

TAKING STOCK 1999

North American Pollutant Releases and Transfers

SOURCEBOOK

COMMISSION FOR ENVIRONMENTAL COOPERATION OF NORTH AMERICA

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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 April 2001 and the NPRI data set of May 2001 were used. The CEC is aware that changes have occurred to both data sets for the reporting year 1999 since this time that are not reflected in this report. These changes will be reflected in the next reports, which will summarize the 2000 data and make year-to-year comparisons with previous years' data.

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Preface

Tracking pollutant data is important not only for what it tells us about the environment around us but also for the questions it can raise. This year's *Taking Stock* takes a five-year look at the amounts of toxic releases and transfers reported by industrial facilities in North America, from 1995 to 1999. Based on data from the national pollutant release and transfer registers (PRTRs), this five-year span provides us with an opportunity to assess key trends and ask ourselves the central question: are we making sufficient progress in reducing the amounts of these substances we are releasing into the environment and transferring into and through our communities each year.

The results are mixed. While we have achieved a slight overall decrease of 3 percent in the total amounts reported by industries in the 1995–1999 time period, when we look at the underlying figures we find some very different patterns. Facilities have made good progress in cutting releases to air (down by 25 percent), but over the same time period the amounts sent to surface waters—lakes, rivers, streams—have actually increased by 26 percent. The picture is also quite different when we look at total releases—amounts put directly into air, water and land—as compared with quantities shipped to other locations for further management (e.g., to sewage or for other treatment). Releases are down 6 percent, but the transfers of chemicals by truck, train or other modes of transport have increased over the five-year period by 12 percent. These five-year trends are for the manufacturing sectors only. As of the 1998 reporting year, we now also have comparable data for additional industry sectors such as electric utilities and hazardous waste management facilities, as well as on transfers for recycling and energy recovery.

These mixed results should prompt all of us—industry, government, NGOs and citizens—to ask ourselves what can be done to get all of the PRTR trends pointing in a downward direction. We have made progress in reducing toxic releases to air. Now, how can we do the same for water and land releases? Why are more substances being shipped off-site for management? Is this indicative of facilities' desire to send their wastes to locations that are better equipped to manage them effectively? Or does it signal that end-of-the-pipe approaches are still too frequently employed instead of preventing pollution at the source? How can the right mix of requirements, incentives and tools be brought to bear to foster a decisive shift to the use of preventive approaches that will safeguard our environment and the health of our populations?

These are vital questions for us to explore and answer in our common pursuit for sustainable development here in North America and worldwide. Indeed, the use of PRTRs to identify opportunities for improvement, to stimulate pollution reductions and to put the power of information into the hands of citizens are gathering momentum around the world. Recent global meetings have called upon countries to develop PRTRs as tools for sound management of chemicals and the public's right-to-know. And there is increasing interest in the use of PRTRs regionally and even globally to track progress on chemicals that are the focus of global concern, such as the persistent organic pollutants (POPs) targeted under the Stockholm Convention. The CEC and the three North American countries are working hard—individually and collectively—to pioneer some of these applications and to share what we are learning with others around the world.

In addition to the five-year trends in pollutant releases and transfers, this year's report provides North Americans with valuable new information as a result of important developments in the national programs for the 1999 reporting year. Due to a recent expansion of NPRI reporting, we now have comparable Canadian and US data for a number of new chemicals, including some of the substances that are known to deplete the ozone layer. We have also included analyses of certain subsets of chemicals, including the ozone depleters, chemicals listed as toxic in the Canadian Environmental Protection Act (CEPA) and chemicals appearing on the California Proposition 65 list of carcinogens and reproductive toxins.

We hope that this report provides you, the reader, with a basis for exploring the issues and questions that are of greatest interest to you. As always, we welcome your suggestions on ways in which *Taking Stock* can keep pace with your interests and needs.

Janine Ferretti
CEC 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 and François Lavallée; Mexico—Juan Barrera Cordero, Hilda Martínez Salgado, Maricruz Rodríguez Gallego, Juan David Reyes Vázquez and Floreida Paz; and the United States—Maria Doa and John Harman.

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A number of CEC Secretariat staff 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. The CEC's publications staff—Jeffrey Stoub, Douglas Kirk, Raymonde Lanthier, Miguel López, Carol Smith and Kevin Crombie—have handled the tremendous task of coordinating the editing, translation and publication of the document in the three languages. Patrick Scantland, CEC webmaster, has contributed greatly to the development of *Taking Stock OnLine*.

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 Abstracts Service
CEC	Commission for Environmental Cooperation of North America
CEPA	Canadian Environmental Protection Act
CFC	chlorofluorocarbon
C.I.	color index
CMAP	<i>Clasificación Mexicana de Actividades y Productos</i> (Mexican Activities and Products Classification)
COA	<i>Cédula de Operación Anual</i> (Annual Certificate of Operation)
DOF	<i>Diario Oficial de la Federación</i> (Mexican Official Gazette of the Federation)
EPA	US Environmental Protection Agency
EPCRA	US Emergency Planning and Community Right-to-Know Act
GWP	global warming potential
HCFC	hydrochlorofluorocarbon
HPV	high production volume
IARC	International Agency for Research on Cancer
IFCS	Intergovernmental Forum on Chemical Safety
INE	<i>Instituto Nacional de Ecología</i> (Mexican National Institute of Ecology)
INEGI	<i>Instituto Nacional de Estadística Geografía e Informática</i> (Mexican National Institute of Statistics, Geography and Informatics)
kg	kilograms
LGEEPA	<i>Ley General del Equilibrio Ecológico y la Protección al Ambiente</i> (General Law of Ecological Equilibrium and Environmental Protection)
MSDS	Material Safety Data Sheet
MSTP	municipal sewage treatment plant
MTBE	methyl tert-butyl ether
NAFTA	North American Free Trade Agreement

NAICS	North American Industry Classification System
NAPRI	North American Pollutant Release Inventory
NCASI	National Council for Air and Stream Improvements
NOM	<i>Norma Oficial Mexicana</i> (Mexican Official Standard)
NMX	<i>Norma Mexicana</i> (Mexican Standard)
NPRI	National Pollutant Release Inventory (PRTR for Canada)
NTP	US National Toxicology Program
ODP	ozone depleting potential
OECD	Organization for Economic Cooperation and Development
OSHA	US Occupational Safety and Health Administration
PBT	persistent bioaccumulative toxicant
POTWs	US publicly owned treatment works
PRTR	pollutant release and transfer register
RETC	<i>Registro de Emisiones y Transferencia de Contaminantes</i> (PRTR for Mexico)
Semarnat	<i>Secretaría de Medio Ambiente y Recursos Naturales</i> (Mexican Secretariat of the Environment and Natural Resources)
SIC	Standard Industrial Classification
TRI	Toxics Release Inventory (PRTR for US)
TCE	trichloroethylene
US	United States
VOC	volatile organic compound

Carcinogens

The International Agency for Research on Cancer <<http://www.iarc.fr>> and the US National Toxicology Program <<http://ntp-server.niehs.nih.gov>> evaluate chemical substances for their cancer-causing potential. Forty-five 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.

Global warming potential

A number that refers to the amount of global warming caused by a substance. It is the ratio of the warming caused by a substance to the warming caused by a similar mass of carbon dioxide.

Incineration

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

Matched data set

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

Nonpoint sources

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

Nonproduction-related waste

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

Off-site releases

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

Off-site transfers

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

On-site

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

On-site releases

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

Otherwise used

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

Ozone depleter

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

Ozone depletion potential

A number that refers to the amount of ozone depletion caused by a substance. It is the ratio of the impact on ozone of a chemical compared to the impact of a similar mass of CFC-11.

Point source

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

Pollution prevention

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

Processing use

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

Production ratio/activity index

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

Production-related waste

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

Recycling

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

SIC codes

The standard industrial classification codes used to describe the types of activities or operations performed by an industrial facility. The actual groups of activities or operations (and, therefore, the codes) differ from country to country. The North 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 equals 1,000 kilograms or 1.1023 short tons or 0.9842 long tons.

Transfers for further management

Chemicals in waste that are sent from the reporting facility to one that treats the chemical (including sewage treatment plants) or burns it 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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Introduction to *Taking Stock 1999*

- **Chapter 1** provides an **introduction** to PRTRs and the CEC. It describes the PRTR programs in the US, Canada and Mexico and provides program contacts and web sites.
- **Chapter 2** offers **guidance** on using the North American PRTR data, explains how the data from the Canadian NPRI and United States TRI are compiled for this report (comparable data for Mexican facilities for 1999 are not available) and provides context for understanding the data and their limitations.
- **Chapter 3** presents data for **on- and off-site releases**. These data cover releases on-site to the air, surface waters, underground injection and land. The analyses also cover off-site releases, i.e., the amounts that facilities transfer to other locations for disposal.
- **Chapter 4** presents data on **transfers for further management**. These data show the amount of the chemicals sent off-site to another location for recycling, energy recovery, and treatment and to municipal sewage treatment plants.
- **Chapter 5** presents data on **total releases and transfers** in 1999. These data show the total amounts of chemicals that were reported for the 1999 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 210 chemicals, including chemicals newly added to NPRI for the 1999 reporting year.
- **Chapter 6** presents changes in releases and transfers for 1998–1999. The data do not include chemicals added to NPRI for the 1999 reporting year, but do include all industry sectors and transfer categories in the matched data set.
- **Chapter 7** presents **trends** in releases and transfers for 1995–1999. The data do not include transfers to recycling since such data were not required to be reported under NPRI until 1998. They also do not include data from the new industrial sectors added to TRI for 1998 or chemicals added to NPRI for 1999.
- **Chapter 8** provides a **more detailed analysis of off-site transfers**, including transfers to recycling and to disposal and treatment. While the data in other chapters are presented from the perspective of the originating facilities, the focus in this chapter is on where the transfers are sent.
- **Appendix A** lists the chemicals required to be reported under the three national PRTRs. **Appendix B** is the list of chemicals in the matched data set. **Appendix C** identifies facilities that appear in tables in this report. **Appendix D** indicates potential health effects of chemicals with large totals for releases, transfers, or both. **Appendix E** indicates uses of chemicals with large totals for releases, transfers, or both. **Appendices F through H** show the reporting forms for 1999 for the US TRI, the Canadian NPRI, and the Mexican COA, which includes the RETC as Section V.

1.1 Introduction

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

This report is the sixth in the annual *Taking Stock* series prepared by the Commission for Environmental Cooperation of North America (CEC). It analyzes the amounts of chemicals released and transferred by facilities. It draws from existing publicly available data from the US Toxics Release Inventory (TRI), the Canadian National Pollutant Release Inventory (NPRI) and, to a limited extent, from the Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC). It contains several new analyses of groups of chemicals, in particular those ozone depleters that have been included in reporting under NPRI for the 1999 reporting year.

Taking Stock 1999 comprises two volumes. The *Summary* volume provides highlights of the 1999 matched data set and trends from 1995–1999. This second volume, the *Sourcebook*, provides the detailed analyses of the same data. Both volumes are available from the CEC in hard copy or on the CEC web site at <www.cec.org>.

Through the 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. They track certain chemicals and, thereby, can 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 identify opportunities for reducing/preventing pollution. Governments can use PRTR data to shift program priorities. New government programs or enforcement measures can be tailored to accomplish specific goals, such as reducing certain chemicals or targeting releases in a particular region. Communities and citizens use PRTR data to gain an understanding of

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 provide input on other relevant aspects of the North American PRTR project.
- Receipt of written comments from members of the Consultative Group and other interested individuals and organizations.
- Preparation and dissemination of a "Response to Comments" based on the written and verbal comments received and explaining how CEC plans to incorporate the comments into the report.

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

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the sources and management of pollutants and as a basis for dialogue with facilities and governments.

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

- reporting on individual substances,
- reporting by individual facilities,
- covering all environmental media (i.e., releases to air, water, land and underground injections, and transfers off-site for further management),
- mandatory, periodic reporting (i.e., annually),
- public disclosure of reported data on a facility- and chemical-specific basis,

- standardized reporting using computerized data management,
- limited data confidentiality and indicating what is being held confidential,
- comprehensive scope, and
- mechanism for public feedback for improvement of the system.

PRTRs collect data on **individual chemicals**, rather than on the volume of wastestreams containing mixtures of substances, because this allows the compilation and tracking of data on releases and transfers of individual chemicals. **Reporting by facility** is key to locating where releases occur and who or what generated them. 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. A clearly defined, **computerized database** allows for a wide range of analyses. 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 computer database. 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 Organisation for Economic Cooperation and Development (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. The Council Recommendation also promotes comparability among national PRTRs and sharing of PRTR data between neighboring countries. A 1999 survey found that eight member countries have PRTRs and eight others are developing them. 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 <www.oecd.org/ehs/prtr/index.htm>.
- 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 encouraged countries without PRTR systems to take steps to initiate a process to design national PRTRs that involves 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, called 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/>.

PRTRs: A Priority Focus for CEC

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

At the Second Annual Regular Session of the CEC in 1995, the Environment Ministers of the three North American countries (the Council) noted in the Communiqué:

This past year, the NAFTA partners began to examine their common need for an inventory of polluting emissions. We have decided 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. This vital tool for improving the quality of the environment will be the result of harmonized methods of reporting on pollutant emissions of mutual concern.

At the Third Annual Regular Session in August 1996 the Ministers noted in the Communiqué:

The Council announced that the intention to produce the first annual North American Pollutant Release Inventory (NAPRI) will be published...as part of an effort to provide the public with information on pollutant sources and risks. This inventory will bring together for the first time existing national public information from the three countries about emissions. In the long run, the NAPRI will help improve the quality of the environment by providing the public with information to assess North American pollutant sources and risks. It also serves as a model for similar efforts in other parts of the world because North America represents the largest land mass ever to be subjected to compatible methods of reporting on pollutant emissions of mutual concern.

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).”

This resolution commits the three governments to work toward adopting more comparable PRTRs, to collaborate on the development of an Internet site to present a matched subset of data from the three North American PRTRs, as well as to cooperate with the CEC in the preparation of the annual CEC North American PRTR report. While recognizing that a higher degree of comparability among the PRTRs is desirable, the resolution specifically notes that each national PRTR program has developed a unique process for the collection and manipulation of environmental data sets.

At the Sixth Annual Regular Session of the CEC in June 1999, the Ministers noted in their Communiqué:

The Council reaffirms 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. The Council supports the continued development and improvement of the North American PRTR system, with a goal of mandatory reporting for all nations.

At the Seventh Annual Regular Session of the CEC in June 2000, the Ministers passed Council Resolution 00-07 on “Pollutant Release and Transfer Registers”:

Through this Resolution, the Council 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. The ministers also noted the opportunities for North America to serve as a global leader in the development and use of PRTRs.

At the Eighth Annual Regular Session of the CEC in June 2001, the Ministers stressed the importance of environmental information in their Communiqué:

Timely and accurate environmental information is essential for rational decision making and the development of sound environmental policies. 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 Council also committed to support Mexico through capacity building, in light of Mexico’s decision to seek legislation to establish a mandatory reporting system for pollutant releases and transfers.

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 1999*, 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 RETC as Section V.

1.2.1 The US TRI

The 1999 reporting year is the thirteenth year for the US TRI, which was created under the Emergency Planning and Community Right-to-know Act (EPCRA) of 1986. The original TRI list contained over 300 chemicals, covered 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 at the facility. The first year for the expanded information reporting was 1991.

There have also been yearly 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 the 1995 reporting year. There are now over 650 chemicals on the TRI list.

Section 313 of EPCRA, the law that created TRI, had identified the manufacturing sector as the original set of industries required to submit TRI reports. Beginning with the 1998 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 PBTs and new reporting thresholds for 1999

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 chemical list. The first reporting year at the lower reporting thresholds is 2000. In addition, a rule on 17 January 2001 lowered the reporting threshold for lead and lead compounds. Reporting for lead and lead compounds 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/pbtrule.htm>.

EPA 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.

Future changes for TRI

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.

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 (which include Canada, Mexico and the US) to investigate these HPV chemicals <www.oecd.org/ehs/hpv.htm>.

1.2.2 Canada's NPRI

The 1999 data are the seventh 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.

Addition of new substances for 1999

Environment Canada added 73 new substances to the 1999 NPRI list. This brings the total number of substances on which companies must report in 1999 to 246, including 20 identified as toxic under the Canadian Environmental Protection Act.

For the 2000 reporting year, four new substances (acrolein, polymeric diphenylmethane diisocyanate and two nonylphenols) were added at the existing 10 tonne threshold. In addition, several categories of PBTs (dioxins/furans, hexachlorobenzene, and polycyclic aromatic hydrocarbons) have been added to the NPRI list at lower reporting thresholds. Hexachlorobenzene and dioxins/furans must be reported by certain sources with no kilogram reporting threshold. Polycyclic aromatic hydrocarbons (PAHs) 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 2002 to 2004 reporting years. These proposed changes include the addition of criteria air contaminants (nitrogen oxides, sulfur oxides, particulate matter, carbon monoxide, and volatile organic compounds) to the NPRI list for 2002 and the addition of greenhouse gases (e.g., carbon dioxide, methane, hydrofluorocarbons). Other changes under consideration are a framework to screen proposed substances for listing at alternate thresholds, the addition of substances under assessment or declared to be toxic under CEPA, and the addition of substances referred for future consideration by the working group on substances. NPRI is also reviewing substances listed in the Ontario "Airborne Contaminants Discharge, Monitoring and Reporting" regulations to ensure greater harmonization between the NPRI program and the Ontario regulations.

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 1999 reporting year.

During 2001, the Mexican RETC experienced some important advances in the establishment of a national PRTR through the collaboration of state authorities and the legal framework.

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*, 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 pollutant 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.

States are establishing PRTRs

Mexico has established the Program of Institutional Environmental Development (*Programa de Desarrollo Institucional Ambiental—PDIA*) to decentralize environmental responsibilities. Until 2001, 15 states were participating in this program, and they will establish their own state RETC. The first state to assume responsibility of the RETC was Aguascalientes. The state PRTRs cover more industry sectors than the federal one, including such sectors as vegetable and animal products, wood and its derivatives, food products, textiles and dress making, printing products, metal products, and graphic arts. Some service facilities are also required to report, including public bath installations, sports centers, hotels, laundry and dry cleaners, bakeries, hospitals and sanatoriums, restaurants and tortillerias and flour mills.

Improvements in reporting for 1999

The voluntary reporting to the RETC has been aided by the publication of a 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 1999 reporting year, 1,525 COA forms were received, of which 353 forms had filled 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) is limited to 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.

A number of measures have been undertaken to improve reporting, including:

- Updating of the COA reporting software, now available at <www.semarnat.gob.mx/dgmic/tramites/requisitos/r03-001.shtml>. This electronic program helps users avoid the most common errors, such as reporting using incorrect units and problems in the conversion of units.

CEC's Air Quality Program

A suggestion by the Consultative Group for *Taking Stock* and a previous CEC study on existing data on non-point sources has led to a new CEC initiative, guided by Council Resolution 01-05. The CEC has begun a project to compile existing information on criteria air pollutants in the three countries. This project is focusing on ways to enhance the comparability of air emission inventories in the three countries. Possible contaminants to include are sulfur dioxide, nitrogen oxides, VOCs, particulate matter (PM_{2.5} and PM₁₀), total suspended particulates and carbon monoxide. The project could assist with atmospheric modeling and track trends, support reciprocity in data exchange among the countries, provide transparency in cross-border trading, and give public access to environmental information.

A summary document describing the current state of emission inventories in Canada, Mexico and the US has been developed, and is available from the CEC. Governmental agencies met in November 2001 to discuss the current state of inventories, and potential areas of cooperation. At this meeting, potential areas of cooperation identified included increased training and information exchange on mobile sources and increased data sharing and exchange using one sector, the power plants. In December 2001, a public meeting was held in conjunction with the annual meeting of the PRTR Consultative Group to obtain stakeholder input on the air emissions inventories project. The CEC is also working with the Western Governors Association to assist with the development of criteria air contaminant inventories in Mexico.

Other activities include working with Mexico to establish a professional association of air quality managers and activities focusing on trade and transportation issues. An initial document proposed a series of voluntary steps to improve air quality in border towns. Some potential projects include the development of a trinational smoke-testing protocol and analyzing diesel exposure and health concerns among congested corridors using common methods. For more information, contact Paul Miller at CEC at (514) 350 4326 or <pmiller@ccemtl.org>.

- Updating of Guidelines for completing the COA, now available in print and electronic versions.
- Improving the internal quality assurance system, especially the collection and the evaluation of the quality and quantity of the reported information.

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The RETC, which is Section 5 of the COA, covers annual releases and transfers of listed pollutants. Currently, reporting on this section is voluntary. The following 117 facilities voluntarily reported data under Sections 5.2 (Listed Pollutant Releases) and/or 5.3 (Listed Pollutant Transfers) for 1999.

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

FACILITY, STATE

ACEITES Y PARAFINAS INDUSTRIALES, S.A. DE C.V., JALISCO
 ADHESIVOS, S.A. DE C.V., TLAXCALA
 ADYDSA DEL CENTRO, S.A. DE C.V., SAN LUIS POTOSI
 AGRICULTURA NACIONAL SA. DE CV., PUEBLA
 ALKEMIN, S. DE R.L. DE C.V., MICHOACAN
 ARNESES Y ACCESORIOS DE MEXICO S. DE R.L. DE C.V. PLANTA ACI,
 COAHUILA
 ARNESES Y ACCESORIOS DE MEXICO, S. DE R.L. DE C.V. PLANTA 3,
 COAHUILA
 ARNESES Y ACCESORIOS DE MEXICO, S. DE R.L. DE C.V. PLANTA 4,
 COAHUILA
 ARTEVA SPECIALITIES S. DE R.L. DE CV., QUERETARO
 AVENTIS CROPSCIENCE S.A. DE C.V., MEXICO
 B D SHANNON DE MEXICO, S.A. DE C.V., TAMAULIPAS
 BENEFICIADORA E INDUSTRIALIZADORA, S.A. DE C.V., MEXICO
 BOMBARDIER CONCARRIL, S.A. DE C.V., HIDALGO
 BUCKAMN LABORATORIES, S.A. DE C.V., MORELOS
 CAMINOS Y PUENTES FEDERALES DE INGRESOS Y SERVICIOS CONEXOS,
 GUANAJUATO
 CELANESE MEXICANA S.A. DE C.V., GUANAJUATO
 CELANESE MEXICANA, S.A. DE C.V. COMPLEJO OCOTLAN, JALISCO
 CELULOSA Y DERIVADOS, S.A. DE C.V. PLANTA CRYSEL, JALISCO
 CEMENTOS APASCO, S.A. DE C.V., GUERRERO
 CEMENTOS APASCO, S.A. DE C.V., MEXICO
 CEMEX MEXICO S.A. DE C.V. (PLANTA ATOTONILCO), HIDALGO
 CFE, CENTRAL TERMoeLECTRICA CICLO COMBINADO TULA, HIDALGO
 CHRISTIANSON, S.A. DE C.V., MORELOS
 CIA HULERA TORNEL, S.A. DE C.V. PLANTA 1, DISTRITO FEDERAL
 CIA. HULERA TORNEL, S.A. DE C.V. PLANTA 2, DISTRITO FEDERAL
 CLOROBENCENOS, S.A. DE C.V., TLAXCALA
 COMPAÑIA MINERA AUTLAN (UNIDAD MOLANGO), S.A. DE C.V., HIDALGO
 DEMATEO Y COMPAÑIA, S.A. DE C.V., MEXICO
 DINA AUTOBUSES, S.A. DE C.V., HIDALGO
 DOW AGROSCIENCES, S.A. DE C.V., TLAXCALA

FACILITY, STATE

DOW QUIMICA MEXICANA, S.A. DE C.V., TLAXCALA
 DUCOA MEXICO, S.A. DE C.V., VERACRUZ
 DUPONT, S.A. DE C.V., MEXICO
 DURAMAX SA. DE CV., MEXICO
 ECOQUIM, S.A. DE C.V., NUEVO LEON
 EJES TRACTIVOS SA. DE CV., MEXICO
 EMPRESAS CALE DE TLAXCALA, S.A. DE C.V., TLAXCALA
 ENERTEC MEXICO, S. DE R.L. DE C.V., TLAXCALA
 ERIKA MICHEL MORALES, JALISCO
 ESSEX DE HERMOSILLO, S.A. DE C.V., SONORA
 EXPLORACIONES EL DORADO, S.A. DE C.V., SONORA
 EXPORTACIONES DE MINERALES DE TOPIA, S.A. DE C.V., DURANGO
 FABRICACION DE MAQUINAS, S.A. DE C.V., NUEVO LEON
 FERSINSA GIST BROCADES, S.A. DE C.V. PLANTA SINTESIS, COAHUILA
 FIBRAS PARA EL ASEO, S.A. DE C.V., TLAXCALA
 FORD MOTOR COMPANY S.A. DE C.V., MEXICO
 FORMULABS DE MEXICO SA. DE CV., DISTRITO FEDERAL
 FUNDITEC SA. DE CV., QUERETARO
 GOLDSCHMIDT QUIMICA DE MEXICO, S.A. DE C.V., SAN LUIS POTOSI
 GRAFICOS MUNDIAL, S.A. DE C.V. PLANTA AGUA BLANCA, JALISCO
 HAI MEXICANA S. DE R.L. DE C.V., TAMAULIPAS
 HULES BANDA S.A. DE C.V., MEXICO
 ICI MEXICANA SA. DE CV., MEXICO
 IDASA INTERNACIONAL DE ACEROS, QUERETARO
 INDUSTRIAS CIDSA BAYER, S.A. DE C.V., VERACRUZ
 INDUSTRIAS OKEN, S.A. DE C.V., MICHOACAN
 INDUSTRIAS PETROQUIMICAS MEXICANAS, S.A. DE C.V., JALISCO
 INSECTICIDAS DEL PACIFICO, S.A. DE C.V., SONORA
 JOHNSON MATTHEY DE MEXICO SA. DE CV., QUERETARO
 KENDALL DE MEXICO S.A. DE C.V., DISTRITO FEDERAL
 KENWORTH MEXICANA S.A. DE C.V., BAJA CALIFORNIA
 KODAK DE MEXICO, S.A. DE C.V., JALISCO
 LABORATORIO AGROENZIMAS, S.A. DE C.V., TLAXCALA
 LABORATORIOS DERMATOLOGICOS DARIER, S.A. DE C.V., MORELOS

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FACILITY, STATE

LABORATORIOS SENOSIAN S.A. DE C.V., GUANAJUATO
 LEAR CORPORATION MEXICO, S.A. DE C.V., SONORA
 LORETO Y PEÑA POBRE, S.A. DE C.V., TLAXCALA
 MEXALIT INDUSTRIAL SA. DE CV., TABASCO
 MINERA SANTA MARIA, S.A. DE C.V., DURANGO
 NITROGENO INDUSTRIAL Y ALIMENTICIO, S.A. DE C.V., TLAXCALA
 NUTRIMENTOS MINERALES DE HIDALGO, S.A. DE C.V., HIDALGO
 NUTRIMENTOS MINERALES, S.A. DE C.V. (PLANTA II), HIDALGO
 OLIVETTI LEXIKON MEXICANA, S.A. DE C.V., TLAXCALA
 ORGANO SINTESIS, S.A DE C.V., MEXICO
 PEMEX REFINACION, DURANGO
 PEMEX REFINACION CENTRO EMBARCADOR PAJARITOS, VERACRUZ
 PEMEX REFINACION TERMINAL DE ALMACENAM Y DISTRIBUCION COLIMA,
 COLIMA
 PIVIDE, S..A. DE C.V., TLAXCALA
 PLASTICOS ESPECIALES GAREN, S.A. DE C.V., TLAXCALA
 POLAQUIMIA DE TLAXCALA, S.A. DE C.V, TLAXCALA
 POLIMEROS DE MEXICO, S.A. DE C.V., TLAXCALA
 POLIUREQUIMICA, S.A. DE C.V., MEXICO
 POLY FORM DE MEXICO, S.A. DE C.V., DISTRITO FEDERAL
 POM, S.A. DE C.V., JALISCO
 PPG INDUSTRIES DE MEXICO SA. DE CV., QUERETARO
 PRAXAIR MEXICO SA. DE CV., MEXICO
 PROCESOS AMBIENTALES ALFA SA. DE CV., QUERETARO
 PROCTER & GAMBLE DE MEXICO S.A. DE C.V., GUANAJUATO
 PRODUCTOS FARMACEUTICOS, DISTRITO FEDERAL
 PRODUCTOS QUIMICOS Y PINTURAS, S.A. DE C.V., MEXICO
 PRODUCTOS R.G.L., DISTRITO FEDERAL

FACILITY, STATE

QUEST INTERNATIONAL DE MEXICO SA. DE CV., QUERETARO
 QUIMIC, S.A. DE C.V., MICHOACAN
 QUIMICA LUCAVA, S.A. DE C.V., MEXICO
 QUIMICAL, S.A. DE C.V., BAJA CALIFORNIA
 QUIMIKAO, S.A. DE C.V., JALISCO
 RAGASA INDUSTRIAS, S.A. DE C.V., JALISCO
 RAMIRO CARDENAS CAMPOS, JALISCO
 REBECA OCAMPO GONZALEZ, MEXICO
 RESIRENE, S.A. DE C.V., TLAXCALA
 ROHM AND HAAS MEXICO, S.A. DE C.V., TLAXCALA
 RUST INTERNATIONAL SA. DE CV., QUERETARO
 SMITHKLINE & FRENCH, S.A. DE C.V. PTA. 2, DISTRITO FEDERAL
 SMITHKLINE BEECHAM MEXICO, S.A. DE C.V. PLANTA I, DISTRITO FEDERAL
 SUELAS PUSA, S.A. DE C.V., JALISCO
 SUPER DIESEL, S.A. DE C.V., JALISCO
 TAURUS MEXICANA, S.A. DE C.V., TLAXCALA
 TECSIQUIM, S.A. DE C.V., DISTRITO FEDERAL
 TEKCHEM S.A. DE C.V., GUANAJUATO
 TERMINAL DE ALMAC. Y DISTRIBUCION SATELITE ORIENTE (AÑIL),
 DISTRITO FEDERAL
 TETRA PAK QUERETARO SA. DE CV., QUERETARO
 TRATAMIENTO DE DESECHOS MEDICOS, S.A. DE C.V., MEXICO
 UGIMAG, S.A. DE C.V., TAMAULIPAS
 UQUIFA MEXICO, S.A. DE C.V., MORELOS
 USEM DE MEXICO, S.A. DE C.V., NUEVO LEON
 VALEO MATERIALES DE FRICCION DE MEXICO SA. DE CV., QUERETARO
 VDO CONTROL SYSTEMS DE MEXICO, S.A. DE C.V., CHIHUAHUA

Note: Names of facilities appear as provided by Semarnat in April 2002 from the 1999 RETC database. We apologize if any facilities have been omitted or if there are other errors in the list.

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>

Cédula de Operación Anual: <<http://www.semarnat.gob.mx/dgmic/tramites/requisitos/r03-001.shtml>>

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 online 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 homepage: <www.scorecard.org/>

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Key Findings

- *Taking Stock* compiles comparable data from the 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 the two systems. Data from Mexico’s RETC are not available for the 1995–1999 reporting years.
- Two-thirds of the chemical reports under NPRI and over 80 percent under TRI are included in the *Taking Stock* matched data set for 1999. These comparable reports represent approximately 21 percent of NPRI total reported amounts and 59 percent of TRI amounts.
- The North American matched data set has grown for the 1999 reporting year, with the addition of a number of new chemicals added to NPRI. However, one of these new NPRI chemicals, hydrogen sulfide, is not on the current TRI list and thus is not included in the matched data set, but represents almost 70 percent of the chemical amounts reported to NPRI for 1999. The matched data set represents 66 percent of the total reported amounts in NPRI, excluding hydrogen sulfide.
- Data for previous years (1995 to 1998) are also included in this *Taking Stock* report. There are three different matched data sets in this report: (1) the 1999 matched set of chemicals and industries, (2) the 1998 matched data set which is used to look at changes from 1998 to 1999, and (3) the 1995 matched data set which is used for analyses of five-year trends from 1995–1999. The 1998 matched data set excludes chemicals added to NPRI for 1999. The 1995 matched data set excludes industry sectors added to TRI for 1998, NPRI chemicals added for 1999 and transfers to recycling and energy recovery. These exclusions are made to make it possible to compare across years during which the 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), or from agricultural operations, transportation or 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 is 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 1999* summarizes PRTR data from reports that industrial facilities filed for the 1999 reporting year, 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, and their limitations)
- Putting PRTR data in context (what other information can help broaden the perspective of PRTR data and where to find it)
- Creating the *Taking Stock* matched data sets (there are three matched data sets: the **1999 data set**, the most comprehensive of the three, which includes the new NPRI chemicals, the newly added industrial sectors and transfers to recycling and energy recovery; the **1998 data set**, which includes the new industries and new transfer types; and the **1995 data set**, which is used to track trends from 1995–1999 and which only covers 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 the programs 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 must also 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: GM, 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.

Canada, Mexico and the United States 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.ntis.gov/yellowbk/1nty205.htm>. For information on NAICS in Spanish, see the INEGI web site <www.inegi.gob.mx/>.

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 chemical, 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 almost 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 reporting on only 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 2002 reporting year. There are 104 chemicals in the list for the RETC, the voluntary Section V of the Mexican COA, which is the section that corresponds to the TRI and NPRI PRTR reporting. As explained below in **Section 2.5**, NPRI and TRI listed 210 substances in common in 1999. For a detailed comparison of the chemical lists in the three countries, see **Appendix A**.

2.2.4 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, Canada, as does the United States, requires that the total weight of the byproduct, regardless of concentration, be included in the calculation of the reporting threshold, eliminating one difference between the two systems. For this reason, the base year used in this report for analysis of changes over time is 1995.

The other major 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 one used by NPRI and TRI. RETC thresholds are based on on-site releases, whereas that 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 amount of on-site releases only. Amounts that are transferred off-site are not included when calculating whether the reporting threshold has been met. Some alternative thresholds for a few substances in NPRI are based on the amount of releases and transfers. 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.

The United States also has set an alternative threshold calculation 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-site 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 Reporting Forms

Facilities submit one form per 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.

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 2–1**, below, for a list of US SIC codes included in the matched data sets.)

2.2.6 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 the 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.

Table 2-1. Comparison of Reporting in North American PRTRs for the 1999 Reporting Year

Major Data Elements	US Toxics Release Inventory (TRI)	Canadian National Pollutant Release Inventory (NPRI)	Mexican <i>Registro de Emisiones y Transferencia de Contaminantes</i> (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 (606 substances and 28 chemical categories).	Chemicals used or manufactured in sufficient quantities (245 substances includes 16 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.
Activity/use of chemicals	Manufacture/process more than 25,000 pounds (11,338 kg) or use more than 10,000 pounds (4,535 kg).	Manufacture, process or use 10 tonnes (10,000 kg) or more.	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 byproducts 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 (454 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 (454 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 <i>Registro de Emisiones y Transferencia de Contaminantes</i> (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 mandatory.
Management of Chemicals			
Use of chemicals	Not mandatory.	Not mandatory.	Amount of chemical used by facility. Not mandatory.
Hazardous waste received	Not mandatory.	Not mandatory.	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 mandatory.
Other Data Elements			
Type of on-site waste treatment	Type for each method used by type of wastestream (separate amounts not reported).	Not mandatory.	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.

2.2.7 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 3 TRI forms out of 84,068 submitted for 1999 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, 6 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.

2.2.8 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 (these may be available for previous years, however, they can be found most readily for the current *reporting* year).

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

Releases On- and Off-site

Releases represent 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 “non-point” 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 generally treated

first, to remove or minimize its pollutant content.) Rainwater may also wash pollutants from on-site waste storage areas into surface waters. These releases from run-off are also reportable.

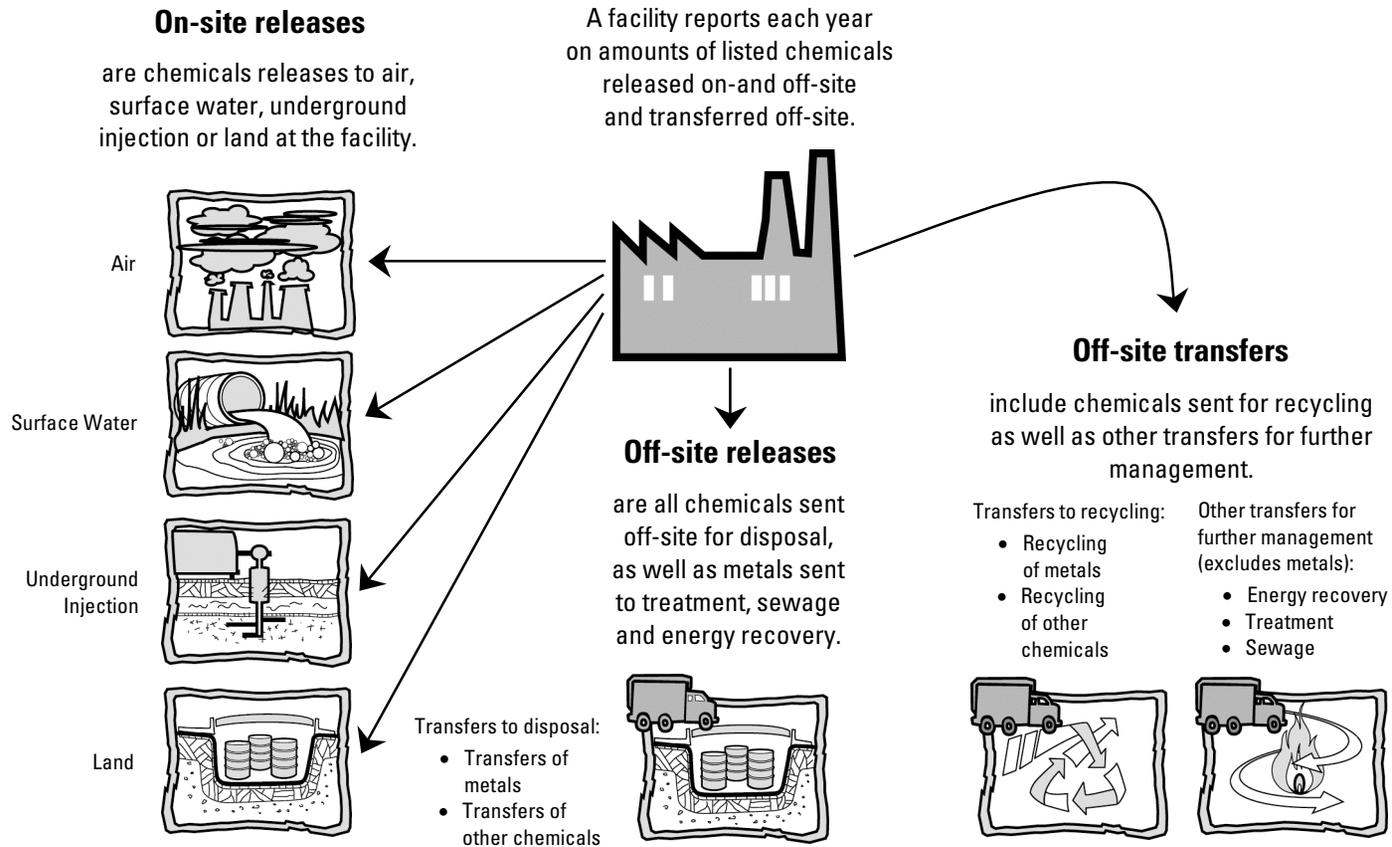
- **Underground injection**—Facilities may inject listed chemicals in waste into deep underground wells, a practice more common in certain parts of the United States than in Canada. Underground injection is regulated, and deep wells that receive toxic waste are intended to isolate the pollutants from groundwater sources. Underground injection is not practiced in Mexico.
- **On-site land releases**—Releases to land at the facility include burying chemical waste in landfills, incorporating it into soil (“land treatment”), holding it in surface impoundments, accumulating it in waste piles, or disposing of it by other methods.
Facilities also report transfers off-site that represent releases to the environment at the off-site location. These include:
 - **Disposal**—Waste sent off-site 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 to 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.

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



- **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 the index reflects changes due to all factors, including, for example, changes in production levels or changes in pollution control equipment.

2.3.3 Finding Information on “What is 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,
- do not address all sources from which chemicals of concern move into the environment,
- do not identify all on-site releases and off-site transfers from a facility,
- do not measure releases and transfers—they estimate them,
- do not 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,
- do not provide information on the toxicity or potential health effects of substances released or transferred by reporting facilities,
- do not indicate risks from substances released or transferred by reporting facilities,
- do not 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 desired products, to give a product improved performance, a longer life or a better appearance, to clean a surface, to meet a certain demand in the commercial or industrial marketplace. Others result as spills or leaks or manufacturing by products or 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 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. Populations both near and far may potentially be affected. Reportable substances may also be shipped across town or out of the country for recycling or energy recovery or for treatment or disposal.

There are many different methods of disposal and treatment. Chemicals can be physically, chemically, and biologically treated, incinerated, landfilled, stored, sent to a sewage treatment plant, injected underground, and incorporated into the land. The type of method chosen will depend on many factors including the chemical and physical nature of the substance, the availability of facilities, and cost. The 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 TRI), 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 a list of the substances covered by the Montreal Protocol <www.unep.org/ozone/montreal.shtml> to begin investigating releases of those substances reported to NPRI and TRI. (See **Chapter 3** for 1999 data for these substances in the matched data set and the companion Summary volume for information on progress under the Montreal Protocol meeting the ban on production of these substances.)

Another question might be, what are the releases of substances listed as toxic under the Canadian Environmental Protection Act (CEPA) or on the California Proposition 65 list of chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. Subsets of these groups of chemicals are in the matched data set, where to find the lists is discussed later in this chapter, and what their releases for 1999 were is discussed in **Chapter 3** of this report.

A similar step is required to analyze NPRI or TRI data for carcinogens, endocrine disruptors, persistent bioaccumulating toxic pollutants, or other chemical groups. 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 **Chapters 3, 6** and **7** of this report.)

- Endocrine disruptors—OECD (discusses research but does not list substances) <www.oecd.org/ehs/endocrin.htm>.
- PBTs—US EPA’s proposed TRI regulations and related developments <www.epa.gov/tri/>.

2.4.2 Chemical Uses and Industry Processes

Releases and transfers arise from particular industrial processes or activities. To assess 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. Factsheets 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 (ECDIN) <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—those in 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 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 on-line 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 has a particular place of originate. 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/index_java.html> 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. Further prior to 1998, TRI did not cover non-manufacturing sources, except for federal facilities. Another seven industries related to manufacturing began reporting to TRI for the 1998 reporting year. 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 report, 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 non-point sources of pollutants. Including data on emissions of PRTR pollutants from non-point 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 non-point 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 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 non-point 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 1999* 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 the US and Canadian PRTR data are not yet available under the voluntary Mexican PRTR program.

These PRTR reports were submitted by facilities during the summer of 2000. The US EPA released the TRI data to the public in April 2000. The NPRI data used in this report were provided by Environment Canada in May 2000. At the same time, updated versions of previous years PRTR data were also made available. *Taking Stock 1999* uses the updated versions of the databases for analyses that include 1995 through 1998.

Not all data submitted to the individual countries' PRTR systems can be used, however, only those data 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.

List of Industry Sectors Covered in the Matched Data Set of *Taking Stock 1999*

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.

2.5.1 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 1999* 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 “newly added industries.”

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

Reporting of Ammonia

As in previous years, the substance ammonia is not included in the analyses for 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 forms.

After discussions with governmental representatives, ammonia has not been included in the matched chemical set and, hence, in 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% of 10 tonnes to water). The facility would *not* report since its releases are below the reporting 11-tonne (25,000 pound) 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% 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**, the amount of ammonia reported in 1999 was about two percent of total releases and transfers in both NPRI and TRI. Had the TRI facilities reported 100 percent of their aqueous ammonia, as they would have 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 was actually reported (387 million kg rather than 99.6 million kg). Therefore, because of the differences in reporting, ammonia is not included in the matched list of chemicals in *Taking Stock*.

the single category, lead and its compounds. All the analyses in *Taking Stock 1999* 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 1999 includes data on 210 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. The addition of these new chemicals results in an approximately 25 percent increase in the number of chemicals analyzed in this *Taking Stock 1999*. The matched chemical set used for analyzing the years 1995 through 1998 contains 165 substances, corresponding to chemicals on the NPRI and TRI lists before the NPRI additions for 1999. (See **Appendix B** for the list of 210 chemicals and the subset of 165 chemicals.)

Ozone Depleters

Among the chemicals added to the NPRI list for 1999 are ozone depleters. These chemicals are the focus of special analyses in **Chapter 3**. Fifteen of the substances in the 1999 matched data set are ozone depleters. Further description of the Montreal Protocol governing the production of these chemicals and progress in reducing their releases can be found in the *Taking Stock Summary* report, the companion volume to this *Sourcebook*.

The ozone layer is a protective layer of ozone molecules high above the earth, which shields us from the sun's harmful ultraviolet rays. Any thinning of the ozone layer permits more ultraviolet rays to reach the earth, which can lead to higher incidence of skin cancer, cataracts and weakened immune systems. Increases in ultraviolet radiation can also reduce crop yields and damage food webs in the oceans.

Some chemicals can damage the ozone layer by reacting with the ozone molecules. Chlorofluorocarbons (CFCs) were invented in 1928 and were rapidly employed in aerosols, foams, refrigerators, air conditioners, solvents and fire extinguishers. They are a large group of chemicals, many of which have now been replaced by hydrochlorofluorocarbons (HCFCs) that are generally less harmful to the ozone layer.

In the 1980s, amid growing concern over the thinning of the ozone layer, countries developed the Montreal Protocol, an international agreement regulating the production and consumption of ozone-depleting chemicals. Production of some of the most damaging ozone-depleting substances was eliminated, except for a few uses, by 1996 in developed countries and by 2010 in developing countries. Approximately 175 countries have supported the Montreal Protocol, including Canada, US and Mexico. Canada and the United States are bound to the 1996 phase-out date and Mexico operates under the provisions for developing countries, which have later phase-out dates. The original Montreal Protocol adopted in 1988 has been modified five times so far to increase control measures. To view the text of the Montreal Protocol and the amendments in different languages go to <www.unep.org/ozone/treaties.shtml>.

The Montreal Protocol sets different control requirements depending on the chemical. Generally, countries supporting the Protocol agree to:

- 1) Stop consumption or production of chemicals in Group 1 of Annex A after 1 January 1996 for developed countries and 1 January 2010 for developing countries (CFC-11, CFC-12, CFC-113, CFC-114 and CFC-115).
- 2) Stop consumption or production of chemicals on Group 2 of Annex A after 1 January 1994 for developed countries (Halon-1211, Halon-1301 and Halon-2402).
- 3) Stop consumption or production of chemicals on Groups 1, 2, and 3 of Annex B after 1 January 1996 (CFC-13, CFC-111, CFC-112, CFC-211, CFC-212, CFC-213, CFC-214, CFCF-215, CFC-216, CFC-217, carbon tetrachloride and 1,1,1-trichloroethane).
- 4) Reduce consumption or production of hydrochlorofluorocarbons listed in Group 1 of Annex C to 1989 levels.
- 5) Reduce consumption or production of methyl bromide to 75 percent of 1991 levels, beginning in 1999.

It is estimated that one chlorine atom can break apart more than 100,000 ozone molecules and one bromine atom can be even more destructive, breaking apart more than 4,000,000 ozone molecules. Scientists have developed a measure of the differing ability of chemicals to destroy ozone molecules. The measure, called the Ozone Depletion Potential (ODP), is the ratio of the impact on ozone (the calculated ozone depletion) of a chemical compared to the impact of a similar mass of the reference gas, CFC-11, which has a set ODP of 1.0. Some chemicals will be more destructive of the ozone layer than CFC-11, and so have an ODP greater than 1.0. Other chemicals will be less destructive of the ozone layer and have a lower ODP, or an ODP less than 1.0. This system allows different chemicals to be compared using CFC-11 equivalents as a common unit.

Many CFCs are also greenhouse gases, and so contribute to climate change. A measure of their effectiveness in doing so is called the Global Warming Potential (GWP), which represents how much a given mass of a chemical contributes to global warming over a given time period compared to the same mass of carbon dioxide. The GWP of carbon dioxide is defined as 1.0. These GWP values are being updated as further research into global warming develops. The GWP values used here are calculated over a 100-year time horizon and are taken from the *Scientific Assessment of Ozone Depletion: 1998*, a report issued by the Global Ozone Research and Monitoring Project of the World Meteorological Organization and UNEP.

For more information on ozone depletion go to <www.unep.org/unep/secretar/ozone/>. For information on activities to reduce ozone depleters in Mexico, go to <www.semarnat.gob.mx/estadisticas_ambientales/estadisticas_am_98/atmosfera/atmosfera06.shtml>, for such activities in Canada, go to <www.ec.gc.ca/ozone/>, and in the US, go to <www.epa.gov/ozone/>. The US site also has information on Ozone Depletion Potentials and Global Warming Potentials of substitutes for ozone-depleting substances.

CEPA Toxics

Another group of chemicals that are the focus of special analyses in **Chapter 3** are those classified as toxic under the Canadian Environmental Protection Act (CEPA) of 1999. Thirty-one of the substances in the 1999 matched data set are CEPA toxics.

In Canada, chemicals are assessed to identify which chemicals 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,
- 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 the chemical. 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/CEPARRegistry/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

Chemicals in a third group selected for special analysis in **Chapter 3** 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 2001 contained almost 700 substances, of which 77 are in the 1999 matched data set. The full list can be found on the Internet at <www.oehha.ca.gov/risk/ChemicalDB/index.asp>.

2.5.3 Matching Chemicals and Industries

In 1999, 2,201 Canadian facilities in all industries reported 1.49 billion kg of releases and transfers to NPRI, and the 22,639 United States facilities reported 5.2 billion kg of releases and transfers (**Table 2–2**). However, not all of these reports match the reporting in the other country (**Table 2–3**).

Table 2–2. All Releases and Transfers Reported to NPRI and TRI, 1999

	NPRI Number	TRI Number
Total Facilities	2,201	22,639
Total Forms	8,634	84,068
Releases On- and Off-site	kg	kg
On-site Releases	324,197,470 *	3,307,307,989
Air	122,640,761	920,346,677
Surface Water	20,783,735	117,406,701
Underground Injection	136,643,057	116,845,870
Land	43,930,261	2,152,708,741
Off-site Releases	54,755,970	264,806,507
Transfers to Disposal (except metals)	19,654,470	37,917,263
Transfers of Metals**	35,101,500 ***	226,889,244
Total Releases	378,953,440	3,572,114,496
Off-site Transfers for Further Management		
Off-site Transfers to Recycling	1,066,198,096	957,651,217
Transfers to Recycling of Metals	101,607,352	145,399,890
Transfers to Recycling (except metals)	964,590,744	812,251,327
Other Off-site Transfers for Further Management	45,714,596	629,816,144
Energy Recovery (except metals)	14,697,952	352,542,859
Treatment (except metals)	20,992,433	131,712,932
Sewage (except metals)	10,024,211	145,560,352
Total Reported Amounts of Releases and Transfers	1,490,866,132	5,159,581,857

Note: Canada and US data only. Mexico data not available for 1999.

* 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.

*** One NPRI facility incorrectly reported transfers to disposal of metals of 46,000 tonnes. The forms for this facility have been omitted in all tables in this report.

In 1999, Canadian facilities in the matched industry sectors reported 106.3 million kg (7 percent) of releases and transfers for substances reportable to NPRI but not covered in TRI—or reportable in both systems but defined differently (see **Figure 2–2**). 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 31.6 million kg (2 percent) 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 1,044.7 million kg (70 percent) of total releases and transfers were also excluded.

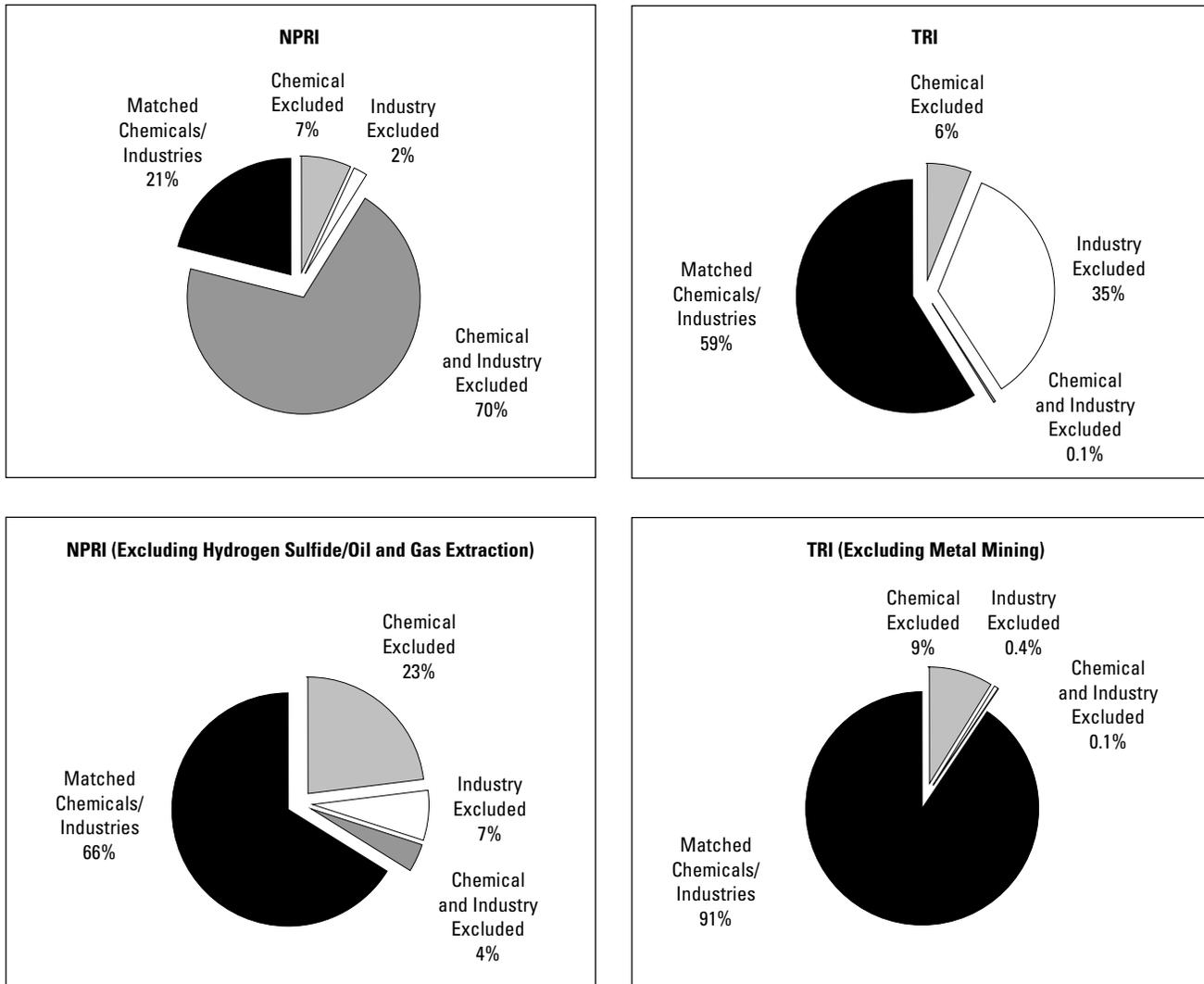
In TRI, matching for common chemicals eliminated 292.9 million kg (6 percent) of releases and transfers. Matching for industries excluded a much larger amount—1.8 billion kg (35 percent). The metal mining industry’s reporting accounted for the vast majority of this amount. A total of 4.4 million kg was excluded because both the chemical and the industry were not comparable to NPRI.

The 1999 matched data set includes two-thirds of the chemical reports under NPRI and over 80 percent under TRI are included in the *Taking Stock* matched data set for 1999. These comparable reports represent approximately 21 percent of NPRI total reported amounts and 59 percent of TRI amounts.

Table 2–3. Creating the Matched Data Set for *Taking Stock 1999*: Effects of Matching NPRI and TRI for Chemicals and Industries, 1999

	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	8,634	100	1,490,866,132	100	84,068	100	5,159,581,857	100
Excluded due to chemical only	1,510	17	106,307,259	7	10,900	13	292,885,758	6
Chemicals with Differences in Reporting Definition								
Hydrochloric and sulfuric acid: non-air releases	431	5	44,737,029	3	406	0.5	7,690,890	0.15
Isopropyl alcohol	208	2	5,152,801	0.3	80	0.1	1,282,504	0.02
Ammonia	264	3	29,917,032	2	2,798	3	99,609,577	2
Chemicals on One List but not on the Other List	607	7	26,500,397	2	7,616	9	184,302,787	4
Excluded due to industry only	1,123	13	31,641,074	2	4,594	5	1,814,812,999	35
Metal Mining	223	3	7,707,792	0.5	636	0.8	1,801,097,790	35
Other Industries	900	10	23,933,282	1.6	3,958	4.7	13,715,209	0.3
Excluded due to both chemical and industry	260	3	1,044,657,381	70	207	0.2	4,445,568	0.1
Hydrogen Sulfide/Oil and Gas Extraction	76	1	1,026,330,288	69	0	0.0	0	0.0
Other Chemicals/Industries	184	2	18,327,093	1	207	0.2	4,445,568	0.1
Total for matched chemicals/industries	5,741	66	308,260,418	21	68,367	81	3,047,437,532	59

Figure 2–2. Percentage of Total Releases and Transfers Included/Excluded when Matching NPRI and TRI for Chemicals and Industries, 1999



The greatest portion of releases and transfers excluded from the 1999 matched data set were due to different types of reporting in NPRI and TRI.

- For NPRI, the exclusions were primarily due to reports from three natural gas extraction facilities belonging to one parent company that reported a total of 905.0 million kg of hydrogen sulfide. TRI includes neither the industry sector nor the chemical. These three reports accounted for 60 percent of the entire NPRI database for 1999.
- 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 3 percent and calcium fluoride, which is not on the TRI list, accounted for 1 percent of all NPRI 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 industries reporting to TRI accounted for 2 percent of the NPRI 1999 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 35 percent of all releases and transfers to TRI in 1999 (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.

In addition, reporting by one Philip Enterprises Inc. facility, Philip Mill Services at Firestone in Hamilton, Ontario, indicated that they had incorrectly reported 46,000 tonnes of transfers of metals to disposal. The facility said that they had reported the volume of the material transferred rather than the amount of the chemicals in the materials. The reports from this facility were omitted from all analyses, as indicated in **Table 2–2**.

2.5.4 Three Matched Data Sets: 1999, 1998 and 1995

Because of the changes in NPRI and TRI over the years, including the addition of new chemicals to the NPRI list for 1999 and the new industry sectors in TRI and of transfers to recycling and energy recovery made mandatory in NPRI for 1998, this year's *Taking Stock* has three “matched” data sets. These three data sets are:

- the *1999 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 and 8**),
- the *1998 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 (**Chapters 6 and 8**). It is used for looking at changes from 1998 to 1999.

Table 2–4. Features of the Three Data Sets in *Taking Stock 1999*

Feature	1999 Matched Chemicals and Industries	1998 Matched Chemicals and Industries	1995 Matched Chemicals and Industries
Years	1999 only	1998–1999	1995–1999
Number of chemicals	210 chemicals	165 chemicals	165 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	1999 analysis	Comparing changes from prior year to current year, from 1998 to 1999	Comparing trends over longer time period, from 1995 to 1999
Found in	Chapters 3, 4, 5 and 8	Chapters 6 and 8	Chapter 7

Table 2–5. Summary of Total Reported Amounts of Releases and Transfers in North America, NPRI and TRI, 1999

	North America Number	NPRI* Number	TRI Number
Total Facilities	21,521	1,634	19,887
Total Forms	74,108	5,741	68,367
Releases On- and Off-site	kg	kg	kg
On-site Releases	1,419,119,790	124,751,036	1,294,368,754
Air	901,416,201	87,800,661	813,615,540
Surface Water	118,215,282	5,855,383	112,359,899
Underground Injection	90,116,656	3,323,257	86,793,399
Land	309,239,442	27,639,526	281,599,916
Off-site Releases	274,801,492	43,710,386	231,091,106
Transfers to Disposal (except metals)	40,358,804	9,469,161	30,889,643
Transfers of Metals**	234,442,688	34,241,225	200,201,463
Total Reported Releases On- and Off-site	1,693,921,282	168,461,422	1,525,459,860
Off-site Transfers for Further Management			
Off-site Transfers to Recycling	1,050,519,901	108,714,208	941,805,693
Transfers to Recycling of Metals	901,927,543	93,959,478	807,968,065
Transfers to Recycling (except metals)	148,592,358	14,754,730	133,837,628
Other Off-site Transfers for Further Management	611,256,767	31,084,788	580,171,979
Energy Recovery (except metals)	346,747,383	14,142,532	332,604,851
Treatment (except metals)	129,939,779	11,507,926	118,431,853
Sewage (except metals)	134,569,605	5,434,330	129,135,275
Total Reported Amounts of Releases and Transfers	3,355,697,950	308,260,418	3,047,437,532

Note: Canada and US data only, Mexico data not available for 1999. Data include 210 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.

- the 1995 matched chemicals and industries data set includes only manufacturing industries, only transfers to disposal, treatment and sewage, and only chemicals reportable 1995 through 1999. It does not include TRI industries added for 1998 reporting, transfers to recycling or energy recovery, or NPRI chemicals added for 1999 reporting (Chapter 7). It is used for five-year trend analyses (1995–1999).

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 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 1999*, 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 1999 and 1998 Matched Data Sets

The resulting matched data set for 1999 is shown in Table 2–5. These data are discussed in Chapters 3, 4, 5 and 8 of this report.

Chapter 3 presents releases on- and off-site. **Chapter 4** presents transfers off-site for recycling and other transfers off-site for further management. **Chapter 5** 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 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 1999 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 1999 data are compared to 1998 data. All other chemicals and industries and types of reporting are included.

These data are shown in **Table 2–6** and discussed in **Chapter 6** of this report. **Chapter 6** presents changes in releases and transfers from 1998 to 1999.

2.5.6 Adjustment of Total Releases in North America for Off-site Releases also Reported as On-site Releases in the 1999 and 1998 Matched Data Sets

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, underground injection wells, or, if they are metals sent to wastewater treatment

Table 2–6. Summary of Releases and Transfers in North America, NPRI and TRI, 1998–1999

	North America		NPRI*		TRI	
	1998 Number	1999** Number	1998 Number	1999** Number	1998 Number	1999** Number
Total Facilities	21,554	21,056	1,510	1,611	20,044	19,445
Total Forms	71,242	70,154	5,096	5,509	66,146	64,645
Releases On- and Off-site	kg	kg	kg	kg	kg	kg
On-site Releases	1,376,291,532	1,364,555,275	103,762,149	120,874,440	1,272,529,383	1,243,680,835
Air	868,023,670	857,822,047	79,932,355	84,006,392	788,091,315	773,815,655
Surface Water	110,564,012	117,263,593	4,987,116	5,831,408	105,576,896	111,432,185
Underground Injection	85,688,150	80,395,386	3,700,429	3,272,500	81,987,721	77,122,886
Land	311,891,192	308,949,221	15,017,741	27,639,112	296,873,451	281,310,109
Off-site Releases	274,169,926	273,697,790	51,573,572	43,686,389	222,596,354	230,011,401
Transfers to Disposal (except metals)	29,944,096	39,255,102	9,421,264	9,445,164	20,522,832	29,809,938
Transfers of Metals***	244,174,478	234,442,688	42,100,956	34,241,225	202,073,522	200,201,463
Total Reported Releases On- and Off-site	1,650,461,458	1,638,253,065	155,335,721	164,560,829	1,495,125,737	1,473,692,236
Off-site Transfers for Further Management						
Off-site Transfers to Recycling	1,028,269,596	1,040,540,267	133,153,379	108,707,063	895,116,217	931,833,204
Transfers to Recycling of Metals	887,408,505	901,927,543	118,331,581	93,959,478	769,076,924	807,968,065
Transfers to Recycling (except metals)	140,861,091	138,612,724	14,821,798	14,747,585	126,039,293	123,865,139
Other Off-site Transfers for Further Management	646,163,089	579,543,929	28,109,509	30,043,913	618,053,580	549,500,016
Energy Recovery (except metals)	386,582,922	326,582,281	12,023,812	14,069,929	374,559,110	312,512,352
Treatment (except metals)	127,013,503	121,411,352	10,722,895	10,590,039	116,290,608	110,821,313
Sewage (except metals)	132,566,664	131,550,296	5,362,802	5,383,945	127,203,862	126,166,351
Total Reported Amounts of Releases and Transfers	3,324,894,143	3,258,337,261	316,598,609	303,311,805	3,008,295,534	2,955,025,456

Note: Canada and US data only, Mexico data not available for 1999. Data include 165 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.

** New NPRI chemicals not included for 1999.

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

Table 2–7. Effect of Adjustment in Off-site Releases on North American Total Releases, NPRI and TRI, 1999

	North America		Canadian NPRI		US TRI	
	kg	%	kg	%	kg	%
Total On-site Releases	1,419,119,790	87	124,751,036	79	1,294,368,754	88
Total Reported Off-site Releases	274,801,492		43,710,386		231,091,106	
Adjustment Component (Off-site transfers to disposal reported as on-site releases by other NPRI or TRI facilities)	(64,633,897)	(24% of total reported off-site releases)	(11,502,192)	(26% of total reported off-site releases)	(53,131,705)	(23% of total reported off-site releases)
Adjusted Off-site Releases*	210,167,595	13	32,208,194	21	177,959,401	12
Total Adjusted Releases*	1,629,287,385	100	156,959,230	100	1,472,328,155	100

Note: Canada and US data only, Mexico data not available for 1999.

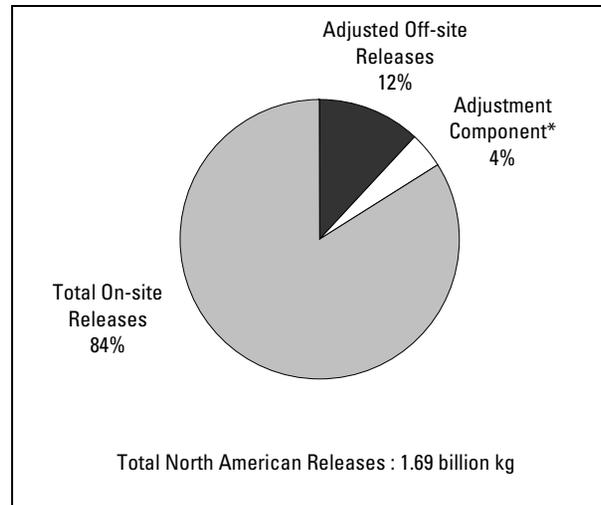
* Adjusted to exclude off-site releases reported as on-site releases by other NPRI or TRI facilities.

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 1999 data were analyzed to determine how much off-site releases were also reported as on-site releases at another facility (see **Table 2–7** and **Figure 2–3**). In all, 11.5 million kg of off-site releases in NPRI (of the total reported off-site releases of 43.7 million kg) and 53.1 million kg of off-site releases in TRI (of the total reported off-site releases of 231.1 million kg) were found to match up with on-site releases also reported for 1999 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.

Figure 2–3. Effect of Adjustment in Off-site Releases on North American Total Releases, 1999



Note: Canada and US data only, Mexico data not available for 1999.

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

Adjusted releases on- and off-site are the focus of **Chapter 3** in this report. In addition, **Chapter 6** compares releases for 1999 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 Matched Data Set

The 1995 matched data set includes 165 chemicals and the original manufacturing sectors. It does not include: the new chemicals added in 1999, as data on these chemicals is only available for 1999, the new sectors added to TRI in 1998, as data on these sectors is only available for 1998 and 1999 or transfers to recycling and energy recovery.

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 1999.

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 recalculate earlier years' data using a different estimation method. Some facilities that adopt new methods of estimating reportable amounts find that

Table 2–8. Summary of Releases and Transfers in North America, NPRI and TRI, 1995–1999

	North America		NPRI*		TRI	
	1995 Number	1999 Number	1995 Number	1999 Number	1995 Number	1999 Number
Total Facilities	20,737	19,762	1,250	1,532	19,487	18,230
Total Forms	63,538	61,444	4,015	5,070	59,523	56,374
Releases On- and Off-site	kg	kg	kg	kg	kg	kg
On-site Releases*	934,143,051	814,300,138	95,812,650	102,242,178	838,330,401	712,057,960
Air	615,163,299	462,635,523	72,163,535	68,787,840	542,999,764	393,847,683
Surface Water	91,681,306	115,701,094	10,215,041	5,801,557	81,466,265	109,899,537
Underground Injection	94,701,022	70,790,592	3,556,927	3,272,500	91,144,095	67,518,092
Land	132,461,061	165,053,664	9,740,784	24,261,016	122,720,277	140,792,648
Off-site Releases	167,586,413	225,744,400	25,712,452	26,570,965	141,873,961	199,173,435
Transfers to Disposal (except metals)	21,464,301	28,525,165	3,768,263	2,285,393	17,696,038	26,239,772
Transfers of Metals**	146,122,112	197,219,235	21,944,189	24,285,572	124,177,923	172,933,663
Total Releases On- and Off-site	1,101,729,464	1,040,044,538	121,525,102	128,813,143	980,204,362	911,231,395
Transfers to Treatment(except metals)	87,549,593	99,813,595	5,988,535	7,964,864	81,561,058	91,848,731
Transfers to Sewage (except metals)	118,875,647	130,756,726	4,110,619	5,383,945	114,765,028	125,372,781
Total Transfers Off-site for Further Management	206,425,240	230,570,321	10,099,154	13,348,809	196,326,086	217,221,512
Total Releases and Transfers	1,308,154,704	1,270,614,859	131,624,256	142,161,952	1,176,530,448	1,128,452,907

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 165 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.

Table 2–9. Changes in Data as Result of Revisions Since *Taking Stock 1998*, NPRI and TRI, 1998

	1998 Data, Reported in <i>Taking Stock 1998</i> *		With Revisions Submitted since <i>Taking Stock 1998</i> **	
	NPRI Number	TRI Number	NPRI Number	TRI Number
Total Facilities	2,036	23,487	2,044	23,322
Total Forms	7,596	87,328	7,663	86,117
Releases On- and Off-site	kg	kg	kg	kg
On-site Releases	159,586,739	3,112,503,837	165,434,210	3,156,435,923
Air	107,448,766	931,292,785	112,032,404	943,856,575
Surface Water	16,626,348	104,960,429	17,573,959	111,581,076
Underground Injection	16,599,322	121,232,079	16,529,740	120,825,486
Land	18,724,696	1,955,018,544	19,107,904	1,980,172,786
Off-site Releases	58,152,220	257,756,902	58,157,399	251,840,863
Transfers to Disposal (except metals)	14,847,497	35,402,133	15,031,873	27,211,459
Transfers of Metals**	43,304,723	222,354,769	43,125,526	224,629,405
Total Reported Releases On- and Off-site	217,738,959	3,370,260,739	223,591,609	3,408,276,787
Off-site Transfers for Further Management				
Off-site Transfers to Recycling	176,455,878	920,798,904	204,413,658	927,419,039
Transfers to Recycling of Metals	91,336,389	770,068,885	120,591,823	773,812,402
Transfers to Recycling (except metals)	85,119,489	150,730,019	83,821,835	153,606,637
Other Off-site Transfers for Further Management	42,725,411	683,793,591	42,784,021	706,432,260
Energy Recovery (except metals)	13,042,673	414,650,011	13,043,666	413,940,256
Treatment (except metals)	20,424,146	147,496,854	20,481,763	144,207,279
Sewage (except metals)	9,258,592	121,646,726	9,258,592	148,284,725
Total Reported Amounts of Releases and Transfers	436,920,248	4,974,853,234	470,789,288	5,042,128,086

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

* All 1998 chemicals and industries reported in 1998 (in 1998 database).

** All 1998 chemicals and industries in 1999 database for 1998 (revised since 1998).

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 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 1998* reported a total of 436.9 million kg of NPRI and 4.97 billion kg of TRI releases and transfers, reflecting the complete NPRI and TRI databases for that year (see **Table 2–9**). Revisions received since the close of the 1998 reporting period raised the total to 470.8 million kg in NPRI and 5.04 billion kg in TRI.

Data for the previous years, 1995 to 1998, are presented in this report for comparison purposes. Some of the data in previous editions of *Taking Stock* may have been revised, so readers should be sure to use the current report or the current databases.

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Key Findings

- In 1999, North American facilities released on- and off-site 1.6 billion kg of listed substances, as 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 87 percent and off-site releases for 13 percent of total releases in North America in 1999. Over half of total releases were on-site air emissions and on-site land releases made up 19 percent. Transfers of metals to disposal, sewage, treatment or energy recovery accounted for 11 percent.
- TRI facilities accounted for 90 percent and NPRI facilities for 10 percent of total North American releases of the 210 chemicals in the matched data set. NPRI had a larger share of off-site releases (21 percent) than TRI (12 percent).
- More than one-quarter of all releases originated in three states and one province. Ohio had the largest amount with 121.9 million kg, Texas, second largest, with 116.5 million kg, Pennsylvania, third, with 98.1 million kg and Ontario, fourth, with 90.1 million kg.
- Ohio and Texas also had the largest total releases within their states (over 115 million kg each), followed by Pennsylvania and Ontario. 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. The primary metals and chemicals sectors accounted for the second- and third-largest total releases, respectively. The hazardous waste management sector had the fourth-largest total releases.
- Facilities in the electric utility sector reported large air emissions of hydrochloric acid. Releases of this chemical were the largest of any in the matched data set for 1999.
- The 56 designated carcinogens in the matched data set accounted for 14 percent of total releases in 1999.
- The 15 metals (and their compounds) reportable to both NPRI and TRI accounted for 29 percent of total releases. Almost all releases of metals are to land, either on-site or as transfers off-site.
- The 47 chemicals newly added to the matched data set in 1999 were released mainly to air and to underground injection.
- A number of the newly added chemicals were ozone-depleting substances, which are of international concern because of their effect on the ozone layer and on global warming. Many of these chemicals are being phased out under the terms of the Montreal Protocol. Releases of ozone depleters were concentrated among a few facilities, and almost all releases were to air.
- Thirty of the 52 chemicals listed as toxic under the Canadian Environmental Protection Act (CEPA) are included in the matched data set. They accounted for 13 percent of total North American releases in 1999.
- Seventy-six of the more than 700 chemicals that the California state government lists as causing cancer, birth defects or other reproductive harm are included in the matched data set. These “Proposition 65” chemicals made up 17 percent of total North American releases in 1999. Three of these chemicals—toluene, chromium and its compounds, and lead and its compounds—accounted for almost half of all releases of Proposition 65 chemicals.

3.1 Introduction

This chapter examines reporting of North American releases on- and off-site of 210 chemicals in 1999. 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 1999 reporting year.

The chapter begins with a summary of 1999 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. Releases are then analyzed by chemical, paying special attention to chemicals released in the largest amounts, to carcinogens, and to metals. Each of these discussions includes information on the 50 facilities with the largest releases of the chemicals.

The 1999 analysis also contains four new sections that cover chemicals newly added to the matched set, ozone-depleting chemicals, chemicals listed as toxic in the Canadian Environmental Protection Act (CEPA), and “Proposition 65” chemicals listed by the California state government as causing cancer, birth defects or other reproductive harm. The last three sections again include material on the 50 facilities reporting the largest releases of these chemicals.

3.2 1999 Releases On- and Off-site in North America

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 that disposes of the waste 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, Section 2.2.8** for a further explanation of the categories used in this report.)

- In 1999, 21,521 North American facilities in industries covered by both the NPRI and the TRI filed 74,108 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.

Table 3-1. Summary of Releases On- and Off-site in North America, NPRI and TRI, 1999

	North America Number	NPRI* Number	TRI Number	NPRI as % of North American Total	TRI as % of North American Total
Total Facilities	21,521	1,634	19,887	8	92
Total Forms	74,108	5,741	68,367	8	92
Releases On- and Off-site	kg	kg	kg		
On-site Releases	1,419,119,790	124,751,036	1,294,368,754	9	91
Air	901,416,201	87,800,661	813,615,540	10	90
Surface Water	118,215,282	5,855,383	112,359,899	5	95
Underground Injection	90,116,656	3,323,257	86,793,399	4	96
Land	309,239,442	27,639,526	281,599,916	9	91
Off-site Releases	274,801,492	43,710,386	231,091,106	16	84
Transfers to Disposal (except metals)	40,358,804	9,469,161	30,889,643	23	77
Transfers of Metals**	234,442,688	34,241,225	200,201,463	15	85
Total Reported Releases On- and Off-site	1,693,921,282	168,461,422	1,525,459,860	10	90
Off-site Releases Omitted for Adjustment Analysis	64,633,897	11,502,192	53,131,705	18	82
Total Releases On- and Off-site (Adjusted)***	1,629,287,385	156,959,230	1,472,328,155	10	90

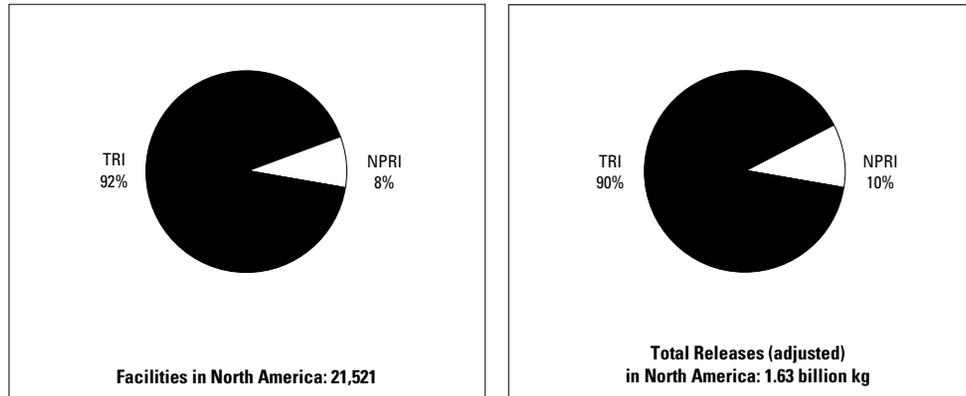
Note: Canada and US data only. Mexico data not available for 1999. Data include 210 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination 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.

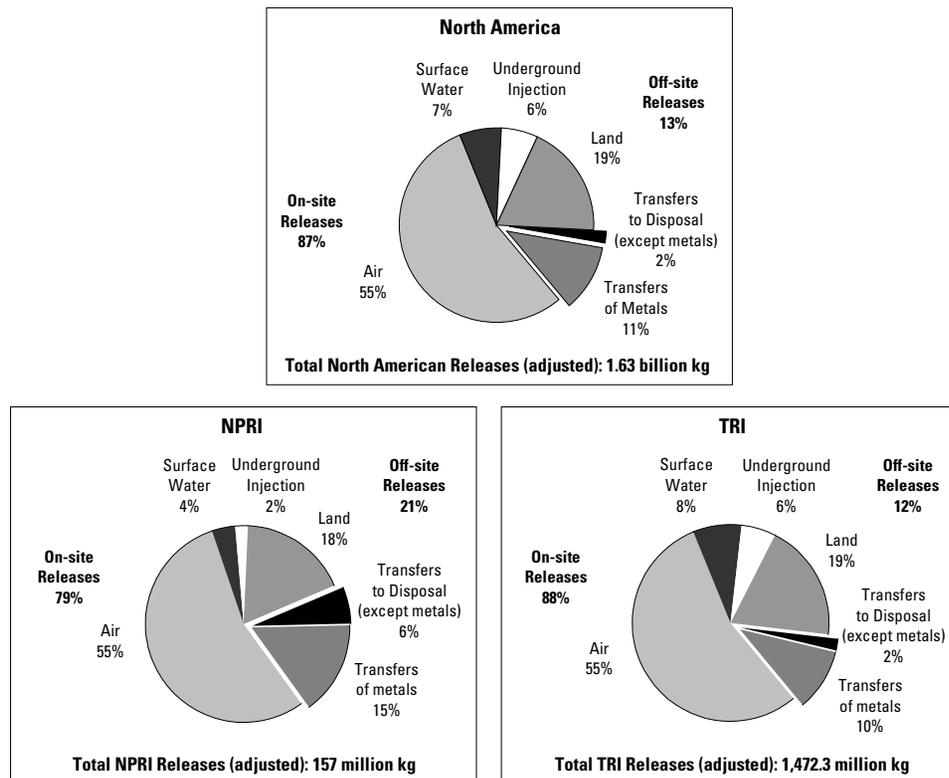
*** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 3–1. Contribution of NPRI and TRI to Total Releases in North America, 1999



Note: Canada and US data only. Mexico data not available for 1999. 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 3–2. Percentage of Releases On- and Off-site in North America by Type, NPRI and TRI, 1999



Note: Canada and US data only. Mexico data not available for 1999. Off-site releases and total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

- Total releases in North America were 1.6 billion kg in 1999 for the matched data set. Most of the North American reporting occurs in the United States, with its larger industrial base. NPRI facilities reported 10 percent of the North American releases—a somewhat larger share of North American releases than the NPRI share of number of facilities.
- On-site releases were 1.4 billion kg, or 87 percent of total releases in North America. Off-site releases, adjusted to take account of transfers to other facilities that reported them as on-site releases, were 210.2 million kg, 13 percent of total releases.
- For both NPRI and TRI, on-site air emissions were over 55 percent of total releases.
- Off-site releases in NPRI were 21 percent of NPRI total releases, while TRI off-site releases were 12 percent of the TRI total.
- TRI facilities reported proportionately larger on-site releases to surface waters (8 percent for TRI and 4 percent for NPRI) and on-site underground injection (6 percent for TRI and 2 percent for NPRI).

3.2.1 Releases On- and Off-site by State and Province, 1999

More than one-quarter of all North American releases originated in three states and one province.

- Ohio reported the largest releases with 121.9 million kg or 7.5 percent of the North American total. Ohio reported the largest on-site air emissions, 57.7 million kg, with several electric generating facilities contributing significantly to its total on-site air emissions. Ohio also had the largest on-site releases to land, 29.4 million kg.
- Texas reported the second-largest total releases, 116.5 million kg (7 percent of the North American total) and the largest on-site releases (107.3 million kg). Texas also had the largest releases on-site to underground injection (31.9 million kg, about one-third of the total in this category).
- Pennsylvania reported the third-largest total releases (98.1 million kg or 6 percent) and the largest on-site surface water discharges (22.1 million kg). One facility in Pennsylvania, a primary metals plant, reported 14.5 million kg of surface water discharges, or 12 percent of total surface water discharges in 1999.
- Ontario reported the fourth-largest total releases (90.1 million or 5.5 percent) and the largest off-site releases, more than three-quarters of which consisted of transfers of metals.

Table 3–2. North American Releases, by State and Province, 1999

State/Province	Number of Facilities	Air (kg)	Surface Water (kg)	On-site Releases		Land (kg)	Total On-site Releases	
				Underground Injection (kg)			kg	Rank
Alabama	471	34,257,351	2,793,539	12,700	11,299,103	48,362,693	11	
Alaska	7	171,903	26,449	113	147	198,612	60	
Alberta	157	8,472,783	446,425	3,319,232	3,183,661	15,435,091	30	
Arizona	187	2,021,008	794	6	22,026,524	24,048,332	22	
Arkansas	358	9,927,015	1,043,315	351,512	1,174,058	12,495,900	32	
British Columbia	87	7,966,287	1,343,819	0	457,889	9,776,971	36	
California	1,167	6,922,385	2,156,630	7,012	7,822,312	16,908,339	28	
Colorado	157	1,348,650	1,391,090	0	269,866	3,009,606	49	
Connecticut	282	1,937,653	445,463	0	9,612	2,392,728	51	
Delaware	57	2,676,700	538,905	0	170,133	3,385,738	46	
District of Columbia	2	35,828	0	0	0	35,828	63	
Florida	523	39,731,507	935,470	14,556,521	3,648,390	58,871,888	6	
Georgia	636	41,470,876	3,204,747	0	2,555,098	47,230,721	12	
Guam	1	0	0	0	0	0	64	
Hawaii	18	1,050,157	140	2	0	1,050,299	56	
Idaho	54	1,251,889	3,436,541	0	16,173,348	20,861,778	25	
Illinois	1,198	35,167,325	2,945,710	544	19,141,971	57,255,550	7	
Indiana	940	42,062,458	3,059,401	95,691	11,570,649	56,788,199	8	
Iowa	367	11,610,374	1,674,466	0	2,014,792	15,299,632	31	
Kansas	242	5,724,411	473,079	516,060	1,203,690	7,917,240	40	
Kentucky	402	32,438,314	1,267,987	0	4,612,671	38,318,972	15	
Louisiana	302	21,284,002	6,440,644	18,738,509	5,962,514	52,425,669	9	
Maine	68	2,021,135	359,463	0	315,455	2,696,053	50	
Manitoba	51	3,242,718	85,542	0	1,239,604	4,580,369	44	
Maryland	161	15,916,343	1,255,785	15,102	1,047,719	18,234,949	26	
Massachusetts	420	3,461,818	42,900	0	1,546	3,506,264	45	
Michigan	820	32,360,186	407,796	1,149,853	3,618,232	37,536,067	16	
Minnesota	425	6,079,598	745,094	0	1,143,344	7,968,036	39	
Mississippi	277	17,218,003	6,484,273	3,772,774	2,537,173	30,012,223	18	
Missouri	521	17,482,505	1,280,014	0	11,845,829	30,608,348	17	
Montana	28	2,437,955	10,256	0	20,714,184	23,162,395	23	
Nebraska	153	3,312,863	5,112,424	0	430,823	8,856,110	38	
Nevada	44	799,298	0	0	2,229,119	3,028,417	48	
New Brunswick	29	5,217,148	1,196,871	0	161,593	6,576,732	42	
New Hampshire	101	2,216,111	43,476	0	24,266	2,283,853	54	
New Jersey	500	6,699,368	2,280,955	1	948,148	9,928,472	34	
New Mexico	47	672,113	10,498	30	9,212,946	9,895,587	35	
New York	598	14,880,851	4,310,530	0	2,155,857	21,347,238	24	
Newfoundland	7	357,741	21,359	0	7,538	386,638	57	
North Carolina	728	53,529,588	3,829,837	0	6,261,832	63,621,257	5	
North Dakota	35	1,289,979	83,828	0	1,006,369	2,380,176	52	
Nova Scotia	29	2,732,915	19,036	0	611,859	3,364,116	47	
Ohio	1,504	57,725,811	2,961,251	10,969,044	29,356,169	101,012,275	2	
Oklahoma	270	5,341,619	1,355,335	1,164,048	2,943,653	10,804,655	33	
Ontario	862	46,303,536	1,357,370	0	18,627,516	66,359,556	4	
Oregon	221	6,458,524	1,458,821	0	18,235,375	26,152,720	21	
Pennsylvania	1,203	47,565,803	22,140,245	0	4,932,384	74,638,432	3	
Prince Edward Island	3	12,847	183,122	0	0	195,969	61	
Puerto Rico	133	6,907,365	34,648	0	76,923	7,018,936	41	
Quebec	377	12,253,247	1,135,981	0	3,300,736	16,711,847	29	
Rhode Island	118	353,808	549	0	2	354,359	58	
Saskatchewan	32	1,241,439	65,858	4,025	49,130	1,363,747	55	
South Carolina	469	23,908,056	1,406,025	0	3,711,043	29,025,124	19	
South Dakota	67	945,322	614,195	0	776,966	2,336,483	53	
Tennessee	587	43,924,048	944,935	0	4,629,023	49,498,006	10	
Texas	1,214	45,026,128	14,486,225	31,933,079	15,848,739	107,294,171	1	
Utah	149	23,666,988	467,241	1,633	20,978,611	45,114,473	13	
Vermont	33	45,262	79,162	0	34,237	158,661	62	
Virgin Islands	3	278,086	549	0	812	279,447	59	
Virginia	401	23,076,434	2,049,450	0	1,646,076	26,771,960	20	
Washington	252	7,028,091	1,265,967	0	570,981	8,865,039	37	
West Virginia	148	33,843,748	3,444,251	4	2,756,350	40,044,353	14	
Wisconsin	787	15,327,887	1,557,047	0	731,897	17,616,831	27	
Wyoming	31	725,040	2,504	3,509,161	1,222,955	5,459,660	43	
Total	21,521	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790		

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 3–2. (continued)

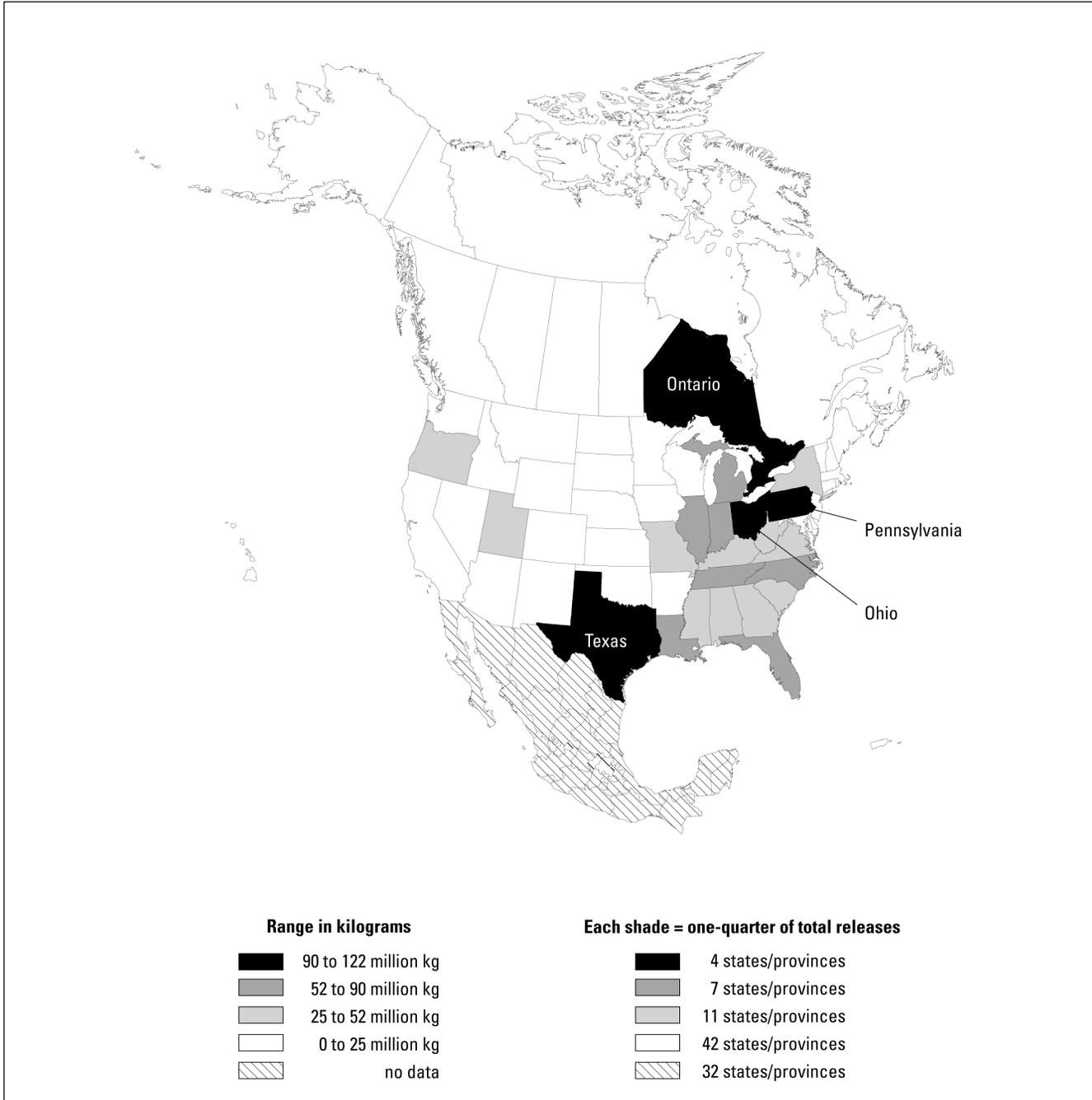
Off-site Releases				Total Releases				1999 Population	Land Area (sq km)	1999 Gross Domestic Product		
Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg Rank)		Total Reported Releases On- and Off-site (kg Rank)		Total Releases (adjusted)** (kg Rank)				US \$ millions	Rank	
908,561	4,305,388	5,213,949	13	53,576,642	12	1,593,843	51,982,799	12	4,369,862	131,432	115,071	27
0	0	0	63	198,612	61	0	198,612	61	619,500	1,477,155	26,353	50
457,203	1,297,671	1,754,874	28	17,189,965	32	35,731	17,154,234	30	2,959,400	661,194	78,746	35
208,418	4,663,544	4,663,544	42	24,693,294	23	37,911	24,655,383	23	4,778,332	294,310	143,683	24
300,235	8,454,189	8,754,424	8	21,250,324	27	6,595,234	14,655,090	32	2,551,373	134,864	64,773	37
225,468	784,720	1,010,188	37	10,787,159	37	0	10,787,159	36	4,028,100	947,806	79,953	34
1,513,152	2,821,063	4,334,215	21	21,242,554	28	1,084,682	20,157,872	28	33,145,121	403,939	1,229,098	1
18,116	717,469	735,585	39	3,745,191	47	409,659	3,335,532	49	4,056,133	268,637	153,728	22
130,679	792,768	923,447	38	3,316,175	50	39,293	3,276,882	50	3,282,031	12,548	151,779	23
154	1,345,681	1,345,835	33	4,731,573	46	2,052	4,729,521	46	753,538	5,063	34,669	46
0	613	613	60	36,441	63	0	36,441	63	519,000	158	55,832	40
951,799	1,273,397	2,225,196	26	61,097,084	8	299,994	60,797,090	8	15,111,244	139,841	442,895	5
352,101	4,428,508	4,780,609	14	52,011,330	13	2,514,055	49,497,275	13	7,788,240	149,999	275,719	10
0	0	0	63	0	64	0	0	64	151,968	544	--	--
858	21,970	22,828	58	1,073,127	56	0	1,073,127	56	1,185,497	16,634	40,914	44
60,859	143,113	203,972	51	21,065,750	29	52,235	21,013,515	27	1,251,700	214,309	34,025	48
1,989,807	14,174,445	16,164,252	6	73,419,802	6	5,742,787	67,677,015	6	12,128,370	143,975	445,666	4
734,405	28,930,307	29,664,712	2	86,452,911	5	3,976,761	82,476,150	5	5,942,901	92,896	182,202	16
222,326	4,463,096	4,685,422	15	19,985,054	30	2,864,561	17,120,493	31	2,869,413	144,705	85,243	32
5,965,946	996,506	6,962,452	10	14,879,692	33	1,243,898	13,635,794	33	2,654,052	211,905	80,843	33
789,505	5,370,128	6,159,633	11	44,478,605	15	1,125,282	43,353,323	15	3,960,825	102,898	113,539	28
591,886	931,615	1,523,501	31	53,949,170	11	129,622	53,819,548	10	4,372,035	112,827	128,959	26
84,344	233,651	317,995	48	3,014,048	52	513	3,013,535	52	1,253,040	79,934	34,064	47
5,585	183,097	188,682	52	4,769,051	45	0	4,769,051	44	1,142,600	649,953	20,863	52
34,780	284,584	319,364	47	18,554,313	31	3,850	18,550,463	29	5,171,634	25,315	174,710	17
134,905	1,154,997	1,289,902	34	4,796,166	44	52,428	4,743,738	45	6,175,169	20,299	262,564	12
747,846	17,762,563	18,510,409	5	56,046,476	9	257,831	55,788,645	9	9,863,775	147,124	308,310	9
161,413	1,417,100	1,578,513	29	9,546,549	39	105,322	9,441,227	39	4,775,508	206,192	172,982	18
124,736	455,376	580,112	44	30,592,335	21	12,686	30,579,649	20	2,768,619	121,498	64,286	38
241,165	1,790,355	2,031,520	27	32,639,868	18	25,738	32,614,130	18	5,468,338	178,432	170,470	19
123	666,963	667,086	41	23,829,481	24	568,203	23,261,278	24	882,779	376,961	20,636	53
82,449	2,680,335	2,762,784	23	11,618,894	36	1,932,115	9,686,779	38	1,666,028	199,099	53,744	41
2,387	265,240	267,627	49	3,296,044	51	189,425	3,106,619	51	1,809,253	284,376	69,864	36
152,442	894,741	1,047,183	36	7,623,915	41	320,219	7,303,696	42	754,300	73,440	12,378	59
34,176	103,546	137,722	55	2,421,575	54	527	2,421,048	54	1,201,134	23,228	44,229	43
337,636	1,887,584	2,225,220	25	12,153,692	35	24,568	12,129,124	35	8,143,412	19,214	331,544	8
4,219	609,688	613,907	43	10,509,494	38	325,622	10,183,872	37	1,739,844	314,311	51,026	42
398,541	4,131,338	4,529,879	18	25,877,117	22	264,292	25,612,825	22	18,196,601	122,301	754,590	2
27,200	12,580	39,780	57	426,418	58	0	426,418	58	540,800	405,721	8,151	60
1,079,341	1,511,333	2,590,674	24	66,211,931	7	270,347	65,941,584	7	7,650,789	126,170	258,592	13
4	1,068,512	1,068,516	35	3,448,692	49	1,379	3,447,313	48	633,666	178,681	16,991	57
146,178	100,523	246,701	50	3,610,817	48	15	3,610,802	47	939,200	55,491	15,082	58
2,773,436	23,136,304	25,909,740	3	126,922,015	1	5,059,996	121,862,019	1	11,256,654	106,060	361,981	7
88,154	1,456,827	1,544,981	30	12,349,636	34	89,011	12,260,625	34	3,358,044	177,865	86,382	31
7,763,248	27,089,782	34,853,030	1	101,212,586	3	11,141,211	90,071,375	4	11,517,300	1,068,586	267,069	11
31,180	4,568,361	4,599,541	16	30,752,261	20	4,116,446	26,635,815	21	3,316,154	248,629	109,694	29
632,596	25,040,300	25,672,896	4	100,311,328	4	2,230,581	98,080,747	3	11,994,016	116,075	382,980	6
8	0	0	62	195,977	62	0	195,977	62	137,600	5,659	2,015	61
347,724	152,924	500,648	45	7,519,584	42	7,506	7,512,078	41	3,889,507	8,875	--	--
691,264	3,868,738	4,560,002	17	21,271,849	26	42	21,271,807	26	7,349,100	1,540,689	137,354	25
53,707	108,271	161,978	54	516,337	57	7,827	508,510	57	990,819	2,706	32,546	49
565	9,373	9,938	59	1,373,685	55	4,974	1,368,711	55	1,025,700	652,334	20,289	54
204,937	7,168,591	7,373,528	9	36,398,652	17	3,094,475	33,304,177	17	3,885,736	77,981	106,917	30
942	166,415	167,357	53	2,503,840	53	45	2,503,795	53	733,133	196,555	21,631	51
279,784	4,246,809	4,526,593	19	54,024,599	10	1,414,048	52,610,551	11	5,483,535	106,752	170,085	20
5,578,093	5,164,863	10,742,956	7	118,037,127	2	1,544,578	116,492,549	2	20,044,141	678,305	687,272	3
29,403	2,972,068	3,001,471	22	48,115,944	14	2,781,824	45,334,120	14	2,129,836	212,799	62,641	39
49,855	59,760	109,615	56	268,276	60	504	267,772	60	593,740	23,953	17,164	56
99	435	534	61	279,981	59	37	279,944	59	119,615	347	--	--
1,369,151	3,068,005	4,437,156	20	31,209,116	19	96,016	31,113,100	19	6,872,912	102,551	242,221	14
237,080	442,834	679,914	40	9,544,953	40	128,332	9,416,621	40	5,756,361	172,431	209,258	15
202,719	1,279,452	1,482,171	32	41,526,524	16	68,365	41,458,159	16	1,806,928	62,381	40,685	45
800,985	5,140,078	5,941,063	12	23,557,894	25	404,905	23,152,989	25	5,250,446	140,662	166,481	21
2,926	399,201	402,127	46	5,861,787	43	340,494	5,521,293	43	479,602	251,483	17,448	55
40,358,804	234,442,688	274,801,492		1,693,921,282		64,633,897	1,629,287,385					

* Off-site releases also reported as on-site releases by another NPRI or TRI facility.

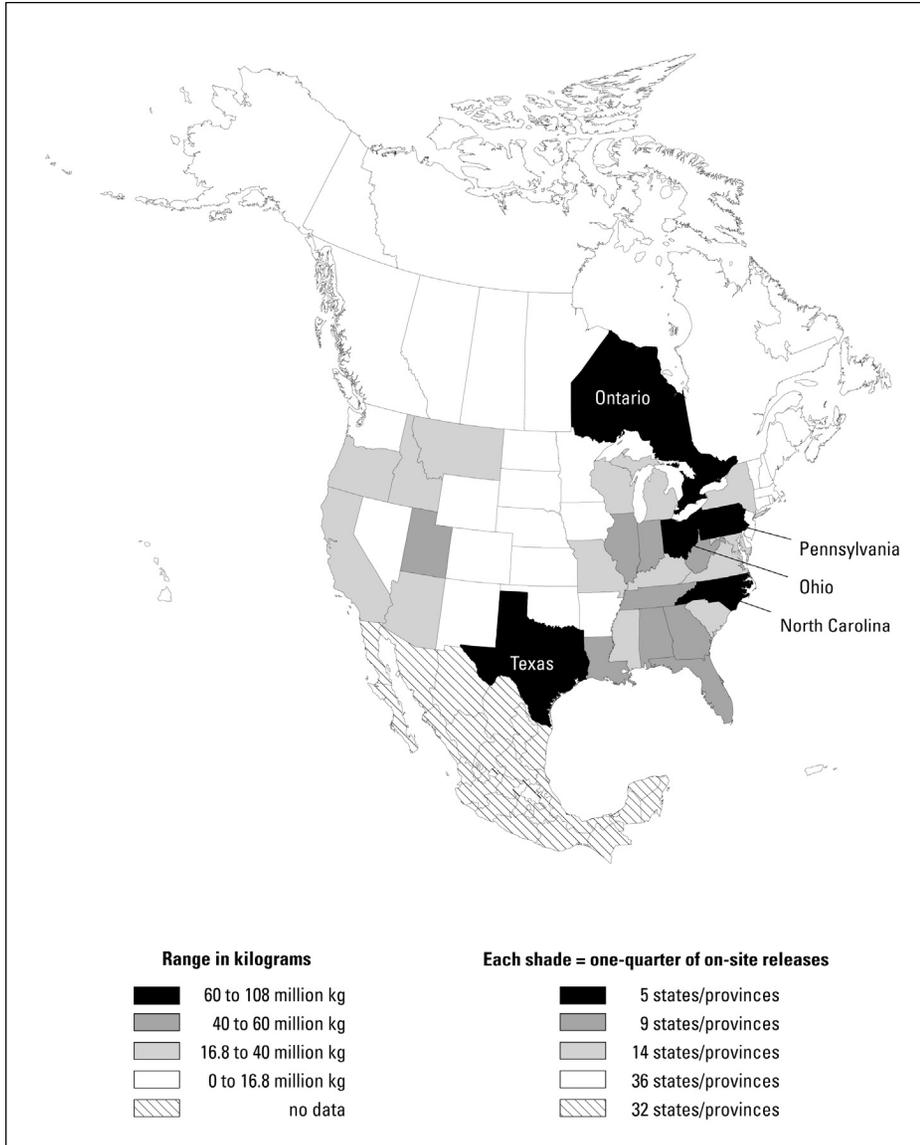
** Does not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

- Ohio and Texas each reported more than 100 million kg in total releases. Another 10 states and provinces each reported more than 50 million kg. Only seven US jurisdictions and Canadian provinces reported less than 500,000 kg. (Rhode Island had slightly more than that amount.)

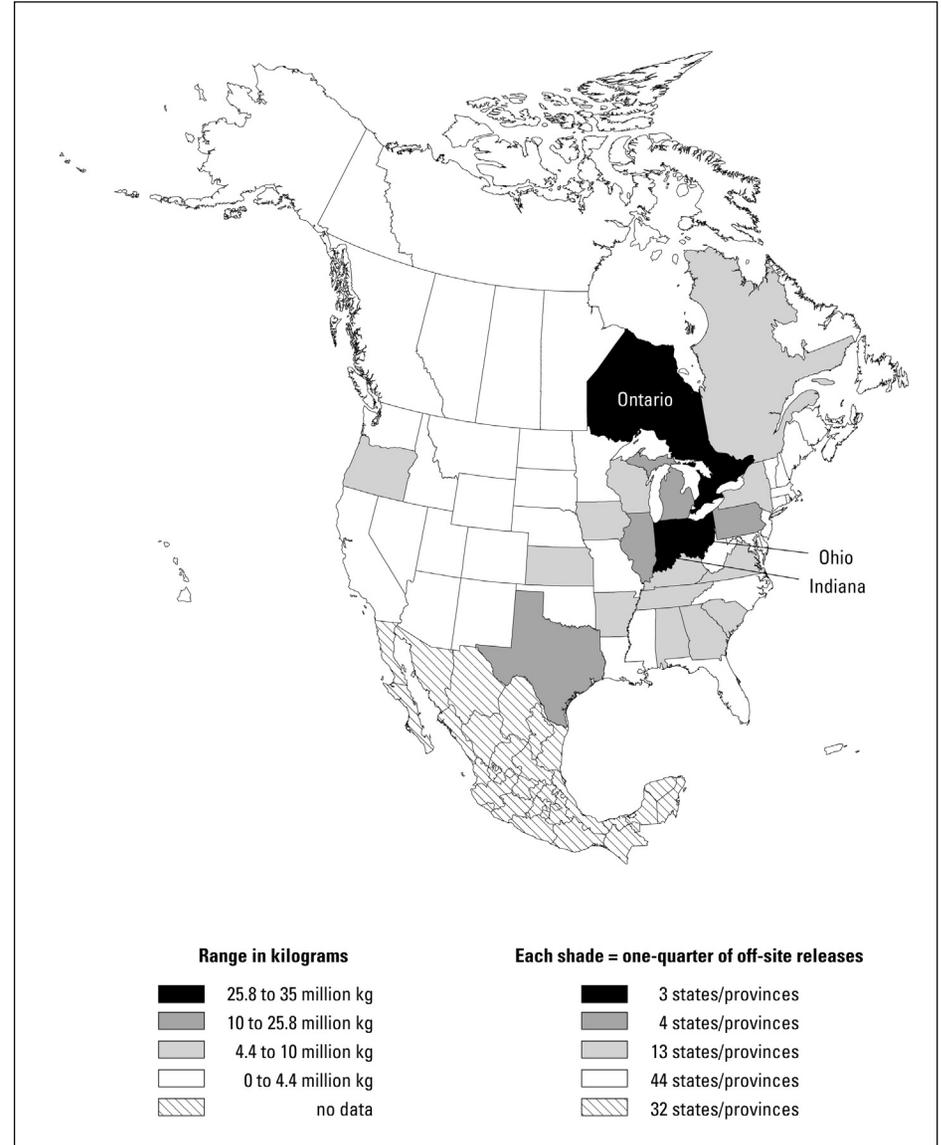
Map 3-1. Largest Sources of Total Releases On-site and Off-site in North America, 1999: States and Provinces



Map 3-2. Largest Sources of Releases On-site in North America, 1999: States and Provinces



Map 3-3. States and Provinces in North America Sending Largest Amounts of Off-site Releases (Off-site Transfers to Disposal), 1999



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.

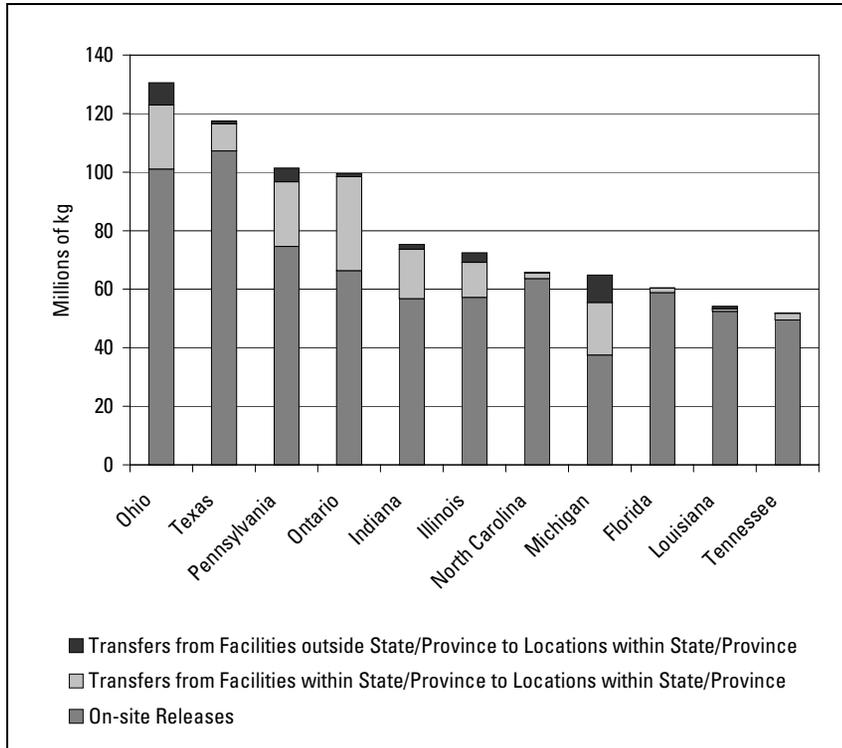
- Ohio and Texas had the largest total releases within their states (over 115 million kg each).
- Texas facilities reported the largest on-site releases. When transfers sent into a state for disposal (off-site releases) were also considered, Ohio became the state with the largest total releases within the state.
- Ontario had the largest off-site releases transferred from facilities located within Ontario to other sites within Ontario. (Such transfers only include transfers that were not reported by Ontario facilities as on-site releases.)
- Michigan received the largest amount of off-site releases transferred from facilities located outside its borders to sites within the state. (Such transfers only include transfers that were not reported by Michigan facilities as on-site releases.)

Table 3-3. Total Releases Within a State/Province, 1999

State/Province	On-site Releases kg Rank		Off-site Releases (adjusted)*				Total Releases (adjusted) within State/Province* kg Rank	
			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) (kg)	Transfers of Metals (kg)	Transfers Off-site to Disposal (except metals) (kg)	Transfers of Metals (kg)		
Alabama	48,362,693	11	411,376	2,305,607	25,424	179,898	51,284,998	12
Alaska	198,612	60	0	0	0	5	198,617	61
Alberta	15,435,091	30	456,839	1,297,671	9,601	9,938	17,209,140	30
Arizona	24,048,332	22	29,399	133,446	94,577	98,710	24,404,464	22
Arkansas	12,495,900	32	24,343	547,032	248,598	474,307	13,790,180	33
British Columbia	9,776,971	36	219,733	732,482	0	448	10,729,634	35
California	16,908,339	28	1,368,787	1,795,359	2,408	64,332	20,139,225	28
Colorado	3,009,606	49	14,483	251,552	38,413	6,859	3,320,913	50
Connecticut	2,392,728	51	27,881	127,498	26,561	108,504	2,683,172	52
Delaware	3,385,738	46	154	1,334,821	0	1,443	4,722,156	45
District of Columbia	35,828	63	0	0	0	235	36,063	63
Florida	58,871,888	6	891,493	650,242	1,054	44,925	60,459,602	9
Georgia	47,230,721	12	215,373	756,556	77,556	212,594	48,492,800	13
Hawaii	1,050,299	56	856	21,970	0	0	1,073,125	56
Idaho	20,861,778	25	59,967	10,409	3,128	366,146	21,301,428	27
Illinois	57,255,550	7	1,717,340	10,264,961	172,026	3,034,486	72,444,363	6
Indiana	56,788,199	8	636,927	16,272,495	191,098	1,372,618	75,261,337	5
Iowa	15,299,632	31	100,935	396,538	526	24,953	15,822,584	32
Kansas	7,917,240	40	68,216	744,752	20,523	253,169	9,003,900	39
Kentucky	38,318,972	15	750,848	1,046,563	41,218	434,700	40,592,301	16
Louisiana	52,425,669	9	411,701	473,768	689,115	118,985	54,119,238	10
Maine	2,696,053	50	61,051	189,427	11,242	22,992	2,980,765	51
Manitoba	4,580,369	44	5,585	178,797	0	0	4,764,751	44
Maryland	18,234,949	26	15,508	191,589	19,103	82,567	18,543,716	29
Massachusetts	3,506,264	45	41,230	507,218	170,415	79,547	4,304,674	46
Michigan	37,536,067	16	692,863	17,240,962	880,049	8,437,499	64,787,440	8
Minnesota	7,968,036	39	1,589,036	528,393	9,960	89,830	8,717,808	40
Mississippi	30,012,223	18	95,252	291,284	10,782	225,264	30,634,805	20
Missouri	30,608,348	17	169,980	1,553,738	284,403	3,721,192	36,337,661	17
Montana	23,162,395	23	29	52,091	0	0	23,214,515	24
Nebraska	8,856,110	38	69,792	315,388	657	189,562	9,431,509	37
Nevada	3,028,417	48	1,365	262,940	3,352	313,748	3,609,822	47
New Brunswick	6,576,732	42	80,989	522,831	0	46,249	7,226,801	41
New Hampshire	2,283,853	54	1,441	61,190	5,279	121,819	2,473,582	53
New Jersey	9,928,472	34	223,614	1,053,554	124,167	150,097	11,479,904	34
New Mexico	9,895,587	35	322	553,666	566	768	10,450,909	36
New York	21,347,238	24	239,459	1,643,867	79,182	30,387	23,340,133	23
Newfoundland	386,638	57	0	7,980	0	0	394,618	58
North Carolina	63,621,257	5	999,431	933,518	63,178	64,579	65,681,963	7
North Dakota	2,380,176	52	0	1,065,751	0	3,515	3,449,442	49
Nova Scotia	3,364,116	47	134,945	79,366	2,320	210	3,580,957	48
Ohio	101,012,275	2	2,332,624	19,590,629	122,849	7,440,572	130,498,949	1
Oklahoma	10,804,655	33	24,194	762,805	4,875,978	498,024	16,965,656	31
Ontario	66,359,556	4	6,352,347	25,753,476	572,135	500,703	99,538,217	4
Oregon	26,152,720	21	30,808	296,993	170,654	156,087	26,807,262	21
Pennsylvania	74,638,432	3	473,516	21,588,142	59,749	4,641,792	101,401,631	3
Prince Edward Island	195,969	61	8	0	0	0	195,977	62
Puerto Rico	7,018,936	41	54,553	139,976	0	0	7,213,465	42
Quebec	16,711,847	29	316,908	3,651,759	123,322	1,610,366	22,414,202	26
Rhode Island	354,359	58	8,407	28,436	14,418	23,935	429,555	57
Saskatchewan	1,363,747	55	202	1,525	4,380	0	1,369,854	55
South Carolina	29,025,124	19	181,918	3,149,610	146,563	95,018	32,598,233	18
South Dakota	2,336,483	53	943	85,527	0	0	2,422,953	54
Tennessee	49,498,006	10	240,055	2,001,549	39,232	162,871	51,941,713	11
Texas	107,294,171	1	4,916,525	4,247,669	431,960	559,958	117,450,283	2
Utah	45,114,473	13	29,393	1,894,790	138,236	314,682	47,491,574	14
Vermont	158,661	62	29,797	2,820	14,416	7,094	212,788	60
Virgin Islands	279,447	59	0	0	0	0	279,447	59
Virginia	26,771,960	20	1,220,362	2,870,197	20,469	72,354	30,955,342	19
Washington	8,865,039	37	11,074	261,045	407	50,681	9,188,246	38
West Virginia	40,044,353	14	13,652	953,714	29,190	79,003	41,119,912	15
Wisconsin	17,616,831	27	767,073	3,227,844	49,273	1,397,216	23,058,237	25
Wyoming	5,459,660	43	2,649	58,023	0	9	5,520,341	43
Total	1,419,119,790		27,368,104	156,963,801	10,119,712	37,997,445	1,651,568,852	

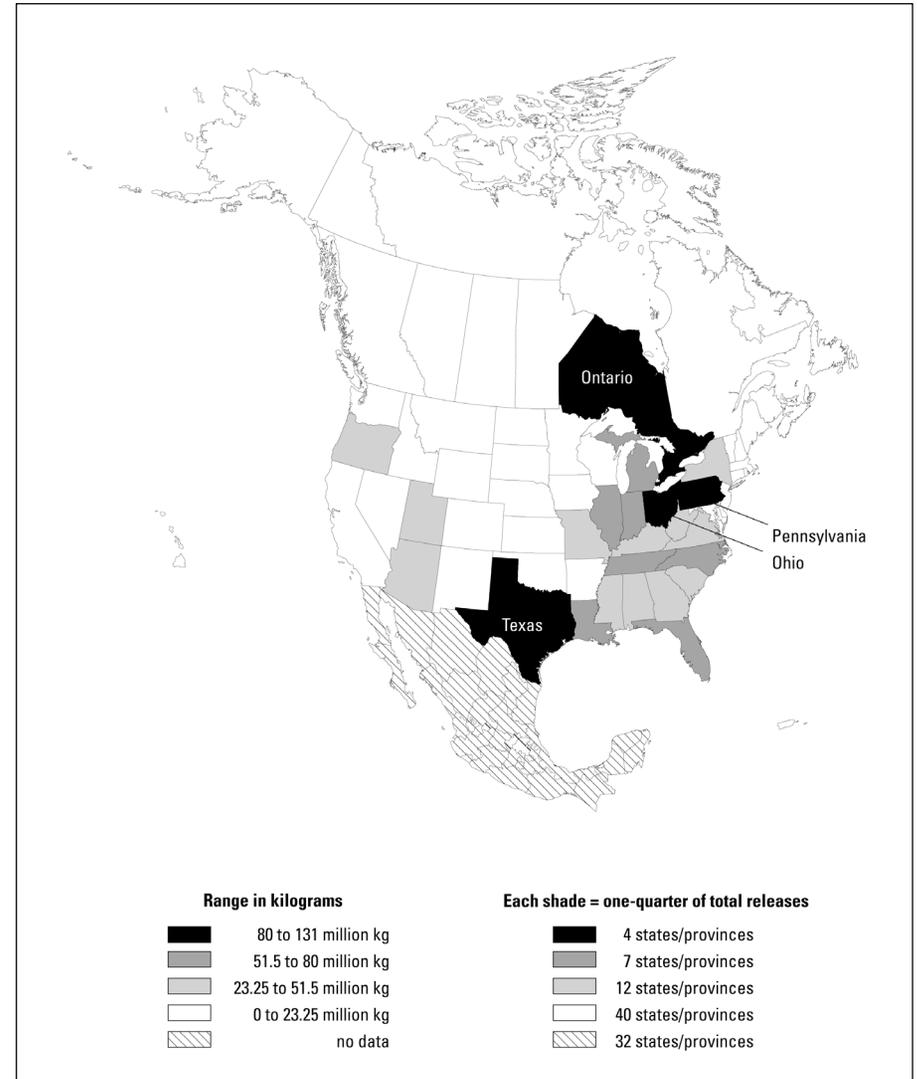
* Off-site releases are omitted (adjusted) if the amount of off-site release is also reported as an on-site release by another facility within the state/province.

Figure 3-3. States and Provinces with Largest Total Releases within the State/Province, 1999



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 3-4. States and Provinces with Largest Total Releases within the State/Province, 1999



3.2.2 Releases On- and Off-site by Industry Sector, 1999

Among industry sectors, electric utilities (US SIC 491/493) reported the largest total on- and off-site releases in 1999. Ranking next were primary metals (US SIC 33), chemicals manufacturing (US SIC 28), hazardous waste management and solvent recovery facilities (US SIC 495/738) and paper products (US SIC 26). These five industry sectors accounted for 78 percent of total releases in 1999.

- Electric utilities reported 458.4 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 more than 40 percent of all North American on-site air emissions in 1999.
- Primary metals facilities reported 282.3 million kg in total releases, or 18 percent of the North American total. This included more than 36 percent of all on-site land releases and over 61 percent of all reported off-site releases of metals, which were primarily transfers to land disposal.
- The chemical manufacturing sector reported 275.4 million kg of total releases in 1999, 17 percent of the North American total. This sector had the largest amount of on-site surface water releases and by far the largest amount of underground injection (79.0 million kg, or 88 percent of the total for the category).

Table 3-4. Releases On- and Off-site in North America by Industry, 1999

US SIC Code	Industry	Air (kg)	On-site Releases			Total On-site Releases (kg)
			Surface Water (kg)	Underground Injection (kg)	Land (kg)	
491/493	Electric Utilities	393,897,220	1,533,160	2	51,241,476	446,671,858
33	Primary Metals	47,289,285	28,759,300	325,045	110,475,167	186,862,136
28	Chemicals	101,744,126	33,850,070	78,957,657	36,934,879	251,548,209
495/738	Hazardous Waste Mgt./Solvent Recovery	392,305	21,845	10,063,467	91,062,699	101,543,816
26	Paper Products	98,271,991	11,065,707	0	6,771,780	116,110,806
30	Rubber and Plastics Products	48,665,198	9,368	0	275,769	48,957,429
	Multiple codes 20-39*	30,002,563	8,581,312	228	5,494,633	44,078,736
37	Transportation Equipment	43,929,265	80,715	0	331,451	44,354,508
20	Food Products	20,628,799	23,033,281	1,707	2,061,580	45,725,367
29	Petroleum and Coal Products	22,086,782	7,275,939	718,599	205,384	30,290,305
34	Fabricated Metals Products	20,650,701	1,099,710	22,151	295,672	22,078,962
24	Lumber and Wood Products	17,644,957	4,047	0	54,394	17,707,337
36	Electronic/Electrical Equipment	6,144,945	1,988,470	0	410,067	8,545,174
32	Stone/Clay/Glass Products	11,297,618	53,751	0	1,417,929	12,772,462
27	Printing and Publishing	11,532,135	196	0	24,290	11,556,621
25	Furniture and Fixtures	7,414,648	4	0	11,284	7,426,973
35	Industrial Machinery	4,440,001	51,625	0	210,483	4,703,929
39	Misc. Manufacturing Industries	4,862,660	11,892	0	61,913	4,939,830
22	Textile Mill Products	3,893,377	91,304	0	206,939	4,191,820
38	Measurement/Photographic Instruments	3,602,834	579,624	0	3,101	4,185,559
12	Coal Mining	524,093	22,819	27,800	1,683,547	2,258,259
31	Leather Products	501,706	26,521	0	4,632	532,859
23	Apparel and Other Textile Products	962,641	0	0	0	962,641
5169	Chemical Wholesalers	538,610	1,153	0	373	542,984
21	Tobacco Products	497,741	73,469	0	0	571,210
	Total	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790

Note: Canada and US data only. Mexico data not available for 1999.

* Multiple SIC codes reported only in TRI.

Table 3-4. (continued)

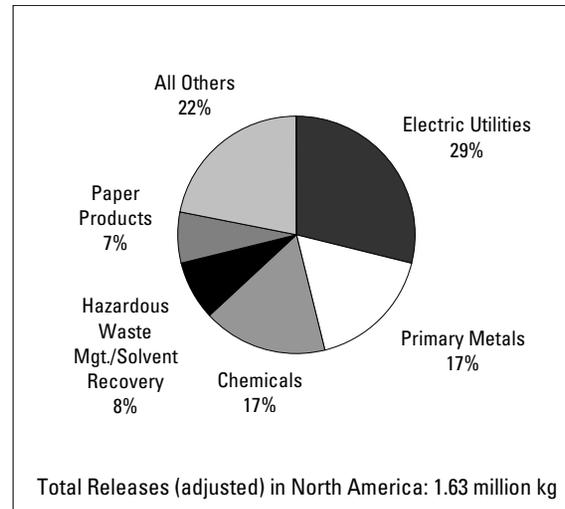
Off-site Releases			Total Releases				
Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site		Adjustment Component* (kg)	Total Releases (adjusted)**	
			kg	Rank		kg	Rank
288,139	11,802,209	12,090,348	458,762,206	1	341,437	458,420,769	1
2,638,461	144,114,893	146,753,354	333,615,490	2	51,314,421	282,301,069	2
15,431,341	11,462,833	26,894,174	278,442,383	3	3,083,172	275,359,211	3
10,233,462	25,406,056	35,639,518	137,183,334	4	4,677,431	132,505,903	4
354,932	2,220,539	2,575,471	118,686,277	5	1,427	118,684,850	5
1,515,463	3,992,139	5,507,602	54,465,031	6	60,737	54,404,294	6
1,119,926	7,283,972	8,403,898	52,482,634	7	2,529,211	49,953,423	7
2,696,890	3,134,153	5,831,043	50,185,551	8	363,332	49,822,219	8
1,215,065	1,027,678	2,242,743	47,968,110	9	0	47,968,110	9
1,304,540	766,745	2,071,285	32,361,590	11	289,878	32,071,712	10
1,184,782	9,745,466	10,930,248	33,009,210	10	949,149	32,060,061	11
138,557	109,590	248,147	17,955,484	12	17,188	17,938,296	12
1,178,228	7,388,335	8,566,563	17,111,737	13	627,236	16,484,501	13
167,102	2,102,019	2,269,121	15,041,583	14	296,749	14,744,834	14
23,379	28,722	52,101	11,608,722	15	1,036	11,607,686	15
97,093	52,189	149,282	7,576,255	16	5,023	7,571,232	16
90,724	1,923,727	2,014,451	6,718,380	17	50,809	6,667,571	17
174,413	467,135	641,548	5,581,378	18	20,312	5,561,066	18
134,943	198,221	333,164	4,524,984	19	350	4,524,634	19
60,954	241,224	302,178	4,487,737	20	2,502	4,485,235	20
0	0	0	2,258,259	21	0	2,258,259	21
9,242	948,895	958,137	1,490,996	22	0	1,490,996	22
24,478	10,756	35,234	997,875	23	0	997,875	23
276,434	15,188	291,622	834,606	24	2,497	832,109	24
256	4	260	571,470	25	0	571,470	25
40,358,804	234,442,688	274,801,492	1,693,921,282		64,633,897	1,629,287,385	

* Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

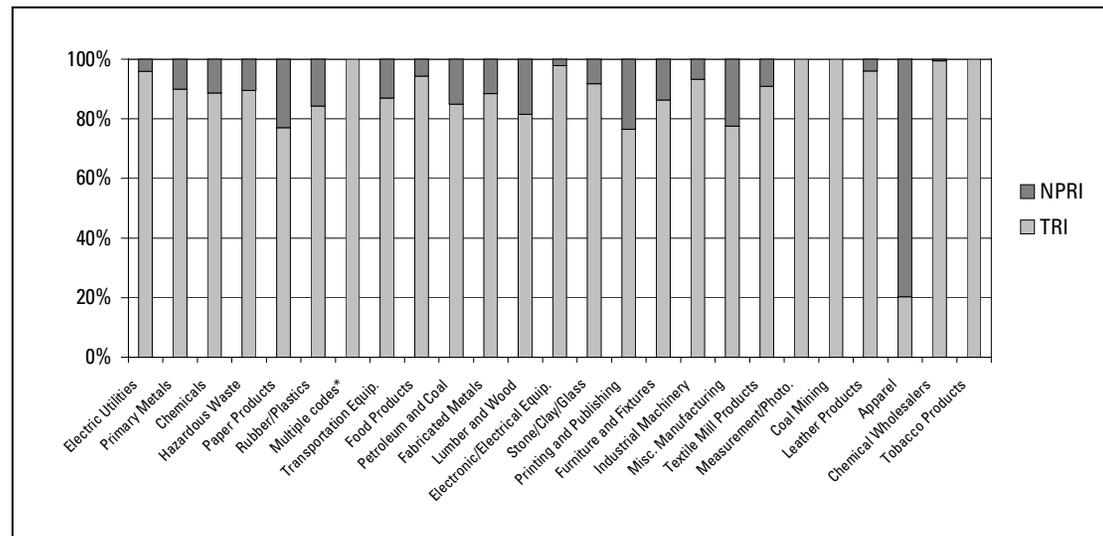
- Hazardous waste management and solvent recovery facilities accounted for 132.5 million kg, or 8 percent of North American total releases. This sector had the second-highest on-site releases to land, and, except for the chemicals industry, reported the largest transfers to disposal of substances that are not metals.
- Electric utilities in the US accounted for 96 percent of total releases from electric utilities in North America. This is higher than the average percentage of total releases for all TRI industry sectors (90 percent). 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. For the other industry sectors with the largest total releases, the percentage from TRI was about 90 percent and from NPRI about 10 percent.

Figure 3-4. Contribution of Top Industry Sectors to Releases On- and Off-site in North America, 1999



Note: Canada and US data only. Mexico data not available for 1999. Total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Figure 3-5. NPRI and TRI as Percentage of North American Total Releases, by Industry, 1999 (Ordered by Total North American Releases)



Note: Canada and US data only. Mexico data not available for 1999. 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 3–5. Average Releases per Facility, NPRI and TRI, 1999

	NPRI*		TRI		Ratio of Average Per Facility (NPRI/TRI)
	Number	Forms/Facility	Number	Forms/Facility	
Total Facilities	1,634		19,887		
Total Forms	5,741	3.5	68,367	3.4	
	kg	kg/facility	kg	kg/facility	
On-site Releases	124,751,036	76,347	1,294,368,754	65,086	1.2
Air	87,800,661	53,734	813,615,540	40,912	1.3
Surface Water	5,855,383	3,583	112,359,899	5,650	0.6
Underground Injection	3,323,257	2,034	86,793,399	4,364	0.5
Land	27,639,526	16,915	281,599,916	14,160	1.2
Off-site Releases	43,710,386	26,751	231,091,106	11,620	2.3
Transfers to Disposal (except metals)	9,469,161	5,795	30,889,643	1,553	3.7
Transfers of Metals**	34,241,225	20,955	200,201,463	10,067	2.1
Total Reported Releases On- and Off-site	168,461,422	103,098	1,525,459,860	76,706	1.3
Off-site Releases Omitted for Adjustment Analysis	11,502,192	--	53,131,705	--	
Total Releases On- and Off-site Adjusted***	156,959,230	96,058	1,472,328,155	74,035	1.3

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

3.2.3 Releases On- and Off-site, by Facility

Average Releases per Facility, NPRI and TRI

- Average on-site releases were about 20 percent higher for NPRI (76,347 kg per facility) than for TRI (65,086 kg per facility). In on-site releases, the NPRI per-facility averages for surface water and underground injection releases were lower than in TRI, but the averages for air and land releases were higher.
- Average reported off-site releases were much higher in NPRI; the ratio of NPRI to TRI per-facility averages was 3.7 for transfers of substances other than metals and 2.1 for transfers of metals.
- Average total on- and off-site releases were 96,176 kg per facility for NPRI and 74,035 kg per facility for TRI—a ratio of 1.3.

Facilities with Largest Total Reported Releases

Fifty facilities in North America, representing only 0.2 percent of all reporting facilities, accounted for more than one-quarter of total reported releases on- and off-site in 1999.

- The 50 facilities with the largest total reported releases in North America reported 436.9 million kg, or 26 percent of the total for 1999. They accounted for 53 percent of all on-site land releases and 54 percent of all on-site underground injection.
- The electric utility industry, the sector with the largest total releases in North America for 1999, had 16 facilities among the 50 facilities with the largest total releases. Fifteen of the 16 plants were in the United States, in 11 states; one was in Ontario. Hydrochloric acid and, in one case, sulfuric acid were the main chemicals released. (Only air emissions of these two chemicals are included in the matched data set.)
- The primary metals industry, the sector with the second-largest total releases, had 15 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 air releases (of chlorine), and the facility that reported the sixth largest total releases, also a primary metals facility, reported large releases of nitric acid and nitrates to water. The other primary metals facilities reported large on-site land releases or off-site transfers of metals. Most of these facilities reported zinc and its compounds as the main substance released.

Table 3-6. The 50 North American Facilities with the Largest Total Reported Releases On- and Off-site, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms	On-site Releases				Total On-site Releases (kg)
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	6	21,471,752	0	0	0	21,471,752
2	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden, AZ		33	11	77,250	0	0	20,948,953	21,026,203
3	ASARCO Inc.	East Helena, MT		33	10	22,913	752	0	19,527,521	19,551,186
4	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	37	341	0	0	18,034,408	18,034,749
5	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	10	433	0	0	17,463,945	17,464,378
6	AK Steel, Butler Works	Butler, PA		33	13	63,835	14,514,107	0	821,406	15,399,348
7	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	15	1,274	0	0	15,377,310	15,378,584
8	Solutia Inc.	Gonzalez, FL		28	20	123,756	863	14,280,263	0	14,404,882
9	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	98,408	11,313	0	12,732,800	12,842,521
10	Zinc Corp. of America Monaca, Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13	425,027	567	0	0	425,594
11	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	9	1,447	0	0	10,855,330	10,856,777
12	BASF Corp.	Freeport, TX		28	28	53,117	8,622,426	1,062,857	0	9,738,400
13	Steel Dynamics Inc.	Butler, IN		33	8	14,836	0	0	0	14,836
14	DuPont, Victoria Plant	Victoria, TX		28	32	287,377	698,656	8,393,029	20,049	9,399,111
15	Keystone Station, Reliant Energy Inc.	Shelocla, PA		491/493	10	9,079,766	3,961	0	219,275	9,303,002
16	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC		491/493	12	8,742,568	2,374	0	442,949	9,187,891
17	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	12	8,636,461	6,210	0	216,001	8,658,672
18	American Electric Power, John E. Amos Plant	Winfield, WV		491/493	12	8,137,096	1,446	0	297,675	8,436,217
19	Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas, NM		33	15	73,431	6,697	0	8,376,735	8,456,863
20	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	9	242	0	0	8,482,676	8,482,918
21	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	8	10,811	17	0	0	10,828
22	Gulf Power Co., Plant Crist, Southern Co.	Pensacola, FL		491/493	11	7,163,993	761	0	140,672	7,305,426
23	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	17	357,486	1,293	0	1	358,780
24	U.S. TVA, Johnsonville Fossil Plant, U.S. Tennessee Valley Authority	New Johnsonville, TN		491/493	13	6,423,433	6,486	0	435,759	6,865,678
25	Duke Energy, Belews Creek Steam Station	Walnut Cove, NC		491/493	12	6,631,583	685	0	196,302	6,828,570
26	Wansley Steam Electric Generating Plant	Roopville, GA		491/493	13	6,279,405	1,339	0	317,645	6,598,389
27	Dayton Power & Light Co., J.M Stuart Station	Manchester, OH		491/493	12	5,814,988	3,143	0	694,331	6,512,462
28	USS Gary Works, USX Corp.	Gary, IN		33	33	528,665	13,062	0	5,459,205	6,000,932
29	Jayhawk Fine Chemicals Corp., Laporte Fine Chemicals	Galena, KS		28	16	13,535	428	0	0	13,963
30	Lenzing Fibers Corp.	Lowland, TN		28	6	6,213,344	1,912	0	65,401	6,280,657
31	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	1	2,063	113	0	5,941,043	5,943,219
32	Safety-Kleen Inc., Grassy Mountain Facility	Grantsville, UT		495/738	20	267	0	0	6,055,921	6,056,188
33	Duke Energy, Marshall Steam Station	Terrell, NC		491/493	12	5,619,301	1,928	0	413,036	6,034,265
34	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	7	7,384	9	0	0	7,393
35	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	17	0	0	5,765,080	0	5,765,080
36	Baldwin Power Station, Dynegey, Inc.	Baldwin, IL		491/493	17	5,328,844	42,531	0	346,078	5,717,453
37	Brandon Shores & Wagner Complex, Baltimore Gas & Electric Co.	Baltimore, MD		491/493	14	5,699,648	2,342	0	8,077	5,710,067
38	Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke, ON	49	491/493	12	5,239,963	8,778	0	349,266	5,598,007
39	Detroit Edison Monroe Power Plant, DTE Energy	Monroe, MI		491/493	12	5,095,284	2,873	0	411,747	5,509,904
40	BP Chemicals Inc., BP America Inc.	Lima, OH		28	30	164,848	0	5,203,948	0	5,368,796
41	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	7	16,032	245	0	0	16,277
42	U.S. TVA, Paradise Fossil Plant, U.S. Tennessee Valley Authority	Drakesboro, KY		491/493	16	4,422,176	417,011	0	487,346	5,326,533
43	Philip Enterprises Inc., Parkdale Avenue Facility, Philip Services Corp.	Hamilton, ON	77	495/738	19	0	0	0	0	0
44	Cytec Inds., Inc. Fortier Plant	Westwego, LA		28	25	59,205	3,535	5,107,349	0	5,170,089
45	American Electric Power, Mitchell Plant	Moundsville, WV		491/493	13	4,813,854	1,566	0	349,816	5,165,236
46	Angus Chemical Co.	Sterlington, LA		28	11	72,823	210,340	4,489,334	163	4,772,660
47	Eramet Marietta Inc., Eramet Manganese Alliage	Marietta, OH		33	6	221,687	140,226	0	4,383,130	4,745,043
48	Monsanto, Luling	Luling, LA		28	13	52,209	104,780	4,471,384	0	4,628,373
49	National Steel Corp., Great Lakes Ops.	Ecorse, MI		33	20	83,899	65,700	0	0	149,599
50	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	19	3,026	0	0	4,641,649	4,644,675
Subtotal					732	133,651,086	24,900,475	48,773,244	164,513,621	371,838,426
% of Total					1	15	21	54	53	26
Total					74,108	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790

Note: Canada and US data only. Mexico data not available for 1999. 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 3–6. (continued)

Rank	Off-site Releases			Total Reported Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)		
1	0	0	0	21,471,752	Chlorine (air)
2	0	149	149	21,026,352	Copper/Zinc and compounds (land)
3	0	612,687	612,687	20,163,873	Zinc and compounds (land)
4	17	2,872	2,889	18,037,638	Aluminum oxide, Asbestos (land)
5	0	808	808	17,465,186	Zinc and compounds (land)
6	299	112,894	113,193	15,512,541	Nitric acid and nitrate compounds (water)
7	0	0	0	15,378,584	Zinc and compounds (land)
8	33	1,154	1,187	14,406,069	Nitric acid and nitrate compounds (UIJ)
9	6	51,384	51,390	12,893,911	Copper/Arsenic/Zinc and compounds (land)
10	0	11,899,963	11,899,963	12,325,557	Zinc and compounds (transfers of metals)
11	0	8	8	10,856,785	Zinc and compounds (land)
12	6,947	4,494	11,441	9,749,841	Nitric acid and nitrate compounds (water)
13	0	9,575,540	9,575,540	9,590,376	Zinc and compounds, Aluminum (transfers of metals)
14	1	9,026	9,027	9,408,138	Nitric acid and nitrate compounds (UIJ)
15	0	0	0	9,303,002	Hydrochloric acid (air)
16	0	0	0	9,187,891	Hydrochloric acid (air)
17	0	20	20	8,858,692	Hydrochloric acid (air)
18	0	369,950	369,950	8,806,167	Hydrochloric acid (air)
19	0	55,785	55,785	8,512,648	Zinc/Copper and compounds (land)
20	0	7	7	8,482,925	Zinc and compounds (land)
21	0	7,674,586	7,674,586	7,685,414	Zinc and compounds (transfers of metals)
22	0	0	0	7,305,426	Hydrochloric acid (air)
23	30	6,872,223	6,872,253	7,231,033	Zinc/Manganese and compounds (transfers of metals)
24	0	2,980	2,980	6,868,658	Hydrochloric acid (air)
25	0	18	18	6,828,588	Hydrochloric acid (air)
26	0	0	0	6,598,389	Hydrochloric acid (air)
27	0	1	1	6,512,463	Hydrochloric acid (air)
28	544	372,086	372,630	6,373,562	Zinc and compounds (land)
29	5,883,972	444,759	6,328,731	6,342,694	Nitric acid and nitrate compounds (transfers to disposal)
30	0	0	0	6,280,657	Carbon disulfide (air)
31	0	195,646	195,646	6,138,865	Chromium and compounds (land)
32	0	8,234	8,234	6,064,422	Zinc/Manganese/Lead/Copper/Chromium and compounds (land)
33	0	19	19	6,034,284	Hydrochloric acid (air)
34	0	5,795,345	5,795,345	5,802,738	Zinc and compounds (transfers of metals)
35	21,826	683	22,509	5,787,589	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
36	0	0	0	5,717,453	Hydrochloric acid (air)
37	0	0	0	5,710,067	Hydrochloric acid (air)
38	0	0	0	5,598,007	Hydrochloric acid (air)
39	0	0	0	5,509,904	Hydrochloric acid (air)
40	249	326	575	5,369,371	Acetonitrile, Acrylamide (UIJ)
41	0	5,345,577	5,345,577	5,361,854	Zinc and compounds (transfers of metals)
42	0	228	228	5,326,761	Sulfuric acid, Hydrochloric acid (air)
43	2,720,544	2,487,456	5,208,000	5,208,000	Zinc and compounds (transfers of metals), Xylenes, Toluene (transfers to disposal)
44	2,797	4,855	7,652	5,177,741	Acetonitrile, Acrylamide, Acrylic acid, Acrylonitrile (UIJ)
45	0	130	130	5,165,366	Hydrochloric acid (air)
46	0	16	16	4,772,676	Nitric acid and nitrate compounds, Formaldehyde (UIJ)
47	0	23,810	23,810	4,768,853	Manganese and compounds (land)
48	0	20,862	20,862	4,649,235	Formaldehyde, Formic acid (UIJ)
49	1,254	4,498,244	4,499,498	4,649,097	Zinc and compounds (transfers of metals)
50	0	2,517	2,517	4,647,192	Aluminum oxide, Lead/Copper and compounds, Asbestos (land)
	8,638,519	56,447,342	65,085,861	436,924,287	
	21	24	24	26	
	40,358,804	234,442,688	274,801,492	1,693,921,282	

UIJ=underground injection.

- The third-ranked industry sector, chemical manufacturing, had 11 facilities in the top 50. Chemicals facilities reported releases of a variety of substances, including nitric acid and nitrates to water and underground injection.
- The fourth-ranked industry sector, hazardous waste management and solvent recovery, had eight facilities in the top 50. Hazardous waste disposal/solvent recovery facilities are disposal sites that receive wastes from manufacturing and other facilities. They may also treat or consolidate wastes and transfer them to other disposal sites.
- Seven TRI facilities each reported more than 15 million kg of releases in 1999. Four of the seven were primary metals facilities, two were hazardous waste management facilities, and one was a chemical manufacturing facility. Most of their releases were on-site.

Facilities with Largest On-site Releases

- The 50 facilities in North America with the largest on-site releases in the matched data set reported 410.3 million kg of on-site releases in 1999, or 29 percent of North American on-site releases.
- These 50 facilities reported 60 percent of North American on-site land releases and 59 percent of underground injection. They also contributed 21 percent of on-site releases to surface water and 16 percent of on-site releases to air.
- The top three facilities, all primary metals facilities located in the United States, each reported more than 19 million kg of on-site releases. The facilities with the fourth- and fifth-largest on-site releases were in the hazardous waste management sector.
- Of the 50 facilities, 20 were electric generating facilities, eight were hazardous waste management facilities, 11 were in the primary metals sector, and 11 were in the chemicals sector.

Table 3-7. The 50 North American Facilities with the Largest Total On-site Releases, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms	On-site Releases			
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)
1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	6	21,471,752	0	0	0
2	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden, AZ		33	11	77,250	0	0	20,948,953
3	ASARCO Inc.	East Helena, MT		33	10	22,913	752	0	19,527,521
4	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	37	341	0	0	18,034,408
5	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	10	433	0	0	17,463,945
6	AK Steel, Butler Works	Butler, PA		33	13	63,835	14,514,107	0	821,406
7	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	15	1,274	0	0	15,377,310
8	Solutia Inc.	Gonzalez, FL		28	20	123,756	863	14,280,263	0
9	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	98,408	11,313	0	12,732,800
10	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	9	1,447	0	0	10,855,330
11	BASF Corp.	Freeport, TX		28	28	53,117	8,622,426	1,062,857	0
12	DuPont, Victoria Plant	Victoria, TX		28	32	287,377	698,656	8,393,029	20,049
13	Keystone Station, Reliant Energy Inc.	Shelocla, PA		491/493	10	9,079,766	3,961	0	219,275
14	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC		491/493	12	8,742,568	2,374	0	442,949
15	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	12	8,636,461	6,210	0	216,001
16	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	9	242	0	0	8,482,676
17	Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas, NM		33	15	73,431	6,697	0	8,376,735
18	American Electric Power, John E. Amos Plant	Winfield, WV		491/493	12	8,137,096	1,446	0	297,675
19	Gulf Power Co., Plant Crist, Southern Co.	Pensacola, FL		491/493	11	7,163,993	761	0	140,672
20	U.S. TVA, Johnsonville Fossil Plant, U.S. Tennessee Valley Authority	New Johnsonville, TN		491/493	13	6,423,433	6,486	0	435,759
21	Duke Energy, Belews Creek Steam Station	Walnut Cove, NC		491/493	12	6,631,583	685	0	196,302
22	Wansley Steam Electric Generating Plant	Roopville, GA		491/493	13	6,279,405	1,339	0	317,645
23	Dayton Power & Light Co., J.M. Stuart Station	Manchester, OH		491/493	12	5,814,988	3,143	0	694,331
24	Lenzing Fibers Corp.	Lowland, TN		28	6	6,213,344	1,912	0	65,401
25	Safety-Kleen Inc., Grassy Mountain Facility	Grantsville, UT		495/738	20	267	0	0	6,055,921
26	Duke Energy Marshall, Steam Station	Terrell, NC		491/493	12	5,619,301	1,928	0	413,036
27	USS Gary Works, USX Corp.	Gary, IN		33	33	528,665	13,062	0	5,459,205
28	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	1	2,063	113	0	5,941,043
29	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	17	0	0	5,765,080	0
30	Baldwin Power Station, Dynegy, Inc.	Baldwin, IL		491/493	17	5,328,844	42,531	0	346,078
31	Brandon Shores & Wagner Complex, Baltimore Gas & Electric Co.	Baltimore, MD		491/493	14	5,699,648	2,342	0	8,077
32	Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke, ON	49	491/493	12	5,239,963	8,778	0	349,266
33	Detroit Edison Monroe Power Plant, DTE Energy	Monroe, MI		491/493	12	5,095,284	2,873	0	411,747
34	BP Chemicals Inc., BP America Inc.	Lima, OH		28	30	164,848	0	5,203,948	0
35	U.S. TVA Paradise, Fossil Plant, U.S. Tennessee Valley Authority	Drakesboro, KY		491/493	16	4,422,176	417,011	0	487,346
36	Cytec Inds. Inc., Fortier Plant	Westwego, LA		28	25	59,205	3,535	5,107,349	0
37	American Electric Power, Mitchell Plant	Moundsville, WV		491/493	13	4,813,854	1,566	0	349,816
38	Angus Chemical Co.	Sterlington, LA		28	11	72,823	210,340	4,489,334	163
39	Eramet Marietta Inc., Eramet Manganese Alliage	Marietta, OH		33	6	221,687	140,226	0	4,383,130
40	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	19	3,026	0	0	4,641,649
41	Monsanto, Luling	Luling, LA		28	13	52,209	104,780	4,471,384	0
42	American Electric Power Cardinal Plant, Cardinal Operating Co.	Brilliant, OH		491/493	14	4,194,743	10,220	0	377,434
43	BP Chemicals Inc., Green Lake Facility, BP America Inc.	Port Lavaca, TX		28	17	91,807	399	4,452,013	990
44	Doe Run Co., Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	9	150,363	80	0	4,386,262
45	Northwestern Steel & Wire Co.	Sterling, IL		33	6	53,175	5,646	0	4,438,548
46	Mississippi Power Co., Plant Watson, Southern Co.	Gulfpport, MS		491/493	11	4,105,842	785	0	172,162
47	Kentucky Utilities Co., Ghent Station, LG&E Energy Corp.	Ghent, KY		491/493	13	3,448,110	27,071	0	796,418
48	Chemical Waste Management Inc., Waste Management Inc.	Emelle, AL		495/738	23	185	0	0	4,268,888
49	PSI Energy Gibson, Generating Station, Cinergy Corp.	Princeton, IN		491/493	12	3,245,651	0	0	1,014,694
50	Doe Run Co., Glover Smelter, Renco Group Inc.	Glover, MO		33	7	21,909	6	0	4,159,274
Subtotal					729	148,033,861	24,876,423	53,225,257	184,128,290
% of Total					1	16	21	59	60
Total					74,108	901,416,201	118,215,282	90,116,656	309,239,442

Note: Canada and US data only. Mexico data not available for 1999. 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 3-7. (continued)

Rank	Total On-site Releases (kg)	Major Chemicals Reported (Primary Media) (chemicals accounting for more than 70% of on-site releases from the facility)	Total Off-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
1	21,471,752	Chlorine (air)	0	21,471,752
2	21,026,203	Copper/Zinc and compounds (land)	149	21,026,352
3	19,551,186	Zinc and compounds (land)	612,687	20,163,873
4	18,034,749	Aluminum oxide, Asbestos (land)	2,889	18,037,638
5	17,464,378	Zinc and compounds (land)	808	17,465,186
6	15,399,348	Nitric acid and nitrate compounds (water)	113,193	15,512,541
7	15,378,584	Zinc and compounds (land)	0	15,378,584
8	14,404,882	Nitric acid and nitrate compounds (UIJ)	1,187	14,406,069
9	12,842,521	Copper/Arsenic/Zinc and compounds (land)	51,390	12,893,911
10	10,856,777	Zinc and compounds (land)	8	10,856,785
11	9,738,400	Nitric acid and nitrate compounds (water)	11,441	9,749,841
12	9,399,111	Nitric acid and nitrate compounds (UIJ)	9,027	9,408,138
13	9,303,002	Hydrochloric acid (air)	0	9,303,002
14	9,187,891	Hydrochloric acid (air)	0	9,187,891
15	8,858,672	Hydrochloric acid (air)	20	8,858,692
16	8,482,918	Zinc and compounds (land)	7	8,482,925
17	8,456,863	Zinc/Copper and compounds (land)	55,785	8,512,648
18	8,436,217	Hydrochloric acid (air)	369,950	8,806,167
19	7,305,426	Hydrochloric acid (air)	0	7,305,426
20	6,865,678	Hydrochloric acid (air)	2,980	6,868,658
21	6,828,570	Hydrochloric acid (air)	18	6,828,588
22	6,598,389	Hydrochloric acid (air)	0	6,598,389
23	6,512,462	Hydrochloric acid (air)	1	6,512,463
24	6,280,657	Carbon disulfide (air)	0	6,280,657
25	6,056,188	Zinc/Manganese/Lead/Copper/Chromium and compounds (land)	8,234	6,064,422
26	6,034,265	Hydrochloric acid (air)	19	6,034,284
27	6,000,932	Zinc and compounds (land)	372,630	6,373,562
28	5,943,219	Chromium and compounds (land)	195,646	6,138,865
29	5,765,080	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)	22,509	5,787,589
30	5,717,453	Hydrochloric acid (air)	0	5,717,453
31	5,710,067	Hydrochloric acid (air)	0	5,710,067
32	5,598,007	Hydrochloric acid (air)	0	5,598,007
33	5,509,904	Hydrochloric acid (air)	0	5,509,904
34	5,368,796	Acetonitrile, Acrylamide (UIJ)	575	5,369,371
35	5,326,533	Sulfuric acid, Hydrochloric acid (air)	228	5,326,761
36	5,170,089	Acetonitrile, Acrylamide, Acrylic acid, Acrylonitrile (UIJ)	7,652	5,177,741
37	5,165,236	Hydrochloric acid (air)	130	5,165,366
38	4,772,660	Nitric acid and nitrate compounds, Formaldehyde (UIJ)	16	4,772,676
39	4,745,043	Manganese and compounds (land)	23,810	4,768,853
40	4,644,675	Aluminum oxide, Lead/Copper and compounds, Asbestos (land)	2,517	4,647,192
41	4,628,373	Formaldehyde, Formic acid (UIJ)	20,862	4,649,235
42	4,582,397	Hydrochloric acid (air)	355	4,582,752
43	4,545,209	Acetonitrile, Acrylamide, Cyanide and compounds (UIJ)	259	4,545,468
44	4,536,705	Zinc and compounds (land)	707	4,537,412
45	4,497,369	Zinc/Manganese and compounds (land)	40,508	4,537,877
46	4,278,789	Hydrochloric acid (air)	7	4,278,796
47	4,271,599	Hydrochloric acid, Sulfuric acid (air)	0	4,271,599
48	4,269,073	Zinc/Lead/Copper and compounds (land)	76,250	4,345,323
49	4,260,345	Hydrochloric acid, Sulfuric acid, Hydrogen fluoride (air)	1	4,260,346
50	4,181,189	Zinc/Lead and compounds (land)	259	4,181,448
	410,263,831		2,004,714	412,268,545
	29		0.7	24
	1,419,119,790		274,801,492	1,693,921,282

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 146.0 million kg of off-site releases in 1999—53 percent of all North American off-site releases.
- The 50 facilities with the largest off-site releases in 1999 reported more than half 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, 34 were in the primary metals sector, 10 were hazardous waste management facilities, four were chemical manufacturing facilities, and two were in other or multiple sectors. Seven of the top 10 facilities were in the primary metals sector.

Table 3–8. The 50 North American Facilities with the Largest Total Off-site Releases, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms	Off-site Releases		Total Off-site Releases (kg)
			Canada	US		Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	
1	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13	0	11,899,963	11,899,963
2	Steel Dynamics Inc.	Butler, IN		33	8	0	9,575,540	9,575,540
3	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	8	0	7,674,586	7,674,586
4	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	17	30	6,872,223	6,872,253
5	Jayhawk Fine Chemicals Corp., Laporte Fine Chemicals	Galena, KS		28	16	5,883,972	444,759	6,328,731
6	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	7	0	5,795,345	5,795,345
7	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	7	0	5,345,577	5,345,577
8	Philip Enterprises Inc., Parkdale Avenue Facility, Philip Services Corp.	Hamilton, ON	77	495/738	19	2,720,544	2,487,456	5,208,000
9	National Steel Corp., Great Lakes Ops.	Ecorse, MI		33	20	1,254	4,498,244	4,499,498
10	USL City Environmental Inc., U.S. Liquids Inc.	Detroit, MI		495/738	8	0	3,964,052	3,964,052
11	Philip Enterprises Inc., Yard 3 Facility, Philip Services Corp.	Hamilton, ON	77	495/738	6	120,840	3,483,350	3,604,190
12	Envirite of Ohio Inc., Envirite Corp.	Canton, OH		495/738	9	153,288	3,436,432	3,589,720
13	Nucor Steel, Nucor Corp.	Huger, SC		33	6	0	3,293,837	3,293,837
14	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville, OR		33	5	0	3,164,138	3,164,138
15	Co-Steel Lasco	Whitby, ON	29	33	5	0	3,077,610	3,077,610
16	Ipsco Steel Inc., Ipsco Inc.	Muscataine, IA		33	6	0	3,064,225	3,064,225
17	Keystone Steel & Wire Co., Keystone Consolidated Inds. Inc.	Peoria, IL		33	5	0	2,970,641	2,970,641
18	American Steel Foundries, Amsted Inds. Inc.	Alliance, OH		33	3	0	2,845,443	2,845,443
19	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	12	0	2,806,033	2,806,033
20	Nucor Steel, Nucor Corp.	Plymouth, UT		33	6	0	2,557,302	2,557,302
21	USS Mon Valley Works, Edgar Thomson Plant, USX Corp.	Braddock, PA		33	6	0	2,547,644	2,547,644
22	Yuasa Inc. Battery Plant	Richmond, KY		36	3	0	2,520,620	2,520,620
23	Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais, IL		33	5	0	2,341,096	2,341,096
24	Southwire Co.	Carrollton, GA		Mult.	35	12,836	2,302,466	2,315,302
25	Nucor Steel—Nebraska, Nucor Corp.	Norfolk, NE		33	5	0	2,272,676	2,272,676
26	Timken Co., Faircrest Steel Plant	Canton, OH		33	7	0	1,974,355	1,974,355
27	Corus Tuscaloosa, Corus Group PLC	Tuscaloosa, AL		33	12	0	1,836,748	1,836,748
28	Wheeling-Pittsburgh Steel Corp., Mingo Junction	Mingo Junction, OH		33	11	0	1,774,827	1,774,827
29	Ivaco Rolling Mills	L'Orignal, ON	29	33	7	0	1,754,100	1,754,100
30	Philip Enterprises Inc., Rexdale Facility, Philip Services Corp.	Etobicoke, ON	77	495/738	8	1,696,287	47,789	1,744,076
31	Macalloy Corp.	North Charleston, SC		33	2	0	1,720,298	1,720,298
32	Roanoke Electric Steel Corp.	Roanoke, VA		33	7	0	1,671,504	1,671,504
33	Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton, PA		33	6	0	1,526,301	1,526,301
34	Birmingham Steel, Memphis SBQ Bar Rod & Wire Div.	Memphis, TN		33	6	0	1,519,755	1,519,755
35	Revere Smelting & Refining Corp., RSR Corp.	Middletown, NY		33	5	0	1,456,328	1,456,328
36	CSC Ltd.	Warren, OH		33	12	0	1,456,138	1,456,138
37	Philip Enterprises Inc., Fort Erie Facility, Philip Services Corp.	Fort Erie, ON	77	495/738	6	707,300	703,937	1,411,237
38	Nucor Steel—Arkansas, Nucor Corp.	Blytheville, AR		33	11	0	1,390,895	1,390,895
39	Eveready Battery Co. Inc., Ralston Purina Co.	Marietta, OH		28	1	0	1,376,782	1,376,782
40	DuPont, Edgemoor	Edgemoor, DE		28	12	0	1,309,615	1,309,615
41	Koppers Inds. Inc.	Cicero, IL		28	10	1,307,068	0	1,307,068
42	Newport Steel Corp., NS Group Inc.	Wilder, KY		33	6	0	1,260,009	1,260,009
43	Onyx Environmental Services L.L.C	Azusa, CA		495/738	36	528,232	719,034	1,247,266
44	Stelco McMaster Ltée, Stelco Inc.	Contrecoeur, QC	29	33	5	0	1,221,420	1,221,420
45	Quemetco Inc., RSR Corp.	Indianapolis, IN		33	5	0	1,204,274	1,204,274
46	AK Steel, Zanesville Works	Zanesville, OH		33	6	1,160,998	32,240	1,193,238
47	Safety-Kleen Corp.	Denton, TX		495/738	29	1,141,007	22,663	1,163,670
48	Philip Services Corp., Windsor Facility	Windsor, ON	77	495/738	10	1,105,574	46,138	1,151,712
49	Slater Steels Inc., Hamilton Specialty Bar Division	Hamilton, ON	29	33	9	213	1,146,744	1,146,957
50	Oregon Steel Mills Inc.	Portland, OR		33	6	0	1,090,522	1,090,522
	Subtotal				475	16,539,443	129,503,674	146,043,117
	% of Total				0.6	41	55	53
	Total				74,106	40,358,804	234,442,688	274,801,492

Note: Canada and US data only. Mexico data not available for 1999. 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 3–8. (continued)

Rank	Major Chemicals Reported (Primary Transfers) (chemicals accounting for more than 70% of off-site releases from the facility)	Total On-site Releases (kg)	Total Reported Releases On- and Off-site (kg)
1	Zinc and compounds (transfers of metals)	425,594	12,325,557
2	Zinc and compounds, Aluminum (transfers of metals)	14,836	9,590,376
3	Zinc and compounds (transfers of metals)	10,828	7,685,414
4	Zinc and compounds (transfers of metals)	358,780	7,231,033
5	Nitric acid and nitrate compounds (transfers to disposal)	13,963	6,342,694
6	Zinc and compounds (transfers of metals)	7,393	5,802,738
7	Zinc and compounds (transfers of metals)	16,277	5,361,854
8	Zinc and compounds (transfers of metals), Xylenes, Toluene (transfers to disposal)	0	5,208,000
9	Zinc and compounds (transfers of metals)	149,599	4,649,097
10	Zinc/Lead and compounds (transfers of metals)	0	3,964,052
11	Zinc/Manganese and compounds (transfers of metals)	0	3,604,190
12	Zinc/Nickel and compounds (transfers of metals)	934	3,590,654
13	Zinc and compounds (transfers of metals)	8,260	3,302,097
14	Zinc and compounds (transfers of metals)	3,908	3,168,046
15	Zinc and compounds (transfers of metals)	1,093,157	4,170,767
16	Zinc and compounds (transfers of metals)	1,400	3,065,625
17	Zinc and compounds (transfers of metals)	29,730	3,000,371
18	Chromium and compounds (transfers of metals)	13,473	2,858,916
19	Nickel/Zinc/Copper and compounds (transfers of metals)	83	2,806,116
20	Zinc and compounds (transfers of metals)	9,886	2,567,188
21	Zinc and compounds (transfers of metals)	2,964	2,550,608
22	Lead and compounds (transfers of metals)	139	2,520,759
23	Zinc and compounds (transfers of metals)	3,596	2,344,692
24	Zinc/Lead and compounds (transfers of metals)	17,545	2,332,847
25	Zinc and compounds (transfers of metals)	6,356	2,279,032
26	Zinc and compounds (transfers of metals)	3,071	1,977,426
27	Zinc and compounds (transfers of metals)	2,919	1,839,667
28	Zinc and compounds (transfers of metals)	30,481	1,805,308
29	Zinc and compounds (transfers of metals)	9,228	1,763,328
30	Xylenes, Toluene (transfers to disposal)	0	1,744,076
31	Chromium and compounds (transfers of metals)	113	1,720,411
32	Zinc and compounds (transfers of metals)	3,066	1,674,570
33	Lead/Zinc and compounds (transfers of metals)	4,414	1,530,715
34	Zinc and compounds (transfers of metals)	11,722	1,531,477
35	Lead and compounds (transfers of metals)	372	1,456,700
36	Zinc and compounds (transfers of metals)	85,070	1,541,208
37	Nitric acid and nitrate compounds (transfers to disposal), Chromium and compounds (transfers of metals)	0	1,411,237
38	Zinc and compounds (transfers of metals)	13,604	1,404,499
39	Manganese and compounds (transfers of metals)	7,716	1,384,498
40	Manganese and compounds (transfers of metals)	19,486	1,329,101
41	Phthalic anhydride (transfers to disposal)	73,792	1,380,860
42	Zinc and compounds (transfers of metals)	20,114	1,280,123
43	Chromium/Lead/Cadmium/Silver/Arsenic and compounds (transfers of metals), Methyl ethyl ketone, Xylenes, Toluene (transfers to disposal)	8,630	1,255,896
44	Zinc and compounds (transfers of metals)	18,236	1,239,656
45	Lead/Arsenic and compounds (transfers of metals)	2,228	1,206,502
46	Nitric acid and nitrate compounds (transfers to disposal)	59,668	1,252,906
47	Toluene, Xylenes, Methyl ethyl ketone, Vinyl acetate, Methanol, Dichloromethane (transfers to disposal)	1,889	1,165,559
48	Xylenes, Toluene (transfers to disposal)	0	1,151,712
49	Zinc/Manganese and compounds (transfers of metals)	17,533	1,164,490
50	Zinc and compounds (transfers of metals)	5,219	1,095,741
		2,587,272	148,630,389
		0.2	9
		1,419,119,790	1,693,921,282

3.2.4 Releases by Chemical

The matched data set contains 210 substances that are reported both to NPRI and to TRI. A very few chemicals account for most releases on- and off-site in North America.

- Just 25 of the 210 matched chemicals, with 1.46 billion kg of releases, represented 90 percent of total releases.
- Hydrochloric acid had the largest releases in North America: 313.6 million kg, or about 19 percent of total releases of all chemicals. Hydrochloric acid is generated during the combustion of coal to produce electricity. Acid aerosols can contribute to respiratory problems, including bronchitis, asthma and emphysema. Hydrochloric acid emissions may increase the acidity in clouds downwind from the facilities, contributing to the formation of acid rain.
- Zinc and its compounds ranked second for total releases, with 207.7 million kg (about 13 percent of the total), mainly in the form of on-site land releases and off-site transfers of metals. Zinc is used to galvanize metals (including steel) to prevent rust and is often found in materials recycled into steel and other products. Although zinc is an essential nutrient, prolonged ingestion of excessive levels of this chemical can cause anemia, damage to the pancreas and reduction of beneficial cholesterol.

Table 3-9. The 25 Chemicals with the Largest Total Releases On- and Off-site in North America, 1999

CAS Number	Chemical	Number of Forms	On-site Releases				Total On-site Releases (kg)
			Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
7647-01-0	Hydrochloric acid	1,471	313,645,594	0	0	0	313,645,594
--	Zinc (and its compounds)*	4,080	5,796,673	730,054	494,255	126,304,629	133,333,125
--	Nitric acid and nitrate compounds	3,837	2,277,164	107,730,570	31,733,853	3,967,607	145,711,156
67-56-1	Methanol	2,803	104,031,202	3,568,764	8,812,959	697,028	117,121,494
7664-93-9	Sulfuric acid	1,116	89,034,766	0	0	0	89,034,766
--	Manganese (and its compounds)*	3,833	1,539,871	3,273,810	3,219,106	47,255,725	55,300,484
108-88-3	Toluene	3,382	47,112,227	14,782	358,781	145,923	47,639,946
--	Copper (and its compounds)*	4,966	2,052,283	199,178	171,487	31,171,772	33,600,848
--	Xylenes	3,492	37,920,006	14,752	54,693	139,568	38,138,177
--	Chromium (and its compounds)*▼	4,055	496,231	118,265	697,062	22,112,800	23,431,663
--	Lead (and its compounds)*▼	1,964	1,055,969	37,574	88,982	23,200,316	24,386,634
7664-39-3	Hydrogen fluoride	1,071	36,494,217	7,703	1,859,410	41,485	38,403,747
100-42-5	Styrene▼	1,725	26,846,446	1,437	87,046	177,419	27,117,004
110-54-3	n-Hexane	1,043	27,610,163	5,412	19,044	3,781	27,642,310
78-93-3	Methyl ethyl ketone	2,170	22,322,161	15,566	1,013,180	113,465	23,470,875
7782-50-5	Chlorine	1,322	22,807,359	179,949	28,318	44,661	23,062,060
75-09-2	Dichloromethane▼	758	18,374,538	5,458	75,672	28,142	18,485,239
--	Nickel (and its compounds)*▼	3,743	922,133	133,199	166,421	8,096,952	9,322,058
75-15-0	Carbon disulfide	116	16,354,816	2,967	7,306	115	16,366,194
1344-28-1	Aluminum oxide (fibrous forms)	74	51,555	342	0	14,569,047	14,621,044
74-85-1	Ethylene	346	13,605,494	416	29,550	32,482	13,668,994
50-00-0	Formaldehyde▼	958	7,174,724	195,532	4,939,348	139,747	12,451,425
71-36-3	n-Butyl alcohol	1,217	10,702,579	25,525	1,446,278	2,098	12,180,266
1332-21-4	Asbestos (friable)▼	133	1,553	0	0	7,792,929	7,794,482
7429-90-5	Aluminum (fume or dust)*	383	1,110,207	2,311	0	3,398,357	4,511,390
	Subtotal	50,058	809,339,931	116,263,566	55,302,751	289,436,048	1,270,440,975
	% of Total	68	90	98	61	94	90
	Total	74,108	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790

Note: Canada and US data only. Mexico data not available for 1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

Table 3–9. (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		Adjustment Component* (kg)	Total Releases (adjusted)**		
			kg	Rank		kg	Rank	
0	0	0	313,645,594	1	0	313,645,594	1	
0	118,306,530	118,306,530	251,639,655	2	43,930,610	207,709,045	2	
11,934,868	0	11,934,868	157,646,024	3	3,087,572	154,558,452	3	
1,156,402	0	1,156,402	118,277,896	4	404,986	117,872,910	4	
0	0	0	89,034,766	6	0	89,034,766	5	
0	35,487,652	35,487,652	90,788,136	5	3,578,544	87,209,592	6	
2,597,600	0	2,597,600	50,237,546	7	106,645	50,130,901	7	
0	13,374,179	13,374,179	46,975,027	9	1,274,269	45,700,758	8	
4,423,461	0	4,423,461	42,561,638	11	7,227	42,554,411	9	
0	20,537,918	20,537,918	43,969,581	10	1,746,540	42,223,041	10	
0	23,598,363	23,598,363	47,984,997	8	7,599,278	40,385,719	11	
264,058	0	264,058	38,667,805	12	222,567	38,445,238	12	
1,003,847	0	1,003,847	28,120,851	13	683	28,120,168	13	
31,143	0	31,143	27,673,453	14	1,339	27,672,114	14	
1,219,081	0	1,219,081	24,689,956	15	21,712	24,668,244	15	
46,215	0	46,215	23,108,275	16	0	23,108,275	16	
494,650	0	494,650	18,979,889	18	8,651	18,971,238	17	
0	10,033,844	10,033,844	19,355,902	17	1,057,378	18,298,524	18	
1,734	0	1,734	16,367,928	19	0	16,367,928	19	
1,576,942	0	1,576,942	16,197,986	20	20,053	16,177,933	20	
343	0	343	13,669,337	21	0	13,669,337	21	
227,536	0	227,536	12,678,961	22	8,110	12,670,851	22	
368,213	0	368,213	12,548,479	23	41,680	12,506,799	23	
3,650,638	0	3,650,638	11,445,120	24	12,001	11,433,119	24	
0	6,669,987	6,669,987	11,181,377	25	105,506	11,075,871	25	
28,996,731	228,008,473	257,005,204	1,527,446,179		63,235,351	1,464,210,828		
72	97	94	90		98	90		
40,358,804	234,442,688	274,801,492	1,693,921,282		64,633,897	1,629,287,385		

* Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

- Nitric acid and nitrate compounds had the third-largest total releases (154.6 million kg). This group ranked first for reported surface water discharges, underground injection, and transfers of substances other than metals off-site to disposal.

Note: 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.

Carcinogens

Of the 210 chemicals in the matched data set, 56 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/>>.

- Fourteen percent of all releases on- and off-site in North America in 1999 were of designated carcinogens. Total releases on- and off-site of carcinogens came to 222.9 million kg.
- Chromium and its compounds were released in the largest amounts: 42.2 million kg, including 22.1 million kg of on-site land releases. Lead and its compounds ranked second, with 40.4 million kg, of which 23.2 million kg was on-site land releases. Lead had the largest off-site releases. Reported off-site releases for the lead group and the chromium group were more than 20 million kg each. Both lead and chromium are metals, and a metal is listed as a designated carcinogen if it or any of its compounds is a designated carcinogen.
- Styrene had the largest on-site air emissions, 26.8 million kg. Dichloromethane was second in air emissions, with 18.4 million kg.

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.

Table 3–10. On- and Off-site Releases in North America of Known or Suspected Carcinogens, 1999

CAS Number	Chemical	Number of Forms	On-site Releases				Total On-site Releases (kg)
			Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
--	Chromium (and its compounds)*	4,055	496,231	118,265	697,062	22,112,800	23,431,663
--	Lead (and its compounds)*	1,964	1,055,969	37,574	88,982	23,200,316	24,386,634
100-42-5	Styrene	1,725	26,846,446	1,437	87,046	177,419	27,117,004
75-09-2	Dichloromethane	758	18,374,538	5,458	75,672	28,142	18,485,239
--	Nickel (and its compounds)*	3,743	922,133	133,199	166,421	8,096,952	9,322,058
50-00-0	Formaldehyde	958	7,174,724	195,532	4,939,348	139,747	12,451,425
1332-21-4	Asbestos (friable)	133	1,553	0	0	7,792,829	7,794,482
--	Arsenic (and its compounds)*	640	270,689	84,242	90,050	7,890,774	8,335,869
75-07-0	Acetaldehyde	323	6,264,250	123,507	342,075	5,467	6,735,450
79-01-6	Trichloroethylene	678	5,422,176	468	0	67,512	5,490,730
71-43-2	Benzene	560	4,404,127	7,108	423,299	259,697	5,094,479
79-06-1	Acrylamide	95	11,542	189	3,406,283	2,852	3,420,966
--	Cobalt (and its compounds)*	709	48,618	41,405	13,957	2,024,855	2,129,035
67-66-3	Chloroform	164	2,532,561	41,881	56,099	5,336	2,636,569
107-13-1	Acrylonitrile	127	452,192	529	2,023,807	10,795	2,488,598
--	Cadmium (and its compounds)*	191	52,124	1,965	27,674	1,809,731	1,891,594
108-05-4	Vinyl acetate	207	1,738,095	1,790	450,051	17,648	2,208,002
127-18-4	Tetrachloroethylene	493	1,773,714	842	4,166	48,004	1,827,164
106-99-0	1,3-Butadiene	203	957,012	862	327	57	958,633
107-06-2	1,2-Dichloroethane	93	274,381	605	29,738	1,656	306,380
117-81-7	Di(2-ethylhexyl) phthalate	389	112,322	1,302	0	15,849	129,596
123-91-1	1,4-Dioxane	68	75,390	77,373	113	24,023	176,899
75-01-4	Vinyl chloride	58	403,575	173	185	0	404,208
75-56-9	Propylene oxide	130	330,074	4,919	6,835	13,317	355,145
75-21-8	Ethylene oxide	154	241,119	523	4,896	793	248,000
584-84-9	Toluene-2,4-diisocyanate	65	2,183	2	0	6,440	8,735
98-95-3	Nitrobenzene	33	35,044	169	95,849	30	131,092
56-23-5	Carbon tetrachloride	73	109,140	37	12,493	425	122,095
106-46-7	1,4-Dichlorobenzene	33	91,387	853	3,311	622	96,273
140-88-5	Ethyl acrylate	114	59,472	50	367	6,878	67,089
106-89-8	Epichlorohydrin	82	66,459	138	0	791	67,392
302-01-2	Hydrazine	64	4,844	2,040	40,080	168	47,132
121-14-2	2,4-Dinitrotoluene	15	1,035	1,266	0	19,692	21,993
101-77-9	4,4'-Methylenedianiline	24	4,172	1,926	14,966	4	21,068
26471-62-5	Toluenediisocyanate (mixed isomers)	210	17,383	1,134	0	115	18,863
67-72-1	Hexachloroethane	25	19,737	0	145	4,206	24,088
120-80-9	Catechol	138	3,189	13,011	0	392	16,592
64-67-5	Diethyl sulfate	31	1,695	0	0	0	1,695
606-20-2	2,6-Dinitrotoluene	6	297	19	0	6,933	7,249
100-44-7	Benzyl chloride	46	11,935	547	122	97	12,801
79-46-9	2-Nitropropane	6	9,497	129	0	0	9,626
106-88-7	1,2-Butylene oxide	14	5,274	1,089	0	0	6,363
139-13-9	Nitrotriacetic acid	22	2,172	2,866	726	0	5,901
101-14-4	4,4'-Methylenebis(2-chloroaniline)	21	18	0	0	3,714	3,737
77-78-1	Dimethyl sulfate	35	4,489	1	0	0	4,490
94-59-7	Safrole	4	128	0	0	2,723	2,851
563-47-3	3-Chloro-2-methyl-1-propene	4	3,952	0	0	0	3,952
96-45-7	Ethylene thiourea	17	133	2	0	0	135
91-08-7	Toluene-2,6-diisocyanate	28	1,090	0	0	0	1,090
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	17	2	2	0	0	4
62-56-6	Thiourea	28	454	116	0	113	683
95-80-7	2,4-Diaminotoluene	6	302	0	0	0	302
90-94-8	Michler's ketone	2	394	0	0	0	394
115-28-6	Chlorendic acid	2	15	0	0	0	15
96-09-3	Styrene oxide	1	3	0	0	0	3
7758-01-2	Potassium bromate	2	2	0	0	0	2
	Subtotal	19,786	80,691,452	906,545	13,102,145	73,800,014	168,529,527
	% of Total	27	9	0.8	15	24	12
	Total	74,108	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790

Note: Canada and US data only. Mexico data not available for 1999. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP).

* Metal and its compounds.

Table 3–10. (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		Adjustment Component* (kg)	Total Releases (adjusted)**			
			kg	Rank		kg	Rank		
0	20,537,918	20,537,918	43,969,581	2	1,746,540	42,223,041	1		
0	23,598,363	23,598,363	47,984,997	1	7,599,278	40,385,719	2		
1,003,847	0	1,003,847	28,120,851	3	683	28,120,168	3		
494,650	0	494,650	18,979,889	5	8,651	18,971,238	4		
0	10,033,844	10,033,844	19,355,902	4	1,057,378	18,298,524	5		
227,536	0	227,536	12,678,961	6	8,110	12,670,851	6		
3,650,638	0	3,650,638	11,445,120	7	12,001	11,433,119	7		
0	2,264,705	2,264,705	10,600,574	8	243,377	10,357,197	8		
2,039	0	2,039	6,737,489	9	0	6,737,489	9		
77,613	0	77,613	5,568,343	10	1,015	5,567,328	10		
224,069	0	224,069	5,318,548	11	56,819	5,261,729	11		
2,787	0	2,787	3,423,753	12	0	3,423,753	12		
0	598,040	598,040	2,727,075	14	28,784	2,698,291	13		
45,801	0	45,801	2,682,370	15	2,986	2,679,384	14		
104,637	0	104,637	2,593,235	16	1	2,593,234	15		
0	950,994	950,994	2,842,588	13	403,688	2,438,900	16		
171,287	0	171,287	2,379,289	17	88	2,379,201	17		
96,929	0	96,929	1,924,093	18	169	1,923,924	18		
1,164	0	1,164	959,797	19	0	959,797	19		
309,889	0	309,889	616,269	20	6,582	609,687	20		
478,114	0	478,114	607,710	21	113	607,597	21		
302,099	0	302,099	478,998	22	3	478,995	22		
6,356	0	6,356	410,564	23	0	410,564	23		
3,272	0	3,272	358,417	24	883	357,534	24		
27,630	0	27,630	275,630	25	0	275,630	25		
222,991	0	222,991	231,726	26	0	231,726	26		
49,864	0	49,864	180,956	27	20,878	160,078	27		
9,104	0	9,104	131,199	28	0	131,199	28		
8	0	8	96,281	29	0	96,281	29		
13,447	0	13,447	80,536	30	0	80,536	30		
1,315	0	1,315	68,707	31	0	68,707	31		
19,981	0	19,981	67,113	32	19,744	47,369	32		
22,357	0	22,357	44,350	33	0	44,350	33		
14,406	0	14,406	35,474	34	0	35,474	34		
16,358	0	16,358	35,221	35	0	35,221	35		
8,340	0	8,340	32,428	36	0	32,428	36		
1,378	0	1,378	17,970	37	0	17,970	37		
15,655	0	15,655	17,350	38	0	17,350	38		
7,669	0	7,669	14,918	39	0	14,918	39		
651	0	651	13,452	40	0	13,452	40		
520	0	520	10,146	41	0	10,146	41		
0	0	0	6,363	42	0	6,363	42		
0	0	0	5,901	43	0	5,901	43		
2,005	0	2,005	5,742	44	0	5,742	44		
85	0	85	4,575	45	0	4,575	45		
1,470	0	1,470	4,321	46	0	4,321	46		
0	0	0	3,952	47	0	3,952	47		
2,809	0	2,809	2,944	48	0	2,944	48		
644	0	644	1,734	49	0	1,734	49		
1,542	0	1,542	1,546	50	0	1,546	50		
588	0	588	1,271	51	0	1,271	51		
351	0	351	653	52	0	653	52		
0	0	0	394	53	0	394	53		
0	0	0	15	54	0	15	54		
0	0	0	3	55	0	3	55		
0	0	0	2	56	0	2	56		
7,643,895	57,983,864	65,627,759	234,157,286		11,217,771	222,939,515			
19	25	24	14		17	14			
40,358,804	234,442,688	274,801,492	1,693,921,282		64,633,897	1,629,287,385			

* Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

Facilities with Largest Total Reported Releases On- and Off-site of Carcinogens

- The 50 facilities in North America with the largest total reported releases of known or suspected carcinogens in the matched data set accounted for just over one-third of all carcinogen releases.
- These 50 facilities reported 74 percent of on-site underground injection of designated carcinogens. These releases, primarily of formaldehyde, acrylamide and acrylonitrile, originated from just six facilities, five of which reported more than 1.2 million kg each.
- The 50 facilities also accounted for 65 percent of on-site land releases of carcinogens in 1999, with 18 facilities reporting more than 1.0 million kg. These releases were mainly of metals and their compounds and of asbestos.
- Twenty of the 50 facilities were hazardous waste management facilities, which receive wastes for treatment and/or disposal. Most reported substantial amounts of on-site land disposal.
- The highest reported amount in the on-site land disposal category by one facility—around 6 million kg—was from a primary metals plant. Three other facilities—two in the chemicals sector and one hazardous waste management facility—reported on-site releases to land of between 4.0 million kg and 5.9 million kg.

Table 3-11. The 50 North American Facilities with the Largest Total Releases On- and Off-site of Known or Suspected Carcinogens, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms	On-site Releases				Total On-site Releases (kg)
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	6	52,385	5,968	0	6,064,063	6,122,416
2	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	1	2,063	113	0	5,941,043	5,943,219
3	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	14	0	0	0	4,324,756	4,324,756
4	Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne, NC		28	1	2,714	27	0	4,036,283	4,039,024
5	Monsanto, Luling	Luling, LA		28	2	19,002	0	3,175,329	0	3,194,331
6	American Steel Foundries, Amsted Inds. Inc.	Alliance, OH		33	1	8,254	0	0	0	8,254
7	Yuasa Inc. Battery Plant	Richmond, KY		36	2	119	11	0	0	130
8	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	5	5	0	0	2,430,500	2,430,505
9	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	5	233,037	0	0	920,000	1,153,037
10	Safety-Kleen Inc., Grassy Mountain Facility	Grantsville, UT		495/738	8	85	0	0	1,947,680	1,947,765
11	Envirite of Ohio Inc., Envirite Corp.	Canton, OH		495/738	5	239	8	0	0	247
12	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	4	8	0	0	0	14
13	Safety-Kleen (Lone & Grassy Mountain) Inc.	Waynoka, OK		495/738	6	337	0	0	1,834,068	1,834,405
14	USL City Environmental Inc., U.S. Liquids Inc.	Detroit, MI		495/738	5	0	0	0	0	0
15	Chemical Waste Management Inc., Waste Management Inc.	Emelle, AL		495/738	7	138	0	0	1,734,327	1,734,465
16	ASARCO Inc.	East Helena, MT		33	4	9,382	31	0	1,301,752	1,311,165
17	Macalloy Corp.	North Charleston, SC		33	1	0	113	0	0	113
18	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	7	692	0	0	1,701,214	1,701,906
19	BP Chemicals Inc., Green Lake Facility, BP America Inc.	Port Lavaca, TX		28	5	19,470	0	1,625,257	164	1,644,891
20	Waste Control Specialists L.L.C.	Andrews, TX		495/738	5	1,647	0	0	1,472,583	1,474,230
21	Cytec Inds. Inc., Fortier Plant	Westwego, LA		28	5	3,903	57	1,453,425	0	1,457,385
22	Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary, AB	99	495/738	1	0	0	0	1,455,560	1,455,560
23	Angus Chemical Co.	Sterlington, LA		28	4	11,377	785	1,428,452	163	1,440,777
24	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	4	36	0	0	1,340,589	1,340,625
25	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden, AZ		33	5	10,643	0	0	1,321,396	1,332,039
26	Safety-Kleen (Buttonwillow) Inc.	Buttonwillow, CA		495/738	7	123	0	0	1,320,671	1,320,794
27	Solutia, Chocolate Bayou Inc., Plant	Alvin, TX		28	4	29,318	0	1,216,508	110	1,245,936
28	Wayne Disposal Inc., EQ - The Environmental Quality Co.	Belleville, MI		495/738	16	298	0	0	808,388	808,686
29	Aquaglass Corp., Masco Corp.	Adamsville, TN		30	1	1,236,076	0	0	0	1,236,076
30	Doe Run Co., Glover Smelter, Renco Group Inc.	Glover, MO		33	4	18,991	3	0	1,206,845	1,225,839
31	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	5	238	0	0	1,200,908	1,201,146
32	Quality Automotive Co., US Automotive Mfg.	Tappahannock, VA		37	1	133	0	0	0	133
33	P4 Production L.L.C./Monsanto	Soda Springs, ID		Mult.	5	4,128	10	0	1,047,619	1,051,757
34	Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton, PA		33	3	6	22	0	0	28
35	Quemetco Inc., RSR Corp.	Indianapolis, IN		33	3	2,132	0	0	0	2,132
36	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	5	11	0	0	858,640	858,651
37	Aquaglass Performance Plant, Masco Corp.	McEwen, TN		30	1	849,656	0	0	0	849,656
38	Carpenter Co., Tupelo Div.	Verona, MS		30	3	842,521	0	0	0	842,521
39	BP Chemicals Inc., BP America	Lima, OH		28	10	23,410	0	810,924	0	834,334
40	CWM Chemical Services L.L.C., Waste Management Inc.	Model City, NY		495/738	6	2	51	0	799,093	799,146
41	Onyx Environmental Services L.L.C.	Azusa, CA		495/738	14	2,956	0	0	0	2,956
42	Carpenter Co.	Russellville, KY		Mult.	5	776,338	0	0	0	776,338
43	Chemical Waste Management Inc., Lake Charles Facility, Waste Management Inc.	Sulphur, LA		495/738	7	4	0	0	749,659	749,663
44	Mill Service Inc.	Yukon, PA		495/738	3	566	228	0	621,904	622,698
45	C & D Techs. Inc.	Conyers, GA		36	1	439	0	0	0	439
46	Foamex L.P.	Corry, PA		30	2	745,075	0	0	0	745,075
47	Doe Run Co., Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	5	130,052	38	0	567,876	697,966
48	Eastman Kodak Co., Kodak Park	Rochester, NY		38	9	649,416	11,559	0	45	661,020
49	Safety-Kleen (Pinewood), Safety-Kleen Corp.	Pinewood, SC		495/738	7	200	0	0	663,595	663,795
50	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	4	2,103	0	0	0	2,103
Subtotal					244	5,689,728	19,030	9,709,895	47,671,494	63,090,147
% of Total					1	7	2	74	65	37
Total for Carcinogens					19,786	80,691,452	906,545	13,102,145	73,800,014	168,529,527

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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.

A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP).

Table 3–11. (continued)

Total Releases Rank	Off-site Releases			Total Reported Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases of carcinogens from the facility)
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)		
1	2	24,724	24,726	6,147,142	Arsenic/Lead and compounds (land)
2	0	195,646	195,646	6,138,865	Chromium and compounds (land)
3	0	1,358	1,358	4,326,114	Asbestos (land)
4	0	1,048	1,048	4,040,072	Chromium and compounds (land)
5	0	0	0	3,194,331	Formaldehyde (UIJ)
6	0	2,812,336	2,812,336	2,820,590	Chromium and compounds (transfers of metals)
7	0	2,462,187	2,462,187	2,462,317	Lead and compounds (transfers of metals)
8	0	0	0	2,430,505	Lead and compounds (land)
9	0	920,000	920,000	2,073,037	Chromium and compounds (land, transfers of metals)
10	0	5,149	5,149	1,952,914	Lead/Chromium/Cadmium/Arsenic and compounds (land)
11	0	1,879,766	1,879,766	1,880,013	Nickel/Chromium and compounds (transfers of metals)
12	0	1,847,830	1,847,830	1,847,844	Nickel/Chromium and compounds (transfers of metals)
13	0	539	539	1,834,944	Lead/Chromium and compounds (land)
14	0	1,761,787	1,761,787	1,761,787	Lead and compounds (transfers of metals)
15	227	19,491	19,718	1,754,183	Lead/Chromium and compounds (land)
16	0	442,229	442,229	1,753,394	Lead and compounds (land)
17	0	1,720,298	1,720,298	1,720,411	Chromium and compounds (transfers of metals)
18	0	1,373	1,373	1,703,279	Lead and compounds, Asbestos (land)
19	2	257	259	1,645,150	Acrylamide (UIJ)
20	0	0	0	1,474,230	Lead/Cadmium and compounds (land)
21	2	25	27	1,457,412	Acrylamide, Acrylonitrile (UIJ)
22	0	0	0	1,455,560	Asbestos (land)
23	0	16	16	1,440,793	Formaldehyde (UIJ)
24	0	579	579	1,341,204	Lead and compounds (land)
25	0	22	22	1,332,061	Lead and compounds (land)
26	0	0	0	1,320,794	Asbestos, Lead and compounds (land)
27	0	0	0	1,245,936	Acrylonitrile, Acrylamide (UIJ)
28	45,599	388,921	434,520	1,243,206	Arsenic/Nickel and compounds (land, transfers of metals)
29	0	0	0	1,236,076	Styrene (air)
30	0	259	259	1,226,098	Lead and compounds (land)
31	0	8	8	1,201,154	Lead and compounds (land)
32	1,071,955	0	1,071,955	1,072,088	Asbestos (transfers to disposal)
33	0	0	0	1,051,757	Chromium and compounds (land)
34	0	1,048,046	1,048,046	1,048,074	Lead and compounds (transfers of metals)
35	0	1,036,280	1,036,280	1,038,412	Lead/Arsenic and compounds (transfers of metals)
36	0	0	0	858,651	Lead and compounds (land)
37	0	0	0	849,656	Styrene (air)
38	0	0	0	842,521	Dichloromethane (air)
39	136	211	347	834,681	Acrylamide, Acrylonitrile (UIJ)
40	0	7,306	7,306	806,452	Asbestos, Lead and compounds (land)
41	180,243	596,356	776,599	779,555	Chromium/Lead/Cadmium/Arsenic and compounds (transfers of metals)
42	0	0	0	776,338	Dichloromethane (air)
43	0	14,070	14,070	763,733	Nickel/Lead and compounds (land)
44	0	139,274	139,274	761,972	Lead and compounds (land)
45	0	744,693	744,693	745,132	Lead and compounds (transfers of metals)
46	0	0	0	745,075	Dichloromethane (air)
47	0	552	552	698,518	Lead and compounds (land)
48	4,963	8,785	13,748	674,768	Dichloromethane (air)
49	0	0	0	663,795	Lead/Nickel and compounds (land)
50	0	641,101	641,101	643,204	Lead and compounds (transfers of metals)
	1,303,129	18,722,522	20,025,651	83,115,798	
	17	32	31	35	
	7,643,895	57,983,864	65,627,759	234,157,286	

- The 50 facilities accounted for 31 percent of all off-site releases of designated carcinogens. Eight facilities reported more than 1.0 million kg of transfers of metals that are known or suspected carcinogens.

UIJ=underground injection.

Metals

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.

- Releases of the 15 metals and their compounds that are reportable to both NPRI and TRI totaled 474.4 million kg in 1999, or 29 percent of total releases.
- Most of the off-site transfers sent to other NPRI or TRI facilities for disposal are metals (transfers of metals are 93 percent of all off-site releases reported as on-site releases by other NPRI or TRI facilities).
- On-site land releases of metals and their compounds accounted for 89 percent of all such releases in North America. Off-site releases of metals (which are primarily transfers to land disposal) were 85 percent of all off-site releases in 1999.
- Zinc and its compounds, with 207.7 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 87.2 million kg, and had the largest on-site releases to surface water and underground injection—more than 3 million kg in each category.

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.

Table 3–12. Releases On- and Off-site in North America of Metals and their Compounds, 1999

CAS Number	Chemical	Number of Forms	On-site Releases				Total On-site Releases (kg)
			Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
	-- Zinc (and its compounds)	4,080	5,796,673	730,054	494,255	126,304,629	133,333,125
	-- Manganese (and its compounds)	3,833	1,539,871	3,273,810	3,219,106	47,255,725	55,300,484
	-- Copper (and its compounds)	4,966	2,052,283	199,178	171,487	31,171,772	33,600,848
	-- Chromium (and its compounds)▼	4,055	496,231	118,265	697,062	22,112,800	23,431,663
	-- Lead (and its compounds)▼	1,964	1,055,969	37,574	88,982	23,200,316	24,386,634
	-- Nickel (and its compounds)▼	3,743	922,133	133,199	166,421	8,096,952	9,322,058
7429-90-5	Aluminum (fume or dust)	383	1,110,207	2,311	0	3,398,357	4,511,390
	-- Arsenic (and its compounds)▼	640	270,689	84,242	90,050	7,890,774	8,335,869
	-- Antimony (and its compounds)	786	69,624	35,693	28,531	1,248,760	1,383,141
	-- Cobalt (and its compounds)▼	709	48,618	41,405	13,957	2,024,855	2,129,035
	-- Cadmium (and its compounds)▼	191	52,124	1,965	27,674	1,809,731	1,891,594
	-- Selenium (and its compounds)	145	308,480	23,930	15,197	1,221,559	1,569,397
	-- Silver (and its compounds)	180	10,875	3,515	7,811	324,496	346,838
7440-62-2	Vanadium (fume or dust)	49	111,373	517	0	236,131	348,033
	-- Mercury (and its compounds)	77	8,058	99	0	211,202	219,369
	Subtotal	25,801	13,853,208	4,685,757	5,020,533	276,508,059	300,109,478
	% of Total	35	2	4	6	89	21
	Total	74,108	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790

Note: Canada and US data only. Mexico data not available for 1999. ▼ Known or suspected carcinogen.

Table 3–12. (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		Adjustment Component* (kg)	Total Releases (adjusted)**		
			kg	Rank		kg	Rank	
0	118,306,530	118,306,530	251,639,655	1	43,930,610	207,709,045	1	
0	35,487,652	35,487,652	90,788,136	2	3,578,544	87,209,592	2	
0	13,374,179	13,374,179	46,975,027	4	1,274,269	45,700,758	3	
0	20,537,918	20,537,918	43,969,581	5	1,746,540	42,223,041	4	
0	23,598,363	23,598,363	47,984,997	3	7,599,278	40,385,719	5	
0	10,033,844	10,033,844	19,355,902	6	1,057,378	18,298,524	6	
0	6,669,987	6,669,987	11,181,377	7	105,506	11,075,871	7	
0	2,264,705	2,264,705	10,600,574	8	243,377	10,357,197	8	
0	1,840,402	1,840,402	3,223,543	9	119,397	3,104,146	9	
0	598,040	598,040	2,727,075	11	28,784	2,698,291	10	
0	950,994	950,994	2,842,588	10	403,688	2,438,900	11	
0	368,665	368,665	1,938,062	12	19,350	1,918,712	12	
0	236,842	236,842	583,680	13	10,025	573,655	13	
0	90,532	90,532	438,565	14	5,616	432,949	14	
0	84,035	84,035	303,404	15	229	303,175	15	
0	234,442,688	234,442,688	534,552,166		60,122,591	474,429,575		
0	100	85	32		93	29		
40,358,804	234,442,688	274,801,492	1,693,921,282		64,633,897	1,629,287,385		

* Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

Facilities with Largest Total On- and Off-site Releases of Metals

Fifty facilities in the matched data set reported more than half of all releases of metals and their compounds in 1999.

- The 50 facilities with the largest releases on- and off-site of metals and their compounds accounted for 53 percent of total releases and for 60 percent of on-site releases.
- These 50 facilities reported 63 percent of on-site releases to land. Six facilities had releases in this category of more than 10 million kg each.
- Total releases to air, surface water and underground injection by the 50 facilities were not large in relation to other forms of release, but one facility, a chemicals plant in Mississippi, reported underground injection of 3.7 million kg, primarily manganese and its compounds, accounting for 74 percent of all metals releases in this category.
- These 50 facilities reported 44 percent of off-site transfers of metals. Six of the facilities reported more than 5 million kg each of such transfers.

Table 3-13. The 50 North American Facilities with the Largest Total Releases On- and Off-site of Metals and Their Compounds, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms	On-site Releases				Total On-site Releases (kg)
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
1	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden, AZ		33	10	54,831	0	0	20,948,953	21,003,784
2	ASARCO Inc.	East Helena, MT		33	9	15,269	752	0	19,527,521	19,543,542
3	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	9	433	0	0	17,393,650	17,394,083
4	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	7	5	0	0	14,656,100	14,656,105
5	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	12	83,460	10,628	0	12,707,286	12,801,374
6	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	9	195,549	113	0	0	195,662
7	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	9	1,447	0	0	10,855,330	10,856,777
8	Steel Dynamics Inc.	Butler, IN		33	8	14,836	0	0	0	14,836
9	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	8	242	0	0	8,476,327	8,476,569
10	Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas, NM		33	12	36,799	6,697	0	8,376,735	8,420,231
11	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	6	1,548	17	0	0	1,565
12	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	6	12,725	1,283	0	0	14,008
13	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	1	2,063	113	0	5,941,043	5,943,219
14	USS Gary Works, USX Corp.	Gary, IN		33	12	215,192	8,255	0	5,444,920	5,668,367
15	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33	7	7,384	9	0	0	7,393
16	Safety-Kleen Inc., Grassy Mountain Facility	Grantsville, UT		495/738	13	256	0	0	5,792,058	5,792,314
17	Rouge Steel Co., Rouge Inds. Inc.	Dearborn, MI		33	6	16,032	245	0	0	16,277
18	Eramet Marietta Inc., Eramet Manganese Alliance	Marietta, OH		33	5	221,461	140,226	0	4,383,130	4,744,817
19	National Steel Corp., Greatlakes Ops.	Ecorse, MI		33	5	51,214	3,723	0	0	54,937
20	Doe Run Co., Herculanum Smelter, Renco Group Inc.	Herculanum, MO		33	8	150,236	80	0	4,386,262	4,536,578
21	Northwestern Steel & Wire Co.	Sterling, IL		33	4	49,275	657	0	4,438,548	4,438,480
22	Doe Run Co., Glover Smelter, Renco Group Inc.	Glover, MO		33	7	21,909	6	0	4,159,274	4,181,189
23	Co-Steel Lasco	Whitby, ON	29	33	5	10,149	1,975	0	1,081,033	1,093,157
24	Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne, NC		28	1	2,714	27	0	4,036,283	4,039,024
25	Chemical Waste Management Inc., Waste Management Inc.	Emelle, AL		495/738	13	158	0	0	3,974,660	3,974,818
26	USL City Environmental Inc., U.S. Liquids Inc.	Detroit, MI		495/738	8	0	0	0	0	0
27	DuPont, Delisle Plant	Pass Christian, MS		28	7	87	366	3,732,880	14,499	3,747,832
28	Philip Enterprises Inc., Yard 3 Facility, Philip Services Corp.	Hamilton, ON	77	495/738	5	0	0	0	0	0
29	Envirite of Ohio Inc., Envirite Corp.	Canton, OH		495/738	7	471	123	0	0	594
30	Nucor Steel, Nucor Corp.	Huger, SC		33	6	8,218	42	0	0	8,260
31	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	Mc Minnville, OR		33	5	3,846	62	0	0	3,908
32	Ipsco Steel Inc., Ipsco Inc.	Muscataine, IA		33	6	1,389	11	0	0	1,400
33	Keystone Steel & Wire Co., Keystone Consolidated Inds. Inc.	Peoria, IL		33	5	29,125	407	0	198	29,730
34	American Steel Foundries, Amsted Inds. Inc.	Alliance, OH		33	3	13,473	0	0	0	13,473
35	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	8	16	33	0	0	49
36	LTV Steel Co. Inc., Cleveland Works	Cleveland, OH		33	8	10,731	3,292	0	2,217,392	2,231,415
37	Chemical Waste Management Inc., Lake Charles Facility, Waste Management Inc.	Sulphur, LA		495/738	11	20	0	0	2,621,313	2,621,333
38	Waste Control Specialists L.L.C.	Andrews, TX		495/738	6	2,896	0	0	2,588,050	2,590,946
39	Nucor Steel, A Div. of Nucor Corp.	Plymouth, UT		33	6	4,146	0	0	5,740	9,886
40	Safety-Kleen (Lone & Grassy Mountain) Inc.	Waynoka, OK		495/738	10	469	0	0	2,553,388	2,553,857
41	USS Mon Valley Works, Edgar Thomson Plant, USX Corp.	Braddock, PA		33	5	1,725	559	0	0	2,284
42	Yuasa Inc. Battery Plant	Richmond, KY		36	3	122	17	0	0	139
43	Philip Enterprises Inc., Parkdale Avenue Facility, Philip Services Corp.	Hamilton, ON	77	495/738	6	0	0	0	0	0
44	Granite City Steel, National Steel Corp.	Granite City, IL		33	6	20,634	3,313	0	2,450,121	2,474,068
45	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	7	517,637	0	0	920,000	1,437,637
46	Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais, IL		33	5	3,596	0	0	0	3,596
47	Southwire Co.	Carrlton, GA		Mult.	30	13,475	693	0	0	14,168
48	Sikeston Power Station, City of Sikeston	Sikeston, MO		491/493	4	15,879	0	0	2,277,480	2,293,359
49	Nucor Steel—Nebraska, Nucor Corp.	Norfolk, NE		33	5	6,141	215	0	0	6,356
50	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	13	2,226	0	0	2,259,072	2,261,298
Subtotal					377	1,821,509	183,939	3,732,880	174,486,366	180,224,694
% of Total					1	13	4	74	63	60
Total for Metals and their Compounds					25,801	13,853,208	4,685,757	5,020,533	276,508,059	300,109,478

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 3–13. (continued)

Total Releases Rank	Off-site Releases			Total Reported Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases of metals from the facility)
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)		
1	0	149	149	21,003,933	Copper/Zinc and compounds (land)
2	0	612,687	612,687	20,156,229	Zinc and compounds (land)
3	0	808	808	17,394,891	Zinc and compounds (land)
4	0	0	0	14,656,105	Zinc and compounds (land)
5	0	51,384	51,384	12,852,758	Copper/Arsenic/Zinc and compounds (land)
6	0	11,899,963	11,899,963	12,095,625	Zinc and compounds (transfers of metals)
7	0	8	8	10,856,785	Zinc and compounds (land)
8	0	9,575,540	9,575,540	9,590,376	Zinc and compounds, Aluminum (transfers of metals)
9	0	7	7	8,476,576	Zinc and compounds (land)
10	0	55,785	55,785	8,476,016	Zinc/Copper and compounds (land)
11	0	7,674,586	7,674,586	7,676,151	Zinc and compounds (transfers of metals)
12	0	6,872,223	6,872,223	6,886,231	Zinc and compounds (transfers of metals)
13	0	195,646	195,646	6,138,865	Chromium and compounds (land)
14	0	372,086	372,086	6,040,453	Zinc and compounds (land)
15	0	5,795,345	5,795,345	5,802,738	Zinc and compounds (transfers of metals)
16	0	8,234	8,234	5,800,548	Zinc/Manganese/Lead/Copper/Chromium and compounds (land)
17	0	5,345,577	5,345,577	5,361,854	Zinc and compounds (transfers of metals)
18	0	23,810	23,810	4,768,627	Manganese and compounds (land)
19	0	4,498,244	4,498,244	4,553,181	Zinc and compounds (transfers of metals)
20	0	707	707	4,537,285	Zinc and compounds (land)
21	0	40,508	40,508	4,528,988	Zinc/Manganese and compounds (land)
22	0	259	259	4,181,448	Zinc/Lead and compounds (land)
23	0	3,077,610	3,077,610	4,170,767	Zinc and compounds (transfers of metals)
24	0	1,048	1,048	4,040,072	Chromium and compounds (land)
25	0	31,305	31,305	4,006,123	Zinc/Lead/Copper and compounds (land)
26	0	3,964,052	3,964,052	3,964,052	Zinc/Lead and compounds (transfers of metals)
27	0	43	43	3,747,875	Manganese and compounds (UIJ)
28	0	3,483,350	3,483,350	3,483,350	Zinc/Manganese and compounds (transfers of metals)
29	0	3,436,432	3,436,432	3,437,026	Zinc/Nickel and compounds (transfers of metals)
30	0	3,293,837	3,293,837	3,302,097	Zinc and compounds (transfers of metals)
31	0	3,164,138	3,164,138	3,168,046	Zinc and compounds (transfers of metals)
32	0	3,064,225	3,064,225	3,065,625	Zinc and compounds (transfers of metals)
33	0	2,970,641	2,970,641	3,000,371	Zinc and compounds (transfers of metals)
34	0	2,845,443	2,845,443	2,858,916	Chromium and compounds (transfers of metals)
35	0	2,806,033	2,806,033	2,806,082	Nickel/Zinc/Copper and compounds (transfers of metals)
36	0	491,501	491,501	2,722,916	Zinc and compounds (land)
37	0	45,461	45,461	2,666,794	Zinc/Nickel and compounds (land)
38	0	0	0	2,590,946	Zinc/Lead and compounds (land)
39	0	2,557,302	2,557,302	2,567,188	Zinc and compounds (transfers of metals)
40	0	707	707	2,554,564	Lead/Chromium/Zinc and compounds (land)
41	0	2,547,644	2,547,644	2,549,928	Zinc and compounds (transfers of metals)
42	0	2,520,620	2,520,620	2,520,759	Lead and compounds (transfers of metals)
43	0	2,487,456	2,487,456	2,487,456	Zinc and compounds (transfers of metals)
44	0	2	2	2,474,070	Zinc and compounds (land)
45	0	920,000	920,000	2,357,637	Chromium and compounds (land, transfers of metals)
46	0	2,341,096	2,341,096	2,344,692	Zinc and compounds (transfers of metals)
47	0	2,302,466	2,302,466	2,316,634	Zinc/Lead and compounds (transfers of metals)
48	0	0	0	2,293,359	Zinc and compounds (land)
49	0	2,272,676	2,272,676	2,279,032	Zinc and compounds (transfers of metals)
50	0	2,517	2,517	2,263,815	Lead/Copper/Zinc/Nickel and compounds (land)
	0	103,651,161	103,651,161	283,875,855	
	--	44	44	53	
	0	234,442,688	234,442,688	534,552,166	

UIJ=underground injection.

Newly Added Chemicals

In 1999, 73 substances were added to the NPRI list of reported substances. Forty-six of these chemicals were also on the TRI list and, therefore, are in the matched data set for 1999. One new NPRI chemical, tetraethyl lead, is included in the category of lead compounds on the TRI list and is, therefore, not listed separately in the matched data set.

- The added chemicals accounted for 55.7 million kg of on-and off-site releases in 1999, or 3 percent of total North American releases. Most releases of these substances were on-site to air (43.6 million kg, or 5 percent of total releases to air). Underground injection, the second-largest category, accounted for 9.7 million kg, or 11 percent of total releases to underground injection. Off-site releases were 1.1 million kg, less than 1 percent of all reported off-site releases.
- By far the largest releases of newly added chemicals were of n-hexane (27.7 million kg, almost all to air). Next were formic acid, with 5.6 million kg, mainly to underground injection, and chlorodifluoromethane (HCFC-22), an ozone-depleting substance, with 4.0 million kg, primarily to air.
- TRI releases accounted for 93 percent of reported releases of the newly added chemicals. Of the top six chemicals (by amount of releases) in this group, TRI accounted for 90–100 percent of releases for all except HCFC-142b; 23 percent of total releases of that ozone-depleting compound were in NPRI.

Table 3–14. North American Releases of Newly Added Chemicals, 1999

CAS Number	Chemical	Number of Forms	On-site Releases					Total On-site Releases (kg)
			Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)		
110-54-3	n-Hexane	1,043	27,610,163	5,412	19,044	3,781	27,642,310	
64-18-6	Formic acid	329	339,763	79,498	5,195,026	1,636	5,616,050	
75-45-6	Chlorodifluoromethane (HCFC-22)	272	3,984,393	1,656	0	0	3,986,916	
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	247	3,621,810	189	0	9,129	3,631,229	
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	40	3,305,777	20	0	0	3,305,797	
872-50-4	N-Methyl-2-pyrrolidone	499	1,556,176	16,114	1,386,185	63,582	3,022,158	
108-93-0	Cyclohexanol	33	74,140	18	1,691,749	0	1,765,907	
7632-00-0	Sodium nitrite	460	70,820	745,025	366,172	118,329	1,300,459	
121-44-8	Triethylamine	196	919,453	8,133	12,998	15,887	956,784	
77-73-6	Dicyclopentadiene	101	161,661	5,359	442,070	5	609,560	
76-14-2	Dichlorotetrafluoroethane (CFC-114)	12	422,036	2	0	0	422,038	
98-86-2	Acetophenone	50	82,998	317	312,847	0	396,862	
--	Chlorotetrafluoroethane (HCFC-124 and isomers)	28	359,952	2	0	0	359,954	
75-71-8	Dichlorodifluoroethane (CFC-12)	53	335,278	1,002	0	0	336,400	
107-19-7	Propargyl alcohol	15	4,524	0	247,346	0	251,870	
124-40-3	Dimethylamine	82	188,315	13,635	5,102	1,240	208,292	
75-69-4	Trichlorofluoromethane (CFC-11)	40	182,283	454	0	4,571	187,308	
7726-95-6	Bromine	53	106,771	6	0	3,494	110,371	
7782-41-4	Fluorine	17	48,177	24,559	0	47,808	120,544	
149-30-4	2-Mercaptobenzothiazole	35	2,363	30,336	16,780	0	49,479	
554-13-2	Lithium carbonate	53	5,445	226	0	5,275	11,046	
--	Dichlorotrifluoroethane (HCFC-123 and isomers)	14	88,500	4	0	0	88,504	
--	Polychlorinated alkanes (C10 to C13)	70	2,622	2,179	0	7,286	12,087	
122-39-4	Diphenylamine	34	23,139	15	2,618	4,707	30,479	
76-15-3	Monochloropentafluoroethane (CFC-115)	6	34,745	2	0	0	34,747	
4170-30-3	Crotonaldehyde	11	13,099	16,914	612	0	30,625	
109-06-8	2-Methylpyridine	10	7,626	0	22,721	0	30,347	
75-63-8	Bromotrifluoromethane (Halon 1301)	8	12,758	0	0	0	12,901	
100-01-6	p-Nitroaniline	5	5,431	0	0	3,467	8,898	
7637-07-2	Boron trifluoride	23	7,587	0	0	0	7,587	
924-42-5	N-Methylolacrylamide	37	2,801	571	0	24	3,408	
75-72-9	Chlorotrifluoromethane (CFC-13)	2	4,894	2	0	0	4,896	
563-47-3	3-Chloro-2-methyl-1-propene▼	4	3,952	0	0	0	3,952	
630-20-6	1,1,1,2-Tetrachloroethane	13	2,434	0	0	0	2,434	
64-75-5	Tetracycline hydrochloride	3	0	0	0	0	0	
612-83-9	3,3'-Dichlorobenzidine dihydrochloride▼	17	2	2	0	0	4	
353-59-3	Bromochlorodifluoromethane (Halon 1211)	4	1,136	0	0	0	1,145	
28407-37-6	C.I. Direct Blue 218	8	0	5	0	0	5	
13463-40-6	Iron pentacarbonyl	1	688	0	0	0	688	
76-01-7	Pentachloroethane	11	395	0	0	0	395	
123-63-7	Paraldehyde	6	25	32	0	0	57	
70-30-4	Hexachlorophene	3	3	0	0	0	3	
542-76-7	3-Chloropropionitrile	2	2	0	0	0	2	
115-28-6	Chlorendic acid▼	2	15	0	0	0	15	
7758-01-2	Potassium bromate▼	2	2	0	0	0	2	
Subtotal		3,954	43,594,154	951,689	9,721,270	290,221	54,564,515	
% of Total		5	5	0.8	11	0.1	4	
Total		74,108	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790	

Note: Canada and US data only. Mexico data not available for 1999. ▼ Known or suspected carcinogen.

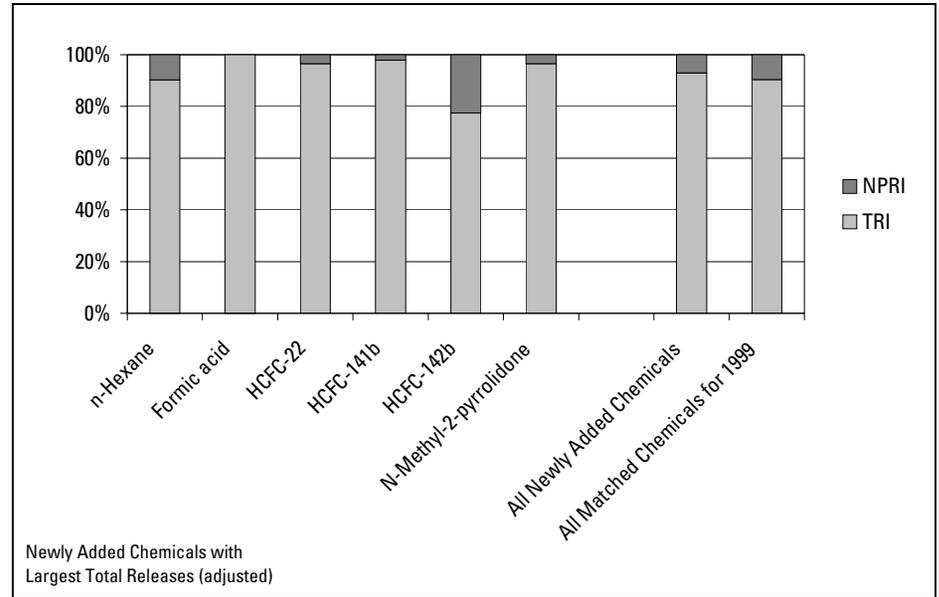
Table 3–14. (continued)

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		Adjustment Component* (kg)	Total Releases (adjusted)**	
			kg	Rank		kg	Rank
31,143	0	31,143	27,673,453	1	1,339	27,672,114	1
20,106	0	20,106	5,636,156	2	0	5,636,156	2
38,195	0	38,195	4,025,111	3	6,349	4,018,762	3
134,718	0	134,718	3,765,947	4	0	3,765,947	4
2,316	0	2,316	3,308,113	5	0	3,308,113	5
276,023	0	276,023	3,298,181	6	0	3,298,181	6
482	0	482	1,766,389	7	0	1,766,389	7
191,027	0	191,027	1,491,486	8	0	1,491,486	8
134,831	0	134,831	1,091,615	9	0	1,091,615	9
1,440	0	1,440	611,000	10	6	610,994	10
0	0	0	422,038	11	0	422,038	11
16,778	0	16,778	413,640	12	0	413,640	12
0	0	0	359,954	13	0	359,954	13
15	0	15	336,415	14	0	336,415	14
4,643	0	4,643	256,513	15	0	256,513	15
199	0	199	208,491	16	0	208,491	16
6,656	0	6,656	193,964	17	0	193,964	17
17,173	0	17,173	127,544	18	0	127,544	18
0	0	0	120,544	19	0	120,544	19
56,240	0	56,240	105,719	20	0	105,719	20
87,476	0	87,476	98,522	21	0	98,522	21
1	0	1	88,505	22	0	88,505	22
54,265	0	54,265	66,352	23	0	66,352	23
21,027	0	21,027	51,506	24	0	51,506	24
0	0	0	34,747	25	0	34,747	25
80	0	80	30,705	26	0	30,705	26
120	0	120	30,467	27	0	30,467	27
0	0	0	12,901	28	0	12,901	28
1,868	0	1,868	10,766	29	0	10,766	29
0	0	0	7,587	30	0	7,587	30
1,654	0	1,654	5,062	31	0	5,062	31
0	0	0	4,896	32	0	4,896	32
0	0	0	3,952	33	0	3,952	33
333	0	333	2,767	34	0	2,767	34
1,950	0	1,950	1,950	35	0	1,950	35
1,542	0	1,542	1,546	36	0	1,546	36
0	0	0	1,145	37	0	1,145	37
1,025	0	1,025	1,030	38	0	1,030	38
0	0	0	688	39	0	688	39
110	0	110	505	40	0	505	40
122	0	122	179	41	0	179	41
75	0	75	78	42	0	78	42
69	0	69	71	43	0	71	43
0	0	0	15	44	0	15	44
0	0	0	2	45	0	2	45
1,103,702	0	1,103,702	55,668,217		7,694	55,660,523	
3	0	0.4	3		0.01	3	
40,358,804	234,442,688	274,801,492	1,693,921,282		64,633,897	1,629,287,385	

* Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

Figure 3–6. Contribution of NPRI and TRI to Total Releases in North America of Newly Added Chemicals, 1999



Note: Total releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Releases of Ozone-depleting Chemicals

Chapter 2 provides information on the international effort to reduce releases of chemicals implicated in the thinning of the stratospheric ozone layer. Among these chemicals are chlorofluorocarbons (CFCs), which have been widely used in aerosols, air conditioners, refrigerators and the like. Most CFCs are being phased out under the terms of the Montreal Protocol, and these substances have been replaced in many uses by hydrochlorofluorocarbons (HCFCs), which are generally less harmful to the ozone layer.

This section reviews the data for 1999 on North American releases to air, water, land and disposal of ozone-depleting substances. Underground injection of these substances is not included since the substances would not be expected to be eventually released to the air through underground injection.

- Total on- and off-site releases of ozone-depleting substances were 13.3 million kg, or 0.9 percent of total releases to air, water, land, and disposal. Almost all releases of ozone depleters were on-site to air. The three chemicals with the largest releases accounted for 83 percent of all reported releases of ozone depleters.
- In 1999, TRI releases made up 93 percent of total releases of ozone-depleting substances, and NPRI releases made up 7 percent. NPRI, however, accounted for 23 percent of the releases of HCFC-142b, the ozone depleter with the third-largest amount of reported releases, while TRI accounted for 98 percent of HCFC-141b, which had the second-largest releases.

Table 3–15. Total Air/Water/Land Releases in North America of Ozone Depleters, by Chemical, 1999

CAS Number	Chemical	Number of Forms	On-site Releases*				Total Off-site Releases (kg)	Total Reported Air/Water/Land Releases On- and Off-site		Adjustment Component** (kg)
			Air (kg)	Surface Water (kg)	Land (kg)	Total On-site Releases* (kg)		kg	Rank	
75-45-6	Chlorodifluoromethane (HCFC-22)	272	3,984,393	1,656	0	3,986,049	38,195	4,024,244	1	6,349
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	247	3,621,810	189	9,129	3,631,128	134,718	3,765,846	2	0
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	40	3,305,777	20	0	3,305,797	2,316	3,308,113	3	0
74-83-9	Bromomethane	45	648,026	13	2	648,041	727	648,768	4	0
76-14-2	Dichlorotetrafluoroethane (CFC-114)	12	422,036	2	0	422,038	0	422,038	5	0
--	Chlorotetrafluoroethane (HCFC-124 and isomers)	28	359,952	2	0	359,954	0	359,954	6	0
75-71-8	Dichlorodifluoromethane (CFC-12)	53	335,278	1,002	0	336,280	15	336,295	7	0
75-69-4	Trichlorofluoromethane (CFC-11)	40	182,283	454	4,571	187,308	6,656	193,964	8	0
56-23-5	Carbon tetrachloride [▼]	73	109,140	37	425	109,602	9,104	118,706	9	0
--	Dichlorotrifluoroethane (HCFC-123 and isomers)	14	88,500	4	0	88,504	1	88,505	10	0
76-15-3	Monochloropentafluoroethane (CFC-115)	6	34,745	2	0	34,747	0	34,747	11	0
75-63-8	Bromotrifluoromethane (Halon 1301)	8	12,758	0	0	12,758	0	12,758	12	0
75-72-9	Chlorotrifluoromethane (CFC-13)	2	4,894	2	0	4,896	0	4,896	13	0
353-59-3	Bromochlorodifluoromethane (Halon 1211)	4	1,136	0	0	1,136	0	1,136	14	0
	Subtotal	844	13,110,728	3,383	14,127	13,128,238	191,732	13,319,970		6,349
	% of Total	1.1	1.5	0.003	0.005	1.0	0.1	0.8		0.01
	Total	74,108	901,416,201	118,215,282	309,239,442	1,328,870,925	274,801,492	1,603,672,417		64,633,897

Note: Canada and US data only. Mexico data not available for 1999. [▼] Known or suspected carcinogen.

* Does not include on-site underground injection.

** Off-site releases also reported as on-site releases by another NPRI or TRI facility.

Table 3–15. (continued)

Air/Water/Land Releases On- and Off-site (adjusted)*							
Amount of Air/Water/Land Releases On- and Off-site (adjusted)		NPRI as % of Total Releases (adjusted)	TRI as % of Total Releases (adjusted)	Amount Weighted by Ozone Depletion Potential		Amount Weighted by Global Warming Potential	
kg	Rank			kg	Rank	kg	Rank
4,017,895	1	3	97	220,984	5	7,634,000,500	1
3,765,846	2	2	98	414,243	2	2,636,092,200	5
3,308,113	3	23	77	215,027	6	7,608,659,900	2
648,768	4	0	100	389,261	3	3,243,840	13
422,038	5	0.03	99.97	422,038	1	4,135,972,400	3
359,954	6	1	99	359,954	4	3,815,512,400	4
336,295	7	0	100	13,452	11	208,502,900	8
193,964	8	0.6	99.4	193,964	7	892,234,400	6
118,706	9	2	98	130,577	8	166,188,400	9
88,505	10	0.3	99.7	5,310	12	10,620,600	12
34,747	11	0	100	20,848	10	357,894,100	7
12,758	12	2	98	127,580	9	88,030,200	10
4,896	13	0	100	4,896	13	68,544,000	11
1,136	14	0.8	99.2	3,408	14	1,476,800	14
13,313,621		7	93	2,521,542		27,626,972,640	
0.9							
1,539,038,520		10	90				

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

As explained in greater detail in **Chapter 2**, the ability of various ozone-depleting chemicals to destroy ozone molecules differs. The ozone-depleting potential (ODP) is a measure of this ability. The reference gas, trichlorofluoromethane (CFC-11), is assigned an ODP of 1.0. Chemicals that are more destructive of the ozone layer than CFC-11 have ODPs higher than 1.0. Chemicals that are less destructive of the ozone layer have ODPs of less than 1.0.

- Weighted by the ODPs of the constituent chemicals, North American releases of ozone-depleting chemicals in 1999 came to 2.5 million kg.

Another tool used to gauge the effects of releases of chemicals that may harm the global environment is global warming potential (GWP). This measure represents how much a given mass of a chemical contributes to global warming over a given time period compared with the same mass of carbon dioxide (which is assigned a GWP of 1.0). The method is described in greater detail in **Chapter 2**.

- When releases of the listed ozone-depleting chemicals are weighed by GWP, the result is an estimate of 27.6 billion kg, indicating a much higher potential effect on global warming than the actual level of releases would suggest.

Facilities report whether a chemical is manufactured, used in processing, or otherwise used. Manufacture includes manufacture for on-site use or for sale or distribution as well as incidental manufacture as a byproduct or impurity. A facility may process the chemical as a reactant, as a formulation component, as an impurity or when repackaging the substance. Chemicals may also be used as physical, chemical, or manufacturing aids, and for ancillary purposes such as cleaning.

- Ozone depleters are mainly used in processing. Over 40 percent of the forms reported only processing uses and accounted for almost half of the releases.
- Uses other than processing and manufacturing were reported on one-third of the forms and accounted for almost one-quarter of the releases.
- Ozone depleters manufactured (either for use on-site, for sale or distribution, or as byproducts or impurities) but not processed or otherwise used were reported on 4 percent of the forms and accounted for 12 percent of the releases. These were mainly HCFCs, whose ban on manufacture takes place beginning in the year 2003.

Table 3–16. North American Releases of Ozone Depleters from Type of Activity or Use, 1999

Type of Activity/Use	Forms		On-site Releases*				Total Off-site Releases (kg)	Total Reported Air/Water/Land Releases On- and Off-site (kg)	Adjustment Component** (kg)	Total Reported Air/Water/Land Releases On- and Off-site (adjusted)***	
	Number	%	Air (kg)	Surface Water (kg)	Land (kg)	Total On-site Releases* (kg)				kg	%
Process Only	364	43	6,389,568	392	9,129	6,399,089	156,337	6,555,426	0	6,555,426	49
Other Use Only	279	33	3,221,065	1,085	4,571	3,226,721	15,026	3,241,747	0	3,241,747	24
Manufacture Only	37	4	1,545,093	212	2	1,545,307	813	1,546,120	0	1,546,120	12
Process and Other Use	24	3	894,876	2	0	894,878	1,365	896,243	0	896,243	7
Manufacture, Process and Other Use	19	2	618,010	1,661	425	620,096	11,841	631,937	0	631,937	5
Manufacture and Process	45	5	264,953	23	0	264,976	0	264,976	0	264,976	2
Manufacture and Other Use	14	2	141,401	8	0	141,409	6,350	147,759	6,349	141,410	1
Unknown or TRI Form A****	62	7	35,762	0	0	35,762	0	35,762	0	35,762	0.3
Total	844	100	13,110,728	3,383	14,127	13,128,238	191,732	13,319,970	6,349	13,313,621	100

* Does not include on-site underground injection.

** Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

**** No activity/use code or amount of releases are reported on a TRI Form A.

Table 3–17. North American Releases of Ozone Depleters by Industry, 1999

US SIC Code	Industry	Forms		On-site Releases*				Total Off-site Releases (ka)	Total Reported Air/Water/Land Releases On- and Off-site (ka)	Adjustment Component** (ka)	Total Reported Air/Water/Land Releases On- and Off-site (adjusted)***	
		Number	%	Air (ka)	Surface Water (ka)	Land (ka)	Total On-site Releases* (ka)				ka	%
28	Chemicals	304	36.0	4,434,211	3,301	427	4,437,939	25,294	4,463,233	6,349	4,456,884	33.5
30	Rubber and Plastics Products	127	15.0	2,961,214	0	8,928	2,970,142	88,479	3,058,621	0	3,058,621	23.0
--	Multiple codes 20–39	39	4.6	1,758,396	82	0	1,758,478	0	1,758,478	0	1,758,478	13.2
36	Electronic/Electrical Equipment	24	2.8	1,316,305	0	0	1,316,305	28,881	1,345,186	0	1,345,186	10.1
35	Industrial Machinery	109	12.9	724,518	0	0	724,518	4,801	729,319	0	729,319	5.5
38	Measurement/Photographic Instruments	26	3.1	629,310	0	0	629,310	0	629,310	0	629,310	4.7
34	Fabricated Metals Products	35	4.1	427,124	0	2	427,126	1,801	428,927	0	428,927	3.2
37	Transportation Equipment	41	4.9	388,284	0	0	388,284	10,497	398,781	0	398,781	3.0
20	Food Products	32	3.8	258,904	0	0	258,904	0	258,904	0	258,904	1.9
5169	Chemical Wholesalers	14	1.7	75,147	0	0	75,147	0	75,147	0	75,147	0.6
39	Misc. Manufacturing Industries	11	1.3	40,567	0	0	40,567	0	40,567	0	40,567	0.3
33	Primary Metals	4	0.5	31,691	0	0	31,691	0	31,691	0	31,691	0.2
29	Petroleum and Coal Products	14	1.7	31,463	0	0	31,463	0	31,463	0	31,463	0.2
495/738	Hazardous Waste Mgt./Solvent Recovery	47	5.6	5,343	0	4,571	9,914	13,268	23,182	0	23,182	0.2
32	Stone/Clay/Glass Products	7	0.8	423	0	0	423	16,443	16,866	0	16,866	0.1
22	Textile Mill Products	1	0.1	12,426	0	0	12,426	113	12,539	0	12,539	0.1
24	Lumber and Wood Products	4	0.5	10,041	0	199	10,240	2,155	12,395	0	12,395	0.1
25	Furniture and Fixtures	2	0.2	5,320	0	0	5,320	0	5,320	0	5,320	0.0
26	Paper Products	1	0.1	41	0	0	41	0	41	0	41	0.0
27	Printing and Publishing	1	0.1	0	0	0	0	0	0	0	0	0.0
491/493	Electric Utilities	1	0.1	0	0	0	0	0	0	0	0	0.0
Total		844	100	13,110,728	3,383	14,127	13,128,238	191,732	13,319,970	6,349	13,313,621	100

Note: No activity/use code or amount of releases are reported on a TRI Form A.

* Does not include on-site underground injection.

** Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

The use of ozone depleters is concentrated in a few industry sectors, primarily in the manufacture of chemicals and plastics.

- The chemical manufacturers reported over one-third of the ozone depleters forms and accounted for one-third of the releases.
- Manufacturers of plastics, primarily plastic foam products, reported 15 percent of the forms for ozone depleters and 23 percent of the releases.
- The industry category “multiple codes” reported 13 percent of the releases. These facilities were frequently plants that manufacture chemicals as well as plastics.

Facilities with Largest Total On- and Off-site Releases of Ozone Depleters

- Fifty North American facilities contributed 64 percent (8.5 million kg) of total releases of ozone-depleting chemicals in 1999.
- Five of the 50 were in Canada; the remaining 45 were in the United States. The 50 firms accounted for 65 percent of on-site releases of these chemicals to air, 69 percent of on-site releases to surface water, and 32 percent of reported off-site releases.
- Releases from the two facilities with the largest total releases of ozone depleters consisted mainly of chlorodifluoromethane (HCFC-22), which ranks fifth for ODP but first for GWP. The facilities with the third-, fourth- and fifth-largest releases reported between 300,000 kg and 500,000 kg each.

Table 3-18. The 50 North American Facilities with the Largest Total Air/Water/Land Releases On- and Off-site of Ozone Depleters, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms	On-site Air/Water/Land Releases		
			Canada	US		Air (kg)	Surface Water (kg)	Land (kg)
1	DuPont, Louisville Plant	Louisville, KY		28	1	847,166	0	0
2	Honeywell Intl. Inc., Baton Rouge Plant	Baton Rouge, LA		28	12	569,379	1,678	0
3	Dow Chemical Co., Riverside Site	Pevely, MO		Mult.	1	474,830	0	0
4	Owens-Corning	Tallmadge, OH		30	1	393,605	0	0
5	Frigidaire Home Prods., Freezer, White Consolidated Inds.	Saint Cloud, MN		36	1	312,472	0	0
6	OC Celfortec Inc.	Grande-Ile, QC	16	30	2	296,949	0	0
7	Pactiv Corp.	Winchester, VA		30	1	268,625	0	0
8	Owens-Corning	Rockford, IL		30	1	240,219	0	0
9	Dow Chemical USA, Hanging Rock Plant	Ironton, OH		Mult.	2	223,464	0	0
10	Dow Chemical Canada Inc., Weston	Weston, ON	16	30	1	202,433	0	0
11	Dow, N.A. Allyn's Point Plant, Dow Chemical Co.	Gales Ferry, CT		Mult.	1	200,608	0	0
12	U.S. DOE, Portsmouth Gaseous Diffusion Plant, United States Enrichment	Piketon, OH		28	1	197,732	0	0
13	GE Appliances, GE Co.	Louisville, KY		36	1	196,717	0	0
14	Atofina Chemicals Inc., Atofina Delaware Inc.	Calvert City, KY		28	5	191,509	514	0
15	Dow Chemical, Joliet Continental Ops.	Channahon, IL		Mult.	1	186,547	0	0
16	GE Appliances, Bloomington Inc., GE Co.	Bloomington, IN		36	1	174,146	0	0
17	Dow Chemical Canada Inc., Varennes Site	Varennes, QC	16	30	2	182,480	0	0
18	Dow Chemical Co., Dalton Plant	Dalton, GA		Mult.	1	177,868	0	0
19	U.S. Enrichment Corp., Paducah Gaseous Diffusion Plant, USEC, Inc.	Paducah, KY		28	1	173,243	0	0
20	Dow Chemical Co., Torrance Facility	Torrance, CA		Mult.	1	170,522	0	0
21	Louisville Packaging	Louisville, KY		28	4	149,964	0	0
22	Whirlpool Corp.	Fort Smith, AR		36	1	140,590	0	0
23	Atofina Chemicals Inc., Atofina Delaware Inc.	Wichita, KS		28	4	127,987	0	0
24	Georgia Gulf Corp.	Plaquemine, LA		28	3	132,960	0	0
25	Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan, AB	37	28	6	127,133	0	0
26	Terumo Medical Corp.	Elkton, MD		38	1	125,678	0	0
27	Rheem Mfg. Co., Pace Group Inc.	Milledgeville, GA		35	1	124,996	0	0
28	Wayne Dalton Corp., Pensacola Division	Pensacola, FL		34	1	114,728	0	0
29	Syndicate Sales Inc.	Kokomo, IN		30	2	104,390	0	0
30	Cook Inc.	Ellettsville, IN		38	1	102,812	0	0
31	Eastman Chemical Co., Carolina Eastman Div.	Cayce-West Columbia, SC		28	1	90,703	0	0
32	DuPont, Chambers Works	Deepwater, NJ		28	6	88,715	0	0
33	DuPont, Cape Fear	Leland, NC		28	2	88,470	0	0
34	Laroche Inds. Inc., Gramercy Facility	Gramercy, LA		28	5	88,364	0	0
35	DuPont, Spruance Plant	Richmond, VA		Mult.	1	84,568	82	0
36	BP Amoco Chemicals, Cooper River Plant, BP Amoco Corp.	Wando, SC		28	1	84,036	0	0
37	Atlas Roofing Corp.	East Moline, IL		30	1	77,019	0	0
38	Eastman Chemical Co., Tennessee Operations	Kingsport, TN		28	2	82,993	13	0
39	Honeywell Intl. Inc., Danville Works	Danville, IL		28	7	79,951	61	0
40	Dow Chemical Co., Louisiana Div.	Plaquemine, LA		Mult.	5	76,943	0	2
41	Dow Chemical Co., Freeport	Freeport, TX		28	3	73,107	0	0
42	Firestone Building Prods. Co., Bridgestone/Firestone Inc.	Covington, KY		30	2	70,916	0	56
43	Natl. Refrigerants Inc.	Rosenhayn, NJ		56	7	70,384	0	0
44	BP Amoco Chemicals, BP Amoco Corp.	Decatur, AL		28	1	70,340	0	0
45	Atlas Roofing Corp.	Camp Hill, PA		30	1	69,107	0	0
46	Norcold Inc., Thetford Corp.	Sidney, OH		36	1	66,213	0	0
47	Johns Manville Intl.	Bremen, IN		30	2	48,951	0	0
48	Johns Manville Canada Inc., Cornwall	Cornwall, ON	16	30	2	56,100	0	0
49	Becton Dickinson & Co.	Columbus, NE		38	1	60,771	0	0
50	Honeywell Intl. Inc.	El Segundo, CA		28	2	59,864	0	0
	Subtotal				115	8,419,267	2,348	58
	% of Total				14	64	69	0.4
	Total for Ozone Depleters				844	13,110,728	3,383	14,127

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 3–18. (continued)

Total On-site Air/Water/Land Releases (kg)	Off-site Releases - Transfers to Disposal (kg)	Total Reported Air/Water/Land Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of air/water/land releases of ozone depleters from the facility)
847,166	0	847,166	Chlorodifluoromethane (air)
571,057	0	571,057	Chlorodifluoromethane (air)
474,830	0	474,830	1-Chloro-1,1-difluoroethane (air)
393,605	0	393,605	1-Chloro-1,1-difluoroethane (air)
312,472	6,349	318,821	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
296,949	0	296,949	1-Chloro-1,1-difluoroethane (air)
268,625	0	268,625	1-Chloro-1,1-difluoroethane (air)
240,219	0	240,219	1-Chloro-1,1-difluoroethane (air)
223,464	0	223,464	1-Chloro-1,1-difluoroethane (air)
202,433	0	202,433	1-Chloro-1,1-difluoroethane (air)
200,608	0	200,608	1-Chloro-1,1-difluoroethane (air)
197,732	0	197,732	Dichlorotetrafluoroethane (CFC-114) (air)
196,717	0	196,717	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
192,023	0	192,023	1-Chloro-1,1-difluoroethane, 1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
186,547	0	186,547	1-Chloro-1,1-difluoroethane (air)
174,146	11,973	186,119	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
182,480	0	182,480	1-Chloro-1,1-difluoroethane (air)
177,868	0	177,868	1-Chloro-1,1-difluoroethane (air)
173,243	0	173,243	Dichlorotetrafluoroethane (CFC-114) (air)
170,522	0	170,522	1-Chloro-1,1-difluoroethane (air)
149,964	0	149,964	Chlorodifluoromethane (air)
140,590	0	140,590	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
127,987	11,841	139,828	Chlorodifluoromethane (air)
132,960	0	132,960	Chlorodifluoromethane (air)
127,133	0	127,133	1-Chloro-1,1-difluoroethane (air)
125,678	0	125,678	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
124,996	0	124,996	Chlorodifluoromethane (air)
114,728	0	114,728	Chlorodifluoromethane (air)
104,390	0	104,390	Chlorodifluoromethane (air)
102,812	0	102,812	Chlorotetrafluoroethane (HCFC 124 and isomers) (air)
90,703	0	90,703	Bromomethane (air)
88,715	0	88,715	Dichlorodifluoromethane (CFC-12) (air)
88,470	0	88,470	Bromomethane (air)
88,364	0	88,364	1-Chloro-1,1-difluoroethane, 1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
84,650	0	84,650	Trichlorofluoromethane (CFC-11) (air)
84,036	0	84,036	Bromomethane (air)
77,019	6,652	83,671	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
83,006	0	83,006	Bromomethane (air)
80,012	0	80,012	Chlorodifluoromethane, Dichlorodifluoromethane (CFC-12), 1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
76,945	0	76,945	Chlorodifluoromethane, Dichlorodifluoromethane (CFC-12) (air)
73,107	0	73,107	Chlorodifluoromethane (air)
70,972	0	70,972	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
70,384	0	70,384	Chlorodifluoromethane, Dichlorodifluoromethane (CFC-12) (air)
70,340	0	70,340	Bromomethane (air)
69,107	0	69,107	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
66,213	113	66,326	Chlorodifluoromethane (air)
48,951	16,007	64,958	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
56,100	8,700	64,800	Chlorodifluoromethane (air)
60,771	0	60,771	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
59,864	0	59,864	1,1-Dichloro-1-fluoroethane (HCFC-141b) (air)
8,421,673	61,635	8,483,308	
64	32	64	
13,128,238	191,732	13,319,970	

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 of these are included in the matched data set. For this analysis, chromium and its compounds are considered CEPA toxic chemicals, although only hexavalent chromium is on the CEPA list.

- North American releases of the listed CEPA toxic chemicals in 1999 totaled 213.7 million kg, or 13 percent of all releases.
- The three chemicals with the largest total releases were chromium and its compounds (42.2 million kg), lead and its compounds (40.4 million kg), and hydrogen fluoride (38.4 million kg). Releases of the other 27 chemicals listed were less than 20 million kg each.
- Releases of chromium and lead were mainly on-site to land and off-site as transfers of metals. Almost 95 percent of all releases of hydrogen fluoride were on-site to air; most of the remaining releases were on-site to underground injection.
- On-site land releases of CEPA toxic chemicals made up 23 percent of all such North American releases. Metals and their compounds made up the bulk of off-site releases of CEPA toxic chemicals.

Table 3-19. Releases On- and Off-site in North America of CEPA Toxic Chemicals, 1999

CAS Number	Chemical	Number of Forms	On-site Releases				Total On-site Releases (kg)
			Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
--	Chromium (and its compounds)*▼	4,055	496,231	118,265	697,062	22,112,800	23,431,663
--	Lead (and its compounds)*▼	1,964	1,055,969	37,574	88,982	23,200,316	24,386,634
7664-39-3	Hydrogen fluoride	1,071	36,494,217	7,703	1,859,410	41,485	38,403,747
75-09-2	Dichloromethane▼	758	18,374,538	5,458	75,672	28,142	18,485,239
--	Nickel (and its compounds)*▼	3,743	922,133	133,199	166,421	8,096,952	9,322,058
1332-21-4	Asbestos (friable)▼	133	1,553	0	0	7,792,929	7,794,482
--	Arsenic (and its compounds)*▼	640	270,689	84,242	90,050	7,890,774	8,335,869
75-07-0	Acetaldehyde▼	323	6,264,250	123,507	342,075	5,467	6,735,450
79-01-6	Trichloroethylene▼	678	5,422,176	468	0	67,512	5,490,730
71-43-2	Benzene▼	560	4,404,127	7,108	423,299	259,697	5,094,479
75-45-6	Chlorodifluoromethane (HCFC-22)	272	3,984,393	1,656	0	0	3,986,916
107-13-1	Acrylonitrile▼	127	452,192	529	2,023,807	10,795	2,488,598
--	Cadmium (and its compounds)*▼	191	52,124	1,965	27,674	1,809,731	1,891,594
127-18-4	Tetrachloroethylene▼	493	1,773,714	842	4,166	48,004	1,827,164
106-99-0	1,3-Butadiene▼	203	957,012	862	327	57	958,633
74-83-9	Bromomethane	45	648,026	13	0	2	648,041
107-06-2	1,2-Dichloroethane▼	93	274,381	605	29,738	1,656	306,380
117-81-7	Di(2-ethylhexyl) phthalate▼	389	112,322	1,302	0	15,849	129,596
76-14-2	Dichlorotetrafluoroethane (CFC-114)	12	422,036	2	0	0	422,038
75-01-4	Vinyl chloride▼	58	403,575	173	185	0	404,208
75-71-8	Dichlorodifluoromethane (CFC-12)	53	335,278	1,002	0	0	336,400
--	Mercury (and its compounds)*	77	8,058	99	0	211,202	219,369
75-21-8	Ethylene oxide▼	154	241,119	523	4,896	793	248,000
75-69-4	Trichlorofluoromethane (CFC-11)	40	182,283	454	0	4,571	187,308
56-23-5	Carbon tetrachloride▼	73	109,140	37	12,493	425	122,095
--	Polychlorinated alkanes (C10 to C13)	70	2,622	2,179	0	7,286	12,087
76-15-3	Monochloropentafluoroethane (CFC-115)	6	34,745	2	0	0	34,747
75-63-8	Bromotrifluoromethane (Halon 1301)	8	12,758	0	0	0	12,901
75-72-9	Chlorotrifluoromethane (CFC-13)	2	4,894	2	0	0	4,896
353-59-3	Bromochlorodifluoromethane (Halon 1211)	4	1,136	0	0	0	1,145
	Subtotal	16,295	83,717,691	529,771	5,846,257	71,606,445	161,722,467
	% of Total	22	9	0.4	6	23	11
	Total	74,108	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790

Note: Canada and US data only. Mexico data not available for 1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

Table 3–19. (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		Adjustment Component* (kg)	Total Releases (adjusted)**	
			kg	Rank		kg	Rank
0	20,537,918	20,537,918	43,969,581	2	1,746,540	42,223,041	1
0	23,598,363	23,598,363	47,984,997	1	7,599,278	40,385,719	2
264,058	0	264,058	38,667,805	3	222,567	38,445,238	3
494,650	0	494,650	18,979,889	5	8,651	18,971,238	4
0	10,033,844	10,033,844	19,355,902	4	1,057,378	18,298,524	5
3,650,638	0	3,650,638	11,445,120	6	12,001	11,433,119	6
0	2,264,705	2,264,705	10,600,574	7	243,377	10,357,197	7
2,039	0	2,039	6,737,489	8	0	6,737,489	8
77,613	0	77,613	5,568,343	9	1,015	5,567,328	9
224,069	0	224,069	5,318,548	10	56,819	5,261,729	10
38,195	0	38,195	4,025,111	11	6,349	4,018,762	11
104,637	0	104,637	2,593,235	13	1	2,593,234	12
0	950,994	950,994	2,842,588	12	403,688	2,438,900	13
96,929	0	96,929	1,924,093	14	169	1,923,924	14
1,164	0	1,164	959,797	15	0	959,797	15
727	0	727	648,768	16	0	648,768	16
309,889	0	309,889	616,269	17	6,582	609,687	17
478,114	0	478,114	607,710	18	113	607,597	18
0	0	0	422,038	19	0	422,038	19
6,356	0	6,356	410,564	20	0	410,564	20
15	0	15	336,415	21	0	336,415	21
0	84,035	84,035	303,404	22	229	303,175	22
27,630	0	27,630	275,630	23	0	275,630	23
6,656	0	6,656	193,964	24	0	193,964	24
9,104	0	9,104	131,199	25	0	131,199	25
54,265	0	54,265	66,352	26	0	66,352	26
0	0	0	34,747	27	0	34,747	27
0	0	0	12,901	28	0	12,901	28
0	0	0	4,896	29	0	4,896	29
0	0	0	1,145	30	0	1,145	30
5,846,748	57,469,859	63,316,607	225,039,074		11,364,757	213,674,317	
14	25	23	13		18	13	
40,358,804	234,442,688	274,801,492	1,693,921,282		64,633,897	1,629,287,385	

* Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

Facilities with Largest Total On- and Off-site Releases of CEPA Toxic Chemicals

- In 1999, 50 North American facilities accounted for 35 percent of all reported releases of CEPA toxic chemicals.
- Three of the top 50 facilities were in Canada; the remaining 47 were in the United States.
- Of the 10 facilities that released more than 2 million kg of CEPA toxic chemicals, eight reported releases of metals (to land or off-site), one of asbestos (to land) and one of hydrogen fluoride (to underground injection).
- The top 50 firms contributed 68 percent of all on-site releases to land, 64 percent of on-site releases to underground injection (more than 60 percent of that total was from the large hydrogen fluoride releaser), and 34 percent of reported off-site releases.

Table 3–20. The 50 North American Facilities with the Largest Total Releases On- and Off-site of CEPA Toxic Chemicals, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms	On-site Releases				Total On-site Releases (kg)
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	6	52,390	5,975	0	6,066,535	6,124,900
2	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	1	2,063	113	0	5,941,043	5,943,219
3	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	10	0	0	0	4,282,211	4,282,211
4	Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne, NC		28	1	2,714	27	0	4,036,283	4,039,024
5	American Steel Foundries, Amsted Inds. Inc.	Alliance, OH		33	1	8,254	0	0	0	8,254
6	Yuasa Inc. Battery Plant	Richmond, KY		36	2	119	11	0	0	130
7	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	4	1	0	0	2,430,500	2,430,501
8	Vickery Environmental Inc., Waste Management Inc.	Vickery, OH		495/738	5	0	0	2,282,993	0	2,282,993
9	Safety-Kleen Inc., Grassy Mountain Facility	Grantsville, UT		495/738	9	93	0	0	2,130,317	2,130,410
10	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	5	233,037	0	0	920,000	1,153,037
11	Envirite of Ohio Inc., Envirite Corp.	Canton, OH		495/738	5	239	8	0	0	247
12	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	5	8	6	0	0	14
13	Safety-Kleen (Lone & Grassy Mountain) Inc.	Waynoka, OK		495/738	7	337	0	0	1,834,068	1,834,405
14	Chemical Waste Management Inc., Waste Management Inc.	Emelle, AL		495/738	8	140	0	0	1,745,586	1,745,726
15	USL City Environmental Inc., U.S. Liquids Inc.	Detroit, MI		495/738	5	0	0	0	0	0
16	ASARCO Inc.	East Helena, MT		33	4	9,382	31	0	1,301,752	1,311,165
17	Macalloy Corp.	North Charleston, SC		33	1	0	113	0	0	113
18	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	6	576	0	0	1,641,554	1,642,130
19	Waste Control Specialists L.L.C.	Andrews, TX		495/738	5	1,647	0	0	1,472,583	1,474,230
20	Browning Ferris Industries, BFI Calgary Landfill District #2,	Calgary, AB	99	495/738	1	0	0	0	1,455,560	1,455,560
21	Revere Smelting & Refining Corp., RSR Corp.	Middletown, NY		33	3	265	0	0	0	265
22	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	4	36	0	0	1,340,589	1,340,625
23	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden, AZ		33	5	10,643	0	0	1,321,396	1,332,039
24	Safety-Kleen (Buttonwillow) Inc.	Buttonwillow, CA		495/738	6	121	0	0	1,312,909	1,313,030
25	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	5	238	0	0	1,200,908	1,201,146
26	Wayne Disposal Inc., EQ - The Environmental Quality Co.	Belleville, MI		495/738	11	96	0	0	758,340	758,436
27	Doe Run Co., Glover Smelter, Renco Group Inc.	Glover, MO		33	3	18,973	2	0	1,142,507	1,161,482
28	Quality Automotive Co., US Automotive Mfg.	Tappahannock, VA		37	1	133	0	0	0	133
29	P4 Production L.L.C./Monsanto	Soda Springs, ID		Mult.	5	43,560	8	0	1,026,304	1,069,872
30	Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton, PA		33	3	6	22	0	0	28
31	Quemetco Inc., RSR Corp.	Indianapolis, IN		33	3	2,132	0	0	0	2,132
32	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	5	11	0	0	858,640	858,651
33	DuPont, Louisville Plant	Louisville, KY		28	6	856,800	0	0	0	856,800
34	Carpenter Co., Tupelo Div.	Verona, MS		30	1	828,998	0	0	0	828,998
35	CWM Chemical Services L.L.C., Waste Management Inc.	Model City, NY		495/738	6	2	51	0	799,093	799,146
36	Mill Service Inc.	Yukon, PA		495/738	4	566	228	0	621,904	622,698
37	Chemical Waste Management Inc., Lake Charles Facility, Waste Management Inc.	Sulphur, LA		495/738	6	4	0	0	740,589	740,593
38	Solutia, Chocolate Bayou Plant	Alvin, TX		28	2	27,690	0	726,712	109	754,511
39	Onyx Environmental Services L.L.C.	Azusa, CA		495/738	9	1,932	0	0	0	1,932
40	C & D Techs. Inc.	Conyers, GA		36	1	439	0	0	0	439
41	Foamex L.P.	Corry, PA		30	1	744,859	0	0	0	744,859
42	Eastman Kodak Co., Kodak Park	Rochester, NY		38	5	727,271	1,946	0	45	729,262
43	PSI Energy, Gibson Generating Station, Cinergy Corp.	Princeton, IN		491/493	5	296,467	0	0	442,912	739,379
44	Cytec Inds. Inc., Fortier Plant	Westwego, LA		28	3	3,900	13	723,810	0	727,723
45	American Electric Power, John E. Amos Plant	Winfield, WV		491/493	5	442,049	733	0	121,382	564,164
46	Carpenter Co.	Russellville, KY		Mult.	3	699,125	0	0	0	699,125
47	Doe Run Co., Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	4	129,818	36	0	567,736	697,590
48	Safety-Kleen (Pinewood), Safety-Kleen Corp.	Pinewood, SC		495/738	7	199	0	0	660,213	660,412
49	Dayton Power & Light Co., J.M Stuart Station	Manchester, OH		491/493	5	360,552	105	0	288,889	649,546
50	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	6	23,386	8	0	0	23,394
Subtotal					224	5,531,271	9,436	3,733,515	48,462,457	57,736,679
% of Total					1	7	2	64	68	36
Total for CEPA Toxic Chemicals					16,295	83,717,691	529,771	5,846,257	71,606,445	161,722,467

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 3–20. (continued)

Rank	Off-site Releases			Total Reported Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases of CEPA chemicals from the facility)
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)		
1	0	24,726	24,726	6,149,626	Arsenic/Lead and compounds (land)
2	0	195,646	195,646	6,138,865	Chromium and compounds (land)
3	0	1,358	1,358	4,283,569	Asbestos (land)
4	0	1,048	1,048	4,040,072	Chromium and compounds (land)
5	0	2,812,336	2,812,336	2,820,590	Chromium and compounds (transfers of metals)
6	0	2,462,187	2,462,187	2,462,317	Lead and compounds (transfers of metals)
7	0	0	0	2,430,501	Lead and compounds (land)
8	8,120	297	8,417	2,291,410	Hydrogen fluoride (UIJ)
9	0	5,788	5,788	2,136,198	Lead/Chromium/Cadmium/Arsenic and compounds (land)
10	0	920,000	920,000	2,073,037	Chromium and compounds (land, transfers to metals)
11	0	1,879,766	1,879,766	1,880,013	Nickel/Chromium and compounds (transfers of metals)
12	0	1,847,830	1,847,830	1,847,844	Nickel/Chromium and compounds (transfers of metals)
13	0	539	539	1,834,944	Lead/Chromium and compounds (land)
14	227	19,496	19,723	1,765,449	Lead/Chromium and compounds (land)
15	0	1,761,787	1,761,787	1,761,787	Lead and compounds (transfers of metals)
16	0	442,229	442,229	1,753,394	Lead and compounds (land)
17	0	1,720,298	1,720,298	1,720,411	Chromium and compounds (transfers of metals)
18	0	1,373	1,373	1,643,503	Lead and compounds, Asbestos (land)
19	0	0	0	1,474,230	Lead/Cadmium and compounds (land)
20	0	0	0	1,455,560	Asbestos (land)
21	0	1,415,553	1,415,553	1,415,818	Lead and compounds (transfers of metals)
22	0	579	579	1,341,204	Lead and compounds (land)
23	0	22	22	1,332,061	Lead and compounds (land)
24	0	0	0	1,313,030	Asbestos, Lead and compounds (land)
25	0	8	8	1,201,154	Lead and compounds (land)
26	18,624	388,921	407,545	1,165,981	Arsenic/Nickel and compounds (land, transfers of metals)
27	0	259	259	1,161,741	Lead and compounds (land)
28	1,071,955	0	1,071,955	1,072,088	Asbestos (transfers to disposal)
29	0	0	0	1,069,872	Chromium and compounds (land)
30	0	1,048,046	1,048,046	1,048,074	Lead and compounds (transfers of metals)
31	0	1,036,280	1,036,280	1,038,412	Lead/Arsenic and compounds (transfers of metals)
32	0	0	0	858,651	Lead and compounds (land)
33	0	760	760	857,560	Chlorodifluoromethane (air)
34	0	0	0	828,998	Dichloromethane (air)
35	0	7,306	7,306	806,452	Asbestos, Lead and compounds (land)
36	0	139,274	139,274	761,972	Lead and compounds (land)
37	0	14,070	14,070	754,663	Nickel/Lead and compounds (land)
38	0	0	0	754,511	Acrylonitrile (UIJ)
39	147,213	596,356	743,569	745,501	Chromium/Lead/Cadmium/Arsenic and compounds (transfers of metals)
40	0	744,693	744,693	745,132	Lead and compounds (transfers of metals)
41	0	0	0	744,859	Dichloromethane (air)
42	4,341	8,785	13,126	742,388	Dichloromethane (air)
43	0	1	1	739,380	Hydrogen fluoride (air), Nickel/Chromium and compounds (land)
44	0	25	25	727,748	Acrylonitrile (UIJ)
45	0	157,156	157,156	721,320	Hydrogen fluoride (air), Chromium and compounds (transfers of metals, land)
46	0	0	0	699,125	Dichloromethane (air)
47	0	552	552	698,142	Lead and compounds (land)
48	0	0	0	660,412	Lead/Nickel and compounds (land)
49	0	1	1	649,547	Hydrogen fluoride (air), Chromium and compounds (land)
50	0	620,135	620,135	643,529	Nickel/Lead/Cadmium and compounds (transfers of metals)
	1,250,480	20,275,486	21,525,966	79,262,645	
	21	35	34	35	
	5,846,748	57,469,859	63,316,607	225,039,074	

UIJ=underground injection.

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 2001, the list contained almost 700 substances, of which 77 are in the matched data set. Only one (C.I. Solvent Yellow 14) had no reports in 1999. This section summarizes the data on North American releases of these "Proposition 65" substances in 1999.

- Proposition 65 chemicals made up 17 percent of all North American releases in 1999.
- Three of these chemicals—toluene, chromium and its compounds and lead and its compounds—were released in amounts greater than 40 million kg. These three accounted for almost half of all releases of Proposition 65 chemicals.
- The largest releases to air were of toluene (47.1 million kg), the largest releases to underground injection were of formaldehyde (4.9 million kg), and the largest releases to land were of chromium and its compounds and lead and its compounds (more than 22 million kg each).
- Chromium and lead also had the largest off-site releases, more than 20 million kg each.

Table 3-21. Releases On- and Off-site in North America of California Proposition 65 Chemicals, 1999

CAS Number	Chemical	Number of Forms	On-site Releases				Total On-site Releases (kg)
			Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
108-88-3	Toluene	3,382	47,112,227	14,782	358,781	145,923	47,639,946
--	Chromium (and its compounds)*	4,055	496,231	118,265	697,062	22,112,800	23,431,663
--	Lead (and its compounds)*	1,964	1,055,969	37,574	88,982	23,200,316	24,386,634
75-09-2	Dichloromethane	758	18,374,538	5,458	75,672	28,142	18,485,239
--	Nickel (and its compounds)*	3,743	922,133	133,199	166,421	8,096,952	9,322,058
75-15-0	Carbon disulfide	116	16,354,816	2,967	7,306	115	16,366,194
50-00-0	Formaldehyde	958	7,174,724	195,532	4,939,348	139,747	12,351,425
1332-21-4	Asbestos (friable)	133	1,553	0	0	7,792,929	7,794,482
--	Arsenic (and its compounds)*	640	270,689	84,242	90,050	7,890,774	8,335,869
75-07-0	Acetaldehyde	323	6,264,250	123,507	342,075	5,467	6,735,450
79-01-6	Trichloroethylene	678	5,422,176	468	0	67,512	5,490,730
71-43-2	Benzene	560	4,404,127	7,108	423,299	259,697	5,094,479
79-06-1	Acrylamide	95	11,542	189	3,406,283	2,852	3,420,966
872-50-4	N-Methyl-2-pyrrolidone	499	1,556,176	16,114	1,386,185	63,582	3,022,158
--	Cobalt (and its compounds)*	709	48,618	41,405	13,957	2,024,855	2,129,035
67-66-3	Chloroform	164	2,532,561	41,881	56,099	5,336	2,536,569
107-13-1	Acrylonitrile	127	452,192	529	2,023,807	10,795	2,488,598
--	Cadmium (and its compounds)*	191	52,124	1,965	27,674	1,809,731	1,891,594
127-18-4	Tetrachloroethylene	493	1,773,714	842	4,166	48,004	1,827,164
108-93-0	Cyclohexanol	33	74,140	18	1,691,749	0	1,765,907
74-87-3	Chloromethane	111	1,630,869	978	71,964	3,756	1,707,567
75-00-3	Chloroethane	58	1,185,984	118	59	0	1,186,161
106-99-0	1,3-Butadiene	203	957,012	862	327	57	958,633
74-83-9	Bromomethane	45	648,026	13	0	2	648,041
107-06-2	1,2-Dichloroethane	93	274,381	605	29,738	1,656	306,380
117-81-7	Di(2-ethylhexyl) phthalate	389	1,302	1,302	0	15,849	129,596
109-86-4	2-Methoxyethanol	54	449,191	9,364	0	33,151	491,706
123-91-1	1,4-Dioxane	68	75,390	77,373	113	24,023	176,899
75-01-4	Vinyl chloride	58	403,575	173	185	0	404,208
75-56-9	Propylene oxide	130	330,074	4,919	6,835	13,317	355,145
62-53-3	Aniline	82	80,550	7,156	242,087	459	330,262
--	Mercury (and its compounds)*	77	8,058	99	0	211,202	219,369
75-21-8	Ethylene oxide	154	241,119	523	4,896	793	248,000
98-95-3	Nitrobenzene	33	35,044	169	95,849	30	131,092
56-23-5	Carbon tetrachloride	73	109,140	37	12,493	425	122,095
110-80-5	2-Ethoxyethanol	52	87,728	170	0	7	87,906
78-87-5	1,2-Dichloropropane	14	113,231	4,191	0	14	117,436
79-00-5	1,1,2-Trichloroethane	39	92,145	420	0	6,252	98,817
554-13-2	Lithium carbonate	53	5,445	226	0	5,275	11,046
106-46-7	1,4-Dichlorobenzene	33	91,387	853	3,311	622	96,273
140-88-5	Ethyl acrylate	114	59,472	50	367	6,878	67,089
106-89-8	Epichlorohydrin	82	66,459	138	0	791	67,392
302-01-2	Hydrazine	64	4,844	2,040	40,080	168	47,132
121-14-2	2,4-Dinitrotoluene	15	1,035	1,266	0	19,692	21,993
74-88-4	Methyl iodide	13	30,793	3	11	8,384	39,191
101-77-9	4,4'-Methylenedianiline	24	4,172	1,926	14,966	4	21,068
26471-62-5	Toluenediisocyanate (mixed isomers)	210	17,383	1,134	0	115	18,663
67-72-1	Hexachloroethane	25	19,737	0	145	4,206	24,088
91-22-5	Quinoline	20	5,557	11	11,431	3	17,002
64-67-5	Diethyl sulfate	31	1,695	0	0	0	1,695
606-20-2	2,6-Dinitrotoluene	6	297	19	0	6,933	7,249
100-44-7	Benzyl chloride	46	11,935	547	122	97	12,801
79-46-9	2-Nitropropane	6	9,497	129	0	0	9,626
139-13-9	Nitrotriacetic acid	22	2,172	2,866	726	0	5,901
101-14-4	4,4'-Methylenebis(2-chloroaniline)	0	18	0	0	3,714	3,737
924-42-5	N-Methylolacrylamide	37	2,801	571	0	24	3,408
25321-14-6	Dinitrotoluene (mixed isomers)	9	4,153	0	499	0	4,652
77-78-1	Dimethyl sulfate	35	4,489	1	0	0	4,490
94-59-7	Safrole	4	128	0	0	2,723	2,851
563-47-3	3-Chloro-2-methyl-1-propene	4	3,952	0	0	0	3,952
96-45-7	Ethylene thiourea	17	133	2	0	0	135
79-34-5	1,1,2,2-Tetrachloroethane	19	2,834	0	0	7	2,841
64-75-5	Tetracycline hydrochloride	3	0	0	0	0	0
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	17	2	2	0	0	4
62-56-6	Thiourea	28	454	116	0	113	683
28407-37-6	C.I. Direct Blue 218	8	0	5	0	0	5
90-43-7	2-Phenylphenol	21	7	5	0	114	126
95-80-7	2,4-Diaminotoluene	6	302	0	0	0	302
90-94-8	Michler's ketone	2	394	0	0	0	394
120-58-1	Isosafrole	1	1	0	0	0	1
115-28-6	Chlorandic acid	2	15	0	0	0	15
86-30-6	N-Nitrosodiphenylamine	5	13	0	0	0	13
96-09-3	Styrene oxide	1	3	0	0	0	3
7758-01-2	Potassium bromate	2	2	0	0	0	2
81-88-9	C.I. Food Red 15	3	0	0	0	0	0
1314-20-1	Thorium dioxide	1	0	0	0	0	0
	Subtotal	22,364	121,539,920	946,427	16,335,120	74,076,385	212,931,496
	% of Total	30	13	0.8	18	24	15
	Total	74,108	901,416,201	118,215,282	90,116,656	309,239,442	1,419,119,790

Note: Canada and US data only. Mexico data not available for 1999. * Metal and its compounds. † Known or suspected carcinogen.

Table 3–21. (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		Adjustment Component* (kg)	Total Releases (adjusted)**		
			kg	Rank		kg	Rank	
2,597,600	0	2,597,600	50,237,546	1	106,645	50,130,901	1	
0	20,537,918	20,537,918	43,969,581	3	1,746,540	42,223,041	2	
0	23,598,363	23,598,363	47,984,997	2	7,599,278	40,385,719	3	
494,650	0	494,650	18,979,889	5	8,651	18,971,238	4	
0	10,033,844	10,033,844	19,355,902	4	1,057,378	18,298,524	5	
1,734	0	1,734	16,367,928	6	0	16,367,928	6	
227,536	0	227,536	12,678,961	7	8,110	12,670,851	7	
3,650,638	0	3,650,638	11,445,120	8	12,001	11,433,119	8	
0	2,264,705	2,264,705	10,600,574	9	243,377	10,357,197	9	
2,039	0	2,039	6,737,489	10	0	6,737,489	10	
77,613	0	77,613	5,568,343	11	1,015	5,567,328	11	
224,069	0	224,069	5,318,548	12	56,819	5,261,729	12	
2,787	0	2,787	3,423,753	13	0	3,423,753	13	
276,023	0	276,023	3,298,181	14	0	3,298,181	14	
0	598,040	598,040	2,727,075	16	28,784	2,698,291	15	
45,801	0	45,801	2,662,370	17	2,986	2,679,384	16	
104,637	0	104,637	2,593,235	18	1	2,593,234	17	
0	950,994	950,994	2,842,588	15	403,688	2,438,900	18	
96,929	0	96,929	1,924,093	19	169	1,923,924	19	
482	0	482	1,766,389	20	0	1,766,389	20	
3,016	0	3,016	1,710,583	21	0	1,710,583	21	
1,047	0	1,047	1,187,208	22	0	1,187,208	22	
1,164	0	1,164	959,797	23	0	959,797	23	
727	0	727	648,768	24	0	648,768	24	
309,889	0	309,889	616,269	25	6,582	609,687	25	
478,114	0	478,114	607,710	26	113	607,597	26	
7,907	0	7,907	499,613	27	0	499,613	27	
302,099	0	302,099	478,998	28	3	478,995	28	
6,356	0	6,356	410,564	29	0	410,564	29	
3,272	0	3,272	358,417	30	883	357,534	30	
25,320	0	25,320	355,582	31	0	355,582	31	
0	84,035	84,035	303,404	32	229	303,175	32	
27,630	0	27,630	275,630	33	0	275,630	33	
49,864	0	49,864	180,956	34	20,878	160,078	34	
9,104	0	9,104	131,199	35	0	131,199	35	
38,383	0	38,383	126,289	36	0	126,289	36	
3,115	0	3,115	120,551	37	0	120,551	37	
6,318	0	6,318	105,135	38	0	105,135	38	
87,476	0	87,476	98,522	39	0	98,522	39	
8	0	8	96,281	40	0	96,281	40	
13,447	0	13,447	80,536	41	0	80,536	41	
1,315	0	1,315	68,707	42	0	68,707	42	
19,981	0	19,981	67,113	43	19,744	47,369	43	
22,357	0	22,357	44,350	44	0	44,350	44	
4,343	0	4,343	43,534	45	0	43,534	45	
14,406	0	14,406	35,474	46	0	35,474	46	
16,358	0	16,358	35,221	47	0	35,221	47	
8,340	0	8,340	32,428	48	0	32,428	48	
9,849	0	9,849	26,851	49	0	26,851	49	
15,655	0	15,655	17,350	50	0	17,350	50	
7,669	0	7,669	14,918	51	0	14,918	51	
651	0	651	13,452	52	0	13,452	52	
520	0	520	10,146	53	0	10,146	53	
0	0	0	5,901	54	0	5,901	54	
2,005	0	2,005	5,742	55	0	5,742	55	
1,654	0	1,654	5,062	56	0	5,062	56	
146	0	146	4,798	57	0	4,798	57	
85	0	85	4,575	58	0	4,575	58	
1,470	0	1,470	4,321	59	0	4,321	59	
0	0	0	3,952	60	0	3,952	60	
2,809	0	2,809	2,944	61	0	2,944	61	
14	0	14	2,855	62	0	2,855	62	
1,950	0	1,950	1,950	63	0	1,950	63	
1,542	0	1,542	1,546	64	0	1,546	64	
588	0	588	1,271	65	0	1,271	65	
1,025	0	1,025	1,030	66	0	1,030	66	
795	0	795	921	67	0	921	67	
351	0	351	653	68	0	653	68	
0	0	0	394	69	0	394	69	
17	0	17	18	70	0	18	70	
0	0	0	15	71	0	15	71	
0	0	0	13	72	0	13	72	
0	0	0	3	73	0	3	73	
0	0	0	2	74	0	2	74	
0	0	0	0	75	0	0	75	
0	0	0	0	76	0	0	76	
9,312,689	58,067,899	67,380,588	280,312,084		11,323,874	268,988,210		
23	25	25	17		18	17		
40,358,804	234,442,688	274,801,492	1,693,921,282		64,633,897	1,629,287,385		

* Off-site releases also reported as on-site releases by another NPRI or TRI facility.

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

Facilities with Largest Total On- and Off-site Releases of California Proposition 65 Chemicals

- Fifty facilities accounted for 34 percent of all North American releases of Proposition 65 chemicals.
- Four of the 50 facilities with the largest releases of Proposition 65 chemicals were in Canada, and three of those four were in Ontario. The remaining 46 were scattered through 23 US states.
- Of the 50 facilities, 18 were hazardous waste disposal facilities; 13, including six of the 10 with the largest releases, were in the chemicals sector; and 10 were primary metals facilities.
- Releases of Proposition 65 chemicals were not concentrated in a few large releasers; the largest amount of releases reported by a facility was 6.1 million kg, and 42 facilities reported more than 1.0 million kg of releases.
- Underground injection by the 50 largest facilities made up 73 percent of total Proposition 65 releases. These 50 facilities reported 61 percent of on-site releases to land but only 14 percent of on-site releases to air and 1 percent of on-site releases to surface water. Underground injection releases consisted mainly of formaldehyde and other organic chemicals; on-site releases to land and off-site releases were mainly of metals and asbestos.

Table 3-22. The 50 North American Facilities with the Largest Total Releases On- and Off-site of California Proposition 65 Chemicals, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms	On-site Releases				Total On-site Releases (kg)
			Canada	US		Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	
1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	7	52,390	5,975	0	6,066,648	6,125,013
2	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28	1	2,063	113	0	5,941,043	5,943,219
3	Lenzing Fibers Corp.	Lowland, TN		28	1	6,060,771	113	0	113	6,060,997
4	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	16	341	0	0	4,336,967	4,337,308
5	Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne, NC		28	1	2,714	27	0	4,036,283	4,039,024
6	Acordis Cellulosic Fibers Inc., Acordis U.S. Holding Inc.	Axis, AL		28	1	3,857,143	1,859	0	0	3,859,002
7	Monsanto, Luling	Luling, LA		28	3	34,422	0	3,193,470	0	3,227,892
8	American Steel Foundries, Amsted Inds. Inc.	Alliance, OH		33	1	8,254	0	0	0	8,254
9	Yuasa Inc. Battery Plant	Richmond, KY		36	2	119	11	0	0	130
10	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	5	9	0	0	2,430,500	2,430,509
11	Safety-Kleen Inc., Grassy Mountain Facility	Grantsville, UT		495/738	9	93	0	0	2,130,317	2,130,410
12	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	5	233,037	0	0	920,000	1,153,037
13	Envirite of Ohio Inc., Envirite Corp.	Canton, OH		495/738	5	239	8	0	0	247
14	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	4	8	6	0	0	14
15	Safety-Kleen (Lone & Grassy Mountain) Inc.	Waynoka, OK		495/738	6	337	0	0	1,834,068	1,834,405
16	Chemical Waste Management Inc., Waste Management Inc.	Emelle, AL		495/738	9	142	0	0	1,751,308	1,751,450
17	USL City Environmental Inc., U.S. Liquids Inc.	Detroit, MI		495/738	5	0	0	0	0	0
18	ASARCO Inc.	East Helena, MT		33	4	9,382	31	0	1,301,752	1,311,165
19	Macalloy Corp.	North Charleston, SC		33	1	0	113	0	0	113
20	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	8	1,146	0	0	1,710,836	1,711,982
21	BP Chemicals Inc., Green Lake Facility, BP America Inc.	Port Lavaca, TX		28	5	19,470	0	1,625,257	164	1,644,891
22	Devro-Teepak	Danville, IL		30	1	1,572,741	0	0	0	1,572,741
23	Intertape Polymer Group Columbia, Div., Intertape Polymer Group	Columbia, SC		26	2	1,492,063	0	0	0	1,492,063
24	Waste Control Specialists L.L.C.	Andrews, TX		495/738	5	1,647	0	0	1,472,583	1,474,230
25	Cytec Inds. Inc., Fortier Plant	Westwego, LA		28	6	4,357	57	1,455,194	0	1,459,608
26	Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary, AB	99	495/738	1	0	0	0	1,455,560	1,455,560
27	Angus Chemical Co.	Sterlington, LA		28	4	11,377	785	1,428,452	163	1,440,777
28	Revere Smelting & Refining Corp., RSR Corp.	Middletown, NY		33	3	265	0	0	0	265
29	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	4	36	0	0	1,340,589	1,340,625
30	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden, AZ		33	5	10,643	0	0	1,321,396	1,332,039
31	Safety-Kleen (Buttonwillow) Inc.	Buttonwillow, CA		495/738	7	123	0	0	1,320,671	1,320,794
32	Wayne Disposal Inc., EQ - The Environmental Quality Co.	Belleville, MI		495/738	18	339	0	0	820,168	820,507
33	Solutia Inc., Chocolate Bayou, Plant	Alvin, TX		28	5	29,329	0	1,216,508	110	1,245,947
34	Doe Run Co., Glover Smelter, Renco Group Inc.	Glover, MO		33	4	18,991	3	0	1,206,845	1,225,839
35	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	5	238	0	0	1,200,908	1,201,146
36	Quebecor World	Dickson, TN		27	1	1,192,896	0	0	0	1,192,896
37	Phillips Chemical Co., Philtex/Ryton Complex, Phillips Petroleum Co.	Borger, TX		28	10	37,347	773	1,124,012	18,055	1,180,187
38	Quality Automotive Co., US Automotive Mfg.	Tappahannock, VA		37	1	133	0	0	0	133
39	P4 Production L.L.C./Monsanto	Soda Springs, ID		Mult.	5	4,128	10	0	1,047,619	1,051,757
40	Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton, PA		33	3	6	22	0	0	28
41	Quemetco Inc., RSR Corp.	Indianapolis, IN		33	3	2,132	0	0	0	2,132
42	BASF Corp.	Freeport, TX		28	8	10,745	90	1,020,136	0	1,030,971
43	Viskase Corp., Viskase Companies, Inc.	Loudon, TN		30	1	991,837	0	0	0	991,837
44	Philip Enterprises Inc., Parkdale Avenue Facility, Philip Services Corp.	Hamilton, ON	77	495/738	8	0	0	0	0	0
45	Shurtape Techs. Inc., Hickory Tape Plant, STM Inc.	Hickory, NC		26	1	920,703	0	0	0	920,703
46	Onyx Environmental Services L.L.C.	Azusa, CA		495/738	16	3,521	0	0	0	3,521
47	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	5	11	0	0	858,640	858,651
48	Carpenter Co., Tupelo Div.	Verona, MS		30	3	842,521	0	0	0	842,521
49	BP Chemicals Inc., BP America	Lima, OH		28	10	23,410	0	810,924	0	834,334
50	CWM Chemical Services L.L.C. Waste Management Inc.	Model City, NY		495/738	6	2	51	0	799,093	799,146
Subtotal					250	17,453,621	10,047	11,873,953	45,322,399	74,660,020
% of Total					1	14	1	73	61	35
Total for Proposition 65 Chemicals					22,364	121,539,920	946,427	16,335,120	74,076,385	212,931,496

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 3–22. (continued)

Rank	Off-site Releases			Total Reported Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases of Proposition 65 chemicals from the facility)
	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)		
1	2	24,726	24,728	6,149,741	Arsenic/Lead and compounds (land)
2	0	195,646	195,646	6,138,865	Chromium and compounds (land)
3	0	0	0	6,060,997	Carbon disulfide (air)
4	0	1,358	1,358	4,338,666	Asbestos (land)
5	0	1,048	1,048	4,040,072	Chromium and compounds (land)
6	0	0	0	3,859,002	Carbon disulfide (air)
7	0	0	0	3,227,892	Formaldehyde (UIJ)
8	0	2,812,336	2,812,336	2,820,590	Chromium and compounds (transfers of metals)
9	0	2,462,187	2,462,187	2,462,317	Lead and compounds (transfers of metals)
10	0	0	0	2,430,509	Lead and compounds (land)
11	0	5,788	5,788	2,136,198	Lead/Chromium/Cadmium/Arsenic and compounds (land)
12	0	920,000	920,000	2,073,037	Chromium and compounds (land, transfers to metals)
13	0	1,879,766	1,879,766	1,880,013	Nickel/Chromium and compounds (transfers of metals)
14	0	1,847,830	1,847,830	1,847,844	Nickel/Chromium and compounds (transfers of metals)
15	0	539	539	1,834,944	Lead/Chromium and compounds (land)
16	17,461	19,496	36,957	1,788,407	Lead/Chromium and compounds (land)
17	0	1,761,787	1,761,787	1,761,787	Lead and compounds (transfers of metals)
18	0	442,229	442,229	1,753,394	Lead and compounds (land)
19	0	1,720,298	1,720,298	1,720,411	Chromium and compounds (transfers of metals)
20	0	1,373	1,373	1,713,355	Lead and compounds, Asbestos (land)
21	2	257	259	1,645,150	Acrylamide (UIJ)
22	0	0	0	1,572,741	Carbon disulfide (air)
23	0	0	0	1,492,063	Toluene (air)
24	0	0	0	1,474,230	Lead/Cadmium and compounds (land)
25	2	25	27	1,459,635	Acrylamide, Acrylonitrile (UIJ)
26	0	0	0	1,455,560	Asbestos (land)
27	0	16	16	1,440,793	Formaldehyde (UIJ)
28	0	1,415,553	1,415,553	1,415,818	Lead and compounds (transfers of metals)
29	0	579	579	1,341,204	Lead and compounds (land)
30	0	22	22	1,332,061	Lead and compounds (land)
31	0	0	0	1,320,794	Asbestos, Lead and compounds (land)
32	51,947	388,921	440,868	1,261,375	Arsenic/Nickel/Lead and compounds (land, transfers of metals)
33	0	0	0	1,245,947	Acrylonitrile, Acrylamide (UIJ)
34	0	259	259	1,226,098	Lead and compounds (land)
35	0	8	8	1,201,154	Lead and compounds (land)
36	0	0	0	1,192,896	Toluene (air)
37	0	0	0	1,180,187	N-Methyl-2-pyrrolidone (UIJ)
38	1,071,955	0	1,071,955	1,072,088	Asbestos (transfers to disposal)
39	0	0	0	1,051,757	Chromium and compounds (land)
40	0	1,048,046	1,048,046	1,048,074	Lead and compounds (transfers of metals)
41	0	1,036,280	1,036,280	1,038,412	Lead/Arsenic and compounds (transfers of metals)
42	38	1,651	1,689	1,032,660	Cyclohexanol (UIJ)
43	0	0	0	991,837	Carbon disulfide (air)
44	748,652	217,765	966,417	966,417	Toluene (transfers to disposal)
45	305	0	305	921,008	Toluene (air)
46	280,004	596,356	876,360	879,881	Chromium and compounds, Lead/Cadmium/Arsenic and compounds (transfers of metals), Toluene (transfers to disposal)
47	0	0	0	858,651	Lead and compounds (land)
48	0	0	0	842,521	Dichloromethane (air)
49	136	211	347	834,681	Acrylamide, Acrylonitrile (UIJ)
50	0	7,306	7,306	806,452	Asbestos, Lead and compounds (land)
	2,170,504	18,809,662	20,980,166	95,640,186	
	23	32	31	34	
	9,312,689	58,067,899	67,380,588	280,312,084	

UIJ=underground injection.

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Key Findings

Transfers to Recycling

- In 1999, North American facilities sent 1.05 billion kg of chemicals included in the matched data set to off-site locations for recycling. These are transfers from the industries in the 1999 matched data set.
- Transfers of metals and their compounds represented the bulk (86 percent) of all substances sent for recycling.
- The primary metals industry reported sending the largest amounts of chemicals for recycling (368.6 million kg, primarily as metals and their compounds). TRI facilities reported 91 percent of this amount.
- The fabricated metals industry reported the second-largest amount, 202.6 million kg, also primarily as metals and their compounds. NPRI facilities reported 22 percent of this amount.
- Facilities in Ohio and Ontario reported transferring the largest amounts (81.7 million kg and 81.2 million kg, respectively) to recycling, each reporting close to 8 percent of all such transfers in North America in 1999.
- Facilities in Pennsylvania reported the third-largest transfers to recycling, 78.7 million kg, or 7.5 percent of all such transfers reported in North America in 1999.

Other Transfers for Further Management

- In 1999, North American facilities reported transferring 611.3 million kg off-site for other types of management, including transfers to energy recovery (346.7 million kg), treatment (129.9 million kg) and sewage (134.6 million kg). These transfers do not include metals and their compounds, which are included as off-site releases in the analysis in **Chapter 3**.
- The chemical manufacturing sector reported the largest amount of other transfers for further management, 316.8 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, 143.5 million kg.
- Of the chemicals in the matched data set other than metals and their compounds, toluene, with 73.7 million kg, accounted for the largest transfers to energy recovery in 1999. Methanol (22.1 million kg) ranked first in transfers to treatment. Nitric acid and nitrate compounds (72.4 million kg) had the largest transfers to sewage, making up almost 54 percent of total such transfers.

4.1 Introduction

This chapter examines reporting of off-site transfers for further management of PRTR-listed substances in North America in 1999. 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 1999 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 3**. 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.

4.2 Transfers to Recycling, 1999

Transfers to recycling are transfers of chemicals from a facility to other sites that recycle the chemical. This section analyzes transfers to recycling for both metals and their compounds and the other chemicals in the 1999 matched data set.

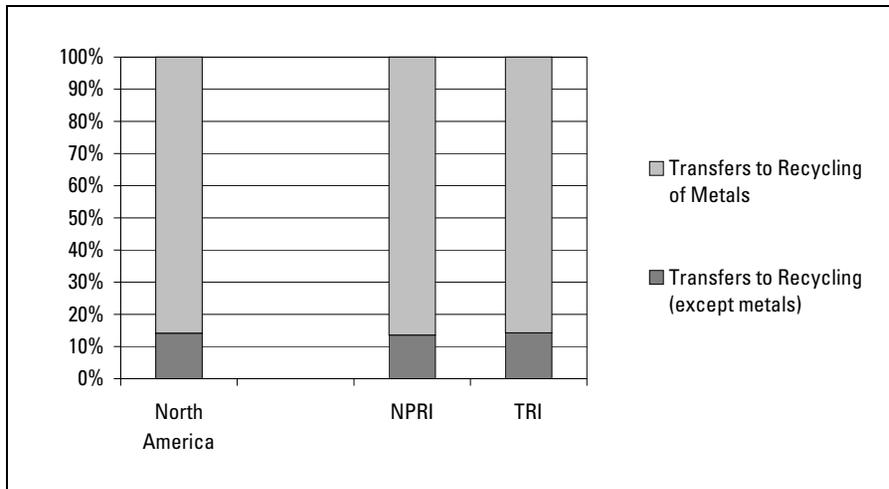
- The matched North American industries sent 1.05 billion kg of matched chemicals off-site for recycling in 1999.
- Most chemicals sent for recycling were metals and their compounds. Overall, metals accounted for 86 percent of all transfers to recycling in North America in 1999; this percentage was the same for both NPRI and TRI.

Table 4–1. Summary of Transfers to Recycling in North America, NPRI and TRI, 1999

	North America		NPRI		TRI		NPRI as % of North American Total	TRI as % of North American Total
	Number		Number		Number			
Total Facilities	21,521		1,634		19,887		8	92
Total Forms	74,108		5,741		68,367		8	92
	kg	%	kg	%	kg	%		
Total Off-site Transfers to Recycling	1,050,519,901	100	108,714,208	100	941,805,693	100	10	90
Transfers to Recycling of Metals	901,927,543	86	93,959,478	86	807,968,065	86	10	90
Transfers to Recycling (except metals)	148,592,358	14	14,754,730	14	133,837,628	14	10	90

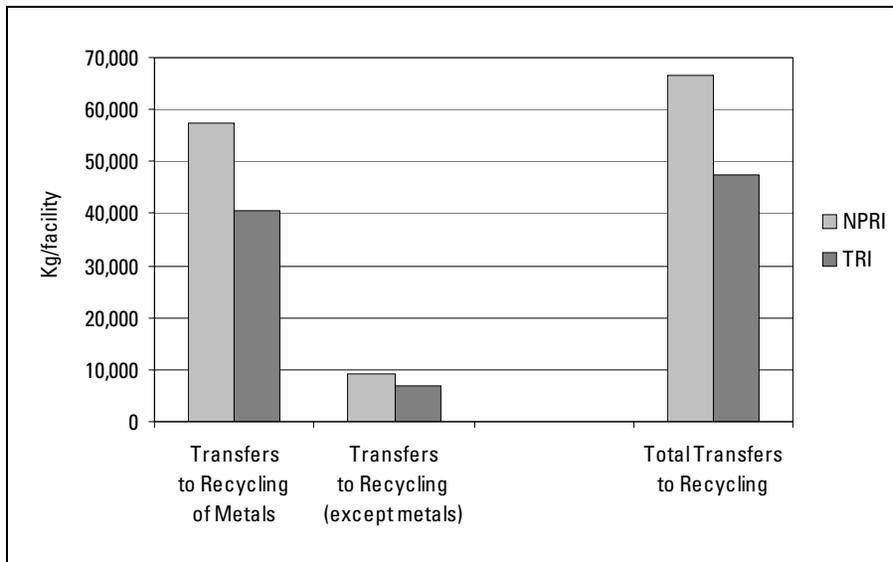
Note: Canada and US data only. Mexico data not available for 1999. Data include 210 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination 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 4–1. Percentage of Transfers to Recycling in North America by Type, NPRI and TRI, 1999



Note: Canada and US data only. Mexico data not available for 1999.

Figure 4–2. Average Kilograms per Facility of Transfers to Recycling, NPRI and TRI, 1999



Note: Canada and US data only. Mexico data not available for 1999.

- NPRI facilities reported higher average amounts of transfers to recycling than TRI facilities. Total transfers to recycling per facility for NPRI facilities were 1.4 times the average for TRI facilities. For metals, the average quantity per NPRI facility was, again, 1.4 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 and TRI explains the differences in average transfers per facility. As noted in **Chapter 3**, the average releases of NPRI facilities were 1.3 times larger than those of TRI facilities. NPRI facilities also reported higher average amounts of off-site disposal than TRI facilities.

4.2.1 Transfers to Recycling by State and Province, 1999

Facilities in the matched data set reported sending 1.05 billion kg of chemicals off-site for recycling in 1999. 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.

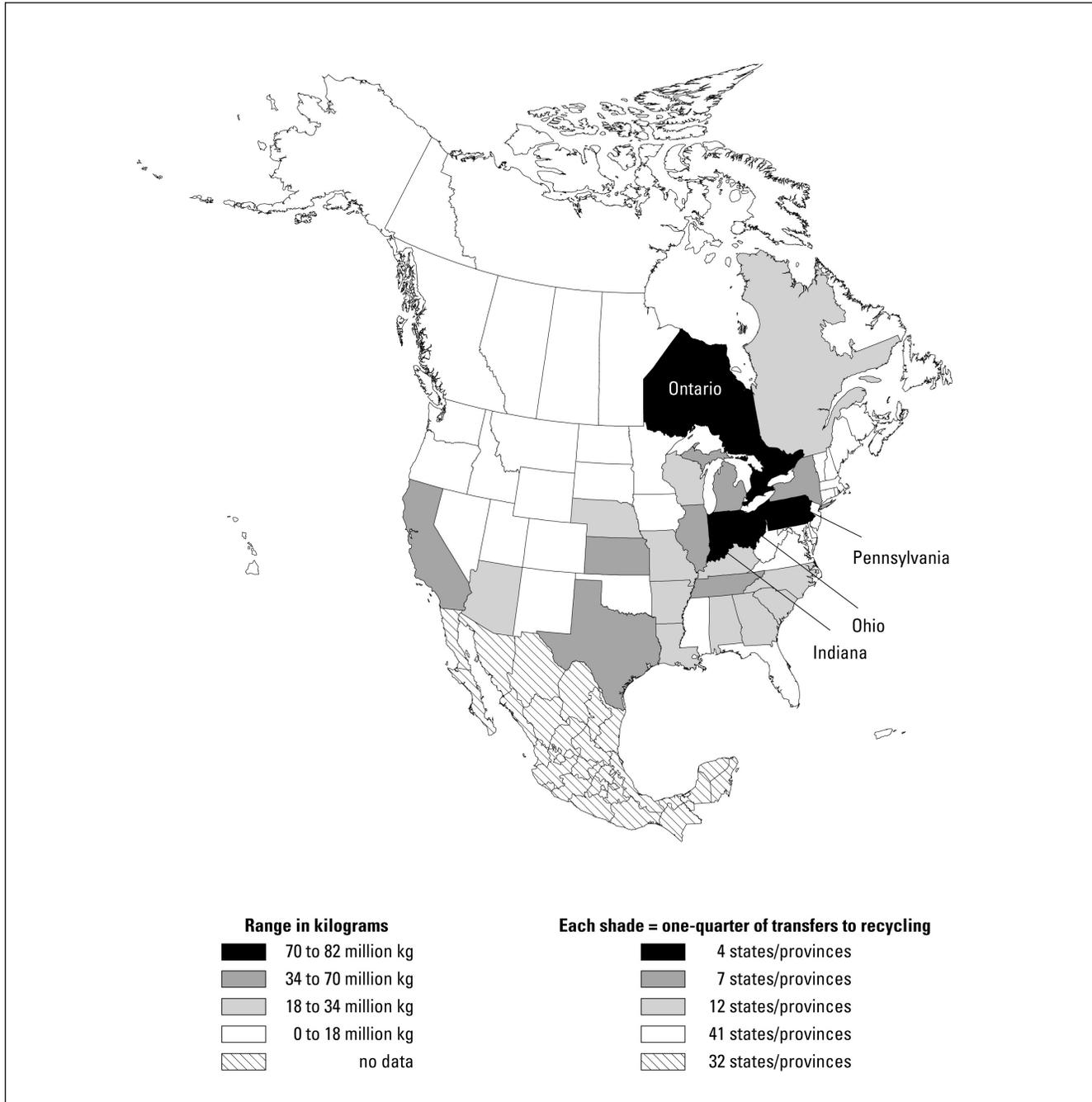
- Facilities in Ohio reported the largest amount of total transfers to recycling, 81.7 million kg, or 8 percent of all such transfers reported in North America in 1999.
- Facilities in Ontario reported the second-largest amount of total transfers to recycling, 81.2 million kg—also 8 percent of all such transfers.
- Facilities in Pennsylvania reported the third-largest amount, sending 78.7 million kg off-site for recycling, or 7.5 percent of total transfers in this category.
- Pennsylvania facilities reported the largest amounts of transfers to recycling of metals and their compounds (76.2 million kg). Texas facilities reported the largest amounts of transfers of other chemicals to recycling (17.4 million kg).
- Three jurisdictions—Guam, Hawaii, and Prince Edward Island—reported no transfers to recycling.

Table 4–2. Transfers to Recycling in North America, by State and Province, 1999

State/Province	Transfers to Recycling of Metals		Transfers to Recycling (except metals)		Total Off-site Transfers to Recycling	
	kg	Rank	kg	Rank	kg	Rank
Alabama	21,566,225	16	535,984	32	22,102,209	18
Alaska	0	--	726	58	726	61
Alberta	1,475,002	43	788,932	28	2,263,934	41
Arizona	17,185,901	20	1,096,686	24	18,282,587	23
Arkansas	23,813,172	14	150,412	40	23,963,584	15
British Columbia	362,783	51	480,480	34	843,263	48
California	28,334,928	11	6,954,008	8	35,288,936	9
Colorado	7,383,064	33	125,360	42	7,508,424	35
Connecticut	8,683,011	29	264,750	39	8,947,761	30
Delaware	3,142,061	39	958,091	25	4,100,152	38
District of Columbia	5,708	59	0	--	5,708	59
Florida	8,164,720	31	680,164	29	8,844,884	31
Georgia	21,198,501	17	2,686,389	15	23,884,890	16
Guam	0	--	0	--	0	--
Hawaii	0	--	0	--	0	--
Idaho	664,413	48	12,570	52	676,983	49
Illinois	32,994,281	8	6,707,437	9	39,701,718	7
Indiana	63,940,189	4	7,518,432	7	71,458,621	4
Iowa	16,036,606	22	568,735	31	16,605,341	25
Kansas	31,841,497	10	2,405,189	19	34,246,686	11
Kentucky	14,386,150	24	5,474,961	10	19,861,111	21
Louisiana	7,115,116	34	14,969,486	2	22,084,602	19
Maine	903,065	47	47,085	49	950,150	47
Manitoba	1,111,284	44	89,745	44	1,201,029	44
Maryland	1,506,834	42	617,353	30	2,124,187	42
Massachusetts	9,441,126	27	935,057	26	10,376,183	29
Michigan	44,706,819	5	11,290,370	5	55,997,189	6
Minnesota	9,091,117	28	1,745,251	22	10,836,368	27
Mississippi	8,275,514	30	414,645	36	8,690,159	32
Missouri	22,763,193	15	2,658,963	16	25,422,156	14
Montana	94,606	56	13,971	51	108,577	56
Nebraska	18,667,224	19	62,389	47	18,729,613	22
Nevada	998,785	46	3,482	55	1,002,267	46
New Brunswick	160,425	55	1,912	57	162,337	55
New Hampshire	6,849,342	35	85,959	45	6,935,301	36
New Jersey	14,692,727	23	2,335,254	20	17,027,981	24
New Mexico	1,963,535	40	316,652	37	2,280,187	40
New York	32,453,338	9	2,503,630	18	34,956,968	10
Newfoundland	4,500	60	0	--	4,500	60
North Carolina	24,414,506	12	8,941,661	6	33,356,167	12
North Dakota	245,777	54	4,468	54	250,245	54
Nova Scotia	273,265	53	5,972	53	279,237	53
Ohio	69,710,434	2	12,035,510	3	81,745,944	1
Oklahoma	9,916,444	26	484,763	33	10,401,207	28
Ontario	69,670,267	3	11,523,390	4	81,193,657	2
Oregon	8,071,735	32	436,921	35	8,508,656	33
Pennsylvania	76,156,449	1	2,542,507	17	78,698,956	3
Prince Edward Island	0	--	0	--	0	--
Puerto Rico	3,837,622	37	4,345,305	11	8,182,927	34
Quebec	20,432,090	18	1,849,256	21	22,281,346	17
Rhode Island	1,690,591	41	79,665	46	1,770,256	43
Saskatchewan	469,862	49	15,043	50	484,905	51
South Carolina	16,870,362	21	3,133,885	14	20,004,247	20
South Dakota	321,502	52	49,181	48	370,683	52
Tennessee	33,090,756	7	3,314,633	13	36,405,389	8
Texas	40,930,764	6	17,387,856	1	58,318,620	5
Utah	1,037,010	45	126,039	41	1,163,049	45
Vermont	469,836	50	122,139	43	591,975	50
Virgin Islands	69,508	57	2,757	56	72,265	57
Virginia	10,662,659	25	1,682,151	23	12,344,810	26
Washington	4,402,831	36	792,496	27	5,195,327	37
West Virginia	3,262,893	38	290,954	38	3,553,847	39
Wisconsin	23,902,303	13	3,924,844	12	27,827,147	13
Wyoming	41,315	58	452	59	41,767	58
Total	901,927,543		148,592,358		1,050,519,901	

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 4-1. States and Provinces in North America Sending Largest Amounts of Transfers to Recycling, 1999



4.2.2 Transfers to Recycling by Industry Sector, 1999

Facilities in three manufacturing industries—primary metals, fabricated metals products and electronic/electrical equipment—reported the largest amounts of transfers to recycling in 1999. For all three, the transfers consisted primarily of metals and their compounds.

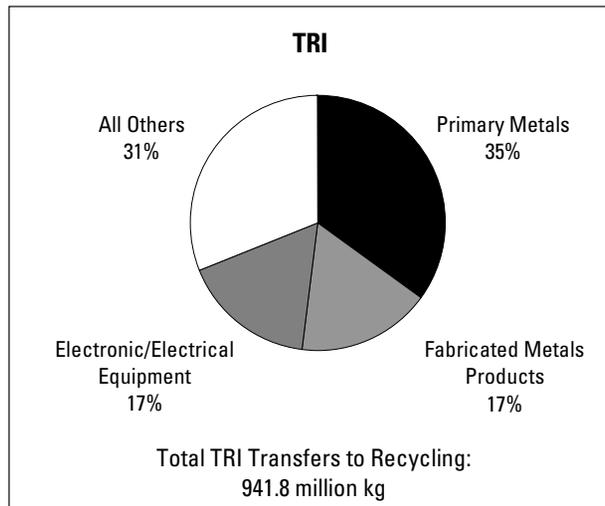
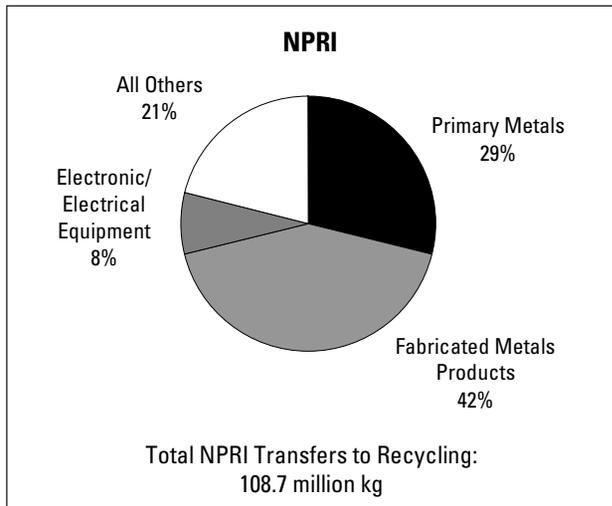
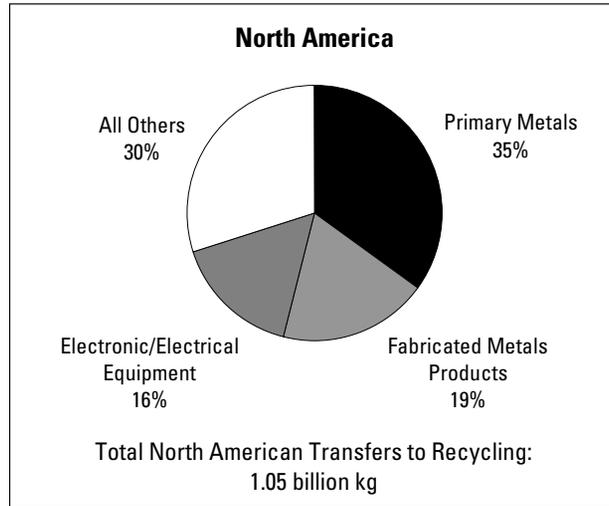
- The primary metals industry (US SIC code 33) reported the largest amount of transfers to recycling, 368.6 million kg. Transfers by this industry accounted for 35 percent of the North American total, 29 percent of all transfers to recycling in NPRI and 35 percent of those in TRI.
- The fabricated metals industry (US SIC code 34) reported the second-largest amount, 202.6 million kg, or 19 percent of the North American total. This sector accounted for the largest share of transfers to recycling in NPRI (42 percent) but for only 17 percent in TRI.
- The electronic/electrical equipment industry (US SIC code 36) reported the third-largest amount of North American transfers, with 166.3 million kg, or 16 percent of the North American total. This sector accounted for 8 percent of transfers to recycling in NPRI and for 17 percent in TRI.

Table 4–3. Transfers to Recycling in North America, by Industry, 1999

US SIC Code	Industry	Transfers to Recycling of Metals (kg)	Transfers to Recycling (except metals) (kg)	Total Off-site Transfers to Recycling (kg)	NPRI as % of North American Total	TRI as % of North American Total
33	Primary Metals	363,567,846	4,983,660	368,551,506	9	91
34	Fabricated Metals Products	196,106,856	6,521,843	202,628,699	22	78
36	Electronic/Electrical Equipment	161,837,662	4,421,863	166,259,525	5	95
28	Chemicals	10,184,892	71,407,649	81,592,541	6	94
--	Multiple codes 20–39*	68,568,059	6,544,866	75,112,925	--	100
37	Transportation Equipment	46,466,750	17,931,554	64,398,304	13	87
35	Industrial Machinery	32,534,258	1,968,507	34,502,765	3	97
495/738	Hazardous Waste Mgt./Solvent Recovery	3,027,111	8,639,331	11,666,442	9	94
29	Petroleum and Coal Products	1,333,601	9,492,264	10,825,865	7	93
39	Misc. Manufacturing Industries	6,399,736	1,699,078	8,098,814	24	76
30	Rubber and Plastics Products	2,595,521	3,378,344	5,973,865	21	79
38	Measurement/Photographic Instruments	2,551,022	2,130,409	4,681,431	--	100
27	Printing and Publishing	444,471	3,813,247	4,257,718	33	67
25	Furniture and Fixtures	1,194,312	1,721,607	2,915,919	27	73
491/493	Electric Utilities	2,357,847	2,585	2,360,432	28	72
32	Stone/Clay/Glass Products	1,678,967	95,315	1,774,282	19	81
5169	Chemical Wholesalers	4,508	1,740,048	1,744,556	--	100
26	Paper Products	225,178	738,102	963,280	5	95
20	Food Products	628,795	41,326	670,121	28	72
22	Textile Mill Products	57,622	569,350	626,972	2	98
23	Apparel and Other Textile Products	50,085	401,150	451,235	96	4
24	Lumber and Wood Products	14,888	347,152	362,040	37	63
31	Leather Products	97,556	45	97,601	--	100
12	Coal Mining	0	3,063	3,063	--	100
21	Tobacco Products	0	0	0	--	100
Total		901,927,543	148,592,358	1,050,519,901	10	90

Note: Canada and US data only. Mexico data not collected for 1999. * Multiple SIC codes reported only in TRI.

Figure 4–3. Percentage Contribution of Top Industry Sectors to Transfers to Recycling, NPRI and TRI, 1999



- The chemical manufacturing industry (US SIC code 28) reported the largest amount of transfers to recycling of chemicals other than metals, 71.4 million kg, or almost half of the North American total of 148.6 million kg.
- Three industry sectors—leather products, coal mining, and tobacco products—reported less than 100,000 kg of transfers to recycling. (For tobacco, the amount was zero.)

Note: Canada and US data only. Mexico data not available for 1999.

4.2.3 Facilities with the Largest Transfers to Recycling, 1999

The 50 facilities in North America reporting the largest transfers to recycling accounted for 256.6 million kg, or 24 percent of all transfers to recycling in the matched data set for 1999.

- One electronic/electric equipment facility, a Delphi Energy & Chassis Systems plant in Olathe, Kansas, reported 12.4 million kg of transfers to recycling, primarily of lead and its compounds.
- Of these 50 facilities, 20 were primary metals facilities, 13 were electronic/electric equipment manufacturing facilities, and eight were fabricated metals facilities. These three industry sectors reported the largest amounts of transfers to recycling in North America in 1999. Transfers by the 50 facilities ranged from Delphi Energy's 12.4 million kg to 3.4 million kg.
- Forty of the 50 facilities reported transfers to recycling of metals and their compounds only.

Table 4-4. The 50 North American Facilities with the Largest Transfers to Recycling, 1999

Rank	Facility	City, State/Province	SIC Codes		Number of Forms
			Canada	US	
1	Delphi Energy & Chassis Sys., Delphi Automotive Sys. L.L.C.	Olathe, KS		36	4
2	Parker Hannifin, Brass Prods. Div., Parker Hannifin Corp.	Otsego, MI		34	2
3	U.S. Mint, U.S. Department of the Treasury	Philadelphia, PA		34	3
4	Nucor Steel—Arkansas, Nucor Corp.	Blytheville, AR		33	11
5	Republic Techs. Intl., Canton Facility	Canton, OH		33	8
6	J&L Specialty Steel Inc.	Louisville, OH		33	6
7	Oxy Vinyls L.P. La Porte, VCM Plant, Occidental Petroleum Corp.	La Porte, TX		28	18
8	North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta, OH		33	6
9	Formosa Plastics Corp. Louisiana, Formosa Plastics Corp. USA	Baton Rouge, LA		28	18
10	Belden Communications Div., Belden, Inc.	Phoenix, AZ		33	3
11	Jessop Steel Co., Allegheny Techs. Inc.	Washington, PA		33	8
12	United Technologies Corp, Carrier Div.	Collierville, TN		Multi.	3
13	Rea Magnet Wire Co.	Lafayette, IN		33	8
14	Exide Corp.	Salina, KS		36	3
15	Exide Corp.	Manchester, IA		36	3
16	Lucent Techs. Inc.	Omaha, NE		Multi.	7
17	Waltec Forgings Incorporated, Wallaceburg Plant	Wallaceburg, ON	30	34	6
18	International Wire, Corunna, Intl. Wire Group Inc.	Corunna, IN		33	2
19	Chaparral Steel Midlothian L.P., Texas Inds. Inc.	Midlothian, TX		33	6
20	Noranda Inc., Affinerie CCR	Montréal-Est, QC	29	33	13
21	Co-Steel Raritan	Perth Amboy, NJ		33	5
22	ASARCO Inc., El Paso	El Paso, TX		33	6
23	General Motors of Canada Limited, Oshawa Battery Plant	Oshawa, ON	33	36	2
24	Firestone Polymers, Bridgestone/Firestone Inc.	Sulphur, LA		28	5
25	Noranda Inc. CEZinc, Usine d'extraction de Zinc	Valleyfield, QC	29	33	9
26	Exide Corp.	Bristol, TN		36	3
27	Rome Cable Corp., Rome Group Inc.	Rome, NY		33	5
28	GNB Techs. Inc.	Leavenworth, KS		36	2
29	Biccgeneral Cable Inds. Inc., General Cable Corp.	Watkinsville, GA		33	1
30	Johnson Controls Inc., Battery Group Inc.	Saint Joseph, MO		36	3
31	Douglas Battery Mfg. Co.	Winston-Salem, NC		36	3
32	Cerro Wire & Cable Co. Inc.	Hartselle, AL		33	3
33	Quanex Macsteel, Quanex Corporation	Fort Smith, AR		33	6
34	Johnson Controls Inc., Battery Group Inc.	Holland, OH		36	2
35	U.S. Mint, U.S. Department of the Treasury	Denver, CO		34	2
36	P & F Tool & Die, Cosma International Inc.	Concord, ON	32	34	3
37	CNA Holdings Inc., Celanese Americas Corp.	Shelby, NC		28	6
38	Delphi Energy & Chassis Sys., Delphi Automotive Sys. L.L.C.	New Brunswick, NJ		36	3
39	Thomas & Betts Corp.	Horseheads, NY		36	4
40	Engineered Controls Intl. Inc.	Whitsett, NC		34	4
41	Delphi Packard Electric Sys., Delphi Automotive Sys.	Warren, OH		37	4
42	Mueller Brass Co., Mueller Inds. Inc.	Port Huron, MI		Multi.	6
43	Karmax Heavy Stampings, Cosma International Inc.	Milton, ON	32	34	3
44	Deco Automotive, Cosma International Inc.	Rexdale, ON	32	34	4
45	Safety-Kleen Oil Recovery Co., Safety-Kleen Corp.	East Chicago, IN		29	5
46	Delphi Energy & Engine Management Sys., Delphi Automotive Sys.	Anaheim, CA		36	3
47	Gallatin Steel Co., Dofasco Gallatin Inc./Co-Steel C.M.S. Corp.	Warsaw, KY		33	6
48	Essex Group Inc., Superior Telecom Inc.	Franklin, TN		33	8
49	Gibbs Die Casting Corp., George Koch & Sons	Henderson, KY		33	8
50	GNB Techs. Inc.	Farmers Branch, TX		36	2
	Subtotal				264
	% of Total				0.4
	Total				74,108

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.

Table 4-4. (continued)

Rank	Transfers to Recycling	Transfers to Recycling	Total Off-site Transfers	Major Chemicals Reported (chemicals accounting for more than 70% of off-site transfers to recycling from the facility)
	of Metals (kg)	(except metals) (kg)	to Recycling (kg)	
1	12,406,332	0	12,406,332	Lead and compounds
2	9,476,003	0	9,476,003	Copper and compounds
3	8,767,762	0	8,767,762	Copper and compounds
4	8,025,473	0	8,025,473	Zinc and compounds
5	7,716,766	1,882	7,718,648	Zinc and compounds
6	7,485,577	0	7,485,577	Chromium/Nickel and compounds
7	0	7,201,748	7,201,748	1,1,2-Trichloroethane, 1,2-Dichloroethane, Chloroform
8	7,037,642	0	7,037,642	Zinc and compounds
9	0	6,995,828	6,995,828	1,1,2-Trichloroethane, 1,2-Dichloroethane
10	6,677,470	0	6,677,470	Copper and compounds
11	6,096,055	0	6,096,055	Chromium/Nickel and compounds
12	5,718,135	0	5,718,135	Copper and compounds
13	5,459,311	0	5,459,311	Copper and compounds
14	5,390,526	0	5,390,526	Lead and compounds
15	5,380,475	0	5,380,475	Lead and compounds
16	5,223,784	2,335	5,226,119	Copper and compounds
17	5,216,301	0	5,216,301	Copper/Zinc and compounds
18	4,658,966	509,247	5,168,213	Lead and compounds
19	5,045,583	0	5,045,583	Zinc and compounds
20	4,969,303	0	4,969,303	Copper/Arsenic and compounds
21	4,941,672	0	4,941,672	Zinc and compounds
22	4,812,336	0	4,812,336	Copper/Lead and compounds
23	4,803,000	0	4,803,000	Lead and compounds
24	0	4,778,361	4,778,361	1,3-Butadiene
25	4,720,805	0	4,720,805	Copper/Lead and compounds
26	4,578,616	0	4,578,616	Lead and compounds
27	4,540,617	0	4,540,617	Copper and compounds
28	4,383,000	0	4,383,000	Lead and compounds
29	4,318,401	0	4,318,401	Copper and compounds
30	4,280,170	0	4,280,170	Lead and compounds
31	4,236,387	0	4,236,387	Lead and compounds
32	4,224,867	0	4,224,867	Copper and compounds
33	4,195,490	1,026	4,196,516	Manganese/Zinc and compounds
34	4,063,727	0	4,063,727	Lead and compounds
35	4,054,221	0	4,054,221	Copper and compounds
36	3,962,600	0	3,962,600	Zinc and compounds
37	0	3,954,649	3,954,649	Ethylene glycol
38	3,782,358	0	3,782,358	Lead and compounds
39	3,712,571	0	3,712,571	Copper and compounds
40	3,697,356	0	3,697,356	Copper and compounds
41	3,673,779	0	3,673,779	Copper and compounds
42	3,633,613	0	3,633,613	Zinc/Copper and compounds
43	3,626,500	0	3,626,500	Zinc/Manganese and compounds
44	3,551,000	0	3,551,000	Zinc and compounds
45	887	3,518,587	3,519,474	Ethylene glycol
46	3,462,868	0	3,462,868	Lead and compounds
47	3,445,941	0	3,445,941	Zinc and compounds
48	3,445,222	0	3,445,222	Copper and compounds
49	1,197,324	2,222,222	3,419,546	Aluminum oxide, Copper and compounds
50	3,360,544	0	3,360,544	Lead and compounds
	227,457,336	29,185,885	256,643,221	
	25	20	24	
	901,927,543	148,592,358	1,050,519,901	

4.2.4 Transfers to Recycling by Chemical, 1999

The 25 chemicals with the largest transfers to recycling in North America, with 1.0 billion kg of total transfers to recycling, represented 98 percent of all transfers to recycling in the matched data set for 1999.

- Nine of the 25 chemicals with the largest amounts of transfers to recycling (including all of the top six) were metals and their compounds.
- Eight of the 25 chemicals were known or suspected carcinogens, including four of the metals and their compounds.
- Copper and its compounds had the largest transfers to recycling in North America in 1999 (362.3 million kg). TRI facilities reported 92 percent of the total for copper and its compounds, a larger proportion than the average for all substances (90 percent). Copper is used in electrical and electronic products, building construction and industrial machinery and equipment. Copper and its compounds are also used by a large variety of industries as mildew preventives, corrosion inhibitors, fuel additives, printing and photocopying inks, and pigments in glass and ceramic production.

Table 4-5. The 25 Chemicals with the Largest Transfers to Recycling in North America, 1999

Rank	CAS Number	Chemical	Number of Forms	Transfers to Recycling of Metals (kg)	Transfers to Recycling (except metals) (kg)
1	--	Copper (and its compounds)*	4,966	362,346,319	0
2	--	Zinc (and its compounds)*	4,080	182,137,733	0
3	--	Lead (and its compounds)*▼	1,964	157,965,841	0
4	--	Manganese (and its compounds)*	3,833	61,260,038	0
5	--	Chromium (and its compounds)*▼	4,055	60,511,425	0
6	--	Nickel (and its compounds)*▼	3,743	52,355,381	0
7	107-21-1	Ethylene glycol	1,776	0	23,844,901
8	--	Xylenes	3,492	0	21,080,404
9	108-88-3	Toluene	3,382	0	15,042,812
10	7429-90-5	Aluminum (fume or dust)*	383	14,944,420	0
11	78-93-3	Methyl ethyl ketone	2,170	0	9,918,428
12	79-00-5	1,1,2-Trichloroethane	39	0	7,273,880
13	75-09-2	Dichloromethane▼	758	0	7,067,355
14	107-06-2	1,2-Dichloroethane▼	93	0	6,806,413
15	67-56-1	Methanol	2,803	0	6,265,085
16	108-10-1	Methyl isobutyl ketone	1,059	0	6,052,903
17	110-54-3	n-Hexane	1,043	0	5,289,771
18	106-99-0	1,3-Butadiene▼	203	0	5,233,114
19	127-18-4	Tetrachloroethylene▼	493	0	4,570,934
20	--	Cobalt (and its compounds)*▼	709	3,871,194	0
21	872-50-4	N-Methyl-2-pyrrolidone	499	0	3,463,093
22	100-41-4	Ethylbenzene	1,260	0	2,750,947
23	--	Antimony (and its compounds)*	786	2,471,512	0
24	1344-28-1	Aluminum oxide (fibrous forms)	74	0	2,463,535
25	--	Nitric acid and nitrate compounds	3,837	0	2,462,160
Subtotal			47,500	897,863,863	129,585,735
% of Total			64	99.6	87
Total for All Chemicals			74,108	901,927,543	148,592,358

Note: Canada and US data only. Mexico data not available for 1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

Table 4–5. (continued)

Total Off-site Transfers to Recycling (kg)	NPRI as % of North American Total	TRI as % of North American Total
362,346,319	8	92
182,137,733	16	84
157,965,841	8	92
61,260,038	17	83
60,511,425	9	91
52,355,381	7	93
23,844,901	4	96
21,080,404	22	78
15,042,812	22	78
14,944,420	22	78
9,918,428	25	75
7,273,880	--	100
7,067,355	2	98
6,806,413	--	100
6,265,085	6	94
6,052,903	12	88
5,289,771	--	100
5,233,114	--	100
4,570,934	3	97
3,871,194	2	98
3,463,093	--	100
2,750,947	10	90
2,471,512	8	92
2,463,535	7	93
2,462,160	4	96
1,027,449,598	10	90
98		
1,050,519,901	10	90

- Zinc and its compounds had the second-largest transfers to recycling, 182.1 million kg. TRI facilities reported 84 percent of the total for zinc and its compounds, a somewhat lower proportion than for all substances. Zinc is used to galvanize metals (including steel) to prevent rust and is often found in materials recycled into steel and other products.

4.3 Other Transfers for Further Management, 1999

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 3**. 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.

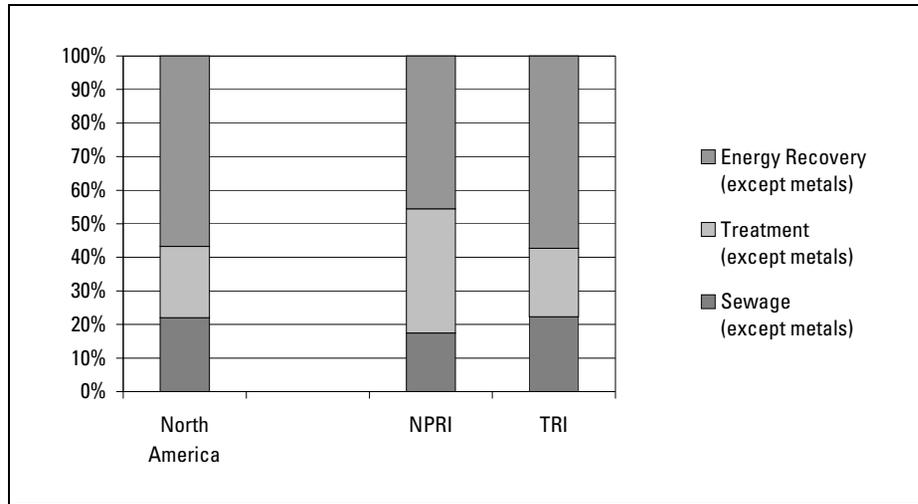
- In 1999, facilities in North America sent 611.3 million kg of chemicals (other than metals) in the matched data set to off-site energy recovery, treatment, and sewage. TRI facilities accounted for 95 percent of these transfers.
- Transfers to energy recovery (346.7 million kg) accounted for 57 percent of the North American total. They made up 46 percent of the NPRI total and 57 percent of the TRI total.
- Transfers to treatment (129.9 million kg) were 21 percent of the North American total, 37 percent of the NPRI total and 21 percent of the TRI total.
- Transfers to sewage (134.6 million kg) made up 22 percent of the North American total, 17 percent of the NPRI total and 22 percent of the TRI total.

Table 4–6. Summary of Other Transfers for Further Management in North America, NPRI and TRI, 1999

	North America		NPRI		TRI		NPRI as % of North American Total	TRI as % of North American Total
	Number		Number		Number			
Total Facilities	21,521		1,634		19,887		8	92
Total Forms	74,108		5,741		68,367		8	92
		kg %		kg %		kg %		
Total Other Off-site Transfers for Further Management (not including recycling)	611,256,767	100	31,084,788	100	580,171,979	100	5	95
Energy Recovery (except metals)	346,747,383	57	14,142,532	46	332,604,851	57	4	96
Treatment (except metals)	129,939,779	21	11,507,926	37	118,431,853	21	9	91
Sewage (except metals)	134,569,605	22	5,434,330	17	129,135,275	22	4	96

Note: Canada and US data only, Mexico data not available for 1999. Data include 210 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.

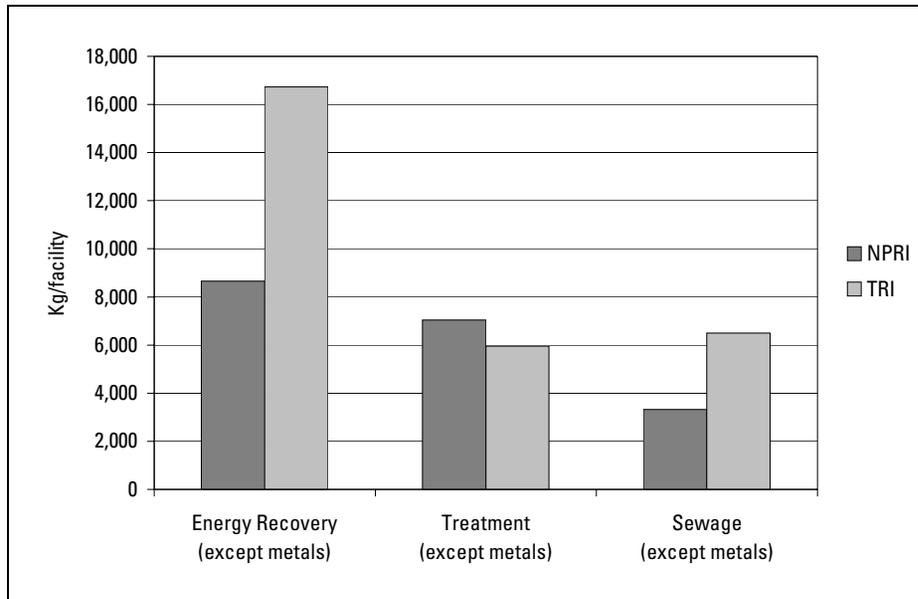
Figure 4–4. Percentage of Other Transfers for Further Management in North America by Type, NPRI and TRI, 1999



Note: Canada and US data only. Mexico data not available for 1999.

- TRI facilities reported larger total transfers to energy recovery (332.6 million kg) than did NPRI facilities (14.1 million kg). The average amount of transfers to energy recovery per facility was almost twice as large (1.9 times) in TRI as in NPRI.
- For transfers to sewage, as well, the TRI per-facility average was about twice that for NPRI facilities. The TRI total was 129.1 million kg and the NPRI total was 5.4 million kg.
- For transfers to treatment, the TRI total was 118.4 million kg, and the NPRI total was 11.5 million kg; however, in this case, the NPRI per-facility average was higher—about 1.2 times the average of TRI facilities.

Figure 4–5. Average Kilograms per Facility of Other Transfers for Further Management, NPRI and TRI, 1999



Note: Canada and US data only. Mexico data not available for 1999.

4.3.1 Other Transfers for Further Management by State and Province, 1999

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.

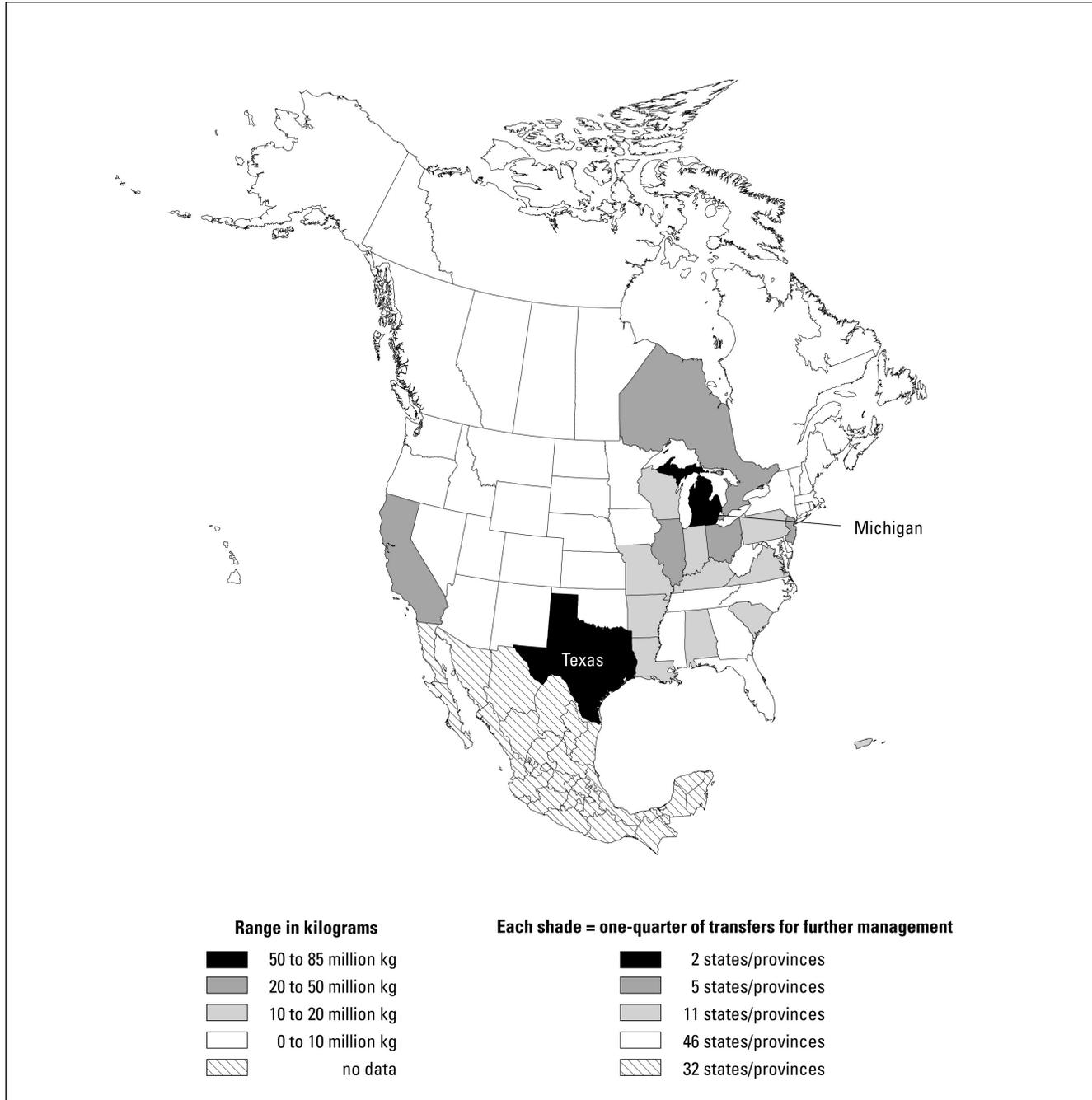
- The jurisdiction with the largest other transfers for further management in 1999 was Michigan, with a total of 84.4 million kg to energy recovery, treatment, and sewage, or 14 percent of all North American transfers of this kind. Michigan's transfers to energy recovery and treatment were the highest in North America in 1999.
- Second was Texas, with total other transfers for further management of 83.4 million kg. Texas facilities reported the largest transfers to sewage and the second-largest transfers to energy recovery and treatment.
- New Jersey ranked third in other transfers, with 47.7 million kg. The state had the second-largest releases to sewage and the third-largest to energy recovery.
- Fourth-ranked Ohio had 41.3 million kg in other transfers and was third in transfers to treatment.

Table 4-7. Other Transfers for Further Management in North America, by State and Province, 1999

State/Province	Transfers to Energy Recovery (except metals)		Transfers to Treatment (except metals)		Transfers to Sewage (except metals)		Total Other Off-site Transfers for Further Management	
	kg	Rank	kg	Rank	kg	Rank	kg	Rank
Alabama	5,547,360	16	3,690,690	14	2,344,948	18	11,582,998	16
Alaska	37	57	299	60	0	--	336	61
Alberta	1,308,419	31	236,461	31	884,719	31	2,429,599	35
Arizona	862,610	36	509,592	34	1,131,413	29	2,503,615	34
Arkansas	15,747,544	5	622,329	32	1,075,822	30	17,445,695	10
British Columbia	394,559	39	343,060	38	11,928	51	749,547	42
California	13,915,939	8	5,364,203	7	9,753,675	3	29,033,817	5
Colorado	2,524,643	26	1,132,885	27	367,055	38	4,024,583	32
Connecticut	971,925	35	2,080,564	19	670,009	34	3,722,498	33
Delaware	517,311	38	402,553	37	1,186,253	28	2,106,117	37
District of Columbia	0	--	0	--	0	--	0	--
Florida	2,308,939	27	1,125,650	28	3,692,214	12	7,126,803	25
Georgia	5,089,499	18	1,251,958	25	1,504,127	23	7,845,584	22
Guam	0	--	0	--	0	--	0	--
Hawaii	392	56	1,447	58	0	--	1,839	60
Idaho	41,397	46	10,603	54	346,658	40	398,658	47
Illinois	15,686,772	6	3,776,927	12	4,993,869	8	24,457,568	6
Indiana	5,789,394	14	4,089,142	10	2,856,603	16	12,735,139	15
Iowa	1,745,472	29	1,420,518	24	2,924,439	15	6,090,429	28
Kansas	1,508,209	30	96,943	46	587,646	35	2,192,798	36
Kentucky	10,205,786	10	3,543,040	15	1,242,108	27	14,990,934	13
Louisiana	5,700,571	15	6,822,397	4	247,313	45	12,770,281	14
Maine	106,679	45	86,293	47	256,784	44	449,756	45
Manitoba	12,020	50	203,593	42	304	52	215,917	50
Maryland	379,459	40	2,726,015	17	1,390,252	24	4,495,726	31
Massachusetts	2,871,130	23	2,027,166	20	4,230,311	9	9,128,607	19
Michigan	58,804,263	1	19,144,729	1	6,485,797	6	84,434,789	1
Minnesota	990,725	34	1,158,840	26	5,389,970	7	7,539,535	23
Mississippi	2,695,832	24	744,681	31	1,652,913	22	5,093,426	30
Missouri	4,296,387	20	3,733,178	13	2,117,410	20	10,146,975	18
Montana	10,706	51	8,677	55	123	53	19,506	57
Nebraska	167,045	43	45,950	49	280,857	43	493,852	44
Nevada	6,581	52	5,730	57	17,084	50	29,395	56
New Brunswick	0	--	30,989	53	0	--	30,989	55
New Hampshire	1,220,647	32	150,145	44	318,733	42	1,689,525	39
New Jersey	28,870,319	3	3,020,120	16	15,775,624	2	47,666,063	3
New Mexico	38,885	47	39,408	50	343,786	41	422,079	46
New York	2,662,574	25	1,811,483	21	4,002,557	10	8,476,614	21
Newfoundland	0	--	0	--	0	--	0	--
North Carolina	4,857,620	19	1,568,751	23	844,245	32	7,270,616	24
North Dakota	29,884	49	429	59	205,883	46	236,196	49
Nova Scotia	0	--	78,141	48	0	--	78,141	53
Ohio	26,239,669	4	6,839,765	3	8,194,275	4	41,273,709	4
Oklahoma	679,279	37	234,474	40	403,924	37	1,317,677	40
Ontario	10,157,939	11	6,357,035	5	4,001,566	11	20,516,540	7
Oregon	1,003,770	33	810,497	29	3,638,145	13	5,452,412	29
Pennsylvania	9,050,402	13	4,401,115	8	3,575,531	14	17,027,048	11
Prince Edward Island	0	--	158,520	43	0	--	158,520	51
Puerto Rico	11,411,207	9	5,792,343	6	809,552	33	18,013,102	9
Quebec	2,269,595	28	4,063,662	11	535,756	36	6,869,013	26
Rhode Island	303,284	41	441,411	35	171,166	47	915,861	41
Saskatchewan	0	--	36,465	51	57	55	36,522	54
South Carolina	14,972,846	7	1,784,252	22	2,694,031	17	19,451,129	8
South Dakota	124,161	44	108,623	45	101,357	48	334,141	48
Tennessee	4,070,614	21	775,044	30	1,832,678	21	6,678,336	27
Texas	49,695,499	2	17,272,611	2	16,450,429	1	83,418,539	2
Utah	35,641	48	222,977	41	366,272	39	624,890	43
Vermont	3,813	53	32,143	52	99,348	49	135,304	52
Virgin Islands	1,898	54	8,477	56	0	--	10,375	58
Virginia	3,301,315	22	542,813	33	7,624,757	5	11,468,885	17
Washington	301,722	42	407,796	36	1,302,238	26	2,011,756	38
West Virginia	5,272,344	17	2,323,295	18	1,324,325	25	8,919,964	20
Wisconsin	9,963,218	12	4,220,635	9	2,310,653	19	16,494,506	12
Wyoming	1,633	55	247	61	113	54	1,993	59
Total	346,747,383		129,939,779		134,569,605		611,256,767	

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 4–2. States and Provinces in North America with Largest Other Off-Site Transfers for Further Management, 1999



4.3.2 Other Transfers for Further Management by Industry Sector, 1999

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 1999.

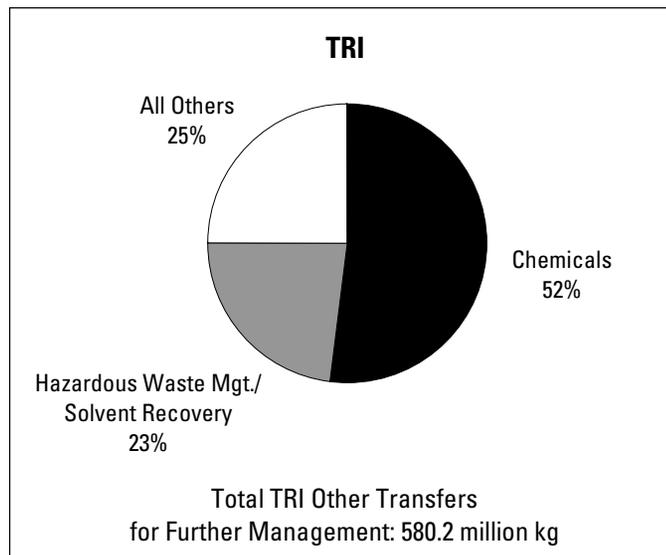
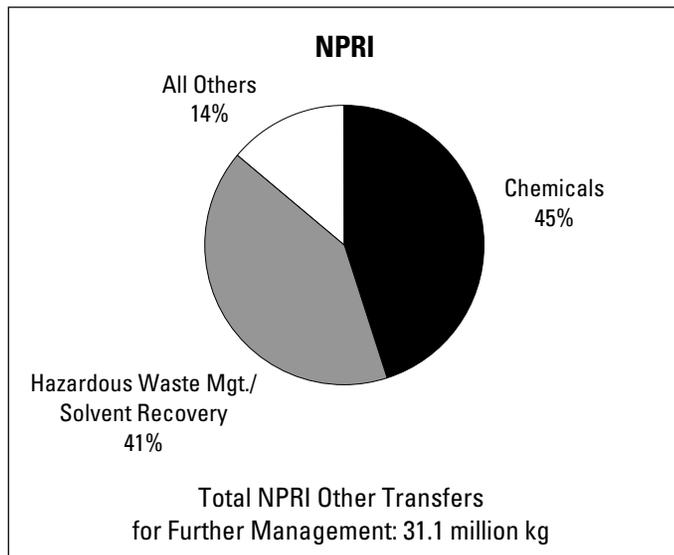
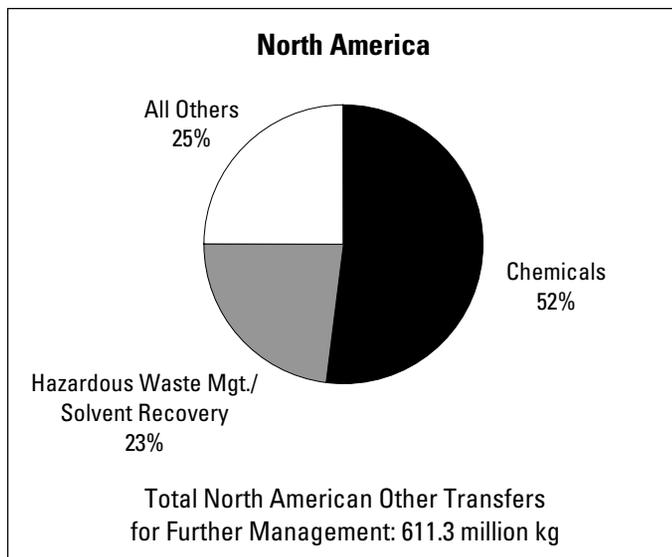
- The chemical manufacturing sector reported the largest total other transfers for further management, 316.8 million kg, or 52 percent of the North American total for such transfers. The chemicals sector had the largest transfers in each of the components of the other transfers category—energy recovery, treatment and sewage. The sector accounted for 45 percent of other transfers in NPRI and 52 percent in TRI.
- Hazardous waste management/solvent recovery facilities reported the second-largest such transfers, 143.5 million kg, including the second-largest transfers to energy recovery and to treatment. This sector accounted for 23 percent of the North American total for other transfers, 41 percent of total other transfers in NPRI, and 23 percent in TRI.
- No other industry sector reported more than 25 million kg of total other transfers for further management. The paper products sector, with 23.0 million kg, reported the second-largest amounts transferred to sewage.

Table 4–8. Other Transfers for Further Management in North America by Industry, 1999

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
28	Chemicals	175,987,811	80,513,002	60,251,045	316,751,858	4	96
495/738	Hazardous Waste Mgt./Solvent Recovery	120,023,432	22,577,249	856,258	143,456,939	9	91
26	Paper Products	2,920,755	3,862,807	16,233,714	23,017,276	0.2	99.8
--	Multiple codes 20–39*	6,040,676	5,858,127	9,725,317	21,624,120	--	100
34	Fabricated Metals Products	4,845,337	2,350,190	7,202,918	14,398,445	5	95
36	Electronic/Electrical Equipment	3,017,409	1,658,751	9,322,097	13,998,257	1	99
29	Petroleum and Coal Products	8,851,502	1,937,876	2,696,854	13,486,232	2	98
20	Food Products	52,462	351,142	12,816,903	13,220,507	6	94
37	Transportation Equipment	5,826,438	1,952,177	3,099,708	10,878,323	7	93
33	Primary Metals	2,114,189	2,168,098	5,670,754	9,953,041	3	97
30	Rubber and Plastics Products	3,187,901	1,592,892	1,705,722	6,486,515	8	92
5169	Chemical Wholesalers	4,905,656	1,394,485	16,155	6,316,296	0.4	99.6
35	Industrial Machinery	1,083,455	358,383	1,945,033	3,386,871	1	99
39	Misc. Manufacturing Industries	1,292,859	728,940	764,788	2,786,587	7	93
27	Printing and Publishing	1,448,207	754,461	428,973	2,631,641	6	94
38	Measurement/Photographic Instruments	1,350,813	801,320	268,584	2,420,717	--	100
25	Furniture and Fixtures	1,771,003	456,465	14,490	2,241,958	10	90
32	Stone/Clay/Glass Products	418,910	411,022	964,774	1,794,706	4	96
22	Textile Mill Products	687,997	96,311	385,098	1,169,406	1	99
24	Lumber and Wood Products	860,154	77,567	169,210	1,106,931	3	97
23	Apparel and Other Textile Products	30,127	23,258	8,442	61,827	72	28
31	Leather Products	11,152	11,045	18,752	40,949	2	98
491/493	Electric Utilities	19,138	3,667	3,981	26,786	7	93
21	Tobacco Products	0	544	35	579	--	100
12	Coal Mining	0	0	0	0	--	--
	Total	346,747,383	129,939,779	134,569,605	611,256,767	5	95

Note: Canada and US data only. Mexico data not collected for 1999. * Multiple SIC codes reported only in TRI.

Figure 4–6. Percentage Contribution of Top Industry Sectors to Other Transfers for Further Management, NPRI and TRI, 1999



Note: Canada and US data only. Mexico data not available for 1999.

4.3.3 Facilities Reporting the Largest Amounts of Transfers to Energy Recovery, Treatment and Sewage, 1999

In 1999, the 50 facilities in North America reporting the largest transfers of chemicals in the matched data set (other than metals and their compounds) to energy recovery, treatment, and sewage accounted for over half of each of these types of transfers. Off-site transfers of metals and their compounds to energy recovery, treatment, and sewage are not included here but are included in **Chapter 3** as off-site releases.

Facilities Reporting the Largest Transfers to Energy Recovery, 1999

The 50 facilities in North America reporting the largest transfers to energy recovery accounted for 205.8 million kg, or 59 percent of all such transfers.

- A hazardous waste management/solvent recovery facility in Michigan reported 17.8 million kg of transfers to energy recovery, over 5 percent of all such transfers in 1999. Michigan reported the largest amount of transfers to energy recovery in 1999.
- A hazardous waste management/solvent recovery facility in Arkansas reported 12.1 million kg of transfers to energy recovery. No other facilities reported more than 10 million kg in transfers to energy recovery.

Table 4–9. The 50 North American Facilities with the Largest Transfers to Energy Recovery (except metals), 1999

Rank	Facility	City, State/Province	SIC Codes		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)
			Canada	US			
1	Petro-Chem Processing Group/Solvent Distillers Group, Nortru, Inc.	Detroit, MI		495/738	23	17,809,689	Toluene, Xylenes, Methanol, Methyl isobutyl ketone, Methyl ethyl ketone
2	Rineco	Benton, AR		495/738	28	12,058,154	Xylenes, Methyl ethyl ketone, Toluene, Cresol
3	Marisol Inc.	Middlesex, NJ		495/738	24	9,063,072	Toluene, Methanol, Xylenes, Methyl ethyl ketone
4	Pharmacia & Upjohn	Kalamazoo, MI		28	28	8,717,484	Methanol, Toluene
5	Michigan Recovery Sys. Inc., EQ - The Environmental Quality Co.	Romulus, MI		495/738	22	8,647,993	Xylenes, Toluene, n-Hexane
6	Coastal Eagle Point Oil Co., Coastal Corp.	Westville, NJ		29	19	8,544,264	Propylene, Ethylene
7	Onyx Environmental Services L.L.C	Azusa, CA		495/738	36	8,414,774	Methyl ethyl ketone, Xylenes, Toluene, Dichloromethane, Tetrachloroethylene, Methyl isobutyl ketone, 2-Ethoxyethanol
8	Pfizer, Inc., Parke-Davis Div.	Holland, MI		28	13	8,024,944	Methanol, Toluene
9	Onyx Environmental Services L.L.C.	West Carrollton, OH		495/738	7	7,119,457	Methyl isobutyl ketone, Toluene, Xylenes
10	Equistar Chemicals L.P., Victoria Facility	Victoria, TX		28	5	6,976,088	Ethylene
11	Southeastern Chemical & Solvent Co. Inc., M&M Chemical & Equipment Co.	Sumter, SC		495/738	5	6,730,755	Toluene, Methyl ethyl ketone
12	Celanese Ltd. Clear Lake Plant, Celanese Americas Corp.	Pasadena, TX		28	21	6,600,969	Diethyl sulfate, Acrylic acid
13	Philip Enterprises Inc., Parkdale Avenue Facility, Philip Services Corp.	Hamilton, ON	77	495/738	19	6,343,067	Xylenes, Toluene
14	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	6	5,781,812	Toluene, Methanol
15	Heat Energy Advanced Tech. Inc.	Dallas, TX		495/738	11	5,630,126	Toluene, Xylenes
16	WRR Environmental Services Co., Inc., Caribou Corp.	Washington, WI		495/738	12	4,233,247	Toluene, Xylenes, Methyl ethyl ketone
17	Lyondell Chemical Co. - Bayport Facility	Pasadena, TX		28	11	4,087,303	tert-Butyl alcohol, Formic acid
18	Safety-Kleen Corp.	Denton, TX		495/738	29	3,990,068	Toluene, Xylenes, Methyl ethyl ketone, Vinyl acetate, Methanol
19	Safety-Kleen EnviroSystems Co. of Puerto Rico Inc.	Manati, PR		495/738	13	3,925,076	Acetonitrile, Xylenes, Methanol
20	Gage Prods. Co.	Ferdale, MI		28	13	3,842,513	Xylenes, Methanol, Ethylbenzene
21	Hukill Chemical Corp.	Bedford, OH		5169	18	3,766,106	Xylenes, Toluene, Methyl ethyl ketone
22	Catalytica Pharmaceuticals, Wyckoff Inc., Catalytica Inc.	South Haven, MI		28	11	3,322,732	Methanol, Toluene
23	Merck & Co. Inc.	Albany, GA		28	10	3,146,680	Methanol, Toluene, n-Hexane
24	Roche Carolina Inc., Hoffmann-Laroche Inc.	Florence, SC		28	6	2,782,131	n-Hexane, Methanol
25	Safety-Kleen Sys. Inc.	Dolton, IL		495/738	9	2,637,051	Xylenes, Toluene, Methyl ethyl ketone, Ethylbenzene
26	Roche Colorado Corp., Syntex (USA) Inc.	Boulder, CO		28	9	2,400,000	n-Hexane, Toluene
27	Merck & Co. Inc., Cherokee Site	Riverside, PA		28	10	2,380,116	Toluene, Methanol
28	Abbott Labs., North Chicago Plant	North Chicago, IL		28	20	2,370,319	Methanol, Toluene
29	Dow Corning Corp.	Midland, MI		28	24	2,152,176	Methanol, Toluene
30	Hydrite Chemical Co.	Cottage Grove, WI		28	21	2,113,180	Methanol, Xylenes
31	Equistar Chemicals L.P., La Porte Plant	La Porte, TX		28	15	2,084,868	Vinyl acetate
32	Ciba Specialty Chemical Corp.	McIntosh, AL		28	36	2,046,000	Xylenes, Methanol
33	Disposal Systems Inc., GNI Group Inc.	Deer Park, TX		495/738	24	2,036,851	Toluene
34	Union Carbide Corp., Institute WV Plant Ops.	Institute, WV		28	20	1,934,274	Ethylene glycol
35	Safety-Kleen Canada Inc., Centre de recyclage de St-Constant	St-Constant, QC	99	495/738	12	1,868,000	Toluene, Xylenes, Methyl ethyl ketone
36	Atofina Petrochemicals Inc.	Pasadena, TX		28	6	1,738,836	n-Hexane, Ethylene
37	Pfizer Pharmaceuticals L.L.C., Pfizer Inc.	Barceloneta, PR		28	5	1,721,814	Methanol, Toluene
38	BASF Corp.	Greenville, OH		28	21	1,629,933	Toluene, Xylenes
39	Excel TSD Inc.	Memphis, TN		495/738	24	1,562,005	Toluene, Xylenes, Methyl ethyl ketone, 2-Ethoxyethanol, n-Butyl alcohol, Methyl isobutyl ketone, Ethylbenzene
40	First Chemical Corp., Chemfirst Inc.	Pascagoula, MS		28	17	1,546,584	Toluene, Nitrobenzene, Aniline
41	DuPont, Cape Fear	Leland, NC		28	21	1,493,303	Ethylene glycol
42	DuPont Agricultural Caribe Inds. Ltd., DuPont Agrichemicals Caribe Inc.	Manati, PR		28	5	1,464,399	Xylenes, Methanol
43	Teva Pharmaceuticals USA, Teva Pharmaceutical Ind. Ltd.	Mexico, MO		28	7	1,439,169	Methanol
44	ISP Van Dyk Inc., International Specialty Prods.	Belleville, NJ		28	3	1,435,512	Toluene
45	Aimco Solrec Ltd.	Milton, ON		37	7	1,419,711	Xylenes, Toluene, Methyl ethyl ketone
46	Romic Environmental Techs. Corp., U.S. Liquids Inc.	East Palo Alto, CA		495/738	24	1,413,674	Methanol, Toluene, N-Methyl-2-pyrrolidone, Xylenes, Methyl ethyl ketone
47	Quality Chemicals Inc., Chemfirst Corp.	Tyrone, PA		28	22	1,382,816	Toluene
48	Chemical Solvents, Denison Avenue Facility	Cleveland, OH		28	15	1,380,006	N-Methyl-2-pyrrolidone, Xylenes, Toluene, Methanol, Methyl ethyl ketone
49	Chemtron Corp.	Avon, OH		495/738	29	1,325,385	n-Hexane, Xylenes, Toluene
50	Bayer Corp.	Baytown, TX		28	29	1,307,462	Methanol, Chlorobenzene
Subtotal					825	205,841,948	
% of Total					1	59	
Total					74,108	346,747,383	

Note: Canada and US data only. Mexico data not available for 1999. 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 4–10. The 50 North American Facilities with the Largest Transfers to Treatment (except metals), 1999

Rank	Facility	City, State/Province	SIC Codes		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)
			Canada	US			
1	Michigan Recovery Sys. Inc., EQ - The Environmental Quality Co.	Romulus, MI		495/738	22	7,260,650	Xylenes, Toluene, n-Hexane
2	Dow Chemical Co., Midland Ops.	Midland, MI		28	68	3,791,384	Styrene
3	Consolidated Papers Inc., Kraft Div.	Wisconsin Rapids, WI		26	12	3,110,949	Methanol
4	FMC Corp.	Baltimore, MD		28	19	2,542,554	Methanol, Toluene
5	Air Prods. & Chemicals Inc.	Geismar, LA		28	8	2,333,778	Nitric acid and nitrate compounds
6	Onyx Environmental Services L.L.C.	Azusa, CA		495/738	36	2,252,008	Methyl ethyl ketone, Xylenes, Toluene, Dichloromethane, Tetrachloroethylene, Ethylene glycol, 2-Ethoxyethanol
7	Pharmacia & Upjohn	Kalamazoo, MI		28	28	2,220,336	Dichloromethane
8	Dow Chemical Co., Freeport	Freeport, TX		28	77	2,094,513	1,2-Dichloropropane
9	Squibb Mfg. Inc., Bristol Myers Squibb Co.	Humacao, PR		28	18	2,063,357	Dichloromethane, Acetonitrile
10	DuPont, Beaumont Plant	Beaumont, TX		28	29	1,932,839	Aniline, Nitrobenzene
11	Dow Corning Corp.	Midland, MI		28	24	1,889,010	Toluene, Xylenes, Benzene, Acetonitrile
12	Ciba Specialty Chemical Corp.	McIntosh, AL		28	36	1,688,127	Methanol
13	Pfizer Inc., Groton Site	Groton, CT		28	13	1,518,104	Methanol
14	CK Witco Corp., Sistersville Plant	Friendly, WV		28	17	1,491,450	Methanol, Toluene
15	Tippecanoe Labs., Eli Lilly & Co.	Lafayette, IN		28	20	1,438,344	Methanol, Toluene, Acetonitrile, Dichloromethane
16	Pharmacia & Upjohn Caribe Inc., Pharmacia Corp.	Arecibo, PR		28	10	1,392,315	Dichloromethane
17	Shell Norco Chemical Plant, East Site, Shell Oil Co.	Norco, LA		28	22	1,302,790	Ethylene, Propylene
18	Akzo Nobel Chemicals Inc., Akzo Nobel Inc.	Deer Park, TX		28	8	1,248,666	n-Hexane
19	3M Springfield, 3M Co. Inc.	Springfield, MO		28	11	1,221,152	Toluene
20	Lilly Tech. Center, Eli Lilly & Co.	Indianapolis, IN		28	9	1,183,265	Acetonitrile
21	Marisol Inc.	Middlesex, NJ		495/738	24	1,181,898	Methanol, Toluene, Dichloromethane, Xylenes, Acetonitrile, Methyl ethyl ketone
22	Safety-Kleen (Niagara) Ltd.	Thorold, ON	49	495/738	24	1,162,074	Toluene, Xylenes, Methanol, Cyclohexane, Methyl ethyl ketone
23	Petro-Chem Processing Group/Solvent Distillers Group, Nortru, Inc.	Detroit, MI		495/738	23	1,145,493	Dichloromethane, Tetrachloroethylene
24	Les Produits chimiques Delmar Inc.	Lasalle, QC	37	28	7	1,097,980	Toluene, n-Hexane
25	DuPont Sabine River Works	Orange, TX		28	52	1,090,965	Vinyl acetate
26	Services Safety-Kleen (Québec) Ltée, Centre de transfert de Thurso	Thurso, QC	77	495/738	12	1,082,000	n-Hexane, Chlorobenzene, Toluene, Xylenes
27	Aimco Solrec Ltd.	Milton, ON	37	28	7	1,052,126	Xylenes, Toluene
28	3M Nevada Plant, 3M Co. Inc.	Nevada, MO		Mult.	12	983,547	Methyl ethyl ketone, Xylenes
29	Laporte Methanol Co. L.P.	Laporte, TX		28	4	907,029	Methanol
30	Pfizer Inc., Parke-Davis Div.	Holland, MI		28	13	879,635	Methanol, Toluene
31	Quality Chemicals Inc., Chemfirst Corp.	Tyrone, PA		28	22	863,767	Toluene, Carbon tetrachloride, Acetonitrile, Methyl isobutyl ketone
32	Romic Environmental Techs. Corp., U.S. Liquids Inc.	East Palo Alto, CA		495/738	24	851,027	N-Methyl-2-pyrrolidone, Methanol, n-Hexane
33	3M Hutchinson, 3M Co. Inc.	Hutchinson, MN		Mult.	13	771,471	Methyl ethyl ketone
34	DDE Louisville, DuPont Dow Elastomers	Louisville, KY		28	8	725,824	Toluene
35	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	6	689,546	Toluene, Methanol
36	DuPont Mobile Plant	Axis, AL		28	17	682,547	Methanol, Toluene, Xylenes
37	Noltex L.L.C., Mitsubishi Chemical America	La Porte, TX		28	2	666,168	Methanol, Vinyl acetate
38	Safety-Kleen Envirosystems Co. of Puerto Rico Inc.	Manati, PR		495/738	13	653,455	n-Butyl alcohol, Pyridine
39	Ashland Distribution Co., Ashland Inc.	Charlotte, NC		5169	24	645,574	Toluene, Methyl ethyl ketone, Xylenes
40	Rutgers Organics Corp., Rutgers AG	State College, PA		28	12	617,236	Nitric acid and nitrate compounds
41	DuPont, La Porte Plant	La Porte, TX		28	25	611,715	Methanol, Toluene, Ethylene glycol, Quinone
42	DuPont, Chambers Works	Deepwater, NJ		28	65	597,748	Methanol, 1,2-Dichlorobenzene, Cyclohexane, Ethylene glycol
43	Consolidated Recycling Co. Inc.	Troy, IN		29	1	592,266	Ethylene glycol
44	Occidental Chemical Corp., Occidental Petroleum Corp.	Convent, LA		28	10	588,090	1,2-Dichloroethane
45	McIntyre Group Ltd.	University Park, IL		28	10	586,106	Methanol
46	Disposal Systems Inc., GNI Group Inc.	Deer Park, TX		495/738	24	583,353	Tetrachloroethylene
47	Huntsman Petrochemical Corp.	Cantonment, FL		28	5	575,628	Maleic anhydride
48	Chemtron Corp.	Avon, OH		495/738	29	550,222	Xylenes, Toluene, Methyl ethyl ketone, Methanol, Styrene, Naphthalene
49	DuPont Agricultural Caribe Inds. Ltd., DuPont Agrichemicals Caribe Inc.	Manati, PR		28	5	547,817	Xylenes, Methanol
50	Dow Chemical Co.	Pittsburg, CA		28	20	543,123	N-Methyl-2-pyrrolidone, Ethylene glycol
Subtotal					1,000	67,501,021	
% of Total					1	52	
Total					74,108	129,939,779	

- Of the 50 facilities with the largest transfers to energy recovery, 29 were chemical manufacturing facilities and 19 were hazardous waste management/solvent recovery facilities.

- Three of the 50 facilities were located in Canada (in Ontario and Quebec).

Facilities Reporting the Largest Transfers to Treatment, 1999

The 50 facilities in North America reporting the largest transfers to treatment, with 67.5 million kg, accounted for over half (52 percent) of all such transfers.

- A hazardous waste management/solvent recovery facility in Michigan reported 7.3 million kg of transfers to treatment, almost 6 percent of all such transfers in 1999. Michigan reported the largest amount of transfers to treatment in 1999. Two other facilities, in Michigan and in Wisconsin, reported more than 3 million kg of transfers to treatment.
- Of the 50 facilities with the largest transfers to treatment, 11 were hazardous waste management/solvent recovery facilities and 34 were chemical manufacturing facilities.
- Four of the 50 facilities were located in Canada (in Ontario and Quebec).

Note: Canada and US data only. Mexico data not available for 1999. 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.

Facilities Reporting the Largest Transfers to Sewage, 1999

The 50 facilities in North America reporting the largest transfers to sewage accounted for 74.8 million kg, or 56 percent of all such transfers.

- Two chemical manufacturing facilities, one in New Jersey (reporting 8.6 million kg) and one in Texas (reporting 6.6 million kg), together accounted for about 11 percent of all transfers to sewage in 1999.
- Two of the five facilities reporting the largest transfers to sewage were located in Texas, the state with the largest amount of transfers to sewage in 1999.
- Of the 50 facilities with the largest transfers to sewage, 29 were chemical manufacturing facilities and seven were in the paper products sector. Two of the 50 facilities were in Canada.

4.3.4 Other Transfers for Further Management by Chemical, 1999

There are 210 chemicals in the matched data set; 195 of them are not included in the category of metals and their compounds. The 25 chemicals with the largest transfers to energy recovery, treatment, and sewage in North America represented 85 percent or more of each of these types of transfers in the matched data set for 1999. Off-site transfers of metals and their compounds to energy recovery, treatment, and sewage are not included here but are included in **Chapter 3** as off-site releases.

Table 4–11. The 50 North American Facilities with the Largest Transfers to Sewage (except metals), 1999

Rank	Facility	City, State/Province	SIC Codes		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)
			Canada	US			
1	Hercules Inc.	Parlin, NJ		28	7	8,611,117	Nitric acid and nitrate compounds
2	Air Prods. L.P., Air Prods. & Chemicals Inc.	Pasadena, TX		28	12	6,581,284	Nitric acid and nitrate compounds
3	Stone Container Corp.	Panama City, FL		26	10	3,584,796	Methanol
4	Pottlatch Corp., MN P&P Div.	Cloquet, MN		26	9	3,231,237	Methanol
5	Celanese Ltd, Celanese Americas Corp.	Pasadena, TX		28	21	2,994,983	Ethylene glycol, Acrylic acid
6	Dominion Color Company, Ajax Plant, Kikuchi Color & Chemicals Corporation	Ajax, ON	37	28	6	2,952,000	Nitric acid and nitrate compounds
7	Hercules Inc.	Hopewell, VA		28	12	2,894,030	Nitric acid and nitrate compounds, Ethylene glycol
8	Solutia Inc.	Springfield, MA		Mult.	18	2,421,776	Formaldehyde, Nitric acid and nitrate compounds
9	Stone Container Corp.	Hopewell, VA		26	11	2,410,046	Methanol
10	Degussa Corp. Metal Group, Degussa AG	South Plainfield, NJ		33	11	2,108,767	Methanol
11	Boise Cascade Corp.	Saint Helens, OR		26	12	1,992,097	Methanol
12	Bristol-Myers Squibb Company (Technical Operations)	East Syracuse, NY		28	9	1,961,075	Nitric acid and nitrate compounds
13	S. D. Warren Co., Sappi, Ltd.	Muskegon, MI		26	11	1,777,690	Methanol
14	Shepherd Chemical Co.	Cincinnati, OH		28	11	1,764,146	Nitric acid and nitrate compounds
15	Aerovox Inc.	Huntsville, AL		36	3	1,579,456	Nitric acid and nitrate compounds
16	First Chemical Corp., Chemfirst Inc.	Pascagoula, MS		28	17	1,444,523	Nitric acid and nitrate compounds
17	International Paper Erie Mill	Erie, PA		26	10	1,409,679	Methanol
18	Procter & Gamble Mfg. Co., The Procter & Gamble Co.	Sacramento, CA		28	3	1,405,896	Methanol
19	Pharmacia & Upjohn	Kalamazoo, MI		28	28	1,349,222	Methanol
20	Penford Prods. Co., Penford Corp.	Cedar Rapids, IA		20	5	1,229,643	Ethylene glycol
21	Westvaco Corp., Fine Papers Div.	Luke, MD		26	19	1,184,949	Methanol
22	Equistar Chemicals, Bayport Chemicals Plant	Pasadena, TX		28	10	1,166,667	Ethylene glycol, 2-Ethoxyethanol
23	Lyondell Chemical Co., Bayport Facility	Pasadena, TX		28	11	1,048,264	Methanol, tert-Butyl alcohol
24	A. E. Staley Mfg. Co., Sagamore Ops.	Lafayette, IN		20	5	1,047,993	Nitric acid and nitrate compounds
25	Demlenno/Kerdoon, World Oil Corp.	Compton, CA		29	1	1,043,084	Ethylene glycol
26	Ciba Specialty Chemicals Corp.	Newport, DE		28	5	1,013,548	Methanol
27	Union Carbide Corp., Texas City Plant	Texas City, TX		28	42	993,840	Methanol
28	Flexsys America L.P., Krummrich	Sauget, IL		28	8	974,048	Formic acid, 4-Nitrophenol
29	Albright & Wilson Americas, Albright & Wilson PLC	Charleston, SC		28	19	939,669	Methanol
30	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28	12	881,240	Methanol
31	Penick Corp., Penick Holding	Newark, NJ		28	1	851,030	Methanol
32	Cargill Corn Milling, Cargill Inc.	Cedar Rapids, IA		20	3	815,860	Ethylene glycol
33	Sun Chemical Corp., Newark Plant, DIC Americas Inc.	Newark, NJ		28	1	634,921	Methanol
34	Fuji Photo Film Inc.	Greenwood, SC		Mult.	8	626,779	Nitric acid and nitrate compounds
35	Sunoco Inc., Frankford Plant	Philadelphia, PA		28	9	606,063	Methanol, Cumene hydroperoxide
36	BASF Corp.	Huntington, WV		28	5	592,947	Aniline, Nitric acid and nitrate compounds
37	Seagate Recording Media, Seagate Tech. Inc.	Anaheim, CA		35	3	584,903	Nitric acid and nitrate compounds
38	Corning Inc.	Danville, VA		32	5	565,533	Nitric acid and nitrate compounds
39	MEMC Electronic Materials Inc., St. Peters Plant, Veba Corp.	O'Fallon, MO		36	5	549,660	Nitric acid and nitrate compounds
40	Cognis Corp., Cincinnati Plant	Cincinnati, OH		28	10	517,772	Methanol
41	SEH America Inc.	Vancouver, WA		Mult.	4	485,265	Nitric acid and nitrate compounds
42	Cincinnati Specialties LLC., PMC Inc.	Cincinnati, OH		28	10	468,617	Methanol
43	Union Carbide Corp., South Charleston Plant	South Charleston, WV		28	28	461,141	Formaldehyde, Dimethylamine
44	Gerber Prods., Novartis Corp.	Fort Smith, AR		20	1	458,644	Nitric acid and nitrate compounds
45	Crosfield Catalysts, Indopco	Chicago, IL		28	8	453,529	Nitric acid and nitrate compounds
46	Dairy Farmers of America Inc.	Corona, CA		Mult.	3	453,515	Nitric acid and nitrate compounds
47	Grace Davison Cincinnati Plant, W. R. Grace & Co.	Cincinnati, OH		28	2	435,374	Nitric acid and nitrate compounds
48	Great Lakes Chemical Corp.	Newport, TN		28	19	434,426	Methanol
49	Mallinckrodt Inc.	Saint Louis, MO		28	19	426,461	Methanol
50	Rohm & Haas Co., Bayport Plant	La Porte, TX		28	12	422,252	Ethylene glycol, Methanol
Subtotal					514	74,841,457	
% of Total					0.7	56	
Total					74,108	134,569,605	

Note: Canada and US data only. Mexico data not available for 1999. 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 4–12. The 25 Chemicals with the Largest Transfers to Energy Recovery (except metals) in North America, 1999

CAS Number	Chemical	Number of Forms	Transfers to Energy Recovery (except metals) (kg)	NPRI as % of North American Total	TRI as % of North American Total
108-88-3	Toluene	3,382	73,739,124	5	95
--	Xylenes	3,492	55,993,883	11	89
67-56-1	Methanol	2,803	55,842,358	1	99
78-93-3	Methyl ethyl ketone	2,170	29,401,443	4	96
110-54-3	n-Hexane	1,043	12,828,155	0.6	99.4
108-10-1	Methyl isobutyl ketone	1,059	12,217,658	3	97
74-85-1	Ethylene	346	10,549,548	--	100
107-21-1	Ethylene glycol	1,775	7,676,125	3	97
100-41-4	Ethylbenzene	1,260	6,990,184	5	95
71-36-3	n-Butyl alcohol	1,217	5,985,729	3	97
75-05-8	Acetonitrile	136	5,871,544	--	100
100-42-5	Styrene▼	1,725	5,767,875	0.04	99.96
75-09-2	Dichloromethane▼	758	5,414,933	7	93
108-05-4	Vinyl acetate▼	207	5,279,622	4	96
115-07-1	Propylene	435	4,671,279	--	100
75-65-0	tert-Butyl alcohol	101	4,088,568	0.2	99.8
872-50-4	N-Methyl-2-pyrrolidone	499	3,888,753	0.03	99.97
64-67-5	Diethyl sulfate▼	31	3,474,335	--	100
79-10-7	Acrylic acid	221	2,887,887	--	100
95-63-6	1,2,4-Trimethylbenzene	1,143	2,247,186	4	96
127-18-4	Tetrachloroethylene▼	493	2,211,542	6	94
110-82-7	Cyclohexane	478	2,167,886	0.8	99.2
1634-04-4	Methyl tert-butyl ether	211	2,022,930	--	100
108-95-2	Phenol	847	1,805,114	0.2	99.8
1319-77-3	Cresol (mixed isomers)	181	1,530,756	--	100
	Subtotal	26,013	324,554,417	4	96
	% of Total	35	94		
	Total	74,108	346,747,383	4	96

Note: Canada and US data only. Mexico data not available for 1999. ▼ Known or suspected carcinogen.

Largest Transfers to Energy Recovery by Chemical, 1999

The 25 chemicals with the largest transfers to energy recovery accounted for 94 percent of all such transfers in North America in 1999.

- Toluene was the chemical with the largest transfers to energy recovery, with 73.7 million kg, accounting for about 21 percent of all such transfers. Toluene also ranked seventh in total releases (see **Table 3–9**) and second in transfers to treatment. Toluene is a byproduct of the production of gasoline and styrene, and the manufacture of coke from coal. It is also used as an ingredient in paints, lacquers, thinners and strippers, adhesives, and cosmetic nail products.
- Xylenes had the second-largest total, 56.0 million kg. NPRI facilities accounted for almost 11 percent of other transfers of xylenes, nearly 3 times the average of 4.1 percent for all such transfers. Xylenes also ranked ninth in total releases (see **Table 3–9**) and third in transfers to treatment. Xylenes are used as solvents in the printing, rubber and leather industries; as cleaning agents and paint thinners; and in paints and varnishes.
- Methanol had the third-largest total, with 55.8 million kg. TRI facilities accounted for almost all transfers of methanol to energy recovery in 1999. Methanol also ranked fourth in total releases (see **Table 3–9**), first in transfers to treatment, and second in transfers to sewage. The largest use of methanol in the United States has been in the production of methyl t-butyl ether (MTBE), which is added

to gasoline to improve octane and reduce hydrocarbons and carbon monoxide. (Concerns about the safety of MTBE have, however, been raised in both Canada and the United States.) Methanol is used in the production of formaldehyde, acetic acid, and some pharmaceuticals; as a solvent in paint strippers, aerosol spray paints, wall paints, carburetor cleaners, and windshield washing products; and as a coating for wood and paper.

- Five of the 25 chemicals with the largest transfers to energy recovery are known or suspected carcinogens.
- This analysis of transfers to energy recovery does not include transfers of metals and their compounds. Transfers of metals and their compounds to energy recovery are included as off-site releases, discussed in **Chapter 3**.

Largest Transfers to Treatment by Chemical, 1999

The 25 chemicals with the largest transfers to treatment accounted for 86 percent of all such transfers in North America in 1999.

- Methanol was the chemical with the largest transfers to treatment, with 22.1 million kg. Transfers of methanol accounted for almost 17 percent of all transfers to treatment in 1999. Methanol ranked third in transfers to energy recovery, second in transfers to sewage, and fourth in total releases.

Table 4-13. The 25 Chemicals with the Largest Transfers to Treatment (except metals) in North America, 1999

CAS Number	Chemical	Number of Forms	Transfers to Treatment (except metals) (kg)	NPRI as % of North American Total	TRI as % of North American Total
67-56-1	Methanol	2,803	22,078,731	5	95
108-88-3	Toluene	3,382	16,053,004	16	84
--	Xylenes	3,492	10,340,694	19	81
75-09-2	Dichloromethane [▼]	758	9,721,162	2	98
--	Nitric acid and nitrate compounds	3,837	9,574,400	8	92
78-93-3	Methyl ethyl ketone	2,170	6,942,108	14	86
100-42-5	Styrene [▼]	1,725	4,606,937	6	94
110-54-3	n-Hexane	1,043	4,186,137	20	80
75-05-8	Acetonitrile	136	3,787,134	1	99
107-21-1	Ethylene glycol	1,775	3,623,980	9	91
127-18-4	Tetrachloroethylene [▼]	493	2,423,792	7	93
108-05-4	Vinyl acetate [▼]	207	2,376,231	0.01	99.99
71-36-3	n-Butyl alcohol	1,217	1,734,978	23	77
872-50-4	N-Methyl-2-pyrrolidone	499	1,650,642	3	97
78-87-5	1,2-Dichloropropane	14	1,600,973	--	100
108-95-2	Phenol	847	1,492,774	14	86
100-41-4	Ethylbenzene	1,260	1,454,184	10	90
110-82-7	Cyclohexane	478	1,247,382	30	70
71-43-2	Benzene [▼]	560	1,241,729	6	94
108-10-1	Methyl isobutyl ketone	1,059	1,148,052	13	87
98-95-3	Nitrobenzene [▼]	33	1,080,358	--	100
62-53-3	Aniline	82	1,059,657	0.2	99.8
67-66-3	Chloroform [▼]	164	951,767	5	95
107-06-2	1,2-Dichloroethane [▼]	93	946,936	1	99
79-01-6	Trichloroethylene [▼]	678	936,243	11	89
	Subtotal	28,805	112,259,985	10	90
	% of Total	39	86		
	Total	74,108	129,939,779	8	92

Note: Canada and US data only. Mexico data not available for 1999. [▼] Known or suspected carcinogen.

Table 4–14. The 25 Chemicals with the Largest Transfers to Sewage (except metals) in North America, 1999

CAS Number	Chemical	Number of Forms	Transfers to Sewage (except metals) (kg)	NPRI as % of North American Total	TRI as % of North American Total
--	Nitric acid and nitrate compounds	3,837	72,355,482	6	94
67-56-1	Methanol	2,803	36,433,482	3	97
107-21-1	Ethylene glycol	1,775	10,569,595	0.3	99.7
50-00-0	Formaldehyde▼	958	1,801,244	3	97
7632-00-0	Sodium nitrite	460	1,521,834	3	97
71-36-3	n-Butyl alcohol	1,217	1,314,335	2	98
108-95-2	Phenol	847	1,077,182	7	93
111-42-2	Diethanolamine	459	599,935	--	100
62-53-3	Aniline	82	570,997	--	100
75-07-0	Acetaldehyde▼	323	538,381	--	100
872-50-4	N-Methyl-2-pyrrolidone	499	529,353	1	99
75-65-0	tert-Butyl alcohol	101	520,852	2	98
64-18-6	Formic acid	329	481,591	--	100.0
110-80-5	2-Ethoxyethanol	52	389,378	0.01	99.99
79-10-7	Acrylic acid	221	382,972	4	96
67-66-3	Chloroform▼	164	345,337	--	100
78-93-3	Methyl ethyl ketone	2,170	334,743	17	83
7782-50-5	Chlorine	1,322	310,018	0.5	99.5
75-56-9	Propylene oxide▼	130	281,961	--	100
108-88-3	Toluene	3,382	261,519	0.5	99.5
--	Xylenes	3,492	257,534	0.05	99.95
100-02-7	4-Nitrophenol	9	237,271	--	100
7664-39-3	Hydrogen fluoride	1,071	215,217	--	100
80-15-9	Cumene hydroperoxide	55	196,482	--	100
75-05-8	Acetonitrile	136	194,492	--	100
	Subtotal	25,894	131,721,187	4	96
	% of Total	35	98		
	Total	74,108	134,569,605	4	96

Note: Canada and US data only. Mexico data not available for 1999. ▼ Known or suspected carcinogen.

- Toluene had the second-largest total, with 16.1 million kg. NPRI facilities accounted for 16 percent of these transfers of toluene. Toluene ranked first in transfers to energy recovery and seventh in total releases.
- Xylenes had the third-largest total, with 10.3 million kg. NPRI facilities accounted for almost 19 percent of transfers of xylenes to treatment in 1999, nearly twice the average of 10 percent for all such transfers. Xylenes ranked second in transfers to energy recovery and ninth in total releases.
- Nine of the 25 chemicals with the largest transfers to treatment are known or suspected carcinogens, including the fourth-ranked dichloromethane. Dichloromethane, which ranked fourth in total releases of designated carcinogens (see **Table 3-10**), is used as a solvent and degreasing agent in metal cleaning and as a process solvent in pharmaceutical production.
- This analysis of transfers to treatment does not include transfers of metals and their compounds. Transfers of metals and their compounds to treatment are included as off-site releases, discussed in **Chapter 3**.

Largest Transfers to Sewage by Chemical, 1999

The 25 chemicals with the largest transfers to sewage accounted for 98 percent of all such transfers in North America in 1999.

- Nitric acid and nitrate compounds had the largest transfers to sewage, with 72.4 million kg, or almost 54 percent of total transfers to sewage in 1999. Nitric acid and nitrate compounds ranked third in total releases and fifth in transfers to treatment. The chief use of nitric acid is in producing ammonium nitrate fertilizer. Nitrates are used in producing explosives, including gunpowder.
- Methanol had the second-largest total, with 36.4 million kg—about 27 percent of all transfers to sewage in 1999. Methanol ranked third in transfers to energy recovery, first in transfers to treatment, and fourth in total releases.
- Ethylene glycol had the third-largest total, with 10.6 million kg. Ethylene glycol is used primarily in antifreeze and de-icing solutions for cars, airplanes, and boats. It is also used in manufacturing polyester fiber and PET resins (for bottles and film).
- No other matched chemical had transfers to sewage of more than 2.0 million kg.
- Four of the 25 chemicals with the largest transfers to sewage are known or suspected carcinogens.
- Except for chloroform, for which the NPRI share of transfers was almost 17 percent, TRI facilities reported transferring between 93 and 100 percent of these chemicals to sewage.
- This analysis of transfers to sewage does not include transfers of metals and their compounds. Transfers of metals and their compounds to sewage are included as off-site releases, discussed in **Chapter 3**.

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Key Findings

- In 1999, total reported releases and transfers in North America were 3.36 billion kg for the matched data set of industries and chemicals.
- Releases represented 51 percent of all reported releases and transfers. On-site releases were 43 percent, and off-site releases were 8 percent.
- Off-site transfers to recycling were 31 percent of total reported releases and transfers in North America, and other off-site transfers for further management were 18 percent.
- The pattern of releases and transfers differed somewhat between NPRI and TRI. While on-site releases were about the same proportion of the total reported amounts in both countries, off-site releases represented a larger share of NPRI releases and transfers (14 percent) than those of TRI (8 percent). Off-site transfers to recycling were larger in NPRI than in TRI (35 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 (10 percent) than in TRI (19 percent).
- Four US states (Texas, Ohio, Michigan and Pennsylvania) and one Canadian province (Ontario) each reported more than 190 million kg. Together, these five jurisdictions reported about one-third (33 percent) of total reported releases and transfers in North America in 1999.
- 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 1999. The electric utilities and hazardous waste management/solvent recovery sectors had the third- and fourth-largest totals; electric utilities accounted for 14 percent of total North American releases and transfers, and hazardous waste management facilities made up 9 percent.
- Fifty North American facilities accounted for 16 percent of total reported releases and transfers. Four of the five facilities with the largest releases were in the primary metals sector.
- The 25 chemicals with the largest total reported releases and transfers accounted for 90 percent of the North American total. The top four chemicals, ranked by amount of transfers and releases, were zinc and its compounds, copper and its compounds, hydrochloric acid, and nitric acid and nitrate compounds.

5.1 Introduction

Chapter 5 examines total reported amounts of releases and transfers in North America for 1999. 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 1999 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 3**, 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 4**. It has been mandatory to report off-site transfers to recycling and energy recovery in NPRI since 1998.

5.2 Total Reported Amounts of Releases and Transfers, 1999

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 1999, reported releases and transfers in North America totaled 3.36 billion kg for the matched data set of industries and chemicals.
- On-site and off-site releases represented 51 percent of all reported releases and transfers in North America. On-site releases alone accounted for 43 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. Off-site releases represented a larger share of releases and transfers in NPRI (14 percent) than in TRI (8 percent). Off-site transfers to recycling were also larger in NPRI than in TRI (35 percent versus 31 percent). However, other off-site transfers for further management made up a smaller share of total releases and transfers in NPRI (10 percent) than in TRI (19 percent).

Table 5-1. Summary of Total Reported Amounts of Releases and Transfers in North America, NPRI and TRI, 1999

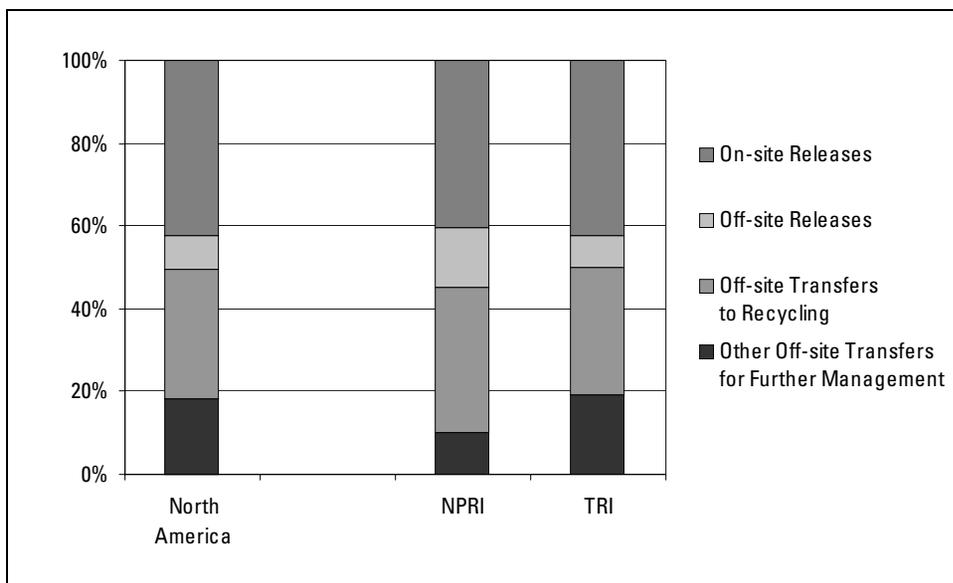
	North America		NPRI*		TRI		NPRI as % of North American Total	TRI as % of North American Total
	Number		Number		Number			
Total Facilities	21,521		1,634		19,887		8	92
Total Forms	74,108		5,741		68,367		8	92
Releases On- and Off-site	kg	%	kg	%	kg	%		
On-site Releases	1,419,119,790	43	124,751,036	41	1,294,368,754	42	9	91
Air	901,416,201	27	87,800,661	29	813,615,540	27	10	90
Surface Water	118,215,282	4	5,855,383	2	112,359,899	3	5	95
Underground Injection	90,116,656	3	3,323,257	1	86,793,399	3	4	96
Land	309,239,442	9	27,639,526	9	281,599,916	9	9	91
Off-site Releases	274,801,492	8	43,710,386	14	231,091,106	8	16	84
Transfers to Disposal (except metals)	40,358,804	1	9,469,161	3	30,889,643	1	23	77
Transfers of Metals**	234,442,688	7	34,241,225	11	200,201,463	7	15	85
Total Reported Releases On- and Off-site	1,693,921,282	51	168,461,422	55	1,525,459,860	50	10	90
Off-site Transfers for Further Management								
Off-site Transfers to Recycling	1,050,519,901	31	108,714,208	35	941,805,693	31	10	90
Transfers to Recycling of Metals	901,927,543	27	93,959,478	30	807,968,065	27	10	90
Transfers to Recycling (except metals)	148,592,358	4	14,754,730	5	133,837,628	4	10	90
Other Off-site Transfers for Further Management	611,256,767	18	31,084,788	10	580,171,979	19	5	95
Energy Recovery (except metals)	346,747,383	10	14,142,532	4	332,604,851	11	4	96
Treatment (except metals)	129,939,779	4	11,507,926	4	118,431,853	4	9	91
Sewage (except metals)	134,569,605	4	5,434,330	2	129,135,275	4	4	96
Total Reported Amounts of Releases and Transfers	3,355,697,950	100	308,260,418	100	3,047,437,532	100	9	91

Note: Canada and US data only. Mexico data not available for 1999. Data include 210 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.

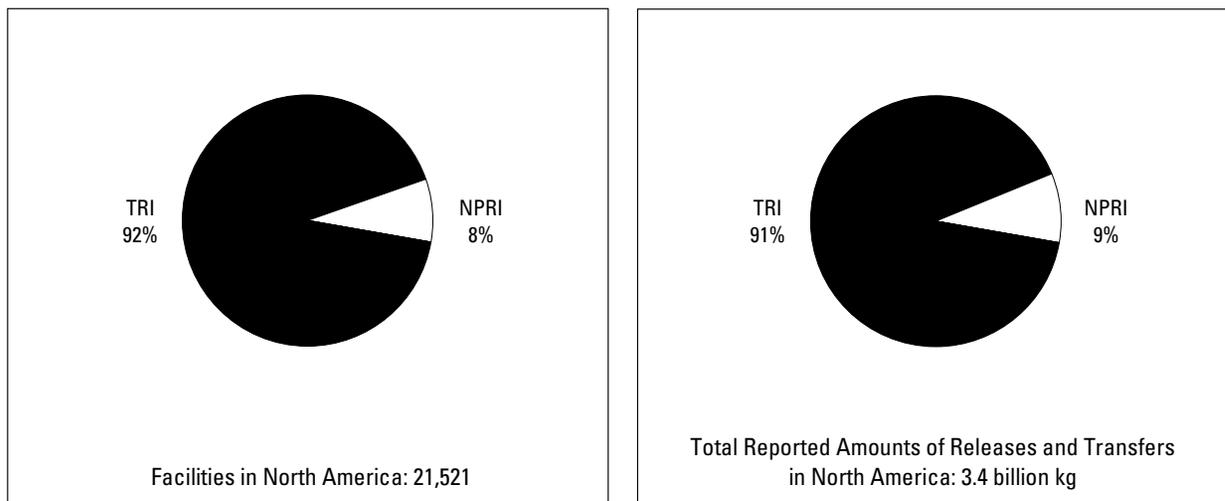
Figure 5-1. Percentage of Total Reported Amounts of Releases and Transfers in North America by Type, NPRI and TRI, 1999



Note: Canada and US data only. Mexico data not available for 1999.

- Because of the large size of the TRI set, North American percentages were close to or the same as TRI percentages—8 percent for off-site releases, 31 percent for off-site transfers to recycling, and 18 percent for other off-site transfers for further management.

Figure 5-2. Contribution of NPRI and TRI to Total Reported Amounts of Releases and Transfers in North America, 1999



Note: Canada and US data only. Mexico data not available for 1999.

5.2.1 Total Reported Amounts of Releases and Transfers by State and Province, 1999

In 1999, four states and one province each reported more than 196 million kg. Together, these five jurisdictions reported about one-third (33 percent) of total reported releases and transfers in North America.

- Texas facilities reported the largest total releases and transfers: 259.8 million kg, almost 8 percent of all releases and transfers reported in North America in 1999. Texas ranked second for total releases and for other transfers for further waste management.
- Ohio facilities reported the second-largest releases and transfers, 249.9 million kg. Ohio ranked first in total releases and in transfers to recycling.
- Facilities in Ontario had the third-largest releases and transfers, 202.9 million kg. Ontario reported the second-largest transfers to recycling.
- Facilities in Michigan reported the fourth-largest releases and transfers, 196.5 million kg. Michigan ranked first in other transfers to further waste management.
- Pennsylvania facilities had the fifth-largest releases and transfers, 196.0 million kg. Pennsylvania ranked third in transfers to recycling.
- Six jurisdictions reported less than 500,000 kg in 1999: Newfoundland, Virgin Islands, Prince Edward Island, Alaska, District of Columbia, and Guam.

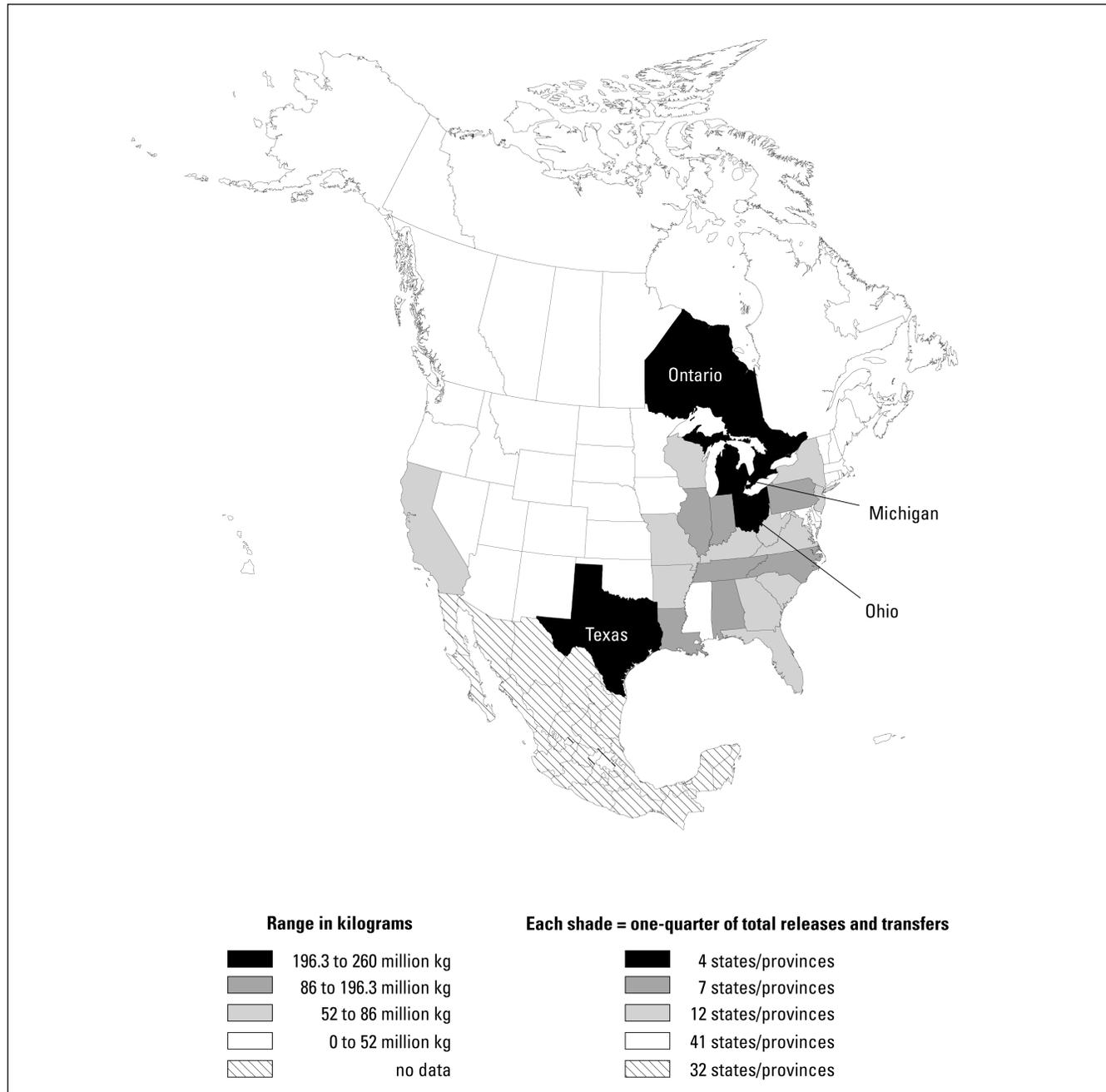
Table 5-2. Total Reported Amounts of Releases and Transfers in North America, by State and Province, 1999

State/Province	Number of Facilities	Releases On- and Off-site			Off-site Transfers for Further Management				Total Reported Amounts of Releases and Transfers kg Rank	1999 Population	Land Area (sq km)	1999 Gross Domestic Product			
		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	US \$ millions	Rank							
Alabama	471	48,362,693	5,213,949	53,576,642	12	22,102,209	18	11,582,998	16	87,261,849	61	4,369,862	131,432	115,071	27
Alaska	7	198,612	0	198,612	61	726	61	336	61	199,674	62	619,500	1,477,155	26,353	50
Alberta	157	15,435,091	1,754,874	17,189,965	32	2,263,934	41	2,429,599	35	21,883,498	39	2,959,400	661,194	78,746	35
Arizona	187	24,048,332	644,962	24,693,294	23	18,282,587	23	2,503,615	34	45,479,496	27	4,778,332	294,310	143,683	24
Arkansas	358	12,495,900	8,754,424	21,250,324	27	23,963,584	15	17,445,695	10	62,659,603	21	2,551,373	134,864	64,773	37
British Columbia	87	9,776,971	1,010,188	10,787,159	37	843,263	48	749,547	42	12,379,969	44	4,028,100	947,806	79,953	34
California	1,167	16,908,339	4,334,215	21,242,554	28	35,288,936	9	29,033,817	5	85,565,307	12	33,145,121	403,939	1,229,098	1
Colorado	157	3,009,606	735,585	3,745,191	47	7,508,424	35	4,024,583	32	15,278,198	42	4,056,133	268,637	153,728	22
Connecticut	282	2,392,728	923,447	3,316,175	50	8,947,761	30	3,722,498	33	15,986,434	41	3,282,031	12,548	151,779	23
Delaware	57	3,385,738	1,345,835	4,731,573	46	4,100,152	38	2,106,117	37	10,937,842	46	753,538	5,063	34,669	46
District of Columbia	2	35,828	613	36,441	63	5,708	59	0	--	42,149	63	519,000	158	55,832	40
Florida	523	58,871,888	2,225,196	61,097,084	8	8,844,884	31	7,126,803	25	77,068,771	15	15,111,244	139,841	442,895	5
Georgia	636	47,230,721	4,780,609	52,011,330	13	23,884,890	16	7,845,584	22	83,741,804	13	7,788,240	149,999	275,719	10
Guam	1	0	0	0	64	0	--	0	--	0	64	151,968	544	--	--
Hawaii	18	1,050,299	22,828	1,073,127	56	0	--	1,839	60	1,074,966	57	1,185,497	16,634	40,914	44
Idaho	54	20,861,778	203,972	21,065,750	29	676,983	49	398,658	47	22,141,391	38	1,251,700	214,309	34,025	48
Illinois	1,198	57,255,550	16,164,252	73,419,802	6	39,701,718	7	24,457,568	6	137,579,088	7	12,128,370	143,975	445,666	4
Indiana	940	56,788,199	29,664,712	86,452,911	5	71,458,621	4	12,735,139	15	170,646,671	6	5,942,901	92,896	182,202	16
Iowa	367	15,299,632	4,685,422	19,985,054	30	16,605,341	25	6,090,429	28	42,680,824	30	2,869,413	144,705	85,243	32
Kansas	242	7,917,240	6,962,452	14,879,692	33	34,246,686	11	2,192,798	36	51,319,176	24	2,654,502	211,905	80,843	33
Kentucky	402	38,318,972	6,159,633	44,478,605	15	19,861,111	21	14,990,934	13	79,330,650	14	3,960,825	102,898	113,539	28
Louisiana	302	52,425,669	1,523,501	53,949,170	11	22,084,602	19	12,770,281	14	88,804,053	10	4,372,035	112,827	128,959	26
Maine	68	2,696,053	317,995	3,014,048	52	950,150	47	449,756	45	4,413,954	50	1,253,400	79,934	34,064	47
Manitoba	51	4,580,369	188,682	4,769,051	45	1,201,029	44	1,152,917	50	6,185,997	48	1,142,600	649,953	20,863	52
Maryland	161	18,234,949	319,364	18,554,313	31	2,124,187	42	4,495,726	31	25,174,226	34	5,171,634	25,315	174,710	17
Massachusetts	420	3,506,264	4,298,902	7,805,166	44	10,376,183	29	9,128,607	19	24,300,956	35	6,175,169	20,299	262,564	12
Michigan	820	37,536,067	18,510,409	56,046,476	9	55,997,189	6	84,434,789	1	196,478,454	4	9,863,775	147,124	308,310	9
Minnesota	425	7,968,036	1,578,513	9,546,549	39	10,836,368	27	7,539,535	23	27,922,452	33	4,775,508	206,192	172,982	18
Mississippi	277	30,012,223	580,112	30,592,335	21	8,690,159	32	5,093,426	30	44,375,920	29	2,768,619	121,498	64,286	38
Missouri	521	30,608,348	2,031,520	32,639,868	18	25,422,156	14	10,146,975	18	68,208,999	19	5,468,338	178,432	170,470	19
Montana	28	23,162,395	667,086	23,829,481	24	108,577	56	19,506	57	23,957,564	37	882,779	376,961	20,636	53
Nebraska	153	8,856,110	2,762,784	11,618,894	36	18,729,613	22	493,852	44	30,842,359	32	1,666,028	199,099	53,744	41
Nevada	44	3,028,417	267,627	3,296,044	51	1,002,267	46	29,355	56	4,327,706	51	1,809,253	284,376	69,864	36
New Brunswick	29	6,576,732	1,047,183	7,623,915	41	162,337	55	30,989	55	7,817,241	47	754,300	73,440	12,378	59
New Hampshire	101	2,283,853	137,722	2,421,575	54	6,935,301	36	1,689,525	39	11,046,401	45	1,201,134	23,228	44,229	43
New Jersey	500	9,928,472	2,225,220	12,153,692	35	17,027,981	24	47,666,063	3	76,847,736	16	8,143,412	19,214	331,544	8
New Mexico	47	9,895,587	613,907	10,509,494	38	2,280,187	40	422,079	46	13,211,760	43	1,739,844	314,311	51,026	42
New York	598	21,347,238	4,529,879	25,877,117	22	34,956,968	10	8,476,614	21	69,310,699	18	18,196,601	122,301	754,590	2
Newfoundland	7	386,638	39,780	426,418	58	4,500	60	0	--	430,918	59	540,800	405,721	8,151	60
North Carolina	728	63,621,257	2,590,674	66,211,931	7	33,356,167	12	7,270,616	24	106,838,714	8	7,650,789	126,170	258,592	13
North Dakota	35	2,380,176	1,068,516	3,448,692	49	250,245	54	250,245	54	633,666	53	3,935,133	178,681	16,991	57
Nova Scotia	29	3,364,116	246,701	3,610,817	48	279,237	53	78,141	53	3,968,195	52	939,200	55,491	15,082	58
Ohio	1,504	101,012,275	25,909,740	126,922,015	1	81,745,944	1	41,273,709	4	249,941,668	2	11,256,654	106,060	361,981	7
Oklahoma	270	10,804,655	1,544,981	12,349,636	34	10,401,207	28	1,317,677	40	24,068,520	36	3,358,044	177,865	86,382	31
Ontario	862	66,359,556	34,853,030	101,212,586	3	81,193,657	2	20,516,540	7	202,922,783	3	11,517,300	1,068,586	267,069	11
Oregon	221	26,152,720	4,599,541	30,752,261	20	8,508,656	33	5,452,412	29	44,713,329	28	3,316,154	248,629	109,694	29
Pennsylvania	1,203	74,638,432	25,672,896	100,311,328	4	78,698,956	3	17,027,048	11	196,037,332	5	11,994,016	116,075	382,980	6
Prince Edward Island	3	195,969	8	195,977	62	0	--	158,520	51	354,497	61	137,600	5,659	2,015	61
Puerto Rico	133	7,018,936	500,648	7,519,584	42	8,182,927	34	18,013,102	9	33,715,613	31	3,889,507	8,875	--	--
Quebec	377	16,711,847	4,560,002	21,271,849	26	22,281,346	17	6,869,013	26	50,422,208	25	7,349,100	1,540,689	137,354	25
Rhode Island	118	354,359	161,978	516,337	57	1,770,256	43	915,861	41	3,202,454	55	990,819	2,706	32,546	49
Saskatchewan	32	1,363,747	9,938	1,373,685	55	484,905	51	36,522	54	1,895,112	56	1,025,700	652,330	20,289	54
South Carolina	469	29,025,124	7,373,528	36,398,652	17	20,004,247	20	19,451,129	8	75,854,028	17	3,885,736	77,981	106,917	30
South Dakota	67	2,336,483	167,357	2,503,840	53	370,683	52	334,141	48	3,208,664	54	733,133	196,555	21,631	51
Tennessee	587	49,498,006	4,526,593	54,024,599	10	36,405,389	8	6,678,336	27	97,108,324	9	5,483,535	106,752	170,885	20
Texas	1,214	107,294,171	10,742,956	118,037,127	2	58,318,620	5	83,418,539	2	259,774,286	1	20,044,141	678,305	687,272	3
Utah	149	45,114,473	3,001,471	48,115,944	14	1,163,049	45	624,890	43	49,903,883	26	2,129,836	212,799	62,641	39
Vermont	33	158,661	109,615	268,276	60	591,975	50	153,304	52	995,555	58	593,740	23,953	17,164	56
Virgin Islands	3	279,447	534	279,981	59	72,265	57	10,375	58	362,621	60	119,615	347	--	--
Virginia	401	26,771,960	4,437,156	31,209,116	19	12,344,810	26	11,468,885	17	55,022,811	22	6,872,912	102,551	242,221	14
Washington	252	8,865,039	679,914	9,544,953	40	5,195,327	37	2,011,756	38	16,752,036	40	5,756,361	172,431	209,258	15
West Virginia	148	40,044,353	1,482,171	41,526,524	16	3,553,847	39	8,919,964	20	54,000,335	23	1,806,928	62,381	40,685	45
Wisconsin	787	17,616,831	5,941,063	23,557,894	25	27,827,147	13	16,494,506	12	67,879,547	20	5,250,446	140,662	166,481	21
Wyoming	31	5,459,660	402,127	5,861,787	43	41,767	58	1,993	59	5,905,547	49	479,602	251,483	17,448	55
Total	21,521	1,419,119,790	274,801,492	1,693,921,282		1,050,519,901		611,256,767		3,355,697,950					

Note: Canada and US data only. Mexico data not available for 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 5-1. Largest Sources of Total Releases and Transfers in North America, 1999: States and Provinces



5.2.2 Total Reported Amounts of Releases and Transfers by Industry Sector, 1999

Facilities in five manufacturing industries each reported more than 250 million kg in total releases and transfers in 1999.

- The primary metals industry (US SIC code 33) reported the largest total releases and transfers (712.1 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 1999. TRI facilities reported 90 percent of this amount. Primary metals facilities accounted for 21 percent of total reported releases and transfers in NPRI in 1999 and for 20 percent in TRI.
- The chemical manufacturing industry (US SIC code 28) reported the second-largest amount (676.8 million kg, or 20 percent of total releases and transfers), primarily as other off-site transfers for further management and as on-site releases. TRI facilities reported 93 percent of this amount. The chemicals industry accounted for 16 percent of releases and transfers in NPRI and 20 percent in TRI.
- The electric utility industry reported the third-largest amount, 461.1 million kg. This industry reported the largest amount of on-site releases and total on- and off-site releases. TRI facilities reported 96 percent of the releases and transfers by the electric utilities industry. This industry's releases and transfers made up 14 percent of the North American total, 6 percent of the NPRI total and 15 percent of the TRI total.

Table 5-3. Total Reported Amounts of Releases and Transfers in North America by Industry, 1999

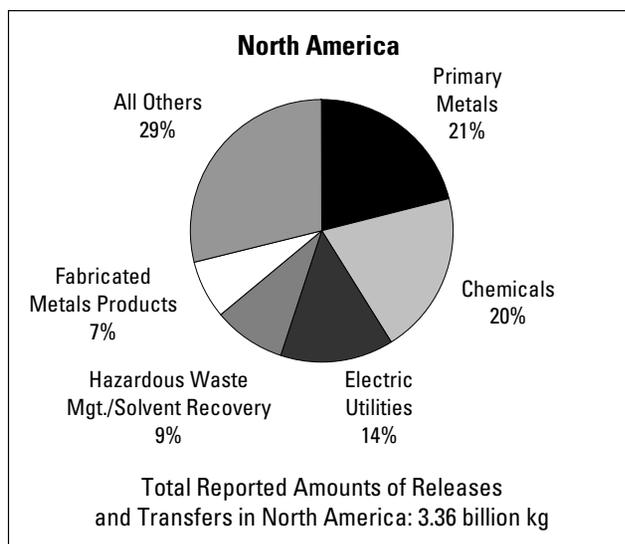
Rank	US SIC Code	Industry	Releases		Total Releases On-and Off-site (kg)	Off-site Transfers for Further Management		Total Reported Amounts of Releases and Transfers (kg)	NPRI as % of North American Total	TRI as % of North American Total
			Total On-site Releases (kg)	Total Off-site Releases (kg)		Total Transfers to Recycling (kg)	Total Other Transfers for Further Management** (kg)			
1	33	Primary Metals	186,862,136	146,753,354	333,615,490	368,551,506	9,953,041	712,120,037	10	90
2	28	Chemicals	251,548,209	26,894,174	278,442,383	81,592,541	316,751,858	676,786,782	7	93
3	491/493	Electric Utilities	446,671,858	12,090,348	458,762,206	2,360,432	26,786	461,149,424	4	96
4	495/738	Hazardous Waste Mgt./ Solvent Recovery	101,543,816	35,639,518	137,183,334	11,666,442	143,456,939	292,306,715	11	89
5	34	Fabricated Metals Products	22,078,962	10,930,248	33,009,210	202,628,699	14,398,445	250,036,354	20	80
6	36	Electronic/Electrical Equipment	8,545,174	8,566,563	17,111,737	166,259,525	13,998,257	197,369,519	5	95
7	--	Multiple codes 20-39**	44,078,736	8,403,898	52,482,634	75,112,925	21,624,120	149,219,679	0	100
8	26	Paper Products	116,110,806	2,575,471	118,686,277	963,280	23,017,276	142,666,833	19	81
9	37	Transportation Equipment	44,354,508	5,831,043	50,185,551	64,398,304	10,878,323	125,462,178	12	88
10	30	Rubber and Plastics Products	48,957,429	5,507,602	54,465,031	5,973,865	6,486,515	66,925,411	15	85
11	20	Food Products	45,725,367	2,242,743	47,968,110	670,121	13,220,507	61,858,738	6	94
12	29	Petroleum and Coal Products	30,290,305	2,071,285	32,361,590	10,825,865	13,486,232	56,673,687	10	90
13	35	Industrial Machinery	4,703,929	2,014,451	6,718,380	34,502,765	3,386,871	44,608,016	3	97
14	24	Lumber and Wood Products	17,707,337	248,147	17,955,484	362,040	1,106,931	19,424,455	18	82
15	32	Stone/Clay/Glass Products	12,772,462	2,269,121	15,041,583	1,774,282	1,794,706	18,610,571	9	91
16	27	Printing and Publishing	11,556,621	52,101	11,608,722	4,257,718	2,631,641	18,498,081	23	77
17	39	Misc. Manufacturing Industries	4,939,830	641,548	5,581,378	8,098,814	2,786,587	16,466,779	21	79
18	25	Furniture and Fixtures	7,426,973	149,282	7,576,255	2,915,919	2,241,958	12,734,132	16	84
19	38	Measurement/Photographic Instruments	4,185,559	302,178	4,487,737	4,681,431	2,420,717	11,589,885	0.03	99.97
20	5169	Chemical Wholesalers	542,984	291,622	834,606	1,744,556	6,316,296	8,895,458	0	100
21	22	Textile Mill Products	4,191,820	333,164	4,524,984	626,972	1,169,406	6,321,362	7	93
22	12	Coal Mining	2,258,259	0	2,258,259	3,063	0	2,261,322	0	100
23	31	Leather Products	532,859	958,137	1,490,996	97,601	40,949	1,629,546	4	96
24	23	Apparel and Other Textile Products	962,641	35,234	997,875	451,235	61,827	1,510,937	84	16
25	21	Tobacco Products	571,210	260	571,470	0	579	572,049	0	100
Total			1,419,119,790	274,801,492	1,693,921,282	1,050,519,901	611,256,767	3,355,697,950	9	91

Note: Canada and US data only. Mexico data not available for 1999.

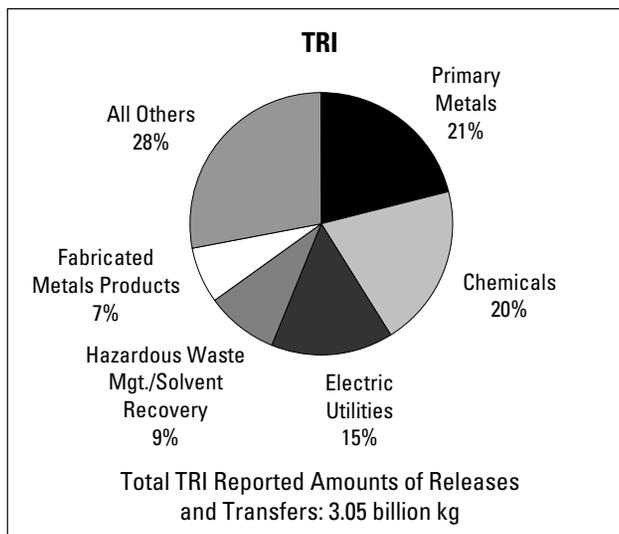
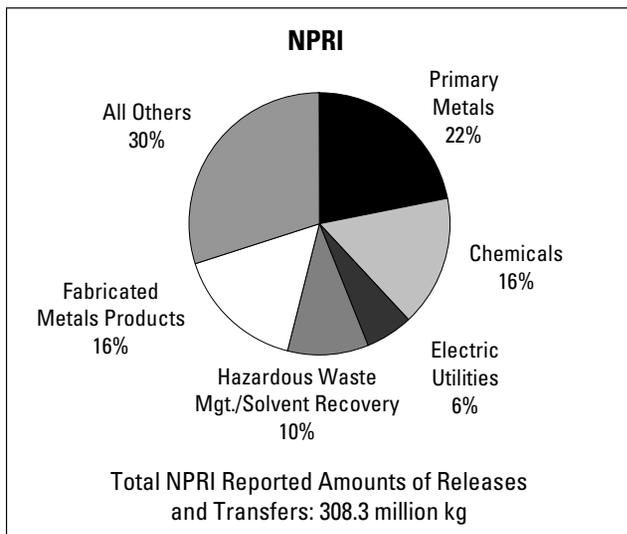
* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

** Multiple SIC codes reported only in TRI.

Figure 5–3. Percentage Contribution of Top Industry Sectors to Total Reported Amounts of Releases and Transfers, NPRI and TRI, 1999



- Hazardous waste management and solvent recovery facilities reported the fourth-largest amount, with 292.3 million kg, primarily as on-site releases and other off-site transfers for further management. TRI facilities reported 89 percent of this amount, and the sector accounted for 9 percent of total North American releases and transfers.
- The fifth-ranked fabricated metals products sector reported 250.0 million kg, 20 percent of which was in NPRI. This industry represented 16 percent of the NPRI total but only 7 percent of the TRI total.



Note: Canada and US data only. Mexico data not available for 1999.

5.2.3 Facilities with the Largest Total Reported Amounts of Releases and Transfers, 1999

The 50 facilities in North America with the largest total releases and transfers reported 551.5 million kg of releases and transfers, 16 percent of the total for the matched data set in 1999.

- The 50 facilities with the largest total releases and transfers in 1999 reported 19 percent of total releases, 8 percent of off-site transfers to recycling, and 25 percent of other off-site transfers for further management.
- The ten facilities with the largest amounts all reported more than 14 million kg each of total releases and transfers. Nine of them were located in the US and one was located in Canada.
- Four 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).
- Four of the top ten were hazardous waste management/solvent recovery facilities located in Michigan, Oregon and Ohio.
- The other two in the top ten were chemical manufacturers located in Ontario and Florida. The Ontario facility also reported having hazardous waste management operations on-site.

Table 5-4. The 50 North American Facilities with the Largest Total Reported Amounts of Releases and Transfers, 1999

Rank	Facility	City, Province/State	SIC Codes		Number of Forms	On- and Off-site Releases		Total Reported Releases On- and Off-site (kg)
			Canada	US		Total On-site Releases (kg)	Total Off-site Releases (kg)	
1	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden, AZ		33	11	21,026,203	149	21,026,352
2	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	6	21,471,752	0	21,471,752
3	ASARCO Inc.	East Helena, MT		33	10	19,551,186	612,687	20,163,873
4	Petro-Chem Processing Group/Solvent Distillers Group, Nortru, Inc.	Detroit, MI		495/738	23	7,124	594	7,718
5	AK Steel, Butler Works	Butler, PA		33	13	15,399,348	113,193	15,512,541
6	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	37	18,034,749	2,889	18,037,638
7	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	10	17,464,378	808	17,465,186
8	Michigan Recovery Sys. Inc., EQ - The Environmental Quality Co.	Romulus, MI		495/738	22	24,361	19,738	44,099
9	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28	15	15,378,584	0	15,378,584
10	Solutia Inc.	Gonzalez, FL		28	20	14,404,882	1,187	14,406,069
11	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	12,842,521	51,390	12,893,911
12	Pharmacia & Upjohn	Kalamazoo, MI		28	28	274,686	17,475	292,161
13	Onyx Environmental Services L.L.C.	Azusa, CA		495/738	36	8,630	1,247,266	1,255,896
14	Delphi Energy & Chassis Sys., Delphi Automotive Sys. L.L.C.	Olathe, KS		36	4	8,087	96,597	104,684
15	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13	425,594	11,899,963	12,325,557
16	Rineco	Benton, AR		495/738	28	846	0	846
17	Philip Enterprises Inc., Parkdale Avenue Facility, Philip Services Corp.	Hamilton, ON	77	495/738	19	0	5,208,000	5,208,000
18	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	9	10,856,777	8	10,856,785
19	Marisol Inc.	Middlesex, NJ		495/738	24	6,972	45,635	52,607
20	Pfizer Inc., Parke-Davis Div.	Holland, MI		28	13	1,096,100	0	1,096,100
21	Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas, NM		33	15	8,456,863	55,785	8,512,648
22	Celanese Ltd., Celanese Americas Corp.	Pasadena, TX		28	21	573,097	38,212	611,309
23	BASF Corp.	Freeport, TX		28	28	9,738,400	11,441	9,749,841
24	DuPont, Victoria Plant	Victoria, TX		28	32	9,399,111	9,027	9,408,138
25	Steel Dynamics Inc.	Butler, IN		33	8	14,836	9,575,540	9,590,376
26	Parker Hannifin, Brass Prods. Div., Parker Hannifin Corp.	Otsego, MI		34	2	0	343	343
27	Nucor Steel—Arkansas, Nucor Corp.	Blytheville, AR		33	11	13,604	1,390,895	1,404,499
28	Keystone Station, Reliant Energy Inc.	Sheloceta, PA		491/493	10	9,303,002	0	9,303,002
29	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC		491/493	12	9,187,891	0	9,187,891
30	American Electric Power, John E. Amos Plant	Winfield, WV		491/493	12	8,436,217	369,950	8,806,167
31	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	12	8,858,672	20	8,858,692
32	U.S. Mint, U.S. Department of the Treasury	Philadelphia, PA		34	3	343	683	1,026
33	Coastal Eagle Point Oil Co., Coastal Corp.	Westville, NJ		29	19	150,117	646	150,763
34	Hercules Inc.	Parlin, NJ		28	7	7,705	0	7,705
35	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	9	8,482,918	7	8,482,925
36	Republic Techs. Intl., Canton Facility	Canton, OH		33	8	12,225	503,448	515,673
37	J&L Specialty Steel Inc.	Louisville, OH		33	6	305,614	120,741	426,355
38	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33	8	10,828	7,674,586	7,685,414
39	Oxy Vinyls L.P., La Porte, VCM Plant, Occidental Petroleum Corp.	La Porte, TX		28	18	40,969	9,287	50,256
40	Gulf Power Co., Plant Crist, Southern Co.	Pensacola, FL		491/493	11	7,305,426	0	7,305,426
41	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33	17	358,780	6,872,253	7,231,033
42	Onyx Environmental Services L.L.C.	West Carrollton, OH		495/738	7	5,175	15,962	21,137
43	Formosa Plastics Corp. Louisiana, Formosa Plastics Corp. USA	Baton Rouge, LA		28	18	95,537	84,417	179,954
44	North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta, OH		33	6	10,913	95,829	106,742
45	Equistar Chemicals L.P., Victoria Facility	Victoria, TX		28	5	118,524	110	118,634
46	Southeastern Chemical & Solvent Co. Inc., M&M Chemical & Equipment Co.	Sumter, SC		495/738	5	1,193	0	1,193
47	Air Prods. L.P., Air Prods. & Chemicals Inc.	Pasadena, TX		28	12	29,228	18,790	48,018
48	U.S. TVA, Johnsonville Fossil Plant, U.S. Tennessee Valley Authority	New Johnsonville, TN		491/493	13	6,865,678	2,980	6,868,658
49	Duke Energy, Belevs Creek Steam Station	Walnut Cove, NC		491/493	12	6,828,570	18	6,828,588
50	Jayhawk Fine Chemicals Corp., Laporte Fine Chemicals	Galena, KS		28	16	13,963	6,328,731	6,342,694
Subtotal					722	262,908,179	52,497,280	315,405,459
% of Total					1	19	19	19
Total					74,108	1,419,119,790	274,801,492	1,693,921,282

Note: Canada and US data only. Mexico data not available for 1999. 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	Off-site Transfers for Further Management		Total Reported Amounts of Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total reported amounts from the facility)
	Total Transfers to Recycling (kg)	Total Other Transfers for Further Management (kg)		
1	3,187,296	0	24,213,648	Copper/Zinc and compounds (land)
2	0	0	21,471,752	Chlorine (air)
3	0	0	20,163,873	Zinc and compounds (land)
4	0	18,955,182	18,962,900	Toluene, Xylenes, Methanol, Methyl isobutyl ketone, Methyl ethyl ketone (transfers to energy recovery)
5	3,242,993	130	18,755,664	Nitric acid and nitrate compounds (water)
6	0	480,061	18,517,699	Aluminum oxide, Asbestos (land)
7	0	0	17,465,186	Zinc and compounds (land)
8	12,245	15,909,751	15,966,095	Xylenes, Toluene, n-Hexane (transfers to energy recovery/treatment)
9	0	0	15,378,584	Zinc and compounds (land)
10	63,492	0	14,469,561	Nitric acid and nitrate compounds (UIJ)
11	0	0	12,893,911	Copper/Arsenic/Zinc and compounds (land)
12	0	12,287,042	12,579,203	Methanol (transfers to energy recovery), Dichloromethane (transfers to treatment), Toluene (transfers to energy recovery)
13	596,150	10,666,844	12,518,890	Methyl ethyl ketone, Xylenes, Toluene, Dichloromethane, Tetrachloroethylene, Methyl isobutyl ketone, 2-Ethoxyethanol, Methanol (transfers to energy recovery), Ethylene glycol (transfers to recycling)
14	12,406,332	0	12,511,016	Lead and compounds (transfers to recycling)
15	0	0	12,325,557	Zinc and compounds (transfers of metals to disposal)
16	0	12,058,154	12,059,000	Xylenes, Methyl ethyl ketone, Toluene, Cresol (transfers to energy recovery)
17	79,239	6,399,442	11,686,681	Xylenes, Toluene (transfers to energy recovery), Zinc and compounds (transfers of metals to disposal)
18	0	0	10,856,785	Zinc and compounds (land)
19	0	10,327,113	10,379,720	Toluene, Methanol, Xylenes, Methyl ethyl ketone (transfers to energy recovery)
20	282,993	8,904,579	10,283,672	Methanol, Toluene (transfers to energy recovery)
21	1,743,561	23	10,256,232	Copper and compounds (land, transfers to recycling), Zinc and compounds (land)
22	108	9,610,649	10,222,066	Diethyl sulfate, Acrylic acid (transfers to energy recovery), Ethylene glycol (transfers to sewage)
23	62,100	26,690	9,838,631	Nitric acid and nitrate compounds (water)
24	0	319,376	9,727,514	Nitric acid and nitrate compounds (UIJ)
25	0	0	9,590,376	Zinc and compounds, Aluminum (transfers of metals to disposal)
26	9,476,003	0	9,476,346	Copper and compounds (transfers to recycling)
27	8,025,473	0	9,429,972	Zinc and compounds (transfers to recycling)
28	0	0	9,303,002	Hydrochloric acid (air)
29	0	0	9,187,891	Hydrochloric acid (air)
30	67,303	0	8,873,470	Hydrochloric acid (air)
31	0	0	8,858,692	Hydrochloric acid (air)
32	8,767,762	0	8,768,788	Copper and compounds (transfers to recycling)
33	507	8,545,984	8,697,254	Propylene, Ethylene (transfers to energy recovery)
34	0	8,611,117	8,618,822	Nitric acid and nitrate compounds (transfers to sewage)
35	0	0	8,482,925	Zinc and compounds (land)
36	7,718,648	0	8,234,321	Zinc and compounds (transfers to recycling)
37	7,485,577	0	7,911,932	Chromium/Nickel and compounds (transfers to recycling)
38	0	0	7,685,414	Zinc and compounds (transfers of metals to disposal)
39	7,201,748	185,807	7,437,811	1,1,2-Trichloroethane, 1,2-Dichloroethane, Chloroform (transfers to recycling)
40	0	0	7,305,426	Hydrochloric acid (air)
41	0	0	7,231,033	Zinc and compounds, Manganese and compounds (transfers of metals to disposal)
42	0	7,205,272	7,226,409	Methyl isobutyl ketone, Toluene, Xylenes (transfers to energy recovery)
43	6,995,828	2,329	7,178,111	1,1,2-Trichloroethane, 1,2-Dichloroethane (transfers to recycling)
44	7,037,642	0	7,144,384	Zinc and compounds (transfers to recycling)
45	0	6,976,115	7,094,749	Ethylene (transfers to energy recovery)
46	0	6,951,577	6,952,770	Toluene, Methyl ethyl ketone (transfers to energy recovery)
47	82,540	6,748,805	6,879,363	Nitric acid and nitrate compounds (transfers to sewage)
48	0	0	6,868,658	Hydrochloric acid (air)
49	0	0	6,828,588	Hydrochloric acid (air)
50	16,317	331,671	6,690,682	Nitric acid and nitrate compounds (transfers to disposal)
	84,551,857	151,503,713	551,461,029	
	8	25	16	
	1,050,519,901	611,256,767	3,355,697,950	

UIJ=underground injection.

5.2.4 Total Reported Amounts of Releases and Transfers by Chemical, 1999

Of the 210 chemicals in the matched data set, the 25 chemicals with the largest amounts of releases and transfers accounted for over 3 billion kg, or 90 percent of all releases and transfers reported in North America in 1999.

- Zinc and its compounds had the largest total releases and transfers in 1999, with 433.8 million kg of releases and transfers, accounting for 13 percent of all North American releases and transfers. Zinc and its compounds ranked first in off-site releases and second in off-site transfers to recycling.
- Copper and its compounds ranked second in total releases and transfers in 1999, with 409.3 million kg. Copper was first in off-site transfers to recycling, with 362.3 million kg.
- Hydrochloric acid had the third-largest total releases and transfers in 1999 (313.6 million kg) and ranked first in on-site releases and total releases. Only air emissions of hydrochloric acid (and of 11th-ranked sulfuric acid) are included in the matched database because only acid aerosols of these chemicals are reportable to TRI.
- Nitric acid and nitrates ranked fourth, with 242.1 million kg of total releases and transfers in 1999. This chemical ranked second in total on-site releases.
- Seven metals and their compounds, including the top two chemicals, were among the 25 chemicals with the largest total releases and transfers in 1999.

Table 5-5. The 25 Chemicals with the Largest Total Reported Amounts of Releases and Transfers in North America, 1999

CAS Number	Chemical	Number of Forms	Releases On- and Off-site		Total Reported Releases On- and Off-site (kg)	Off-site Transfers for Further Management	
			Total On-site Releases (kg)	Total Off-site Releases (kg)		Total Transfers to Recycling (kg)	Total Other Transfers for Further Management** (kg)
--	Zinc (and its compounds)*	4,080	133,333,125	118,306,530	251,639,655	182,137,733	0
--	Copper (and its compounds)*	4,966	33,600,848	13,374,179	46,975,027	362,346,319	0
7647-01-0	Hydrochloric acid	1,471	313,645,594	0	313,645,594	0	0
--	Nitric acid and nitrate compounds	3,837	145,711,156	11,934,868	157,646,024	2,462,160	81,955,162
67-56-1	Methanol	2,803	117,121,494	1,156,402	118,277,896	6,265,085	114,354,571
--	Lead (and its compounds)*▼	1,964	24,386,634	23,598,363	47,984,997	157,965,841	0
108-88-3	Toluene	3,382	47,639,946	2,597,600	50,237,546	15,042,812	90,053,647
--	Manganese (and its compounds)*	3,833	55,300,484	35,487,652	90,788,136	61,260,038	0
--	Xylenes	3,492	38,138,177	4,423,461	42,561,638	21,080,404	66,592,111
--	Chromium (and its compounds)*▼	4,055	23,431,663	20,537,918	43,969,581	60,511,425	0
7664-93-9	Sulfuric acid	1,116	89,034,766	0	89,034,766	0	0
--	Nickel (and its compounds)*▼	3,743	9,322,058	10,033,844	19,355,902	52,355,381	0
78-93-3	Methyl ethyl ketone	2,170	23,470,875	1,219,081	24,689,956	9,918,428	36,678,294
107-21-1	Ethylene glycol	1,776	4,307,329	1,584,579	5,891,908	23,844,901	21,869,700
110-54-3	n-Hexane	1,043	27,642,310	31,143	27,673,453	5,289,771	17,039,313
75-09-2	Dichloromethane▼	758	18,485,239	494,650	18,979,889	7,067,355	15,322,157
7664-39-3	Hydrogen fluoride	1,071	38,403,747	264,058	38,667,805	86,067	1,059,522
100-42-5	Styrene▼	1,725	27,117,004	1,003,847	28,120,851	102,647	10,408,795
108-10-1	Methyl isobutyl ketone	1,059	7,220,113	290,385	7,510,498	6,052,903	13,451,362
7429-90-5	Aluminum (fume or dust)*	383	4,511,390	6,669,987	11,181,377	14,944,420	0
74-85-1	Ethylene	346	13,668,994	343	13,669,337	257	11,253,690
7782-50-5	Chlorine	1,322	23,062,060	46,215	23,108,275	58,921	580,123
71-36-3	n-Butyl alcohol	1,217	12,180,266	368,213	12,548,479	1,268,112	9,035,042
75-05-8	Acetonitrile	136	9,275,590	345,413	9,621,003	1,077,623	9,853,170
1344-28-1	Aluminum oxide (fibrous forms)	74	14,621,044	1,576,942	16,197,986	2,463,535	490,091
	Subtotal	51,822	1,254,631,906	255,345,673	1,509,977,579	993,602,138	499,996,750
	% of Total	70	88	93	89	95	82
	Total	74,108	1,419,119,790	274,801,492	1,693,921,282	1,050,519,901	611,256,767

Note: Canada and US data only. Mexico data not available for 1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

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

Table 5–5. (continued)

Total Reported Amounts of Releases and Transfers (kg)	NPRI as % of North American Total	TRI as % of North American Total
433,777,388	15	85
409,321,346	7	93
313,645,594	4	96
242,063,346	4	96
238,897,552	11	89
205,950,838	9	91
155,334,005	12	88
152,048,174	14	86
130,234,153	17	83
104,481,006	10	90
89,034,766	9	91
71,711,283	7	93
71,286,678	16	84
51,606,509	4	96
50,002,537	7	93
41,369,401	7	93
39,813,394	9	91
38,632,293	6	94
27,014,763	8	92
26,125,797	18	82
24,923,284	8	92
23,747,319	2	98
22,851,633	9	91
20,551,796	0.2	99.8
19,151,612	5	95
3,003,576,467	9	91
90		
3,355,697,950	9	91

- Five chemicals designated as known or suspected carcinogens were among the 25 chemicals with the largest total releases and transfers in 1999.

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Key Findings

- In 1999, facilities in North America released 1.57 billion kg of listed substances on- and off-site, as reported to TRI and NPRI. This total was 1 percent lower than in 1998.
- The jurisdictions with the highest total releases were the same in 1999 as in 1998: Ohio, Texas, Pennsylvania, Ontario, and Indiana. The amounts were lower than in 1998 for Ohio, Texas, and Ontario.
- In both 1998 and 1999, the industry that accounted for the largest total releases was electric utilities, followed by primary metals, chemicals, and hazardous waste management/solvent recovery.
- Total releases on- and off-site of known and suspected carcinogens decreased by 5 percent. The largest quantity decrease was for friable asbestos, and the largest increases were for formaldehyde and styrene.
- North American off-site transfers to recycling rose slightly between 1998 and 1999, but in NPRI they fell 18 percent, mainly because of a 21-percent decline in transfers to recycling of metals.
- North American off-site transfers of chemicals (excluding metals) for other types of further management (energy recovery, treatment, and sewage) declined 10 percent between 1998 and 1999. In NPRI, off-site transfers to energy recovery increased by 17 percent, while in TRI such transfers fell by 17 percent.
- Total North American releases and transfers declined from 3.32 billion kg in 1998 to 3.26 billion kg in 1999. The main reduction was in off-site transfers to energy recovery.
- Ohio, Texas and Ontario had the highest total releases and transfers in 1999; Ontario was in fourth place in 1998 while Michigan ranked third in 1998.
- The primary metals sector reported the largest total North American releases and transfers, in both 1998 and 1999. The chemicals, electric utilities, and hazardous waste management industries followed, with their rankings unchanged. The total for hazardous waste management/solvent recovery, however, decreased by 22 percent between 1998 and 1999.
- The chemical with the largest reported decrease in total releases and transfers for 1998–1999 was xylenes. The largest overall increase was for hydrochloric acid, followed by nitric acid and nitrate compounds.

6.1 Introduction

This chapter examines changes in reported amounts of North American releases and transfers from 1998 to 1999, 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 1999. 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 reporting year because data for these chemicals are not available for 1998. The 1999 data presented in this chapter are therefore a subset of the 1999 data presented in **Chapters 3, 4 and 5**.

The information is presented under the same categories as in previous chapters. Data for releases on- and off-site are presented first; these are the “adjusted” releases similar to those in **Chapter 3**. Next come data on transfers to recycling and other transfers for further management (that is, to energy recovery, treatment, and sewage) and, finally, total reported releases and transfers. Within sections, the data is presented in the following order: by states and provinces, by industry sector, by facilities with the largest changes (for total releases and for total releases and transfers) and, finally, by chemical.

Further details of facilities’ reporting and their changes can be found on the *Taking Stock* web site <www.cec.org/takingstock>.

6.2 1998–1999 Releases On- and Off-site in North America

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. 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 that disposes of the waste in an on-site landfill and reports it as on-site land releases. In this section, total releases are adjusted so that the waste is included only once. In the final section of this chapter, total releases (unadjusted) are presented with transfers for recycling and other management. (See **Chapter 2, Section 2.2.8** for a further explanation of the categories used in this report.) Chief findings include:

- Total adjusted releases on- and off-site in North America from reporting facilities were 1.57 billion kg in 1999, a decrease of 1 percent from the 1.59 billion kg reported in 1998. On-site releases declined by 1 percent, from 1.38 billion kg in 1998 to 1.36 billion kg in 1999. Adjusted off-site releases fell by 4 percent, from 218.2 million kg to 210.3 million kg.

Table 6–1. Summary of Releases On- and Off-site in North America, NPRI and TRI, 1998–1999

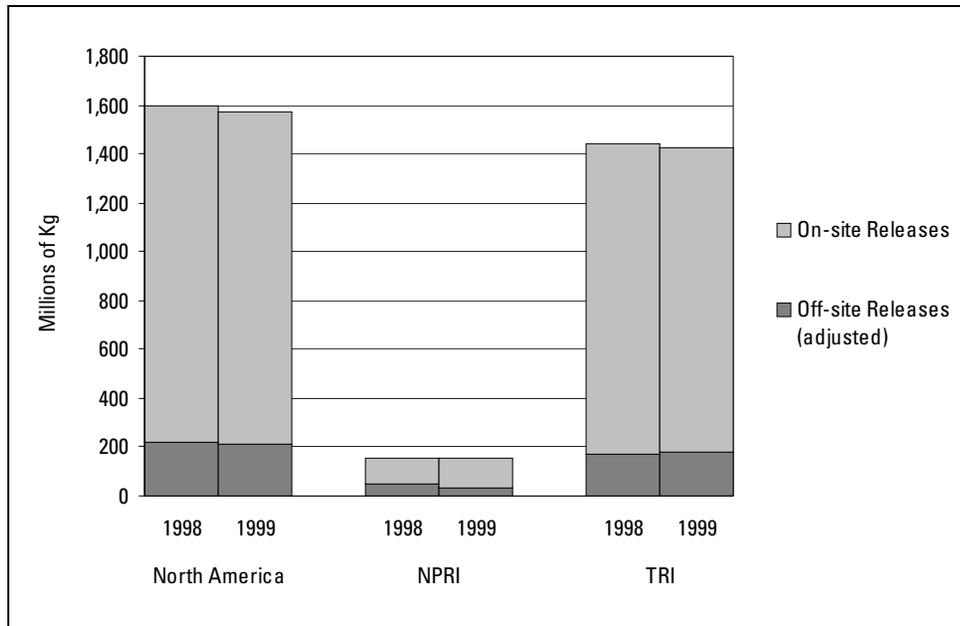
	North America			NPRI*			TRI		
	1998 Number	1999 Number	Change 1998–1999 (%)	1998 Number	1999 Number	Change 1998–1999 (%)	1998 Number	1999 Number	Change 1998–1999 (%)
Total Facilities	21,554	21,056	-2	1,510	1,611	7	20,044	19,445	-3
Total Forms	71,242	70,154	-2	5,096	5,509	8	66,146	64,645	-2
Releases On- and Off-site	kg	kg		kg	kg		kg	kg	
On-site Releases	1,376,291,532	1,364,555,275	-1	103,762,149	120,874,440	16	1,272,529,383	1,243,680,835	-2
Air	868,023,670	857,822,047	-1	79,932,355	84,006,392	5	788,091,315	773,815,655	-2
Surface Water	110,564,012	117,263,593	6	4,987,116	5,831,408	17	105,576,896	111,432,185	6
Underground Injection	85,688,150	80,395,386	-6	3,700,429	3,272,500	-12	81,987,721	77,122,886	-6
Land	311,891,192	308,949,221	-1	15,017,741	27,639,112	84	296,873,451	281,310,109	-5
Off-site Releases	274,169,926	273,697,790	-0.2	51,573,572	43,686,389	-15	222,596,354	230,011,401	3
Transfers to Disposal (except metals)	29,944,096	39,255,102	31	9,421,264	9,445,164	0.3	20,522,832	29,809,938	45
Transfers of Metals**	244,225,830	234,442,688	-4	42,152,308	34,241,225	-19	202,073,522	200,201,463	-1
Total Reported Releases On- and Off-site	1,650,461,458	1,638,253,065	-1	155,335,721	164,560,829	6	1,495,125,737	1,473,692,236	-1
Transfers Omitted for Adjustment Analysis	56,018,382	63,413,622	13	1,055,951	11,502,192	989	54,962,431	51,911,430	-1
Total Releases On- and Off-site (adjusted)	1,594,443,076	1,574,839,443	-1	154,279,770	153,058,637	-1	1,440,163,306	1,421,780,806	-1

Note: Canada and US data only. Mexico data not available for 1998–1999. Data include 165 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 6–1. Change in Releases On- and Off-site in North America, NPRI and TRI, 1998–1999



Note: Off-site releases do not include those also reported as on-site releases by another NPRI or TRI facility.

- North American releases to air and land decreased slightly, by 1 percent. Releases to surface water rose 6 percent (from 110.6 million kg to 117.3 million kg), while releases to underground injection fell by 6 percent (from 85.7 million kg to 80.4 million kg).
- North American transfers to disposal (except metals) rose from 29.9 million kg in 1998 to 39.3 million kg in 1999 (31 percent). Transfers of metals declined from 244.2 million kg to 234.4 million kg (4 percent).
- The number of reporting facilities in North America decreased by 2 percent from 1998 to 1999, from 21,554 in 1998 to 21,056 in 1999. The number of forms filed was also 2 percent lower. The change was attributable to a 3-percent decline in the number of TRI facilities reporting, from 20,044 in 1998 to 19,445 in 1999. The number of TRI forms declined by 2 percent. The number of reporting facilities in NPRI increased by 7 percent, from 1,510 to 1,611, and the number of forms rose 8 percent.
- Adjusted total releases by NPRI facilities declined 1 percent, from 154.3 million kg in 1998 to 153.1 million kg in 1999. On-site releases increased by 16 percent, from 103.8 million kg to 120.9 million kg. Air releases, the largest category of on-site release, rose 5 percent, from 79.9 million kg to 84.0 million kg. On-site releases to land rose 84 percent; releases to surface water increased by 17 percent; and releases to underground injection fell 12 percent. Adjusted off-site releases in NPRI fell 36 percent, from 50.5 million kg in 1998 to 32.2 million kg in 1999, mainly because of a drop in transfers of metals.

- Total releases in TRI declined 1 percent from 1998 to 1999. On-site releases decreased by 2 percent, from 1.27 billion kg in 1998 to 1.24 billion kg in 1999, whereas adjusted off-site releases increased 6 percent, mainly because of a rise in transfers to disposal (except metals). The pattern for types of release was generally similar to that for the North American totals except for a greater proportional decrease in on-site land releases, 5 percent.

6.2.1 1998–1999 Releases On- and Off-site by State and Province

Among states and provinces, 37 reported lower total releases in 1999 than in 1998, and 26 reported higher total releases. (Guam reported no releases.) Findings according to jurisdiction include:

- The five jurisdictions with the highest total releases were the same in 1999 as in 1998: Ohio, Texas, Pennsylvania, Ontario, and Indiana.
- In on-site releases, Ohio, Texas, and Pennsylvania ranked first through third in both 1998 and 1999.
- In off-site releases (adjusted to omit such releases also reported as on-site releases at another NPRI or TRI facility), Indiana had the largest amounts in 1999 and the second-largest in 1998. Pennsylvania moved up from third-largest in 1998 to second-largest in 1999. Both Indiana and Pennsylvania did, however, have overall decreases in adjusted off-site releases.

Table 6–2. Change in Total Releases On- and Off-site in North America, by State and Province, 1998–1999

State/Province	Total On-site Releases					Total Off-site Releases (adjusted)*				
	1998 kg	Rank	1999 kg	Rank	Change 1998–1999 (%)	1998 kg	Rank	1999 kg	Rank	Change 1998–1999 (%)
Alabama	49,254,045	10	47,320,590	11	-4	3,748,647	10	3,608,946	15	-4
Alaska	253,002	60	189,365	61	-25	130	61	0	--	-100
Alberta	16,907,604	28	14,555,210	30	-14	1,433,175	30	1,718,795	25	20
Arizona	26,081,450	21	23,888,366	22	-8	368,607	46	607,024	37	65
Arkansas	10,771,051	34	11,295,034	32	5	2,405,429	16	2,135,426	20	-11
British Columbia	6,617,258	41	9,759,321	35	47	1,550,706	28	1,010,158	33	-35
California	16,993,187	27	16,060,750	28	-5	3,578,711	11	3,207,853	16	-10
Colorado	2,797,349	51	2,887,448	49	3	500,650	41	316,551	42	-37
Connecticut	2,725,457	52	2,051,820	53	-25	1,330,002	32	872,435	34	-34
Delaware	4,673,501	44	3,225,444	47	-31	1,696,030	25	1,343,783	30	-21
District of Columbia	30,045	63	35,828	63	19	2	63	613	60	30,550
Florida	51,633,472	7	56,044,801	6	9	1,889,103	22	1,905,914	23	1
Georgia	43,189,278	13	46,340,548	12	7	1,868,746	23	2,234,066	18	20
Guam	0	64	0	64	--	0	64	0	--	--
Hawaii	1,494,634	54	1,024,575	56	-31	2,675	59	22,656	58	747
Idaho	22,321,063	24	20,859,355	25	-7	97,261	53	151,397	51	56
Illinois	55,133,856	5	52,807,044	8	-4	9,164,434	6	10,392,412	6	13
Indiana	51,604,218	8	53,874,568	7	4	25,825,121	2	25,650,549	1	-1
Iowa	13,508,313	31	13,137,879	31	-3	1,567,405	27	1,813,970	24	16
Kansas	9,548,491	37	7,212,335	39	-24	1,333,171	31	5,705,308	8	328
Kentucky	36,589,343	16	35,560,867	16	-3	2,426,015	15	4,999,663	10	106
Louisiana	51,095,001	9	47,541,655	10	-7	953,679	37	1,378,261	28	45
Maine	3,218,084	48	2,579,046	50	-20	483,886	43	312,354	44	-35
Manitoba	4,500,308	45	4,283,447	44	-5	156,965	49	188,682	48	20
Maryland	15,546,658	30	17,980,550	26	16	393,988	45	315,514	43	-20
Massachusetts	3,317,546	47	3,443,319	45	4	1,757,777	24	1,243,124	31	-29
Michigan	36,930,123	15	36,457,038	15	-1	17,235,824	5	18,252,015	5	6
Minnesota	6,965,924	40	6,669,994	41	-4	1,024,248	36	1,466,530	26	43
Mississippi	28,107,864	19	28,895,032	18	3	534,470	40	537,517	38	1
Missouri	31,509,614	17	29,339,219	17	-7	2,026,459	19	2,003,502	22	-1
Montana	22,337,208	23	23,134,367	23	4	293,824	47	98,881	54	-66
Nebraska	8,483,381	38	8,357,747	38	-1	1,635,996	26	829,953	35	-49
Nevada	2,974,830	49	3,004,463	48	1	39,207	56	77,006	55	96
New Brunswick	5,634,267	43	6,569,593	42	17	1,063,682	35	726,844	36	-32
New Hampshire	2,827,176	50	2,277,338	51	-19	132,290	51	137,167	52	4
New Jersey	9,642,424	36	9,360,198	36	-3	2,065,105	18	2,150,131	19	4
New Mexico	12,122,057	33	9,856,365	34	-19	795,340	38	287,197	45	-64
New York	22,797,761	22	21,229,486	24	-7	2,252,578	17	4,254,342	14	89
Newfoundland	457,691	58	373,372	57	-18	220	60	39,780	57	17,982
North Carolina	58,838,116	4	62,111,351	5	6	1,975,106	21	2,126,829	21	8
North Dakota	1,921,445	53	2,092,829	52	9	1,127,922	34	1,067,137	32	-5
Nova Scotia	4,462,745	46	3,356,719	46	-25	187,368	48	246,686	46	32
Ohio	114,207,853	1	98,569,267	1	-14	20,567,882	4	20,798,896	4	1
Oklahoma	12,271,046	32	10,692,406	33	-13	1,530,037	29	1,455,762	27	-5
Ontario	48,371,313	11	64,455,484	4	33	41,242,125	1	23,690,703	3	-43
Oregon	19,442,292	25	26,089,275	20	34	731,298	39	480,414	41	-34
Pennsylvania	67,117,325	3	74,017,281	3	10	25,555,739	3	24,526,740	2	-4
Prince Edward Island	207,650	61	194,469	60	-6	3	62	8	62	167
Puerto Rico	7,007,679	39	6,858,471	40	-2	431,374	44	492,499	40	14
Quebec	15,869,518	29	16,026,049	29	1	4,873,560	9	4,558,142	11	-6
Rhode Island	560,064	57	348,401	58	-38	140,092	50	153,516	50	10
Saskatchewan	733,795	56	1,300,776	55	77	9,817	58	4,399	59	-55
South Carolina	28,260,137	18	28,477,621	19	1	1,999,684	20	4,269,962	13	114
South Dakota	1,449,225	55	1,917,710	54	32	55,813	55	167,312	49	200
Tennessee	47,577,615	12	48,535,000	9	2	2,577,740	14	3,095,425	17	20
Texas	102,161,243	2	97,288,590	2	-5	6,593,014	7	9,057,521	7	37
Utah	53,263,269	6	44,988,681	13	-16	496,664	42	218,624	47	-56
Vermont	122,929	62	155,910	62	27	95,399	54	109,111	53	14
Virgin Islands	427,849	59	264,735	59	-38	13,203	57	497	61	-96
Virginia	26,142,834	20	25,917,891	21	-1	3,322,220	12	4,292,775	12	29
Washington	10,425,633	35	8,767,832	37	-16	1,281,503	33	514,376	39	-60
West Virginia	39,202,589	14	39,812,210	14	2	3,193,291	13	1,363,195	29	-57
Wisconsin	19,428,439	26	17,445,861	27	-10	6,403,016	8	5,535,690	9	-14
Wyoming	6,224,395	42	5,387,079	43	-13	116,116	52	61,630	56	-47
Total	1,376,291,532		1,364,555,275		-1	218,151,544		210,284,168		-4

Note: Canada and US data only. Mexico data not available for 1998–1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 off-site to disposal and transfers of metals from facilities located in the state/province. They do not include transfers sent to other NPRI or TRI facilities that reported them as on-site releases.

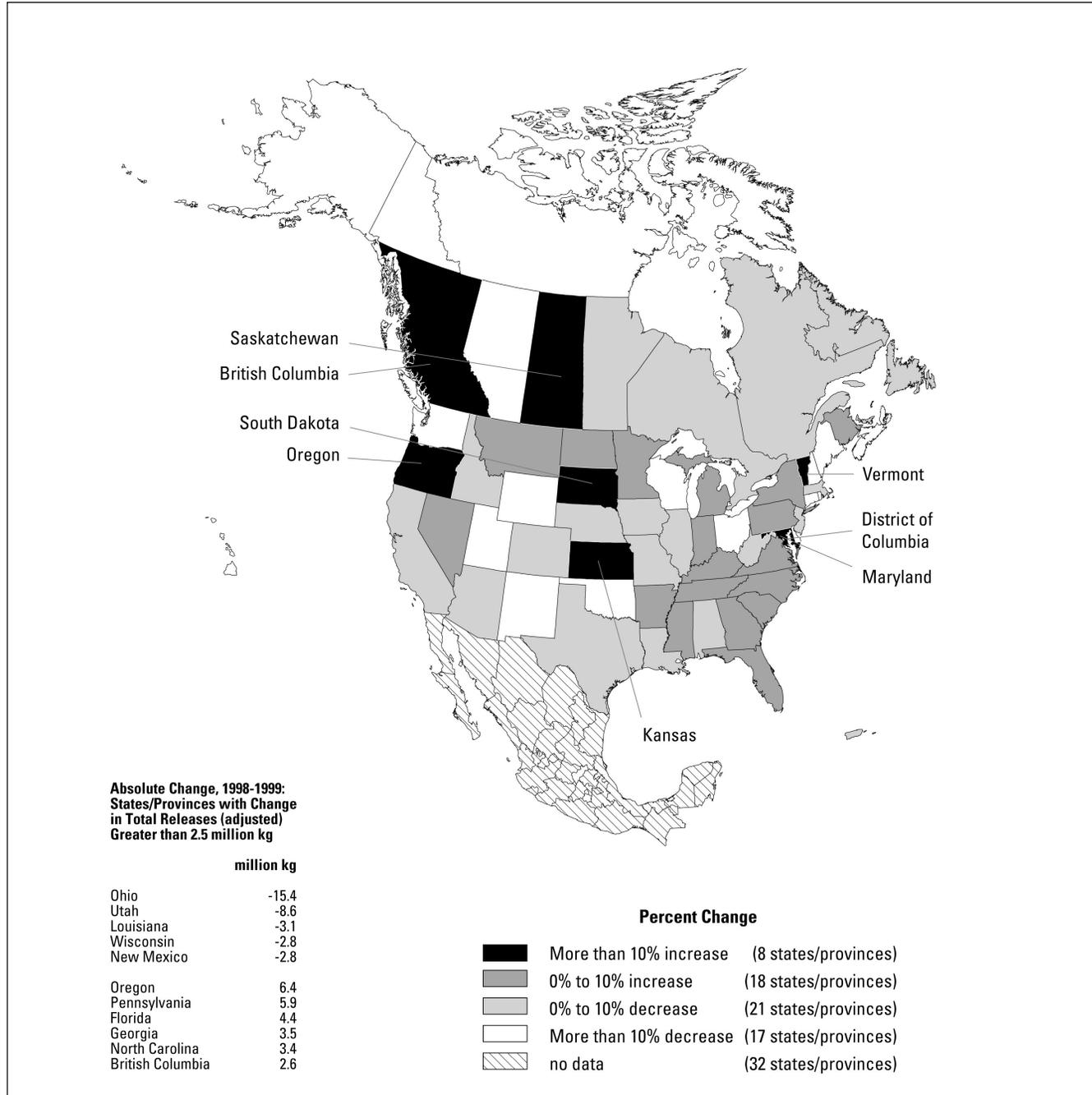
Table 6–2. (continued)

State/Province	Total Releases On-site and Off-site (adjusted)**				Change 1998–1999 (%)
	1998		1999		
	kg	Rank	kg	Rank	
Alabama	53,002,692	11	50,929,536	11	-4
Alaska	253,132	60	189,365	62	-25
Alberta	18,340,779	29	16,274,005	30	-11
Arizona	26,450,057	21	24,495,390	23	-7
Arkansas	13,176,480	33	13,430,460	32	2
British Columbia	8,167,964	39	10,769,479	36	32
California	20,571,898	27	19,268,603	28	-6
Colorado	3,297,999	50	3,203,999	48	-3
Connecticut	4,055,459	48	2,924,255	51	-28
Delaware	6,369,531	43	4,569,227	45	-28
District of Columbia	30,047	63	36,441	63	21
Florida	53,522,575	10	57,950,715	8	8
Georgia	45,058,024	14	48,574,614	13	8
Guam	0	64	0	64	--
Hawaii	1,497,309	55	1,047,231	56	-30
Idaho	22,418,324	25	21,010,752	26	-6
Illinois	64,298,290	6	63,199,456	7	-2
Indiana	77,429,339	5	79,525,117	5	3
Iowa	15,075,718	31	14,951,849	31	-1
Kansas	10,881,662	37	12,917,643	33	19
Kentucky	39,015,358	16	40,560,530	16	4
Louisiana	52,048,680	12	48,919,916	12	-6
Maine	3,701,970	49	2,891,400	52	-22
Manitoba	4,657,273	46	4,472,129	46	-4
Maryland	15,940,646	30	18,296,064	29	15
Massachusetts	5,075,323	45	4,686,443	44	-8
Michigan	54,165,947	8	54,709,053	9	1
Minnesota	7,990,172	40	8,136,524	40	2
Mississippi	28,642,334	20	29,432,549	20	3
Missouri	33,536,073	17	31,342,721	18	-7
Montana	22,631,032	24	23,233,248	24	3
Nebraska	10,119,377	38	9,187,700	39	-9
Nevada	3,014,037	52	3,081,469	50	2
New Brunswick	6,697,949	42	7,296,437	42	9
New Hampshire	2,959,466	53	2,414,505	53	-18
New Jersey	11,707,529	35	11,510,329	35	-2
New Mexico	12,917,397	34	10,143,562	37	-21
New York	25,050,339	23	25,483,828	22	2
Newfoundland	457,911	58	413,152	58	-10
North Carolina	60,813,222	7	64,238,180	6	6
North Dakota	3,049,367	51	3,159,966	49	4
Nova Scotia	4,650,113	47	3,603,405	47	-23
Ohio	134,775,735	1	119,368,163	1	-11
Oklahoma	13,801,083	32	12,148,168	34	-12
Ontario	89,613,438	4	88,146,187	4	-2
Oregon	20,173,590	28	26,569,689	21	32
Pennsylvania	92,673,064	3	98,544,021	3	6
Prince Edward Island	207,653	62	194,477	61	-6
Puerto Rico	7,439,053	41	7,350,970	41	-1
Quebec	20,743,078	26	20,584,191	27	-1
Rhode Island	700,156	57	501,917	57	-28
Saskatchewan	743,612	56	1,305,175	55	76
South Carolina	30,259,821	18	32,747,583	17	8
South Dakota	1,505,038	54	2,085,022	54	39
Tennessee	50,155,355	13	51,630,425	10	3
Texas	108,754,257	2	106,346,111	2	-2
Utah	53,759,933	9	45,207,305	14	-16
Vermont	218,328	61	265,021	60	21
Virgin Islands	441,052	59	265,232	59	-40
Virginia	29,465,054	19	30,210,666	19	3
Washington	11,707,136	36	9,282,208	38	-21
West Virginia	42,395,880	15	41,175,405	15	-3
Wisconsin	25,831,455	22	22,981,551	25	-11
Wyoming	6,340,511	44	5,448,709	43	-14
Total	1,594,443,076		1,574,839,443		-1

** Total releases do not include transfers sent to other NPRI or TRI facilities that reported them as on-site releases.

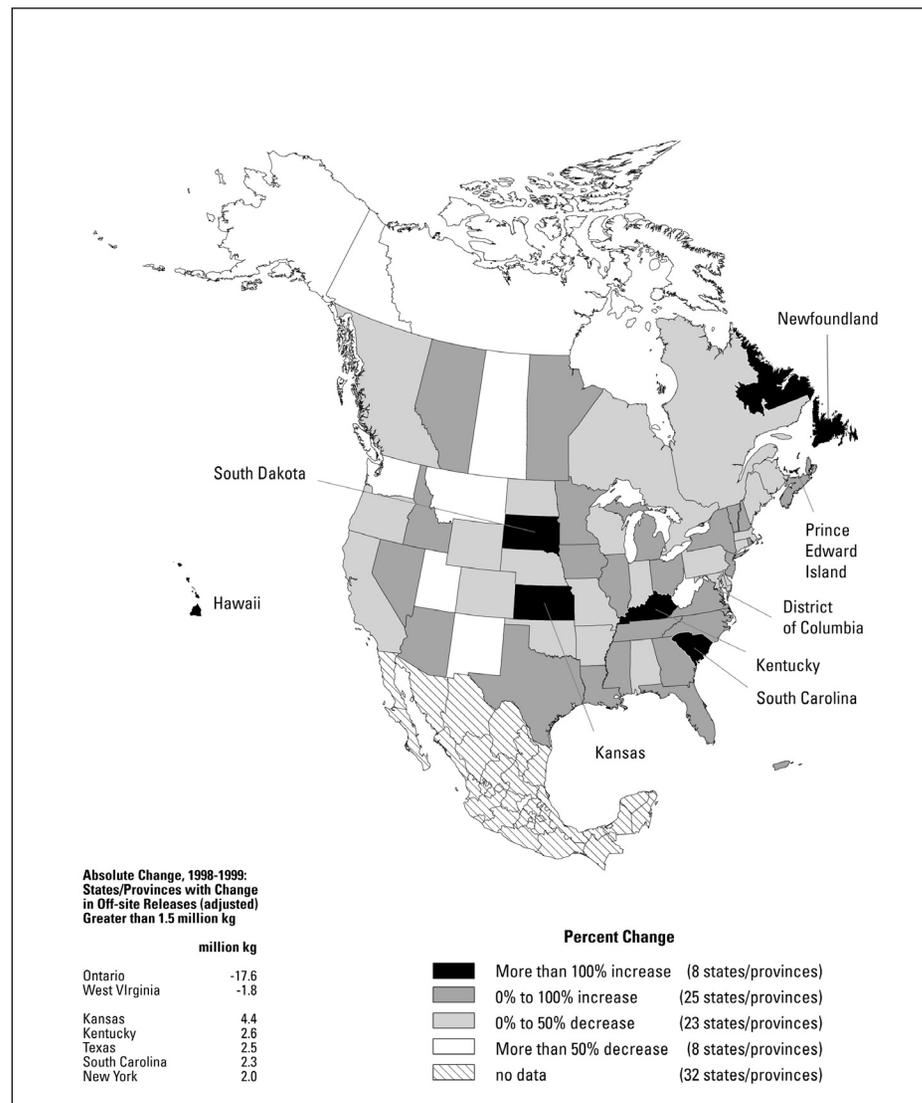
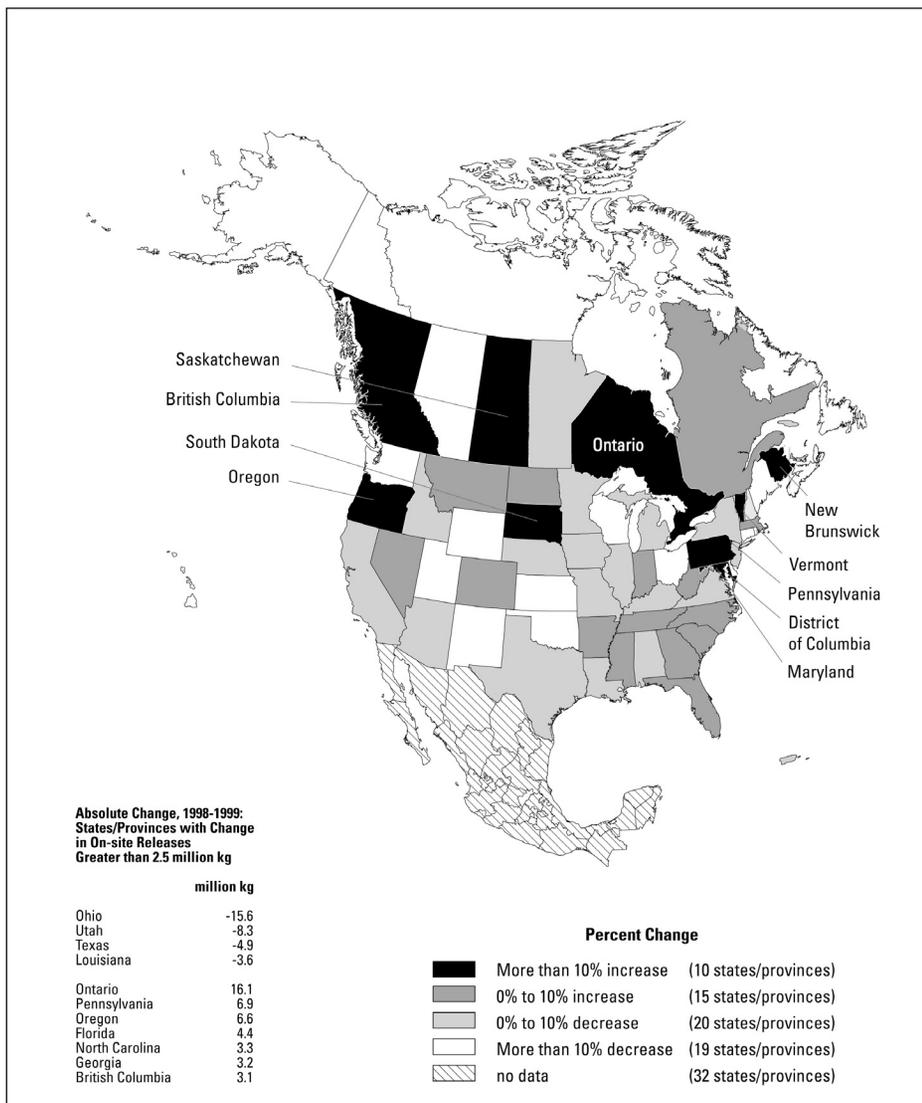
- Ontario had the largest adjusted off-site releases in 1998 but dropped to third-largest in 1999 with a decrease of 17.6 million kg, or 43 percent. This apparent large decrease was a result of reporting by one facility. In 1999, a variety of facilities sent over 10 million kg of zinc to the Safety-Kleen hazardous waste management facility in Corunna, which the facility then reported as released into a landfill on-site. The amount was therefore reported twice, once by a variety of facilities as off-site releases, and once by Safety-Kleen as an on-site release. To adjust for this double reporting, the 10 million kilograms was subtracted from Ontario's off-site releases in 1999. This lowered the province's 1999 off-site releases and resulted in an apparent decrease in off-site releases from 1998 to 1999. In 1998, while large quantities of zinc were reported as off-site releases to Safety-Kleen, these amounts could not be matched to the reporting of on-site releases. Therefore it was not possible to adjust the off-site releases for large quantities of zinc in Ontario in 1998. This change in reporting also accounts for the 33-percent increase in on-site releases in Ontario from 1998 to 1999. Safety-Kleen reported over 10 million kilograms of zinc as an on-site release in 1999 and zero in 1998. Safety-Kleen reported that this change was due to variation in its waste management business.
- Ohio had the largest total releases of any state or province, with 119.4 million kg in 1999, but this amount was 11 percent lower than in 1998. In both years, Ohio was first in on-site releases and fourth in off-site releases.
- Texas had the second-largest total releases in 1999, 106.3 million kg, down 2 percent from 1998. In both 1998 and 1999, Texas was second in on-site releases and seventh in off-site releases.
- Pennsylvania had a 6-percent rise in total releases, from 92.7 million kg in 1998 to 98.5 million kg in 1999. In both years, Pennsylvania had the third-highest on-site releases. It ranked second in off-site releases in 1999, with 24.5 million kg. This amount represented a one-million-kg decrease from 1998.
- Ontario had the fourth-largest total releases in both 1998 and 1999, with 89.6 million kg in 1998 and 88.1 million kg in 1999, a 2-percent decrease.
- Indiana had the fifth-largest total releases in both 1998 and 1999. They increased 3 percent between 1998 and 1999, from 77.4 million kg to 79.5 million kg. Indiana had the highest off-site releases in 1999, with 25.7 million kg, slightly lower than in 1998.

Map 6-1. Percent Change in Total Releases On- and Off-site in North America, 1998-1999



Map 6–2. Percent Change in On-site Releases in North America, 1998–1999

Map 6–3. Percent Change in Off-site Releases in North America, 1998–1999



6.2.2 1998–1999 Releases On- and Off-site by Industry Sector

Data comparing 1998 to 1999 include all industry sectors in the matched data set. Findings by sector include:

- In 1999, as in 1998, the electric utilities sector accounted for the largest total releases in North America. At 458.4 million kg, the amount was 3 percent higher in 1999 than it had been in 1998.
- Primary metals had the second-largest total releases, though the amount declined 8 percent, from 307.8 million kg in 1998 to 282.2 million kg in 1999.
- The chemicals industry, with the third-largest total releases in both years, showed a 3-percent increase in total releases, from 247.7 million kg to 254.8 million kg.
- With the fourth-largest total releases in both years, hazardous waste management/solvent recovery facilities showed a 7-percent decrease; the paper products industry, with the fifth-largest total releases, showed a 1-percent decrease. No other industry had more than 100 million kg in total releases in either year.
- In on-site releases, the rank order for the sectors with the largest on-site releases in 1999 was unchanged from 1998: electric utilities (with 446.6 million kg in 1999, 3 percent higher than in 1998), chemicals (231.5 million kg, a slight increase), and primary metals (185.7 million kg, 8 percent lower than in 1998).

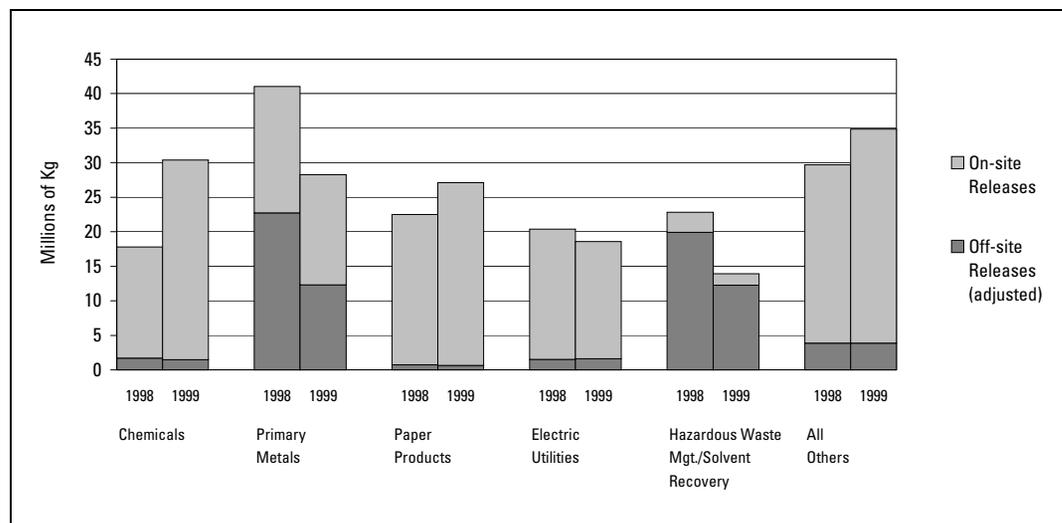
Table 6–3. Change in Total Releases On- and Off-site in North America, by Industry, 1998–1999 (Ordered by Total Releases, 1999)

US SIC Code	Industry	Total On-site Releases				Change 1998–1999 (%)	Total Off-site Releases (adjusted)*				Change 1998–1999 (%)
		1998		1999			1998		1999		
		kg	Rank	kg	Rank		kg	Rank	kg	Rank	
492/493	Electric Utilities	432,897,559	1	446,603,475	1	3	12,800,187	4	11,748,907	4	-8
33	Primary Metals	201,848,724	3	185,660,702	3	-8	105,970,632	1	96,495,885	1	-9
28	Chemicals	230,930,723	2	231,513,791	2	0.3	16,722,308	3	23,335,894	3	40
495/738	Hazardous Waste Mgt./Solvent Recovery	105,898,855	5	100,964,397	5	-5	36,355,912	2	30,954,055	2	-15
26	Paper Products	116,649,599	4	115,718,444	4	-1	2,576,342	10	2,569,695	10	-0.3
30	Rubber and Plastics Products	46,557,177	6	44,621,768	6	-4	4,949,845	8	5,328,498	9	8
37	Transportation Equipment	42,214,282	7	43,096,263	7	2	4,888,905	9	5,366,887	8	10
--	Multiple codes 20–39**	39,903,110	8	41,466,109	8	4	6,659,281	6	5,799,042	7	-13
20	Food Products	29,822,902	10	29,440,148	9	-1	2,234,596	13	2,242,448	11	0.4
34	Fabricated Metals Products	21,831,483	11	21,016,928	11	-4	10,563,922	5	9,961,202	5	-6
29	Petroleum and Coal Products	30,157,448	9	28,391,016	10	-6	2,002,457	14	1,777,304	14	-11
24	Lumber and Wood Products	16,212,685	12	17,456,251	12	8	138,472	19	228,633	20	65
36	Electronic/Electrical Equipment	6,818,969	16	7,062,579	16	4	5,130,126	7	7,870,752	6	53
32	Stone/Clay/Glass Products	12,458,180	13	12,093,448	13	-3	2,307,108	12	1,949,377	13	-16
27	Printing and Publishing	11,104,472	14	11,522,705	14	4	69,303	22	51,065	22	-26
25	Furniture and Fixtures	8,294,394	15	7,309,079	15	-12	72,742	21	144,259	21	98
35	Industrial Machinery	5,310,781	17	3,870,578	19	-27	2,361,091	11	1,958,501	12	-17
39	Misc. Manufacturing Industries	4,489,662	19	4,797,098	17	7	489,154	16	620,391	16	27
22	Textile Mill Products	4,910,219	18	3,930,296	18	-20	334,626	18	310,023	17	-7
38	Measurement/Photographic Instruments	3,941,009	20	3,512,575	20	-11	438,173	17	299,660	18	-32
12	Coal Mining	2,296,032	21	2,258,259	21	-2	0	25	0	25	--
31	Leather Products	506,453	23	373,901	25	-26	977,811	15	949,123	15	-3
23	Apparel and Other Textile Products	155,539	25	875,249	22	463	18,527	23	35,234	23	90
5169	Chemical Wholesalers	461,704	24	429,006	24	-7	88,244	20	287,073	19	225
21	Tobacco Products	619,571	22	571,210	23	-8	1,780	24	260	24	-85
Total		1,376,291,532		1,364,555,275		-1	218,151,544		210,284,168		-4

* Transfers off-site to disposal and transfers of metals do not include transfers sent to other NPRI or TRI facilities that reported them as on-site releases.

** Multiple SIC codes reported only in TRI.

Figure 6–2. Change in NPRI Total Releases On- and Off-site, by Industry, 1998–1999



Note: Off-site releases do not include those also reported as on-site releases by another NPRI or TRI facility.

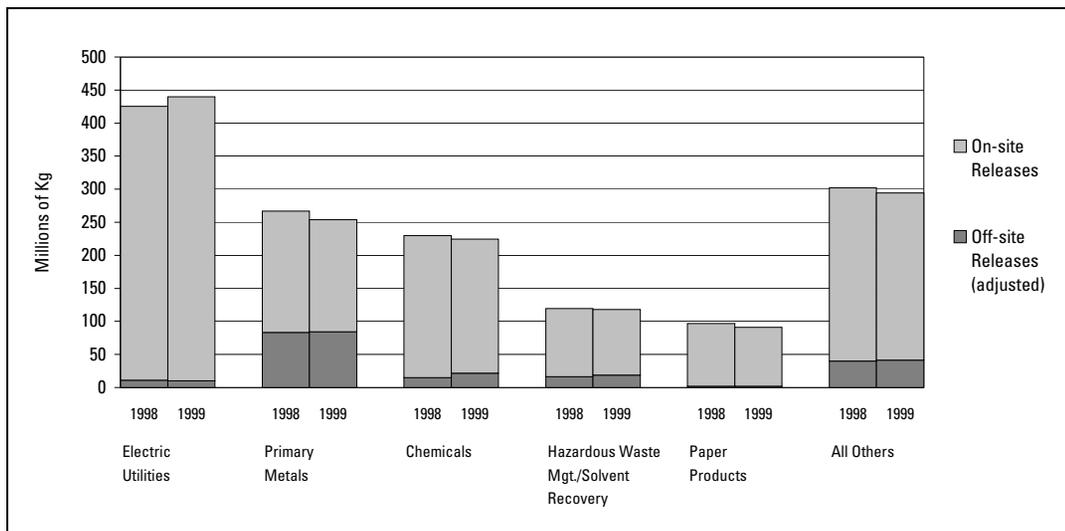
Table 6–3. (continued)

US SIC Code	Industry	Total Releases On- and Off-site (adjusted)*				Change 1998–1999 (%)
		1998		1999		
		kg	Rank	kg	Rank	
492/493	Electric Utilities	445,697,746	1	458,352,382	1	3
33	Primary Metals	307,819,356	2	282,156,587	2	-8
28	Chemicals	247,653,031	3	254,849,685	3	3
495/738	Hazardous Waste Mgt./Solvent Recovery	142,254,767	4	131,918,452	4	-7
26	Paper Products	119,225,941	5	118,288,139	5	-1
30	Rubber and Plastics Products	51,507,022	6	49,950,266	6	-3
37	Transportation Equipment	47,103,187	7	48,463,150	7	3
--	Multiple codes 20–39**	46,562,391	8	47,265,151	8	2
20	Food Products	32,057,498	11	31,682,596	9	-1
34	Fabricated Metals Products	32,395,405	9	30,978,130	10	-4
29	Petroleum and Coal Products	32,159,905	10	30,168,320	11	-6
24	Lumber and Wood Products	16,351,157	12	17,684,884	12	8
36	Electronic/Electrical Equipment	11,949,095	14	14,933,331	13	25
32	Stone/Clay/Glass Products	14,765,288	13	14,042,825	14	-5
27	Printing and Publishing	11,173,775	15	11,573,770	15	4
25	Furniture and Fixtures	8,367,136	16	7,453,338	16	-11
35	Industrial Machinery	7,671,872	17	5,829,079	17	-24
39	Misc. Manufacturing Industries	4,978,816	19	5,417,489	18	9
22	Textile Mill Products	5,244,845	18	4,240,319	19	-19
38	Measurement/Photographic Instruments	4,379,182	20	3,812,235	20	-13
12	Coal Mining	2,296,032	21	2,258,259	21	-2
31	Leather Products	1,484,264	22	1,323,024	22	-11
23	Apparel and Other Textile Products	174,066	25	910,483	23	423
5169	Chemical Wholesalers	549,948	24	716,079	24	30
21	Tobacco Products	621,351	23	571,470	25	-8
Total		1,594,443,076		1,574,839,443		-1

* Total releases do not include transfers sent to other NPRI or TRI facilities that reported them as on-site releases.

** Multiple SIC codes reported only in TRI.

Figure 6–3. Change in TRI Total Releases On- and Off-site, by Industry, 1998–1999



Note: Off-site releases do not include those also reported as on-site releases by another NPRI or TRI facility.

- Primary metals had the largest adjusted off-site releases in both years, with 96.5 million kg in 1999, a decrease of 9 percent over 1998. The hazardous waste management/solvent recovery facilities had the second-largest adjusted off-site releases in both 1998 and 1999, though the amount was lower by 31.9 million kg, or 15 percent.
- For chemicals facilities in NPRI, total releases increased by 71 percent. Other notable changes were a 31-percent drop in total releases by the primary metals industry and a 39-percent decline in total releases from hazardous waste management/solvent recovery facilities.
- Little change took place in total TRI releases between 1998 and 1999; total releases from electric utilities rose by 3 percent, but total releases from the other four top industries and from the “all others” group declined. Total releases from the TRI hazardous waste management/solvent recovery industry declined by 1 percent.

6.2.3 Facilities with Largest Change in Releases On- and Off-site, 1998–1999

Ten facilities in North America—eight in the United States and two in Ontario, Canada—reported the largest reductions in total releases on- and off-site, totalling 33.5 million kg of chemicals. The individual decreases ranged from 2.0 million kg to 5.5 million kg. The following points pertain to these facilities:

- Of the 10 facilities with the largest decreases, three were in the hazardous waste management/solvent recovery industry; four were primary metals facilities; and the others were in the chemical wholesale, chemicals and electric utilities sectors.
- EnviroSAFE Services of Oregon, Ohio, a hazardous waste management facility, reported the largest decrease—5.5 million kg, primarily in on-site land disposal of zinc and its compounds.
- The second-largest decrease was reported by Philips Enterprises of Hamilton, Ontario, also a hazardous waste treatment and transfer facility. It reported decreases of 5.0 million kg, primarily as off-site transfers to disposal of zinc and its compounds.
- The third-largest decrease was 4.7 million kg of chlorine released to air by Magnesium Corporation of America in Rowley, Utah. The decrease was due to reduced production at this facility.

Table 6–4. Facilities in North America with Largest Decrease in Total Reported Releases On- and Off-site, 1998–1999

Rank	Facility	City, State/Province	SIC Codes	
			Canada	US
1	EnviroSAFE Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738
2	Philip Enterprises Inc., Yard 3 Facility, Philip Services Corp.	Hamilton, ON	77	495/738
3	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33
4	EnviroSAFE Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738
5	Co-Steel Lasco	Whitby, ON	29	33
6	Crystal Clean Services L.L.C.	Indianapolis, IN		5169
7	Cytec Inds. Inc., Fortier Plant	Westwego, LA		28
8	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33
9	Republic Techs. Intl. L.L.C., Primary Ops.	Johnstown, PA		33
10	Seminole Generating Station	Palatka, FL		491/493
Total				

Note: Canada and US data only. Mexico data not available for 1998–1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 6–5. Facilities in North America with Largest Increase in Total Reported Releases On- and Off-site, 1998–1999

Rank	Facility	City, State/Province	SIC Code	
			Canada	US
1	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28
2	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738
3	Jayhawk Fine Chemicals Corp., Laporte Fine Chemicals	Galena, KS		28
4	Keystone Station, Reliant Energy Inc.	Sheloceta, PA		491/493
5	Steel Dynamics Inc.	Butler, IN		33
6	U.S. TVA, Johnsonville Fossil Plant, U.S. Tennessee Valley Authority	New Johnsonville, TN		491/493
7	USL City Environmental Inc., U.S. Liquids Inc.	Detroit, MI		495/738
8	Wansley Steam Electric Generating Plant	Roopville, GA		491/493
9	Gulf Power Co., Plant Crist, Southern Co.	Pensacola, FL		491/493
10	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33
Total				

Note: Canada and US data only. Mexico data not available for 1998–1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 6–4. (continued)

Rank	1998		1999		Change in Total Releases 1998-1999 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases) (chemicals accounting for more than 70% of decrease in total releases from the facility)
	Number of Forms	Total Reported Releases On- and Off-site (kg)	Number of Forms	Total Reported Releases On- and Off-site (kg)		
1	11	22,918,608	10	17,465,186	-5,453,422	Zinc and compounds (land)
2	8	8,576,167	6	3,604,190	-4,971,977	Zinc and compounds (transfers of metals)
3	5	26,163,746	6	21,471,752	-4,691,994	Chlorine (air)
4	13	14,100,227	9	10,856,785	-3,243,442	Zinc/Lead and compounds (land)
5	6	7,063,650	5	4,170,767	-2,892,883	Zinc and compounds (transfers of metals)
6	13	2,707,324	1	0	-2,707,324	Nickel/Zinc/Copper and compounds (transfers of metals)
7	22	7,667,373	23	5,106,363	-2,561,010	Acetonitrile, Acrylic acid (UIJ)
8	16	15,446,345	18	12,893,911	-2,552,434	Copper/Zinc and compounds (land)
9	6	2,434,641	6	6,004	-2,428,637	Zinc and compounds (transfers of metals)
10	11	4,793,744	11	2,775,027	-2,018,717	Sulfuric acid (air)
	111	111,871,825	95	78,349,985	-33,521,840	

UIJ = Underground injection.

Table 6–5. (continued)

Rank	1998		1999		Change in Total Releases 1998-1999 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (Chemicals accounting for more than 70% of increase in total releases from the facility)
	Number of Forms	Total Reported Releases On- and Off-site (kg)	Number of Forms	Total Reported Releases On- and Off-site (kg)		
1	18	152,090	15	15,378,584	15,226,494	Zinc and compounds (land)
2	25	10,504,405	35	18,012,829	7,508,424	Aluminum oxide (land)
3	13	825,162	16	6,342,694	5,517,532	Nitric acid and nitrate compounds (transfers to disposal)
4	10	4,178,470	10	9,303,002	5,124,532	Hydrochloric acid (air)
5	3	4,653,338	8	9,590,376	4,937,038	Aluminum, Zinc and compounds (transfers of metals)
6	12	2,766,314	12	6,868,431	4,102,117	Hydrochloric acid (air)
7	11	209,042	8	3,964,052	3,755,010	Zinc/Lead and compounds (transfers of metals)
8	13	3,338,945	13	6,598,389	3,259,444	Hydrochloric acid (air)
9	11	4,346,736	11	7,305,426	2,958,690	Hydrochloric acid (air)
10	13	9,466,279	13	12,325,557	2,859,278	Zinc and compounds (transfers of metals)
	129	40,440,781	141	95,689,340	55,248,559	

The ten facilities with the largest increases in total releases accounted for increases of 55.2 million kg:

- The facility with the largest increase was in the chemical industry: Safety-Kleen Ltd. in Corunna, Ontario, which reported a rise of 15.2 million kg. The facility reported that the increases in on-site disposal were due to variation in its waste management business.
- Chemical Waste Management of the Northwest Inc. in Arlington, Oregon reported the second-largest increase—7.5 million kg, primarily in on-site land disposal of aluminum oxide.
- Jayhawk Fine Chemicals in Galena, Kansas, reported an increase of 5.5 million kg, primarily of transfers to disposal of nitric acid and nitrate compounds. The facility cited a change in reporting requirements as the cause of the increase.
- Four of the 10 facilities with the largest increases were electric utilities, two were hazardous waste management/solvent recovery facilities, two were chemical manufacturing facilities, and two were in the primary metals industry.

6.2.4 1998–1999 Releases

On- and Off-site by Chemical

The 1998 matched data set includes 165 chemicals reported by both NPRI and TRI facilities. It does not include those chemicals added to the NPRI list for the 1999 reporting year. (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.)

- Of the 10 chemicals with the largest reductions in total releases on- and off-site between 1998 and 1999, four were metals or metal compounds and two—friable asbestos and lead—were carcinogens.
- The largest decreases in amount were for manganese and its compounds (a 9.0-million-kg decrease), sulfuric acid (8.4 million kg), and zinc and its compounds (7.6 million kg).
- The 10 chemicals with the largest increases over the same period include one metal (aluminum) and three carcinogens: formaldehyde (fifth in size of increase), styrene (sixth) and acrylamide (ninth).
- The largest increases were for hydrochloric acid, (a 25.2-million-kg increase), nitric acid and nitrate compounds (11.9 million kg), and fibrous forms of aluminum oxide (7.3 million kg). No other chemical increased by more than 4 million kg.

Table 6–6. The 10 Chemicals with the Largest Decrease in Total Releases On- and Off-site in North America, 1998–1999

Rank	CAS Number	Chemical	Total Releases On- and Off-site (adjusted)*		Change 1998–1999 kg	%
			1998 (kg)	1999 (kg)		
1	--	Manganese (and its compounds)*	96,175,411	87,209,592	-8,965,819	-9
2	7664-93-9	Sulfuric acid	97,407,760	89,034,766	-8,372,994	-9
3	--	Zinc (and its compounds)*	215,339,313	207,709,045	-7,630,268	-4
4	--	Copper (and its compounds)*	51,739,096	45,700,758	-6,038,338	-12
5	7782-50-5	Chlorine	28,096,886	23,108,275	-4,988,611	-18
6	1332-21-4	Asbestos (friable)▼	15,418,984	11,433,119	-3,985,865	-26
7	--	Lead (and its compounds)*▼	44,001,212	40,385,719	-3,615,493	-8
8	75-15-0	Carbon disulfide	19,726,560	16,367,928	-3,358,632	-17
9	108-88-3	Toluene	53,266,930	50,130,901	-3,136,029	-6
10	74-85-1	Ethylene	16,507,846	13,669,337	-2,838,509	-17

Note: Canada and US data only. Mexico data not available for 1998–1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

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

Table 6–7. The 10 Chemicals with the Largest Increase in Total Releases On- and Off-site in North America, 1998–1999

Rank	CAS Number	Chemical	Total Releases On- and Off-site (adjusted)*		Change 1998–1999 kg	%
			1998 (kg)	1999 (kg)		
1	7647-01-0	Hydrochloric acid	288,464,621	313,645,594	25,180,973	9
2	--	Nitric acid and nitrate compounds	142,708,127	154,558,452	11,850,325	8
3	1344-28-1	Aluminum oxide (fibrous forms)	8,878,003	16,177,933	7,299,930	82
4	7429-90-5	Aluminum (fume or dust)*	7,257,896	11,075,871	3,817,975	53
5	50-00-0	Formaldehyde▼	11,664,652	12,670,851	1,006,199	9
6	100-42-5	Styrene▼	27,118,364	28,120,168	1,001,804	4
7	80-62-6	Methyl methacrylate	1,467,427	2,297,083	829,656	57
8	107-21-1	Ethylene glycol	5,124,415	5,692,191	567,776	11
9	79-06-1	Acrylamide▼	2,887,686	3,423,753	536,067	19
10	74-90-8	Hydrogen cyanide	927,766	1,461,249	533,483	58

Note: Canada and US data only. Mexico data not available for 1998–1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

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

Table 6–8. Change in Total Releases On- and Off-site of Known or Suspected Carcinogens in North America, 1998–1999

CAS Number	Chemical	Total Releases On- and Off-site (adjusted)**			
		1998 (kg)	1999 (kg)	Change 1998–1999 kg	%
1332-21-4	Asbestos (friable)	15,418,984	11,433,119	-3,985,865	-26
--	Lead (and its compounds)*	44,001,212	40,385,719	-3,615,493	-8
--	Nickel (and its compounds)*	20,736,801	18,298,524	-2,438,277	-12
75-09-2	Dichloromethane	20,944,678	18,971,238	-1,973,440	-9
--	Cadmium (and its compounds)*	4,108,406	2,438,900	-1,669,506	-41
79-01-6	Trichloroethylene	6,838,174	5,567,328	-1,270,846	-19
--	Chromium (and its compounds)*	43,090,216	42,223,041	-867,175	-2
127-18-4	Tetrachloroethylene	2,647,983	1,923,924	-724,059	-27
67-66-3	Chloroform	3,275,721	2,679,384	-596,337	-18
106-99-0	1,3-Butadiene	1,354,559	959,797	-394,762	-29
--	Cobalt (and its compounds)*	2,885,833	2,698,291	-187,542	-6
98-95-3	Nitrobenzene	234,315	160,078	-74,237	-32
75-21-8	Ethylene oxide	345,070	275,630	-69,440	-20
117-81-7	Di(2-ethylhexyl) phthalate	675,812	607,597	-68,215	-10
75-01-4	Vinyl chloride	459,170	410,564	-48,606	-11
106-89-8	Epichlorohydrin	104,115	68,707	-35,408	-34
95-80-7	2,4-Diaminotoluene	25,406	653	-24,753	-97
56-23-5	Carbon tetrachloride	147,744	131,199	-16,545	-11
139-13-9	Nitrilotriacetic acid	13,516	5,901	-7,615	-56
26471-62-5	Toluenediisocyanate (mixed isomers)	41,379	35,221	-6,158	-15
62-56-6	Thiourea	4,160	1,271	-2,889	-69
75-56-9	Propylene oxide	360,153	357,534	-2,619	-1
106-88-7	1,2-Butylene oxide	8,608	6,363	-2,245	-26
100-44-7	Benzyl chloride	14,854	13,452	-1,402	-9
79-46-9	2-Nitropropane	11,150	10,146	-1,004	-9
77-78-1	Dimethyl sulfate	5,405	4,575	-830	-15
96-09-3	Styrene oxide	347	3	-344	-99
96-45-7	Ethylene thiourea	3,035	2,944	-91	-3
90-94-8	Michler's ketone	232	394	162	70
91-08-7	Toluene-2,6-diisocyanate	1,199	1,734	535	45
106-46-7	1,4-Dichlorobenzene	94,246	96,281	2,035	2
101-77-9	4,4'-Methylenedianiline	32,736	35,474	2,738	8
120-80-9	Catechol	14,244	17,970	3,726	26
94-59-7	Safrole	5	4,321	4,316	86,320
101-14-4	4,4'-Methylenebis(2-chloroaniline)	14	5,742	5,728	40,914
67-72-1	Hexachloroethane	21,508	32,428	10,920	51
64-67-5	Diethyl sulfate	2,886	17,350	14,464	501
606-20-2	2,6-Dinitrotoluene	242	14,918	14,676	6,064
140-88-5	Ethyl acrylate	63,609	80,536	16,927	27
302-01-2	Hydrazine	19,999	47,369	27,370	137
121-14-2	2,4-Dinitrotoluene	6,358	44,350	37,992	598
123-91-1	1,4-Dioxane	343,083	478,995	135,912	40
107-06-2	1,2-Dichloroethane	434,834	609,687	174,853	40
71-43-2	Benzene	5,079,623	5,261,729	182,106	4
584-84-9	Toluene-2,4-diisocyanate	5,065	231,726	226,661	4,475
107-13-1	Acrylonitrile	2,350,768	2,593,234	242,466	10
108-05-4	Vinyl acetate	2,044,393	2,379,201	334,808	16
75-07-0	Acetaldehyde	6,385,421	6,737,489	352,068	6
--	Arsenic (and its compounds)*	9,978,482	10,357,197	378,715	4
79-06-1	Acrylamide	2,887,686	3,423,753	536,067	19
100-42-5	Styrene	27,118,364	28,120,168	1,001,804	4
50-00-0	Formaldehyde	11,664,652	12,670,851	1,006,199	9
	Subtotal	236,306,455	223,892,632	-12,413,823	-5
	% of Total	15	14	63	
	Total for Matched Chemicals	1,594,443,076	1,574,839,443	-19,603,633	-1

Note: Canada and US data only. Mexico data not available for 1998–1999. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP).

* Metal and its compounds.

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

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/>>. (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.)

- Total releases on- and off-site of known or suspected carcinogens fell by 5 percent between 1998 and 1999, from 236.3 million kg to 223.9 million kg.
- The largest absolute decreases (more than 1 million kg each) were for, in descending order, friable asbestos (4.0 million kg), lead and its compounds, nickel and its compounds, dichloromethane, cadmium and its compounds and trichloroethylene.
- The largest total increases (about 1 million kg each) were for formaldehyde and styrene.
- Known or suspected carcinogens made up 15 percent of total releases in 1998 and 14 percent in 1999. The 12.4 million kg reduction in carcinogen releases represented 63 percent of the 19.6 million kg decline in total releases on- and off-site of all chemicals in the matched data set.

6.3 1998–1999 Transfers to Recycling in North America

This section presents information on changes in transfers of chemicals for recycling for 1998 and 1999. It includes all industry sectors in the matched data set and those chemicals that were reportable for both 1998 and 1999:

- North American off-site transfers to recycling rose 1 percent between 1998 and 1999, from 1.03 billion kg to 1.04 billion kg.
- Transfers to recycling in NPRI fell 18 percent, mainly as a result of a steep (21 percent) decline in transfers to recycling of metals, from 118.3 million kg to 94.0 million kg.
- Transfers to recycling in TRI rose 4 percent, due primarily to a 5-percent increase in transfers to recycling of metals, from 769.1 million kg to 808.0 million kg.

Table 6–9. Summary of Total Transfers to Recycling in North America, NPRI and TRI, 1998–1999

	North America		Change 1998–1999 (%)
	1998 Number	1999 Number	
Total Facilities	21,554	21,056	-2
Total Forms	71,242	70,154	-2
	kg	kg	
Off-site Transfers to Recycling	1,028,269,596	1,040,540,267	1
Transfers to Recycling of Metals	887,408,505	901,927,543	2
Transfers to Recycling (except metals)	140,861,091	138,612,724	-2

Note: Canada and US data only. Mexico data not available for 1998–1999. Data include 165 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 6–4. Change in Transfers to Recycling in North America, NPRI and TRI, 1998–1999

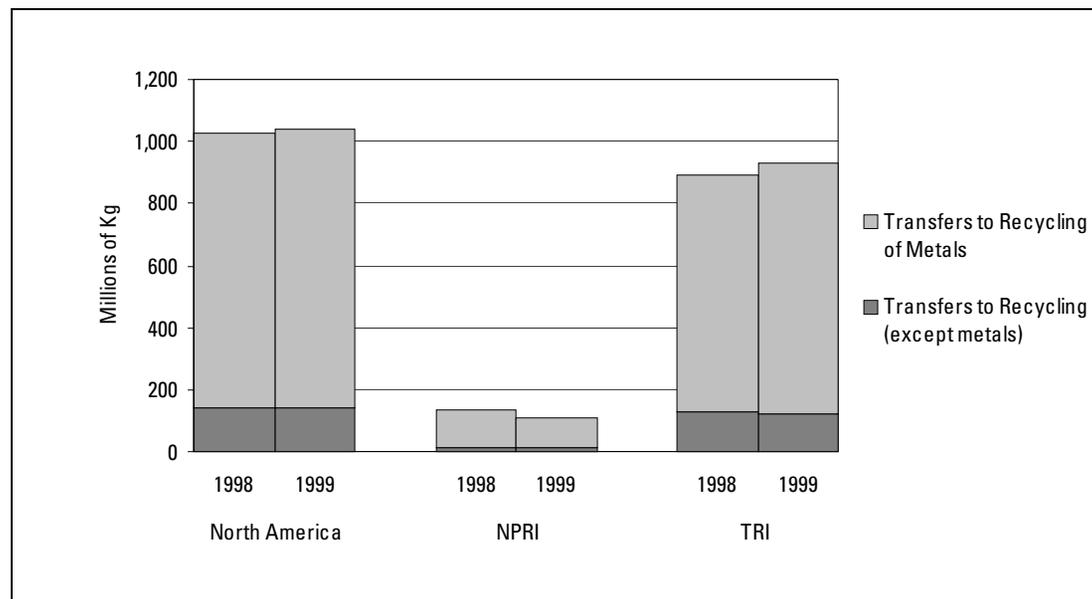


Table 6–9. (continued)

	NPRI			TRI		
	1998 Number	1999 Number	Change 1998–1999 (%)	1998 Number	1999 Number	Change 1998–1999 (%)
Total Facilities	1,510	1,611	7	20,044	19,445	-3
Total Forms	5,096	5,509	8	66,146	64,645	-2
	kg	kg		kg	kg	
Off-site Transfers to Recycling	133,153,379	108,707,063	-18	895,116,217	931,833,204	4
Transfers to Recycling of Metals	118,331,581	93,959,478	-21	769,076,924	807,968,065	5
Transfers to Recycling (except metals)	14,821,798	14,747,585	-1	126,039,293	123,865,139	-2

6.3.1 1998–1999 Transfers to Recycling by State and Province

In 1999, 32 states and provinces had lower transfers to recycling than in 1998, 30 had higher transfers, and the remaining two reported no change or no such transfers:

- Ontario reported the largest transfers to recycling in both 1998 and 1999, with 81.2 million kg in 1999. Its total transfers declined by 21 percent between 1998 and 1999, the result of a 24-percent decrease in transfers to recycling of metals, from 91.7 million kg to 69.7 million kg. Ontario reported a 10-percent rise in transfers to recycling of non-metals from 1998 to 1999.
- For both total transfers to recycling and recycling of metals, Ohio was in second place both years. Its total transfers to recycling decreased by 2 percent between 1998 and 1999, and its recycling of metals, by 3 percent.
- Third in total transfers to recycling was Pennsylvania, with the amount rising by 30 percent from 1998 to 1999. The state had the highest transfers to recycling of metals in 1999, with a 30-percent increase from the amount in 1998.
- Indiana was fourth in 1999 in both total transfers and transfers to recycling of metals; in 1998, it had the third-largest recycling in both categories.
- In transfers to recycling (except metals), the three top jurisdictions in 1999 were Texas, with 15.3 million kg (an increase of 48 percent over 1998); Louisiana, which had been first in 1998; and, in third place, Ontario.

Table 6–10. Change in Transfers to Recycling in North America, by State and Province, 1998–1999

State/Province	Transfers to Recycling of Metals					Transfers to Recycling (except metals)				
	1998	1999	Change 1998–1999	1998	1999	Change 1998–1999	1998	1999	Change 1998–1999	
	kg	kg	(%)	kg	kg	(%)	kg	kg	(%)	
Alabama	18,709,721	21,566,225	15	20	1,193,030	27	535,898	30	-55	
Alaska	11,791	0	-100	--	510	57	726	58	42	
Alberta	1,429,756	1,475,002	3	43	1,682,070	25	788,932	26	-53	
Arizona	11,154,161	17,185,901	54	20	169,412	39	497,217	31	193	
Arkansas	19,394,739	23,813,172	23	14	303,669	37	129,991	39	-57	
British Columbia	268,851	362,783	35	51	217,406	38	480,480	33	121	
California	27,680,207	28,334,928	2	11	3,259,531	16	5,929,087	9	82	
Colorado	8,699,134	7,383,064	-15	33	127,800	41	125,360	41	-2	
Connecticut	8,213,878	8,683,011	6	29	335,590	36	183,123	38	-45	
Delaware	4,285,947	3,142,061	-27	39	1,127,546	28	957,592	24	-15	
District of Columbia	3,311	5,708	72	59	0	--	0	--	--	
Florida	8,979,423	8,164,720	-9	31	339,095	34	382,049	35	13	
Georgia	20,147,728	21,198,501	5	17	3,466,056	14	2,426,081	17	-30	
Guam	0	0	--	--	0	--	0	--	--	
Hawaii	21,571	0	-100	--	23,789	51	0	--	-100	
Idaho	804,379	664,413	-17	48	12,369	53	10,433	52	-16	
Illinois	31,957,139	32,994,281	3	8	6,300,748	9	6,479,893	8	3	
Indiana	65,688,863	63,940,189	-3	4	6,658,963	7	7,415,908	7	11	
Iowa	22,614,620	16,036,606	-29	22	527,683	32	567,275	28	8	
Kansas	27,362,199	31,841,497	16	10	2,785,283	19	2,404,407	18	-14	
Kentucky	19,842,903	14,386,150	-27	24	2,930,876	18	5,473,152	10	87	
Louisiana	8,190,691	7,115,116	-13	34	14,128,478	1	14,812,209	2	5	
Maine	931,347	903,065	-3	47	47,349	50	47,085	46	-1	
Manitoba	3,051,696	1,111,284	-64	44	60	59	89,745	42	149,475	
Maryland	1,560,327	1,506,834	-4	42	437,085	33	566,688	29	30	
Massachusetts	9,710,711	9,441,126	-3	27	1,381,737	26	871,358	25	-37	
Michigan	40,356,972	44,706,819	11	5	10,355,759	4	9,943,705	5	-4	
Minnesota	8,075,899	9,091,117	13	28	1,932,797	23	1,470,091	23	-24	
Mississippi	6,977,570	8,275,514	19	30	993,202	29	414,645	34	-58	
Missouri	22,681,194	22,763,193	15	15	3,644,714	12	2,652,145	15	-27	
Montana	22,548	94,606	320	58	69	58	13,971	51	20,148	
Nebraska	10,830,918	18,667,224	72	19	81,633	43	62,389	44	-24	
Nevada	1,209,181	998,785	-17	46	2,308	56	3,268	55	42	
New Brunswick	154,154	160,425	5	55	64,149	47	1,912	57	-97	
New Hampshire	5,837,993	6,849,342	17	35	66,223	45	85,959	43	30	
New Jersey	15,105,245	14,692,727	-3	23	3,460,186	15	2,122,853	20	-39	
New Mexico	63,594	1,963,535	2,988	40	19,560	52	35,473	48	81	
New York	34,624,762	32,453,338	-6	9	2,348,623	20	2,333,329	19	-1	
Newfoundland	0	4,500	--	60	0	--	0	--	--	
North Carolina	27,984,169	24,414,506	-13	12	8,774,104	6	8,919,430	6	2	
North Dakota	307,396	245,777	-20	54	3,678	55	4,468	54	21	
Nova Scotia	1,657,767	273,265	-84	53	5,149	54	5,951	53	16	
Ohio	71,507,324	69,710,434	-3	2	10,662,126	2	10,656,863	4	-0.05	
Oklahoma	9,095,830	9,916,444	9	26	924,073	30	484,572	32	-48	
Ontario	91,714,412	69,670,267	-24	3	10,440,992	3	11,516,358	3	10	
Oregon	6,306,386	8,071,735	28	32	167,669	40	187,941	37	12	
Pennsylvania	58,659,051	76,156,449	30	1	2,017,657	22	2,497,002	16	24	
Prince Edward Island	0	0	--	--	0	--	0	--	--	
Puerto Rico	1,676,433	3,837,622	129	37	4,245,218	10	4,325,805	11	2	
Quebec	19,635,780	20,432,090	4	18	2,343,944	21	1,849,164	21	-21	
Rhode Island	1,899,825	1,690,591	-11	41	3,178,279	17	25,081	49	-99	
Saskatchewan	419,165	469,862	12	49	68,028	44	15,043	50	-78	
South Carolina	14,691,315	16,870,362	15	21	6,445,107	8	2,758,753	14	-57	
South Dakota	400,383	321,502	-20	52	65,475	46	49,181	45	-25	
Tennessee	28,664,437	33,090,756	15	7	4,009,549	11	3,129,306	13	-22	
Texas	49,664,432	40,930,764	-18	6	10,318,447	5	15,318,591	1	48	
Utah	1,058,869	1,037,010	-2	45	105,113	42	126,037	40	20	
Vermont	175,339	469,836	168	50	61,526	48	39,916	47	-35	
Virgin Islands	24,472	69,508	184	57	50,601	49	2,757	56	-95	
Virginia	7,911,216	10,662,659	35	25	1,701,652	24	1,475,427	22	-13	
Washington	1,934,080	4,402,831	128	36	879,677	31	732,784	27	-17	
West Virginia	2,539,355	3,262,893	28	38	336,451	35	290,954	36	-14	
Wisconsin	22,206,446	23,902,303	8	13	3,631,197	13	3,886,459	12	7	
Wyoming	619,500	41,315	-93	58	21	60	452	59	2,052	
Total	887,408,505	901,927,543	2	2	140,861,091	138,612,724	138,612,724	138,612,724	-2	

Note: Canada and US data only. Mexico data not available for 1998–1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 to recycling are from facilities located in the state/province.

Table 6–10. (continued)

State/Province	Total Transfers to Recycling						Change 1998–1999 (%)
	1998		1999				
	kg	Rank	kg	Rank			
Alabama	19,902,751	21	22,102,123	18			11
Alaska	12,301	60	726	61			-94
Alberta	3,111,826	39	2,263,934	40			-27
Arizona	11,323,573	24	17,683,118	23			56
Arkansas	19,698,408	22	23,943,163	15			22
British Columbia	486,257	51	843,263	48			73
California	30,939,738	11	34,264,015	10			11
Colorado	8,826,934	31	7,508,424	35			-15
Connecticut	8,549,468	32	8,866,134	30			4
Delaware	5,413,493	37	4,099,653	38			-24
District of Columbia	3,311	61	5,708	59			72
Florida	9,318,518	30	8,546,769	32			-8
Georgia	23,613,784	15	23,624,582	16			0.05
Guam	0	--	0	--			--
Hawaii	45,360	58	0	--			-100
Idaho	816,748	48	674,846	49			-17
Illinois	38,257,887	7	39,474,174	7			3
Indiana	72,347,826	3	71,356,097	4			-1
Iowa	23,142,303	16	16,603,881	25			-28
Kansas	30,147,482	12	34,245,904	11			14
Kentucky	22,773,779	17	19,859,302	20			-13
Louisiana	22,319,169	18	21,927,325	19			-2
Maine	978,696	47	950,150	47			-3
Manitoba	3,051,756	40	1,201,029	44			-61
Maryland	1,997,412	43	2,073,522	41			4
Massachusetts	11,092,448	25	10,312,484	29			-7
Michigan	50,712,731	6	54,650,524	6			8
Minnesota	10,008,696	28	10,561,208	27			6
Mississippi	7,970,772	33	8,690,159	31			9
Missouri	26,325,908	13	25,415,338	14			-3
Montana	22,617	59	108,577	56			380
Nebraska	10,912,551	26	18,729,613	22			72
Nevada	1,211,489	45	1,002,053	46			-17
New Brunswick	218,303	55	162,337	55			-26
New Hampshire	5,904,216	36	6,935,301	36			17
New Jersey	18,565,431	23	16,815,580	24			-9
New Mexico	83,154	56	1,999,008	42			2,304
New York	36,973,385	8	34,786,667	9			-6
Newfoundland	0	--	4,500	60			--
North Carolina	36,758,273	9	33,333,936	12			-9
North Dakota	311,074	53	250,245	54			-20
Nova Scotia	1,662,916	44	279,216	53			-83
Ohio	82,169,450	2	80,367,297	2			-2
Oklahoma	10,019,903	27	10,401,016	28			4
Ontario	102,155,404	1	81,186,625	1			-21
Oregon	6,474,055	34	8,259,676	33			28
Pennsylvania	60,676,708	4	78,653,451	3			30
Prince Edward Island	0	--	0	--			--
Puerto Rico	5,921,651	35	8,163,427	34			38
Quebec	21,979,724	19	22,281,254	17			1
Rhode Island	5,078,104	38	1,715,672	43			-66
Saskatchewan	487,193	50	484,905	51			-0.5
South Carolina	21,136,422	20	19,629,115	21			-7
South Dakota	465,858	52	370,683	52			-20
Tennessee	32,673,986	10	36,220,062	8			11
Texas	59,982,879	5	56,249,355	5			-6
Utah	1,163,982	46	1,163,047	45			-0.1
Vermont	236,865	54	509,752	50			115
Virgin Islands	75,073	57	72,265	57			-4
Virginia	9,612,868	29	12,138,086	26			26
Washington	2,813,757	42	5,135,615	37			83
West Virginia	2,875,806	41	3,553,847	39			24
Wisconsin	25,837,643	14	27,788,762	13			8
Wyoming	619,521	49	41,767	58			-93
Total	1,028,269,596		1,040,540,267				1

6.3.2 1998–1999 Transfers to Recycling by Industry Sector

The seven industry sectors with the largest total transfers to recycling kept the same relative rankings in 1999 as in 1998:

- Primary metals had the highest amount in 1999: 368.2 million kg, or 5 percent more than in 1998. Next were fabricated metals products, with a 1-percent decrease, to 202.4 million kg in 1999, and electronic/electrical equipment, with a decrease of 8 percent, to 165.0 million kg.
- Eleven industries reported increases in transfers to recycling. Transfers by the apparel and other textile products industry rose from less than 5,000 kg to almost half a million kg—an increase of 10,477 percent. Recycling by hazardous waste management/solvent recovery facilities rose less dramatically, by 24 percent, from 9.1 million kg to 11.2 million kg.
- In 1999, as in 1998, primary metals, fabricated metals products, and electronic/electrical equipment were the top three industries in transfers to recycling of metals. As would be expected, the greatest share by far of their transfers to recycling was in this category.
- In transfers to recycling (except metals), the chemical manufacturing sector was first in 1999 (with a 3-percent increase), followed by transportation equipment (a 2-percent increase). These rankings were the same as in 1998.

Table 6–11. Change in Transfers to Recycling in North America, by Industry, 1998–1999 (Ordered by Total Transfers to Recycling, 1999)

SIC Code	Industry	Transfers to Recycling of Metals				Change 1998–1999 (%)	Transfers to Recycling (except metals)				Change 1998–1999 (%)
		1998		1999			1998		1999		
		kg	Rank	kg	Rank		kg	Rank	kg	Rank	
33	Primary Metals	348,014,903	1	363,567,846	1	4	2,164,084	10	4,640,644	7	114
34	Fabricated Metals Products	196,997,606	2	196,106,856	2	-0.5	6,640,137	6	6,315,541	6	-5
36	Electronic/Electrical Equipment	176,792,635	3	161,837,662	3	-8	2,704,987	9	3,134,932	10	16
28	Chemicals	10,406,658	7	10,184,892	7	-2	64,374,768	1	66,279,807	1	3
--	Multiple codes 20–39*	56,857,273	4	68,568,059	4	21	12,718,522	3	6,357,665	5	-50
37	Transportation Equipment	42,236,473	5	46,466,750	5	10	17,380,350	2	17,720,812	2	2
35	Industrial Machinery	31,135,848	6	32,534,258	6	4	1,495,177	14	1,194,304	15	-20
495/738	Hazardous Waste Mgt./Solvent Recovery	2,350,571	11	3,027,111	9	29	6,731,026	5	8,194,033	4	22
29	Petroleum and Coal Products	1,195,573	16	1,333,601	14	12	7,960,166	4	8,669,998	3	9
39	Misc. Manufacturing Industries	7,705,578	8	6,399,736	8	-17	1,526,901	13	1,685,462	14	10
30	Rubber and Plastics Products	2,471,664	10	2,595,521	10	5	6,279,862	7	3,339,200	9	-47
38	Measurement/Photographic Instruments	2,830,138	9	2,551,022	11	-10	2,157,172	11	1,895,837	11	-12
27	Printing and Publishing	370,368	17	444,471	17	20	3,161,570	8	3,811,161	8	21
25	Furniture and Fixtures	2,238,779	12	1,194,312	15	-47	2,030,441	12	1,705,794	13	-16
491/493	Electric Utilities	1,903,655	13	2,357,847	12	24	4,667	22	2,584	23	-45
32	Stone/Clay/Glass Products	1,890,294	14	1,678,967	13	-11	62,199	20	94,635	20	52
5169	Chemical Wholesalers	4,341	22	4,508	23	4	1,137,299	15	1,734,353	12	52
26	Paper Products	310,734	18	225,178	18	-28	1,100,191	16	541,109	16	-51
20	Food Products	1,459,187	15	628,795	16	-57	81,901	19	41,326	21	-50
22	Textile Mill Products	37,897	21	57,622	20	52	687,308	17	502,117	17	-27
23	Apparel and Other Textile Products	1,361	23	50,085	21	3,580	2,905	24	401,150	18	13,709
24	Lumber and Wood Products	52,524	20	14,888	22	-72	436,397	18	347,152	19	-20
31	Leather Products	144,445	19	97,556	19	-32	3,227	23	45	24	-99
12	Coal Mining	0	--	0	--	--	19,834	21	3,063	22	-85
21	Tobacco Products	0	--	0	--	--	0	25	0	25	--
Total		887,408,505		901,927,543		2	140,861,091		138,612,724		-2

* Multiple SIC codes reported only in TRI.

Figure 6–5. Change in NPRI Transfers to Recycling, by Industry, 1998–1999

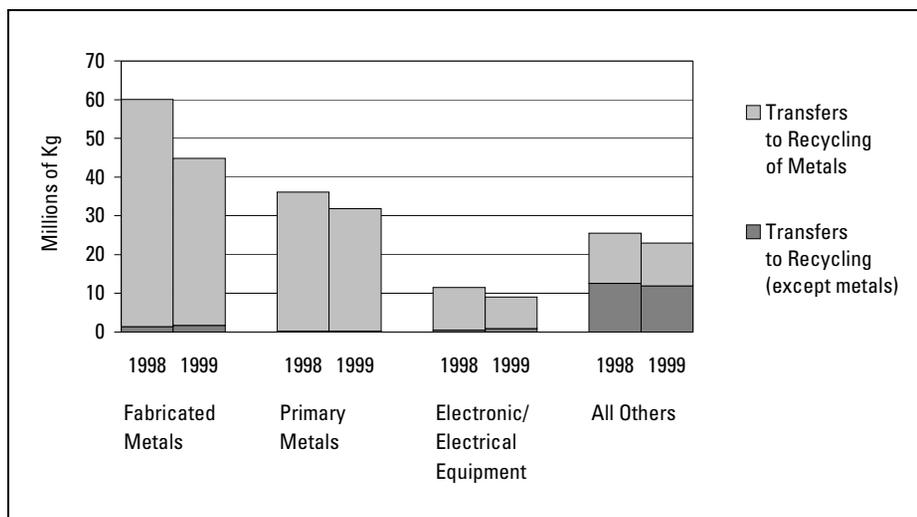


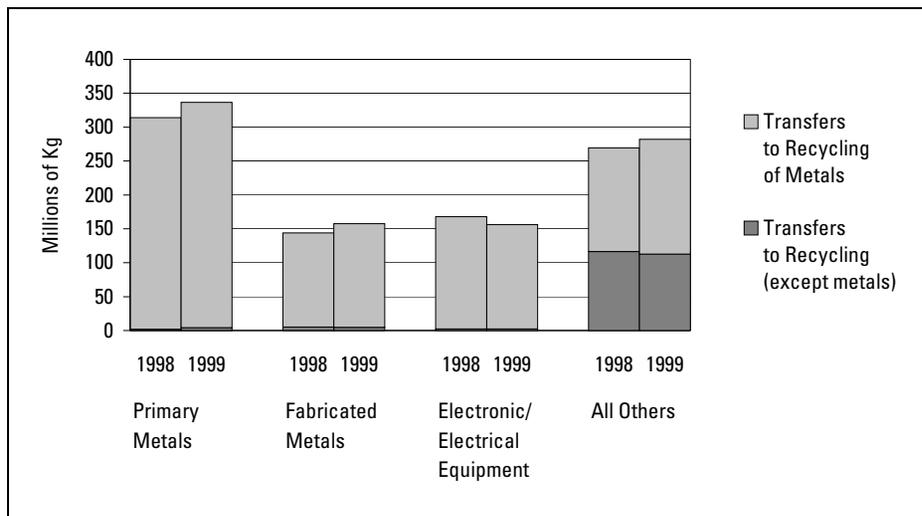
Table 6–11. (continued)

SIC Code	Industry	Total Transfers to Recycling				Change 1998–1999 (%)
		1998		1999		
		kg	Rank	kg	Rank	
33	Primary Metals	350,178,987	1	368,208,490	1	5
34	Fabricated Metals Products	203,637,743	2	202,422,397	2	-1
36	Electronic/Electrical Equipment	179,497,622	3	164,972,594	3	-8
28	Chemicals	74,781,426	4	76,464,699	4	2
--	Multiple codes 20–39*	69,575,795	5	74,925,724	5	8
37	Transportation Equipment	59,616,823	6	64,187,562	6	8
35	Industrial Machinery	32,631,025	7	33,728,562	7	3
495/738	Hazardous Waste Mgt./Solvent Recovery	9,081,597	10	11,221,144	8	24
29	Petroleum and Coal Products	9,155,739	9	10,003,599	9	9
39	Misc. Manufacturing Industries	9,232,479	8	8,085,198	10	-12
30	Rubber and Plastics Products	8,751,526	11	5,934,721	11	-32
38	Measurement/Photographic Instruments	4,987,310	12	4,446,859	12	-11
27	Printing and Publishing	3,531,938	14	4,255,632	13	20
25	Furniture and Fixtures	4,269,220	13	2,900,106	14	-32
491/493	Electric Utilities	1,908,322	16	2,360,431	15	24
32	Stone/Clay/Glass Products	1,952,493	15	1,773,602	16	-9
5169	Chemical Wholesalers	1,141,640	19	1,738,861	17	52
26	Paper Products	1,410,925	18	766,287	18	-46
20	Food Products	1,541,088	17	670,121	19	-57
22	Textile Mill Products	725,205	20	559,739	20	-23
23	Apparel and Other Textile Products	4,266	24	451,235	21	10,477
24	Lumber and Wood Products	488,921	21	362,040	22	-26
31	Leather Products	147,672	22	97,601	23	-34
12	Coal Mining	19,834	23	3,063	24	-85
21	Tobacco Products	0	25	0	25	--
Total		1,028,269,596		1,040,540,267		1

* Multiple SIC codes reported only in TRI.

- In NPRI, the biggest change in transfers to recycling, by industry, was in the fabricated metals total, which decreased from 60.0 million kg in 1998 to 44.8 million kg in 1999 as transfers of metals fell steeply. Transfers by other industries fell by lesser amounts.
- In TRI, primary metals transfers rose from 314.0 million kg to 336.3 million kg, with increases in both the metals and the other-than-metals categories. Transfers by fabricated metals products facilities rose from 143.6 million kg to 157.6 million kg, and those by the electrical equipment industry fell from 168.0 million kg to 156.0 million kg; in both cases, the overall changes were due to changes in transfers of metals to recycling.

Figure 6–6. Change in TRI Transfers to Recycling, by Industry, 1998–1999



6.3.3 1998–1999 Transfers to Recycling by Chemical

- The largest reduction in transfers to recycling for any chemical was reported for lead and its compounds, down by 4 percent, from 164.9 million kg in 1998 to 158.0 million kg in 1999, a difference of 6.9 million kg.
- Transfers of ethylene glycol dropped by 17 percent, or 5.0 million kg. For chromium and its compounds, the decrease was 3.6 million kg (6 percent); for manganese and its compounds, 3.3 million kg (5 percent); and for methyl ethyl ketone, 1.2 million kg (11 percent). No other chemical decreased by more than 1 million kg.
- Six of the 10 chemicals with the largest decreases are known or suspected carcinogens; they include lead and chromium (and their compounds), the chemicals with the largest and third-largest decreases.

Table 6–12. The 10 Chemicals with the Largest Decrease in Total Transfers to Recycling in North America, 1998–1999

Rank	CAS Number	Chemical	Total Transfers to Recycling			
			1998 (kg)	1999 (kg)	Change 1998–1999 kg	%
1	--	Lead (and its compounds)*▼	164,850,072	157,965,841	-6,884,231	-4
2	107-21-1	Ethylene glycol	28,828,341	23,844,901	-4,983,440	-17
3	--	Chromium (and its compounds)*▼	64,153,679	60,511,425	-3,642,254	-6
4	--	Manganese (and its compounds)*	64,545,880	61,260,038	-3,285,842	-5
5	78-93-3	Methyl ethyl ketone	11,108,474	9,918,428	-1,190,046	-11
6	127-18-4	Tetrachloroethylene▼	5,245,004	4,570,934	-674,070	-13
7	100-41-4	Ethylbenzene	3,391,177	2,750,947	-640,230	-19
8	75-09-2	Dichloromethane▼	7,699,423	7,067,355	-632,068	-8
9	100-42-5	Styrene▼	657,908	102,647	-555,261	-84
10	79-01-6	Trichloroethylene▼	2,464,262	1,911,690	-552,572	-22

Note: Canada and US data only. Mexico data not available for 1998–1999. *Metal and its compounds. ▼Known or suspected carcinogen.

Table 6–13. The 10 Chemicals with the Largest Increase in Total Transfers to Recycling in North America, 1998–1999

Rank	CAS Number	Chemical	Total Transfers to Recycling			%
			1998 (kg)	1999 (kg)	Change 1998–1999 kg	
1	--	Copper (and its compounds)*	344,819,518	362,346,319	17,526,801	5
2	--	Zinc (and its compounds)*	174,239,591	182,137,733	7,898,142	5
3	7429-90-5	Aluminum (fume or dust)*	12,061,507	14,944,420	2,882,913	24
4	1344-28-1	Aluminum oxide (fibrous forms)	261,181	2,463,535	2,202,354	843
5	79-00-5	1,1,2-Trichloroethane	5,623,900	7,273,880	1,649,980	29
6	107-06-2	1,2-Dichloroethane▼	5,172,501	6,806,413	1,633,912	32
7	117-81-7	Di(2-ethylhexyl) phthalate▼	534,727	1,324,585	789,858	148
8	106-99-0	1,3-Butadiene▼	4,588,810	5,233,114	644,304	14
9	67-66-3	Chloroform▼	748,710	1,250,079	501,369	67
10	56-23-5	Carbon tetrachloride▼	952,115	1,450,781	498,666	52

Note: Canada and US data only. Mexico data not available for 1998–1999. *Metal and its compounds. ▼Known or suspected carcinogen.

- Of the 10 chemicals with the largest rises in total transfers to recycling, six increased by more than 1 million kg.
- For copper and its compounds, the increase was 17.5 million kg, or 5 percent; for zinc and its compounds, it was 7.9 million kg (5 percent); for aluminum (fume or dust), 2.9 million kg (24 percent); for aluminum oxide (fibrous forms), 2.2 million kg (843 percent, starting from less than 300,000 kg in 1998); for 1,1,2-trichloroethane, 1.6 million kg (29 percent); and for 1,2-dichloroethane, 1.6 million kg (32 percent).
- Of the 10 chemicals with the largest increases, five were known or suspected carcinogens.

6.4 1998–1999 Other Transfers for Further Management in North America

This section presents changes in transfers off-site of chemicals in waste for other types of further management between 1998 and 1999. Other transfers for further management refer to energy recovery and treatment, including sewage treatment, but do not include recycling. Nor do these transfers include transfers of metals, which are discussed in the preceding sections on off-site releases and recycling. Transfers of metals to disposal, treatment and sewage are placed 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.

When reporting off-site transfers of chemicals in waste, facilities indicate how much of and where the waste is treated. Tracking off-site transfers for further management provides a means of estimating how much of a chemical, aside from on- and off-site releases, is being moved to other locations and where other releases may occur. It does not provide the same level of detail on environmental releases as tracking on-site releases because it is not known how much of the off-site transfers may be released at off-site locations after treatment.

Table 6–14. Summary of Total Other Transfers for Further Management in North America, NPRI and TRI, 1998–1999

	North America		Change 1998–1999 (%)
	1998 Number	1999 Number	
Total Facilities	21,554	21,056	-2
Total Forms	71,242	70,154	-2
	kg	kg	
Other Off-site Transfers for Further Management	646,163,089	579,543,929	-10
Energy Recovery (except metals)	386,582,922	326,582,281	-16
Treatment (except metals)	127,013,503	121,411,352	-4
Sewage (except metals)	132,566,664	131,550,296	-1

Note: Canada and US data only. Mexico data not available for 1998–1999. Data include 165 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 6–7. Change in Other Transfers for Further Management in North America, NPRI and TRI, 1998–1999

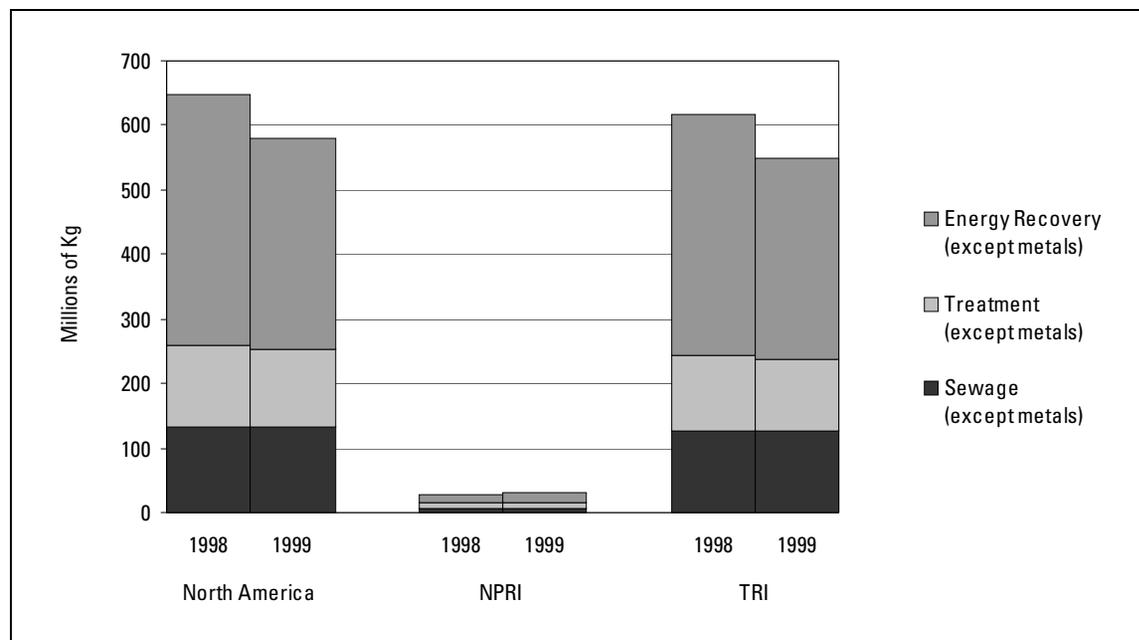


Table 6–14. (continued)

	NPRI			TRI		
	1998 Number	1999 Number	Change 1998–1999 (%)	1998 Number	1999 Number	Change 1998–1999 (%)
Total Facilities	1,510	1,611	7	20,044	19,445	-3
Total Forms	5,096	5,509	8	66,146	64,645	-2
	kg	kg		kg	kg	
Other Off-site Transfers for Further Management	28,109,509	30,043,913	7	618,053,580	549,500,016	-11
Energy Recovery (except metals)	12,023,812	14,069,929	17	374,559,110	312,512,352	-17
Treatment (except metals)	10,722,895	10,590,039	-1	116,290,608	110,821,313	-5
Sewage (except metals)	5,362,802	5,383,945	0.4	127,203,862	126,166,351	-1

- North American totals for other off-site transfers (except metals) for further management declined from 646.2 million kg in 1998 to 579.5 million kg in 1999, a decrease of 10 percent.
- In NPRI, off-site transfers to energy recovery increased by 17 percent, from 12.0 million kg to 14.1 million kg; off-site transfers to treatment and sewage changed only slightly.
- TRI off-site transfers to energy recovery, treatment, and sewage all declined—by 17 percent, in the case of energy recovery.

6.4.1 1998–1999 Other Transfers for Further Management by State and Province

While it is to be expected that most transfers to sewage are to sites within the same state or province, this is not always the case with transfers to treatment or energy recovery. This section examines transfers from the perspective of where they originate; **Chapter 8** examines cross-border transfers and where the transfers end up.

- Among states and provinces, 32 reported overall decreases in other transfers for further management between 1998 and 1999, 29 reported increases, and three had no such transfers.
- The North American jurisdiction with the largest other transfers for further management in 1999 was Michigan, which was also first in 1998. Its total, however, declined 30 percent during the period, from 114.3 million kg to 79.5 million kg. The decrease took place in all categories: transfers to energy recovery (–34 percent), to treatment (–26 percent), and to sewage (–11 percent). Michigan remained first in transfers to energy recovery and treatment.
- Texas had the second-largest other transfers for further management in 1999, as in 1998, although the total fell 6 percent, to 76.9 million kg. Texas retained first place in transfers to sewage, despite a 32-percent decrease. Texas was also second in transfers to both energy recovery (showing a 2-percent decline) and treatment (though these transfers rose 33 percent, from 11.7 million kg to 15.6 million kg).

Table 6–15. Change in Other Transfers for Further Management in North America, by State and Province, 1998–1999 (Ordered by Total Other Further Waste Management, 1999)

State/Province	Transfers to Energy Recovery					Transfers to Treatment					
	1998	1999	Change 1998–1999	1998	1999	1998	1999	Change 1998–1999	1998	1999	Change 1998–1999
	kg	kg	(%)	kg	kg	kg	kg	(%)	kg	kg	(%)
	Rank	Rank		Rank	Rank	Rank	Rank		Rank	Rank	
Alabama	17,946,493	5,371,344	-70	6	15	3,474,158	3,549,615	2	13	13	2
Alaska	2,224	23	-99	55	57	89	246	176	60	60	176
Alberta	551,907	1,282,955	132	37	31	603,288	230,052	-62	32	40	-62
Arizona	198,454	745,673	276	43	36	202,065	488,406	142	40	33	142
Arkansas	5,985,465	14,782,008	147	16	6	668,117	621,295	-7	30	32	-7
British Columbia	415,178	373,900	-10	39	40	88,325	318,172	260	46	38	260
California	7,762,343	13,085,217	69	14	8	2,190,224	4,398,337	101	19	7	101
Colorado	1,370,405	1,354,076	-1	30	30	655,190	1,078,494	65	31	27	65
Connecticut	999,996	964,116	-4	33	34	3,119,534	2,027,110	-35	15	19	-35
Delaware	465,845	468,650	1	38	38	160,481	395,870	147	42	36	147
District of Columbia	0	0	--	--	--	0	0	--	--	--	--
Florida	1,971,750	2,255,217	14	27	26	970,521	955,084	-2	26	28	-2
Georgia	4,506,329	4,113,320	-9	19	20	1,566,804	1,124,442	-28	23	26	-28
Guam	0	0	--	--	--	0	0	--	--	--	--
Hawaii	296	392	32	56	56	1,340	1,257	-6	59	58	-6
Idaho	52,501	23,846	-55	47	49	12,175	4,374	-64	54	57	-64
Illinois	14,989,945	14,973,207	0	7	5	4,375,413	3,686,794	-16	10	12	-16
Indiana	33,862,228	5,661,217	-83	4	14	4,357,780	3,958,100	-9	11	10	-9
Iowa	1,623,156	1,744,766	7	28	28	1,441,032	1,409,474	-2	24	24	-2
Kansas	1,582,544	1,497,536	-5	29	29	154,050	94,912	-38	44	46	-38
Kentucky	7,985,028	10,191,121	28	13	10	3,181,641	3,110,396	-15	14	15	-15
Louisiana	6,753,473	4,245,145	-37	15	19	6,495,907	6,390,033	-4	4	4	-2
Maine	124,191	89,901	-28	44	45	54,177	86,293	59	51	47	59
Manitoba	73,970	12,020	-84	46	50	278,087	203,513	-41	38	41	-27
Maryland	331,566	378,518	14	40	39	2,592,346	2,682,951	3	17	17	3
Massachusetts	3,155,822	2,700,668	-14	24	23	1,946,654	1,961,530	20	1	1	20
Michigan	83,226,979	55,341,981	-34	1	1	23,975,385	17,797,378	-26	1	1	-26
Minnesota	975,947	971,181	0	34	33	479,355	1,141,603	138	33	25	138
Mississippi	2,371,397	2,690,133	13	25	24	465,816	740,094	31	34	31	59
Missouri	4,781,072	4,247,114	-11	18	18	3,642,326	3,700,860	2	12	11	2
Montana	25,619	10,593	-59	49	51	2,928	8,675	196	57	54	196
Nebraska	248,971	166,508	-33	41	43	35,881	44,620	24	53	49	24
Nevada	11,395	6,581	-42	52	52	4,384	5,730	56	55	56	56
New Brunswick	0	0	--	--	--	56,269	30,989	-45	50	51	-45
New Hampshire	1,047,248	1,214,532	16	32	32	136,037	149,980	10	45	43	10
New Jersey	19,580,118	28,514,158	46	5	3	2,239,069	2,708,000	16	18	16	21
New Mexico	18,450	24,113	31	51	48	59,785	30,974	-48	48	52	-48
New York	3,629,156	2,557,150	-30	21	25	1,723,860	1,431,679	-17	21	22	-17
Newfoundland	0	0	--	--	--	0	0	--	--	--	--
North Carolina	5,909,955	4,753,423	-20	17	17	1,621,375	1,431,511	-12	22	23	-12
North Dakota	36,500	29,884	-18	48	47	4,053	429	-89	56	59	-89
Nova Scotia	0	0	--	--	--	292,099	78,141	-73	37	48	-73
Ohio	43,905,497	24,968,342	-43	3	4	7,941,690	6,556,275	-17	3	3	-17
Oklahoma	1,975,967	644,471	-67	26	37	192,177	232,997	39	41	39	21
Ontario	9,698,375	10,156,488	5	9	11	6,371,121	6,312,884	-1	5	5	-1
Oregon	687,652	817,475	19	36	35	425,867	772,931	81	36	29	81
Pennsylvania	8,874,384	8,575,447	-3	10	13	4,731,899	4,324,114	-9	8	8	-9
Prince Edward Island	0	0	--	--	--	71,041	137,874	94	47	44	94
Puerto Rico	8,255,587	11,190,242	36	11	9	4,826,654	5,772,010	6	7	6	20
Quebec	1,284,382	2,244,566	75	31	27	2,960,165	3,255,229	10	16	14	10
Rhode Island	236,997	295,801	25	42	41	465,022	441,411	-5	35	34	-5
Saskatchewan	0	0	--	--	--	2,500	23,185	827	58	53	827
South Carolina	11,445,899	13,218,716	15	8	7	4,563,464	1,780,567	-61	9	21	-61
South Dakota	79,804	120,966	52	45	44	58,269	101,820	45	49	45	75
Tennessee	3,497,840	3,960,946	13	22	21	1,410,972	753,167	-30	25	30	-47
Texas	45,878,888	44,929,127	-2	2	2	11,703,690	15,602,025	33	2	2	33
Utah	19,035	35,572	87	50	46	214,189	178,496	-17	39	42	-17
Vermont	7,425	3,665	-51	53	53	41,819	32,007	-23	52	50	-23
Virgin Islands	0	1,898	--	--	54	154,972	8,477	-95	43	55	-95
Virginia	3,469,478	3,240,326	-7	23	22	811,073	330,961	-59	28	37	-59
Washington	824,134	290,229	-65	35	42	777,955	407,788	-48	29	35	-48
West Virginia	3,768,729	5,240,584	39	20	16	964,378	2,100,114	118	27	18	118
Wisconsin	8,094,435	9,803,600	21	12	12	4,996,371	4,209,371	-16	6	9	-16
Wyoming	4,498	1,633	-64	54	55	195	236	61	60	61	21
Total	386,582,922	326,582,281	-16			127,013,503	121,411,352	-4			

Note: Canada and US data only. Mexico data not available for 1998 or 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 6–15. (continued)

State/Province	Transfers to Sewage					Total Other Transfers for Further Management				
	1998		1999		Change 1998–1999 (%)	1998		1999		Change 1998–1999 (%)
	kg	Rank	kg	Rank		kg	Rank	kg	Rank	
Alabama	534,192	33	2,341,125	18	338	21,954,843	7	11,262,084	15	-49
Alaska	0	--	0	--	--	2,313	60	269	61	-83
Alberta	317,110	39	882,666	31	178	1,472,305	38	2,395,673	34	-68
Arizona	1,021,961	27	1,101,284	29	8	1,422,480	39	2,335,363	35	64
Arkansas	558,976	32	1,054,601	30	89	7,212,558	22	16,457,904	10	128
British Columbia	1,468	51	11,928	51	713	504,971	44	704,000	42	39
California	8,851,355	3	9,606,382	3	9	18,803,922	9	27,089,936	5	44
Colorado	301,289	40	338,482	39	12	2,326,884	35	2,771,052	33	19
Connecticut	622,681	31	586,043	35	-6	4,742,211	29	3,577,269	32	-25
Delaware	1,164,707	26	1,148,123	28	-1	1,791,033	37	2,012,643	37	12
District of Columbia	0	--	0	--	--	0	--	0	--	--
Florida	2,710,020	16	3,676,658	12	36	5,652,291	27	6,886,959	24	22
Georgia	1,442,256	23	1,447,252	23	0	7,515,389	21	6,685,014	25	-11
Guam	0	--	0	--	--	0	--	0	--	--
Hawaii	0	--	0	--	--	1,636	61	1,649	60	1
Idaho	327,524	38	332,940	41	2	392,200	46	361,160	47	-8
Illinois	4,028,428	9	4,432,686	8	10	23,393,786	6	23,092,687	6	-1
Indiana	3,338,598	12	2,693,383	16	-19	41,558,606	4	12,312,700	14	-70
Iowa	3,195,912	14	2,915,076	15	-9	6,260,100	25	6,069,316	27	-3
Kansas	358,996	36	587,189	34	64	2,095,590	36	2,179,637	36	4
Kentucky	681,773	29	1,183,523	27	74	11,848,442	15	14,485,040	13	22
Louisiana	244,609	42	247,313	45	1	13,493,989	14	10,882,491	17	-19
Maine	179,874	46	249,528	44	39	358,242	47	425,722	45	19
Manitoba	0	--	42	55	--	352,057	48	215,575	50	-39
Maryland	1,252,457	25	1,388,002	24	11	4,176,369	32	4,449,471	31	7
Massachusetts	3,380,811	11	4,105,525	9	21	8,483,287	19	8,767,723	19	3
Michigan	7,141,748	5	6,360,277	6	-11	114,344,112	1	79,499,636	1	-30
Minnesota	3,977,673	10	5,363,936	7	35	5,432,975	28	7,476,720	22	38
Mississippi	1,713,621	21	1,641,037	22	-4	4,550,834	30	5,071,264	30	11
Missouri	1,815,041	20	2,078,377	20	15	10,238,439	17	10,026,351	18	-2
Montana	4	55	123	52	2,975	28,551	57	19,391	57	-32
Nebraska	128,854	48	273,178	43	112	413,706	45	484,306	44	17
Nevada	15,810	50	17,084	50	8	31,589	56	29,395	55	-7
New Brunswick	0	--	0	--	--	56,269	55	30,989	54	-45
New Hampshire	201,877	44	305,917	42	52	1,385,162	40	1,670,429	39	21
New Jersey	14,964,103	2	15,581,915	2	4	36,783,290	5	46,804,073	3	27
New Mexico	194,021	45	335,619	40	73	272,256	50	390,706	46	44
New York	3,323,983	13	3,901,525	11	17	8,676,999	18	7,890,354	21	-9
Newfoundland	0	--	0	--	--	0	--	0	--	--
North Carolina	649,638	30	824,568	32	27	8,180,968	20	7,009,502	23	-14
North Dakota	218,184	43	205,697	46	-6	258,737	51	236,010	49	-9
Nova Scotia	1,200	52	0	--	-100	293,299	49	78,141	53	-73
Ohio	7,433,583	4	7,792,716	4	5	59,280,770	3	39,317,333	4	-34
Oklahoma	412,285	35	403,783	37	-2	2,580,429	34	1,281,251	40	-50
Ontario	4,754,508	8	3,953,510	10	-17	20,824,004	8	20,422,882	7	-2
Oregon	5,250,280	7	3,593,514	13	-32	6,363,799	24	5,183,920	29	-19
Pennsylvania	2,973,466	15	3,362,032	14	13	16,579,749	11	16,261,593	12	-2
Prince Edward Island	0	--	0	--	--	71,041	54	137,874	51	94
Puerto Rico	967,596	28	793,265	33	-18	14,049,837	13	17,755,517	8	26
Quebec	288,461	41	535,743	36	86	4,533,008	31	6,035,538	28	33
Rhode Island	154,668	47	157,625	47	2	856,687	41	894,837	41	4
Saskatchewan	55	54	56	54	2	2,555	59	23,241	56	810
South Carolina	2,563,247	17	2,675,496	17	4	18,572,610	10	17,674,779	9	-5
South Dakota	502,159	34	101,357	48	-80	640,232	42	324,143	48	-49
Tennessee	2,142,919	19	1,802,046	21	-16	7,051,731	23	6,516,159	26	-8
Texas	24,075,529	1	16,401,373	1	-32	81,658,107	2	76,932,525	2	-6
Utah	339,613	37	363,971	38	7	572,837	43	578,039	43	1
Vermont	109,636	49	99,348	49	-9	158,880	52	135,020	52	-15
Virgin Islands	0	--	0	--	--	154,972	53	10,375	58	-93
Virginia	6,555,341	6	7,542,242	5	15	10,835,892	16	11,113,529	16	3
Washington	1,499,473	22	1,301,454	25	-13	3,101,562	33	1,999,471	38	-36
West Virginia	1,439,557	24	1,192,183	26	-17	6,172,664	26	8,532,881	20	38
Wisconsin	2,243,421	18	2,259,465	19	1	15,334,227	12	16,272,436	11	6
Wyoming	113	53	113	53	0	4,806	58	1,982	59	-59
Total	132,566,664		131,550,296		-1	646,163,089		579,543,929		-10

- New Jersey, fifth in 1998, rose to third in 1999, as total transfers increased by 27 percent, from 36.8 million kg to 46.8 million kg. New Jersey was second in transfers to sewage in both 1998 and 1999.
- Ohio, which had the third-largest other transfers in 1998, dropped to fourth place in 1999, as its total fell by 34 percent. The state had the third-largest transfers to treatment in both 1998 and 1999, but the amount declined 17 percent, from 7.9 million kg to 6.6 million kg.

6.4.2 1998–1999 Other Transfers for Further Management by Industry Sector

Of the 25 industry sectors in the matched data set, 16 reported decreases in other transfers for further management between 1998 and 1999, and eight reported increases.

- In 1999, the largest other transfers for further management, by far, were reported by chemical manufacturing facilities (296.6 million kg, up 3 percent from 289.1 million kg in 1998) and hazardous waste management/solvent recovery facilities (135.8 million kg, down 34 percent from 206.5 million kg in 1998).
- The chemical industry also had the largest transfers to energy recovery (up 5 percent from 1998), treatment (up 5 percent), and sewage (down 6 percent).
- Hazardous waste management/solvent recovery facilities had the second-highest transfers to energy recovery (down 36 percent from 1998, when the industry had the highest total in the category) and treatment (down 20 percent).
- The second-largest transfers to sewage in both years were by the paper products industry, though the amount declined by 6 percent.
- In both NPRI and TRI, the chemicals and hazardous waste management industries reported the largest amounts of other transfers for further waste management in both 1998 and 1999.

Table 6–16. Change in Other Transfers for Further Management in North America, by Industry, 1998–1999 (Ordered by Total Other Transfers for Further Management, 1999)

SIC Code	Industry	Transfers to Energy Recovery				Change 1998–1999 (%)	Transfers to Treatment				Change 1998–1999 (%)
		1998	kg Rank	1999	kg Rank		1998	kg Rank	1999	kg Rank	
28	Chemicals	154,811,124	2	162,373,376	1	5	71,502,042	1	75,350,205	1	5
495/738	Hazardous Waste Mgt./Solvent Recovery	180,843,115	1	114,845,717	2	-36	25,156,022	2	20,212,631	2	-20
26	Paper Products	2,980,834	8	2,844,712	9	-5	4,148,371	4	3,789,348	4	-9
--	Multiple codes 20–39*	6,982,931	4	5,834,801	4	-16	7,325,189	3	5,732,958	3	-22
34	Fabricated Metals Products	4,410,319	6	4,794,202	7	9	1,534,313	9	2,333,495	5	52
29	Petroleum and Coal Products	2,316,641	10	8,812,237	3	280	1,963,229	8	1,904,190	7	-3
20	Food Products	1,052,823	16	48,866	20	-95	1,068,031	13	337,193	17	-68
36	Electronic/Electrical Equipment	2,085,894	11	2,488,816	10	19	1,279,870	12	1,278,426	11	-0.1
37	Transportation Equipment	5,262,790	5	5,789,529	5	10	2,378,004	6	1,852,680	8	-22
33	Primary Metals	1,535,178	13	2,055,587	11	34	3,378,313	5	2,095,173	6	-38
5169	Chemical Wholesalers	10,660,452	3	4,813,096	6	-55	1,485,960	10	1,381,459	10	-7
30	Rubber and Plastics Products	3,022,947	7	3,044,833	8	1	1,990,532	7	1,525,812	9	-23
35	Industrial Machinery	1,010,141	18	1,059,728	16	5	344,432	17	289,997	18	-16
39	Misc. Manufacturing Industries	1,460,244	14	1,289,581	15	-12	258,856	18	723,264	14	179
27	Printing and Publishing	1,294,926	15	1,422,155	13	10	459,444	15	752,487	13	64
38	Measurement/Photographic Instruments	827,022	19	1,326,324	14	60	1,355,004	11	787,140	12	-42
25	Furniture and Fixtures	1,885,344	12	1,759,264	12	-7	414,949	16	456,455	15	10
32	Stone/Clay/Glass Products	2,383,218	9	411,234	19	-83	660,848	14	407,779	16	-38
24	Lumber and Wood Products	1,036,535	17	859,821	17	-17	91,107	20	77,567	20	-15
22	Textile Mill Products	668,321	20	649,119	18	-3	204,538	19	92,676	19	-55
23	Apparel and Other Textile Products	30,073	21	28,993	21	-4	113	24	23,258	21	20,482
491/493	Electric Utilities	11,315	22	19,138	22	69	4,828	22	3,667	22	-24
31	Leather Products	10,735	23	11,152	23	4	8,781	21	2,948	23	-66
21	Tobacco Products	0	--	0	--	--	727	23	544	24	-25
12	Coal Mining	0	--	0	--	--	0	25	0	25	--
	Total	386,582,922		326,582,281		-16	127,013,503		121,411,352		-4

* Multiple SIC codes reported only in TRI.

Figure 6–8. Change in NPRI Other Transfers for Further Management, by Industry, 1998–1999

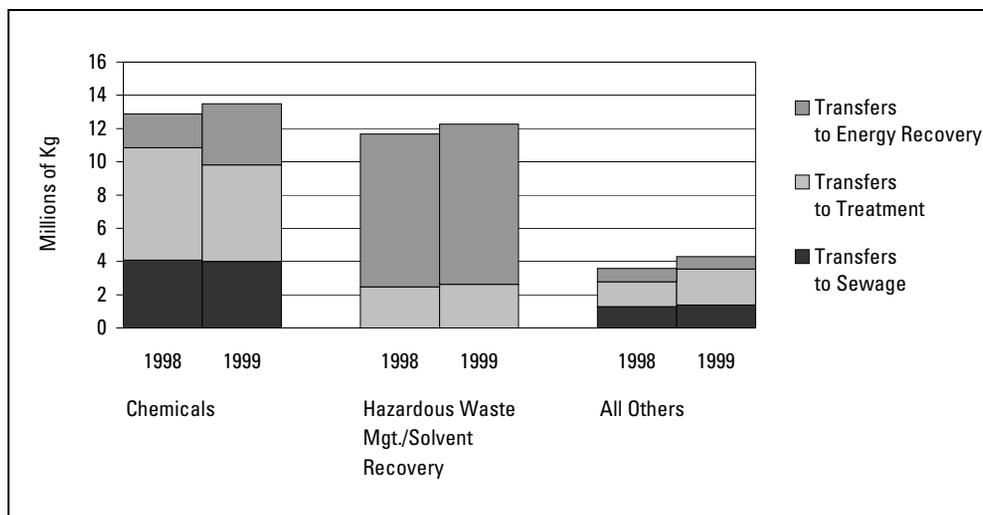


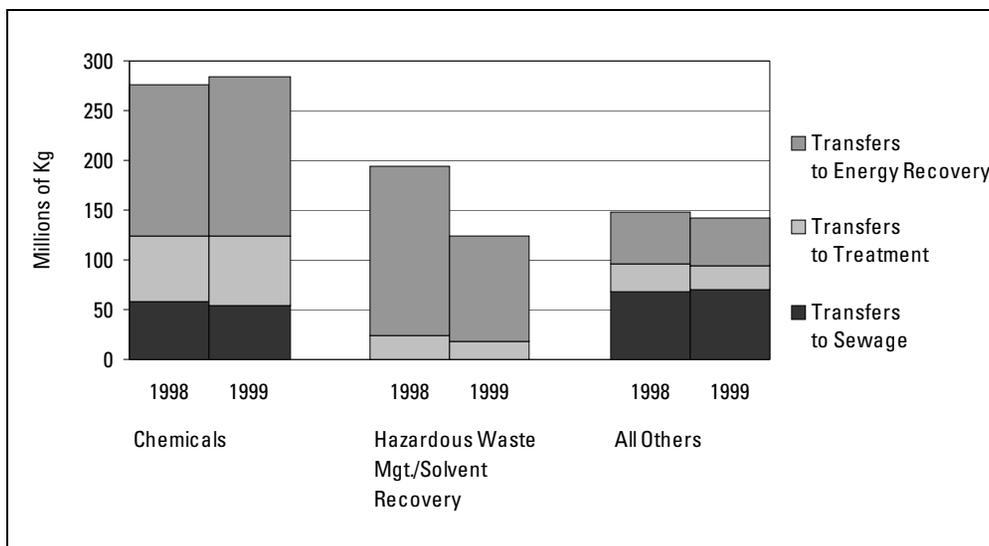
Table 6–16. (continued)

SIC Code	Industry	Transfers to Sewage				Change 1998–1999 (%)	Other Transfers for Further Management				Change 1998–1999 (%)
		1998		1999			1998		1999		
		kg	Rank	kg	Rank		kg	Rank	kg	Rank	
28	Chemicals	62,752,543	1	58,910,911	1	-6	289,065,709	1	296,634,492	1	3
495/738	Hazardous Waste Mgt./Solvent Recovery	511,836	14	774,035	13	51	206,510,973	2	135,832,383	2	-34
26	Paper Products	17,195,589	2	16,169,150	2	-6	24,324,794	3	22,803,210	3	-6
--	Multiple codes 20–39*	8,629,397	4	9,608,863	4	11	22,937,517	4	21,176,622	4	-8
34	Fabricated Metals Products	6,177,473	6	6,892,103	6	12	12,122,105	7	14,019,800	5	16
29	Petroleum and Coal Products	2,903,096	9	2,696,094	9	-7	7,182,966	11	13,412,521	6	87
20	Food Products	13,379,732	3	12,599,164	3	-6	15,500,586	5	12,985,223	7	-16
36	Electronic/Electrical Equipment	6,388,084	5	9,198,379	5	44	9,753,848	10	12,965,621	8	33
37	Transportation Equipment	2,946,421	8	2,924,418	8	-1	10,587,215	8	10,566,627	9	-0.2
33	Primary Metals	5,371,020	7	5,595,277	7	4	10,284,511	9	9,746,037	10	-5
5169	Chemical Wholesalers	41,943	19	15,554	19	-63	12,188,355	6	6,210,109	11	-49
30	Rubber and Plastics Products	1,438,410	11	1,541,826	11	7	6,451,889	12	6,112,471	12	-5
35	Industrial Machinery	1,918,244	10	1,793,172	10	-7	3,272,817	14	3,142,897	13	-4
39	Misc. Manufacturing Industries	736,120	13	641,447	14	-13	2,455,220	16	2,654,292	14	8
27	Printing and Publishing	321,441	16	428,633	15	33	2,075,811	18	2,603,275	15	25
38	Measurement/Photographic Instruments	284,109	17	253,945	17	-11	2,466,135	15	2,367,409	16	-4
25	Furniture and Fixtures	15,208	20	14,490	20	-5	2,315,501	17	2,230,209	17	-4
32	Stone/Clay/Glass Products	944,992	12	955,504	12	1	3,989,058	13	1,774,517	18	-56
24	Lumber and Wood Products	132,125	18	169,210	18	28	1,259,767	20	1,106,598	19	-12
22	Textile Mill Products	453,349	15	345,620	16	-24	1,326,208	19	1,087,415	20	-18
23	Apparel and Other Textile Products	8,807	22	8,442	22	-4	38,993	21	60,693	21	56
491/493	Electric Utilities	4,332	23	3,981	23	-8	20,475	23	26,786	22	31
31	Leather Products	12,298	21	10,043	21	-18	31,814	22	24,143	23	-24
21	Tobacco Products	95	24	35	24	-63	822	24	579	24	-30
12	Coal Mining	0	25	0	25	--	0	25	0	25	--
Total		132,566,664		131,550,296		-1	646,163,089		579,543,929		-10

* Multiple SIC codes reported only in TRI.

- The NPRI totals for these two industries both increased. Transfers to treatment by the chemicals industry declined from 6.8 million kg to 5.8 million kg, but all other subtotals remained broadly stable or increased.
- In TRI, transfers to energy recovery and treatment by the chemicals industry rose, and transfers to sewage declined. The hazardous waste management industry reported a drop in transfers to energy recovery, from 171.6 million kg in 1998 to 105.2 million kg in 1999, and in transfers to treatment, from 22.7 million kg to 17.6 million kg. Transfers to sewage increased, but the 1999 amount was less than 800,000 kg.

Figure 6–9. Change in TRI Other Transfers for Further Management, by Industry, 1998–1999



6.4.3 1998–1999 Other Transfers for Further Management by Chemical

- The chemical with the largest decrease in transfers to energy recovery between 1998 and 1999 was xylenes, which dropped from 73.0 million kg to 56.0 million kg, a decrease of 17.0 million kg, or 23 percent.
- Next were naphthalene (a decrease of 9.8 million kg, or 88 percent); acetaldehyde, a known or suspected carcinogen (down by 5.9 million kg, or 99 percent); and methyl ethyl ketone (a decrease of 5.8 million kg, or 16 percent).
- Transfers of benzene and vinyl acetate, other designated carcinogens, decreased by 68 percent and 31 percent, respectively.
- The largest increases in transfers to energy recovery were recorded for propylene (up by 4.7 million kg from about 1,000 kg in 1998) and ethylene (an increase of 4.7 million kg, or 79 percent).
- None of the other 10 top chemicals in this category had changes of more than 800,000 kg. Five of the 10 chemicals were known or suspected carcinogens: dichloromethane (a 17-percent increase), styrene (11 percent), tetrachloroethylene (27 percent), 1,4-dioxane (120 percent), and diethyl sulfate (11 percent).

Table 6–17. The 10 Chemicals with the Largest Decrease in Total Transfers to Energy Recovery (except metals) in North America, 1998–1999

Rank	CAS Number	Chemical	Total Transfers to Energy Recovery			%
			1998 (kg)	1999 (kg)	Change 1998–1999 kg	
1	--	Xylenes	73,038,199	55,993,883	-17,044,316	-23
2	91-20-3	Naphthalene	11,161,587	1,317,606	-9,843,981	-88
3	75-07-0	Acetaldehyde [▼]	5,986,235	86,175	-5,900,060	-99
4	78-93-3	Methyl ethyl ketone	35,161,422	29,401,443	-5,759,979	-16
5	108-88-3	Toluene	77,249,783	73,739,124	-3,510,659	-5
6	100-41-4	Ethylbenzene	10,313,300	6,990,184	-3,323,116	-32
7	71-43-2	Benzene [▼]	4,681,812	1,491,395	-3,190,417	-68
8	71-36-3	n-Butyl alcohol	8,954,309	5,985,729	-2,968,580	-33
9	107-21-1	Ethylene glycol	10,166,996	7,676,125	-2,490,871	-24
10	108-05-4	Vinyl acetate [▼]	7,637,811	5,279,622	-2,358,189	-31

Note: Canada and US data only. Mexico data not available for 1998–1999. [▼] Known or suspected carcinogen.

Table 6–18. The 10 Chemicals with the Largest Increase in Total Transfers to Energy Recovery (except metals) in North America, 1998–1999

Rank	CAS Number	Chemical	Total Transfers to Energy Recovery			%
			1998 (kg)	1999 (kg)	Change 1998–1999 kg	
1	115-07-1	Propylene	1,005	4,671,279	4,670,274	464,704
2	74-85-1	Ethylene	5,885,749	10,549,548	4,663,799	79
3	75-09-2	Dichloromethane [▼]	4,630,291	5,414,933	784,642	17
4	75-05-8	Acetonitrile	5,184,258	5,871,544	687,286	13
5	95-63-6	1,2,4-Trimethylbenzene	1,657,988	2,247,186	589,198	36
6	100-42-5	Styrene [▼]	5,210,365	5,767,875	557,510	11
7	127-18-4	Tetrachloroethylene [▼]	1,746,916	2,211,542	464,626	27
8	123-91-1	1,4-Dioxane [▼]	304,873	670,903	366,030	120
9	64-67-5	Diethyl sulfate [▼]	3,123,734	3,474,335	350,601	11
10	1634-04-4	Methyl tert-butyl ether	1,734,562	2,022,930	288,368	17

Note: Canada and US data only. Mexico data not available for 1998–1999. [▼] Known or suspected carcinogen.

Table 6–19. The 10 Chemicals with the Largest Decrease in Total Transfers to Treatment (except metals) in North America, 1998–1999

Rank	CAS Number	Chemical	Total Transfers to Treatment			%
			1998 (kg)	1999 (kg)	Change 1998–1999 kg	
1	95-50-1	1,2-Dichlorobenzene	2,381,086	490,654	-1,890,432	-79
2	110-82-7	Cyclohexane	2,801,145	1,247,382	-1,553,763	-55
3	108-90-7	Chlorobenzene	2,176,992	690,292	-1,486,700	-68
4	106-99-0	1,3-Butadiene [▼]	1,785,195	327,172	-1,458,023	-82
5	67-56-1	Methanol	23,335,775	22,078,731	-1,257,044	-5
6	77-47-4	Hexachlorocyclopentadiene	1,269,904	42,396	-1,227,508	-97
7	79-01-6	Trichloroethylene [▼]	2,140,083	936,243	-1,203,840	-56
8	79-34-5	1,1,2,2-Tetrachloroethane	1,213,172	23,211	-1,189,961	-98
9	56-23-5	Carbon tetrachloride [▼]	1,395,942	337,797	-1,058,145	-76
10	74-87-3	Chloromethane	1,037,503	120,407	-917,096	-88

Note: Canada and US data only. Mexico data not available for 1998–1999. [▼] Known or suspected carcinogen.

Table 6–20. The 10 Chemicals with the Largest Increase in Total Transfers to Treatment (except metals) in North America, 1998–1999

Rank	CAS Number	Chemical	Total Transfers to Treatment			%
			1998 (kg)	1999 (kg)	Change 1998–1999 kg	
1	100-42-5	Styrene [▼]	2,324,964	4,606,937	2,281,973	98
2	108-05-4	Vinyl acetate [▼]	796,115	2,376,231	1,580,116	198
3	78-93-3	Methyl ethyl ketone	5,466,325	6,942,108	1,475,783	27
4	78-87-5	1,2-Dichloropropane	526,652	1,600,973	1,074,321	204
5	--	Nitric acid and nitrate compounds	8,529,366	9,574,400	1,045,034	12
6	108-88-3	Toluene	15,214,583	16,053,004	838,421	6
7	98-95-3	Nitrobenzene [▼]	487,497	1,080,358	592,861	122
8	75-09-2	Dichloromethane [▼]	9,130,268	9,721,162	590,894	6
9	74-85-1	Ethylene	369,035	704,027	334,992	91
10	107-21-1	Ethylene glycol	3,311,260	3,623,980	312,720	9

Note: Canada and US data only. Mexico data not available for 1998–1999. [▼] Known or suspected carcinogen.

- Decreases in transfers to treatment of the 10 chemicals with the largest decreases between 1998 and 1999 ranged from 1.9 million kg (1,2-dichlorobenzene, a reduction of 79 percent) to just under 1 million kg (chloromethane, down by 88 percent).
- After 1,2-dichlorobenzene, the next-largest decreases were of cyclohexane (a decrease of 1.6 million kg or 55 percent) and chlorobenzene (a decrease of 1.5 million kg or 68 percent).
- Three of the chemicals in this list were known or suspected carcinogens: 1,3-butadiene (down by 82 percent), trichloroethylene (56 percent) and carbon tetrachloride (76 percent).
- Styrene, a known or suspected carcinogen, recorded the largest increase in transfers to treatment, 2.3 million kg, a rise of 98 percent from 1998.
- Vinyl acetate, another designated carcinogen, was next, with an increase of 1.6 million kg, or 198 percent, from less than 800,000 kg in 1998.
- The third-largest increase was for methyl ethyl ketone: 1.5 million kg, or 27 percent. The other seven chemicals in the top 10 had increases ranging from about 1 million kg down to about 300,000 kg.
- In addition to styrene and vinyl acetate, the group included two other known or suspected carcinogens: nitrobenzene, which increased 122 percent, to over 1 million kg, and dichloromethane, with an increase of 6 percent.

- Of the 10 chemicals with the largest decreases in transfers to sewage, ethylene glycol showed a decline of 1.8 million kg, or 14 percent, from 1998.
- The second-largest decrease was for methanol, with a drop of less than 800,000 kg (from 37.2 million kg to 36.4 million kg), or 2 percent.
- Two of the chemicals in this group, dichloromethane (with a 38-percent decrease) and acetaldehyde (with a 15-percent decrease), were carcinogens.

Table 6–21. The 10 Chemicals with the Largest Decrease in Total Transfers to Sewage (except metals) in North America, 1998–1999

Rank	CAS Number	Chemical	Total Transfers to Sewage			
			1998 (kg)	1999 (kg)	Change 1998–1999 kg	%
1	107-21-1	Ethylene glycol	12,326,831	10,569,595	-1,757,236	-14
2	67-56-1	Methanol	37,216,810	36,433,482	-783,328	-2
3	111-42-2	Diethanolamine	1,082,983	599,935	-483,048	-45
4	108-95-2	Phenol	1,267,343	1,077,182	-190,161	-15
5	75-09-2	Dichloromethane [▼]	301,984	186,062	-115,922	-38
6	123-72-8	Butyraldehyde	173,369	73,112	-100,257	-58
7	75-07-0	Acetaldehyde [▼]	634,298	538,381	-95,917	-15
8	7664-39-3	Hydrogen fluoride	288,831	215,217	-73,614	-25
9	85-44-9	Phthalic anhydride	61,639	2,920	-58,719	-95
10	62-53-3	Aniline	617,934	570,997	-46,937	-8

Note: Canada and US data only. Mexico data not available for 1998–1999. [▼] Known or suspected carcinogen.

Table 6–22. The 10 Chemicals with the Largest Increase in Total Transfers to Sewage (except metals) in North America, 1998–1999

Rank	CAS Number	Chemical	Total Transfers to Sewage			%
			1998 (kg)	1999 (kg)	Change 1998–1999 kg	
1	--	Nitric acid and nitrate compounds	70,783,019	72,355,482	1,572,463	2
2	50-00-0	Formaldehyde [▼]	1,374,321	1,801,244	426,923	31
3	79-10-7	Acrylic acid	68,405	382,972	314,567	460
4	75-65-0	tert-Butyl alcohol	362,248	520,852	158,604	44
5	67-66-3	Chloroform [▼]	214,742	345,337	130,595	61
6	78-93-3	Methyl ethyl ketone	237,873	334,743	96,870	41
7	80-15-9	Cumene hydroperoxide	119,476	196,482	77,006	64
8	140-88-5	Ethyl acrylate [▼]	15,267	87,391	72,124	472
9	71-36-3	n-Butyl alcohol	1,273,542	1,314,335	40,793	3
10	141-32-2	Butyl acrylate	6,468	43,926	37,458	579

Note: Canada and US data only. Mexico data not available for 1998–1999. [▼] Known or suspected carcinogen.

- The greatest increase in transfers to sewage was for nitric acid and nitrate compounds. These transfers rose from 70.8 million kg in 1998 to 72.4 million kg in 1999, a change of 1.6 million kg, or 2 percent. Amounts and absolute increases for the other nine compounds were much smaller.
- Among the increasers, formaldehyde, chloroform and ethyl acrylate were known or suspected carcinogens; transfers of formaldehyde to sewage were 1.8 million kg in 1999, up 31 percent from 1998.

6.5 1998–1999 Total Reported Amounts of Releases and Transfers in North America

Total reported amounts of releases and transfers for North America remained generally stable between 1998 and 1999. This section analyzes all releases; in other words, off-site releases are not adjusted since the focus here is on how the total amounts reported by facilities are managed.

- Total releases and transfers declined from 3.32 billion kg to 3.26 billion kg, or 2 percent, from 1998 to 1999.
- North American on-site releases to air and land showed little change, while on-site water discharges rose by 6 percent and underground injection fell by 6 percent.
- In off-site releases, transfers to disposal (except metals) rose 31 percent, from 29.9 million kg to 39.3 million kg, and transfers of metals decreased by 4 percent.
- Transfers to recycling of metals rose 2 percent and recycling of other chemicals declined 2 percent. Within other transfers for further management, which fell 10 percent overall, transfers to energy recovery declined by 16 percent, from 386.6 million kg to 326.6 million kg, and transfers to treatment declined by 4 percent.
- In NPRI, increases in on-site releases and other off-site transfers combined with decreases in off-site releases and off-site transfers to recycling netted a 4-percent decrease in total transfers and releases, from 316.6 million kg in 1998 to 303.3 million kg in 1999.

Table 6–23. Summary of Total Reported Amounts of Releases and Transfers in North America, NPRI and TRI, 1998–1999

	North America		Change 1998–1999 (%)
	1998 Number	1999 Number	
Total Facilities	21,554	21,056	-2
Total Forms	71,242	70,154	-2
Releases On- and Off-site	kg	kg	
On-site Releases	1,376,291,532	1,364,555,275	-1
Air	868,023,670	857,822,047	-1
Surface Water	110,564,012	117,263,593	6
Underground Injection	85,688,150	80,395,386	-6
Land	311,891,192	308,949,221	-1
Off-site Releases	274,169,926	273,697,790	-0.2
Transfers to Disposal (except metals)	29,944,096	39,255,102	31
Transfers of Metals**	244,225,830	234,442,688	-4
Total Reported Releases On- and Off-site	1,650,461,458	1,638,253,065	-1
Off-site Transfers for Further Management			
Off-site Transfers to Recycling	1,028,269,596	1,040,540,267	1
Transfers to Recycling of Metals	887,408,505	901,927,543	2
Transfers to Recycling (except metals)	140,861,091	138,612,724	-2
Other Off-site Transfers for Further Management	646,163,089	579,543,929	-10
Energy Recovery (except metals)	386,582,922	326,582,281	-16
Treatment (except metals)	127,013,503	121,411,352	-4
Sewage (except metals)	132,566,664	131,550,296	-1
Total Reported Amounts of Releases and Transfers	3,324,894,143	3,258,337,261	-2

Note: Canada and US data only. Mexico data not available for 1998–1999. Data include 165 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 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 in North America, NPRI and TRI, 1998–1999

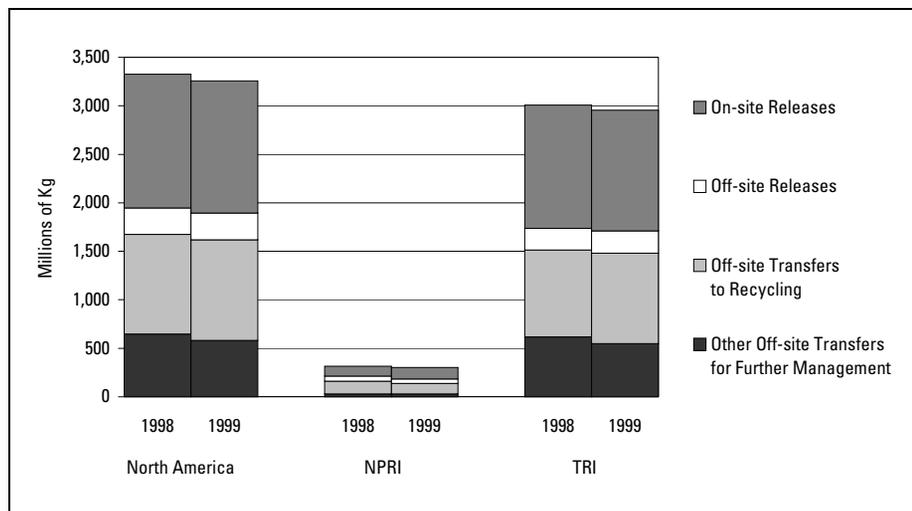


Table 6–23. (continued)

	NPRI*			TRI		
	1998 Number	1999 Number	Change 1998–1999 (%)	1998 Number	1999 Number	Change 1998–1999 (%)
Total Facilities	1,510	1,611	7	20,044	19,445	-3
Total Forms	5,096	5,509	8	66,146	64,645	-2
Releases On- and Off-site	kg	kg		kg	kg	
On-site Releases	103,762,149	120,874,440	16	1,272,529,383	1,243,680,835	-2
Air	79,932,355	84,006,392	5	788,091,315	773,815,655	-2
Surface Water	4,987,116	5,831,408	17	105,576,896	111,432,185	6
Underground Injection	3,700,429	3,272,500	-12	81,987,721	77,122,886	-6
Land	15,017,741	27,639,112	84	296,873,451	281,310,109	-5
Off-site Releases	51,573,572	43,686,389	-15	222,596,354	230,011,401	3
Transfers to Disposal (except metals)	9,421,264	9,445,164	0.3	20,522,832	29,809,938	45
Transfers of Metals**	42,152,308	34,241,225	-19	202,073,522	200,201,463	-1
Total Reported Releases On- and Off-site	155,335,721	164,560,829	6	1,495,125,737	1,473,692,236	-1
Off-site Transfers for Further Management						
Off-site Transfers to Recycling	133,153,379	108,707,063	-18	895,116,217	931,833,204	4
Transfers to Recycling of Metals	118,331,581	93,959,478	-21	769,076,924	807,968,065	5
Transfers to Recycling (except metals)	14,821,798	14,747,585	-1	126,039,293	123,865,139	-2
Other Off-site Transfers for Further Management	28,109,509	30,043,913	7	618,053,580	549,500,016	-11
Energy Recovery (except metals)	12,023,812	14,069,929	17	374,559,110	312,512,352	-17
Treatment (except metals)	10,722,895	10,590,039	-1	116,290,608	110,821,313	-5
Sewage (except metals)	5,362,802	5,383,945	0.4	127,203,862	126,166,351	-1
Total Reported Amounts of Releases and Transfers	316,598,609	303,311,805	-4	3,008,295,534	2,955,025,456	-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.

- In TRI, there was little change, overall or within categories, except for sizable decreases in other off-site transfers for further management. TRI total releases and transfers were 2 percent lower in 1999 (2.96 billion kg) than in 1998 (3.01 billion kg).
- In NPRI, on-site releases rose 16 percent, from 103.8 million kg to 120.9 million kg, as a result of higher releases to air, surface water and land; these increases were offset slightly by lower releases to underground injection. Off-site releases declined by 15 percent, mainly because of a 19-percent reduction in transfers of metals. Off-site transfers to recycling fell by 18 percent, with transfers to recycling of metals dropping by 21 percent. Other off-site transfers for further management rose by 7 percent, led by a 17-percent increase in transfers to energy recovery.
- Changes in TRI (with its larger 1998 amounts) were generally smaller than those in NPRI, ranging from -2 to +6 percent. Transfers to disposal (except metals) rose 45 percent; however, such transfers represent the smallest amounts of any TRI category (29.8 million kg in 1999). Other off-site transfers for further management fell 11 percent, from 618.1 million kg to 549.5 million kg, with declines in all categories, notably in off-site transfers to energy recovery, which fell 17 percent.

6.5.1 1998–1999 Total Reported Amounts of Releases and Transfers by State and Province

- Ohio had the highest North American total releases and transfers in both 1998 and 1999, but its reported amount fell by 13 percent, from 280.4 million kg to 244.1 million kg.
- Second-highest overall in both years was Texas, with 253.8 million kg in 1998 and 241.1 million kg in 1999, a decline of 5 percent.
- Ontario had the third-highest total releases and transfers in 1999 with a decrease of 6 percent; in 1998 the province was in fourth place.
- Fourth in total releases and transfers for 1999 was Pennsylvania, with 194.6 million kg, 12 percent higher than in 1998 (when the state was in sixth place).
- Michigan had the fifth-largest total releases and transfers in 1999, with 189.1 million kg, a decrease of 14 percent from 1998 (when the state was in third place).

Table 6–24. Change in Total Reported Amounts of Releases and Transfers in North America, by State and Province, 1998–1999

State/Province	Total Releases						Total Transfers to Recycling					
	1998		1999		Change 1998–1999 (%)	1998		1999		Change 1998–1999 (%)		
	kg	Rank	kg	Rank		kg	Rank	kg	Rank			
Alabama	53,394,751	11	52,517,030	11	-2	19,902,751	21	22,102,123	18	11		
Alaska	258,030	60	189,365	62	-27	12,301	60	726	61	-94		
Alberta	18,359,291	30	16,309,736	32	-11	3,111,826	39	2,263,934	40	-27		
Arizona	26,560,908	21	24,533,301	23	-8	11,323,573	24	17,683,118	23	56		
Arkansas	20,006,884	29	20,025,694	29	0	19,698,408	22	23,943,163	15	22		
British Columbia	8,167,972	40	10,769,479	37	32	486,257	51	843,263	48	73		
California	21,531,293	27	20,353,279	28	-5	30,939,738	11	34,264,015	10	11		
Colorado	3,478,252	50	3,613,658	47	4	8,826,934	31	7,508,424	35	-15		
Connecticut	4,173,160	48	2,963,548	51	-29	8,549,468	32	8,866,134	30	4		
Delaware	6,373,314	44	4,571,279	45	-28	5,413,493	37	4,099,653	38	-24		
District of Columbia	30,047	63	36,441	63	21	3,311	61	5,708	59	72		
Florida	53,834,429	10	58,250,709	8	8	9,318,518	30	8,546,769	32	-8		
Georgia	48,473,181	14	51,088,669	12	5	23,613,784	15	23,624,582	16	0		
Guam	0	64	0	64	--	0	--	0	--	--		
Hawaii	1,504,977	55	1,047,231	56	-30	45,360	58	0	62	-100		
Idaho	22,439,162	26	21,062,987	26	-6	816,748	48	674,846	49	-17		
Illinois	70,608,388	6	68,942,243	6	-2	38,257,887	7	39,474,174	7	3		
Indiana	80,432,694	5	83,501,864	5	4	72,347,826	3	71,356,097	4	-1		
Iowa	17,250,815	31	17,816,410	31	3	23,142,303	16	16,603,881	25	-28		
Kansas	10,942,328	38	14,161,541	33	29	30,147,482	12	34,245,904	11	14		
Kentucky	39,539,846	16	41,668,418	15	5	22,773,779	17	19,859,302	20	-13		
Louisiana	52,209,278	12	49,049,538	13	-6	22,319,169	18	21,927,325	19	-2		
Maine	3,702,323	49	2,891,913	52	-22	978,696	47	950,150	47	-3		
Manitoba	4,657,273	46	4,472,129	46	-4	3,051,756	40	1,201,029	44	-61		
Maryland	15,945,711	32	18,299,914	30	15	1,997,412	43	2,073,522	41	4		
Massachusetts	5,144,009	45	4,724,583	44	-8	11,092,448	25	10,312,484	29	-7		
Michigan	54,531,510	9	54,925,939	9	1	50,712,731	6	54,650,524	6	8		
Minnesota	8,210,942	39	8,241,846	40	0	10,008,696	28	10,561,208	27	6		
Mississippi	28,691,196	20	29,445,235	21	3	7,970,772	33	8,690,159	31	9		
Missouri	33,571,410	17	31,368,459	18	-7	26,325,908	13	25,415,338	14	-3		
Montana	24,555,211	25	23,801,451	24	-3	22,617	59	108,577	56	380		
Nebraska	11,523,485	37	11,119,815	36	-4	10,912,551	26	18,729,613	22	72		
Nevada	3,116,831	51	3,270,894	49	5	1,211,489	45	1,002,053	46	-17		
New Brunswick	6,708,036	42	7,616,656	41	14	218,303	55	162,337	55	-26		
New Hampshire	2,960,493	53	2,415,032	53	-18	5,904,216	36	6,935,301	36	17		
New Jersey	11,750,464	36	11,534,897	35	-2	18,565,431	23	16,815,580	24	-9		
New Mexico	12,917,397	35	10,469,184	38	-19	83,154	56	1,999,008	42	2,304		
New York	25,257,666	23	25,745,779	22	2	36,973,385	8	34,786,667	9	-6		
Newfoundland	457,911	58	413,152	58	-10	0	62	4,500	60	--		
North Carolina	61,316,869	7	64,508,527	7	5	36,758,273	9	33,333,936	12	-9		
North Dakota	3,049,372	52	3,161,345	50	4	311,074	53	250,245	54	-20		
Nova Scotia	4,650,127	47	3,603,420	48	-23	1,662,916	44	279,216	53	-83		
Ohio	138,975,131	1	124,388,321	1	-10	82,169,450	2	80,367,297	2	-2		
Oklahoma	13,898,397	33	12,237,179	34	-12	10,019,903	27	10,401,016	28	4		
Ontario	90,640,160	4	99,287,398	4	10	102,155,404	1	81,186,625	1	-21		
Oregon	24,629,426	24	30,686,135	19	25	6,474,055	34	8,259,676	33	28		
Pennsylvania	96,785,023	3	99,676,784	3	3	60,676,708	4	78,653,451	3	30		
Prince Edward Island	207,653	62	194,477	61	-6	0	--	0	--	--		
Puerto Rico	7,444,477	41	7,358,476	42	-1	5,921,651	35	8,163,427	34	38		
Quebec	20,743,686	28	20,584,233	27	-1	21,979,724	19	22,281,254	17	1		
Rhode Island	708,544	57	509,744	57	-28	5,078,104	38	1,715,672	43	-66		
Saskatchewan	743,612	56	1,310,149	55	76	487,193	50	484,905	51	0		
South Carolina	32,690,272	18	35,842,058	17	10	21,136,422	20	19,629,115	21	-7		
South Dakota	1,505,038	54	2,085,067	54	39	465,858	52	370,683	52	-20		
Tennessee	50,975,001	13	53,044,473	10	4	32,673,986	10	36,220,062	8	11		
Texas	112,138,971	2	107,889,369	2	-4	59,982,879	5	56,249,355	5	-6		
Utah	56,945,138	8	47,989,127	14	-16	1,163,982	46	1,163,047	45	0		
Vermont	218,437	61	265,525	59	22	236,865	54	509,752	50	115		
Virgin Islands	441,063	59	265,269	60	-40	75,073	57	72,265	57	-4		
Virginia	29,646,435	19	30,306,722	20	2	9,612,868	29	12,138,086	26	26		
Washington	13,744,732	34	9,410,540	39	-32	2,813,757	42	5,135,615	37	83		
West Virginia	42,410,137	15	41,243,770	16	-3	2,875,806	41	3,553,847	39	24		
Wisconsin	26,194,986	22	23,386,456	25	-11	25,837,643	14	27,788,762	13	8		
Wyoming	6,487,903	43	5,789,203	43	-11	619,521	49	41,767	58	-93		
Total	1,650,461,458		1,638,253,065		-1	1,028,269,596		1,040,540,267		1		

Note: Canada and US data only. Mexico data not available for 1998–1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 from facilities located in the state/province.

Table 6–24. (continued)

State/Province	Other Transfers for Further Management					Total Reported Amount of Releases and Transfers				
	1998		1999		Change 1998–1999 (%)	1998		1999		Change 1998–1999 (%)
	kg	Rank	kg	Rank		kg	Rank	kg	Rank	
Alabama	21,954,843	7	11,262,084	15	-49	95,252,345	9	85,881,237	10	-10
Alaska	2,313	60	269	61	-88	272,644	62	190,360	62	-30
Alberta	1,472,305	38	2,395,673	34	63	22,943,422	37	20,969,343	39	-9
Arizona	1,422,480	39	2,335,363	35	64	39,306,961	29	44,551,782	27	13
Arkansas	7,212,558	22	16,457,904	10	128	46,917,850	25	60,426,761	21	29
British Columbia	504,971	44	704,000	42	39	9,159,200	46	12,316,742	44	34
California	18,803,922	9	27,089,936	5	44	71,274,953	15	81,707,230	12	15
Colorado	2,326,884	35	2,771,052	33	19	14,632,070	42	13,893,134	42	-5
Connecticut	4,742,211	29	3,577,269	32	-25	17,464,839	41	15,406,951	41	-12
Delaware	1,791,033	37	2,012,643	37	12	13,577,840	43	10,683,575	46	-21
District of Columbia	0	--	0	--	--	33,358	63	42,149	63	26
Florida	5,652,291	27	6,886,959	24	22	68,805,238	18	73,684,437	16	7
Georgia	7,515,389	21	6,685,014	25	-11	79,602,354	12	81,398,265	13	2
Guam	0	--	0	--	--	0	64	0	64	--
Hawaii	1,636	61	1,649	60	1	1,551,973	56	1,048,880	57	-32
Idaho	392,200	46	361,160	47	-8	23,648,110	36	22,098,993	38	-7
Illinois	23,393,786	6	23,092,687	6	-1	132,260,061	7	131,509,104	7	-1
Indiana	41,558,606	4	12,312,700	14	-70	194,339,126	5	167,170,661	6	-14
Iowa	6,260,100	25	6,069,316	27	-3	46,653,218	26	40,489,607	30	-13
Kansas	2,095,590	36	2,179,637	36	4	43,185,400	27	50,587,082	24	17
Kentucky	11,848,442	15	14,485,040	13	22	74,162,067	13	76,012,760	14	2
Louisiana	13,493,989	14	10,882,491	17	-19	88,022,436	11	81,859,354	11	-7
Maine	358,242	47	425,722	45	19	5,039,261	52	4,267,785	51	-15
Manitoba	352,057	48	215,575	50	-39	8,061,086	47	5,888,733	48	-27
Maryland	4,176,369	32	4,449,471	31	7	22,119,492	39	24,822,907	34	12
Massachusetts	8,483,287	19	8,767,723	19	3	24,719,744	33	23,804,790	37	-4
Michigan	114,344,112	1	79,499,636	1	-30	219,588,353	3	189,076,099	5	-14
Minnesota	5,432,975	28	7,476,720	22	38	23,652,613	35	26,279,774	33	11
Mississippi	4,550,834	30	5,071,264	30	11	41,212,802	28	43,206,658	29	5
Missouri	10,238,439	17	10,026,351	18	-2	70,135,757	17	66,810,148	20	-5
Montana	28,551	57	19,391	57	-32	24,606,379	34	23,929,419	35	-3
Nebraska	413,706	45	484,306	44	17	22,849,742	38	30,333,734	32	33
Nevada	31,589	56	29,395	55	-7	4,359,909	53	4,302,342	50	-1
New Brunswick	56,269	55	30,989	54	-45	6,982,608	49	7,809,982	47	12
New Hampshire	1,385,162	40	1,670,429	39	21	10,249,871	45	11,020,762	45	8
New Jersey	36,783,290	5	46,804,073	3	27	67,099,185	20	75,154,550	15	12
New Mexico	272,256	50	390,706	46	44	13,272,807	44	12,858,898	43	-3
New York	8,676,999	18	7,890,354	21	-9	70,908,050	16	68,422,800	18	-4
Newfoundland	0	--	0	--	--	457,911	60	417,652	59	-9
North Carolina	8,180,968	20	7,009,502	23	-14	106,256,110	8	104,851,965	8	-1
North Dakota	258,737	51	236,010	49	-9	3,619,183	54	3,647,600	53	1
Nova Scotia	293,299	49	78,141	53	-73	6,606,342	51	3,960,777	52	-40
Ohio	59,280,770	3	39,317,333	4	-34	280,425,351	1	244,072,951	1	-13
Oklahoma	2,580,429	34	1,281,251	40	-50	26,498,729	32	23,919,446	36	-10
Ontario	20,824,004	8	20,422,882	7	-2	213,619,568	4	200,896,905	3	-6
Oregon	6,363,799	24	5,183,920	29	-19	37,467,280	30	44,129,731	28	18
Pennsylvania	16,579,749	11	16,261,593	12	-2	174,041,480	6	194,591,828	4	12
Prince Edward Island	71,041	54	137,874	51	94	278,694	61	332,351	61	19
Puerto Rico	14,049,837	13	17,755,517	8	26	27,415,965	31	33,277,420	31	21
Quebec	4,533,008	31	6,035,538	28	33	47,256,418	24	48,901,025	26	3
Rhode Island	856,687	41	894,837	41	4	6,643,335	50	3,120,253	54	-53
Saskatchewan	2,555	59	23,241	56	810	1,233,360	57	1,818,295	56	47
South Carolina	18,572,610	10	17,674,779	9	-5	72,399,304	14	73,145,952	17	1
South Dakota	640,232	42	324,143	48	-49	2,611,128	55	2,779,893	55	6
Tennessee	7,051,731	23	6,516,159	26	-8	90,700,718	10	95,780,694	9	6
Texas	81,658,107	2	76,932,525	2	-6	253,779,957	2	241,071,249	2	-5
Utah	572,837	43	578,039	43	1	58,681,957	21	49,730,213	25	-15
Vermont	158,880	52	135,020	52	-15	614,182	59	910,297	58	48
Virgin Islands	154,972	53	10,375	58	-93	671,108	58	347,909	60	-48
Virginia	10,835,892	16	11,113,529	16	3	50,095,195	23	53,558,337	22	7
Washington	3,101,562	33	1,999,471	38	-36	19,660,051	40	16,545,626	40	-16
West Virginia	6,172,664	26	8,532,881	20	38	51,458,607	22	53,330,498	23	4
Wisconsin	15,334,227	12	16,272,436	11	6	67,366,856	19	67,447,654	19	0
Wyoming	4,806	58	1,982	59	-59	7,112,230	48	5,832,952	49	-18
Total	646,163,089		579,543,929		-10	3,324,894,143		3,258,337,261		-2

Map 6-4. Percent Change in Total Reported Amounts of Releases and Transfers in North America, 1998-1999

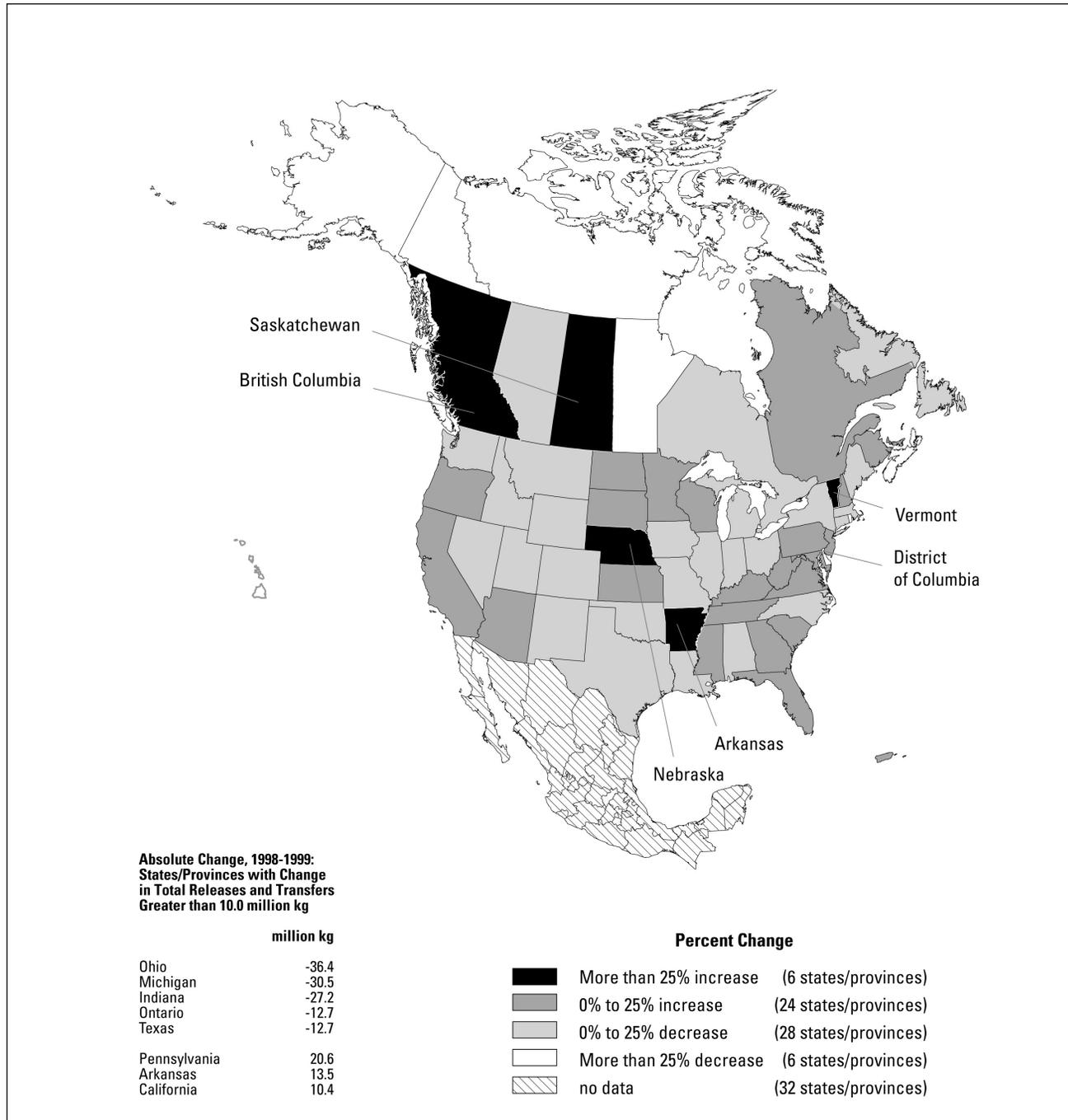


Table 6–25. Average Releases and Transfers per Facility, NPRI and TRI, 1998–1999

	NPRI		TRI		Ratio of Average per Facility (NPRI/TRI)	
	1998 (kg/facility)	1999 (kg/facility)	1998 (kg/facility)	1999 (kg/facility)	1998	1999
On-site Releases	68,717	75,031	63,487	63,959	1.1	1.2
Air	52,935	52,145	39,318	39,795	1.3	1.3
Surface Water	3,303	3,620	5,267	5,731	0.6	0.6
Underground Injection	2,451	2,031	4,090	3,966	0.6	0.5
Land	9,946	17,156	14,811	14,467	0.7	1.2
Off-site Releases	34,155	27,118	11,105	11,829	3.1	2.3
Transfers to Disposal (except metals)	6,239	5,863	1,024	1,533	6.1	3.8
Transfers of Metals	27,915	21,255	10,081	10,296	2.8	2.1
Total Reported Releases On- and Off-site	102,871	102,148	74,592	75,788	1.4	1.3
Off-site Transfers for Further Management						
Off-site Transfers to Recycling	88,181	67,478	44,658	47,921	2.0	1.4
Transfers to Recycling of Metals	78,365	58,324	38,369	41,551	2.0	1.4
Transfers to Recycling (except metals)	9,816	9,154	6,288	6,370	1.6	1.4
Other Off-site Transfers for Further Management	18,616	18,649	30,835	28,259	0.6	0.7
Energy Recovery (except metals)	7,963	8,734	18,687	16,072	0.4	0.5
Treatment (except metals)	7,101	6,574	5,802	5,699	1.2	1.2
Sewage (except metals)	3,552	3,342	6,346	6,488	0.6	0.5
Total Reported Amounts of Releases and Transfers	209,668	188,275	150,085	151,968	1.4	1.2

6.5.2 1998–1999 Average Releases and Transfers per Facility

Between 1998 and 1999, average total releases and transfers per facility decreased in NPRI and increased in TRI, further narrowing the difference between them.

- The ratio between NPRI and TRI per-facility on-site releases remained generally unchanged except for releases to land, where it increased from 0.7 to 1.2. The ratio for off-site releases fell from 3.1 to 2.3, and that for off-site transfers to recycling declined from 2.0 to 1.4. The overall ratio for total releases and transfers decreased from 1.4 to 1.2.
- Average releases and transfers per facility in NPRI declined from 209,668 kg in 1998 to 188,275 kg in 1999. The largest reductions were in off-site transfers of metals (from 27,915 kg to 21,255 kg) and in off-site transfers to recycling of metals (from 78,365 kg to 58,324 kg). The largest increases were in on-site releases to land (from 9,946 kg to 17,156 kg).
- TRI facilities showed little change except for an increase in transfers to recycling of metals, from 38,369 kg to 41,551 kg, and a decline in off-site transfers to energy recovery, from 18,687 kg to 16,072 kg. The overall TRI average rose slightly, from 150,085 kg to 151,968 kg per facility.

6.5.3 1998–1999 Total Reported Amounts of Releases and Transfers by Industry Sector

Data comparing 1998 to 1999 include all industry sectors in the matched data set.

- Primary metals, the industry reporting the largest total amounts of releases and transfers, recorded only a slight decrease between 1998 and 1999. In 1999, its total was 710.3 million kg while its total in 1998 was 713.7 million kg.
- The chemical manufacturing sector (second in total amounts) and electric utilities (third) both showed a 3-percent increase. Hazardous waste facilities, in fourth place, reported a decrease of 22 percent in total releases and transfers, from 361.3 million kg to 283.6 million kg. No other industry with total releases and transfers of more than 100 million kg reported a change in either direction of more than 5 percent.
- In NPRI, total releases and transfers by primary metals facilities dropped from 77.5 million kg to 68.5 million kg as the industry's total releases and transfers to recycling declined. Fabricated metals releases and transfers fell from 63.6 million kg to 49.2 million kg, mainly because of a 25-percent decrease in transfers to recycling. The total for the chemicals industry rose from 36.2 million kg to 48.7 million kg, primarily the result of a 71-percent increase in total releases due to increased reporting of 15 million kg by one facility. The amount reported by hazardous waste facilities decreased from 36.2 million kg to 30.5 million kg.

Table 6–26. Change in Total Reported Amounts of Releases and Transfers in North America, by Industry, 1998–1999 (Ordered by Total Releases and Transfers, 1999)

SIC Code	Industry	Total Releases On- and Off-site			Change 1998–1999 (%)	Total Transfers to Recycling			Change 1998–1999 (%)		
		1998		1999		1998		1999			
		kg	Rank	kg		Rank	kg	Rank		kg	Rank
33	Primary Metals	353,195,415	2	332,363,115	2	-6	350,178,987	1	368,208,490	1	5
28	Chemicals	249,636,835	3	257,925,465	3	3	74,781,426	4	76,464,699	4	2
491/493	Electric Utilities	445,742,024	1	458,693,819	1	3	1,908,322	16	2,360,431	15	24
495/738	Hazardous Waste Mgt./Solvent Recovery	145,677,811	4	136,537,873	4	-6	9,081,597	10	11,221,144	8	24
34	Fabricated Metals Products	33,337,677	9	31,891,441	9	-4	203,637,743	2	202,422,397	2	-1
36	Electronic/Electrical Equipment	12,512,433	14	15,549,768	13	24	179,497,622	3	164,972,594	3	-8
--	Multiple codes 20–39*	48,788,858	7	49,794,362	7	2	69,575,795	5	74,925,724	5	8
26	Paper Products	119,227,202	5	118,289,501	5	-1	1,410,925	18	766,287	18	-46
37	Transportation Equipment	47,451,541	8	48,826,482	8	3	59,616,823	6	64,187,562	6	8
30	Rubber and Plastics Products	51,580,514	6	50,011,003	6	-3	8,751,526	11	5,934,721	11	-32
29	Petroleum and Coal Products	32,498,892	10	30,457,920	11	-6	9,155,739	9	10,003,599	9	9
20	Food Products	32,057,758	11	31,682,596	10	-1	1,541,088	17	670,121	19	-57
35	Industrial Machinery	7,728,964	17	5,879,888	17	-24	32,631,025	7	33,728,562	7	3
24	Lumber and Wood Products	16,367,112	12	17,702,072	12	8	488,921	21	362,040	22	-26
27	Printing and Publishing	11,174,299	15	11,574,806	15	4	3,531,938	14	4,255,632	13	20
32	Stone/Clay/Glass Products	15,345,093	13	14,339,574	14	-7	1,952,493	15	1,773,602	16	-9
39	Misc. Manufacturing Industries	5,004,891	19	5,437,801	18	9	9,232,479	8	8,085,198	10	-12
25	Furniture and Fixtures	8,375,629	16	7,458,361	16	-11	4,269,220	13	2,900,106	14	-32
38	Measurement/Photographic Instruments	4,381,661	20	3,814,737	20	-13	4,987,310	12	4,446,859	12	-11
5169	Chemical Wholesalers	555,928	24	718,576	24	29	1,141,640	19	1,738,861	17	52
22	Textile Mill Products	5,245,208	18	4,240,669	19	-19	725,205	20	559,739	20	-23
12	Coal Mining	2,296,032	21	2,258,259	21	-2	19,834	23	3,063	24	-85
31	Leather Products	1,484,264	22	1,323,024	22	-11	147,672	22	97,601	23	-34
23	Apparel and Other Textile Products	174,066	25	910,483	23	423	4,266	24	451,235	21	10,477
21	Tobacco Products	621,351	23	571,470	25	-8	0	25	0	25	--
Total		1,650,461,458		1,638,253,065		-1	1,028,269,596		1,040,540,267		1

* Multiple SIC codes reported only in TRI.

Figure 6–11. Change in NPRI Total Reported Amounts of Releases and Transfers, by Industry, 1998–1999

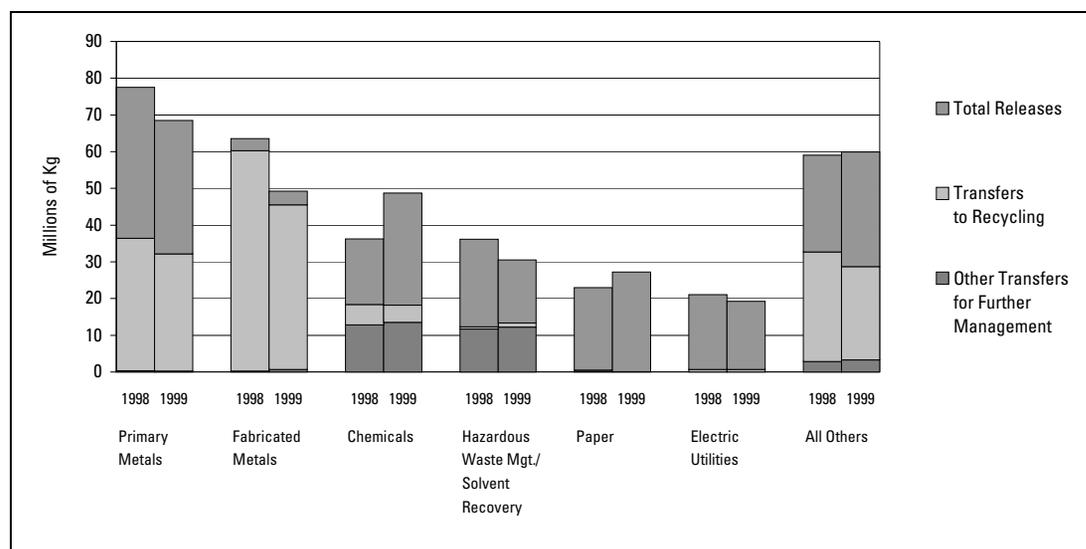
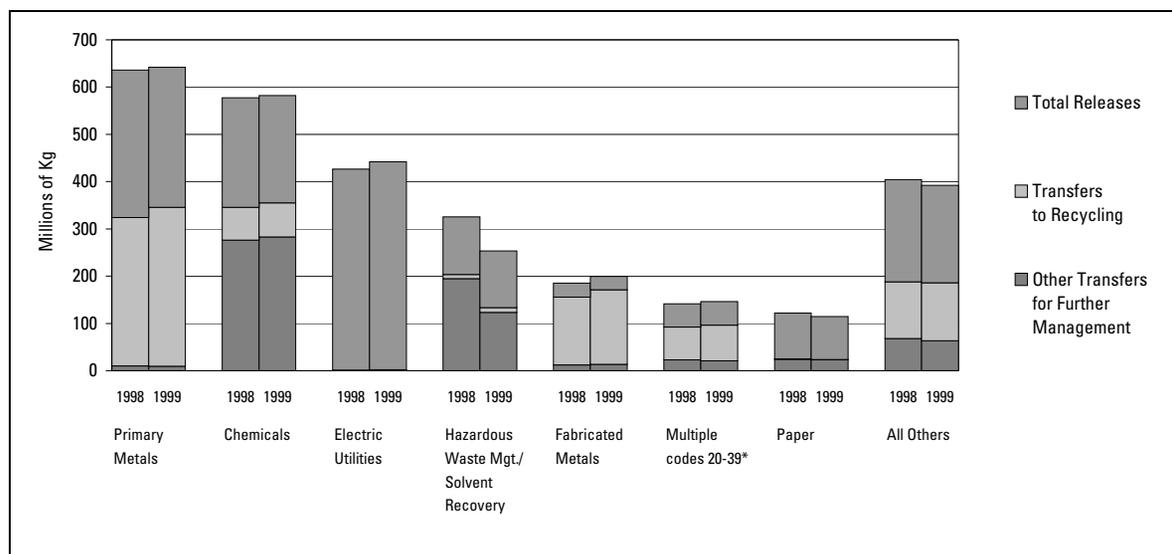


Table 6–26. (continued)

SIC Code	Industry	Other Transfers for Further Management				Change 1998–1999 (%)	Total Reported Amounts of Releases and Transfers					
		1998		1999			1998		1999		Change 1998–1999 (%)	
		kg	Rank	kg	Rank		kg	Rank	kg	Rank		
33	Primary Metals	10,284,511	9	9,746,037	10	-5	713,658,913	1	710,317,642	1	-0.5	
28	Chemicals	289,065,709	1	296,634,492	1	3	613,483,970	2	631,024,656	2	3	
491/493	Electric Utilities	20,475	23	26,786	22	31	447,670,821	3	461,081,036	3	3	
495/738	Hazardous Waste Mgt./Solvent Recovery	206,510,973	2	135,832,383	2	-34	361,270,381	4	283,591,400	4	-22	
34	Fabricated Metals Products	12,122,105	7	14,019,800	5	16	249,097,525	5	248,333,638	5	-0.3	
36	Electronic/Electrical Equipment	9,753,848	10	12,965,621	8	33	201,763,903	6	193,487,983	6	-4	
--	Multiple codes 20–39*	22,937,517	4	21,176,622	4	-8	141,302,170	8	145,896,708	7	3	
26	Paper Products	24,324,794	3	22,803,210	3	-6	144,962,921	7	141,858,998	8	-2	
37	Transportation Equipment	10,587,215	8	10,566,627	9	-0.2	117,655,579	9	123,580,671	9	5	
30	Rubber and Plastics Products	6,451,889	12	6,112,471	12	-5	66,783,929	10	62,058,195	10	-7	
29	Petroleum and Coal Products	7,182,966	11	13,412,521	6	87	48,837,597	12	53,874,040	11	10	
20	Food Products	15,500,586	5	12,985,223	7	-16	49,099,432	11	45,337,940	12	-8	
35	Industrial Machinery	3,272,817	14	3,142,897	13	-4	43,632,806	13	42,751,347	13	-2	
24	Lumber and Wood Products	1,259,767	20	1,106,598	19	-12	18,115,800	15	19,170,710	14	6	
27	Printing and Publishing	2,075,811	18	2,603,275	15	25	16,782,048	16	18,433,713	15	10	
32	Stone/Clay/Glass Products	3,989,058	13	1,774,517	18	-56	21,286,644	14	17,887,693	16	-16	
39	Misc. Manufacturing Industries	2,455,220	16	2,654,292	14	8	16,692,590	17	16,177,291	17	-3	
25	Furniture and Fixtures	2,315,501	17	2,230,209	17	-4	14,960,350	18	12,588,676	18	-16	
38	Measurement/Photographic Instruments	2,466,135	15	2,367,409	16	-4	11,835,106	20	10,629,005	19	-10	
5169	Chemical Wholesalers	12,188,355	6	6,210,109	11	-49	13,885,923	19	8,667,546	20	-38	
22	Textile Mill Products	1,326,208	19	1,087,415	20	-18	7,296,621	21	5,887,823	21	-19	
12	Coal Mining	0	25	0	25	--	2,315,866	22	2,261,322	22	-2	
31	Leather Products	31,814	22	24,143	23	-24	1,663,750	23	1,444,768	23	-13	
23	Apparel and Other Textile Products	38,993	21	60,693	21	56	217,325	25	1,422,411	24	555	
21	Tobacco Products	822	24	579	24	-30	622,173	24	572,049	25	-8	
Total		646,163,089		579,543,929		-10	3,324,894,143		3,258,337,261		-2	

* Multiple SIC codes reported only in TRI.

Figure 6–12. Change in TRI Total Reported Amounts of Releases and Transfers, by Industry, 1998–1999



* Multiple SIC codes reported only in TRI.

- The paper industry in NPRI reported an 18-percent increase. Some of this increase was due to the change in estimation methods, and some was due to increased production or other factors. In NPRI many pulp and paper mills reported a change in how they estimated their on-site releases. A handbook recently developed by the National Council for Air and Stream Improvements (NCASI) provides improved estimation methods, which, in several cases, resulted in increased estimates and/or numbers of chemicals reported. Over 70 percent of NPRI paper facilities reported using the new estimation methods for their 1999 data. About 30 percent revised their 1998 data.
- Most TRI industries showed little change in total releases and transfers. Other transfers for further management by hazardous waste facilities dropped from 194.8 million kg in 1998 to 123.6 million kg in 1999, and total releases and transfers for the industry fell from 325.1 million kg to 253.1 million kg. The total for the fabricated metals products industry rose from 185.5 million kg to 199.1 million kg, mainly because of increased transfers to recycling.

6.5.4 Facilities with Largest Change in Total Reported Amounts of Releases and Transfers, 1998–1999

- The largest decreases in total reported amounts of releases and transfers were by two hazardous waste management facilities: Petro-Chem Processing Group in Detroit, Michigan, with a decline of 42.7 million kg, and Pollution Control Industries in East Chicago, Indiana, with a decrease of 29.0 million kg. The main chemicals involved were hydrocarbons (xylenes, naphthalene, benzene, and others), transferred to energy recovery or treatment.
- The third-largest decrease, 14.8 million kg, was reported by Magna-Cosma, Presstran Industries, in St. Thomas, Ontario, a fabricated metals products facility. The principal chemical involved in its decrease was zinc and its compounds, transferred to recycling. However, this facility indicated that it is considering revising its numbers for 1998.
- Of the other seven facilities in the top 10, five were in TRI, and two were in NPRI (both in Ontario). Six of the top 10 facilities reporting decreases were in hazardous waste management, two were in fabricated metals products and two were in electronic/electrical equipment; the last two reported lead and its compounds as the main chemical involved in the decreases.

Table 6–27. Facilities in North America with Largest Decrease in Total Reported Amounts of Releases and Transfers, 1998–1999

Rank	Facility	City, State/Province	SIC Codes	
			Canada	US
1	Petro-Chem Processing Group/Solvent Distillers Group, Nortru, Inc.	Detroit, MI		495/738
2	Pollution Control Inds. Inc.	East Chicago, IN		495/738
3	Magna - Cosma, Presstran Industries, Cosma International Inc.	St. Thomas, ON	32	34
4	Systech Environmental Corp., Lafarge Corp.	Demopolis, AL		495/738
5	North East Chemical Corp., TBN Holdings Inc.	Cleveland, OH		495/738
6	Karmax Heavy Stampings, Cosma International Inc.	Milton, ON	32	34
7	Safety-Kleen Corp.	San Antonio, TX		495/738
8	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738
9	Raw Materials Corporation	Port Colborne, ON	33	36
10	Exide Corp.	Manchester, IA		36
Total				

Note: Canada and US data only. Mexico data not available for 1998–1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 6–28. Facilities in North America with Largest Increase in Total Reported Amounts of Releases and Transfers, 1998–1999

Rank	Facility	City, State/Province	SIC Codes	
			Canada	US
1	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28
2	Onyx Environmental Services L.L.C.	Azusa, CA		495/738
3	Rineco	Benton, AR		495/738
4	Coastal Eagle Point Oil Co., Coastal Corp.	Westville, NJ		29
5	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738
6	Oxy Vinyls L.P., La Porte - VCM Plant, Occidental Petroleum Corp.	La Porte, TX		28
7	Delphi Energy & Chassis Sys., Delphi Automotive Sys. L.L.C.	Olathe, KS		36
8	U.S. Mint, U.S. Department of the Treasury	Philadelphia, PA		34
9	Belden Communications Div., Belden, Inc.	Phoenix, AZ		33
10	Jayhawk Fine Chemicals Corp., Laporte Fine Chemicals	Galena, KS		28
Total				

Note: Canada and US data only. Mexico data not available for 1998–1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 6–27. (continued)

Rank	1998		1999		Change in Total Reported Amounts of Releases and Transfers 1998–1999 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases) (chemicals accounting for more than 70% of decrease in total releases and transfers from the facility)
	Number of Forms	Total Reported Amounts of Releases and Transfers (kg)	Number of Forms	Total Reported Amounts of Releases and Transfers (kg)		
1	34	60,534,158	21	17,789,485	-42,744,673	Xylenes, Naphthalene, Benzene, Ethylbenzene (transfers to energy recovery), 1,2-Dichlorobenzene (transfers to treatment), Phenol, n-Butyl alcohol, Toluene (transfers to energy recovery)
2	51	29,094,310	3	143,706	-28,950,604	Naphthalene, Acetaldehyde, Toluene, Methyl ethyl ketone, Methanol, n-Butyl alcohol, Benzene, Xylenes (transfers to energy recovery)
3	5	14,944,300	5	141,770	-14,802,530	Zinc and compounds (transfers to recycling)
4	15	11,110,905	9	106,206	-11,004,699	Xylenes, Toluene, Methyl ethyl ketone (transfers to energy recovery)
5	28	10,342,275	*	*	-10,342,275	Toluene, Xylenes, Methyl ethyl ketone, Trichloroethylene, Acrylonitrile (transfers to energy recovery)
6	3	10,750,300	3	3,626,800	-7,123,500	Zinc and compounds (transfers to recycling)
7	9	5,925,030	*	*	-5,925,030	Toluene, Xylenes, Methyl ethyl ketone (transfers to energy recovery)
8	11	22,918,608	10	17,465,186	-5,453,422	Zinc and compounds (land)
9	1	5,304,500	*	*	-5,304,500	Lead and compounds (transfers to recycling)
10	3	10,530,056	3	5,382,222	-5,147,834	Lead and compounds (transfers to recycling)
	160	181,454,442	54	44,655,375	-136,799,067	

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

Table 6–28. (continued)

Rank	1998		1999		Change in Total Reported Amounts of Releases and Transfers 1998–1999 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (chemicals accounting for more than 70% of increase in total releases and transfers from the facility)
	Number of Forms	Total Reported Amounts of Releases and Transfers (kg)	Number of Forms	Total Reported Amounts of Releases and Transfers (kg)		
1	18	152,090	15	15,378,584	15,226,494	Zinc and compounds (land)
2	10	2,216,370	34	12,174,426	9,958,056	Methyl ethyl ketone, Xylenes, Dichloromethane, Tetrachloroethylene, 2-Ethoxyethanol, Methyl isobutyl ketone, Benzene (transfers to energy recovery), Ethylene glycol (transfers to recycling)
3	11	2,512,640	25	11,282,314	8,769,674	Xylenes, Methyl ethyl ketone, Toluene (transfers to energy recovery)
4	17	149,207	18	8,691,259	8,542,052	Propylene, Ethylene (transfers to energy recovery)
5	25	10,744,650	35	18,492,890	7,748,240	Aluminum oxide (land)
6	19	45,296	17	7,425,473	7,380,177	1,1,2-Trichloroethane, 1,2-Dichloroethane, Chloroform (transfers to recycling)
7	4	6,101,885	4	12,511,016	6,409,131	Lead and compounds (transfers to recycling)
8	3	2,567,567	3	8,768,788	6,201,221	Copper and compounds (transfers to recycling)
9	3	898,653	3	6,677,698	5,779,045	Copper and compounds (transfers to recycling)
10	13	1,131,770	16	6,690,682	5,558,912	Nitric acid and nitrate compounds (transfers to disposal)
	123	26,520,128	170	108,093,130	81,573,002	

- The facility reporting the largest increase in total reported releases and transfers was Safety-Kleen Ltd. in Corunna, Ontario. Its increase of 15.2 million kg (from about 150,000 kg in 1998) mainly involved releases of zinc and its compounds to land. The facility reported that the increases in on-site land disposal were due to variation in its waste management business.
- No other facility reported a change of more than 10 million kg. The other nine facilities were in TRI.
- Of the 10 facilities with the largest increased totals, three were in the hazardous waste management industry, three were in chemicals, and one each was in petroleum and coal products, electronics/electrical equipment, fabricated metals products and primary metals. The main chemicals involved were hydrocarbons (transferred to energy recovery), aluminum oxide (released on-site to land), nitric acid and nitrate compounds (transferred to disposal) and, for the metals industries, metals and their compounds transferred to recycling.

6.5.5 1998–1999 Total Reported Amounts of Releases and Transfers by Chemical

- Xylenes had the largest decreases in total amounts of releases and transfers between 1998 and 1999—17.9 million kg, or 12 percent.
- Manganese and its compounds and naphthalene had decreases of 11.8 million kg (7 percent) and 11.3 million kg (75 percent) respectively. Lead and its compounds had the fourth-largest decline, 10.0 million kg (5 percent). Manganese and lead were the two metals among the top 10 chemicals.
- Of the 10 chemicals with the largest decreases in total releases and transfers, two were designated carcinogens: lead and its compounds and acetaldehyde, which decreased by 5.7 million kg, or 43 percent.

Table 6–29. The 10 Chemicals with the Largest Decrease in Total Reported Amounts of Releases and Transfers in North America, 1998–1999

Rank	CAS Number	Chemical	Total Reported Amounts of Releases and Transfers		Change 1998–1999	
			1998 (kg)	1999 (kg)	kg	%
1	--	Xylenes	148,102,402	130,234,153	-17,868,249	-12
2	--	Manganese (and its compounds)*	163,853,266	152,048,174	-11,805,092	-7
3	91-20-3	Naphthalene	14,995,751	3,732,277	-11,263,474	-75
4	--	Lead (and its compounds)*▼	215,938,675	205,950,838	-9,987,837	-5
5	7664-93-9	Sulfuric acid	97,407,760	89,034,766	-8,372,994	-9
6	107-21-1	Ethylene glycol	59,809,013	51,606,509	-8,202,504	-14
7	78-93-3	Methyl ethyl ketone	79,189,562	71,286,678	-7,902,884	-10
8	67-56-1	Methanol	244,751,970	238,897,552	-5,854,418	-2
9	75-07-0	Acetaldehyde▼	13,152,486	7,500,392	-5,652,094	-43
10	108-88-3	Toluene	160,747,807	155,334,005	-5,413,802	-3

Note: Canada and US data only. Mexico data not available for 1998–1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

Table 6–30. The 10 Chemicals with the Largest Increase in Total Reported Amounts of Releases and Transfers in North America, 1998–1999

Rank	CAS Number	Chemical	Total Reported Amounts of Releases and Transfers		Change 1998–1999 kg	%
			1998 (kg)	1999 (kg)		
1	7647-01-0	Hydrochloric acid	288,464,621	313,645,594	25,180,973	9
2	--	Nitric acid and nitrate compounds	225,722,110	242,063,346	16,341,236	7
3	--	Copper (and its compounds)*	398,119,464	409,321,346	11,201,882	3
4	1344-28-1	Aluminum oxide (fibrous forms)	9,440,390	19,151,612	9,711,222	103
5	7429-90-5	Aluminum (fume or dust)*	19,414,666	26,125,797	6,711,131	35
6	--	Zinc (and its compounds)*	427,435,251	433,777,388	6,342,137	1
7	100-42-5	Styrene▼	35,392,721	38,632,293	3,239,572	9
8	115-07-1	Propylene	9,548,662	12,450,432	2,901,770	30
9	74-85-1	Ethylene	22,762,748	24,923,284	2,160,536	9
10	107-06-2	1,2-Dichloroethane▼	6,543,498	8,510,221	1,966,723	30

Note: Canada and US data only. Mexico data not available for 1998–1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

- Hydrochloric acid, with an increase of 25.2 million kg, or 9 percent, was the chemical with the largest increase in total releases and transfers between 1998 and 1999. The amount rose from 288.5 million kg to 313.6 million kg.
- The second-ranked chemical was the category of nitric acid and nitrate compounds, which rose by 16.3 million kg (7 percent), from 225.7 million kg to 242.1 million kg.
- Copper and its compounds, ranked third, increased by 11.2 million kg, or 3 percent. Two other metals—aluminum (fume or dust) and zinc and its compounds—were also among the 10 chemicals with the largest increases in total releases and transfers.
- There were two designated carcinogens among the top 10 chemicals for increases in total releases and transfers: styrene, with an increase of 3.2 million kg (9 percent), and 1,2-dichloroethane, with an increase of 2.0 million kg (30 percent).

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Key Findings

- In 1999, manufacturing facilities in North America released 1.04 billion kg of listed substances on- and off-site, as reported to TRI and NPRI. 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.
- The North American facilities reported a decrease in total releases on- and off-site of 6 percent from 1995 to 1999. After rising between 1996 and 1997, releases decreased by 4 percent from 1997 to 1999.
- NPRI manufacturing facilities reported an increase in total releases from 1995 to 1999 of 6 percent, while TRI manufacturing facilities reported a 7-percent reduction.
- There was a 3-percent reduction in releases on- and off-site of known or suspected carcinogens from 1995 to 1999, less than the change for overall releases.
- As a group, metals and their compounds showed significant increases from 1995 to 1999 in North America; releases of these substances rose 28 percent. Metals made up 26 percent of total releases in 1995 and 36 percent in 1999.
- Transfers off-site for further management increased in North America by 12 percent over the five-year period from 1995 through 1999. They did, however, decrease slightly in the most recent reporting period, from 1998 to 1999. Both NPRI and TRI followed this pattern.
- Total releases and transfers in North America were 1.27 billion kg in 1999, a decrease of 3 percent from 1.31 billion kg in 1995.
- The per-facility averages for total releases and transfers declined in NPRI and rose slightly in TRI from 1995 to 1999. The ratio between the NPRI average and the TRI average thus decreased from 1.7 in 1995 to 1.5 in 1999. The ratio for on-site releases remained about the same as a result of reductions in the per-facility averages in both NPRI and TRI. For off-site releases, however, the ratio fell from 2.8 to 1.6. The ratio for total transfers for further management remained about the same as both NPRI and TRI experienced increases in per-facility averages.
- The industries with the largest total releases and transfers in North America in 1999—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 1999. It analyzes data for industries and chemicals that were reported in both the United States and Canada (the 1995 matched data set) for the years 1995 through 1999. Comparable Mexican data are not available for the 1995–1999 reporting years.

The data in this chapter 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 1999 are excluded. The 1998 and 1999 data presented in this chapter are thus a subset of the 1998 and 1999 data presented in **Chapters 3, 4, 5, and 6**. They include only data from the manufacturing sectors (US SIC codes 20–39), and data for on-site releases and transfers to disposal, treatment, and sewage.

The data are presented in the same categories as in previous chapters. Releases on- and off-site are presented first. Transfers off-site for further management (transfers to treatment and sewage) are presented next, followed by the combined total for all releases and transfers. The section presents data for the states and provinces, by industry sector, on the facilities with the largest amounts, and, finally, by chemical.

7.2 1995–1999 Releases from Manufacturing Industries in North America

In this report, releases are defined as on-site releases to air, surface water, underground injection, and land occurring at the reporting facility, plus off-site releases, including off-site transfers to disposal and all off-site transfers of metals. Transfers of metals to disposal, treatment, and sewage 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.

- Total releases on- and off-site in North America from manufacturing facilities were 1.04 billion kg in 1999, a 6 percent decrease from 1.10 billion kg in 1995.
- Total North American releases declined steadily between 1995 and 1999, except for a small rise between 1996 and 1997. Total NPRI releases rose from 1996 to 1997, fell from 1997 to 1998, and rose again from 1998 to 1999. In 1999 they were 6 percent higher than in 1995. Total TRI releases decreased by 7 percent over the same period.

Table 7–1. Releases On- and Off-site in North America, 1995–1999

	North America					Change 1995-1999	
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	Number	%
Total Facilities	20,737	20,514	20,344	20,242	19,762	-975	-5
Total Forms	63,538	62,264	62,275	62,206	61,444	-2,094	-3
	kg	kg	kg	kg	kg	kg	
On-site Releases*	934,143,051	890,835,934	845,497,620	834,737,382	814,300,138	-119,842,913	-13
Air	615,163,299	573,545,043	520,436,177	490,404,932	462,635,523	-152,527,776	-25
Surface Water	91,681,306	88,303,283	95,899,257	108,042,035	115,701,094	24,019,788	26
Underground Injection	94,701,022	83,975,497	80,679,546	75,992,890	70,790,592	-23,910,430	-25
Land	132,461,061	144,884,149	148,354,452	160,174,217	165,053,664	32,592,603	25
Off-site Releases	167,586,413	184,893,044	239,207,372	221,452,281	225,744,400	58,157,987	35
Transfers to Disposal (except metals)	21,464,301	17,139,586	18,297,595	20,843,757	28,525,165	7,060,864	33
Transfers of Metals**	146,122,112	167,753,458	220,909,777	200,608,524	197,219,235	51,097,123	35
Total Releases On- and Off-site	1,101,729,464	1,075,728,978	1,084,704,992	1,056,189,663	1,040,044,538	-61,684,926	-6

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 165 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.

Table 7–2. NPRI Releases On- and Off-site, 1995–1999

	NPRI						%
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	Change 1995-1999 Number	
Total Facilities	1,250	1,308	1,393	1,434	1,532	282	23
Total Forms	4,015	4,176	4,484	4,637	5,070	1,055	26
	kg	kg	kg	kg	kg	kg	
On-site Releases*	95,812,650	87,802,558	85,768,759	81,954,820	102,242,178	6,429,528	7
Air	72,163,535	68,109,125	67,536,607	62,824,360	68,787,840	-3,375,695	-5
Surface Water	10,215,041	5,448,729	4,527,589	4,961,451	5,801,557	-4,413,484	-43
Underground Injection	3,556,927	4,846,549	4,197,660	3,700,429	3,272,500	-284,427	-8
Land	9,740,784	9,270,193	9,378,715	10,345,272	24,261,016	14,520,232	149
Off-site Releases	25,712,452	27,103,282	33,772,920	29,122,842	26,570,965	858,513	3
Transfers to Disposal (except metals)	3,768,263	1,800,796	1,824,909	2,290,921	2,285,393	-1,482,870	-39
Transfers of Metals**	21,944,189	25,302,486	31,948,011	26,831,921	24,285,572	2,341,383	11
Total Releases On- and Off-site	121,525,102	114,905,840	119,541,679	111,077,662	128,813,143	7,288,041	6

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 165 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.

Table 7–3. TRI Releases On- and Off-site, 1995–1999

	TRI						%
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	Change 1995-1999 Number	
Total Facilities	19,487	19,206	18,951	18,808	18,230	-1,257	-6
Total Forms	59,523	58,088	57,791	57,569	56,374	-3,149	-5
	kg	kg	kg	kg	kg	kg	
On-site Releases	838,330,401	803,033,376	759,728,861	752,782,562	712,057,960	-126,272,441	-15
Air	542,999,764	505,435,918	452,899,570	427,580,572	393,847,683	-149,152,081	-27
Surface Water	81,466,265	82,854,554	91,371,668	103,080,584	109,899,537	28,433,272	35
Underground Injection	91,144,095	79,128,948	76,481,886	72,292,461	67,518,092	-23,626,003	-26
Land	122,720,277	135,613,956	138,975,737	149,828,945	140,792,648	18,072,371	15
Off-site Releases	141,873,961	157,789,762	205,434,452	192,329,439	199,173,435	57,299,474	40
Transfers to Disposal (except metals)	17,696,038	15,338,790	16,472,686	18,552,836	26,239,772	8,543,734	48
Transfers of Metals*	124,177,923	142,450,972	188,961,766	173,776,603	172,933,663	48,755,740	39
Total Releases On- and Off-site	980,204,362	960,823,138	965,163,313	945,112,001	911,231,395	-68,972,967	-7

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 165 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.

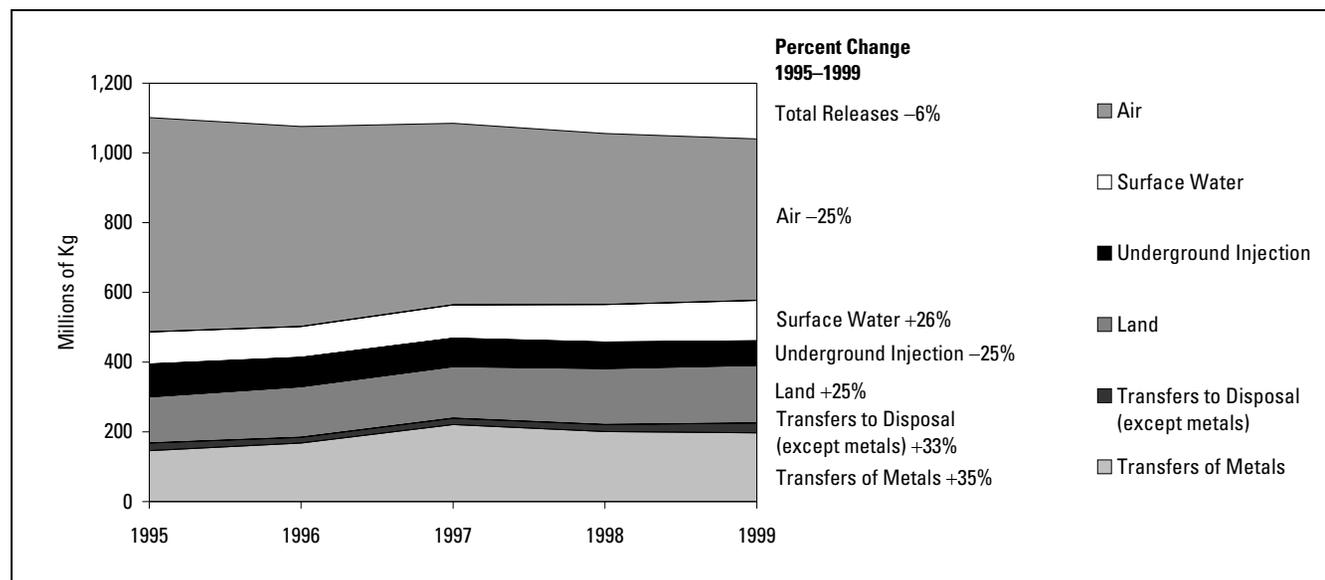
* Includes transfers of metals and metal compounds to treatment, sewage and disposal.

- On-site releases by manufacturing facilities in North America decreased by 13 percent from 1995 to 1999, with declines in every year. US facilities also reported a steady decline, resulting in an overall 15-percent reduction. Canadian facilities reported an overall increase of 7 percent, decreasing from 1995 through 1998 and then rising from 1998 to 1999. One facility accounted for the overall increase; Safety-Kleen in Corunna, Ontario reported an increase of over 15.4 million kg in on-site land releases from 1998 to 1999. Without this facility's on-site releases in the most recent reporting period, the change for NPRI from 1995 to 1999 in on-site releases would have been a decrease of 9 percent.
- Off-site releases in North America rose 35 percent from 1995 to 1999; they increased between 1995 and 1997, decreased between 1997 and 1998, and rose again in 1999. In NPRI, off-site releases rose between 1995 and 1997 and decreased between 1997 and 1999, resulting in an overall increase of 3 percent from 1995 to 1999. Off-site releases in TRI rose between 1995 and 1997, declined between 1997 and 1998, and rose again between 1998 and 1999, increasing 40 percent over the period.

Decreases from 1995 to 1999 in total releases on- and off-site reflect substantial reductions in on-site air emissions in North America, particularly in TRI. On-site underground injection in North America also decreased over the period. Increases were reported in the other types of releases, including on-site land disposal and off-site transfers of metals (primarily transfers to off-site land disposal).

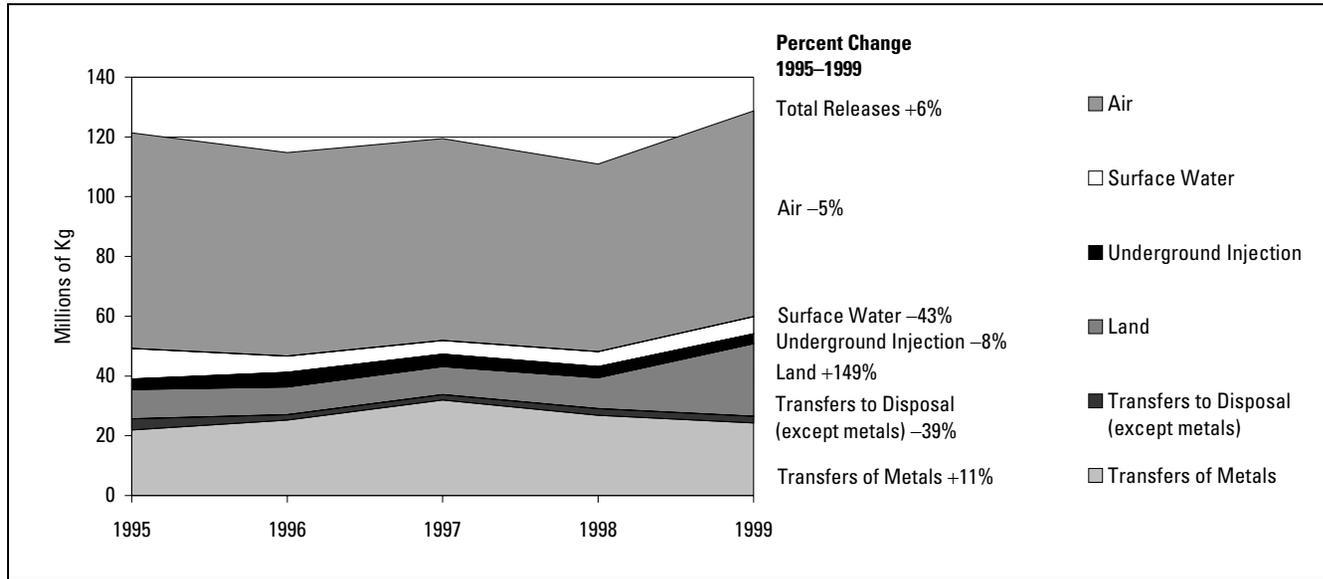
- On-site air emissions dropped by 25 percent in North America from 1995 to 1999, with reductions in each year. In Canada, the reduction was 5 percent, although there was an increase reported from 1998 to 1999; in the United States, the reduction was 27 percent.
- Releases to surface water fell in NPRI by 43 percent but rose by 35 percent in TRI, for an overall 26-percent rise in North American releases.
- On-site underground injection decreased by 25 percent in North America. For Canadian facilities, the decline was 8 percent, after an initial increase between 1995 and 1996. US facilities reported a drop of 26 percent.
- On-site releases to land rose 25 percent in North America from 1995 to 1999. TRI facilities reported an increase in on-site land releases of 15 percent for the period, although the amount declined between 1998 and 1999 after rising in every year from 1995 to 1998. NPRI facilities reported a jump of 149 percent, with the increase due to one facility's report of over 15 million kg in 1999 (reported by Safety-Kleen in Corunna, Ontario).

Figure 7-1. Releases On- and Off-site in North America, 1995-1999



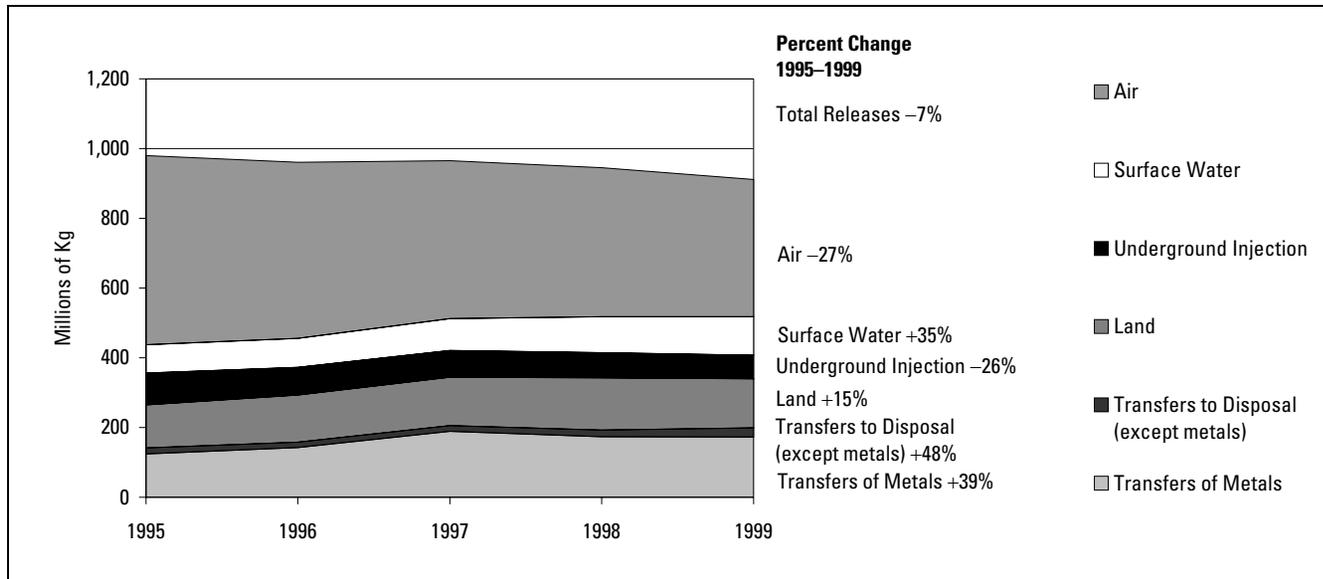
Note: Canada and US data only. Mexico data not available for 1995-1999.

Figure 7–2. NPRI Releases On- and Off-site, 1995–1999



- Off-site North American transfers to disposal (except metals) rose by 33 percent. The amount declined between 1995 and 1996 and then rose between 1996 and 1999. Canadian facilities reported a 39-percent decrease in this type of transfer, with a sharp drop between 1995 and 1996 and a steep rise between 1997 and 1998. US facilities reported a 48-percent increase, with declines from 1995 to 1996 more than offset by a steady rise between 1996 and 1999.
- The largest increase for North American releases was in off-site transfers of metals, which rose by 35 percent from 1995 to 1999. Both Canadian and US facilities reported increases: 11 percent in Canada and 39 percent in the United States. North American off-site transfers of metals decreased by 11 percent from 1997 to 1999, after steady increases from 1995 to 1997. In Canada, off-site transfers of metals reached a high point in 1997 and then fell 24 percent between 1997 and 1999.

Figure 7–3. TRI Releases On- and Off-site, 1995–1999



7.2.1 1995–1999 Releases On- and Off-site by State and Province

A small number of states and provinces—Texas, Ontario, Pennsylvania, Ohio, Indiana and Louisiana—each reported more than 50 million kg of total on- and off-site releases in 1995 or 1999, or both. Their ranked order changed from year to year.

On-site releases are releases to air, water, underground injection wells, and on-site land disposal that occur at the site of the facility. Off-site releases are chemicals in wastes sent for disposal by the facility to a location nearby, out of the state or province, or out of the country. Only amounts from manufacturing facilities (US SIC Codes 20-39) are included in the 1995–1999 comparison.

- Texas facilities reported the largest total releases on- and off-site from 1995 to 1999, but the amount declined by 19 percent. Texas had the largest on-site releases in both 1995 and 1999. The state reported a 22-percent reduction in on-site releases and a 26-percent increase in off-site releases from 1995 to 1999.
- Ontario reported the second-largest total releases in both 1995 and 1999. The amount rose 18 percent from 1995 to 1999. Ontario was third in on-site releases in 1995 but second in 1999, as these releases rose 20 percent. In off-site releases, the province fell in rank from second to fourth, with a decline of 10 percent.

Table 7–4. Change in Total Releases On- and Off-site in North America, by State and Province, 1995–1999

State/Province	Total On-site Releases					Total Off-site Releases*				
	1995 kg	Rank	1999 kg	Rank	Change 1995-1999 (%)	1995 kg	Rank	1999 kg	Rank	Change 1995-1999 (%)
Alabama	41,808,650	5	25,684,755	10	-39	5,579,572	9	5,080,098	13	-9
Alaska	1,005,984	56	116,809	61	-88	2,735	60	0	63	-100
Alberta	14,888,596	24	10,434,960	26	-30	535,383	39	818,207	33	53
Arizona	16,968,691	22	22,346,355	14	32	2,280,631	17	362,555	41	-84
Arkansas	11,247,356	28	10,669,801	24	-5	1,372,814	27	8,563,616	7	524
British Columbia	6,054,914	38	9,730,823	28	61	2,536,989	15	345,503	42	-86
California	9,623,088	31	9,040,557	29	-6	4,132,895	11	2,908,347	21	-30
Colorado	1,538,658	51	2,057,467	46	34	63,058	49	522,177	40	727
Connecticut	3,903,742	43	1,824,245	47	-53	832,452	35	530,528	39	-36
Delaware	2,022,136	47	1,632,491	48	-19	1,268,061	30	1,339,898	30	6
District of Columbia	0	63	0	63	--	116	62	613	60	428
Florida	18,095,368	20	25,409,736	11	40	1,448,826	26	1,760,826	27	22
Georgia	20,324,521	17	19,694,740	17	-3	2,246,906	18	4,748,098	14	111
Hawaii	146,635	61	95,522	62	-35	73,933	47	686	59	-99
Idaho	5,646,899	39	10,002,578	27	77	18,245	55	203,624	46	1,016
Illinois	35,440,788	7	26,413,217	9	-26	8,027,260	6	14,082,918	5	75
Indiana	30,095,126	10	27,682,176	8	-8	13,872,477	5	26,356,457	1	90
Iowa	10,669,684	29	8,440,430	31	-21	1,012,433	32	4,664,195	15	361
Kansas	6,777,619	35	5,953,287	37	-12	2,711,408	13	6,927,180	10	155
Kentucky	13,268,000	26	11,102,364	23	-16	2,672,378	14	5,821,993	11	118
Louisiana	52,524,396	2	42,170,304	3	-20	1,216,127	31	1,453,041	29	19
Maine	3,737,529	44	2,549,034	44	-32	791,242	36	312,867	44	-60
Manitoba	1,667,530	49	3,949,447	42	137	83,676	46	188,682	47	125
Maryland	4,669,486	40	4,470,607	40	-4	914,067	34	234,104	45	-74
Massachusetts	3,031,204	46	1,483,421	49	-51	760,473	38	737,755	34	-3
Michigan	27,036,327	12	16,153,636	20	-40	14,316,774	3	13,196,321	6	-8
Minnesota	7,598,426	33	5,251,979	39	-31	778,622	37	1,490,143	28	91
Mississippi	25,305,235	13	23,163,626	13	-9	1,319,406	28	550,196	37	-58
Missouri	22,347,877	15	20,709,352	16	-7	1,582,298	24	2,029,066	25	28
Montana	19,379,820	18	21,564,001	15	11	11,686	56	614,996	36	5,163
Nebraska	4,108,609	41	6,466,716	35	57	1,725,772	20	2,699,733	23	56
Nevada	1,506,023	52	1,353,690	50	-10	24,677	53	13,950	57	-43
New Brunswick	6,681,696	36	4,276,856	41	-36	70,549	48	652,022	35	824
New Hampshire	1,053,794	54	1,054,926	52	0	107,493	44	132,574	51	23
New Jersey	6,441,491	37	5,844,097	38	-9	1,703,517	22	1,862,958	26	9
New Mexico	18,657,903	19	8,849,615	30	-53	29,667	52	84,152	53	184
New York	16,079,834	23	10,480,993	25	-35	2,320,890	16	4,326,674	19	86
Newfoundland	313,517	59	233,472	58	-26	28	63	39,780	56	141,971
North Carolina	30,818,013	9	23,225,897	12	-25	1,301,327	29	2,219,090	24	71
North Dakota	652,717	57	410,109	55	-37	10,863	57	70,917	54	553
Nova Scotia	1,583,093	50	727,499	54	-54	101,656	45	148,455	50	46
Ohio	41,557,103	6	33,211,339	6	-20	13,994,442	4	20,944,840	3	50
Oklahoma	7,251,303	34	6,075,676	36	-16	1,668,445	23	1,251,112	31	-25
Ontario	46,182,682	3	55,621,909	2	20	18,173,058	2	20,034,624	4	10
Oregon	9,394,609	32	7,974,729	32	-15	2,172,460	19	4,589,921	16	111
Pennsylvania	29,501,164	11	38,050,551	4	29	26,243,633	1	22,012,323	2	-16
Prince Edward Island	13,020	62	194,469	59	1,394	400	61	8	62	-98
Puerto Rico	3,542,240	45	2,421,388	45	-32	214,994	43	183,564	48	-15
Quebec	17,413,949	21	15,863,117	21	-9	4,205,221	10	4,334,311	18	3
Rhode Island	1,120,895	53	348,168	56	-69	246,977	42	161,343	49	-35
Saskatchewan	1,013,653	55	1,209,626	51	19	5,492	58	9,373	58	71
South Carolina	21,565,212	16	19,144,847	18	-11	1,722,635	21	7,321,041	9	325
South Dakota	1,720,558	48	1,054,185	53	-39	41,810	51	48,490	55	16
Tennessee	43,202,227	4	30,940,863	7	-28	3,093,849	12	4,417,843	17	43
Texas	108,340,282	1	84,590,546	1	-22	6,578,154	7	8,281,733	8	26
Utah	34,647,293	8	36,708,261	5	6	408,068	40	2,866,366	22	602
Vermont	271,945	60	155,910	60	-43	45,576	50	109,615	52	141
Virgin Islands	549,643	58	235,495	57	-57	18,587	54	534	61	-97
Virginia	22,549,754	14	16,633,599	19	-26	985,918	33	4,141,305	20	320
Washington	10,240,487	30	7,751,914	33	-24	295,674	41	534,732	38	81
West Virginia	11,500,729	27	7,512,946	34	-35	1,544,374	25	953,313	32	-38
Wisconsin	13,787,498	25	12,071,596	22	-12	6,063,796	8	5,108,581	12	-16
Wyoming	4,055,830	42	3,807,414	43	-6	3,468	59	344,433	43	9,832
Total	934,143,051		814,300,138		-13	167,586,413		225,744,400		35

Note: Canada and US data only. Mexico data not available for 1995 or 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 off-site to disposal and transfers of metals from facilities located in the state/province.

Table 7-4. (continued)

State/Province	Total Releases On-site and Off-site				Change 1995-1999 (%)
	1995		1999		
	kg	Rank	kg	Rank	
Alabama	47,388,222	6	30,764,853	10	-35
Alaska	1,008,719	56	116,809	61	-88
Alberta	15,423,979	26	11,253,167	30	-27
Arizona	19,249,322	22	22,708,910	18	18
Arkansas	12,620,170	29	19,233,417	22	52
British Columbia	8,591,903	35	10,076,326	32	17
California	13,755,983	27	11,948,904	29	-13
Colorado	1,601,716	51	2,579,644	47	61
Connecticut	4,736,194	42	2,354,773	48	-50
Delaware	3,290,197	47	2,972,389	44	-10
District of Columbia	116	63	613	63	428
Florida	19,544,194	20	27,170,562	12	39
Georgia	22,571,427	17	24,442,838	15	8
Hawaii	220,568	61	96,208	62	-56
Idaho	5,665,144	40	10,206,202	31	80
Illinois	43,468,048	9	40,496,135	7	-7
Indiana	43,967,603	8	54,038,633	5	23
Iowa	11,682,117	30	13,104,625	26	12
Kansas	9,489,027	33	12,880,467	27	36
Kentucky	15,940,378	25	16,924,357	24	6
Louisiana	53,740,523	5	43,623,345	6	-19
Maine	4,528,771	43	2,861,901	45	-37
Manitoba	1,751,206	49	4,138,129	43	136
Maryland	5,583,553	41	4,704,711	41	-16
Massachusetts	3,791,677	45	2,221,176	49	-41
Michigan	41,353,101	10	29,349,957	11	-29
Minnesota	8,377,048	36	6,742,122	39	-20
Mississippi	26,624,641	13	23,713,822	16	-11
Missouri	23,930,175	14	22,738,418	17	-5
Montana	19,391,506	21	22,178,997	19	14
Nebraska	5,834,381	39	9,166,449	33	57
Nevada	1,530,700	52	1,367,640	50	-11
New Brunswick	6,752,245	38	4,928,878	40	-27
New Hampshire	1,161,287	54	1,187,500	52	2
New Jersey	8,145,008	37	7,707,055	37	-5
New Mexico	18,687,570	23	8,933,767	34	-52
New York	18,400,724	24	14,807,667	25	-20
Newfoundland	313,545	60	273,252	57	-13
North Carolina	32,119,340	12	25,444,987	14	-21
North Dakota	663,580	57	481,026	56	-28
Nova Scotia	1,684,749	50	875,954	54	-48
Ohio	55,551,545	4	54,156,179	4	-3
Oklahoma	8,919,748	34	7,326,788	38	-18
Ontario	64,355,740	2	75,656,533	2	18
Oregon	11,567,069	31	12,564,650	28	8
Pennsylvania	55,744,797	3	60,062,874	3	8
Prince Edward Island	13,420	62	194,477	60	1,349
Puerto Rico	3,757,234	46	2,604,952	46	-31
Quebec	21,619,170	18	20,197,428	21	-7
Rhode Island	1,367,872	53	509,511	55	-63
Saskatchewan	1,019,145	55	1,218,999	51	20
South Carolina	23,287,847	16	26,465,888	13	14
South Dakota	1,762,368	48	1,102,675	53	-37
Tennessee	46,296,076	7	35,358,706	9	-24
Texas	114,918,436	1	92,872,279	1	-19
Utah	35,055,361	11	39,574,627	8	13
Vermont	317,521	59	265,525	58	-16
Virgin Islands	568,230	58	236,029	59	-58
Virginia	23,535,672	15	20,774,904	20	-12
Washington	10,536,161	32	8,286,646	36	-21
West Virginia	13,045,103	28	8,466,259	35	-35
Wisconsin	19,851,294	19	17,180,177	23	-13
Wyoming	4,059,298	44	4,151,847	42	2
Total	1,101,729,464		1,040,044,538		-6

- Pennsylvania was third in total releases in both 1995 and 1999. In on-site releases, the state rose from 11th in rank in 1995 to fourth in 1999, with an increase of 29 percent. Its off-site releases decreased by 16 percent, and the state moved from first to second place in this category. Pennsylvania facilities' total releases rose 8 percent from 1995 to 1999.
- Ohio facilities ranked fourth in total releases in both 1995 and 1998, although the amount declined by 3 percent. With a 50-percent rise in off-site releases, Ohio moved from fourth place in this category in 1995 to third in 1999.
- Indiana ranked fifth in total releases in 1999; it had been eighth in 1995. Its total releases increased by 23 percent to amounts slightly lower than Ohio's. In 1999 Indiana ranked first for off-site releases, which were 90 percent higher than in 1995, when the state ranked fifth in this category.
- Louisiana, which had the fifth-largest total releases in 1995, ranked sixth in 1999. Its total releases fell by 19 percent from 1995 to 1999. The main factor was a 20 percent drop in on-site releases; the state moved from second to third place in this type of release.

7.2.2 1995–1999 Releases On- and Off-site by Industry Sector

Data comparing 1995 with 1999 do not include the industry sectors reporting for the first time to TRI for 1998. Information on releases from the new industry sectors is presented in previous chapters. Only the manufacturing sectors (US SIC codes 20–39) are included in this chapter because they are the only sectors for which both TRI and NPRI data are available for the period 1995 to 1999.

- Among manufacturing sectors in North America, primary metals had the second-largest total releases on- and off-site in 1995 and the largest in 1999. Releases from this industry rose 18 percent from 1995 to 1999. In both years, primary metals reported the second-largest on-site releases and the largest off-site releases; the latter rose by 42 percent.
- The chemicals industry, first in total releases in 1995, ranked second in 1999, its total having fallen by 19 percent. In both 1995 and 1999, chemical manufacturing facilities reported the largest on-site releases and the second largest off-site releases, but the industry’s on-site releases dropped 22 percent from 1999 to 1995.
- Paper products was in third place in both years, although total releases decreased by 10 percent from 1995 to 1999. The industry had the third-largest on-site releases in both years, but that amount, too, fell by 11 percent during the period.

Table 7–5. Change in Total Releases On- and Off-site in North America, by Industry, 1995–1999

US SIC Code	Industry	Total On-site Releases			Change 1995-1999 (%)	Total Off-site Releases*			Change 1995-1999 (%)
		1995	1999	Rank		1995	1999	Rank	
33	Primary Metals	178,066,863	185,660,702	2	4	103,632,854	146,702,413	1	42
28	Chemicals	297,420,483	231,513,791	1	-22	20,477,811	26,411,674	2	29
26	Paper Products	130,171,120	115,718,444	3	-11	1,726,583	2,571,057	8	49
30	Rubber and Plastics Products	50,622,136	44,621,768	5	-12	5,037,855	5,389,235	7	7
--	Multiple codes 20–39**	54,061,565	41,466,109	6	-23	7,237,531	8,328,253	5	15
37	Transportation Equipment	48,558,533	43,096,263	6	-11	5,501,048	5,730,219	6	4
34	Fabricated Metals Products	29,624,547	21,016,928	7	-29	10,018,093	10,874,513	3	9
20	Food Products	20,567,708	29,440,148	9	43	333,386	2,242,448	10	573
29	Petroleum and Coal Products	26,768,368	28,391,016	8	6	1,521,551	2,066,904	11	36
24	Lumber and Wood Products	14,934,174	17,456,251	10	17	184,015	245,821	17	34
36	Electronic/Electrical Equipment	11,058,229	7,062,579	13	-36	4,522,717	8,487,189	4	88
32	Stone/Clay/Glass Products	10,417,744	12,093,448	14	16	2,918,396	2,246,126	9	-23
27	Printing and Publishing	14,228,681	11,522,705	12	-19	69,869	52,101	19	-25
25	Furniture and Fixtures	18,505,279	7,309,079	10	-61	60,772	149,282	18	146
35	Industrial Machinery	8,644,680	3,870,578	15	-55	1,823,041	2,009,310	12	10
39	Misc. Manufacturing Industries	4,979,034	4,797,098	18	-4	1,045,558	640,703	14	-39
22	Textile Mill Products	7,696,372	3,930,296	16	-49	361,613	310,373	15	-14
38	Measurement/Photographic Instruments	6,063,618	3,512,575	17	-42	331,621	302,162	16	-9
31	Leather Products	793,871	373,901	19	-53	768,655	949,123	13	23
23	Apparel and Other Textile Products	444,100	875,249	21	97	12,904	35,234	20	173
21	Tobacco Products	515,946	571,210	20	11	540	260	21	-52
Total		934,143,051	814,300,138		-13	167,586,413	225,744,400		35

Note: Canada and US data only. Mexico data not available for 1995 or 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 off-site to disposal and transfers of metals.

** Multiple SIC codes reported only in TRI.

Figure 7–4. Change in NPRI Total Releases On- and Off-site, by Industry, 1995–1999

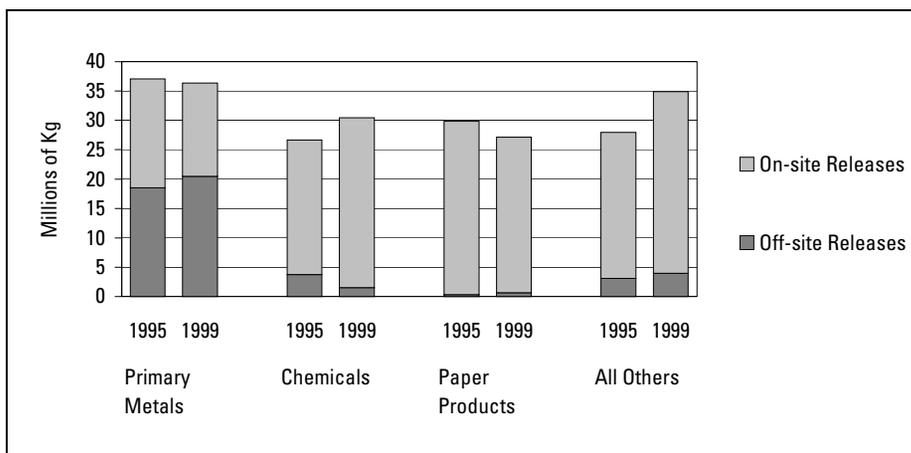


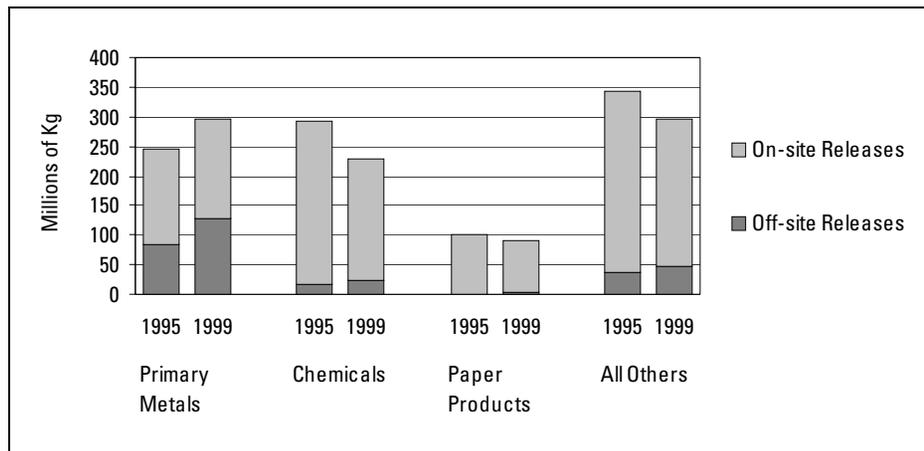
Table 7-5. (continued)

US SIC Code	Industry	Total Releases On- and Off-site				Change 1995-1999 (%)
		1995		1999		
		kg	Rank	kg	Rank	
33	Primary Metals	281,699,717	2	332,363,115	1	18
28	Chemicals	317,898,294	1	257,925,465	2	-19
26	Paper Products	131,897,703	3	118,289,501	3	-10
30	Rubber and Plastics Products	55,659,991	5	50,011,003	4	-10
--	Multiple codes 20–39**	61,299,096	4	49,794,362	5	-19
37	Transportation Equipment	54,059,581	6	48,826,482	6	-10
34	Fabricated Metals Products	39,642,640	7	31,891,441	7	-20
20	Food Products	20,901,094	9	31,682,596	8	52
29	Petroleum and Coal Products	28,289,919	8	30,457,920	9	8
24	Lumber and Wood Products	15,118,189	12	17,702,072	10	17
36	Electronic/Electrical Equipment	15,580,946	11	15,549,768	11	-0.2
32	Stone/Clay/Glass Products	13,336,140	14	14,339,574	12	8
27	Printing and Publishing	14,298,550	13	11,574,806	13	-19
25	Furniture and Fixtures	18,566,051	10	7,458,361	14	-60
35	Industrial Machinery	10,467,721	15	5,879,888	15	-44
39	Misc. Manufacturing Industries	6,024,592	18	5,437,801	16	-10
22	Textile Mill Products	8,057,985	16	4,240,669	17	-47
38	Measurement/Photographic Instruments	6,395,239	17	3,814,737	18	-40
31	Leather Products	1,562,526	19	1,323,024	19	-15
23	Apparel and Other Textile Products	457,004	21	910,483	20	99
21	Tobacco Products	516,486	20	571,470	21	11
Total		1,101,729,464		1,040,044,538		-6

** Multiple SIC codes reported only in TRI.

- Fourteen of the 21 industries in the matched data set for North America reported declines in total releases between 1995 and 1999. A notable exception was food products, which reported a 52-percent rise in total releases (comprising a 43-percent increase in on-site releases and a 573-percent jump in off-site releases, to about 2.2 million kg). Of the 21 industries, 14 reported lower on-site releases in 1999 than in 1995. In off-site releases, 15 industries reported an increase in the totals from 1995 to 1999.
- Primary metals, chemicals and paper products ranked first, second, and third respectively in NPRI, TRI, and North America as a whole, in 1999. They were also the top three industries in 1995, but the order differed somewhat. For TRI, chemicals ranked first in 1995 and for NPRI, paper products ranked second in 1995.

Figure 7-5. Change in TRI Total Releases On- and Off-site, by Industry, 1995–1999



7.2.3 1995–1999 Total Releases On- and Off-site by Chemical

There are 165 substances in the 1995 matched data set, which contains the substances reported to both NPRI and TRI for the years 1995 through 1999. This set does not include those chemicals added to the NPRI list for 1999. It is, therefore, a subset of the 1999 matched data set presented in **Chapters 3, 4 and 5**. The list of chemicals is the same as is found in **Chapter 6** (the 1998 matched data set).

Appendix D presents information on potential health effects of the substances with the largest releases and transfers as reported to the North American PRTRs, from the US Agency for Toxic Substances and Disease Registry, the US EPA's Office of Pollution Prevention and Toxics and the New Jersey Department of Health and Senior Services. **Appendix E** describes uses of these substances.

- The chemical with the largest reduction in total releases in North America from 1995 to 1999 was methanol, with a reported reduction of 31.0 million kg, or 21 percent.
- Toluene had the second-largest reduction in North America, with a reported reduction of 25.7 million kg, or 35 percent.
- Carbon disulfide was third, with a decrease of 21.8 million kg, or 57 percent.
- Two of the 10 chemicals with the largest decreases—dichloromethane and trichloroethylene—are known or suspected carcinogens.

Table 7–6. The 10 Chemicals with the Largest Decrease in Total Releases On- and Off-site in North America, 1995–1999

Rank	CAS Number	Chemical	Total Releases On- and Off-site			
			1995 (kg)	1999 (kg)	Change 1995-1999 kg	%
1	67-56-1	Methanol	147,992,856	116,955,002	-31,037,854	-21
2	108-88-3	Toluene	73,835,417	48,110,181	-25,725,236	-35
3	75-15-0	Carbon disulfide	38,198,047	16,367,795	-21,830,252	-57
4	--	Xylenes	55,043,788	38,703,885	-16,339,903	-30
5	78-93-3	Methyl ethyl ketone	36,939,993	23,659,938	-13,280,055	-36
6	75-09-2	Dichloromethane [▼]	28,559,885	18,374,191	-10,185,694	-36
7	7782-50-5	Chlorine	31,588,664	22,960,350	-8,628,314	-27
8	7647-01-0	Hydrochloric acid	32,746,556	24,847,517	-7,899,039	-24
9	79-01-6	Trichloroethylene [▼]	12,614,062	5,526,700	-7,087,362	-56
10	115-07-1	Propylene	13,756,989	7,049,570	-6,707,419	-49

Note: Canada and US data only. Mexico data not available for 1995–1999. [▼] Known or suspected carcinogen.

Table 7–7. The 10 Chemicals with the Largest Increase in Total Releases On- and Off-site in North America, 1995–1999

Rank	CAS Number	Chemical	Total Releases On- and Off-site			
			1995 (kg)	1999 (kg)	Change 1995-1999 kg	%
1	--	Zinc (and its compounds)*	128,619,650	185,467,125	56,847,475	44
2	--	Nitric acid and nitrate compounds	116,341,798	150,192,310	33,850,512	29
3	--	Manganese (and its compounds)*	55,183,267	64,773,073	9,589,806	17
4	--	Lead (and its compounds)*▼	23,444,977	30,532,642	7,087,665	30
5	100-42-5	Styrene▼	21,220,625	28,066,386	6,845,761	32
6	--	Chromium (and its compounds)*▼	27,640,932	31,959,982	4,319,050	16
7	--	Arsenic (and its compounds)*▼	2,197,803	5,786,017	3,588,214	163
8	7429-90-5	Aluminum (fume or dust)*	5,367,105	8,803,703	3,436,598	64
9	50-00-0	Formaldehyde▼	9,967,761	12,623,239	2,655,478	27
10	85-44-9	Phthalic anhydride	318,747	1,816,968	1,498,221	470

Note: Canada and US data only. Mexico data not available for 1995–1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

- Metals and their compounds accounted for six of the 10 substances with the largest increases in total releases in North America from 1995 to 1999. Zinc and its compounds accounted for the largest increase, with 56.8 million kg, a rise of 44 percent.
- The second-largest increase was for nitric acid and nitrate compounds. Total releases of this chemical rose 33.9 million kg, or 29 percent.
- Third and fourth by size of increase were two metals, manganese and its compounds (an increase of 9.6 million kg) and lead and its compounds (7.1 million kg).
- Among the chemicals with the largest increases in total releases were five known or suspected carcinogens. They were (in descending order of size of increase) lead and its compounds, styrene, chromium and its compounds, arsenic and its compounds and formaldehyde.

Carcinogens

Of the 165 substances in the 1995 matched data set, 52 are known or suspected carcinogens. The substances are designated as known or suspected carcinogens in the International Agency for Research on Cancer (IARC) Monographs <<http://www.iarc.fr/>> or by the US National Toxicology Program (NTP) <<http://ntp-server.niehs.nih.gov/>>.

- From 1995 to 1999, total releases on- and off-site of designated carcinogens decreased by approximately 5.0 million kg, or 3 percent, a smaller decrease than the 6 percent for all matched chemicals.
- Releases decreased for 29 of the designated carcinogens and increased for 23 of them.
- Dichloromethane was the carcinogen with the largest decrease in North America during the period. Releases of this chemical fell 10.2 million kg, or 36 percent.
- The second-largest reduction was for trichloroethylene, 7.1 million kg, a decrease of 56 percent.
- Reductions of between 3 million kg and 1 million kg were reported for tetrachloroethylene, chloroform, friable asbestos, benzene and di(2-ethylhexyl) phthalate.
- Of all the designated carcinogens, the largest increase in North America was for lead and its compounds: 7.1 million kg, a 30-percent change from 1995 to 1999.
- The next-largest increases were for styrene (6.8 million kg, a change of 32 percent), chromium and its compounds (4.3 million kg, 16 percent), arsenic and its compounds (3.6 million kg, 163 percent) and formaldehyde (2.7 million kg, 27 percent). No other chemical on

Table 7-8. Change in Total Releases On- and Off-site in North America of Known or Suspected Carcinogens, 1995-1999

CAS Number	Chemical	Total Releases On- and Off-site			%
		1995 (kg)	1999 (kg)	Change 1995-1999 Kg	
75-09-2	Dichloromethane	28,559,885	18,374,191	-10,185,694	-36
79-01-6	Trichloroethylene	12,614,062	5,526,700	-7,087,362	-56
127-18-4	Tetrachloroethylene	4,513,593	1,708,943	-2,804,650	-62
67-66-3	Chloroform	5,191,032	2,622,600	-2,568,432	-49
1332-21-4	Asbestos (friable)	5,739,840	3,517,383	-2,222,457	-39
71-43-2	Benzene	6,230,606	4,814,315	-1,416,291	-23
117-81-7	Di(2-ethylhexyl) phthalate	1,705,120	590,427	-1,114,693	-65
106-99-0	1,3-Butadiene	1,613,118	959,095	-654,023	-41
107-13-1	Acrylonitrile	3,072,018	2,576,078	-495,940	-16
75-07-0	Acetaldehyde	7,015,716	6,737,092	-278,624	-4
108-05-4	Vinyl acetate	2,471,756	2,197,001	-274,755	-11
75-21-8	Ethylene oxide	478,196	254,941	-223,255	-47
	-- Cadmium (and its compounds)*	1,339,535	1,127,736	-211,799	-16
	-- Nickel (and its compounds)*	7,631,483	7,453,734	-177,749	-2
56-23-5	Carbon tetrachloride	226,893	124,350	-102,543	-45
106-89-8	Epichlorohydrin	167,169	68,353	-98,816	-59
75-01-4	Vinyl chloride	499,294	403,658	-95,636	-19
75-56-9	Propylene oxide	421,093	340,665	-80,428	-19
140-88-5	Ethyl acrylate	106,426	72,656	-33,770	-32
107-06-2	1,2-Dichloroethane	616,734	585,081	-31,653	-5
106-46-7	1,4-Dichlorobenzene	123,683	96,247	-27,436	-22
98-95-3	Nitrobenzene	162,246	151,324	-10,922	-7
96-45-7	Ethylene thiourea	9,269	2,583	-6,686	-72
79-46-9	2-Nitropropane	15,665	9,582	-6,083	-39
62-56-6	Thiourea	5,725	1,089	-4,636	-81
26471-62-5	Toluenediisocyanate (mixed isomers)	35,533	32,035	-3,498	-10
90-94-8	Michler's ketone	715	394	-321	-45
101-14-4	4,4'-Methylenebis(2-chloroaniline)	124	9	-115	-93
96-09-3	Styrene oxide	106	3	-103	-97
94-59-7	Safrole	116	118	2	2
95-80-7	2,4-Diaminotoluene	227	286	59	26
91-08-7	Toluene-2,6-diisocyanate	1,450	1,659	209	14
106-88-7	1,2-Butylene oxide	5,030	6,358	1,328	26
77-78-1	Dimethyl sulfate	3,053	4,470	1,417	46
100-44-7	Benzyl chloride	10,814	13,362	2,548	24
120-80-9	Catechol	14,610	17,842	3,232	22
606-20-2	2,6-Dinitrotoluene	270	4,215	3,945	1,461
139-13-9	Nitrotri-acetic acid	1,956	5,901	3,945	202
584-84-9	Toluene-2,4-diisocyanate	4,165	8,834	4,669	112
302-01-2	Hydrazine	16,757	24,707	7,950	47
67-72-1	Hexachloroethane	9,029	19,286	10,257	114
121-14-2	2,4-Dinitrotoluene	1,697	13,666	11,969	705
64-67-5	Diethyl sulfate	3,278	17,345	14,067	429
101-77-9	4,4'-Methylenedianiline	19,570	35,474	15,904	81
	-- Cobalt (and its compounds)*	677,814	723,998	46,184	7
123-91-1	1,4-Dioxane	369,224	445,024	75,800	21
79-06-1	Acrylamide	2,859,444	3,418,036	558,592	20
50-00-0	Formaldehyde	9,967,761	12,623,239	2,655,478	27
	-- Arsenic (and its compounds)*	2,197,803	5,786,017	3,588,214	163
	-- Chromium (and its compounds)*	27,640,932	31,959,982	4,319,050	16
100-42-5	Styrene	21,220,625	28,066,386	6,845,761	32
	-- Lead (and its compounds)*	23,444,977	30,532,642	7,087,665	30
	Subtotal	179,037,237	174,077,112	-4,960,125	-3
	% of Total	16	17		
	Total	1,101,729,464	1,040,044,538	-61,684,926	-6

Note: Canada and US data only. Mexico data not available for 1995-1999. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carcinogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) or the US National Toxicology Program (NTP).

* Metal and its compounds.

Table 7–9. Change in Total Releases On- and Off-site in North America of Metals and their Compounds, 1995–1999

CAS Number	Chemical	Total Releases On- and Off-site			%
		1995 (kg)	1999 (kg)	Change 1995-1999 kg	
--	Copper (and its compounds)	34,660,010	32,269,027	-2,390,983	-7
--	Antimony (and its compounds)	2,788,144	2,251,710	-536,434	-19
--	Cadmium (and its compounds)▼	1,339,535	1,127,736	-211,799	-16
--	Nickel (and its compounds)▼	7,631,483	7,453,734	-177,749	-2
7440-62-2	Vanadium (fume or dust)	258,457	172,200	-86,257	-33
--	Mercury (and its compounds)	129,948	47,993	-81,955	-63
--	Cobalt (and its compounds)▼	677,814	723,998	46,184	7
--	Silver (and its compounds)	51,923	99,785	47,862	92
--	Selenium (and its compounds)	226,298	334,504	108,206	48
7429-90-5	Aluminum (fume or dust)	5,367,105	8,803,703	3,436,598	64
--	Arsenic (and its compounds)▼	2,197,803	5,786,017	3,588,214	163
--	Chromium (and its compounds)▼	27,640,932	31,959,982	4,319,050	16
--	Lead (and its compounds)▼	23,444,977	30,532,642	7,087,665	30
--	Manganese (and its compounds)	55,183,267	64,773,073	9,589,806	17
--	Zinc (and its compounds)	128,619,650	185,467,125	56,847,475	44
	Subtotal	290,217,346	371,803,229	81,585,883	28
	% of Total	26	36		
	Total	1,101,729,464	1,040,044,538	-61,684,926	-6

Note: Canada and US data only. Mexico data not available for 1995–1999. ▼Known or suspected carcinogen.

the list of carcinogens had increases of more than 2 million kg.

Metals and Their Compounds

The off-site releases category includes transfers of metals to disposal, treatment, and sewage in order 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.

- Total releases of the 15 metals and metal compounds in the matched data set rose 28 percent from 1995 to 1999, in contrast to a 6-percent decline for all matched chemicals. Of the 15 metals listed, reductions in total releases were reported for six.
- By far the largest decrease—2.4 million kg, a 7-percent change—was for copper and its compounds. No other metal reported decreases of more than 600,000 kg from 1995 to 1999.
- The largest increase was for zinc and its compounds, with a reported rise of 56.8 million kg, or 44 percent.
- Next by size of increase were manganese and its compounds (an increase of 9.6 million kg, or 17 percent) and lead and its compounds (7.1 million kg, or 30 percent). No other metal had increases of more than 5 million kg from 1995 to 1999.
- Of the 15 listed metals, six were known or suspected carcinogens. These included the metals with the third- and fourth-largest reductions from 1995 to 1999 (cadmium and its compounds and nickel and its compounds) and the metals with the third-, fourth- and fifth-largest increases (lead and its compounds, chromium and its compounds and arsenic and its compounds).
- Metals made up 26 percent of all releases in 1995 but 36 percent in 1999.

7.3 1995–1999 Transfers Off-site for Further Management

This section presents changes in transfers of chemicals in waste off-site for further management between 1995 and 1999. Further management refers to treatment, including sewage treatment, but does not include recycling or energy recovery. Reporting of transfers to recycling and energy recovery did not become mandatory until the 1998 reporting year in NPRI. Therefore, such reporting is not comparable to TRI reports for the years 1995 through 1997.

In addition, data from the new TRI industries for 1998 are not included in this section because they did not report to TRI prior to 1998 and are not comparable to NPRI reporting in previous years.

These transfers also do not include transfers of metals, which are included in earlier sections of this chapter as off-site releases. Transfers of metals to disposal, treatment, and sewage 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.

Reporting on off-site transfers of chemicals in waste includes the amounts of waste and where it is treated. Tracking off-site transfers for further management provides a means of estimating how much of a chemical, in addition to on- and off-site releases, is being moved to other locations and where other releases may occur. It does not provide the same level of detail on environmental releases as tracking on- and off-site releases because it is not known what amounts of the off-site transfers are released at off-site locations after treatment.

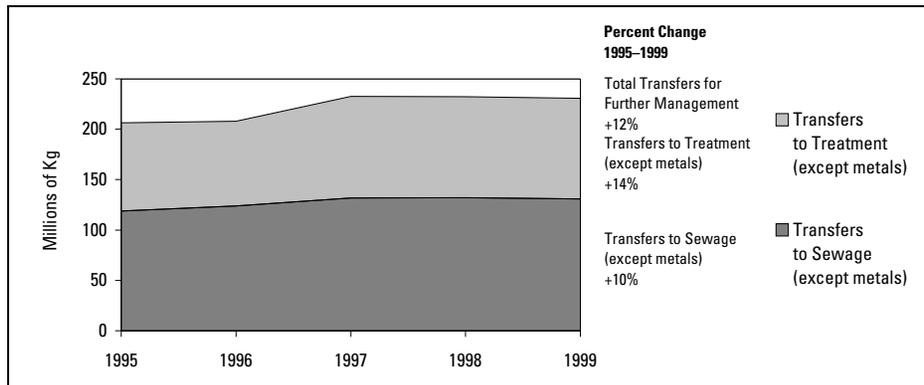
Table 7–10. Transfers Off-site for Further Management in North America, 1995–1999

	North America					Change 1995-1999	
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	Number	%
Total Facilities	20,737	20,514	20,344	20,242	19,762	-975	-5
Total Forms	63,538	62,264	62,275	62,206	61,444	-2,094	-3
	kg	kg	kg	kg	kg	kg	
Transfers to Treatment (except metals)	87,549,593	84,030,097	100,984,148	100,366,693	99,813,595	12,264,002	14
Transfers to Sewage (except metals)	118,875,647	123,817,148	131,649,222	132,008,553	130,756,726	11,881,079	10
Total Transfers Off-site for Further Management*	206,425,240	207,847,245	232,633,370	232,375,246	230,570,321	24,145,081	12

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 165 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.

* Does not include transfers of metals and metal compounds to treatment, sewage or disposal.

Figure 7–6. Transfers Off-site for Further Management in North America, 1995–1999



Note: Canada and US data only. Mexico data not available for 1995–1999.

Figure 7–7. NPRI Transfers Off-site for Further Management, 1995–1999

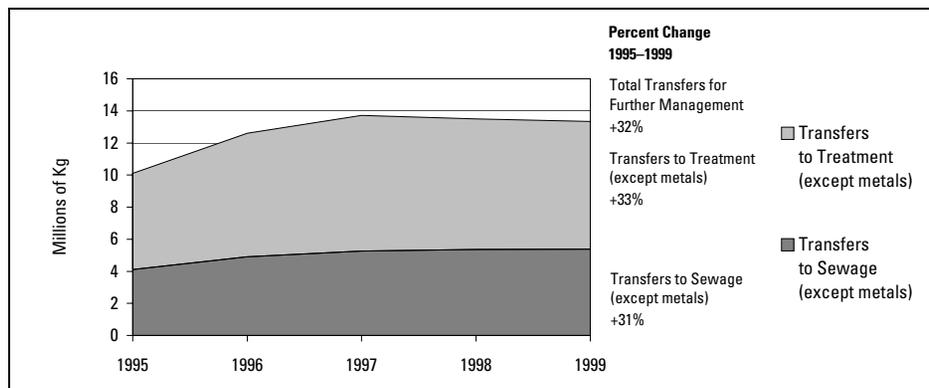
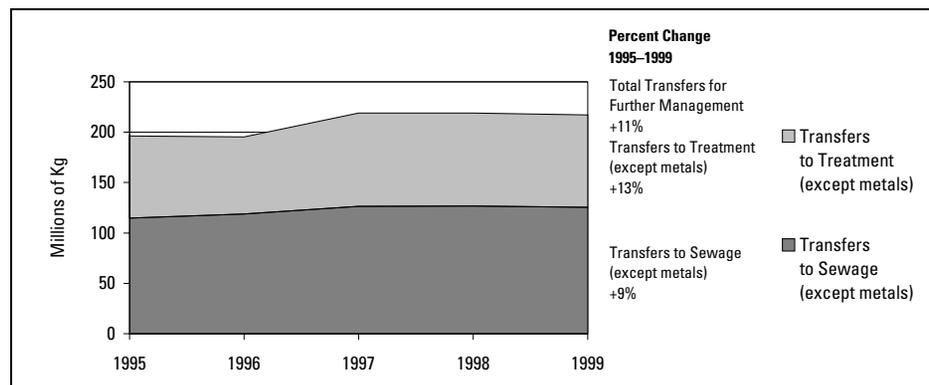


Figure 7–8. TRI Transfers Off-site for Further Management, 1995–1999



The information in this section is on amounts of chemicals sent off-site to treatment and sewage, with the focus on the amounts reported by the sending facilities. **Chapter 8**, which addresses cross-border transfers, focuses on the sites receiving the transfers.

- North American transfers off-site for further management (except metals) increased by 12 percent from 1995 to 1999, despite decreases in the number of facilities reporting (by 5 percent) and the number of forms filed (by 3 percent). Transfers to treatment rose 14 percent, and transfers to sewage increased by 10 percent.
- Total transfers rose from 1995 to 1997 and then fell between 1997 and 1999. Transfers to treatment followed the same general pattern. Transfers to sewage rose between 1995 and 1998 and then declined between 1998 and 1999.
- Total transfers for further management in NPRI increased 32 percent (3.2 million kg) from 1995 to 1999. The greatest change was in transfers to treatment, which rose 33 percent (2.0 million kg). Transfers to sewage rose by 31 percent (1.3 million kg).
- Total transfers for further management in TRI rose 11 percent from 1995 to 1999. Total transfers decreased between 1995 and 1996 and then increased between 1996 and 1997 before declining again between 1997 and 1999.

7.3.1 1995–1999 Transfers Off-site for Further Management by State and Province

Increases and decreases in reported transfers to treatment and sewage by facilities in the manufacturing sectors have resulted in changes in the ranking of the states and provinces where the facilities are located. Again, these transfers do not include transfers of metals, which are included as off-site releases.

While the greatest part of transfers to sewage can be expected to be to sites within the same state or province, some transfers to treatment may not be. This section examines transfers from the perspective of where they originate. **Chapter 8** examines cross-border transfers and where such transfers end up.

- In both 1995 and 1999, Texas facilities reported the largest North American transfers for further management, and the largest transfers to treatment and sewage. Total transfers in this state decreased by 2 percent from 1995 to 1999.
- New Jersey ranked second in both 1995 and 1999 for total transfers, although the amount fell by 14 percent. The state had the second-highest transfers to sewage in both years; these transfers decreased by 11 percent from 1995 to 1999.
- Michigan was third in total transfers for further management in 1999; its total was 53 percent higher than in 1995, when the state ranked fourth. Michigan had the second-highest transfers to treatment in both years, and the amount reported increased by 68 percent from 1995 to 1999.

Table 7–11. Change in Transfers for Further Management in North America, by State and Province, 1995–1999

State/Province	Transfers to Treatment (except metals)					Change 1995-1999 (%)	Transfers to Sewage (except metals)					Change 1995-1999 (%)
	1995		1999		1995		1999		1995	1999		
	kg	Rank	kg	Rank			kg	Rank		kg	Rank	
Alabama	2,358,151	12	3,470,763	11	47	336,903	35	2,341,125	18	595	--	
Alaska	12	60	246	60	1,950	0	--	0	--	--	--	
Alberta	661,514	29	129,492	42	-80	33,030	49	882,666	31	2,572	--	
Arizona	89,385	44	295,920	35	231	842,419	29	1,101,284	29	31	--	
Arkansas	450,951	32	560,886	31	24	425,312	31	1,054,601	30	148	--	
British Columbia	18,328	48	13,769	53	-25	13,000	50	11,928	51	-8	--	
California	1,290,226	23	1,547,689	20	20	8,388,677	3	9,558,503	3	14	--	
Colorado	475,846	31	1,076,790	26	126	195,301	40	338,482	39	73	--	
Connecticut	2,678,429	10	1,968,826	17	-26	390,767	32	544,959	35	39	--	
Delaware	297,111	34	395,870	32	33	1,128,396	25	1,148,123	28	2	--	
District of Columbia	0	--	0	--	--	0	--	0	--	--	--	
Florida	906,355	25	879,597	27	-3	2,717,454	15	3,676,545	12	35	--	
Georgia	802,980	26	1,123,582	25	40	1,375,335	22	1,447,242	23	5	--	
Hawaii	3,331	54	1,257	58	-62	0	--	0	--	--	--	
Idaho	2,465	55	4,374	57	77	164,979	41	332,940	41	102	--	
Illinois	3,167,679	9	3,177,096	12	0.3	4,056,476	8	4,096,122	9	1	--	
Indiana	1,968,947	18	3,921,189	8	99	1,977,323	17	2,686,512	16	36	--	
Iowa	658,991	30	1,407,538	22	114	3,700,940	9	2,915,076	15	-21	--	
Kansas	950,709	24	94,060	44	-90	256,495	37	583,330	34	127	--	
Kentucky	2,210,733	14	2,397,359	15	8	549,799	30	1,183,523	27	115	--	
Louisiana	2,199,253	16	5,848,027	3	166	104,785	47	247,269	45	136	--	
Maine	185,860	38	86,293	45	-54	152,226	43	249,528	44	64	--	
Manitoba	205,419	36	203,513	38	-1	0	--	42	55	--	--	
Maryland	713,960	28	2,682,951	13	276	1,533,686	21	1,388,002	24	-9	--	
Massachusetts	2,179,629	17	1,837,933	18	-16	3,211,447	12	4,105,525	8	28	--	
Michigan	6,216,353	2	10,464,973	2	68	4,751,641	6	6,358,894	6	34	--	
Minnesota	249,200	35	1,141,198	24	358	3,689,782	10	5,363,336	7	45	--	
Mississippi	738,061	27	709,889	30	-4	1,122,328	26	1,641,034	22	46	--	
Missouri	3,792,421	7	3,662,307	10	-3	1,969,143	18	2,078,264	20	6	--	
Montana	12,950	51	8,562	54	-34	10	52	123	52	1,130	--	
Nebraska	40,149	47	27,207	50	-32	124,494	46	273,178	43	119	--	
Nevada	648	58	5,730	56	784	5	53	17,084	50	341,580	--	
New Brunswick	1,010	56	30,989	48	2,968	0	--	0	--	--	--	
New Hampshire	110,651	42	149,980	40	36	148,455	44	305,910	42	106	--	
New Jersey	2,261,393	13	1,382,563	23	-39	17,482,095	2	15,581,793	2	-11	--	
New Mexico	16,163	50	30,974	49	92	136,183	45	335,619	40	146	--	
New York	1,839,436	20	1,431,660	21	-22	3,051,438	13	3,901,525	11	28	--	
Newfoundland	0	--	0	--	--	0	--	0	--	--	--	
North Carolina	5,281,297	5	788,943	28	-85	912,821	28	824,192	32	-10	--	
North Dakota	8,073	52	429	59	-95	242,500	38	205,697	46	-15	--	
Nova Scotia	6,261	53	23,134	52	269	0	--	0	--	--	--	
Ohio	5,420,903	4	5,431,526	4	0.2	6,662,604	4	7,698,210	4	16	--	
Oklahoma	95,762	43	231,997	37	142	278,122	36	375,088	37	35	--	
Ontario	3,300,161	8	4,929,594	6	49	3,677,081	11	3,953,510	10	8	--	
Oregon	122,458	41	292,276	36	139	4,543,056	7	3,593,148	13	-21	--	
Pennsylvania	5,711,014	3	4,322,212	7	-24	2,983,253	14	3,175,345	14	6	--	
Prince Edward Island	0	--	137,874	41	--	0	--	0	--	--	--	
Puerto Rico	2,455,473	11	5,129,983	5	109	1,077,992	27	787,652	33	-27	--	
Quebec	1,795,342	21	2,473,314	14	38	387,243	34	535,743	36	38	--	
Rhode Island	171,906	39	68,409	46	-60	228,738	39	157,625	47	-31	--	
Saskatchewan	500	59	23,185	51	4,537	265	51	56	54	-79	--	
South Carolina	2,210,535	15	1,552,477	19	-30	1,768,613	20	2,675,253	17	51	--	
South Dakota	43,271	46	101,820	43	135	158,638	42	101,357	48	-36	--	
Tennessee	1,933,109	19	744,574	29	-61	1,925,205	19	1,776,959	21	-8	--	
Texas	12,836,405	1	14,501,710	1	13	18,545,593	1	16,398,956	1	-12	--	
Utah	16,966	49	155,559	39	817	388,678	33	363,971	38	-6	--	
Vermont	126,120	40	32,007	47	-75	80,419	48	99,348	49	24	--	
Virgin Islands	68,096	45	8,477	55	-88	0	--	0	--	--	--	
Virginia	383,259	33	330,731	34	-14	6,129,203	5	7,531,262	5	23	--	
Washington	192,331	37	369,695	33	92	1,232,466	24	1,301,333	25	6	--	
West Virginia	1,732,757	22	2,100,114	16	21	1,340,867	23	1,192,183	26	-11	--	
Wisconsin	3,882,131	6	3,892,267	9	0.3	2,281,966	16	2,259,038	19	-1	--	
Wyoming	764	57	236	61	-69	0	--	113	53	--	--	
Total	87,549,593		99,813,595		14	118,875,647		130,756,726		10		

Note: Canada and US data only. Mexico data not available for 1995 or 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 to treatment or sewage (except metals) from facilities located in the state/province.

Table 7–11. (continued)

State/Province	Total Transfers for Further Management					
	1995		1999		Change 1995-1999 (%)	
	kg	Rank	kg	Rank		
Alabama	2,695,054	26	5,811,888	16	116	
Alaska	12	60	246	61	1,950	
Alberta	694,544	37	1,012,158	37	46	
Arizona	931,804	35	1,397,204	36	50	
Arkansas	876,263	36	1,615,487	32	84	
British Columbia	31,328	52	25,697	53	-18	
California	9,678,903	5	11,106,192	5	15	
Colorado	671,147	38	1,415,272	35	111	
Connecticut	3,069,196	24	2,513,785	29	-18	
Delaware	1,425,507	32	1,543,993	34	8	
District of Columbia	0	--	0	--	--	
Florida	3,623,809	21	4,556,142	19	26	
Georgia	2,178,315	30	2,570,824	27	18	
Hawaii	3,331	55	1,257	59	-62	
Idaho	167,444	48	337,314	43	101	
Illinois	7,224,155	7	7,273,218	9	1	
Indiana	3,946,270	18	6,607,701	10	67	
Iowa	4,359,931	16	4,322,614	20	-1	
Kansas	1,207,204	34	677,390	38	-44	
Kentucky	2,760,532	25	3,580,882	24	30	
Louisiana	2,304,038	27	6,095,296	13	165	
Maine	338,086	42	335,821	44	-1	
Manitoba	205,419	46	203,555	48	-1	
Maryland	2,247,646	28	4,070,953	22	81	
Massachusetts	5,391,076	13	5,943,458	14	10	
Michigan	10,967,994	4	16,823,867	3	53	
Minnesota	3,938,982	19	6,505,134	11	65	
Mississippi	1,860,389	31	2,350,923	30	26	
Missouri	5,761,564	12	5,740,571	17	-0.4	
Montana	12,960	53	8,685	57	-33	
Nebraska	164,643	49	300,385	45	82	
Nevada	653	59	22,814	56	3,394	
New Brunswick	1,010	56	30,989	52	2,968	
New Hampshire	259,106	43	455,890	41	76	
New Jersey	19,743,488	2	16,964,356	2	-14	
New Mexico	152,346	50	366,593	42	141	
New York	4,890,874	14	5,333,185	18	9	
Newfoundland	0	--	0	--	--	
North Carolina	6,194,118	10	1,613,135	33	-74	
North Dakota	250,573	44	206,126	47	-18	
Nova Scotia	6,261	54	23,134	55	269	
Ohio	12,083,507	3	13,129,736	4	9	
Oklahoma	373,884	41	607,085	39	62	
Ontario	6,977,242	8	8,883,104	6	27	
Oregon	4,665,514	15	3,885,424	23	-17	
Pennsylvania	8,694,267	6	7,497,557	8	-14	
Prince Edward Island	0	--	137,874	50	--	
Puerto Rico	3,533,465	22	5,917,635	15	67	
Quebec	2,182,585	29	3,009,057	26	38	
Rhode Island	400,644	40	226,034	46	-44	
Saskatchewan	765	57	23,241	54	2,938	
South Carolina	3,979,148	17	4,227,730	21	6	
South Dakota	201,909	47	203,177	49	1	
Tennessee	3,858,314	20	2,521,533	28	-35	
Texas	31,381,998	1	30,900,666	1	-2	
Utah	405,644	39	519,530	40	28	
Vermont	206,539	45	131,355	51	-36	
Virgin Islands	68,096	51	8,477	58	-88	
Virginia	6,512,462	9	7,861,993	7	21	
Washington	1,424,797	33	1,671,028	31	17	
West Virginia	3,073,624	23	3,292,297	25	7	
Wisconsin	6,164,097	11	6,151,305	12	-0.2	
Wyoming	764	58	349	60	-54	
Total	206,425,240		230,570,321		12	

- Ohio, which had the third-largest total transfers in 1995, was fourth in 1999. The drop in rank occurred even though transfers increased 9 percent from 1995 to 1999, the result of a 16-percent rise in transfers to sewage. Ohio was fourth in transfers to treatment and to sewage in both years.
- In NPRI, facilities in Ontario reported the largest transfers for further management in 1995 and in 1999. Ontario had the sixth-largest amount of such transfers in North America in 1999, up from eighth-largest in 1995, the result of a 27-percent increase.

7.3.2 1995–1999 Transfers Off-site for Further Management by Industry Sector

Data comparing 1995 and 1999 do not include the industry sectors reporting for the first time to TRI in 1998. Transfers from the new industry sectors were included in data presented in Chapters 3, 4, 5 and 6. Only the manufacturing sectors (US SIC codes 20–39) are covered in this chapter. Transfers to recycling or energy recovery are not included because they were not required reporting under NPRI until 1998. Therefore, the data for 1999 presented in this section and in this chapter are a subset of the data presented in previous chapters.

- The chemical manufacturing industry reported the largest amounts of North American transfers for further management in both 1995 and 1999. This industry sector reported transfers of 134.3 million kg in 1999, an increase of 14 percent from 1995. Chemicals also ranked first in transfers to treatment and transfers to sewage in both years.
- The paper products industry had the second-largest transfers in both 1995 and 1999, but the 1999 total was down 12 percent from that in 1995. The paper products industry reported the third-largest transfers to treatment, up from fourth-largest in 1995; the amount, however, was 6 percent lower in 1999 than in 1995. Paper products had the second-largest transfers to sewage in both years, although here, too, the amount declined, by 13 percent, from 1995 to 1999.
- The multiple codes group (reported only in TRI) had the third-largest North American transfers to further management in both 1995 and 1999;

Table 7–12. Change in Transfers for Further Management in North America, by Industry, 1995–1999

US IC Code	Industry	Transfers to Treatment (except metals)				Change 1995-1999 (%)	Transfers to Sewage (except metals)				Change 1995-1999 (%)
		1995		1999			1995		1999		
		kg	Rank	kg	Rank		kg	Rank	kg	Rank	
28	Chemicals	60,474,737	1	75,350,205	1	25	57,070,768	1	58,910,911	1	3
26	Paper Products	4,037,257	4	3,789,348	3	-6	18,565,734	2	16,169,150	2	-13
--	Multiple codes 20–39*	5,754,338	2	5,732,958	2	-0.4	7,747,499	4	9,608,863	4	24
20	Food Products	398,697	11	337,193	15	-15	10,532,840	3	12,599,164	3	20
36	Electronic/Electrical Equipment	1,800,460	7	1,278,426	9	-29	6,601,211	5	9,198,379	5	39
34	Fabricated Metals Products	2,073,526	6	2,333,495	4	13	5,223,057	6	6,892,103	6	32
33	Primary Metals	5,200,903	3	2,095,173	5	-60	4,347,877	7	5,595,277	7	29
37	Transportation Equipment	2,135,338	5	1,852,680	7	-13	1,719,438	9	2,924,418	8	70
29	Petroleum and Coal Products	323,307	14	1,904,190	6	489	1,781,464	8	2,696,094	9	51
30	Rubber and Plastics Products	1,670,788	8	1,525,812	8	-9	1,092,138	11	1,541,826	11	41
35	Industrial Machinery	367,361	12	289,997	16	-21	1,395,379	10	1,793,172	10	29
39	Misc. Manufacturing Industries	214,025	17	723,264	12	238	642,629	13	641,447	13	-0.2
32	Stone/Clay/Glass Products	613,832	10	407,779	14	-34	639,756	14	955,504	12	49
27	Printing and Publishing	251,246	15	752,487	11	200	255,425	16	428,633	14	68
38	Measurement/Photographic Instruments	1,496,768	9	787,140	10	-47	397,057	15	253,945	16	-36
25	Furniture and Fixtures	346,019	13	456,455	13	32	22,933	19	14,490	18	-37
22	Textile Mill Products	228,607	16	92,676	17	-59	699,618	12	345,620	15	-51
24	Lumber and Wood Products	129,954	18	77,567	18	-40	103,963	17	169,210	17	63
23	Apparel and Other Textile Products	26,891	19	23,258	19	-14	11,193	20	8,442	20	-25
31	Leather Products	5,467	20	2,948	20	-46	25,639	18	10,043	19	-61
21	Tobacco Products	72	21	544	21	656	29	21	35	21	21
Total		87,549,593		99,813,595		14	118,875,647		130,756,726		10

Note: Canada and US data only. Mexico data not available for 1995 or 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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.

* Multiple SIC codes reported only in TRI.

Figure 7–9. Change in NPRI Transfers for Further Management, by Industry, 1995–1999

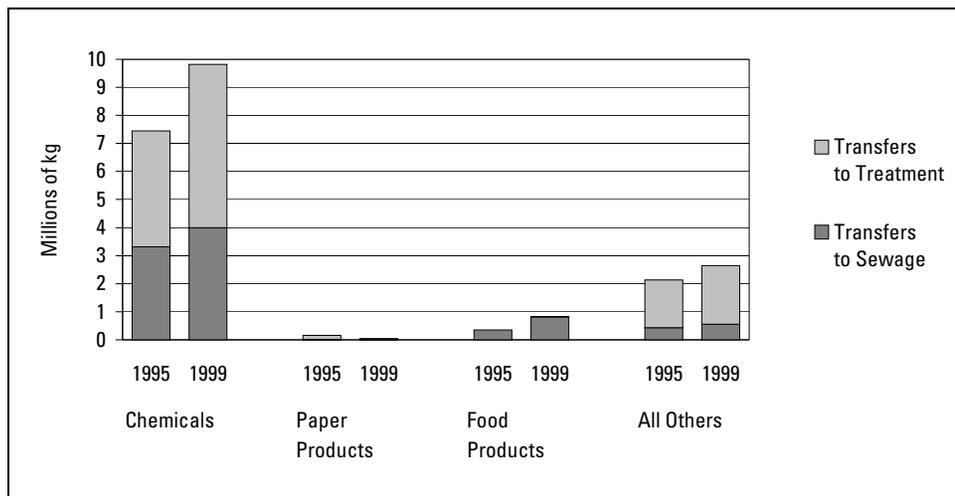
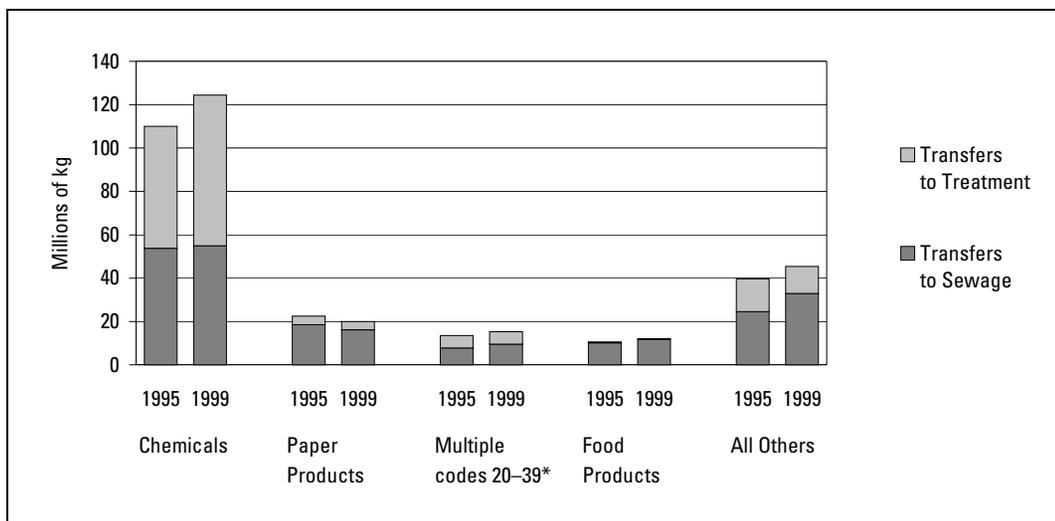


Table 7–12. (continued)

US SIC Code	Industry	Total Transfers for Further Management				Change 1995-1999 (%)
		1995		1999		
		kg	Rank	kg	Rank	
28	Chemicals	117,545,505	1	134,261,116	1	14
26	Paper Products	22,602,991	2	19,958,498	2	-12
--	Multiple codes 20–39*	13,501,837	3	15,341,821	3	14
20	Food Products	10,931,537	4	12,936,357	4	18
36	Electronic/Electrical Equipment	8,401,671	6	10,476,805	5	25
34	Fabricated Metals Products	7,296,583	7	9,225,598	6	26
33	Primary Metals	9,548,780	5	7,690,450	7	-19
37	Transportation Equipment	3,854,776	8	4,777,098	8	24
29	Petroleum and Coal Products	2,104,771	10	4,600,284	9	119
30	Rubber and Plastics Products	2,762,926	9	3,067,638	10	11
35	Industrial Machinery	1,762,740	12	2,083,169	11	18
39	Misc. Manufacturing Industries	856,654	15	1,364,711	12	59
32	Stone/Clay/Glass Products	1,253,588	13	1,363,283	13	9
27	Printing and Publishing	506,671	16	1,181,120	14	133
38	Measurement/Photographic Instruments	1,893,825	11	1,041,085	15	-45
25	Furniture and Fixtures	368,952	17	470,945	16	28
22	Textile Mill Products	928,225	14	438,296	17	-53
24	Lumber and Wood Products	233,917	18	246,777	18	5
23	Apparel and Other Textile Products	38,084	19	31,700	19	-17
31	Leather Products	31,106	20	12,991	20	-58
21	Tobacco Products	101	21	579	21	473
Total		206,425,240		230,570,321		12

* Multiple SIC codes reported only in TRI.

Figure 7–10. Change in TRI Transfers for Further Management, by Industry, 1995–1999



* Multiple SIC codes reported only in TRI.

the amount rose 14 percent over this period. This group had the second-largest transfers to treatment in both years.

- The food industry reported the fourth-largest transfers for further management in 1999, mostly as transfers to sewage, in which it ranked third. The industry’s total transfers rose 18 percent from 1995 to 1999, and its transfers to sewage rose 20 percent.
- Fifteen of the 21 industry sectors in the matched data set for North America reported higher transfers to further management in 1999 than in 1995. Of these, which included the first-, third-, and fourth-ranked sectors, electronic/electrical equipment had the fifth-largest total transfers in both 1995 and 1999, with an increase of 25 percent.

In both NPRI and TRI, the chemicals industry had the largest transfers for further management in both 1995 and 1999.

- Transfers for further management by chemical manufacturing industry facilities in NPRI were 32 percent higher in 1999 than in 1995. The main reason was an increase in transfers to treatment, but transfers to sewage also rose.
- For the NPRI food products industry, total transfers more than doubled. The greatest increase was in transfers to sewage, but transfers to treatment also rose, from zero to about 14,000 kg.
- Total transfers for further management by the paper products industry in NPRI fell by 68 percent, primarily because of a drop in transfers to treatment. The amounts, however, were small; in 1999, total transfers by the industry were less than 51,000 kg.

- Total transfers for further management by the TRI chemicals industry rose 13 percent from 1995 to 1999, mainly because of increased transfers to treatment.
- The TRI paper products industry reported the second-largest transfers for further management in TRI in 1996 and in 1999, but the amount decreased by 11 percent from 1995 to 1999 as a result of lower transfers to sewage.
- The industries with the next-largest transfers to further management in TRI were the multiple codes group (reported only in TRI) and food products. For both, transfers to further management were about 14 percent higher in 1999 than in 1995, and in each case the main change was in transfers to sewage.

7.3.3 1995–1999 Transfers Off-site for Further Management by Chemical

The 1995 matched data set contains 165 substances reportable to both NPRI and TRI in both 1995 and 1999. The list of substances in the matched data set remained the same for the years 1995 to 1998. Not included in the matched data set are those chemicals added to the NPRI list for 1999.

Appendix D presents information on potential health effects of the substances with the largest releases and transfers as reported to the North American PRTRs, from the US Agency for Toxic Substances and Disease Registry, the US EPA's Office of Pollution Prevention and Toxics and the New Jersey Department of Health and Senior Services. **Appendix E** describes uses of these substances.

Table 7–13. The 10 Chemicals with the Largest Decrease in Transfers for Further Management in North America, 1995–1999

Rank	CAS Number	Chemical	Transfers to Treatment (except metals)				Transfers to Sewage (except metals)				Total Transfers for Further Management			
			1995 kg	1999 kg	Change 1995-1999		1995 kg	1999 kg	Change 1995-1999		1995 kg	1999 kg	Change 1995-1999	
					kg	%			kg	%			kg	%
1	107-21-1	Ethylene glycol	7,451,750	2,729,758	-4,721,992	-63	8,853,897	10,528,707	1,674,810	19	16,305,647	13,258,465	-3,047,182	-19
2	108-05-4	Vinyl acetate [▼]	4,612,386	2,354,330	-2,258,056	-49	125,277	80,002	-45,275	-36	4,737,663	2,434,332	-2,303,331	-49
3	79-00-5	1,1,2-Trichloroethane	1,474,584	328,348	-1,146,236	-78	4,082	690	-3,392	-83	1,478,666	329,038	-1,149,628	-78
4	108-95-2	Phenol	1,659,953	1,382,901	-277,052	-17	1,734,756	1,077,182	-657,574	-38	3,394,709	2,460,083	-934,626	-28
5	95-50-1	1,2-Dichlorobenzene	1,213,738	340,353	-873,385	-72	2,939	5	-2,934	-100	1,216,677	340,358	-876,319	-72
6	127-18-4	Tetrachloroethylene [▼]	1,037,173	417,793	-619,380	-60	6,685	304	-6,381	-95	1,043,858	418,097	-625,761	-60
7	106-44-5	p-Cresol	24,817	2,286	-22,531	-91	424,440	18,216	-406,224	-96	449,257	20,502	-428,755	-95
8	109-86-4	2-Methoxyethanol	91,417	70,991	-20,426	-22	488,102	140,426	-347,676	-71	579,519	211,417	-368,102	-64
9	1319-77-3	Cresol (mixed isomers)	494,725	193,177	-301,548	-61	35,994	28,246	-7,748	-22	530,719	221,423	-309,296	-58
10	7664-39-3	Hydrogen fluoride	1,129,965	821,558	-308,407	-27	174,186	215,215	41,029	24	1,304,151	1,036,773	-267,378	-21

Note: Canada and US data only. Mexico data not available for 1995–1999. [▼] Known or suspected carcinogen.

Table 7–14. The 10 Chemicals with the Largest Increase in Transfers for Further Management in North America, 1995–1999

Rank	CAS Number	Chemical	Transfers to Treatment (except metals)				Transfers to Sewage (except metals)				Total Transfers for Further Management			
			1995 kg	1999 kg	Change 1995-1999 kg	1995-1999 %	1995 kg	1999 kg	Change 1995-1999 kg	%	1995 kg	1999 kg	Change 1995-1999 kg	%
1	--	Nitric acid and nitrate compounds	7,968,359	9,160,945	1,192,586	15	57,150,890	71,621,123	14,470,233	25	65,119,249	80,782,068	15,662,819	24
2	75-09-2	Dichloromethane [▼]	5,005,873	8,166,060	3,160,187	63	362,370	185,401	-176,969	-49	5,368,243	8,351,461	2,983,218	56
3	100-42-5	Styrene [▼]	2,007,060	4,488,449	2,481,389	124	56,861	33,979	-22,882	-40	2,063,921	4,522,428	2,458,507	119
4	78-93-3	Methyl ethyl ketone	3,194,130	5,218,883	2,024,753	63	227,731	332,073	104,342	46	3,421,861	5,550,956	2,129,095	62
5	78-87-5	1,2-Dichloropropane	1,628	1,600,973	1,599,345	98,240	1,867	0	-1,867	-100	3,495	1,600,973	1,597,478	45,708
6	75-05-8	Acetonitrile	1,896,935	3,601,061	1,704,126	90	415,921	194,490	-221,431	-53	2,312,856	3,795,551	1,482,695	64
7	62-53-3	Aniline	107,073	1,059,655	952,582	890	444,044	570,997	126,953	29	551,117	1,630,652	1,079,535	196
8	67-56-1	Methanol	14,710,058	20,392,153	5,682,095	39	41,171,352	36,428,211	-4,743,141	-12	55,881,410	56,820,364	938,954	2
9	50-00-0	Formaldehyde [▼]	405,692	650,985	245,293	60	1,121,902	1,800,413	678,511	60	1,527,594	2,451,398	923,804	60
10	71-36-3	n-Butyl alcohol	876,840	1,206,134	329,294	38	829,118	1,314,193	485,075	59	1,705,958	2,520,327	814,369	48

Note: Canada and US data only. Mexico data not available for 1995–1999. [▼] Known or suspected carcinogen.

- The chemical with the largest decrease in transfers for further management in North America from 1995 to 1999 was ethylene glycol. The amount fell by 3.0 million kg, or 19 percent.
- The second-largest reduction was for vinyl acetate, a designated carcinogen. The reported decrease in transfers from 1995 to 1999 was 2.3 million kg, or 49 percent.
- Third was 1,1,2-trichloroethane, with a reduction of 1.1 million kg, or 78 percent.
- No other listed chemical had decreases of more than 1 million kg.
- Of the 10 chemicals with the largest decreases between 1995 and 1999 in North America, two—vinyl acetate and tetrachloroethylene—were designated known or suspected carcinogens.
- The chemical with the largest increase in transfers for further management from 1995 to 1999 in North America was nitric acid and nitrate compounds. The amount transferred increased 15.7 million kg, or 24 percent, from 1995 to 1999.
- The second-largest increase was reported for dichloromethane, a known or suspected carcinogen. Transfers of this chemical amounted to 3.0 million kg in 1999, 56 percent higher than in 1995.
- The third-highest rise was for styrene, another designated carcinogen. Its transfers increased 2.5 million kg, or 119 percent, from 1995 to 1999.
- One other chemical among those with the largest increases was a designated carcinogen: ninth-ranked formaldehyde.

7.4 1995–1999 Total Releases and Transfers

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 include releases at the reporting facility site to air, surface water, underground injection wells, and land. Off-site releases include 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.

In this section, reports to both NPRI and TRI by the industries in which TRI facilities reported for the first time in 1998 are not included because no comparable data are available for the years prior to 1998. Similarly, the chemicals added to the NPRI list for 1999 are excluded. In addition, only manufacturing industry sectors are included because no comparable data for other industries are available for TRI before 1998.

- The number of facilities reporting in North America declined each year between 1995 and 1999 and was 5 percent lower at the end of the period than in 1995. The number of forms for North America decreased by 3 percent from 1995 to 1999.

Table 7–15. Total Releases and Transfers in North America, 1995–1999

	North America					Change 1995-1999	
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	Number	%
Total Facilities	20,737	20,514	20,344	20,242	19,762	-975	-5
Total Forms	63,538	62,264	62,275	62,206	61,444	-2,094	-3
	kg	kg	kg	kg	kg	kg	
On-site Releases	934,143,051	890,835,934	845,497,620	834,737,382	814,300,138	-119,842,913	-13
Off-site Disposal	167,586,413	184,893,044	239,207,372	221,452,281	225,744,400	58,157,987	35
Total Releases On- and Off-site	1,101,729,464	1,075,728,978	1,084,704,992	1,056,189,663	1,040,044,538	-61,684,926	-6
Transfers to Treatment (except metals)	87,549,593	84,030,097	100,984,148	100,366,693	99,813,595	12,264,002	14
Transfers to Sewage (except metals)	118,875,647	123,817,148	131,649,222	132,008,553	130,756,726	11,881,079	10
Off-site Transfers for Further Management	206,425,240	207,847,245	232,633,370	232,375,246	230,570,321	24,145,081	12
Total Releases and Transfers	1,308,154,704	1,283,576,223	1,317,338,362	1,288,564,909	1,270,614,859	-37,539,845	-3

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 165 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.

Table 7–16. Average Total Releases and Transfers per Facility, NPRI and TRI, 1995 and 1999

	NPRI		TRI		Ratio of Average per Facility (NPRI/TRI)	
	1995 (kg/facility)	1999 (kg/facility)	1995 (kg/facility)	1999 (kg/facility)	1995	1999
On-site Releases	76,650	66,738	43,020	39,060	1.8	1.7
Off-site Releases	20,570	17,344	7,280	10,926	2.8	1.6
Total Releases On- and Off-site	97,220	84,082	50,300	49,985	1.9	1.7
Transfers to Treatment (except metals)	4,791	5,199	4,185	5,038	1.1	1.0
Transfers to Sewage (except metals)	3,288	3,514	5,889	6,877	0.6	0.5
Total Off-site Transfers for Further Management	8,079	8,713	10,075	11,916	0.8	0.7
Total Releases and Transfers	105,299	92,795	60,375	61,901	1.7	1.5

Table 7–17. NPRI Total Releases and Transfers, 1995–1999

	NPRI					Change 1995-1999	
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	Number	%
Total Facilities	1,250	1,308	1,393	1,434	1,532	282	23
Total Forms	4,015	4,176	4,484	4,637	5,070	1,055	26
	kg	kg	kg	kg	kg	kg	
On-site Releases	95,812,650	87,802,558	85,768,759	81,954,820	102,242,178	6,429,528	7
Off-site Disposal	25,712,452	27,103,282	33,772,920	29,122,842	26,570,965	858,513	3
Total Releases On- and Off-site	121,525,102	114,905,840	119,541,679	111,077,662	128,813,143	7,288,041	6
Transfers to Treatment (except metals)	5,988,535	7,700,639	8,453,387	8,132,099	7,964,864	1,976,329	33
Transfers to Sewage (except metals)	4,110,619	4,899,954	5,268,109	5,361,602	5,383,945	1,273,326	31
Total Transfers Off-site for Further Management	10,099,154	12,600,593	13,721,496	13,493,701	13,348,809	3,249,655	32
Total Releases and Transfers	131,624,256	127,506,433	133,263,175	124,571,363	142,161,952	10,537,696	8

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 165 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.

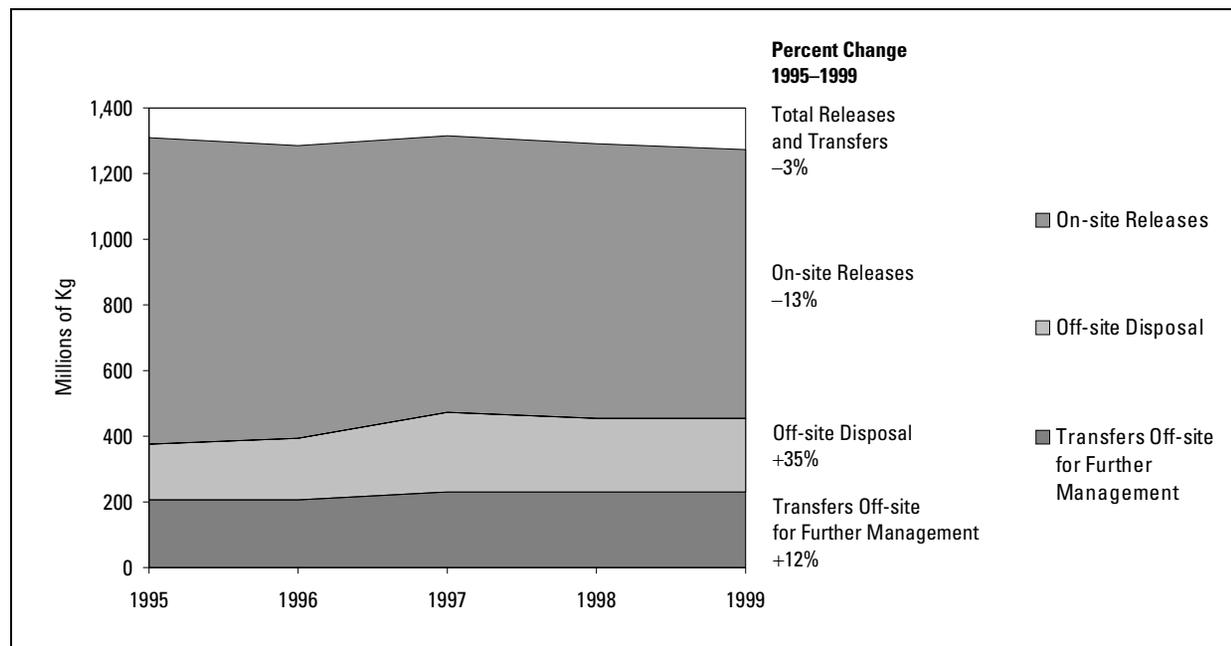
Table 7–18. TRI Total Releases and Transfers, 1995–1999

	TRI					Change 1995-1999	
	1995 Number	1996 Number	1997 Number	1998 Number	1999 Number	Number	%
Total Facilities	19,487	19,206	18,951	18,808	18,230	-1,257	-6
Total Forms	59,523	58,088	57,791	57,569	56,374	-3,149	-5
	kg	kg	kg	kg	kg	kg	
On-site Releases	838,330,401	803,033,376	759,728,861	752,782,562	712,057,960	-126,272,441	-15
Off-site Disposal	141,873,961	157,789,762	205,434,452	192,329,439	199,173,435	57,299,474	40
Total Releases On- and Off-site	980,204,362	960,823,138	965,163,313	945,112,001	911,231,395	-68,972,967	-7
Transfers to Treatment (except metals)	81,561,058	76,329,458	92,530,761	92,234,594	91,848,731	10,287,673	13
Transfers to Sewage (except metals)	114,765,028	118,917,194	126,381,113	126,646,951	125,372,781	10,607,753	9
Total Transfers Off-site for Further Management	196,326,086	195,246,652	218,911,874	218,881,545	217,221,512	20,895,426	11
Total Releases and Transfers	1,176,530,448	1,156,069,790	1,184,075,187	1,163,993,546	1,128,452,907	-48,077,541	-4

Note: Canada and US data only. Mexico data not available for 1995–1999. Data include 165 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.

- Total reported releases and transfers in North America were 1.27 billion kg in 1999, a decrease of 3 percent from 1995. Total releases and transfers decreased between 1995 and 1996, rose between 1996 and 1997, and declined over the rest of the period.
- From 1995 to 1999, average total releases and transfers per facility decreased in NPRI and increased in TRI, further narrowing the difference between them. The average amounts of on-site releases and of total releases per facility in TRI decreased, but the averages for off-site releases and transfers off-site for further management rose. For NPRI, the averages fell in every category except for transfers for further management.
- In 1995, NPRI average total releases and transfers per facility were 1.7 times those of TRI. By 1999, the NPRI/TRI ratio was 1.5.
- In North America, releases on- and off-site, which account for most of the total releases and transfers, fell in every year except 1997; the reduction from 1995 to 1999 was 6 percent. On-site releases declined steadily over the period, for a 13 percent reduction from 1995 to 1999.
- Transfers off-site to disposal increased by 35 percent from 1995 to 1999 in North America. Amounts increased between 1995 and 1997 and between 1998 and 1999, but fell between 1997 and 1998.
- Transfers for further management also increased from 1995 to 1999 in North America. They rose between 1995 and 1997 and then fell between 1997 and 1999, for a rise of 12 percent from 1995 to 1999.

Figure 7-11. Total Releases and Transfers in North America, 1995-1999



Note: Canada and US data only. Mexico data not available for 1995-1999.

- Total NPRI releases and transfers were 8 percent higher in 1999 than in 1995. The amount decreased one year and increased the next year, with an increase of 14 percent between 1998 and 1999. The number of NPRI facilities reporting increased in every year.
- Total releases and transfers in TRI were 4 percent lower in 1999 than in 1995, and the numbers of facilities reporting and forms filed also decreased. Total TRI releases and transfers decreased between 1995 and 1996, rose between 1996 and 1997, and fell thereafter.
- On-site releases accounted for the greatest part of the reported amounts in North America in all years, despite the increases in off-site disposal and in off-site transfers for further management. On-site releases made up 71 percent of total releases and transfers in 1995 and 64 percent in 1999.
- Since the US data set is so much larger than the Canadian set, the trends for North America as a whole will be similar to those of TRI, while any disparities between NPRI and TRI data will show up as differences between NPRI and the North American trend. With this in mind, NPRI data differed from that of North America as whole in many ways. On-site releases in NPRI increased, and off-site disposal increased only slightly; total releases on- and off-site showed an increase, although a small one; and total releases and transfers increased somewhat. Only for total transfers for further management did the overall change in NPRI follow that of North America, an increase in each case.

Figure 7–12. NPRI Total Releases and Transfers, 1995–1999

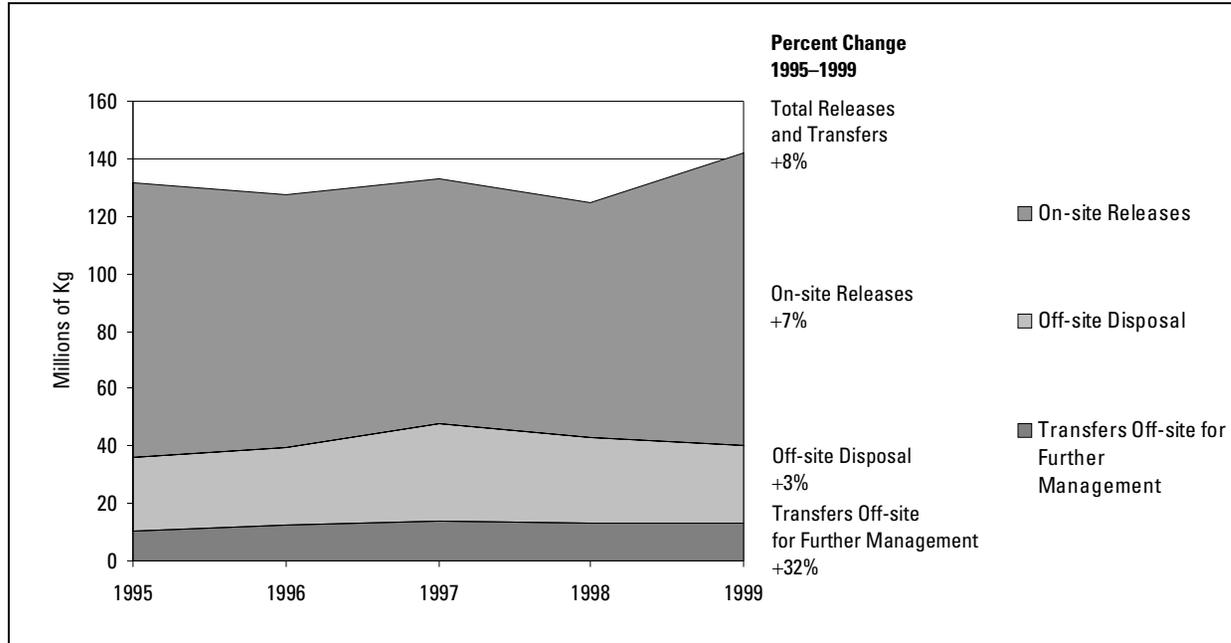
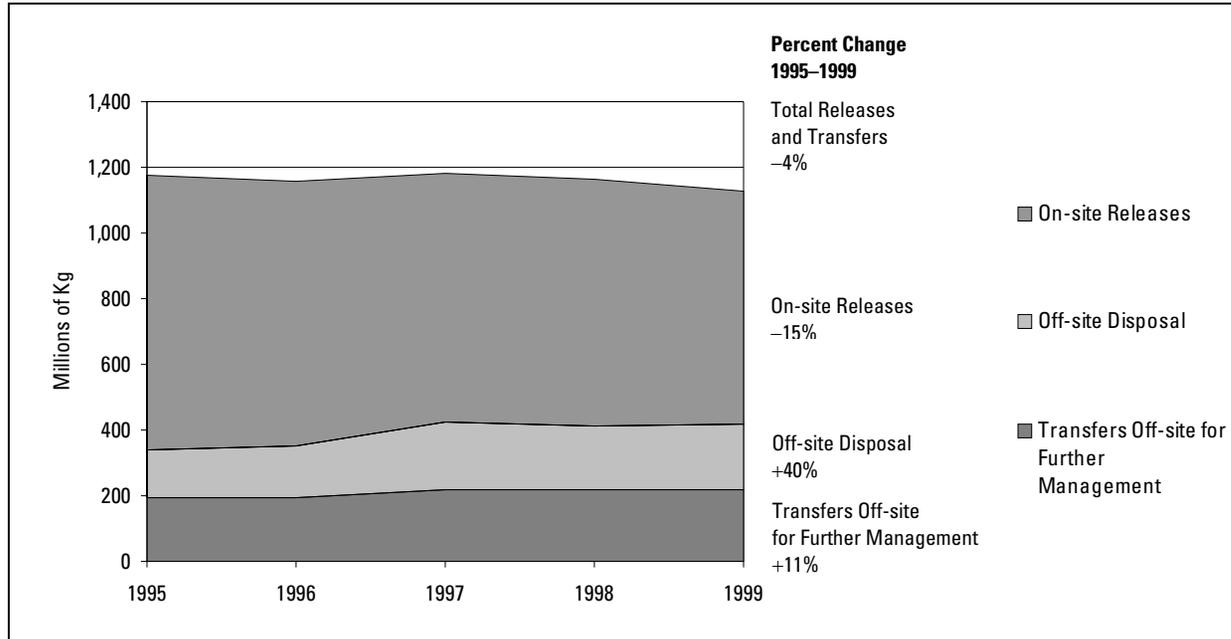


Figure 7–13. TRI Total Releases and Transfers, 1995–1999



7.4.1 1995–1999 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. 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 1999, but the amount declined by 15 percent. Texas also had the largest total releases and total transfers off-site for further management in both years, with declines in both categories.
- Ontario reported the second-largest releases and transfers in North America in both 1995 and 1999; the amount rose 19 percent. Ontario also had the second-largest total releases in 1995 and in 1999. Total releases and total transfers for further management both rose between 1995 and 1999.
- Pennsylvania reported the third-largest North American releases and transfers in 1999, an increase of 5 percent from 1995, when the state ranked fourth. Pennsylvania also ranked third in total releases in both 1995 and 1999, with the amount rising by 8 percent. The state's total transfers for further management fell by 14 percent from 1995 to 1999.

Table 7–19. Change in Total Releases and Transfers in North America, by State and Province, 1995–1999

State/Province	Total Releases On- and Off-site					Total Transfers for Further Management				
	1995		1999		Change 1995-1999 (%)	1995		1999		Change 1995-1999 (%)
	kg	Rank	kg	Rank		kg	Rank	kg	Rank	
Alabama	47,388,222	6	30,764,853	10	-35	2,695,054	26	5,811,888	16	116
Alaska	1,008,719	56	116,809	61	-88	12	60	246	61	1,950
Alberta	15,423,979	26	11,253,167	30	-27	694,544	37	1,012,158	37	46
Arizona	19,249,322	22	22,708,910	18	18	931,804	35	1,397,204	36	50
Arkansas	12,620,170	29	19,233,417	22	52	876,263	36	1,615,487	32	84
British Columbia	8,591,903	35	10,076,326	32	17	31,328	52	25,697	53	-18
California	13,755,983	27	11,948,904	29	-13	9,678,903	5	11,106,192	5	15
Colorado	1,601,716	51	2,579,644	47	61	671,147	38	1,415,272	35	111
Connecticut	4,736,194	42	2,354,773	48	-50	3,069,196	24	2,513,785	29	-18
Delaware	3,290,197	47	2,972,389	44	-10	1,425,507	32	1,543,993	34	8
District of Columbia	116	63	613	63	428	0	--	0	--	--
Florida	19,544,194	20	27,170,562	12	39	3,623,809	21	4,556,142	19	26
Georgia	22,571,427	17	24,442,838	15	8	2,178,315	30	2,570,824	27	18
Hawaii	220,568	61	96,208	62	-56	3,331	55	1,257	59	-62
Idaho	5,665,144	40	10,206,202	31	80	167,444	48	337,314	43	101
Illinois	43,468,048	9	40,496,135	7	-7	7,224,155	7	7,273,218	9	1
Indiana	43,967,603	8	54,038,633	5	23	3,946,270	18	6,607,701	10	67
Iowa	11,682,117	30	13,104,625	26	12	4,359,931	16	4,322,614	20	-1
Kansas	9,489,027	33	12,880,467	27	36	1,207,204	34	677,390	38	-44
Kentucky	15,940,378	25	16,924,357	24	6	2,760,532	25	3,580,882	24	30
Louisiana	53,740,523	5	43,623,345	6	-19	2,304,038	27	6,095,296	13	165
Maine	4,528,771	43	2,861,901	45	-37	338,086	42	335,821	44	-1
Manitoba	1,751,206	49	4,138,129	43	136	205,419	46	203,555	48	-1
Maryland	5,583,553	41	4,704,711	41	-16	2,247,646	28	4,070,953	22	81
Massachusetts	3,791,677	45	2,221,176	49	-41	5,391,076	13	5,943,458	14	10
Michigan	41,353,101	10	29,349,957	11	-29	10,967,994	4	16,823,867	3	53
Minnesota	8,377,048	36	6,742,122	39	-20	3,938,982	19	6,505,134	11	65
Mississippi	26,624,641	13	23,713,822	16	-11	1,860,389	31	2,350,923	30	26
Missouri	23,930,175	14	22,738,418	17	-5	5,761,564	12	5,740,571	17	-0.4
Montana	19,391,506	21	22,178,997	19	14	12,960	53	6,685	57	-33
Nebraska	5,834,381	39	9,166,449	33	57	164,643	49	300,385	45	82
Nevada	1,530,700	52	1,367,640	50	-11	653	59	22,814	56	3,394
New Brunswick	6,752,245	38	4,928,878	40	-27	1,010	56	30,989	52	2,968
New Hampshire	1,161,287	54	1,187,500	52	2	259,106	43	455,890	41	76
New Jersey	8,145,008	37	7,707,055	37	-5	19,743,488	2	16,964,356	2	-14
New Mexico	18,687,570	23	8,933,767	34	-52	152,346	50	366,593	42	141
New York	18,400,724	24	14,807,667	25	-20	4,890,874	14	5,333,185	18	9
Newfoundland	313,545	60	273,252	57	-13	0	--	0	--	--
North Carolina	32,119,340	12	25,444,987	14	-21	6,194,118	10	1,613,135	33	-74
North Dakota	663,580	57	481,026	56	-28	250,573	44	206,126	47	-18
Nova Scotia	1,684,749	50	875,954	54	-48	6,261	54	23,134	55	269
Ohio	55,551,545	4	54,156,179	4	-3	12,083,507	3	13,129,736	4	9
Oklahoma	8,919,748	34	7,326,788	38	-18	373,884	41	607,085	39	62
Ontario	64,355,740	2	75,656,533	2	18	6,977,242	8	8,883,104	6	27
Oregon	11,567,069	31	12,564,650	28	9	4,665,514	15	3,885,424	23	-17
Pennsylvania	55,744,797	3	60,062,874	3	8	8,694,267	6	7,497,557	8	-14
Prince Edward Island	13,420	62	194,477	60	1,349	0	--	137,874	50	--
Puerto Rico	3,757,234	46	2,604,952	46	-31	3,533,465	22	5,917,635	15	67
Quebec	21,619,170	18	20,197,428	21	-7	2,182,585	29	3,009,057	26	38
Rhode Island	1,367,872	53	509,511	55	-63	400,644	40	226,034	46	-44
Saskatchewan	1,019,145	55	1,218,999	51	20	765	57	23,241	54	2,938
South Carolina	23,287,847	16	26,465,888	13	14	3,979,148	17	4,227,730	21	6
South Dakota	1,762,368	48	1,102,675	53	-37	201,909	47	203,177	49	1
Tennessee	46,296,076	7	35,358,706	9	-24	3,858,314	20	2,521,533	28	-35
Texas	114,918,436	1	92,872,279	1	-19	31,381,998	1	30,900,666	1	-2
Utah	35,055,361	11	39,574,627	8	13	405,644	39	519,530	40	28
Vermont	317,521	59	265,525	58	-16	206,539	45	131,355	51	-36
Virgin Islands	568,230	58	236,029	59	-58	68,096	51	8,477	58	-88
Virginia	23,535,672	15	20,774,904	20	-12	6,512,462	9	7,861,993	7	21
Washington	10,536,161	32	8,286,646	36	-21	1,424,797	33	1,671,028	31	17
West Virginia	13,045,103	28	8,466,259	35	-35	3,073,624	23	3,292,297	25	7
Wisconsin	19,851,294	19	17,180,177	23	-13	6,164,097	11	6,151,305	12	-0.2
Wyoming	4,059,298	44	4,151,847	42	2	764	58	349	60	-54
Total	1,101,729,464		1,040,044,538		-6	206,425,240		230,570,321		12

Note: Canada and US data only. Mexico data not available for 1995 or 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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 7–19. (continued)

State/Province	Total Releases and Transfers				Change 1995-1999 (%)
	1995		1999		
	kg	Rank	kg	Rank	
Alabama	50,083,276	9	36,576,741	11	-27
Alaska	1,008,731	56	117,055	61	-88
Alberta	16,118,523	30	12,265,325	32	-24
Arizona	20,181,126	24	24,106,114	20	19
Arkansas	13,496,433	32	20,848,904	25	54
British Columbia	8,623,231	38	10,102,023	35	17
California	23,434,886	21	23,055,096	23	-2
Colorado	2,272,863	48	3,994,916	48	76
Connecticut	7,805,390	40	4,868,558	44	-38
Delaware	4,715,704	46	4,516,382	45	-4
District of Columbia	116	63	613	63	428
Florida	23,168,003	23	31,726,704	12	37
Georgia	24,749,742	19	27,013,662	17	9
Hawaii	223,899	61	97,465	62	-56
Idaho	5,832,588	44	10,543,516	34	81
Illinois	50,692,203	7	47,769,353	7	-6
Indiana	47,913,873	10	60,646,334	5	27
Iowa	16,042,048	31	17,427,239	28	9
Kansas	10,696,231	35	13,557,857	30	27
Kentucky	18,700,910	27	20,505,239	26	10
Louisiana	56,044,561	5	49,718,641	6	-11
Maine	4,866,857	45	3,197,722	49	-34
Manitoba	1,956,625	50	4,341,684	46	122
Maryland	7,831,199	39	8,775,664	39	12
Massachusetts	9,182,753	37	8,164,634	41	-11
Michigan	52,321,095	6	46,173,824	8	-12
Minnesota	12,316,030	33	13,247,256	31	8
Mississippi	28,485,030	15	26,064,745	18	-8
Missouri	29,691,739	14	28,478,989	15	-4
Montana	19,404,466	25	22,187,682	24	14
Nebraska	5,999,024	43	9,466,834	37	58
Nevada	1,531,353	53	1,390,454	51	-9
New Brunswick	6,753,255	42	4,959,867	43	-27
New Hampshire	1,420,393	54	1,643,390	50	16
New Jersey	27,888,496	16	24,671,411	19	-12
New Mexico	18,839,916	26	9,300,360	38	-51
New York	23,291,598	22	20,140,852	27	-14
Newfoundland	313,545	60	273,252	59	-13
North Carolina	38,313,458	11	27,058,122	16	-29
North Dakota	914,153	57	687,152	56	-25
Nova Scotia	1,691,010	52	899,088	54	-47
Ohio	67,635,052	3	67,285,915	4	-1
Oklahoma	9,293,632	36	7,933,873	42	-15
Ontario	71,332,982	2	84,539,637	2	19
Oregon	16,232,583	28	16,450,074	29	1
Pennsylvania	64,439,064	4	67,560,431	3	5
Prince Edward Island	13,420	62	332,351	58	2,377
Puerto Rico	7,290,699	41	8,522,587	40	17
Quebec	23,801,755	20	23,206,485	22	-3
Rhode Island	1,768,516	51	735,545	55	-58
Saskatchewan	1,019,910	55	1,242,240	53	22
South Carolina	27,266,995	17	30,693,618	13	13
South Dakota	1,964,277	49	1,305,852	52	-34
Tennessee	50,154,390	8	37,880,239	10	-24
Texas	146,300,434	1	123,772,945	1	-15
Utah	35,461,005	12	40,094,157	9	13
Vermont	524,060	59	396,880	57	-24
Virgin Islands	636,326	58	244,506	60	-62
Virginia	30,048,134	13	28,636,897	14	-5
Washington	11,960,958	34	9,957,674	36	-17
West Virginia	16,118,727	29	11,758,556	33	-27
Wisconsin	26,015,391	18	23,331,482	21	-10
Wyoming	4,060,062	47	4,152,196	47	2
Total	1,308,154,704		1,270,614,859		-3

- Ohio, which had the third-largest total releases and transfers in 1995, reported a 1-percent decline from 1995 to 1999 and ranked fourth in total releases in both years, and in 1999 it was fourth in total transfers to further management, down from third in 1995. Ohio's total releases were 3 percent lower in 1999 than in 1995; its total transfers for further management were 9 percent higher.
- Indiana ranked fifth in 1999, up from tenth in 1995 due to an overall increase of 27 percent. This included an increase of 23 percent in total releases and a 67-percent increase in transfers off-site for further management.
- In NPRI, five of the 10 Canadian provinces reported higher total releases and transfers in 1999 than in 1995. They included Ontario, which had the highest total releases and transfers in NPRI and the second-highest total in North America.
- In TRI, 22 jurisdictions reported increases in total releases and transfers from 1995 to 1999, and 31 jurisdictions reported decreases, including Texas, which had the highest total in North America.

7.4.2 1995–1999 Total Releases and Transfers by Industry

Data comparing 1995 with 1999 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. Therefore, the data for 1999 presented in this section and this chapter are a subset of the data presented in previous chapters.

- Of the 21 industry sectors in the matched data set, 13 reported decreases in total releases and transfers from 1995 to 1999.
- In both 1995 and 1999, the chemical manufacturing sector had the largest releases and transfers of any manufacturing industry in North America. Its total, however, was 10 percent lower in 1999 than in 1995 as a result of a 19-percent decline in total releases. Chemicals ranked first in total releases in 1995 but second in 1999. The industry had the largest transfers for further management in both years; the amount rose 14 percent from 1995 to 1999.
- Primary metals reported the second-highest total releases and transfers. The amount was 17 percent higher in 1999 than in 1995. The industry ranked first in total releases in 1999, up from second in 1995, with an 18-percent increase. The primary metals industry fell from fifth to seventh place in total transfers for further management, which were 19 percent lower in 1999 than in 1995.

Table 7–20. Change in Total Releases and Transfers in North America, by Industry, 1995–1999

US SIC Code	Industry	Total Releases				Change 1995-1999 (%)	Total Transfers for Further Management				
		1995		1999			1995		1999		
		kg	Rank	kg	Rank		kg	Rank	kg	Rank	Change 1995-1999 (%)
28	Chemicals	317,898,294	1	257,925,465	2	-19	117,545,505	1	134,261,116	1	14
33	Primary Metals	281,699,717	2	332,363,115	1	18	9,548,780	5	7,690,450	7	-19
26	Paper Products	131,897,703	3	118,289,501	3	-10	22,602,991	2	19,958,498	2	-12
--	Multiple codes 20–39*	61,299,096	4	49,794,362	5	-19	13,501,837	3	15,341,821	3	14
37	Transportation Equipment	54,059,581	6	48,826,482	6	-10	3,854,776	8	4,777,098	8	24
30	Rubber and Plastics Products	55,659,991	5	50,011,003	4	-10	2,762,926	9	3,067,638	10	11
20	Food Products	20,901,094	9	31,682,596	8	52	10,931,537	4	12,936,357	4	18
34	Fabricated Metals Products	39,642,640	7	31,891,441	7	-20	7,296,583	7	9,225,598	6	26
29	Petroleum and Coal Products	28,289,919	8	30,457,920	9	8	2,104,771	10	4,600,284	9	119
36	Electronic/Electrical Equipment	15,580,946	11	15,549,768	11	0	8,401,671	6	10,476,805	5	25
24	Lumber and Wood Products	15,118,189	12	17,702,072	10	17	233,917	18	246,777	18	5
32	Stone/Clay/Glass Products	13,336,140	14	14,339,574	12	8	1,253,588	13	1,363,283	13	9
27	Printing and Publishing	14,298,550	13	11,574,806	13	-19	506,671	16	1,181,120	14	133
35	Industrial Machinery	10,467,721	15	5,879,888	15	-44	1,762,740	12	2,083,169	11	18
25	Furniture and Fixtures	18,566,051	10	7,458,361	14	-60	368,952	17	470,945	16	28
39	Misc. Manufacturing Industries	6,024,592	18	5,437,801	16	-10	856,654	15	1,364,711	12	59
38	Measurement/Photographic Instruments	6,395,239	17	3,814,737	18	-40	1,893,825	11	1,041,085	15	-45
22	Textile Mill Products	8,057,985	16	4,240,669	17	-47	928,225	14	438,296	17	-53
31	Leather Products	1,562,526	19	1,323,024	19	-15	31,106	20	12,991	20	-58
23	Apparel and Other Textile Products	457,004	21	910,483	20	99	38,084	19	31,700	19	-17
21	Tobacco Products	516,486	20	571,470	21	11	101	21	579	21	473
Total		1,101,729,464		1,040,044,538		-6	206,425,240		230,570,321		12

Note: Canada and US data only. Mexico data not available for 1995 or 1999. The data are estimates of releases and transfers of chemicals reported by facilities. None of the rankings is 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.

* Multiple SIC codes reported only in TRI.

Figure 7–14. Change in NPRI Total Releases and Transfers, by Industry, 1995–1999

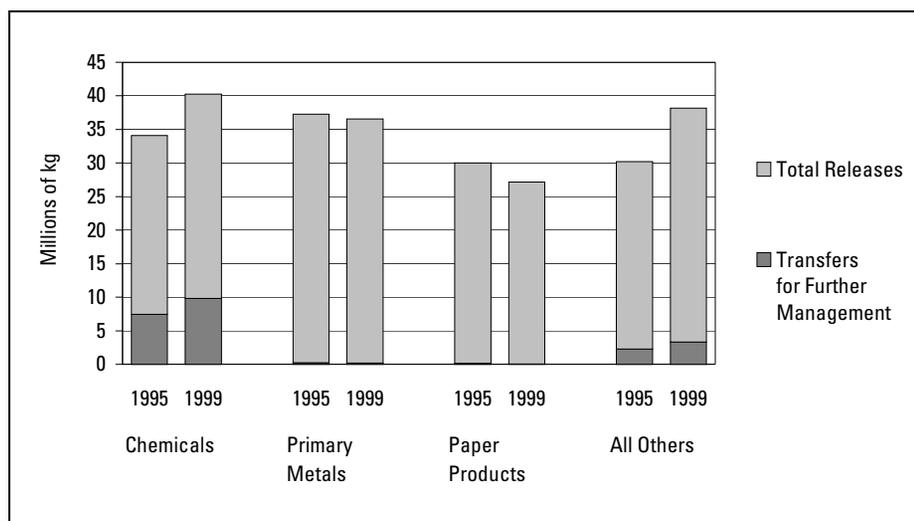
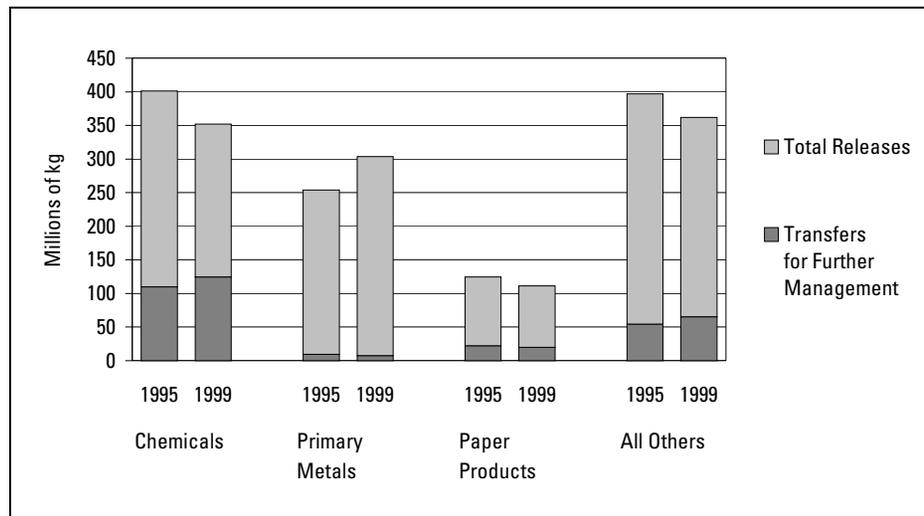


Table 7–20. (continued)

US SIC Code	Industry	Total Releases and Transfers				Change 1995-1999 (%)
		1995		1999		
		kg	Rank	kg	Rank	
28	Chemicals	435,443,799	1	392,186,581	1	-10
33	Primary Metals	291,248,497	2	340,053,565	2	17
26	Paper Products	154,500,694	3	138,247,999	3	-11
--	Multiple codes 20–39*	74,800,933	4	65,136,183	4	-13
37	Transportation Equipment	57,914,357	6	53,603,580	5	-7
30	Rubber and Plastics Products	58,422,917	5	53,078,641	6	-9
20	Food Products	31,832,631	8	44,618,953	7	40
34	Fabricated Metals Products	46,939,223	7	41,117,039	8	-12
29	Petroleum and Coal Products	30,394,690	9	35,058,204	9	15
36	Electronic/Electrical Equipment	23,982,617	10	26,026,573	10	9
24	Lumber and Wood Products	15,352,106	12	17,948,849	11	17
32	Stone/Clay/Glass Products	14,589,728	14	15,702,857	12	8
27	Printing and Publishing	14,805,221	13	12,755,926	13	-14
35	Industrial Machinery	12,230,461	15	7,963,057	14	-35
25	Furniture and Fixtures	18,935,003	11	7,929,306	15	-58
39	Misc. Manufacturing Industries	6,881,246	18	6,802,512	16	-1
38	Measurement/Photographic Instruments	8,289,064	17	4,855,822	17	-41
22	Textile Mill Products	8,986,210	16	4,678,965	18	-48
31	Leather Products	1,593,632	19	1,336,015	19	-16
23	Apparel and Other Textile Products	495,088	21	942,183	20	90
21	Tobacco Products	516,587	20	572,049	21	11
Total		1,308,154,704		1,270,614,859		-3

* Multiple SIC codes reported only in TRI.

Figure 7–15. Change in TRI Total Releases and Transfers, by Industry, 1995–1999



- Paper products ranked third in both years in total releases and transfers, but the reported amount fell 11 percent from 1995 to 1999. Total releases fell by 10 percent and total transfers for further management by the industry fell by 12 percent.
- In NPRI, the primary metals industry reported the largest total amounts of releases and transfers in 1995, with chemicals a close second. In 1999, the rankings had reversed, with the total for chemicals 18 percent higher than in 1995 and that for primary metals 2 percent lower. The increase for the chemicals industry is primarily due to reporting by one facility, Safety-Kleen in Corunna, Ontario, which reported a 15 million kg increase in on-site land releases from 1998 to 1999.
- Paper products was third in total releases and transfers in NPRI in both years. Its total, however, was 9 percent lower in 1999 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 1999, 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 32 percent from 1995 to 1999.
- In TRI, the chemicals industry reported the largest total amounts of releases and transfers in 1995 and in 1999, but the total decreased by 12 percent from 1995 to 1999. Total releases fell 22 percent during the period, while transfers for further management rose 13 percent.

- The TRI primary metals industry, with the second-largest releases and transfers in both 1995 and 1999, reported an overall increase of 20 percent, bringing its total closer to that of chemicals. Total releases by the industry increased by 21 percent from 1995 to 1999, and transfers for further management declined by 20 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 1999, from second (after chemicals) in 1995.
- The paper products industry, third largest in total releases and transfers in TRI, reported reductions of 11 percent from 1995 to 1999. Total releases, which made up the bulk of total releases and transfers by the industry, declined by a like percentage, and transfers for further management also decreased.

7.4.3 Facilities with the Largest Decreases and Increases in Total Releases and Transfers, 1995–1999

The 50 North American facilities that reported the largest decreases in total releases and transfers from 1995 to 1999 accounted for 148.9 million kg of reductions.

- Of the 50 facilities with the largest decreases in total releases and transfers, 29 were chemical manufacturers, 13 were primary metals facilities, five were paper products facilities, and three were in other industries. Ten of the facilities were in Canada. Five facilities, all in TRI, reported reductions of more than 6 million kg.

Table 7–21. Facilities in North America with Largest Decrease in Total Releases and Transfers, 1995–1999

Rank	Facility	City, State/Province	SIC Codes	
			Canada	US
1	Acordis Cellulosic Fibers Inc., Acordis U.S. Holding Inc.	Axis, AL		28
2	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33
3	Phelps Dodge Miami Inc., Phelps Dodge	Claypool, AZ		33
4	Cytec Inds. Inc., Fortier Plant	Westwego, LA		28
5	Phelps Dodge Hidalgo Inc., Phelps Dodge Corp.	Playas, NM		33
6	GMC Powertrain, Defiance, General Motors Corp.	Defiance, OH		33
7	Millennium Petrochemical Inc., La Porte Plant, Millennium Chemicals	La Porte, TX		28
8	Lenzing Fibers Corp.	Lowland, TN		28
9	DuPont, Cape Fear	Leland, NC		28
10	Huntsman Corp. Port Arthur, A&O Plant, Huntsman Petrochemical Corp.	Port Arthur, TX		28
11	DuPont, Beaumont Plant	Beaumont, TX		28
12	Co-Steel Lasco	Whitby, ON	29	33
13	Simpson Pasadena Paper Co., Simpson Investment Co.	Pasadena, TX		26
14	Celanese Ltd., Celanese Americas Corp.	Pasadena, TX		28
15	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33
16	Cerro Wire & Cable Co. Inc.	Hartselle, AL		33
17	Sterling Chemicals Inc.	Texas City, TX		28
18	Chino Mines Co., Phelps Dodge Corp.	Hurley, NM		33
19	Methanex Corporation, Medicine Hat Plant	Medicine Hat, AB	37	28
20	Northwestern Steel & Wire Co.	Sterling, IL		33
21	Irving Pulp & Paper Limited/Irving Tissue Company	Saint John, NB	27	26
22	DuPont, Victoria Plant	Victoria, TX		28
23	DuPont, Johnsonville Plant	New Johnsonville, TN		28
24	Bayer Corp.	New Martinsville, WV		28
25	Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan, AB	37	28
26	Air Prods. L.P., Air Prods. & Chemicals Inc.	Pasadena, TX		28
27	Cxy Chemicals Canada Limited Partnership, Canadian Occidental Petroleum	Naniamo, BC	37	28
28	Rubicon Inc.	Geismar, LA		28
29	Cartons St-Laurent Inc, Usine de La Tuque	La Tuque, QC	27	26
30	Cabot Corp., Canal Plant	Franklin, LA		28
31	Mallinckrodt Inc.	Saint Louis, MO		28
32	Nova Chemicals Corporation, St. Clair River Site	Corunna, ON	37	28
33	Cabot Corp., Ville Platte Plant	Ville Platte, LA		28
34	National Steel Corp., Great Lakes Ops.	Ecorse, MI		33
35	Eastman Chemical Co., Tennessee Operations	Kingsport, TN		28
36	Shell Chemical L.P., Shell Oil Co.	Deer Park, TX		28
37	PD Glycol, Equistar Chemicals L.P.	Beaumont, TX		28
38	Boise Cascade Corp.	Saint Helens, OR		26
39	Eastman Kodak Co., Kodak Park	Rochester, NY		38
40	ASARCO Inc., Omaha Plant	Omaha, NE		33
41	Algoma Steel Inc	Sault Ste. Marie, ON	29	33
42	North American Rayon Corp., North American Corp.	Elizabethton, TN		28
43	Monsanto – Chocolate Bayou, Monsanto Co.	Alvin, TX		28
44	Bayer Corp.	Baytown, TX		28
45	Weyerhaeuser Co.	Longview, WA		Mult.
46	Marathon Pulp Inc., Tembec Inc./Krugler Inc.	Marathon, ON	27	26
47	Bayer Inc.	Sarnia, ON	37	28
48	Electralloy, G.O. Carlson Inc.	Oil City, PA		33
49	Omnova Solutions Inc.	Columbus, MS		22
50	Witco, Gretna Facility, Crompton Corp.	Harvey, LA		28
Total				

Note: Canada and US data only. Mexico data not available for 1995–1999. The data are estimates of releases and transfers of chemicals 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 7–21. (continued)

Rank	1995		1999		Change in Total Releases and Transfers 1995–1999 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases) (chemicals accounting for more than 70% of decrease in total releases and transfers from the facility)
	Number of Forms	Total Releases and Transfers (kg)	Number of Forms	Total Releases and Transfers (kg)		
1	4	15,427,756	3	3,995,214	-11,432,542	Carbon disulfide (air)
2	5	29,168,743	6	21,471,752	-7,696,991	Chlorine (air)
3	13	7,066,233	*	*	-7,066,233	Copper/Zinc and compounds (land)
4	21	11,718,277	23	5,108,617	-6,609,660	Acetonitrile, Acrylic acid (UIJ)
5	11	14,607,894	15	8,512,671	-6,095,223	Zinc/Copper and compounds (land)
6	16	6,544,692	15	1,137,457	-5,407,235	Zinc and compounds (land)
7	21	5,148,906	7	104,618	-5,044,288	Vinyl acetate (transfers to treatment)
8	4	10,789,274	6	6,280,657	-4,508,617	Carbon disulfide (air)
9	21	5,283,733	19	793,120	-4,490,613	Ethylene glycol (transfers to treatment)
10	23	4,462,199	19	80,222	-4,381,977	Propylene (air)
11	34	8,921,575	26	4,600,819	-4,320,756	Nitric acid and nitrate compounds (UIJ)
12	6	8,442,331	5	4,170,767	-4,271,564	Zinc and compounds (transfers of metals), Copper and compounds (land)
13	8	4,359,973	2	283,575	-4,076,398	Methanol (transfers to sewage)
14	21	7,498,535	19	3,606,079	-3,892,456	Ethylene glycol (UIJ)
15	10	15,994,774	13	12,325,557	-3,669,217	Lead/Zinc/Manganese and compounds (transfers of metals)
16	3	3,415,787	3	576	-3,415,211	Copper and compounds (transfers of metals)
17	36	5,427,247	34	2,108,360	-3,318,887	Nitric acid and nitrate compounds (UIJ)
18	3	3,233,586	*	*	-3,233,586	Copper and compounds (land)
19	4	3,385,170	3	237,064	-3,148,106	Methanol (air)
20	8	7,458,528	6	4,537,877	-2,920,651	Zinc/Manganese and compounds (land)
21	4	3,663,623	9	1,120,300	-2,543,323	Methanol (water)
22	28	10,799,431	28	8,340,956	-2,458,475	Nitric acid and nitrate compounds (UIJ)
23	13	2,757,902	12	319,205	-2,438,697	Manganese and compounds (UIJ)
24	29	3,839,899	26	1,518,649	-2,321,250	Nitric acid and nitrate compounds (water)
25	13	2,291,434	4	101,872	-2,189,562	Methanol (air)
26	10	8,828,922	11	6,760,506	-2,068,416	Nitric acid and nitrate compounds (transfers to sewage)
27	2	1,988,244	2	159	-1,988,085	Asbestos (transfers to disposal)
28	24	3,727,641	24	1,808,519	-1,919,122	Nitric acid and nitrate compounds (UIJ)
29	3	2,408,582	9	516,720	-1,891,862	Methanol (water)
30	3	1,905,154	3	62,330	-1,842,824	Carbon disulfide, Ethylene (air)
31	18	2,299,526	18	716,434	-1,583,092	1,1,2-Trichloroethane (transfers to treatment)
32	9	2,196,950	5	626,412	-1,570,538	Cyclohexane (air)
33	3	1,614,127	3	56,364	-1,557,763	Carbon disulfide (air)
34	15	6,215,822	19	4,659,475	-1,556,347	Zinc and compounds (transfers of metals)
35	61	4,133,749	55	2,595,584	-1,538,165	Hydrochloric acid, Methanol (air), Xylenes (transfers to treatment)
36	53	2,527,468	44	990,170	-1,537,298	Phenol (UIJ), Methyl ethyl ketone (air)
37	6	1,783,723	6	274,587	-1,509,136	Ethylene glycol (transfers to treatment)
38	8	3,857,130	11	2,371,020	-1,486,110	Methanol (transfers to sewage)
39	51	3,823,561	46	2,381,630	-1,441,931	Methanol, Dichloromethane (air)
40	6	1,407,644	*	*	-1,407,644	Zinc/Lead and compounds (transfers of metals)
41	16	1,598,360	14	191,422	-1,406,938	Manganese and compounds (land)
42	3	1,389,668	*	*	-1,389,668	Carbon disulfide (air)
43	18	1,856,308	3	469,898	-1,386,410	Acrylonitrile, Acetonitrile, Hydrogen cyanide, Phenol (UIJ)
44	28	1,960,843	26	600,498	-1,360,345	Nitric acid and nitrate compounds (water)
45	16	2,529,048	17	1,171,528	-1,357,520	Methanol (air)
46	5	1,491,724	5	189,984	-1,301,740	Methanol (water)
47	14	2,718,271	17	1,452,215	-1,266,056	Chloromethane, Hydrochloric acid (air), Benzene (air, transfers to treatment)
48	4	1,336,940	5	90,933	-1,246,007	Chromium and compounds (transfers of metals)
49	7	1,178,288	5	15,959	-1,162,329	Methyl ethyl ketone (air)
50	2	1,763,311	1	626,995	-1,136,316	Methanol (UIJ)
	744	268,248,506	652	119,385,326	-148,863,180	

* Indicates facility did not report any matched chemicals that year within US SIC code 20–39.

UIJ = Underground Injection.

- The facility with the largest reduction in total releases and transfers from 1995 to 1999 was Acordis Cellulosic Fibers in Axis, Alabama, with a decrease of 11.4 million kg. In 1997, Acordis, a chemicals facility, completed the installation of a new spinning machine for the production of rayon fibers. The project allows Acordis to collect carbon disulfide and recycle it instead of releasing the chemical to air.
- Second was Magnesium Corp. of America in Rowley, Utah, a primary metals facility that reduced its total releases and transfers by 7.7 million kg between 1995 and 1999. The main reduction was in releases of chlorine to air due to increased production at the facility.
- The facility with the third-largest apparent reductions in total releases and transfers, Phelps Dodge Miami Inc. in Claypool, Arizona, expanded its reporting to include operations under the new TRI industry, metal mining. Consequently, no forms for 1998 or 1999 are included, since they are all assigned to the “new” industry SIC code. Prior to 1998, Cyprus Miami Mining reported only on its copper smelting and refining operations. It is not possible to know from the reported data how much of the 1999 amounts is from only the copper smelting and refining operations.

- Cytec Industries, Inc., a chemicals facility in Westwego, Louisiana, had the fourth-largest reduction, 6.6 million kg. Its total releases and transfers decreased by more than 50 percent; the main reductions were in releases of acetonitrile and acrylic acid to underground injection. The facility began combusting for energy recovery the waste that had previously been injected underground. A decline in production also accounted for some of the reductions.
 - The NPRI facility with the largest decrease in total releases and transfers from 1995 to 1999 was Co-Steel Lasco in Whitby, Ontario. With a reduction of 4.3 million kg, it reported the 12th-largest decrease in North America. The facility reported that the decrease was due to a change in raw material composition. The facility has also reported increases in amounts transferred for recycling along with decreases in on-site land disposal of metals.
- The 50 North American facilities that reported the largest increases in total releases and transfers from 1995 to 1999 accounted, together, for 162.3 million kg in increases.
- Of the 50 facilities, 14 were in the chemicals industry and 29 were primary metals facilities. Two of the facilities, including the one with the largest increase, were in Canada, both in Ontario.
 - Six North American facilities (five of them in TRI) reported increases of more than 6 million kg in total releases and transfers from 1995 to 1999.

Table 7–22. Facilities in North America with Largest Increase in Total Releases and Transfers, 1995–1999

Rank	Facility	City, State/Province	SIC Codes	
			Canada	US
1	Safety-Kleen Ltd., Lambton Facility	Corunna, ON	37	28
2	ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden, AZ		33
3	AK Steel, Butler Works	Butler, PA		33
4	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33
5	Steel Dynamics Inc.	Butler, IN		33
6	Solutia Inc.	Gonzalez, FL		28
7	Nucor-Yamato Steel Co., Nucor Corp.	Blytheville, AR		33
8	Dofasco Inc., Dofasco Hamilton	Hamilton, ON	29	33
9	Jayhawk Fine Chemicals Corp., Laporte Fine Chemicals	Galena, KS		28
10	Dow Chemical Co., Midland Ops.	Midland, MI		28
11	Nucor Steel, Nucor Corp.	Huger, SC		33
12	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	Mc Minnville, OR		33
13	Ipsco Steel Inc., Ipsco Inc.	Muscataine, IA		33
14	IBP Inc.	Lexington, NE		20
15	USS Gary Works, USX Corp.	Gary, IN		33
16	LTV Steel Co. Inc., Cleveland Works	Cleveland, OH		33
17	J. R. Simplot Co., Heyburn Food Group	Heyburn, ID		Mult.
18	Yuasa Inc. Battery Plant	Richmond, KY		36
19	Nucor Steel, Nucor Corp.	Crawfordsville, IN		33
20	Nucor Steel, Nucor Corp.	Plymouth, UT		33
21	Solutia Inc., Chocolate Bayou Plant	Alvin, TX		28
22	FMC Corp.	Baltimore, MD		28
23	Angus Chemical Co.	Sterlington, LA		28
24	Air Prods. & Chemicals Inc.	Geismar, LA		28
25	Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais, IL		33
26	Nucor Steel—Nebraska Nucor Corp.	Norfolk, NE		33
27	ASARCO Inc.	East Helena, MT		33
28	Squibb Mfg. Inc., Bristol Myers Squibb Co.	Humacao, PR		28
29	Timken Co., Faircrest Steel Plant	Canton, OH		33
30	Southwire Co.	Carrollton, GA		Mult.
31	AK Steel Corp.	Rockport, IN		33
32	Corus Tuscaloosa, Corus Group PLC	Tuscaloosa, AL		33
33	Elementis Chromium L.P., Elementis Inc.	Corpus Christi, TX		28
34	Macalloy Corp.	North Charleston, SC		33
35	Roanoke Electric Steel Corp.	Roanoke, VA		33
36	American Steel Foundries, Amsted Inds. Inc.	Alliance, OH		33
37	Aerovox Inc.	Huntsville, AL		36
38	Birmingham Steel, Memphis SBQ Bar Rod & Wire Div.	Memphis, TN		33
39	Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton, PA		33
40	CSC Ltd.	Warren, OH		33
41	Bristol-Myers Squibb Company (Technical Operations)	East Syracuse, NY		28
42	USS Mon Valley Works, Edgar Thomson Plant, USX Corp.	Braddock, PA		33
43	Wheeling-Pittsburgh Steel Corp., Mingo Junction	Mingo Junction, OH		33
44	Monsanto, Luling	Luling, LA		28
45	Revere Smelting & Refining Corp., RSR Corp.	Middletown, NY		33
46	Nucor Steel - Arkansas, Nucor Corp.	Blytheville, AR		33
47	Equistar Chemicals L.P., La Porte Plant	La Porte, TX		28
48	BP Amoco, Texas City Business Unit, BP Amoco Corp.	Texas City, TX		29
49	Potlatch Corp., MN P&P Div.	Cloquet, MN		26
50	Koppers Inds. Inc.	Cicero, IL		28
Total				

Note: Canada and US data only. Mexico data not available for 1995–1999. The data are estimates of releases and transfers of chemicals 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 7–22. (continued)

Rank	1995		1999		Change in Total Releases and Transfers 1995–1999 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (chemicals accounting for more than 70% of increase in total releases and transfers from the facility)
	Number of Forms	Total Releases and Transfers (kg)	Number of Forms	Total Releases and Transfers (kg)		
1	*	*	15	15,378,584	15,378,584	Zinc and compounds (land)
2	9	9,919,427	11	21,026,352	11,106,925	Copper/Zinc and compounds (land)
3	13	4,738,386	13	15,512,671	10,774,285	Nitric acid and nitrate compounds (water)
4	14	2,885,124	18	12,893,911	10,008,787	Arsenic/Copper/Zinc and compounds (land)
5	1	6,117	8	9,590,376	9,584,259	Zinc and compounds, Aluminum (transfers of metals)
6	21	5,939,341	18	12,118,894	6,179,553	Nitric acid and nitrate compounds (UIJ)
7	7	72,019	7	5,802,738	5,730,719	Zinc and compounds (transfers of metals)
8	17	2,523,129	17	7,231,033	4,707,904	Zinc and compounds (transfers of metals)
9	4	1,926,108	16	6,342,694	4,416,586	Nitric acid and nitrate compounds (transfers to disposal)
10	48	582,446	61	4,143,576	3,561,130	Styrene (transfers to treatment)
11	*	*	6	3,302,097	3,302,097	Zinc and compounds (transfers of metals)
12	5	1,969	5	3,168,046	3,166,077	Zinc and compounds (transfers of metals)
13	*	*	6	3,065,625	3,065,625	Zinc and compounds (transfers of metals)
14	*	*	5	2,950,029	2,950,029	Nitric acid and nitrate compounds (water)
15	28	3,512,656	32	6,373,902	2,861,246	Zinc and compounds (land)
16	11	222,271	10	2,785,638	2,563,367	Zinc and compounds (land)
17	1	0	1	2,532,619	2,532,619	Nitric acid and nitrate compounds (water)
18	3	1,314	3	2,520,759	2,519,445	Lead and compounds (transfers of metals)
19	8	5,236,424	7	7,685,414	2,448,990	Zinc/Manganese and compounds (transfers of metals)
20	7	180,864	6	2,567,188	2,386,324	Zinc and compounds (transfers of metals)
21	*	*	19	2,369,841	2,369,841	Acrylonitrile, Hydrogen cyanide, Acrylamide (UIJ)
22	14	281,359	17	2,634,648	2,353,289	Methanol, Toluene (transfers to treatment)
23	11	2,531,292	11	4,876,127	2,344,835	Nitric acid and nitrate compounds (UIJ)
24	*	*	8	2,343,037	2,343,037	Nitric acid and nitrate compounds (transfers to treatment)
25	5	2,252	5	2,344,692	2,342,440	Zinc and compounds (transfers of metals)
26	6	1,272	5	2,279,032	2,277,760	Zinc and compounds (transfers of metals)
27	10	17,921,953	10	20,163,873	2,241,920	Zinc and compounds (land)
28	15	19,832	16	2,127,909	2,108,077	Dichloromethane, Acetonitrile (transfers to treatment)
29	7	28,324	7	1,977,426	1,949,102	Zinc and compounds (transfers of metals)
30	19	396,307	33	2,324,868	1,928,561	Zinc and compounds (transfers of metals)
31	*	*	6	1,922,443	1,922,443	Nitric acid and nitrate compounds (water)
32	7	0	12	1,839,667	1,839,667	Zinc and compounds (transfers of metals)
33	2	4,307,148	1	6,138,865	1,831,717	Chromium and compounds (land)
34	2	4,828	2	1,720,411	1,715,583	Chromium and compounds (transfers of metals)
35	7	1,865	7	1,674,570	1,672,705	Zinc and compounds (transfers of metals)
36	7	1,272,044	3	2,858,916	1,586,872	Chromium and compounds (transfers of metals)
37	2	27,726	3	1,602,098	1,574,372	Nitric acid and nitrate compounds (transfers to sewage)
38	*	*	6	1,531,477	1,531,477	Zinc and compounds (transfers of metals)
39	3	9,653	6	1,530,715	1,521,062	Lead/Zinc and compounds (transfers of metals)
40	6	32,964	12	1,541,208	1,508,244	Zinc and compounds (transfers of metals)
41	10	644,821	9	2,148,406	1,503,585	Nitric acid and nitrate compounds (transfers to sewage)
42	6	1,068,496	6	2,550,608	1,482,112	Zinc and compounds (transfers of metals)
43	5	336,082	10	1,803,539	1,467,457	Zinc and compounds (transfers of metals)
44	12	1,984,312	12	3,428,393	1,444,081	Formaldehyde (UIJ)
45	6	20,391	5	1,456,700	1,436,309	Lead and compounds (transfers of metals)
46	8	12,006	9	1,398,649	1,386,643	Zinc and compounds (transfers of metals)
47	*	*	15	1,385,692	1,385,692	Vinyl acetate (transfers to treatment), Ethylene (air)
48	31	670,584	31	2,038,195	1,367,611	Methanol (air)
49	7	1,993,189	8	3,334,725	1,341,536	Methanol (transfers to sewage)
50	9	93,801	10	1,394,385	1,300,584	Phthalic anhydride (transfers to disposal)
	414	71,410,096	569	233,733,261	162,323,165	

* Indicates facility did not report any matched chemicals that year within US SIC code 20–39.

UIJ = Underground Injection.

- The facility with the largest increase, 15.4 million kg, was Safety-Kleen Ltd. in Corunna, Ontario, a chemical manufacturing facility. The main increase was in zinc and compounds released to land. The facility cited variation in its waste management business as the reason for the change.
- The facility with the second-largest apparent increase in total releases, ASARCO Inc. in Hayden, Arizona, increased its reporting of on-site land disposal of copper compounds to include its metal mining operations (a new TRI industry category). Because it reported only under SIC code 33, it is included in this analysis; it is not possible to know from the reported data how much of the 1999 amount is due to the metal mining operations. The main chemicals involved were copper and compounds and zinc and compounds, released to land.
- The third-largest increase, 10.8 million kg, was reported by AK Steel in Butler, Pennsylvania. The main chemical involved in the increase was nitric acid and nitrate compounds, released to surface water. This steel mill uses a nitric acid pickling process in the production of specialty steels. Its increases are directly related to increases in production.
- Kennecott Utah Copper Smelter & Refinery in Magna, Utah, reported the fourth-largest increase in total releases and transfers in North America from 1995 to 1999, 10.0 million kg. The increases (in releases to land of arsenic, copper and zinc and their compounds) were the result of higher production following the installation of a new smelter in 1995.

Some of the increases came from metal compounds that were below the reporting threshold before 1999 but that were reported in 1999.

- Fifth in the size of its increase was Steel Dynamics Inc. in Butler, Indiana, with 9.6 million kg, mainly involving transfers of metals (zinc and its compounds and aluminum). This Steel Dynamics facility began production in 1996 and has increased production since that time.

7.4.4 1995–1999 Total Releases and Transfers by Chemical

The 1995 matched data set contains 165 substances reportable to both NPRI and TRI for the period 1995 through 1999. The list of substances in the 1995 matched data set does not include the chemicals added to the NPRI list for 1999.

Appendix D presents information on potential health effects of the substances with the largest releases and transfers as reported to the North American PRTRs, from the US Agency for Toxic Substances and Disease Registry, the US EPA's Office of Pollution Prevention and Toxics and the New Jersey Department of Health and Senior Services. **Appendix E** describes uses of these substances.

- The chemical with the largest reduction in total releases and transfers in North America from 1995 to 1999 was methanol, with a decrease of 30.1 million kg, or 15 percent.
- The chemical with the second-largest decrease in total releases and transfers was toluene; the total fell 25.0 million kg, for a decline of 29 percent.

Table 7–23. The 10 Chemicals with the Largest Decrease in Total Releases and Transfers in North America, 1995–1999

Rank	CAS Number	Chemical	Total Releases and Transfers			
			1995 (kg)	1999 (kg)	Change 1995-1999 kg	%
1	67-56-1	Methanol	203,874,266	173,775,366	-30,098,900	-15
2	108-88-3	Toluene	84,924,761	59,948,543	-24,976,218	-29
3	75-15-0	Carbon disulfide	38,412,745	16,545,707	-21,867,038	-57
4	--	Xylenes	61,246,581	44,945,718	-16,300,863	-27
5	78-93-3	Methyl ethyl ketone	40,361,854	29,210,894	-11,150,960	-28
6	107-21-1	Ethylene glycol	27,051,399	18,377,437	-8,673,962	-32
7	7782-50-5	Chlorine	31,890,336	23,469,103	-8,421,233	-26
8	7647-01-0	Hydrochloric acid	32,746,556	24,847,517	-7,899,039	-24
9	75-09-2	Dichloromethane▼	33,928,128	26,725,652	-7,202,476	-21
10	79-01-6	Trichloroethylene▼	13,121,694	6,109,559	-7,012,135	-53

Note: Canada and US data only. Mexico data not available for 1995–1999. ▼ Known or suspected carcinogen.

Table 7–24. The 10 Chemicals with the Largest Increase in Total Releases and Transfers in North America, 1995–1999

Rank	CAS Number	Chemical	Total Releases and Transfers			
			1995 (kg)	1999 (kg)	Change 1995-1999 kg	%
1	--	Zinc (and its compounds)*	128,619,650	185,467,125	56,847,475	44
2	--	Nitric acid and nitrate compounds	181,461,047	230,974,378	49,513,331	27
3	--	Manganese (and its compounds)*	55,183,267	64,773,073	9,589,806	17
4	100-42-5	Styrene▼	23,284,546	32,588,814	9,304,268	40
5	--	Lead (and its compounds)*▼	23,444,977	30,532,642	7,087,665	30
6	--	Chromium (and its compounds)*▼	27,640,932	31,959,982	4,319,050	16
7	--	Arsenic (and its compounds)*▼	2,197,803	5,786,017	3,588,214	163
8	50-00-0	Formaldehyde▼	11,495,355	15,074,637	3,579,282	31
9	7429-90-5	Aluminum (fume or dust)*	5,367,105	8,803,703	3,436,598	64
10	78-87-5	1,2-Dichloropropane	285,672	1,721,507	1,435,835	503

Note: Canada and US data only. Mexico data not available for 1995–1999. * Metal and its compounds. ▼ Known or suspected carcinogen.

- The third-largest reduction was for carbon disulfide: 21.9 million kg, or 57 percent.
- No other chemical had reductions of more than 20 million kg from 1995 to 1999.
- Of the 10 chemicals with the largest decreases, the ninth and tenth, by size of reduction, were known or suspected carcinogens: dichloromethane and trichloroethylene.
- The largest increase in total releases and transfers in North America between 1995 and 1999 was reported for zinc and its compounds. The amount rose by 56.8 million kg, or 44 percent.
- The second-largest increase was for nitric acid and nitrate compounds: 49.5 million kg, or 27 percent.
- No other chemical had increases of more than 10 million kg in total releases and transfers from 1995 to 1999.
- Of the 10 chemicals with the largest increases during the period, six were known or suspected carcinogens: styrene, lead and its compounds, chromium and its compounds, arsenic and its compounds and formaldehyde. These substances ranked fourth through eighth according to size of increase.
- Six of the 10 chemicals with the largest total increase were metals. These included the chemical with the largest increase, zinc and its compounds; manganese and its compounds, which ranked third; lead and its compounds; chromium and its compounds; arsenic and its compounds; and aluminum (fume or dust).

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Key Findings

- Most transfers sent outside the country of the originating facility were transfers of metals to recycling in 1999—69 percent for NPRI facilities and 77 percent for TRI facilities.
- For both US and Canada, transfers outside the country were more likely to be transfers of metals to recycling and less likely to be transfers of metals to disposal than for transfers sent within the country.
- NPRI facilities sent 29.7 million kg of matched chemicals to US locations in 1999.
- TRI facilities sent 30.9 million kg of matched chemicals to Canadian locations and 27.0 million kg to Mexican locations in 1999.
- Mexico has not begun to collect mandatory data on transfers so it is not known how much was transferred from Mexican facilities to the US or Canada.
- A relatively small number of facilities in each country sent transfers across the US-Canada border—271 TRI facilities and 131 NPRI facilities. A total of 15 facilities in each country accounted for about two-thirds of the cross-border transfers.
- Most cross-border transfers were received at sites in Ontario and Quebec in Canada and in Michigan and Ohio in the United States.
- Cross-border transfers to Canada from the US decreased by 12 percent between 1998 and 1999, from 34.2 million kg to 30.0 million kg. The decrease was primarily in transfers of metals for recycling.
- Cross-border transfers to the US from Canada decreased by 9 percent between 1998 and 1999, from 32.7 million kg to 29.7 million kg. The decrease was primarily in transfers of all substances for recycling.

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 other countries. This chapter examines off-site transfers that were sent to sites across national boundaries in 1998 and 1999. The off-site transfers examined are those 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 those sent from a facility to other locations—nearby, within the state or province, or outside the country. While other chapters examine transfers at their point of origin, this chapter examines the destinations of the transfers and the subset of the transfers that are sent across national boundaries.

This chapter presents:

- 1999 data for transfers to disposal, recycling, energy recovery, and treatment; and
- data for the time period 1998–1999.

The 1998–1999 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 1999 reporting year and earlier. 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 1999 Transfers Outside the Country

Chemicals can be transferred off-site to another facility for recycling, further management (energy recovery or treatment), or disposal. All transfers of metals that are not sent for recycling are presented in one energy recovery/treatment/disposal category. This is done to make the TRI and NPRI data comparable because TRI classifies all transfers of metals, except those to recycling, as transfers to disposal since metals are not destroyed by treatment or burned in energy recovery.

- Most transfers sent outside the country in 1999 were transfers of metals to recycling—69 percent for NPRI facilities and 77 percent for TRI facilities.
- NPRI facilities reported sending 29.8 million kg outside the country, amounting to 17 percent of all NPRI transfers for 1999.
- TRI facilities reported sending 62.9 million kg outside the country, or 4 percent of all TRI transfers for 1999.

Table 8–1. Transfers from NPRI Facilities within Canada and to Other Countries, 1999

	Outside Canada		Within Canada		Total Off-site Transfers	
	kg	%	kg	%	kg	%
Recycling of Metals	20,477,138	69	73,482,340	50	93,959,478	53
Recycling (except metals)	2,353,037	8	12,401,693	8	14,754,730	8
Energy Recovery (except metals)	4,593,816	15	9,548,716	6	14,142,532	8
Treatment (except metals)	348,214	1	11,159,712	8	11,507,926	7
Disposal (except metals)	1,330,135	5	8,139,026	5	9,469,161	5
Metals to Disposal/Energy Recovery/Treatment	720,256	2	33,454,518	23	34,174,774	19
Total Off-site Transfers	29,822,596	100	148,186,005	100	178,008,601	100

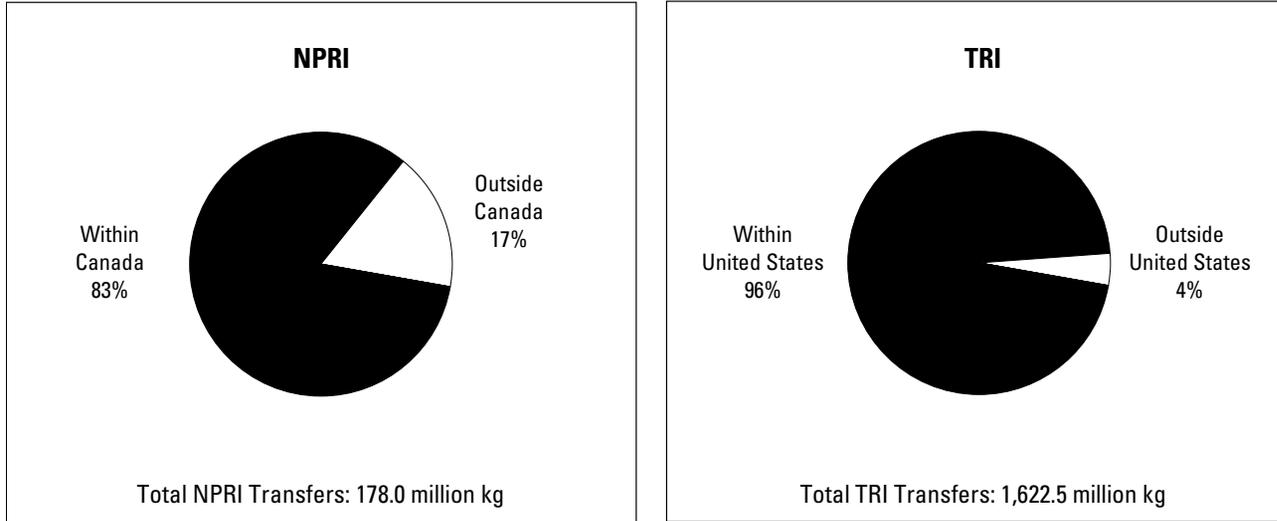
Note: Does not include transfers to sewage.

Table 8–2. Transfers from TRI Facilities within United States and to Other Countries, 1999

	Outside United States		Within United States		Total Off-site Transfers	
	kg	%	kg	%	kg	%
Recycling of Metals	48,223,181	77	759,733,180	49	807,956,361	50
Recycling (except metals)	3,122,823	5	130,713,797	8	133,836,620	8
Energy Recovery (except metals)	1,769,654	3	330,833,059	21	332,602,713	21
Treatment (except metals)	6,463,782	10	111,967,490	7	118,431,272	7
Disposal (except metals)	303,257	0.5	30,553,062	2	30,856,319	2
Metals to Disposal/Energy Recovery/ Treatment	3,044,017	5	195,768,473	13	198,812,490	12
Total Off-site Transfers	62,926,714	100	1,559,569,061	100	1,622,495,775	100

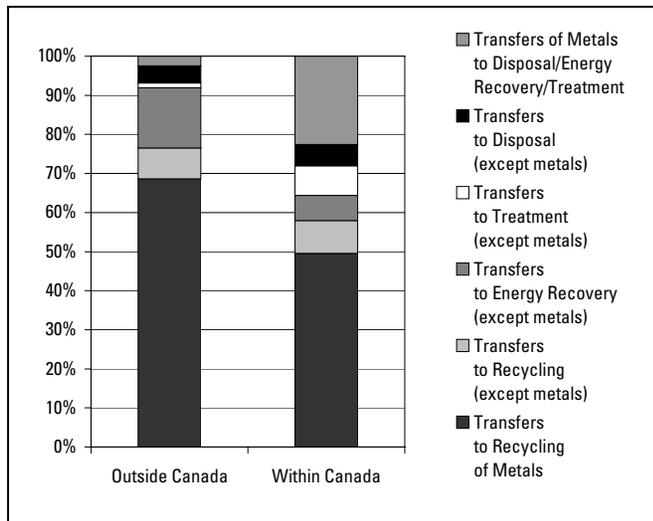
Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (less than 0.01% of total).

Figure 8–1. Percentage of Transfers sent Within and Outside Country, NPRI and TRI, 1999



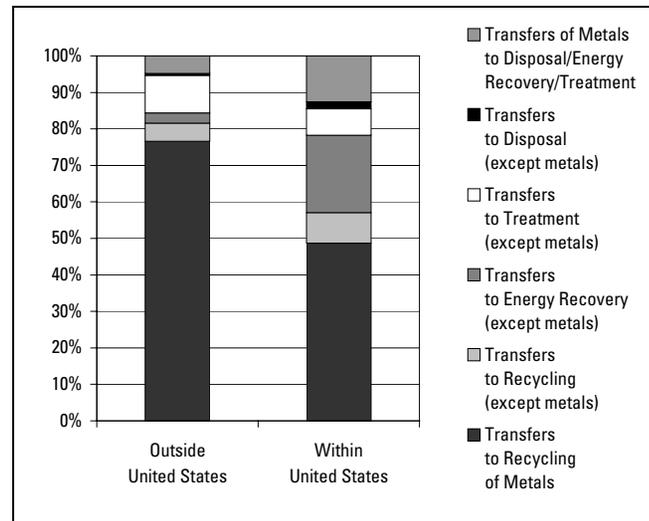
Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (less than 0.01% of total).

Figure 8–2. Transfers from NPRI Facilities within Canada and to Other Countries, by Type of Transfer, 1999



Note: Does not include transfers to sewage.

Figure 8–3. Transfers from TRI Facilities within United States and to Other Countries, by Type of Transfer, 1999



Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (less than 0.01% of total).

- For both US and Canadian facilities, transfers to recycling were a bigger percentage of the total for transfers sent outside the home country than for transfers sent within. And transfers of metals to disposal were a smaller percentage of the total for transfers sent outside than for transfers sent within.
- For transfers within Canada reported to NPRI, 50 percent were to recycling of metals (versus 69 percent for transfers outside Canada) and 23 percent were of metals to energy recovery, treatment or disposal (versus 2 percent for transfers outside Canada).
- In TRI, 49 percent of transfers within the US were transfers of metals to recycling (versus 77 percent for transfers sent outside the US), 21 percent were transfers to energy recovery (other than metals), and 13 percent were transfers of metals (other than to recycling). Three percent of transfers to energy recovery (other than metals) and 5 percent of transfers of metals (other than to recycling) were sent outside the US.

8.2.1 Transfers Across North American Borders, 1999

Both NPRI and TRI facilities sent transfers across the border between the two countries as well as to other countries outside North America. TRI facilities also sent transfers to Mexico.

- Virtually all of Canadian transfers sent outside its borders went to locations in the United States. This amounted to 29.7 million kg of matched chemicals in 1999.
- TRI facilities sent 30.9 million kg to Canadian locations and 27.0 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 (13.4 million kg, representing 45 percent of all such transfers). Another 13 percent went to the state of Ohio (3.9 million kg).
- The largest amount of transfers to Canada from the US was to Ontario (15.5 million kg or 25 percent of all US transfers to other countries). Another 23 percent went to the province of Quebec (14.7 million kg).

Table 8-3. NPRI Off-site Transfers to Other Countries from Canada, 1999

Receiving Country	Type of Transfer						Total Transfers Received (kg)	Transfers Outside Canada (%)
	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/ Energy Recovery/ Treatment (kg)		
United States	20,390,105	2,353,037	4,593,816	348,214	1,330,135	720,256	29,735,563	99.7
California	192,050	3,174	0	0	0	0	195,224	0.7
Connecticut	498,760	0	0	0	0	0	498,760	1.7
Florida	4,300	0	0	0	0	0	4,300	0.0
Georgia	189	0	0	0	0	0	189	0.0
Idaho	1,839	0	0	0	0	0	1,839	0.0
Illinois	732,316	21,661	0	91,396	0	0	845,373	2.8
Indiana	105,242	150,000	6,900	0	0	0	262,142	0.9
Iowa	623,000	0	0	0	0	0	623,000	2.1
Kansas	0	0	339,320	0	0	0	339,320	1.1
Kentucky	39,280	0	0	0	0	0	39,280	0.1
Louisiana	100,084	326,216	0	0	0	0	426,300	1.4
Maryland	0	3,470	0	0	0	0	3,470	0.0
Massachusetts	0	0	0	12,400	0	0	12,400	0.0
Michigan	9,066,612	1,560,823	1,941,639	10,291	603,900	226,187	13,409,452	45.0
Minnesota	0	956	0	0	0	0	956	0.0
Mississippi	1,910	0	0	0	0	0	1,910	0.0
Missouri	0	0	425,517	0	0	0	425,517	1.4
New Jersey	679,690	0	0	0	0	0	679,690	2.3
New York	2,233,484	34,730	7,282	11,900	0	34,190	2,321,586	7.8
North Carolina	77,940	0	0	0	0	0	77,940	0.3
North Dakota	0	0	0	0	0	2,427	2,427	0.0
Ohio	2,201,235	0	321,378	208,450	725,550	411,442	3,868,055	13.0
Oregon	0	0	235	0	0	0	235	0.0
Pennsylvania	1,199,043	3,803	0	0	400	30	1,203,276	4.0
South Carolina	0	0	1,505,473	0	0	0	1,505,473	5.0
Texas	2,444,291	174,526	0	0	0	0	2,618,817	8.8
Utah	9,130	31,200	0	0	0	0	40,330	0.1
Virginia	390	0	0	0	0	0	390	0.0
Washington	179,300	42,478	46,072	13,777	285	45,980	327,892	1.1
Wisconsin	20	0	0	0	0	0	20	0.0
Other Countries	87,033	0	0	0	0	0	87,033	0.3
Germany	12,523	0	0	0	0	0	12,523	0.0
Netherlands	53,770	0	0	0	0	0	53,770	0.2
United Kingdom	20,740	0	0	0	0	0	20,740	0.1
Total Transferred Outside Canada	20,477,138	2,353,037	4,593,816	348,214	1,330,135	720,256	29,822,596	100.0

Table 8–4. TRI Off-site Transfers to Other Countries from the United States, 1999

Receiving Country	Type of Transfer						Total Transfers Received (kg)	Transfers Outside US (%)
	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Disposal/Energy Recovery/Treatment (kg)		
Canada	16,469,257	3,103,424	1,769,654	6,463,782	303,257	2,813,690	30,923,064	49.1
Alberta	0	24,768	0	0	0	0	24,768	0.0
British Columbia	147,586	0	16,626	215	0	0	164,427	0.3
Manitoba	11,338	0	0	0	0	0	11,338	0.0
New Brunswick	519,610	1	0	0	0	59	519,670	0.8
Ontario	5,252,273	274,080	1,596,928	6,209,506	287,625	1,873,551	15,493,963	24.6
Quebec	10,538,450	2,804,575	156,100	254,061	15,632	940,080	14,708,898	23.4
Mexico	26,760,008	0	0	0	0	227,697	26,987,705	42.9
Monterrey	26,114,420	0	0	0	0	227,697	26,342,117	41.9
Other Cities	645,588	0	0	0	0	0	645,588	1.0
Other Countries	4,993,916	19,399	0	0	0	2,630	5,015,945	8.0
Australia	14,074	0	0	0	0	0	14,074	0.0
Belgium	55,084	7	0	0	0	0	55,091	0.1
China	241,871	0	0	0	0	0	241,871	0.4
France	78	0	0	0	0	0	78	0.0
Germany	812,406	0	0	0	0	0	812,406	1.3
Italy	8,345	0	0	0	0	0	8,345	0.0
Japan	612,245	19,392	0	0	0	0	631,637	1.0
Korea	24,047	0	0	0	0	0	24,047	0.0
Netherlands	2,309,178	0	0	0	0	0	2,309,178	3.7
Sweden	11,414	0	0	0	0	0	11,414	0.0
United Arab Emirates	232,783	0	0	0	0	0	232,783	0.4
United Kingdom	672,391	0	0	0	0	2,630	675,021	1.1
Total Transferred Outside US	48,223,181	3,122,823	1,769,654	6,463,782	303,257	3,044,017	62,926,714	100.0

Map 8-1. Off-site Transfers across North America, 1999

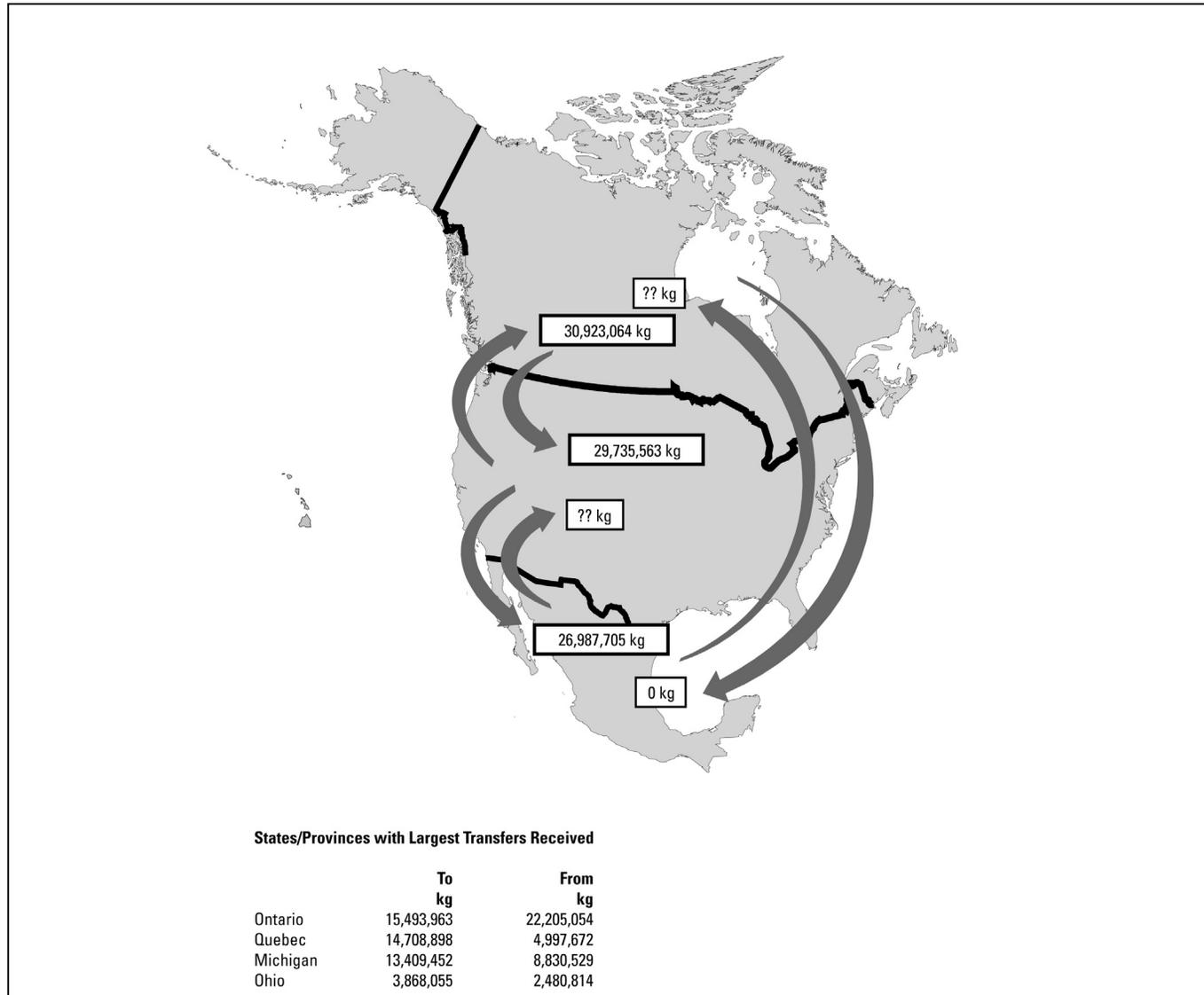


Table 8–5. Off-site Transfers across National Boundaries between United States and Canada, 1999

To/From US State	To/From Canadian Province															Total Cross-Boundary Transfers																				
	To Alberta		From Alberta		To British Columbia		From British Columbia		To Manitoba		From Manitoba		To New Brunswick		From New Brunswick		To Nova Scotia		From Nova Scotia		To Ontario		From Ontario		To Quebec		From Quebec		To Saskatchewan		From Saskatchewan		To Canada		From Canada	
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)		
Arizona	0	0	4,147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,147	0					
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
California	0	146,240	28,938	40,410	11,338	0	0	0	0	0	0	0	0	4,714	8,574	1,900	0	0	0	0	0	0	0	0	0	0	0	0	0	46,890	195,224					
Connecticut	0	0	0	0	0	0	0	0	0	0	0	0	0	27,763	463,600	329,106	35,160	0	0	0	0	0	0	0	0	0	0	0	356,869	498,760						
Delaware	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	4,300	10,181	0	1	0	0	0	0	0	0	0	0	0	0	0	0	10,182	4,300					
Georgia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	189	258,340	0	0	0	0	0	0	0	0	0	0	0	0	258,340	189						
Idaho	0	0	0	1,839	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,839			
Illinois	0	0	0	0	0	0	0	0	0	0	0	0	0	57,946	145,373	1,253,260	700,000	0	0	0	0	0	0	0	0	0	0	0	1,311,206	845,373						
Indiana	0	6,900	0	0	0	0	0	0	0	0	0	0	0	47,145	255,242	0	0	0	0	0	0	0	0	0	0	0	0	0	47,145	262,142						
Iowa	0	0	0	0	0	0	623,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	623,000			
Kansas	0	27,200	0	125,990	0	0	0	0	0	0	0	0	0	3,429	0	176,470	186,130	0	0	0	0	0	0	0	0	0	0	0	179,899	339,320						
Kentucky	0	39,280	113	0	0	0	0	0	0	0	0	0	0	478,907	0	3,980,741	0	0	0	0	0	0	0	0	0	0	0	0	4,459,761	39,280						
Louisiana	0	425,340	0	0	0	0	0	0	0	0	0	0	0	0	0	11,594	4	0	0	0	0	0	0	0	0	0	0	0	11,594	426,300						
Maine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,350	0	0	0	0	0	0	0	0	0	0	0	0	14,350	0						
Maryland	0	0	0	0	0	0	0	0	0	0	0	0	0	39	3,470	0	0	0	0	0	0	0	0	0	0	0	0	0	39	3,470						
Massachusetts	0	0	0	0	0	0	0	0	0	0	0	0	0	186,182	0	552,782	12,400	0	0	0	0	0	0	0	0	0	0	0	738,964	12,400						
Michigan	0	0	0	0	0	0	0	0	0	0	0	0	0	8,815,571	13,356,264	14,958	53,188	0	0	0	0	0	0	0	0	0	0	0	8,830,529	13,409,452						
Minnesota	0	0	0	0	0	0	0	0	0	0	0	0	0	956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,855	956						
Mississippi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,910	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,910				
Montana	4,576	0	27,849	37,080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32,425	425,517						
Nebraska	0	0	0	0	0	0	0	0	0	0	0	0	0	188,693	0	0	0	0	0	0	0	0	0	0	0	0	0	0	188,693	0						
New Hampshire	0	0	0	0	0	0	0	0	0	0	0	0	0	63,177	0	32,181	0	0	0	0	0	0	0	0	0	0	0	0	95,358	0						
New Jersey	0	0	259	0	0	0	0	0	0	0	0	0	0	9,623	27,760	52,706	585,394	0	0	0	0	0	0	0	0	0	0	0	62,588	679,690						
New York	0	32,119	0	0	0	0	0	559	0	0	0	0	0	745,375	2,230,967	2,281,977	58,500	0	0	0	0	0	0	0	0	0	0	0	3,027,911	2,321,586						
North Carolina	0	0	0	0	0	0	0	0	0	0	0	0	0	15,083	20,000	113	57,940	0	0	0	0	0	0	0	0	0	0	0	15,196	77,940						
North Dakota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Ohio	0	197,358	0	46,600	0	0	0	0	0	0	0	0	0	2,432,407	3,416,137	48,407	207,960	0	0	0	0	0	0	0	0	0	0	0	2,480,814	3,868,055						
Oregon	0	235	14,944	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,944	235						
Pennsylvania	0	0	0	0	0	0	0	0	0	0	0	0	0	1,637,400	1,164,542	2,202,538	38,734	0	0	0	0	0	0	0	0	0	0	0	3,839,938	1,203,276						
Rhode Island	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93,993	0	0	0	0	0	0	0	0	0	0	0	0	93,993	0						
South Carolina	0	0	0	25,910	0	0	0	0	0	0	0	0	0	131,519	0	1,043	1,479,563	0	0	0	0	0	0	0	0	0	0	0	132,562	1,505,473						
Tennessee	0	0	0	0	0	0	0	0	0	0	0	0	0	35,037	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35,037	0						
Texas	0	0	0	89,047	0	35,000	519,111	0	0	0	0	0	0	572,592	1,112,526	0	1,111,402	270,842	0	0	0	0	0	0	0	0	0	1,091,703	2,618,817							
Utah	0	0	0	40,330	0	0	0	0	0	0	0	0	0	234	0	226	0	0	0	0	0	0	0	0	0	0	0	460	40,330							
Vermont	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20,948	0	0	0	0	0	0	0	0	0	0	0	0	20,948	0						
Virginia	0	0	0	0	0	0	0	0	0	0	0	0	0	22,795	390	250,336	0	0	0	0	0	0	0	0	0	0	0	0	273,131	390						
Washington	20,192	1,780	88,177	159,162	0	86,000	0	0	0	0	0	0	0	0	0	13,114	80,950	0	0	0	0	0	0	0	0	0	0	0	121,483	327,892						
West Virginia	0	0	0	0	0	0	0	0	0	0	0	0	0	7,872	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7,872	0						
Wisconsin	0	0	0	0	0	0	0	0	0	0	0	0	0	279	20	0	0	0	0	0	0	0	0	0	0	0	0	0	279	20						
Total	24,768	876,452	164,427	566,368	11,338	744,000	519,670	68,448	4,300	15,493,963	22,205,054	14,708,898	4,997,672	273,269	30,923,064	29,735,563																				

Note: Does not include transfers to sewage.

8.2.2 Transfers between US States and Canadian Provinces, 1999

A relatively small number of facilities transfer listed substances in the matched data set across the Canada-US border, and 15 facilities in each country account for the majority of such transfers.

- For 1999, 271 TRI facilities and 131 NPRI facilities reported transfers across the US-Canada border.
- Eight TRI facilities and eight NPRI facilities reported more than 1.0 million kg of cross-border transfers. Only 15 facilities in each country reported about two-thirds of the total cross-border transfers between the two countries.
- Over two-thirds of the transfers of the NPRI facilities with the largest cross-border transfers, and nearly half of those from the corresponding population of TRI facilities, were of metals and their compounds destined for recycling.

Table 8-6. NPRI Facilities with Largest Transfers to US from Canada, 1999

Rank	Facility	City, Province	US SIC Code	Number of Facilities Reporting Transfers to US
1	Waltec Forgings Incorporated, Wallaceburg Plant	Wallaceburg, ON	34	1
2	Safety-Kleen Canada Inc., Centre de recyclage de St-Constant	St-Constant, QC	495/738	1
3	Aimco Solrec Ltd.	Milton, ON	28	1
4	Fisher Gauge Limited, Otonabee Plant	Peterborough, ON	33	1
5	Ball Packaging Products Canada, Inc., Ball Corp.	Burlington, ON	34	1
6	DNN Galvanizing, Dofasco/National Steel/NKK	Windsor, ON	33	1
7	L&M Screw Machine Products Limited	North York, ON	34	1
8	Philip Enterprises Inc., Fort Erie Facility, Philip Services Corp.	Fort Erie, ON	495/738	1
9	Philip Services Corp., Windsor Facility	Windsor, ON	495/738	1
10	Noma Cable Tech, Stouffville Plant, Gentek	Stouffville, ON	33	1
11	Sorevco, Société en commandite, Dofasco Inc./Ispat (Sidbec) Inc.	Côteau-du-Lac, QC	39	1
12	Lofthouse Brass Manufacturing Limited, Burks Falls	Burks Falls, ON	34	1
13	Superior Cable Corporation, Superior Telecommunication Inc.	Winnipeg, MB	33	1
14	Ford Motor Company, Oakville Assembly Plant	Oakville, ON	37	1
15	Ford Motor Company, St. Thomas Assembly Plant	St. Thomas, ON	37	1
	Subtotal			15
	% of Total			11
	Total			131

Table 8-7. TRI Facilities with Largest Transfers to Canada from US, 1999

Rank	Facility	City, State	US SIC Code	Number of Facilities Reporting Transfers to Canada
1	Michigan Recovery Sys. Inc., EQ - The Environmental Quality Co.	Romulus, MI	495/738	1
2	Gibbs Die Casting Corp., George Koch & Sons	Henderson, KY	33	1
3	GNB Techs. Inc.	Dunmore, PA	Mult.	1
4	Johnson Controls Inc., Battery Group Inc.	Middletown, DE	36	1
5	Petro-Chem Processing Group/Solvent Distillers Group, Nortru, Inc.	Detroit, MI	495/738	1
6	Delphi Packard Electric Sys., Delphi Automotive Sys.	Warren, OH	37	1
7	Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton, PA	33	1
8	GNB Techs. Inc., GNB Indl. Battery Co.	Fort Smith, AR	36	1
9	GE Co. Silicone Prods., GE Co.	Waterford, NY	28	1
10	Dow Corning Corp.	Carrollton, KY	28	1
11	Encycle Texas Inc., ASARCO Inc.	Corpus Christi, TX	495/738	1
12	Dow Corning Corp.	Midland, MI	28	1
13	H. Kramer & Co.	Chicago, IL	33	1
14	Wyeth Ayerst Pharmaceuticals Inc., American Home Prods. Corp.	Rouses Point, NY	28	1
15	Buckbee-Mears Cortland, BMC Inds. Inc.	Cortland, NY	34	1
	Subtotal			15
	% of Total			6
	Total			271

Table 8–6. (continued)

Rank	Type of Transfer						Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers (kg)	Chemicals Transferred in Largest Amounts
	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Disposal (except metals) (kg)			
1	5,162,000	0	0	0	0	0	0	5,162,000	Copper/Zinc and its compounds
2	0	0	1,868,000	0	0	0	0	1,868,000	Toluene, Xylenes
3	0	0	1,419,711	0	0	0	0	1,419,711	Xylenes, Toluene
4	1,253,930	0	0	0	0	0	0	1,253,930	Zinc and its compounds
5	1,248,588	0	0	0	0	0	0	1,248,588	Copper and its compounds
6	1,152,000	0	0	0	0	0	0	1,152,000	Zinc and its compounds
7	1,060,885	0	0	0	0	0	0	1,060,885	Copper/Zinc and its compounds
8	5,400	0	0	490	652,500	394,437	0	1,052,827	Nitric acid and nitrate compounds
9	0	0	451,062	0	401,051	42,607	0	894,720	Xylenes, Toluene
10	886,300	0	0	0	0	0	0	886,300	Copper and its compounds
11	700,000	0	0	0	0	0	0	700,000	Zinc and its compounds
12	659,000	0	0	0	0	0	0	659,000	Copper/Zinc and its compounds
13	623,000	0	0	0	0	0	0	623,000	Copper and its compounds
14	0	569,500	0	0	0	0	0	569,500	Xylenes, Methyl isobutyl ketone
15	0	538,400	0	0	0	0	0	538,400	Xylenes, Methyl isobutyl ketone
	12,751,103	1,107,900	3,738,773	490	1,053,551	437,044	0	19,088,861	
	63	47	81	0.1	79	61	0	64	
	20,390,105	2,353,037	4,593,816	348,214	1,330,135	720,256	0	29,735,563	

Table 8–7. (continued)

Rank	Type of Transfer						Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers (kg)	Chemicals Transferred in Largest Amounts
	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Disposal (except metals) (kg)			
1	0	0	0	5,129,253	0	8,163	0	5,137,416	Xylenes, Toluene, n-Hexane
2	1,034,014	2,222,222	0	0	0	0	0	3,256,236	Aluminum oxide (fibrous forms)
3	2,199,093	0	0	0	0	0	0	2,199,093	Lead and its compounds
4	2,046,467	0	0	0	0	0	0	2,046,467	Lead and its compounds
5	0	0	1,520,875	101,938	0	0	0	1,622,813	Toluene, Xylenes
6	1,593,697	0	0	0	0	0	0	1,593,697	Copper and its compounds
7	0	0	0	0	0	1,444,584	0	1,444,584	Lead/Zinc and its compounds
8	1,063,492	0	0	0	0	0	0	1,063,492	Lead and its compounds
9	771,474	657	0	0	0	86,227	0	858,358	Copper and its compounds
10	724,505	0	0	0	0	0	0	724,505	Copper and its compounds
11	621,024	0	0	0	0	0	0	621,024	Lead/Zinc and its compounds
12	0	0	0	563,395	0	0	0	563,395	Xylenes, Toluene, Methanol
13	557,909	0	0	0	0	0	0	557,909	Copper and its compounds
14	0	278,458	0	120,590	0	0	0	399,048	Dichloromethane, Methanol
15	0	0	0	5,990	0	391,610	0	397,600	Nickel and its compounds
	10,611,675	2,501,337	1,520,875	5,921,166	0	1,930,584	0	22,485,637	
	64	81	86	92	0	69	0	73	
	16,469,257	3,103,424	1,769,654	6,463,782	303,257	2,813,690	0	30,923,064	

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

- One site in Michigan (Mueller Brass Company in Port Huron) received 5.9 million kg from Canadian facilities, which represented 39 percent of the 15.2 million kg reported as transferred to this site from both Canada and the US in 1999. The vast majority of the transfers to this site were to recycling.
- A second site in Michigan (Systech Environmental in Alpena) received 2.1 million kg from Canadian facilities, which represented 26 percent of all transfers to this site in 1999. Most of these transfers were to energy recovery.
- One site in Ohio (Chase Brass & Copper Company in Montpelier) received 1.7 million kg from Canadian facilities (representing 11 percent of all transfers to this site) and 12.9 million kg from US facilities. All of these transfers were to recycling.
- A second site in Ohio (Waste Management of Ohio in Vickery) received 1.1 million kg from Canadian facilities (representing 32 percent of all transfers to this site) and 2.4 million kg from TRI facilities. Most transfers received at the site were to disposal of substances other than metals.

Table 8–8. Sites in Michigan that Received Largest Transfers from Canada, 1999

Rank	Facility	Location	City/State
1	Mueller Brass Company	Lapeer Avenue	Port Huron, MI
2	Systech Environmental Corp.	Ford Avenue	Alpena, MI
3	Gage Products Company	Wanda Avenue	Ferndale, MI
4	Arco Alloys Corp.	Trombly Street	Detroit, MI
5	Alchem Aluminum Inc.	West Garfield	Cold Water, MI
1	Mueller Brass Company	Lapeer Avenue	Port Huron, MI
2	Systech Environmental Corp.	Ford Avenue	Alpena, MI
3	Gage Products Company	Wanda Avenue	Ferndale, MI
4	Arco Alloys Corp.	Trombly Street	Detroit, MI
5	Alchem Aluminum Inc.	West Garfield	Cold Water, MI

Table 8–9. Sites in Ohio that Received Largest Transfers from Canada, 1999

Rank	Facility	Location	City/State
1	Chase Brass & Copper Company	Route 15	Montpelier, OH
2	Waste Management of Ohio, Chemical Waste Management	State Route 412	Vickery, OH
3	Systech Environmental Technologies	North Valley Road	Xenia, OH
4	Rock Creek Aluminium Inc.	East Water Street	Rock Creek, OH
5	PPG Industries, Inc.	Route 23	Circleville, OH
1	Chase Brass & Copper Company	Route 15	Montpelier, OH
2	Waste Management of Ohio, Chemical Waste Management	State Route 412	Vickery, OH
3	Systech Environmental Technologies	North Valley Road	Xenia, OH
4	Rock Creek Aluminium Inc.	East Water Street	Rock Creek, OH
5	PPG Industries, Inc.	Route 23	Circleville, OH

Table 8–8. (continued)

Rank	Number of Facilities	Number of Forms	Type of Transfer					Total Transfers (kg)	Total North American Transfers (kg)	From Canada (%)
			Recycling* (kg)	Energy Recovery** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Energy Recovery/ Treatment/ Disposal* (kg)			
From Canadian NPRI Facilities										
1	3	11	5,873,703	0	0	0	0	5,873,703	15,225,099	39
2	6	42	148,672	1,941,639	0	8,109	5,813	2,104,233	7,973,329	26
3	4	26	1,529,319	0	0	0	0	1,529,319	9,197,911	17
4	1	1	1,152,000	0	0	0	0	1,152,000	1,273,135	90
5	4	14	880,168	0	0	0	0	880,168	2,306,742	38
From US TRI Facilities										
1	25	52	9,317,298	0	0	0	34,098	9,351,396		
2	9	97	2,948	5,793,985	72,163	0	0	5,869,096		
3	33	198	7,668,580	0	0	0	12	7,668,592		
4	2	2	121,135	0	0	0	0	121,135		
5	21	43	1,426,574	0	0	0	0	1,426,574		

* Includes metals and their compounds.

** Does not include metals and their compounds.

Table 8–9. (continued)

Rank	Number of Facilities	Number of Forms	Type of Transfer					Total Transfers (kg)	Total North American Transfers (kg)	From Canada (%)
			Recycling* (kg)	Energy Recovery** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Energy Recovery/ Treatment/ Disposal* (kg)			
From Canadian NPRI Facilities										
1	4	12	1,653,160	0	0	0	0	1,653,160	14,536,113	11
2	3	8	0	0	490	725,550	410,487	1,136,527	3,548,451	32
3	3	13	0	140,199	207,960	0	0	348,159	350,419	99
4	2	5	260,362	0	0	0	0	260,362	325,013	80
5	1	13	0	163,188	0	0	625	163,813	1,252,126	13
From US TRI Facilities										
1	34	64	12,882,953	0	0	0	0	12,882,953		
2	64	136	58,338	0	379,799	1,495,203	478,584	2,411,924		
3	2	6	0	2,256	0	0	4	2,260		
4	7	20	64,645	0	0	0	6	64,651		
5	15	66	6,931	1,068,440	0	0	12,942	1,088,313		

* Includes metals and their compounds.

** Does not include metals and their compounds.

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

- One site in Ontario (Safety-Kleen in Corunna) received 7.8 million kg from TRI facilities, which represented 45 percent of the total transfers it received in 1999 (another 9.5 million kg came from NPRI facilities). Most of the transfers from TRI facilities were chemicals other than metals sent for treatment, while transfers from NPRI facilities were primarily of metals sent for disposal.
- Two sites in Hamilton, Ontario, both owned by Philip Environmental, received a total of 3.5 million kg from the US and 3.6 million kg from sites within Canada. US transfers, most of which were sent for recycling, represented 49 percent of the total transfers received at these two sites in 1999..
- One site in Quebec (Nova Lead in Sainte-Catherine) received 6.3 million kg from US facilities, representing 97 percent of all transfers reported to this site in 1999. All were to recycling.
- A second site in Quebec (Norsk Hydro in Bécancour) received 3.3 million kg, all from US facilities and all went to recycling.

Table 8–10. Sites in Ontario that Received Largest Transfers from US, 1999

Rank	Facility	Location	City/Province
1	Safety-Kleen Ltd., Lambton Facility	Telfer Road	Corunna, ON
2	Philip Environmental	Centennial Parkway North	Hamilton, ON
3	Philip Environmental	Parkdale Avenue	Hamilton, ON
4	Safety-Kleen Corp.	Avonhead Road	Mississauga, ON
5	Central Machinery & Metals	Fenmar Drive	Weston, ON
1	Safety-Kleen Corp.	Telfer Road	Corunna, ON
2	Philip Environmental	Centennial Parkway North	Hamilton, ON
3	Philip Environmental	Parkdale Avenue	Hamilton, ON
4	Safety-Kleen Corp.	Avonhead Road	Mississauga, ON
5	Central Machinery & Metals	Fenmar Drive	Weston, ON

Table 8–11. Sites in Quebec that Received Largest Transfers from US, 1999

Rank	Facility	Location	City/Province
1	Nova Lead Inc.	Garnier St.	Ste-Catherine, QC
2	Norsk Hydro	Boul. Raoul-Duchesne	Bécancour, QC
3	Noranda Metallurgy Inc. (Horne Smelter)	Réal Caouette Avenue	Rouyn-Noranda, QC
4	Stablex Canada Inc.	Boul. Industriel	Blainville, QC
5	Chemrec Inc.	Brosseau	Cowansville, QC
1	Nova Lead Inc.	Garnier St.	Ste-Catherine, QC
2	Norsk Hydro	Boul. Raoul-Duchesne	Bécancour, QC
3	Noranda Metallurgy Inc. (Horne Smelter)	Réal Caouette Avenue	Rouyn-Noranda, QC
4	Stablex Canada Inc.	Boul. Industriel	Blainville, QC
5	Chemrec Inc.	Brosseau	Cowansville, QC

Table 8–10. (continued)

Rank	Number of Facilities	Number of Forms	Type of Transfer					Total Transfers (kg)	Total North American Transfers (kg)	From US (%)
			Recycling* (kg)	Energy Recovery** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Energy Recovery/ Treatment/ Disposal* (kg)			
From US TRI Facilities										
1	59	413	0	131,734	5,604,060	250,766	1,795,502	7,782,062	17,326,220	45
2	8	11	2,042,678	0	0	0	0	2,042,678	4,792,768	43
3	7	34	5,364	1,352,015	90,075	0	2,650	1,450,104	2,289,578	63
4	6	71	0	0	497,833	4,494	68,355	570,682	3,891,165	15
5	3	5	487,975	0	0	0	0	487,975	490,407	99.5
From Canadian NPRI Facilities										
1	23	90	772,482	451,062	1,015,661	12,575	7,292,378	9,544,158		
2	7	10	2,750,090	0	0	0	0	2,750,090		
3	11	44	338,086	470,013	16,453	0	14,922	839,474		
4	20	82	1,668,097	1,990	981,809	44,606	623,981	3,320,483		
5	3	8	2,432	0	0	0	0	2,432		

* Includes metals and their compounds.

** Does not include metals and their compounds.

Table 8–11. (continued)

Rank	Number of Facilities	Number of Forms	Type of Transfer					Total Transfers (kg)	Total North American Transfers (kg)	From US (%)
			Recycling* (kg)	Energy Recovery** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Energy Recovery/ Treatment/ Disposal* (kg)			
From US TRI Facilities										
1	11	22	6,344,493	0	0	0	0	6,344,493	6,574,423	97
2	2	5	3,256,281	0	0	0	0	3,256,281	3,256,281	100
3	19	48	2,737,130	0	0	0	86,168	2,823,298	6,118,709	46
4	55	139	25,487	0	126,048	15,617	847,340	1,014,492	2,545,678	40
5	9	17	466,544	0	120,590	0	0	587,134	1,511,327	39
From Canadian NPRI Facilities										
1	2	2	229,930	0	0	0	0	229,930		
2	0	0	0	0	0	0	0	0		
3	6	21	3,276,293	0	19,103	0	15	3,295,411		
4	43	97	282,786	53,000	254,419	98,544	842,417	1,531,186		
5	9	27	913,953	0	8,500	0	1,590	924,193		

* Includes metals and their compounds.

** Does not include metals and their compounds.

Most cross-border transfers were transfers of metals to recycling, followed by transfers to energy recovery of chemicals other than metals by NPRI facilities and by transfers to treatment of chemicals other than metals by TRI facilities.

- Fabricated metals (US SIC code 34) facilities in Canada sent 38 percent of all transfers to the US. These transfers were mostly metals to recycling.
- Primary metals (US SIC code 33) facilities in Canada sent 22 percent of all transfers to the US. These transfers were also mostly metals to recycling.
- Hazardous waste management facilities in Canada sent the largest amount of chemicals (other than metals) to energy recovery; these represented 16 percent of all transfers to the US.

Table 8-12. NPRI Industries Reporting Transfers to US from Canada, 1999

US SIC Code	Industry	Type of Transfer					Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers (kg)	Total (%)
		Recycling of Metals (kg)	Energy		Disposal (except metals) (kg)	Total			
			Recycling (except metals) (kg)	Recovery (except metals) (kg)					
34	Fabricated Metals Products	11,152,953	0	0	0	0	2,877	11,155,830	37.5
33	Primary Metals	6,337,748	70,033	0	0	0	201,832	6,609,613	22.2
495/738	Hazardous Waste Mgt./Solvent Recovery	44,530	223,678	2,623,883	105,663	1,270,065	488,246	4,756,065	16.0
28	Chemicals	239,347	334,260	1,962,651	242,551	57,000	751	2,836,560	9.5
37	Transportation Equipment	59,784	1,529,323	0	0	0	0	1,589,107	5.3
39	Misc. Manufacturing Industries	821,823	0	0	0	0	0	821,823	2.8
36	Electronic/Electrical Equipment	766,116	21,661	0	0	0	0	787,777	2.6
29	Petroleum and Coal Products	260,487	167,438	0	0	0	0	427,925	1.4
32	Stone/Clay/Glass Products	224,830	0	7,282	0	0	0	232,112	0.8
491/493	Electric Utilities	219,508	0	0	0	0	0	219,508	0.7
35	Industrial Machinery	185,172	0	0	0	0	0	185,172	0.6
20	Food Products	74,319	0	0	0	0	0	74,319	0.2
26	Paper Products	0	0	0	0	0	26,310	26,310	0.1
30	Rubber and Plastics Products	3,488	3,174	0	0	3,070	0	9,732	0.03
27	Printing and Publishing	0	3,470	0	0	0	0	3,470	0.01
22	Textile Mill Products	0	0	0	0	0	240	240	0.001
Total		20,390,105	2,353,037	4,593,816	348,214	1,330,135	720,256	29,735,563	100

Table 8–13. TRI Industries Reporting Transfers to Canada from US, 1999

US SIC Code	Industry	Type of Transfer						Total Transfers (kg)	Total (%)
		Recycling of Metals (kg)	Energy			Metals to Energy Recovery/ Disposal (kg)			
			Recycling (except metals) (kg)	Recovery (except metals) (kg)	Treatment (except metals) (kg)		Disposal (except metals) (kg)		
495/738	Hazardous Waste Mgt./Solvent Recovery	676,197	29,196	1,661,165	5,632,627	50,239	465,024	8,514,448	27.5
33	Primary Metals	3,614,107	2,396,264	0	0	18,936	1,476,632	7,505,939	24.3
36	Electronic/Electrical Equipment	4,434,412	188	0	997	0	18,565	4,454,162	14.4
28	Chemicals	1,539,437	549,841	16,806	781,178	212,986	113,188	3,213,436	10.4
--	Multiple codes 20–39	2,933,845	2,721	0	34,919	88	85,314	3,056,887	9.9
37	Transportation Equipment	2,632,596	4,835	436	0	12	18,151	2,656,030	8.6
34	Fabricated Metals Products	353,400	0	0	10,846	0	630,006	994,252	3.2
30	Rubber and Plastics Products	29,462	1,695	91,247	1,224	0	76	123,704	0.4
38	Measurement/Photographic Instruments	91,809	20,256	0	5	822	2	112,894	0.4
26	Paper Products	25,367	81,008	0	0	15	2,992	109,382	0.4
39	Misc. Manufacturing Industries	47,625	12,744	0	0	0	3,028	63,397	0.2
29	Petroleum and Coal Products	20,602	4,676	0	495	20,159	595	46,527	0.2
32	Stone/Clay/Glass Products	40,329	0	0	1,491	0	0	41,820	0.1
35	Industrial Machinery	30,069	0	0	0	0	117	30,186	0.1
Total		16,469,257	3,103,424	1,769,654	6,463,782	303,257	2,813,690	30,923,064	100

- US hazardous waste management facilities sent 28 percent of all transfers to Canada from the US. This sector reported the largest amounts of transfers (except to recycling) of chemicals other than metals to treatment.
- The US primary metals (US SIC code 33) facilities sent 24 percent of all transfers to Canada. Among these transfers, metals to recycling was the category with the highest amount—48 percent. This sector also reported the largest amounts of transfers of metals to energy recovery, treatment, and disposal.

- Two metals (copper and zinc and their compounds) were the substances with the largest transfers to the US from Canada. The two represented more than half of all such transfers in 1999.
- Twenty-five chemicals accounted for 99 percent of all transfers to the US from Canada. Nine of the 25 were metals, including the two with the largest transfers, and seven were known or suspected carcinogens.
- Xylenes and toluene were the chemicals with the largest transfers to energy recovery of substances other than metals and were the third- and fourth-largest amounts overall.

Table 8–14. Chemicals Transferred to US from Canadian NPRI Facilities, 1999

Rank	CAS Number	Chemical	Type of Transfer					Metals to Energy Recovery/Disposal (kg)	Total Transfers (kg)	Total (%)
			Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)			
1	--	Copper (and its compounds)*	9,382,227	0	0	0	0	36,004	9,418,231	31.7
2	--	Zinc (and its compounds)*	7,811,365	0	0	0	0	233,780	8,045,145	27.1
3	1330-20-7	Xylenes	0	725,023	1,396,223	58,742	333,080	0	2,513,068	8.5
4	108-88-3	Toluene	0	27,470	1,591,736	95,273	154,665	0	1,869,144	6.3
5	--	Manganese (and its compounds)*	817,025	0	0	0	0	81,100	898,125	3.0
6	78-93-3	Methyl ethyl ketone	0	17,100	622,716	38,038	57,198	0	735,052	2.5
7	--	Nitric acid and nitrate compounds	0	0	0	490	725,550	0	726,040	2.4
8	7429-90-5	Aluminum (fume or dust)*	709,900	0	0	0	0	0	709,900	2.4
9	--	Lead (and its compounds)*▼	612,919	0	0	0	0	41,265	654,184	2.2
10	108-10-1	Methyl isobutyl ketone	0	439,000	172,375	746	18,422	0	630,543	2.1
11	--	Chromium (and its compounds)*▼	252,894	0	0	0	0	300,205	553,099	1.9
12	--	Nickel (and its compounds)*▼	490,372	0	0	0	0	23,806	514,178	1.7
13	1313-27-5	Molybdenum trioxide	0	328,369	0	0	0	0	328,369	1.1
14	100-41-4	Ethylbenzene	0	154,844	121,846	72	15,144	0	291,906	1.0
15	107-21-1	Ethylene glycol	0	181,204	52,144	11,900	11,995	0	257,243	0.9
16	67-56-1	Methanol	0	74,342	157,184	1,533	1,010	0	234,069	0.8
17	7440-62-2	Vanadium (fume or dust)*	188,077	0	0	0	0	0	188,077	0.6
18	71-36-3	n-Butyl alcohol	0	49,000	122,212	519	15	0	171,746	0.6
19	108-95-2	Phenol	0	145,900	3,641	5,129	0	0	154,670	0.5
20	127-18-4	Tetrachloroethylene▼	0	0	123,198	14,107	0	0	137,305	0.5
21	95-63-6	1,2,4-Trimethylbenzene	0	55,358	54,001	0	0	0	109,359	0.4
22	75-09-2	Dichloromethane▼	0	40,130	56,723	662	0	0	97,515	0.3
23	79-01-6	Trichloroethylene▼	0	0	53,220	43,200	0	0	96,420	0.3
24	--	Silver (and its compounds)*	68,894	0	0	0	0	0	68,894	0.2
25	67-66-3	Chloroform▼	0	0	0	48,010	0	0	48,010	0.2
Subtotal			20,333,673	2,237,740	4,527,219	318,421	1,317,079	716,160	29,450,292	99.0
% of Total			99.7	95.1	98.6	91.4	99.0	99.4	99.0	
Total			20,390,105	2,353,037	4,593,816	348,214	1,330,135	720,256	29,735,563	100

* Metal and its compounds. ▼ Known or suspected carcinogen.

Table 8–15. Chemicals Transferred to Canada from US TRI Facilities, 1999

Rank	CAS Number	Chemical	Type of Transfer					Total Transfers (kg)	Total (%)	
			Recycling of Metals (kg)	Energy Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)			Metals to Energy Recovery/Disposal (kg)
1	--	Lead (and its compounds)*▼	6,832,789	0	0	0	0	1,169,126	8,001,915	25.9
2	--	Copper (and its compounds)*	6,789,506	0	0	0	0	135,905	6,925,411	22.4
3	108-88-3	Toluene	0	110,845	498,545	1,664,290	13,019	0	2,286,699	7.4
4	--	Xylenes	0	6,997	303,856	1,924,362	9,721	0	2,244,936	7.3
5	1344-28-1	Aluminum oxide (fibrous forms)	0	2,222,222	0	0	0	0	2,222,222	7.2
6	--	Zinc (and its compounds)*	1,028,683	0	0	0	0	686,175	1,714,858	5.5
7	--	Nickel (and its compounds)*▼	960,891	0	0	0	0	500,807	1,461,698	4.7
8	67-56-1	Methanol	0	26,832	239,261	528,099	239	0	794,431	2.6
9	110-54-3	n-Hexane	0	12,451	17,073	725,437	3,016	0	757,977	2.5
10	78-93-3	Methyl ethyl ketone	0	24,969	203,539	360,799	404	0	589,711	1.9
11	75-09-2	Dichloromethane▼	0	417,982	0	113,129	243	0	531,354	1.7
12	--	Manganese (and its compounds)*	455,154	0	0	0	0	8,134	463,288	1.5
13	--	Chromium (and its compounds)*▼	210,696	0	0	0	0	206,165	416,861	1.3
14	108-10-1	Methyl isobutyl ketone	0	17,833	130,117	150,889	134	0	298,973	1.0
15	100-41-4	Ethylbenzene	0	612	86,512	196,337	1,911	0	285,372	0.9
16	107-21-1	Ethylene glycol	0	20,158	589	216,058	388	0	237,193	0.8
17	872-50-4	N-Methyl-2-pyrrolidone	0	32,241	88,669	57,278	122	0	178,310	0.6
18	91-20-3	Naphthalene	0	0	5,574	14,916	150,340	0	170,830	0.6
19	75-01-4	Vinyl chloride▼	0	158,603	0	113	1	0	158,717	0.5
20	--	Nitric acid and nitrate compounds	0	50	0	101,783	28,197	0	130,030	0.4
21	71-36-3	n-Butyl alcohol	0	2,911	40,487	67,402	160	0	110,960	0.4
22	--	Antimony (and its compounds)*	103,169	0	0	0	0	4,688	107,857	0.3
23	127-18-4	Tetrachloroethylene▼	0	0	0	98,728	469	0	99,197	0.3
24	--	Cadmium (and its compounds)*▼	24,701	0	0	0	0	55,163	79,864	0.3
25	79-01-6	Trichloroethylene▼	0	0	0	54,890	116	0	55,006	0.2
Subtotal			16,405,589	3,054,706	1,614,222	6,274,510	208,480	2,766,163	30,323,670	98.1
% of Total			99.6	98.4	91.2	97.1	68.7	98.3	98.1	
Total			16,469,257	3,103,424	1,769,654	6,463,782	303,257	2,813,690	30,923,064	100

* Metal and its compounds. ▼ Known or suspected carcinogen.

- Two metals (lead and copper and their compounds) were the substances with the largest transfers to Canada from the US. These two metals represented almost half of all such transfers in 1999.
- Twenty-five chemicals accounted for 98 percent of all transfers to Canada from the US in 1999. Eight of the 25 were metals, including the two with the largest transfers, and eight were known or suspected carcinogens.
- Toluene and xylenes were the chemicals with the largest transfers to treatment of substances other than metals, constituting the third- and fourth-largest amounts overall.

8.3 1998–1999 Cross-Border Transfers

Transfers to recycling and energy recovery became mandatory for NPRI for the 1998 reporting year. Therefore, comparisons for all types of transfers can be made for the years 1998 to 1999. However, the 1998–1999 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 1999 reporting year are excluded from the 1999 data.

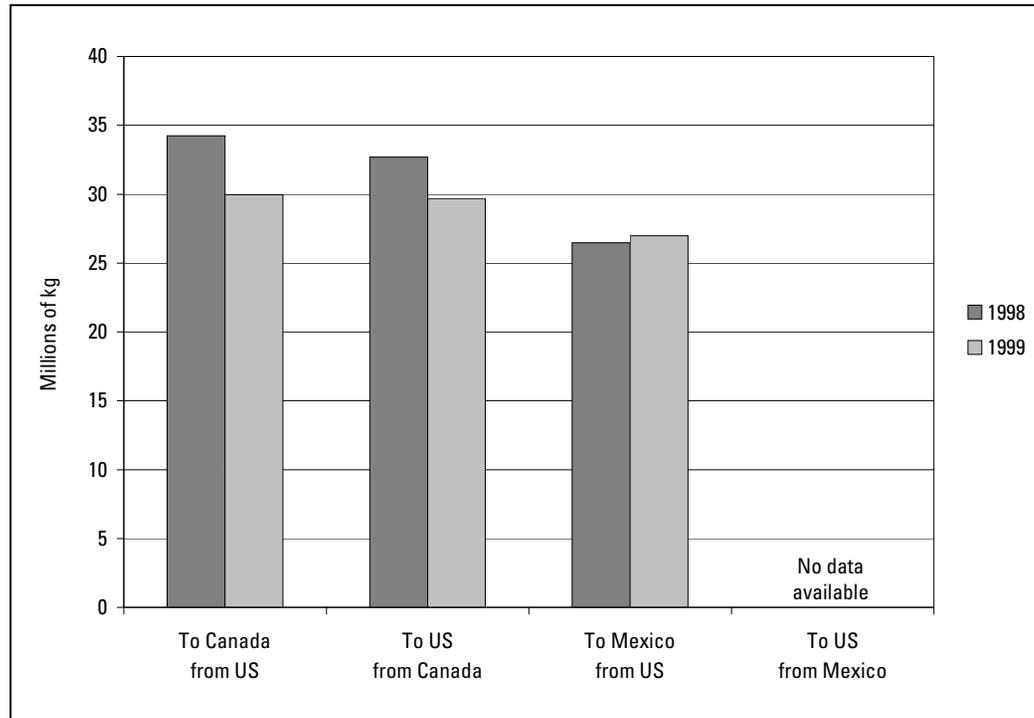
- Transfers to Canada from the US decreased from 34.2 million kg to 30.0 million kg from 1998 to 1999, a decrease of 12 percent.
- The decrease occurred primarily in recycling of metals. Transfers of substances other than metals to recycling and treatment increased by over 4 million kg.
- Transfers to the US from Canada decreased from 32.7 million kg to 29.7 million kg from 1998 to 1999, a decrease of 9 percent.;
- The decrease occurred primarily in transfers to recycling. Transfers of substances other than metals to energy recovery increased by 1.3 million kg.
- TRI facilities transferred 27.0 million kg to Mexican sites in 1999, an increase of 2 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, US and Mexico, 1998–1999

Type of Transfer	1998 (kg)	1999 (kg)	Change 1998–1999 kg	%
To Canada from US	34,242,639	29,972,914	-4,269,725	-12
Recycling of Metals	24,494,416	16,469,257	-8,025,159	-33
Recycling (except metals)	1,012,440	3,056,011	2,043,571	202
Energy Recovery (except metals)	1,847,940	1,663,912	-184,028	-10
Treatment (except metals)	3,586,640	5,670,017	2,083,377	58
Disposal (except metals)	352,148	300,027	-52,121	-15
Metals to Energy Recovery/Treatment/Disposal	2,949,055	2,813,690	-135,365	-5
To US from Canada	32,690,745	29,683,235	-3,007,510	-9
Recycling of Metals	22,017,359	20,390,105	-1,627,254	-7
Recycling (except metals)	4,051,957	2,349,037	-1,702,920	-42
Energy Recovery (except metals)	3,261,930	4,570,906	1,308,976	40
Treatment (except metals)	299,182	322,826	23,644	8
Disposal (except metals)	1,172,331	1,330,105	157,774	13
Metals to Energy Recovery/Treatment/Disposal	1,887,986	720,256	-1,167,730	-62
To Mexico from US	26,465,788	26,987,705	521,917	2
Recycling of Metals	26,423,805	26,760,008	336,203	1
Recycling (except metals)	13	0	-13	-100
Energy Recovery (except metals)	0	0	0	--
Treatment (except metals)	0	0	0	--
Disposal (except metals)	0	0	0	--
Metals to Energy Recovery/Treatment/Disposal	41,970	227,697	185,727	443
To US from Mexico	(No data available)			

Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 1998–1999.

Figure 8–4. Change in Off-site Transfers to/from Canada, US and Mexico, 1998–1999



Note: Does not include transfers to sewage. Data on Mexico transfers to US or Canada not available for 1998–1999.

8.3.1 1998 to 1999 Transfers by Industry

In NPRI, 16 sectors reported transfers to US sites and, in TRI, 15 industry sectors reported transfers to Canadian sites in 1998 or 1999.

- Transfers to the US by the Canadian fabricated metals sector increased by 6.1 million kg, or 120 percent, giving this sector the largest cross-border transfers of either country in 1999.
- Canadian primary metals facilities, the sector that had had the largest transfers in 1998, decreased their transfers by 3.8 million kg (36 percent) from 1998 to 1999 and ranked second in 1999.
- The sector with the second-largest transfers in 1998, electronic/electrical equipment, decreased its transfers by 5.1 million kg or 87 percent, dropping it to eighth place in 1999.

Table 8–17. NPRI Off-site Transfers to US from Canada, by Industry, 1998–1999 (Ordered by Largest Transfers in 1999)

US SIC Code	Industry	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			%
		1998 (kg)	1999 (kg)	Change 1998–1999 kg	
34	Fabricated Metals Products	5,061,143	11,155,830	6,094,687	120
33	Primary Metals	10,373,603	6,609,613	-3,763,990	-36
495/738	Hazardous Waste Mgt./Solvent Recovery	3,918,895	4,754,944	836,049	21
28	Chemicals	2,762,995	2,789,353	26,358	1
37	Transportation Equipment	1,953,722	1,585,107	-368,615	-19
39	Misc. Manufacturing Industries	838,000	821,823	-16,177	-2
36	Electronic/Electrical Equipment	5,881,154	787,777	-5,093,377	-87
29	Petroleum and Coal Products	1,109,153	427,925	-681,228	-61
32	Stone/Clay/Glass Products	121,129	232,112	110,983	92
491/493	Electric Utilities	268,032	219,508	-48,524	-18
35	Industrial Machinery	174,494	185,172	10,678	6
20	Food Products	191,573	74,319	-117,254	-61
26	Paper Products	27,171	26,310	-861	-3
30	Rubber and Plastics Products	3,884	9,732	5,848	151
27	Printing and Publishing	5,797	3,470	-2,327	-40
Total		32,690,745	29,683,235	-3,007,510	-9

Table 8–18. TRI Off-site Transfers to Canada from US, by Industry, 1998–1999 (Ordered by Largest Transfers in 1999)

US SIC Code	Industry	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			
		1998 (kg)	1999 (kg)	Change 1998–1999 kg	%
495/738	Hazardous Waste Mgt./Solvent Recovery	5,422,368	7,623,128	2,200,760	41
33	Primary Metals	9,835,508	7,505,939	-2,329,569	-24
36	Electronic/Electrical Equipment	5,335,118	4,454,162	-880,956	-17
28	Chemicals	3,224,032	3,177,696	-46,336	-1
--	Multiple codes 20–39	8,437,924	3,054,166	-5,383,758	-64
37	Transportation Equipment	520,986	2,656,022	2,135,036	410
34	Fabricated Metals Products	798,853	994,252	195,399	24
30	Rubber and Plastics Products	70,578	122,480	51,902	74
38	Measurement/Photographic Instruments	199,320	112,878	-86,442	-43
26	Paper Products	284,069	99,107	-184,962	-65
39	Misc. Manufacturing Industries	29,210	57,456	28,246	97
29	Petroleum and Coal Products	22,753	43,622	20,869	92
32	Stone/Clay/Glass Products	35,533	41,820	6,287	18
35	Industrial Machinery	26,274	30,186	3,912	15
23	Apparel and Other Textile Products	113	0	-113	-100
Total		34,242,639	29,972,914	-4,269,725	-12

- The primary metals industry (US SIC code 33) reported the largest cross-border transfers in 1998, but decreased its transfers in 1999 in both TRI and NPRI.
- US hazardous waste management facilities, comprising the sector with the largest cross-border transfers in 1999, increased the amount they sent to Canada by 2.2 million kg, or 41 percent.
- US primary metals facilities, the sector with the largest cross-border transfers in 1998, decreased such transfers by 2.3 million kg (24 percent) and ranked second in 1999.
- The third-ranked sector in 1999, electronic/electrical equipment manufacturers, also decreased their cross-border transfers from 1998 to 1999 by 17 percent.

8.3.2 1998 to 1999 Transfers by Chemical

A few chemicals accounted for most of the cross-border transfers in 1998 and 1999 in both TRI and NPRI.

- Twenty-five chemicals accounted for more than 97 percent of all cross-border transfers in 1998 and 1999.
- Copper and its compounds was transferred across the border to the US from Canada in the largest amounts in both 1998 and 1999, and increased 21 percent, or 1.7 million kg, from 1998 to 1999.
- Zinc and its compounds was transferred in the second-largest amount in 1999, an increase of 30 percent, or 1.9 million kg, from 1998 to 1999.
- Xylenes and toluene ranked third and fourth in overall cross-border transfers in 1999, both having increased from 1998 to 1999. Cross-border transfers to the US from Canada of xylenes increased by 1 percent in 1999, while those of toluene increased by 34 percent.

Table 8–19. NPRI Off-site Transfers to US from Canada, by Chemical, 1998–1999 (Chemicals with Largest Transfers in 1999)

Rank	CAS Number	Chemical	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			%
			1998 (kg)	1999 (kg)	Change 1998–1999 (kg)	
1	--	Copper (and its compounds)*	7,759,914	9,418,231	1,658,317	21
2	--	Zinc (and its compounds)*	6,188,771	8,045,145	1,856,374	30
3	1330-20-7	Xylenes	2,495,615	2,513,068	17,453	1
4	108-88-3	Toluene	1,389,703	1,869,144	479,441	34
5	--	Manganese (and its compounds)*	750,578	898,125	147,547	20
6	78-93-3	Methyl ethyl ketone	560,332	735,052	174,720	31
7	7697-37-2	Nitric acid and nitrate compounds	607,179	726,040	118,861	20
8	7429-90-5	Aluminum (fume or dust)*	1,620,290	709,900	-910,390	-56
9	--	Lead (and its compounds)*▼	6,276,900	654,184	-5,622,716	-90
10	108-10-1	Methyl isobutyl ketone	571,175	630,543	59,368	10
11	--	Chromium (and its compounds)*▼	463,877	553,099	89,222	19
12	--	Nickel (and its compounds)*▼	481,672	514,178	32,506	7
13	1313-27-5	Molybdenum trioxide	31,629	328,369	296,740	938
14	100-41-4	Ethylbenzene	286,210	291,906	5,696	2
15	107-21-1	Ethylene glycol	1,378,003	257,243	-1,120,760	-81
16	67-56-1	Methanol	201,448	234,069	32,621	16
17	7440-62-2	Vanadium (fume or dust)*	186,391	188,077	1,686	1
18	71-36-3	n-Butyl alcohol	101,959	171,746	69,787	68
19	108-95-2	Phenol	748,347	154,670	-593,677	-79
20	127-18-4	Tetrachloroethylene▼	56,420	137,305	80,885	143
21	95-63-6	1,2,4-Trimethylbenzene	82,543	109,359	26,816	32
22	75-09-2	Dichloromethane▼	125,756	97,515	-28,241	-22
23	79-01-6	Trichloroethylene▼	40,194	96,420	56,226	140
24	--	Silver (and its compounds)*	144,993	68,894	-76,099	-52
25	67-66-3	Chloroform	0	48,010	48,010	--
Subtotal			32,549,899	29,450,292	-3,099,607	-10
% of Total			99.6	99.2		
Total			32,690,745	29,683,235	-3,007,510	-9

* Metal and its compounds. ▼ Known or suspected carcinogen.

Table 8–20. TRI Off-site Transfers to Canada from US, by Chemical, 1998–1999 (Chemicals with Largest Transfers in 1999)

Rank	CAS Number	Chemical	Total Transfers to Recycling/Energy Recovery/Treatment/Disposal			
			1998 (kg)	1999 (kg)	Change 1998–1999 (kg)	%
1	--	Lead (and its compounds)*▼	9,000,328	8,001,915	-998,413	-11
2	--	Copper (and its compounds)*	14,445,806	6,925,411	-7,520,395	-52
3	108-88-3	Toluene	1,672,313	2,286,699	614,386	37
4	108-38-3	Xylenes	1,663,652	2,244,936	581,284	35
5	1344-28-1	Aluminum oxide (fibrous forms)	42,630	2,222,222	2,179,592	5,113
6	--	Zinc (and its compounds)*	1,406,177	1,714,858	308,681	22
7	--	Nickel (and its compounds)*▼	1,297,689	1,461,698	164,009	13
8	67-56-1	Methanol	480,061	794,431	314,370	65
9	78-93-3	Methyl ethyl ketone	303,756	589,711	285,955	94
10	75-09-2	Dichloromethane▼	521,303	531,354	10,051	2
11	--	Manganese (and its compounds)*	450,288	463,288	13,000	3
12	--	Chromium (and its compounds)*▼	458,657	416,861	-41,796	-9
13	108-10-1	Methyl isobutyl ketone	126,187	298,973	172,786	137
14	100-41-4	Ethylbenzene	184,401	285,372	100,971	55
15	107-21-1	Ethylene glycol	55,645	237,193	181,548	326
16	91-20-3	Naphthalene	251,754	170,830	-80,924	-32
17	75-01-4	Vinyl chloride▼	167,728	158,717	-9,011	-5
18	--	Nitric acid and nitrate compounds	198,201	130,030	-68,171	-34
19	71-36-3	n-Butyl alcohol	98,157	110,960	12,803	13
20	--	Antimony (and its compounds)*	117,828	107,857	-9,971	-8
21	127-18-4	Tetrachloroethylene▼	63,765	99,197	35,432	56
22	--	Cadmium (and its compounds)*▼	80,440	79,864	-576	-1
23	79-01-6	Trichloroethylene▼	59,319	55,006	-4,313	-7
24	95-63-6	1,2,4-Trimethylbenzene	391	50,416	50,025	12,794
25	71-43-2	Benzene▼	148,208	42,321	-105,887	-71
		Subtotal	33,294,684	29,480,120	-3,814,564	-11
		% of Total	97	98		
		Total	34,242,639	29,972,914	-4,269,725	-12

* Metal and its compounds. ▼ Known or suspected carcinogen.

- Lead and its compounds was transferred in the largest amounts to Canada from the US in 1999, despite a decrease of almost one million kg, or 11 percent, from 1998.
- Copper and its compounds was transferred across the border to Canada in the largest amount in 1998. However, a 52-percent decrease in such transfers (7.5 million kg) dropped it to second place in 1999, behind lead and its compounds.
- Cross-border transfers to Canada of toluene and xylenes, ranked third and fourth in both 1998 and 1999. Both increased by over 33 percent from 1998 to 1999.

Appendix A – A Comparison of Chemicals Listed under 1999 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
51-03-6	Piperonyl butoxide	Pipéronyl butoxyde	Piperonil butóxido	X		
51-21-8	Fluorouracil	Fluoro-uracil	Fluorouracilo	X		
51-28-5	2,4-Dinitrophenol	2,4-Dinitrophenól	2,4-Dinitrofenol	X		
51-75-2	Nitrogen mustard	Moutarde azotée	Mostaza de nitrógeno	X		
51-79-6	Urethane	Uréthane	Uretano	X		
52-68-6	Trichlorfon	Trichlorfon	Triclorfón	X		
52-85-7	Famphur	Famphur	Famfur	X		
53-96-3	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 tributilestano	X		
56-38-2	Parathion	Parathion	Paratión	X		
57-14-7	1,1-Dimethylhydrazine	1,1-Diméthylhydrazine	1,1-Dimetilhidracina	X		
57-33-0	Pentobarbital sodium	Pentobarbital sodique	Pentobarbital sódico	X		
57-41-0	Phenytoin	Phénytoïne	Fenitoina	X		
57-57-8	beta-Propiolactone	bêta-Propiolactone	beta-Propiolactona	X		
57-74-9	Chlordane	Chlordane	Clordano	X		X
58-89-9	Lindane	Lindane	Lindano	X		X
58-90-2	2,3,4,6-Tetrachlorophenol	2,3,4,6-Tétrachlorophénol	2,3,4,6-Tetraclorofenol			X
59-89-2	N-Nitrosomorpholine	n-Nitrosomorpholine	N-Nitrosomorfolina	X		
60-09-3	4-Aminoazobenzene	4-Aminoazobenzène	4-Aminoazobenceno	X		
60-11-7	4-Dimethylaminoazobenzene	4-Diméthylaminoazobenzène	4-Dimetilaminoazobenceno	X		
60-34-4	Methylhydrazine	Méthylhydrazine	Metilhidracina	X		
60-35-5	Acetamide	Acétamide	Acetamida	X		
60-51-5	Dimethoate	Diméthoate	Dimetoato	X		
60-57-1	Dieldrin	Dieldrine	Dieldrín			X
61-82-5	Amitrole	Amitrole	Amitrol	X		
62-53-3	Aniline	Aniline	Anilina	X	X	X
62-55-5	Thioacetamide	Thioacétamide	Tioacetamida	X		
62-56-6	Thiourea	Thio-urée	Tiourea	X	X	
62-73-7	Dichlorvos	Dichlorvos	Diclorvos	X		
62-74-8	Sodium fluoroacetate	Fluoroacétate de sodium	Fluoroacetato de sodio	X		
62-75-9	N-Nitrosodimethylamine	N-Nitrosodiméthylamine	N-Nitrosodimetilamina	X		X
63-25-2	Carbaryl	Carbaryl	Carbaril	X		
64-18-6	Formic acid	Acide formique	Ácido fórmico	X	X	
64-67-5	Diethyl sulfate	Sulfate de diéthyle	Sulfato de dietilo	X	X	
64-75-5	Tetracycline hydrochloride	Chlorhydrate de tétracycline	Clorhidrato de tetraciclina	X	X	
67-56-1	Methanol	Méthanol	Metanol	X	X	
67-63-0	Isopropyl alcohol	Alcool iso-propylique	Alcohol isopropílico	X	X	
67-64-1	Acetone	Acétone	Acetona		X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
67-66-3	Chloroform	Chloroforme	Cloroformo	X	X	X
67-72-1	Hexachloroethane	Hexachloroéthane	Hexachloroetano	X	X	X
68-12-2	N,N-Dimethylformamide	N,N-Diméthyl formamide	N,N-Dimetilformamida	X		
68-76-8	Triaziuone	Triaziuone	Triaziuone	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	Méthoxychlor	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-Methylacetonitrile	Acétonecyanhydrine	2-Metilactonitrilo	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	
76-02-8	Trichloroacetyl chloride	Chlorure de trichloroacétyle	Cloruro de tricloroacetilo	X		
76-06-2	Chloropicrin	Chloropicrine	Cloropicrina	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Heptachloro	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-Tributiltritifosfato	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	Tiosemicarbácida	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	Dimethylcarbamyil chloride	Chlorure de diméthylcarbamyle	Cloruro de dimetilcarbamil	X		
79-46-9	2-Nitropropane	2-Nitropropane	2-Nitropropano	X	X	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-methylantraquinone	1-Amino-2-méthylantraquinone	1-Amino-2-metilntraquinona	X		
82-68-8	Quintozene	Quintozène	Quintoceno	X		
84-66-2	Diethyl phthalate	Phtalate de diéthyle	Dietyl ftalato		X	
84-74-2	Dibutyl phthalate	Phtalate de dibutyle	Dibutil ftalato	X	X	X
85-01-8	Phenanthrene	Phénanthrène	Fenantreno	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		
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

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
88-75-5	2-Nitrophenol	2-Nitrophénol	2-Nitrofenol	X		
88-85-7	Dinitrobutyl phenol	Dinosébé	Dinitrobutilfenol	X		
88-89-1	Picric acid	Acide picrique	Ácido picrico	X		
90-04-0	o-Anisidine	o-Anisidine	o-Anisidina	X		
90-43-7	2-Phenylphenol	o-Phénylphénol	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 benzylidène	Benzotricloruro	X		
98-82-8	Cumene	Cumène	Cumeno	X	X	
98-86-2	Acetophenone	Acétophénone	Acetofenona	X	X	
98-87-3	Benzal chloride	Chlorure de benzale	Cloruro de benzal	X		
98-88-4	Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo	X	X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
98-95-3	Nitrobenzene	Nitrobenzène	Nitrobencono	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-Dinitrobencono	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-Dinitrobencono	X		
100-41-4	Ethylbenzene	Éthylbenzène	Étilbencono	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)	4,4'-Méthylènebis(2-chloroaniline)	4,4'-Metilénobis(2-cloroanilina)	X	X	
101-61-1	4,4'-Methylenebis(N,N-dimethyl)benzeneamine	4,4'-Méthylènebis(N,N-diméthyl)benzèneamine	4,4'-Metilénobis(N,N-dimetil)bencenamina	X		
101-68-8	Methylenebis(phenylisocyanate)	Méthylènebis(phénylisocyanate)	Metilénobis(fenilisocianato)			X
101-77-9	4,4'-Methylenedianiline	p,p'-Méthylènedianiline	4,4'-Metilenedianilina	X	X	
101-80-4	4,4'-Diaminodiphenyl ether	Éther 4,4'-diaminodiphényle	Éter 4,4'-diaminodifenilico	X		
101-90-6	Diglycidyl resorcinol ether	Éther de résorcinol et de diglycidyle	Diglicidil resorcinol éter	X		
103-23-1	Bis(2-ethylhexyl) adipate	Adipate de bis(2-éthylhexyle)	Bis(2-etilhexil) adipato			X
104-12-1	p-Chlorophenyl isocyanate	Isocyanate de 4-chlorophényle	p-Clorofenil isocianato	X		
104-35-8	2-(p-Nonylphenoxy) ethanol	2-(p-Nonylphénoxy) éthanol	Étanol 2-(nonilfenoxi)			X
104-40-5	Nonylphenol	Nonylphénol	Nonilfenol			X
104-94-9	p-Anisidine	p-Anisidine	p-Anisidina	X		
105-67-9	2,4-Dimethylphenol	2,4-Diméthylphénol	2,4-Dimetilfenol	X		
106-42-3	p-Xylene	p-Xylène	p-Xileno	X	X	
106-44-5	p-Cresol	p-Crésol	p-Cresol	X	X	
106-46-7	1,4-Dichlorobenzene	p-Dichlorobenzène	1,4-Diclorobenceno	X	X	X
106-47-8	p-Chloroaniline	p-Chloroaniline	p-Cloroanilina	X		
106-50-3	p-Phenylenediamine	p-Phénylènediamine	p-Fenilenediamina	X	X	
106-51-4	Quinone	p-Quinone	Quinona	X	X	
106-88-7	1,2-Butylene oxide	1,2-Époxybutane	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
107-04-0	1-Bromo-2-chloroethane	1-Bromo-2-chloroéthane	1-bromo-1-cloroetano			X
107-05-1	Allyl chloride	Chlorure d'allyle	Cloruro de alilo	X	X	
107-06-2	1,2-Dichloroethane	1,2-Dichloroéthane	1,2-Dicloroetano	X	X	X
107-11-9	Allylamine	Allylamine	Alil amina	X		
107-13-1	Acrylonitrile	Acrylonitrile	Acrlonitrilo	X	X	X
107-18-6	Allyl alcohol	Alcool allylique	Alcohol alílico	X	X	
107-19-7	Propargyl alcohol	Alcool propargylique	Alcohol propargílico	X	X	
107-21-1	Ethylene glycol	Éthylèneglycol	Étilén glicol	X	X	
107-30-2	Chloromethyl methyl ether	Éther de méthyle et de chlorométhyle	Éter clorometil metílico	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Anhidrido 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-Fenilèndiamina	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-butoxietanol		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	Aldicarb	Aldicarb	X		
117-79-3	2-Aminoanthraquinone	2-Aminoantraquinone	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
119-90-4	3,3'-Dimethoxybenzidine	3,3'-Diméthoxybenzidine	3,3'-Dimetoxibencidina	X		
119-93-7	3,3'-Dimethylbenzidine	3,3'-Diméthylbenzidine	3,3'-Dimetilbencidina	X		
120-12-7	Anthracene	Anthracène	Antraceno	X	X	
120-36-5	2,4-DP	Dichlorprop	2,4-DP	X		
120-58-1	Isosafrole	Isosafrole	Isosafrol	X	X	
120-71-8	p-Cresidine	p-Crésidine	p-Cresidina	X		
120-80-9	Catechol	Catéchol	Catecol	X	X	
120-82-1	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzène	1,2,4-Triclorobenceno	X	X	X
120-83-2	2,4-Dichlorophenol	2,4-Dichlorophénol	2,4-Diclorofenol	X	X	
121-14-2	2,4-Dinitrotoluene	2,4-Dinitrotoluène	2,4-Dinitrotolueno	X	X	X

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Malatiön	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	Diméthylthiocarbamate de potassium	Dimetilthiocarbamato de potasio	X		
128-04-1	Sodium dimethyldithiocarbamate	Diméthylthiocarbamate de sodium	Dimetilthiocarbamato 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		
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 hidrocloreuro	X		
134-32-7	alpha-Naphthylamine	alpha-Naphtylamine	alfa-Naftilamina	X		
135-20-6	Cupferron	Cupferron	Cupferron	X		
136-45-8	Dipropyl isocinchomerate	Pyridine-2,5-dicarboxylate de dipropyle	Dipropilisocincomerato	X		
137-26-8	Thiram	Thirame	Tiram	X		
137-41-7	Potassium N-methyldithiocarbamate	Méthylthiocarbamate de potassium	N-Metilthiocarbamato de potasio	X		
137-42-8	Metham sodium	Métam-sodium	N-Metilthiocarbamato de sodio	X		
138-93-2	Disodium cyanodithioimidocarbonate	Cyanodithiocarbamate de disodium	Cianodithiocarbamato de disodio	X		
139-13-9	Nitritriacetic acid	Acide nitritriacétique	Ácido nitritriacético	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	
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	Thiabendazol	X		
149-30-4	2-Mercaptobenzothiazole	Benzothiazole-2-thiol	2-Mercaptobenzotiazol	X	X	
150-50-5	Merphos	Trithiophosphate de tributyle	Merfos	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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-Nitrosodiphenylamine	p-Nitrosodifeniamina	X		
156-62-7	Calcium cyanamide	Cyanamide calcique	Cianamida de calcio	X	X	
298-00-0	Methyl parathion	Parathion-méthyl	Metilparatióñ	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		
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-Dinitrobencono	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(chlorometil) éter	X		X
554-13-2	Lithium carbonate	Carbonate de lithium	Carbonato de litio	X	X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	Dichlorhydrate de 4,4'-bi-o-toluidine	Dihidrocloruro de 3,3'-dimetilbencidina	X		
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	Dichlorhydrate de 3,3'-dichlorobenzidine	Dihidrocloruro de 3,3'-diclorobencidina	X	X	
615-05-4	2,4-Diaminoanisole	2,4-Diaminoanisole	2,4-Diaminoanisol	X		
615-28-1	1,2-Phenylenediamine dihydrochloride	Dichlorhydrate d'o-phénylènediamine	Dihidrocloruro de 1,2-fenilendiamina	X		
621-64-7	N-Nitrosodi-n-propylamine	N-Nitrosodi-n-propylamine	N-Nitrosodi-n-propilamina	X		
624-18-0	1,4-Phenylenediamine dihydrochloride	Dichlorhydrate de benzène-1,4-diamine	Dihidrocloruro de 1,4-fenilendiamina	X		
624-83-9	Methyl isocyanate	Isocyanate de méthyle	Isocianato de metilo	X		
630-20-6	1,1,1,2-Tetrachloroethane	1,1,1,2-Tétrachloroéthane	1,1,1,2-Tetracloroetano	X	X	
636-21-5	o-Toluidine hydrochloride	Chlorhydrate de o-toluidine	o-Toluidina hidrocloruro	X		
639-58-7	Triphenyltin chloride	Chlorure de triphénylétain	Cloruro de trifenilestano	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 solvante	X	X	
872-50-4	N-Methyl-2-pyrrolidone	N-Méthyl-2-pyrrolidone	N-Metil2-pirrolidona	X	X	
924-16-3	N-Nitrosodi-n-butylamine	N-Nitrosodi-n-butylamine	N-Nitrosodi-n-butilamina	X		
924-42-5	N-Methylolacrylamide	N-(Hydroxyméthyl)acrylamide	N-Metilolacrilamida	X	X	
957-51-7	Diphenamid	Difénamide	Difenamida	X		
961-11-5	Tetrachlorvinphos	Tétrachlorvinphos	Tetraclorvinfos	X		
989-38-8	C.I. Basic Red 1	Indice de couleur Rouge de base 1	Rojo 1 básico	X	X	
1114-71-2	Pebulate	Pébulate	Pebulato	X		
1120-71-4	Propane sultone	Propanesultone	Propane sultone	X		
1134-23-2	Cycloate	Cycloate	Cicloato	X		
1163-19-5	Decabromodiphenyl oxide	Oxyde de décabromodiphényle	Óxido de decabromodifenilo	X	X	
1300-71-6	Dimethyl phenol	Diméthylphénol	Dimetilfenol	X	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

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Trifluraline	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	Atacina	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 endothal	Endothal-potassium	Endotal dipotásico	X		
2164-17-2	Fluometuron	Fluométuren	Fluometurón	X		
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 hexachloride	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 sodica 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-tetrafluoroéthane (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		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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-méthylphénoxy)acétique, sel de sodium	Sal sodica 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	Diisocianato de isoforona	X	X	
4170-30-3	Crotonaldehyde	Crotonaldéhyde	Crotonaldehído	X	X	
4549-40-0	N-Nitrosomethylvinylamine	N-Nitrosométhylvinilamine	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-isocianato de ciclohexano)	X	X	
5234-68-4	Carboxin	Carboxine	Carboxina	X		
5598-13-0	Chlorpyrifos methyl	Chlorpyrifos-méthyl	Metil clorpirifos	X		
5902-51-2	Terbacil	Terbacile	Metilterbacilo	X		
6459-94-5	C.I. Acid Red 114	Indice de couleur Rouge acide 114	Índice de color rojo ácido 114	X		
7287-19-6	Prometryn	Prométryne	Prometrín	X		
7311-27-5	2-(2-(2-(2-(p-Nonylphenoxy) ethoxy)ethoxy)ethoxy) ethanol	2-(2-(2-(2-(p-Nonylphénoxy) éthoxy)éthoxy)éthoxy) éthanol	Etanol 2-(2-(2-(2-(p-nonilfenoxi etoxi)etoxi)etoxi)			X
7429-90-5	Aluminum (fume or dust)	Aluminium (fumée ou poussière)	Aluminio (humo o polvo)	X	X	
7439-92-1	Lead	Plomb	Plomo	X		
7439-96-5	Manganese	Manganèse	Manganeso	X		
7439-97-6	Mercury	Mercur	Mercurio	X		
7440-02-0	Nickel	Nickel	Níquel	X		
7440-22-4	Silver	Argent	Plata	X		
7440-28-0	Thallium	Thallium	Talio	X		
7440-36-0	Antimony	Antimoine	Antimonio	X		
7440-38-2	Arsenic	Arsenic	Arsénico	X		
7440-39-3	Barium	Baryum	Bario	X		
7440-41-7	Beryllium	Béryllium	Berilio	X		
7440-43-9	Cadmium	Cadmium	Cadmio	X		
7440-47-3	Chromium	Chrome	Cromo	X		
7440-48-4	Cobalt	Cobalt	Cobalto	X		
7440-50-8	Copper	Cuivre	Cobre	X		
7440-62-2	Vanadium (fume or dust)	Vanadium (fumée ou poussière)	Vanadio (humo o polvo)	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	
7664-38-2	Phosphoric acid	Acide phosphorique	Ácido fosfórico	X	X	
7664-39-3	Hydrogen fluoride	Fluorure d'hydrogène	Ácido fluorhídrico	X	X	
7664-41-7	Ammonia	Ammoniac	Amoniac	X	X	
7664-93-9	Sulfuric acid	Acide sulfurique	Ácido sulfúrico	X	X	
7681-49-4	Sodium fluoride	Fluorure de sodium	Fluoruro 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	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Fluoruro 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	
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		
13684-56-5	Desmedipham	Desmédiophame	Desmedifam	X		
14484-64-1	Ferbam	Ferbame	Ferban	X		
15646-96-5	2,4,4-Trimethylhexamethylene diisocyanate	Diisocyanate de 2,4,4-triméthylhexaméthylène	2,4,4-trimetilhexametileno diisocianato	X	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-Nitrosornicotine	N-Nitrosornicotine	N-Nitrosornicotina	X		
16938-22-0	2,2,4-Trimethylhexamethylene diisocyanate	Diisocyanate de 2,2,4-triméthylhexaméthylène	2,4,4-trimetilhexametileno diisocianato	X	X	
17804-35-2	Benomyl	Bénomyl	Benomil	X		
19044-88-3	Oryzalin	Oryzalin	Orizalina	X		
19666-30-9	Oxydiazon	Oxydiazon	Oxidazono	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		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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 (ixómeros diversos)		X	
25311-71-1	Isofenphos	Isofenphos	Isofenfos	X		
25321-14-6	Dinitrotoluene (mixed isomers)	Dinitrotoluène (mélange d'isomères)	Dinitrotolueno (mezcla de isómeros)	X	X	
25321-22-6	Dichlorobenzene (mixed isomers)	Dichlorobenzène (mélange d'isomères)	Diclorobenceno (mezcla de isómeros)	X		
25376-45-8	Diaminotoluene (mixed isomers)	Diaminotoluène (mélange d'isomères)	Diaminotolueno (mezcla de isómeros)	X		
26002-80-2	Phenothrin	Phénothrine	Fenotrina	X		
26027-38-3	p-Nonylphenol polyethylene glycol ether	p-Nonylphénol, éther de polyéthylèneglycol	Éter de 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	Nonylphenol nona(oxyethylene) ethanol		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	
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		
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		
38727-55-8	Diethyl ethyl	N-(chloroacetyl)-N-(2,6-diethylphenyl) glycinate d'éthyle	Etildietatil	X		
39156-41-7	2,4-Diaminoanisole sulfate	Sulfate de 2,4-diaminoanisole	Sulfato de 2,4-diaminoanisol	X		
39300-45-3	Dinocap	Dinocap	Dinocap	X		
39515-41-8	Fenpropathrin	Fenpropathrine	Fenpropatrina	X		
40487-42-1	Pendimethalin	Pendiméthaline	Pendimetalina	X		
41198-08-7	Profenofos	Profenofos	Profenofos	X		
41766-75-0	3,3'-Dimethylbenzidine dihydrofluoride	Dihydrofluorure de 3,3'-diméthylbenzidine	Difluoruro de 3,3'-dimetilbencidina	X		
41834-16-6	HCFC-122 and all isomers	HCFC-122 et tous ses isomères	HCFC-122 e isómeros		X	
42874-03-3	Oxyfluorfen	Oxyfluorène	Oxifluorfero	X		
43121-43-3	Triadimefon	Triadiméfon	Triadimefón	X		
50471-44-8	Vinclozolin	Vinclozoline	Vinclosolín	X		
51235-04-2	Hexazinone	Hexazinone	Hexacinona	X		
51338-27-3	Diclofop methyl	Diclofop-méthyl	Metildiclofop	X		
51630-58-1	Fenvalerate	Fenvalérate	Fenvalerato	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
52645-53-1	Permethrin	Perméthrine	Permitrina	X		
53404-19-6	Bromacil, lithium salt	Bromacil, sel de lithium	Sal de litio bromacilica	X		
53404-37-8	2,4-D 2-Ethyl-4-methylpentyl ester	(2,4-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 diazoméctica	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 butilcarbamatato	X		
57213-69-1	Triclopyr triethylammonium salt	Acide [(3,5,6-trichloro-2-pyridyl)oxy]acétique,	Sal de triclopir trietilamónio	X		
59669-26-0	Thiodicarb	Thiodicarbe	Tiodicarb	X		
60168-88-9	Fenarimol	Fénarimol	Fenarimol	X		
60207-90-1	Propiconazole	Propiconazole	Propiconazol	X		
62476-59-9	Acifluorfen, sodium salt	Acifluorfen, sel de sodium	Sal de sodio de acifluorfero	X		
63938-10-3	Chlorotetrafluoroethane (HCFC-124 and isomers)	Chlorotétrafluoroéthane	Clorotetrafluoroetano	X	X	
64902-72-3	Chlorsulfuron	Chlorsulfuron	Clorsulfurón	X		
64969-34-2	3,3'-Dichlorobenzidine sulfate	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 psychlorés (C8-C18)	Alcanos policlorinados (C8-C18)		X	
69409-94-5	Fluvalinate	Fluvalinate	Fluvalinato	X		
69806-50-4	Fluazifop butyl	Fluazifop-butyl	Butil flucifop	X		
71751-41-2	Abamectin	Abamectine	Abamectina	X		
72178-02-0	Fomesafen	Fomésafène	Fomesafén	X		
72490-01-8	Fenoxycarb	Fénoxycarbe	Fenoxicarb	X		
74051-80-2	Sethoxydim	Séthoxydime	Setoxidime	X		
76578-14-8	Quizalofop-ethyl	Quizalofop	Etilquizalofop	X		
77501-63-4	Lactofen	Lactofène	Lactofén	X		
82657-04-3	Bifenthrin	Bifenthrine	Bifentrina	X		
84852-15-3	Nonylphenol, industrial	Nonylphénol de qualité industrielle	Nonilfenol industrial		X	
88671-89-0	Myclobutanil	Myclobutanil	Miclobutanilo	X		
90454-18-5	Dichloro-1,1,2-trifluoroethane	Dichloro-1,1,2-trifluoroéthane	Dicloro-1,1,2-trifluoroetano	X		
90982-32-4	Chlorimuron ethyl	Chlorimuron	Etil clorimurón	X		
101200-48-0	Tribenuron methyl	Tribénuron	Metiltribenurón	X		
111512-56-2	1,1-Dichloro-1,2,3,3-pentafluoropropane (HCFC-225eb)	1,1-Dichloro-1,2,3,3-pentafluoropropane (HCFC-225eb)	1,1-Dicloro-1,2,3,3-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 compounds**	Antimoine (et ses composés)**	Antimonio y compuestos**	X	X	
	Arsenic compounds	Arsenic (et ses composés)	Arsénico y compuestos	X	X	X
	Barium compounds	Baryum (et ses composés)	Barío y compuestos	X		
	Beryllium compounds	Béryllium (et ses composés)	Berilio y compuestos	X		
	Cadmium compounds	Cadmium (et ses composés)	Cadmio y compuestos	X	X	X
	Chlorophenols	Chlorophénols	Clorofenoles	X		
	Chromium compounds	Chrome (et ses composés)	Cromo y compuestos	X	X	X

* RETC list of chemicals for voluntary reporting in Section V of COA.

** Elemental compounds are reported separately from their respective elements in TRI and RETC and aggregated with them in NPRI.

Appendix A – A Comparison of Chemicals Listed under 1999 TRI, NPRI and RETC* (continued)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
	Cobalt compounds	Cobalt (et ses composés)	Cobalto y compuestos	X	X	
	Copper 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 compounds	Plomb (et ses composés)	Plomo y compuestos	X	X	X
	Manganese compounds	Manganèse (et ses composés)	Manganeso y compuestos	X	X	
	Mercury compounds	Mercure (et ses composés)	Mercurio y compuestos	X	X	X
	Nickel 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 polychlorés (C10-C13)	Alcanos policlorinados (C10-C13)	X	X	
	Polycyclic aromatic compounds	Composés aromatiques polycycliques	Compuestos aromáticos policíclicos	X		
	Selenium compounds	Sélénium (et ses composés)	Selenio y compuestos	X	X	
	Silver compounds	Argent (et ses composés)	Plata y compuestos	X	X	
	Strychnine and salts	Strychnine et sels	Estricnina y sales	X		
	Thallium compounds	Thallium (et ses composés)	Talio y compuestos	X		
	Warfarin and salts	Warfarine et sels	Warfarina y sales	X		X
	Zinc compounds	Zinc (et ses composés)	Zinc y compuestos	X	X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1999

CAS Number	Chemical Name	Substance	Sustancia
50-00-0	Formaldehyde▼	Formaldéhyde	Formaldehído
55-63-0	Nitroglycerin	Nitroglicérine	Nitroglicerina
56-23-5	Carbon tetrachloride▼	Tétrachlorure de carbone	Tetracloruro de carbono
62-53-3	Aniline	Aniline	Anilina
62-56-6	Thiourea▼	Thio-urée	Tiourea
64-18-6	Formic acid▶	Acide formique	Ácido fórmico
64-67-5	Diethyl sulfate▼	Sulfate de diéthyle	Sulfato de dietilo
64-75-5	Tetracycline hydrochloride▶	Chlorhydrate de tétracycline	Clorhidrato de tetraciclina
67-56-1	Methanol	Méthanol	Metanol
67-66-3	Chloroform▼	Chloroforme	Cloroformo
67-72-1	Hexachloroethane	Hexachloroéthane	Hexacloroetano
70-30-4	Hexachlorophene▶	Hexachlorophène	Hexaclorofeno
71-36-3	n-Butyl alcohol	Butan-1-ol	Alcohol n-butílico
71-43-2	Benzene▼	Benzène	Benceno
74-83-9	Bromomethane	Bromométhane	Bromometano
74-85-1	Ethylene	Éthylène	Etileno
74-87-3	Chloromethane	Chlorométhane	Clorometano
74-88-4	Methyl iodide	Iodométhane	Yoduro de metilo
74-90-8	Hydrogen cyanide	Cyanure d'hydrogène	Ácido cianhídrico
75-00-3	Chloroethane	Chloroéthane	Cloroetano
75-01-4	Vinyl chloride▼	Chlorure de vinyle	Cloruro de vinilo
75-05-8	Acetonitrile	Acétonitrile	Acetonitrilo
75-07-0	Acetaldehyde▼	Acétaldéhyde	Acetaldehído
75-09-2	Dichloromethane▼	Dichlorométhane	Diclorometano
75-15-0	Carbon disulfide	Disulfure de carbone	Disulfuro de carbono
75-21-8	Ethylene oxide▼	Oxyde d'éthylène	Óxido de etileno
75-35-4	Vinylidene chloride	Chlorure de vinylidène	Cloruro de vinilideno
75-44-5	Phosgene	Phosgène	Fosgeno
75-45-6	Chlorodifluoromethane (HCFC-22)▶	Chlorodifluorométhane (HCFC-22)	Clorodifluorometano (HCFC-22)
75-56-9	Propylene oxide▼	Oxyde de propylène	Óxido de propileno
75-63-8	Bromotrifluoromethane (Halon 1301)▶	Bromotrifluorométhane (Halon 1301)	Bromotrifluorometano (Halon 1301)
75-65-0	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	Trichlorofluoromethane (CFC-11)▶	Trichlorofluorométhane (CFC-11)	Triclorofluorometano (CFC-11)
75-71-8	Dichlorodifluoromethane (CFC-12)▶	Dichlorodifluorométhane (CFC-12)	Diclorodifluorometano (CFC-12)
75-72-9	Chlorotrifluoromethane (CFC-13)▶	Chlorotrifluorométhane (CFC-13)	Clorotrifluorometano (CFC-13)
76-01-7	Pentachloroethane▶	Pentachloroéthane	Pentacloroetano
76-14-2	Dichlorotetrafluoroethane (CFC-114)▶	Dichlorotétrafluoroéthane (CFC-114)	Diclorotetrafluoroetano (CFC-114)
76-15-3	Monochloropentafluoroethane (CFC-115)▶	Chloropentafluoroéthane (CFC-115)	Cloropentafluoroetano (CFC-115)
77-47-4	Hexachlorocyclopentadiene	Hexachlorocyclopentadiène	Hexaclorciclopentadieno
77-73-6	Dicyclopentadiene▶	Dicyclopentadiène	Dicloropentadieno
77-78-1	Dimethyl sulfate▼	Sulfate de diméthyle	Sulfato de dimetilo
78-84-2	Isobutyraldehyde	Isobutyraldéhyde	Isobutiraldehído
78-87-5	1,2-Dichloropropane	1,2-Dichloropropane	1,2-Dicloropropano
78-92-2	sec-Butyl alcohol	Butan-2-ol	Alcohol sec-butílico

▼ Known or suspected carcinogen. ▶ Newly added for 1999.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1999 (*continued*)

CAS Number	Chemical Name	Substance	Sustancia
78-93-3	Methyl ethyl ketone	Méthyléthylcétone	Metil etil cetona
79-00-5	1,1,2-Trichloroethane	1,1,2-Trichloroéthane	1,1,2-Tricloroetano
79-01-6	Trichloroethylene▼	Trichloroéthylène	Tricloroetileno
79-06-1	Acrylamide▼	Acrylamide	Acrilamida
79-10-7	Acrylic acid	Acide acrylique	Ácido acrílico
79-11-8	Chloroacetic acid	Acide chloroacétique	Ácido cloroacético
79-21-0	Peracetic acid	Acide peracétique	Ácido peracético
79-34-5	1,1,2,2-Tetrachloroethane	1,1,2,2-Tétrachloroéthane	1,1,2,2-Tetracloroetano
79-46-9	2-Nitropropane▼	2-Nitropropane	2-Nitropropano
80-05-7	4,4'-Isopropylidenediphenol	p,p'-Isopropylidenediphénol	4,4'-Isopropilidenodifenol
80-15-9	Cumene hydroperoxide	Hydroperoxyde de cumène	Cumeno hidroperóxido
80-62-6	Methyl methacrylate	Méthacrylate de méthyle	Metacrilato de metilo
81-88-9	C.I. Food Red 15	Indice de couleur Rouge alimentaire 15	Rojo 15 alimenticio
84-74-2	Dibutyl phthalate	Phtalate de dibutyle	Dibutil ftalato
85-44-9	Phthalic anhydride	Anhydride phtalique	Anhídrido ftálico
86-30-6	N-Nitrosodiphenylamine	N-Nitrosodiphénylamine	N-Nitrosodifenilamina
90-43-7	2-Phenylphenol	o-Phénylphénol	2-Fenilfenol
90-94-8	Michler's ketone▼	Cétone de Michler	Cetona Michler
91-08-7	Toluene-2,6-diisocyanate▼	Toluène-2,6-diisocyanate	Toluen-2,6-diisocianato
91-20-3	Naphthalene	Naphtalène	Naftaleno
91-22-5	Quinoline	Quinoléine	Quinoleína
92-52-4	Biphenyl	Biphényle	Bifenilo
94-36-0	Benzoyl peroxide	Peroxyde de benzoyle	Peróxido de benzoilo
94-59-7	Safrole▼	Safrole	Safrol
95-47-6	o-Xylene	o-Xylène	o-Xileno
95-48-7	o-Cresol	o-Crésol	o-Cresol
95-50-1	1,2-Dichlorobenzene	o-Dichlorobenzène	1,2-Diclorobenceno
95-63-6	1,2,4-Trimethylbenzene	1,2,4-Triméthylbenzène	1,2,4-Trimetilbenceno
95-80-7	2,4-Diaminotoluene▼	2,4-Diaminotoluène	2,4-Diaminotolueno
96-09-3	Styrene oxide▼	Oxyde de styrène	Óxido de estireno
96-33-3	Methyl acrylate	Acrylate de méthyle	Acrilato de metilo
96-45-7	Ethylene thiourea▼	Imidazolidine-2-thione	Etilén tiourea
98-82-8	Cumene	Cumène	Cumeno
98-86-2	Acetophenone▶	Acétophénone	Acetofenona
98-88-4	Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo
98-95-3	Nitrobenzene▼	Nitrobenzène	Nitrobenceno
100-01-6	p-Nitroaniline▶	p-Nitroaniline	p-Nitroanilina
100-02-7	4-Nitrophenol	p-Nitrophénol	4-Nitrofenol
100-41-4	Ethylbenzene	Éthylbenzène	Etilbenceno
100-42-5	Styrene▼	Styrène	Estireno
100-44-7	Benzyl chloride▼	Chlorure de benzyle	Cloruro de bencilo
101-14-4	4,4'-Methylenebis(2-chloroaniline)▼	p,p'-Méthylènebis(2-chloroaniline)	4,4'-Metilenobis(2-cloroanilina)
101-77-9	4,4'-Methylenedianiline▼	p,p'-Méthylenedianiline	4,4'-Metilenodianilina
106-42-3	p-Xylene	p-Xylène	p-Xileno
106-44-5	p-Cresol	p-Crésol	p-Cresol

▼ Known or suspected carcinogen. ▶ Newly added for 1999.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1999 (continued)

CAS Number	Chemical Name	Substance	Sustancia
106-46-7	1,4-Dichlorobenzene▼	p-Dichlorobenzène	1,4-Diclorobenceno
106-50-3	p-Phenylenediamine	p-Phénylènediamine	p-Fenilenodiamina
106-51-4	Quinone	Quinone	Quinona
106-88-7	1,2-Butylene oxide	1,2-Époxybutane	Óxido de 1,2-butileno
106-89-8	Epichlorohydrin▼	Épichlorohydrine	Epichlorohidrina
106-99-0	1,3-Butadiene▼	Buta-1,3-diène	1,3-Butadieno
107-05-1	Allyl chloride	Chlorure d'allyle	Cloruro de alilo
107-06-2	1,2-Dichloroethane▼	1,2-Dichloroéthane	1,2-Dicloroetano
107-13-1	Acrylonitrile▼	Acrylonitrile	Acrlonitrilo
107-18-6	Allyl alcohol	Alcool allylique	Alcohol alílico
107-19-7	Propargyl alcohol▶	Alcool propargylique	Alcohol propargílico
107-21-1	Ethylene glycol	Éthylèneglycol	Etilén glicol
108-05-4	Vinyl acetate▼	Acétate de vinyle	Acetato de vinilo
108-10-1	Methyl isobutyl ketone	Méthylisobutylcétone	Metil isobutil cetona
108-31-6	Maleic anhydride	Anhydride maléique	Anhídrido maleico
108-38-3	m-Xylene	m-Xylène	m-Xileno
108-39-4	m-Cresol	m-Crésol	m-Cresol
108-88-3	Toluene	Toluène	Tolueno
108-90-7	Chlorobenzene	Chlorobenzène	Clorobenceno
108-95-2	Phenol	Phénol	Fenol
109-06-8	2-Methylpyridine▶	2-Méthylpyridine	2-Metilpiridina
109-86-4	2-Methoxyethanol	2-Méthoxyéthanol	2-Metoxietanol
110-54-3	n-Hexane▶	n-Hexane	n-Hexano
110-80-5	2-Ethoxyethanol	2-Éthoxyéthanol	2-Etoxietanol
110-82-7	Cyclohexane	Cyclohexane	Ciclohexano
110-86-1	Pyridine	Pyridine	Piridina
111-42-2	Diethanolamine	Diéthanolamine	Dietanolamina
115-07-1	Propylene	Propylène	Propileno
115-28-6	Chlorendic acid▼▶	Acide chlorendique	Ácido cloréndico
117-81-7	Di(2-ethylhexyl) phthalate▼	Phtalate de bis(2-éthylhexyle)	Di(2-etilhexil) ftalato
120-12-7	Anthracene	Anthracène	Antraceno
120-58-1	Isosafrole	Isosafrole	Isosafrol
120-80-9	Catechol	Catéchol	Catecol
120-82-1	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzène	1,2,4-Triclorobenceno
120-83-2	2,4-Dichlorophenol	2,4-Dichlorophénol	2,4-Diclorofenol
121-14-2	2,4-Dinitrotoluene▼	2,4-Dinitrotoluène	2,4-Dinitrotolueno
121-44-8	Triethylamine▶	Triéthylamine	Trietilamina
121-69-7	N,N-Dimethylaniline	N,N-Diméthylaniline	N,N-Dimetilanilina
122-39-4	Diphenylamine▶	Dianiline	Difenilamina
123-31-9	Hydroquinone	Hydroquinone	Hidroquinona
123-38-6	Propionaldehyde	Propionaldéhyde	Propionaldehído
123-63-7	Paraldehyde▶	Paraldéhyde	Paraldehído
123-72-8	Butyraldehyde	Butyraldéhyde	Butiraldehído
123-91-1	1,4-Dioxane▼	1,4-Dioxane	1,4-Dioxano
124-40-3	Dimethylamine▶	Diméthylamine	Dimetilamina

▼ Known or suspected carcinogen. ▶ Newly added for 1999.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1999 (continued)

CAS Number	Chemical Name	Substance	Sustancia
127-18-4	Tetrachloroethylene▼	Tétrachloroéthylène	Tetracloroetileno
131-11-3	Dimethyl phthalate	Phtalate de diméthyle	Dimetil ftalato
139-13-9	Nitrilotriacetic acid▼	Acide nitrilotriacétique	Ácido nitrilotriacético
140-88-5	Ethyl acrylate▼	Acrylate d'éthyle	Acrilato de etilo
141-32-2	Butyl acrylate	Acrylate de butyle	Acrilato de butilo
149-30-4	2-Mercaptobenzothiazole▶	Benzothiazole-2-thiol	2-Mercaptobenzotiazol
156-62-7	Calcium cyanamide	Cyanamide calcique	Cianamida de calcio
302-01-2	Hydrazine▼	Hydrazine	Hidracina
353-59-3	Bromochlorodifluoromethane (Halon 1211)▶	Bromochlorodifluorométhane (Halon 1211)	Bromoclorodifluorometano (Halon 1211)
534-52-1	4,6-Dinitro-o-cresol	4,6-Dinitro-o-crésol	4,6-Dinitro-o-cresol
541-41-3	Ethyl chloroformate	Chloroformiate d'éthyle	Cloroformiato de etilo
542-76-7	3-Chloropropionitrile▶	3-Chloropropionitrile	3-Cloropropionitrilo
554-13-2	Lithium carbonate▶	Carbonate de lithium	Carbonato de litio
563-47-3	3-Chloro-2-methyl-1-propene▶	3-Chloro-2-méthylpropène	3-Cloro-2-metil-1-propeno
569-64-2	C.I. Basic Green 4	Indice de couleur Vert de base 4	Verde 4 básico
584-84-9	Toluene-2,4-diisocyanate▼	Toluène-2,4-diisocyanate	Toluen-2,4-diisocianato
606-20-2	2,6-Dinitrotoluene▼	2,6-Dinitrotoluène	2,6-Dinitrotolueno
612-83-9	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	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvente
872-50-4	N-Methyl-2-pyrrolidone▶	N-Méthyl-2-pyrrolidone	N-Metil2-pirrolidona
924-42-5	N-Methylolacrylamide▶	N-(Hydroxyméthyl)acrylamide	N-Metilolacrilamida
989-38-8	C.I. Basic Red 1	Indice de couleur Rouge de base 1	Rojo 1 básico
1163-19-5	Decabromodiphenyl oxide	Oxyde de décabromodiphényle	Óxido de decabromodifenilo
1313-27-5	Molybdenum trioxide	Trioxyde de molybdène	Trióxido de molibdeno
1314-20-1	Thorium dioxide	Dioxyde de thorium	Dióxido de torio
1319-77-3	Cresol (mixed isomers)	Crésol (mélange d'isomères)	Cresol (mezcla de isómeros)
1330-20-7	Xylene (mixed isomers)	Xylène (mélange d'isomères)	Xileno (mezcla de isómeros)
1332-21-4	Asbestos (friable form)▼	Amiante (forme friable)	Asbestos (friables)
1344-28-1	Aluminum oxide (fibrous forms)	Oxyde d'aluminium (formes fibreuses)	Óxido de aluminio (formas fibrosas)
1634-04-4	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	C.I. Disperse Yellow 3	Indice de couleur Jaune de dispersion 3	Amarillo 3 disperso
3118-97-6	C.I. Solvent Orange 7	Indice de couleur Orange de solvant 7	Naranja 7 solvente
4170-30-3	Crotonaldehyde▶	Crotonaldéhyde	Crotonaldehído
4680-78-8	C.I. Acid Green 3	Indice de couleur Vert acide 3	Verde 3 ácido
7429-90-5	Aluminum (fume or dust)	Aluminium (fumée ou poussière)	Aluminio (humo o polvo)
7440-62-2	Vanadium (fume or dust)	Vanadium (fumée ou poussière)	Vanadio (humo o polvo)
7550-45-0	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	Hydrochloric acid	Acide chlorhydrique	Ácido clorhídrico
7664-38-2	Phosphoric acid	Acide phosphorique	Ácido fosfórico
7664-39-3	Hydrogen fluoride	Fluorure d'hydrogène	Ácido fluorhídrico
7664-93-9	Sulfuric acid	Acide sulfurique	Ácido sulfúrico

▼ Known or suspected carcinogen. ▶ Newly added for 1999.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1999 (*continued*)

CAS Number	Chemical Name	Substance	Sustancia
7697-37-2	Nitric acid**	Acide nitrique	Ácido nítrico
7723-14-0	Phosphorus (yellow or white)	Phosphore (jaune ou blanc)	Fósforo (amarillo o blanco)
7726-95-6	Bromine>	Brome	Bromo
7758-01-2	Potassium bromate>▼	Bromate de potassium	Bromato de potasio
7782-41-4	Fluorine>	Fluor	Fluor
7782-50-5	Chlorine	Chlore	Cloro
10049-04-4	Chlorine dioxide	Dioxyde de chlore	Dióxido de cloro
13463-40-6	Iron pentacarbonyl>	Fer-pentacarbonyle	Pentacarbonilo de hierro
25321-14-6	Dinitrotoluene (mixed isomers)	Dinitrotoluène (mélange d'isomères)	Dinitrotolueno (mezcla de isómeros)
26471-62-5	Toluenediisocyanate (mixed isomers)▼	Toluenediisocyanate (mélange d'isomères)	Toluendiisocianatos (mezcla de isómeros)
28407-37-6	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
	Antimony compounds* ***	Antimoine (et ses composés)*	Antimonio y compuestos*
	Arsenic compounds*▼	Arsenic (et ses composés)	Arsénico y compuestos
	Cadmium compounds*▼	Cadmium (et ses composés)	Cadmio y compuestos
	Chromium compounds*	Chrome (et ses composés)	Cromo y compuestos
	Cobalt compounds*▼	Cobalt (et ses composés)	Cobalto y compuestos
	Copper compounds*	Cuivre (et ses composés)	Cobre y compuestos
	Cyanide compounds	Cyanure (et ses composés)	Cianuro y compuestos
	Lead compounds*▼ ***	Plomb (et ses composés)	Plomo y compuestos
	Manganese compounds*	Manganèse (et ses composés)	Manganeso y compuestos
	Mercury compounds*	Mercuré (et ses composés)	Mercurio y compuestos
	Nickel compounds*▼	Nickel (et ses composés)	Níquel y compuestos
	Nitric acid and nitrate compounds****	Acide nitrique et composés de nitrate	Ácido nítrico y compuestos nitrados
	Polychlorinated alkanes (C10-C13)>	Alcanes polychlorés (C10-C13)	Alcanos policlorinados (C10-C13)
	Selenium compounds*	Sélénium (et ses composés)	Selenio y compuestos
	Silver compounds*	Argent (et ses composés)	Plata y compuestos
	Zinc compounds*	Zinc (et ses composés)	Zinc y compuestos

* Metal and metal compounds. ▼ Known or suspected carcinogen. > Newly added for 1999.

** 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 C. List of Facilities that Appear in Tables

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
3M Hutchinson, 3M Co. Inc.	Hutchinson	MN	55350MMGMDHIGHW	4-10
3M Nevada Plant, 3M Co. Inc.	Nevada	MO	64772MNVDPHIGHW	4-10
3M Springfield, 3M Co. Inc.	Springfield	MO	65802M 3211E	4-10
A. E. Staley Mfg. Co., Sagamore Ops.	Lafayette	IN	47902STLYM2245N	4-11
Abbott Labs, North Chicago Plant	North Chicago	IL	60064BBTTL1400N	4-9
Acordis Cellulosic Fibers Inc., Acordis U.S. Holding Inc.	Axis	AL	36505CRTLDUSHIG	3-22 7-21
Aerovox Inc.	Huntsville	AL	35801RVXML2615M	4-11 7-22
Aguaglass Corp., Masco Corp.	Adamsville	TN	38310QGLSSINDUS	3-11
Aimco Solrec Ltd.	Milton	ON	0000004893	4-9 4-10 8-7
Air Prods. & Chemicals Inc.	Geismar	LA	70734RPRDS36637	4-10 7-22
Air Prods. L.P., Air Prods. & Chemicals Inc.	Pasadena	TX	77506RPRDC1423H	4-11 5-4 7-21
AK Steel - Butler Works (Rte. 8 S)	Butler	PA	16003RMCDVROUTE	3-6 3-7 5-4 7-22
AK Steel Corp.	Rockport	IN	47635KSTLC6500N	7-22
AK Steel Corp., Zanesville Works	Zanesville	OH	43701RMCDV1724L	3-8
Akzo Nobel Chemicals Inc., Akzo Nobel Inc.	Deer Park	TX	77536TXSLK730BA	4-10
Albright & Wilson Americas, Albright & Wilson PLC	Charleston	SC	29415LBRGH2151K	4-11
Algoma Steel Inc.	Sault Ste. Marie	ON	0000001070	7-21
American Electric Power Cardinal Plant, Cardinal Operating Co.	Brilliant	OH	43913CRDNL306CO	3-7
American Electric Power, John E. Amos Plant	Winfield	WV	25213JHNMS1530W	3-6 3-7 3-20 5-4
American Electric Power, Mitchell Plant	Moundsville	WV	26041MTCHLSTATE	3-6 3-7
American Steel Foundries, Amsted Inds. Inc.	Alliance	OH	44601MRCNS1001E	3-8 3-11 3-13 3-20 3-22 7-22
Angus Chemical Co.	Sterlington	LA	71280NGSCHLAHWY	3-6 3-7 3-11 3-22 7-22
Aquaglass Performance Plant, Masco Corp.	Mc Ewen	TN	37101QGLSS155FO	3-11
ASARCO Inc.	East Helena	MT	59635SRCNCSMELT	3-6 3-7 3-11 3-13 3-20 3-22 5-4 7-22
ASARCO Inc., El Paso	El Paso	TX	79999SRCNCPOBOX	4-4
ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator, Grupo Mexico	Hayden	AZ	85235SRCNC64ASA	3-6 3-7 3-11 3-13 3-20 3-22 5-4 7-22
ASARCO Inc., Omaha Plant	Omaha	NE	68102SRCNC500DO	7-21
Ashland Distribution Co., Ashland Inc.	Charlotte	NC	28208SHLND3930G	4-10
Atlas Roofing Corp.	Camp Hill	PA	17011TLNRP817SP	3-18
Atlas Roofing Corp.	East Moline	IL	61244TLNRP3110M	3-18
Atofina Chemicals Inc., Atofina Delaware Inc.	Wichita	KS	67215RCNNC6040S	3-18
Atofina Chemicals Inc., Atofina Delaware Inc.	Calvert City	KY	42029PNNWLALTON	3-18
Atofina Petrochemicals Inc.	Pasadena	TX	77507TFNPT12212	4-9
Baldwin Power Station, Dynegey, Inc.	Baldwin	IL	62217LLNSP1901B	3-6 3-7
Ball Packaging Products Canada Inc., Ball Corp.	Burlington	ON	0000003117	8-7
BASF Corp.	Huntington	WV	25722BSFCR24THS	4-11
BASF Corp.	Greenville	OH	45331BSFCRSTATE	4-9
BASF Corp.	Freeport	TX	77541BSFCR602CO	3-6 3-7 3-22 5-4
Bayer Corp.	Baytown	TX	77520MBYCR8500W	4-9 7-21
Bayer Corp.	New Martinsville	WV	26155MBYCRSTATE	7-21
Bayer Inc.	Sarnia	ON	0000001944	7-21
Becton Dickinson & Co.	Columbus	NE	68601BCTNDINDUS	3-18
Belden Communications Div., Belden, Inc.	Phoenix	AZ	85043TTTCH505NO	4-4 6-28
Bicgeneral Cable Inds. Inc., General Cable Corp.	Watkinsville	GA	30677LLDTBBARNE	4-4
Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais	IL	60914BRMNGRR1BO	3-8 3-13 7-22

Appendix C. List of Facilities that Appear in Tables (continued)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in									
Birmingham Steel, Memphis SBQ Bar Rod & Wire Div.	Memphis	TN	38109BRMNG3601P	3-8	7-22								
Boise Cascade Corp.	Saint Helens	OR	97051BSCSC1300K	4-11	7-21								
Bowen Steam Electric Generating Plant, Southern Co.	Cartersville	GA	30120BWNST317CO	3-6	3-7	5-4							
BP Amoco Chemicals, Cooper River Plant, BP Amoco Corp.	Wando	SC	29492MCCHMCLEME	3-18									
BP Amoco Chemicals, BP Amoco Corp.	Decatur	AL	35601MCCHMFINLE	3-18									
BP Amoco, Texas City Business Unit, BP Amoco Corp.	Texas City	TX	77590MCLCM24015	7-22									
BP Chemicals Inc., Green Lake Facility, BP America Inc.	Port Lavaca	TX	77979BPCHMTEXAS	3-7	3-11	3-22							
BP Chemicals Inc., BP America Inc.	Lima	OH	45805BPCHMFORTA	3-6	3-7	3-11	3-22						
Brandon Shores & Wagner Complex, Baltimore Gas & Electric Co.	Baltimore	MD	21226BRNDN1000B	3-6	3-7								
Bristol-Myers Squibb Company (Technical Operations)	East Syracuse	NY	13221BRSTLTHOMP	4-11	7-22								
Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary	AB	0000005200	3-11	3-20	3-22							
Buckbee-Mears Cortland, BMC Inds. Inc.	Cortland	NY	13045BCKBKMELLO	8-6									
C & D Techs. Inc.	Conyers	GA	30207CDCHR1835I	3-11	3-20								
Cabot Corp., Canal Plant	Franklin	LA	70583CBTCRSTATE	7-21									
Cabot Corp., Ville Platte Plant	Ville Platte	LA	70586CBTCR412MI	7-21									
Cargill Corn Milling, Cargill Inc.	Cedar Rapids	IA	52406CRGLL17101	4-11									
Carpenter Co.	Russellville	KY	42276RCRPNFORRE	3-11	3-20								
Carpenter Co., Tupelo Div.	Verona	MS	38879RCRPNLEEIN	3-11	3-20	3-22							
Cartons St-Laurent Inc, Usine de La Tuque	La Tuque	QC	0000003140	7-21									
Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville	OR	97128CSCDS3200N	3-8	3-13	7-22							
Catalytica Pharmaceuticals, Wyckoff Inc., Catalytica Inc.	South Haven	MI	49090WYCKF1421K	4-9									
Celanese Canada Inc., Edmonton Facility	Edmonton	AB	0000001162	4-11									
Celanese Ltd., Celanese Americas Corp.	Pasadena	TX	77507HCHST9502B	4-9	4-11	5-4	7-21						
Cerro Wire & Cable Co. Inc.	Hartselle	AL	35640CRRWR201TH	4-4	7-21								
Chaparral Steel Midlothian L.P., Texas Inds. Inc.	Midlothian	TX	76065CHPRR300WA	4-4									
Chemical Solvents, Denison Avenue Facility	Cleveland	OH	44109CHMCL1010D	4-9									
Chemical Waste Management, Lake Charles Facility, Waste Management Inc.	Sulphur	LA	70665CHMCL7170J	3-11	3-13	3-20							
Chemical Waste Management Inc., Waste Management Inc.	Kettleman City	CA	93239CHMCL35251	3-6	3-7	3-11	3-13	3-20	3-22				
Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington	OR	97812CHMCL17629	3-6	3-7	3-11	3-20	3-22	5-4	6-5	6-28		
Chemical Waste Management Inc., Waste Management Inc.	Emelle	AL	35459CHMCLHWY17	3-7	3-11	3-13	3-20	3-22					
Chemtron Corp.	Avon	OH	44011CHMTR35850	4-9	4-10								
Chino Mines Co., Phelps Dodge Corp.	Hurley	NM	88043CHNMN210CO	7-21									
Ciba Specialty Chemical Corp.	McIntosh	AL	36653CBGGYGEIGY	4-9	4-10								
Ciba Specialty Chemicals Corp.	Newport	DE	19804CBGGYJAMES	4-11									
Cincinnati Specialties LLC., PMC Inc.	Cincinnati	OH	45217PMCSP501MU	4-11									
CK Witco Corp., Sistersville Plant	Friendly	WV	26175NNCRBSTATE	4-10									
CNA Holdings Inc., Celanese Americas Corp.	Shelby	NC	28150HCHSTHWY19	4-4									
Coastal Eagle Point Oil Co., Coastal Corp.	Westville	NJ	08093CSTLGRTES1	4-9	5-4	6-28							
Cognis Corp., Cincinnati Plant	Cincinnati	OH	45232HNKLC4900E	4-11									
Consolidated Papers Inc., Kraft Div.	Wisconsin Rapids	WI	54494CNSLD950FO	4-10									
Consolidated Recycling Co. Inc.	Troy	IN	47588CNSLDEIGHT	4-10									
Cook Inc.	Ellettsville	IN	47429CKNC 6300N	3-18									
Corning Inc.	Danville	VA	24541CRNNGROUTE	4-11									
Corus Tuscaloosa, Corus Group PLC	Tuscaloosa	AL	35404TSCLS1500H	3-8	7-22								
Co-Steel Lasco	Whitby	ON	0000003824	3-8	3-13	6-4	7-21						

Appendix C. List of Facilities that Appear in Tables (continued)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in
Co-Steel Raritan	Perth Amboy	NJ	08862RRTNR225EL	4-4
Crosfield Catalysts, Indopco	Chicago	IL	60629KTLCD4099W	4-11
Crystal Clean Services L.L.C.	Indianapolis	IN	46222CRYST3970W	6-4
CSC Ltd.	Warren	OH	44482CPRW4000M	3-8 7-22
CWM Chemical Services L.L.C, Waste Management Inc.	Model City	NY	14107CWMCH1550B	3-11 3-20 3-22
Cxy Chemicals Canada Limited Partnership, Canadian Occidental Petro	Naniamo	BC	0000003526	7-21
Cytec Inds. Inc., Fortier Plant	Westwego	LA	70094MRCNC10800	3-6 3-7 3-11 3-20 3-22 6-4 7-21
Dairy Farmers of America Inc.	Corona	CA	91720GLDNC1138W	4-11
Dayton Power & Light Co., J.M Stuart Station	Manchester	OH	45144DYTNP745US	3-6 3-7 3-20
DDE Louisville, DuPont Dow Elastomers	Louisville	KY	40216DDLVS4242C	4-10
Deco Automotive, Cosma International Inc.	Rexdale	ON	0000002687	4-4
Degussa Corp. Metal Group, Degussa AG	South Plainfield	NJ	07080MTZMT3900S	4-11
Delphi Energy & Chassis Sys., Delphi Automotive Sys. L.L.C.	New Brunswick	NJ	08903DLCRM760JE	4-4
Delphi Energy & Chassis Sys., Delphi Automotive Sys. L.L.C.	Olathe	KS	66061DLCRM400WD	4-4 5-4 6-28
Delphi Energy & Engine Management Sys., Delphi Automotive Sys.	Anaheim	CA	92801DLCRM1201N	4-4
Delphi Packard Electric Sys., Delphi Automotive Sys.	Warren	OH	44483GMPCPNORTH	4-4 8-6
Demunno/Kerdoon, World Oil Corp.	Compton	CA	90222DMNNK2000N	4-11
Detroit Edison Monroe Power Plant, DTE Energy	Monroe	MI	48161DTRTD3500E	3-6 3-7
Devro-Teepak	Danville	IL	61832TPKNC915NM	3-22
Disposal Systems Inc., GNI Group Inc.	Deer Park	TX	77536DPSPL2525B	4-9 4-10
DNN Galvanizing, Dofasco/National Steel/NKK	Windsor	ON	0000000276	8-7
Doe Run Co., Glover Smelter, Renco Group Inc.	Glover	MO	63646SRCNCHIGHW	3-7 3-11 3-13 3-20 3-22
Doe Run Co., Herculaneum Smelter, Renco Group Inc.	Herculaneum	MO	63048HRCLN881MA	3-7 3-11 3-13 3-20
Dofasco Inc., Dofasco Hamilton	Hamilton	ON	0000003713	3-6 3-8 3-13 5-4 7-22
Dominion Color Company, Ajax Plant, Kikuchi Color & Chemicals Corp.	Ajax	ON	0000001495	4-11
Douglas Battery Mfg. Co.	Winston-Salem	NC	27107DGLSB500BA	4-4
Dow Chemical Canada Inc., Weston	Weston	ON	0000000282	3-18
Dow Chemical Canada Inc., Varennes Site	Varennes	QC	0000000281	3-18
Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan	AB	0000000280	3-18
Dow Chemical Co.	Pittsburg	CA	94565DWCHMFOOTO	4-10
Dow Chemical Co., Midland Ops.	Midland	MI	48667THDWCMICHI	4-10 7-22
Dow Chemical Co., Torrance Facility	Torrance	CA	90503DWCHM305CR	3-18
Dow Chemical Co., Dalton Plant	Dalton	GA	30720DWCHM1468P	3-18
Dow Chemical Co., Freeport	Freeport	TX	77541THDWCBUILD	3-18 4-10
Dow Chemical Co., Louisiana Div.	Plaquemine	LA	70765THDWCHIGHW	3-18
Dow Chemical Co., Riverside Site	Pevely	MO	63070DWCHMDOWIN	3-18
Dow Chemical, Joliet Continental Ops.	Channahon	IL	60410DWCHMI55AR	3-18
Dow Chemical USA, Hanging Rock Plant	Ironton	OH	45638DWCHMOLDHI	3-18
Dow Corning Corp.	Midland	MI	48686DWCRN3901S	4-9 4-10 8-6
Dow Corning Corp.	Carrollton	KY	41008DWCRNUSHIG	8-6
Dow N.A., Allyn's Point Plant, Dow Chemical Co.	Gales Ferry	CT	06335DWCHMROUTE	3-18
DuPont, Beaumont Plant	Beaumont	TX	77704DPNTBSTATE	4-10 7-21
DuPont, Cape Fear	Leland	NC	28451DPNT STATE	3-18 4-9 7-21
DuPont, Chambers Works	Deepwater	NJ	08023DPNTCART130	3-18 4-10
DuPont, Delisle Plant	Pass Christian	MS	39571DPNTD7685K	3-13

Appendix C. List of Facilities that Appear in Tables (continued)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in					
GE Appliances, Bloomington Inc., GE Co.	Bloomington	IN	47401GNRLL301NO	3-18					
GE Appliances, GE Co.	Louisville	KY	40225GPPLNAPPLI	3-18					
GE Co. Silicone Prods., GE Co.	Waterford	NY	12188GNRLL260HU	8-6					
General Motors of Canada Limited, Oshawa Battery Plant	Oshawa	ON	0000003221	4-4					
Georgia Gulf Corp.	Plaquemine	LA	70765GRGGLHIGHW	3-18					
Gerber Prods., Novartis Corp.	Fort Smith	AR	72917GRBRP4301H	4-11					
Gibbs Die Casting Corp., George Koch & Sons	Henderson	KY	42420GBBSDUS60W	4-4	8-6				
GMC Powertrain, Defiance, General Motors Corp.	Defiance	OH	43512GMC STATE	7-21					
GNB Techs. Inc.	Leavenworth	KS	66048GNBNC1901S	4-4					
GNB Techs. Inc.	Farmers Branch	TX	75234GNBNC1880V	4-4					
GNB Techs. Inc., GNB Indl. Battery Co.	Fort Smith	AR	72901GNBNC4115S	8-6					
GNB Techs. Inc.	Dunmore	PA	18512GNBNCONEDU	8-6					
Grace Davison Cincinnati Plant, W. R. Grace & Co.	Cincinnati	OH	45229WRGRC4775P	4-11					
Granite City Steel, National Steel Corp.	Granite City	IL	62040GRNTC20THS	3-13					
Great Lakes Chemical Corp.	Newport	TN	37821GRTLKROUTE	4-11					
Gulf Power Co., Plant Crist, Southern Co.	Pensacola	FL	32514GLFPW11999	3-6	3-7	5-4	6-5		
H. Kramer & Co.	Chicago	IL	60608HKRMR1359W	8-6					
Heat Energy Advanced Tech. Inc.	Dallas	TX	75212HTNRG4460S	4-9					
Hercules Inc.	Hopewell	VA	23860QLNCM1111H	4-11					
Hercules Inc.	Parlin	NJ	08859HRCSSOUTH	4-11	5-4				
Heritage Environmental Services L.L.C.	Indianapolis	IN	46231HRTGN7901W	3-8	3-11	3-13	3-20	3-22	
Honeywell Intl. Inc.	El Segundo	CA	90245LLDSG850SO	3-18					
Honeywell Intl. Inc., Baton Rouge Plant	Baton Rouge	LA	70805LLDSGCORNE	3-18					
Honeywell Intl. Inc., Danville Works	Danville	IL	61834LLDSGNO5BR	3-18					
Hukill Chemical Corp.	Bedford	OH	44146HKLLC7013K	4-9					
Huntsman Corp. Port Arthur, A&O Plant, Huntsman Petrochemical Corp	Port Arthur	TX	77641TXCCHGATE2	7-21					
Huntsman Petrochemical Corp.	Cantonment	FL	32533HNTSM30000	4-10					
Hydrite Chemical Co.	Cottage Grove	WI	53527HYDRT150WD	4-9					
IBP Inc.	Lexington	NE	68850BPNC 1500S	7-22					
Inco Limited, Copper Cliff Smelter Complex	Copper Cliff	ON	0000000444	3-11	3-13	3-20	3-22		
International Paper Erie Mill	Erie	PA	16533HMMRM1540E	4-11					
International Wire, Corunna, Intl. Wire Group Inc.	Corunna	IN	46730HSRFN1720U	4-4					
Intertape Polymer Group, Columbia Div., Intertape Polymer Group	Columbia	SC	29205NCHRC2000S	3-22					
Ipsco Steel Inc., Ipsco Inc.	Muscatine	IA	52761PSCST1770B	3-8	3-13	7-22			
Irving Pulp & Paper Limited/Irving Tissue Company	Saint John	NB	0000002604	7-21					
ISP Van Dyk Inc., International Specialty Prods.	Belleville	NJ	07109VNDYKMAINW	4-9					
Ivaco Rolling Mills	L'original	ON	0000001520	3-8					
J&L Specialty Steel Inc.	Louisville	OH	44641JLSPC1500W	4-4	5-4				
J. R. Simplot Co., Heyburn Food Group, J. R. Simplot Co.	Heyburn	ID	83336JRSMPHIGHW	7-22					
Jayhawk Fine Chemicals Corp., Laporte Fine Chemicals	Galena	KS	66739LLCCH22MIS	3-6	3-8	5-4	6-5	6-28	7-22
Jessop Steel Co., Allegheny Techs. Inc.	Washington	PA	15301JSSPS500GR	4-4					
Johns Manville Canada Inc., Cornwall	Cornwall	ON	0000005749	3-18					
Johns Manville Intl.	Bremen	IN	46506NRGBR1215W	3-18					
Johnson Controls Inc., Battery Group Inc.	Saint Joseph	MO	64502JHNSN4722P	4-4					
Johnson Controls Inc., Battery Group	Holland	OH	43528JHNSN10300	4-4					

Appendix C. List of Facilities that Appear in Tables (continued)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in						
Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan	AB	0000002132	7-21						
Shurtape Techs. Inc., Hickory Tape Plant, STM Inc.	Hickory	NC	28601SHFRDLIGHL	3-22						
Sikeston Power Station, City of Sikeston	Sikeston	MO	63801SKSTN1551W	3-13						
Simpson Pasadena Paper Co., Simpson Investment Co.	Pasadena	TX	77506SMPSNNORTH	7-21						
Slater Steels Inc., Hamilton Specialty Bar Division	Hamilton	ON	0000002161	3-8						
Solutia - Chocolate Bayou	Alvin	TX	77511SLTNCFM291	3-11	3-20	3-22	7-22			
Solutia Inc.	Springfield	MA	01151MNSNT730WO	4-11						
Solutia Inc.	Gonzalez	FL	32533MNSNT30000	3-6	3-7	5-4	7-22			
Sorevco, Société en commandite, Dofasco Inc/Ispar (Sidbec) Inc.	Côteau-du-Lac	QC	0000004328	8-7						
Southeastern Chemical & Solvent Co. Inc., M&M Chemical & Equipment	Sumter	SC	29151STHST755IN	4-9	5-4					
Southwire Co.	Carrollton	GA	30119CPPRDCESTR	3-8	3-13	7-22				
Squibb Mfg. Inc., Bristol Myers Squibb Co.	Humacao	PR	00661SQBBMSTATE	4-10	7-22					
Steel Dynamics Inc.	Butler	IN	46721STLDY4500C	3-6	3-8	3-13	5-4	6-5	7-22	
Stelco McMaster Ltée, Stelco Inc.	Contrecoeur	QC	0000002986	3-8						
Sterling Chemicals Inc.	Texas City	TX	77592STRLN201BA	7-21						
Stone Container Corp.	Hopewell	VA	23860STNHP910IN	4-11						
Stone Container Corp.	Panama City	FL	32401STNCN1EVER	4-11						
Sun Chemical Corp., Newark Plant, DIC Americas Inc.	Newark	NJ	07105SNCHM185FO	4-11						
Sunoco Inc., Frankford Plant	Philadelphia	PA	19137LLDSGMARGA	4-11						
Superior Cable Corporation, Superior TeleCom	Winnipeg	MB	0000000968	8-7						
Syndicate Sales Inc.	Kokomo	IN	46901SYNDC2025N	3-18						
Systech Environmental Corp., Lafarge Corp.	Demopolis	AL	36732SYSTCARCOL	6-27						
Terumo Medical Corp.	Elkton	MD	21921TRMMD950EL	3-18						
Teva Pharmaceuticals USA, Teva Pharmaceutical Ind. Ltd.	Mexico	MO	65265BCRFT5000C	4-9						
Thomas & Betts Corp.	Horseheads	NY	14845LRCLC224NM	4-4						
Timken Co., Faircrest Steel Plant	Canton	OH	44706HTMK4511F	3-8	7-22					
Tippecanoe Labs., Eli Lilly & Co.	Lafayette	IN	47905LLLLYLILLY	4-10						
U.S. DOE, Portsmouth Gaseous Diffusion Plant, United States Enrichme	Pikeston	OH	45661NTDST3930U	3-18						
U.S. Enrichment Corp., Paducah Gaseous Diffusion Plant, USEC, Inc.	Paducah	KY	42001PDCHGHOBBS	3-18						
U.S. Mint, U.S. Department of the Treasury	Philadelphia	PA	19106NTDST151NI	4-4	5-4	6-28				
U.S. Mint, U.S. Department of the Treasury	Denver	CO	80204NTDST320WE	4-4						
U.S. TVA, Johnsonville Fossil Plant, U.S. Tennessee Valley Authority	New Johnsonville	TN	37134STVJH535ST	3-6	3-7	5-4	6-5			
U.S. TVA, Paradise Fossil Plant, U.S. Tennessee Valley Authority	Drakesboro	KY	42337STVPR13246	3-6	3-7					
Union Carbide Corp., Institute WV Plant Ops.	Institute	WV	25112NNCRBRT25	4-9						
Union Carbide Corp., South Charleston Plant	South Charleston	WV	25303NNCRB437MA	4-11						
Union Carbide Corp., Texas City Plant	Texas City	TX	77592NNCRB33015	4-11						
United Technologies Corp., Carrier Div.	Collierville	TN	38017CRRRC975BY	4-4						
USL City Environmental Inc., U.S. Liquids Inc.	Detroit	MI	48211SLCTY1923F	3-8	3-11	3-13	3-20	3-22	6-5	
USS Gary Works, USX Corp.	Gary	IN	46402SSGRYONENO	3-6	3-7	3-13	7-22			
USS Mon Valley Works - Edgar Thomson Plant, USX Corp.	Braddock	PA	15104SSDGRBRADD	3-8	3-13	7-22				
Vickery Environmental Inc., Waste Management Inc.	Vickery	OH	43464WSTMN3956S	3-6	3-7	3-20				
Viskase Corp., Viskase Companies, Inc	Loudon	TN	37774VSKSCEASTL	3-22						
Waltec Forgings Incorporated, Wallaceburg Plant	Wallaceburg	ON	0000004432	4-4	8-7					
Wansley Steam Electric Generating Plant	Roopville	GA	30170WNSLYGGEORG	3-6	3-7	6-5				
Waste Control Specialists L.L.C.	Andrews	TX	79714WSTCN9998H	3-11	3-13	3-20	3-22			

Appendix C. List of Facilities that Appear in Tables (continued)

Facility Name	City	State/Province	PRTR ID Number	Tables Facility Appears in						
Wayne Dalton Corp., Pensacola Div.	Pensacola	FL	32514WYN DL3395A	3-18						
Wayne Disposal Inc., EQ - The Environmental Quality Co.	Belleville	MI	48111WYN DS49350	3-11	3-20	3-22				
Westvaco Corp., Fine Papers Div.	Luke	MD	21540WST VC300PR	4-11						
Weyerhaeuser Co.	Longview	WA	98632WYR HS3401I	7-21						
Wheeling-Pittsburgh Steel Corp., Mingo Junction	Mingo Junction	OH	43952WHL NGMCLIS	3-8	7-22					
Whirlpool Corp.	Fort Smith	AR	72903WHRL P6400J	3-18						
Witco - Gretna Facility, Crompton Corp.	Harvey	LA	70058WTCCR1805F	7-21						
WRR Environmental Services Co. Inc., Caribou Corp.	Washington	WI	54701WRR NV5200S	4-9						
Wyeth Ayerst Pharmaceuticals Inc., American Home Prods. Corp.	Rouses Point	NY	12979YRST L64MAP	8-6						
Yuasa Inc. Battery Plant	Richmond	KY	40475XD CRP876RI	3-8	3-11	3-13	3-20	3-22	7-22	
Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca	PA	15061ZNCCR300FR	3-6	3-8	3-13	3-20	5-4	6-5	7-21
Zinc Corp. of America, Horsehead Inds. Inc.	Palmerton	PA	18071ZNCCRFOURT	3-8	3-11	3-20	3-22	7-22	8-6	

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 the manner in which they affect 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 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 be 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 uncertain.
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 <i>cancer</i> 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.

Appendix D – Human Health Effects of Chemicals on the “Top 25” Lists for Releases and for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
7782-50-5	Chlorine	EPA	Effects range from coughing and chest pain to water retention in the lungs; irritation to skin, eyes, and respiratory system.	Adverse effects on immune system, blood, heart, and respiratory system in laboratory studies.
--	Chromium (and its compounds)	ATSDR	Hexavalent forms (Cr VI) are more toxic than trivalent (Cr III). Inhalation effects include irritation/damage to nose, lungs, stomach, and intestines. Some persons are allergic and high exposure may trigger asthma. Ingestion effects include stomach upset and ulcers, convulsions, damage to kidneys and liver, and death.	Some chromium VI compounds are <i>known human carcinogens</i> , 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 fumes 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 <i>cancer</i> 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 <i>cancer</i> of the nasal passages in laboratory studies or rats. Low levels can irritation of the eyes, nose, throat, and skin. People with asthma may be more sensitive.
110-54-3	n-Hexane	ATSDR	Inhalation of large amounts cause numbness in hands and feet, followed by muscle weakness in the feet and lower legs.	Causes nerve and lung damage in laboratory studies of rats.

Appendix D – Human Health Effects of Chemicals on the “Top 25” Lists for Releases and for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
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 <i>cancer</i> in exposed workers.
7664-39-3	Hydrogen fluoride	NJDOH	Inhalation effects include damage to nose, throat and lungs causing coughing and/or shortness of breath. Can lead to a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath. Dermal contact will burn skin and eyes.	Irritation of eyes, skin, and lungs. Repeated exposures may cause bronchitis. Long-term exposure may damage liver and kidneys.
--	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, 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. <i>Cancer</i> of lung and nasal sinus seen in nickel workers, inhalation of insoluble nickel compounds caused cancer in laboratory studies.

Appendix D – Human Health Effects of Chemicals on the “Top 25” Lists for Releases and for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
--	Nitric acid and nitrate compounds	NJDOH	Inhalation of nitric acid can irritate the lungs, as well as mouth, nose and throat; higher exposures can lead to fluid buildup (pulmonary edema), a medical injury. Dermal contact can cause severe, permanent eye and skin damage.	Exposure to vapor may cause erosion of teeth.
100-42-5	Styrene	ATSDR	Inhalation effects include depression, trouble concentrating, muscle weakness, fatigue, and nausea; possibly irritation of eye, nose, and throat. Laboratory studies show damage to nose and liver, reproductive and fetal toxicity. Ingestion can lead to damage of liver, kidney, brain, and lungs in laboratory studies.	Studies not reported.
7664-93-9	Sulfuric acid	ATSDR	Inhalation can irritate the lungs. Ingestion can burn mouth, throat, and stomach and result in death. Contact with skin and eyes can cause third-degree burns and blindness.	Exposure to vapor may cause chronic runny nose, tearing of the eyes, nose bleeds and stomach upset, as well as erosion and pitting of teeth. Evidence of increased <i>cancer</i> 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 1997 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 the chemical industry to extract inorganic and organic chemicals, especially butadiene. Also used in the manufacture of pesticides.
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).
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.
71-36-3	n-Butyl alcohol	Principal use 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 in production of rayon. Also used in production of chemicals for agriculture (fumigants), for production of rubber and cellophane. Some use 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 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 purifying agents 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. Employed 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 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, 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 (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 chloral-kali processes, steel pickling, food processing (including production of corn syrup) and production of calcium chloride. Also used in oil well acidulation (to stimulate oil and gas production), production of chlorine and in water treatment for swimming pools. Other uses (together representing more than 40 percent of usage) include metal recovery from used catalysts, pH control, sludge removal, sand and clay purification and production of inorganics such as sodium chlorate, metal chlorides, activated carbon and iron oxide pigments and organics like polycarbonate resins, bisphenol-A, polyvinyl chloride resins and synthetic glycerine. Hydrochloric acid is also a byproduct of the manufacture of isocyanates.
7664-39-3	Hydrogen fluoride	Used mainly to make aluminum and chlorofluorocarbons (CFCs), 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. Employed 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 of 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 catalyst, 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 for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Uses
--	Manganese (and its compounds)	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, 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 and 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, and to color ceramics and as catalysts.
--	Nitric acid and nitrate compounds	The chief use of nitric acid is in producing ammonium nitrate fertilizer. Also used in the manufacture of cyclohexanone and as a raw material for adipic acid and caprolactam, both used in making nylon. Nitrates are used in producing explosives, including gunpowder.
100-42-5	Styrene	Mainly used (two-thirds) in producing polystyrene. Also used in production of acrylonitrile-butadiene-styrene (ABS) resins and acrylonitrile-styrene resins; these are used in automobile parts, appliances (including refrigerators and freezers), pipe, business machines and luggage and recreational goods. Also used to produce styrene-butadiene latex and rubber, unsaturated polyester resins, thermoplastics elastomers and various styrene copolymers.
7664-93-9	Sulfuric acid	Principal use (almost three-quarters) is in fertilizer production, generally produced by fertilizer manufacturers themselves. Sulfuric acid generated during smelting is sold for numerous chemical and industrial uses, but is also used in leaching copper. Industrial uses include production of explosives, other acids, dyestuffs, glue, wood preservatives and lead-acid vehicle batteries. Also used in purifying petroleum, pickling metal, electroplating and nonferrous metallurgy.
108-88-3	Toluene	By far, the largest use is in gasoline; most toluene is never separated from petroleum crude oil (its largest source) but is pumped from refineries to other locations where it is added directly to gasoline. Toluene “recovered” from crude oil is principally used to make benzene. Toluene is also a byproduct of gasoline production, the manufacture of coke from coal and production of styrene. Uses include paints, lacquers, thinners and strippers, adhesives, cosmetic nail products and others.
--	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). Also used in dry cell batteries and in such alloys 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)

 <p>EPA United States Environmental Protection Agency</p>	<p>FORM R</p> <p>TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM</p>
<p>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</p>	<p>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</p>

<p>WHERE TO SEND COMPLETED FORMS:</p> <p>1. EPCRA Reporting Center P.O. Box 3348 Merrifield, VA 22116-3348 ATTN: TOXIC CHEMICAL RELEASE INVENTORY</p>	<p>2. APPROPRIATE STATE OFFICE (See instructions in Appendix F)</p>
<p>Enter "X" here if this is a revision</p>	
<p>For EPA use only</p>	

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION	
SECTION 1. REPORTING YEAR	19 ____
SECTION 2. TRADE SECRET INFORMATION	

<p>Are you claiming the toxic chemical identified on page 2 trade secret?</p> <p><input type="checkbox"/> Yes (Answer question 2.2; Attach substantiation forms)</p> <p><input type="checkbox"/> No (Do not answer 2.2; go to Section 3)</p>	<p>Is this copy <input type="checkbox"/> Sanitized <input type="checkbox"/> Unsanitized</p> <p>(Answer only if "YES" in 2.1)</p>
2.1	2.2

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	
<p>4.1 Facility or Establishment Name</p> <p>Street</p> <p>City/County/State/Zip Code</p>	<p>TRI Facility ID Number</p> <p>Facility or Establishment Name or Mailing Address (if different from street address)</p> <p>Mailing Address</p> <p>City/County/State/Zip Code</p>

<p>4.2 This report contains information for: (Important: check a or b; check c if applicable)</p> <p>a. <input type="checkbox"/> An entire facility</p> <p>b. <input type="checkbox"/> Part of a facility</p> <p>c. <input type="checkbox"/> A Federal facility</p>	<p>Telephone Number (include area code)</p> <p>Telephone Number (include area code)</p>		
<p>4.3 Technical Contact Name</p>	<p>Telephone Number (include area code)</p>	<p>Telephone Number (include area code)</p>	<p>Telephone Number (include area code)</p>
<p>4.4 Public Contact Name</p>	<p>SIC Code(s) (4 digits)</p>	<p>Latitude</p>	<p>Longitude</p>
<p>4.5</p>	<p>Degrees</p>	<p>Minutes</p>	<p>Seconds</p>
<p>4.6</p>	<p>Degrees</p>	<p>Minutes</p>	<p>Seconds</p>
<p>4.7</p>	<p>Dun & Bradstreet Number(s) (9 digits)</p>	<p>EPA Identification Number(s) (RCRA I.D. No.) (12 characters)</p>	<p>Facility NPDES Permit Number(s) (9 characters)</p>
<p>a.</p>	<p>4.8</p>	<p>4.9</p>	<p>4.10</p>
<p>b.</p>	<p>a.</p>	<p>a.</p>	<p>Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)</p>
<p>b.</p>	<p>b.</p>	<p>b.</p>	<p>a.</p>

SECTION 5. PARENT COMPANY INFORMATION	
<p>5.1 Name of Parent Company</p>	<p><input type="checkbox"/> NA</p>
<p>5.2 Parent Company's Dun & Bradstreet Number</p>	<p><input type="checkbox"/> NA (9 digits)</p>

EPA FORM R		TRI FACILITY ID NUMBER
PART II. CHEMICAL - SPECIFIC INFORMATION		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 I, Section 2.1 is checked "yes". Generic name must be structurally descriptive.)

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.	<input type="checkbox"/> Produce <input type="checkbox"/> Import		
c.	if produce or import: <input type="checkbox"/> For on-site use/processing		a. <input type="checkbox"/> As a chemical processing aid
d.	<input type="checkbox"/> For sale/distribution	a. <input type="checkbox"/> As a reactant	b. <input type="checkbox"/> As a manufacturing aid
e.	<input type="checkbox"/> As a byproduct	b. <input type="checkbox"/> As a formulation component	c. <input type="checkbox"/> Ancillary or other use
f.	<input type="checkbox"/> As an impurity	c. <input type="checkbox"/> As an article component	
		d. <input type="checkbox"/> Repackaging	

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1	<input type="text"/> (Enter two-digit code from instruction package.)
------------	---

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

	A. Total Release (pounds/year)(enter range, from instructions or estimate)	B. Basis of estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions <input type="checkbox"/> NA <input type="checkbox"/>		
5.2	Stack or point air emissions <input type="checkbox"/> NA <input type="checkbox"/>		
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			
5.4.1	Underground Injection on-site to Class I Wells <input type="checkbox"/> NA <input type="checkbox"/>		
5.4.2	Underground Injection on-site to Class II-V Wells <input type="checkbox"/> NA <input type="checkbox"/>		

If additional pages of Part II, Section 5.3 are attached, indicate the total number of pages in this box and indicate which Part II, Section 5.3 page this is, here (example: 1,2,3, etc.)

EPA Form 9350-1 (Rev. 04/97) - Previous editions are obsolete. Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

EPA FORM R		TRI FACILITY ID NUMBER
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)		Toxic Chemical, Category, or Generic Name
SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM		
	NA	B. Basis of Estimate (enter code)
A. Total Release (pounds/year) (enter range code from instructions or estimate)		
5.5	Disposal to land on-site	
5.5.1A	RCRA Subtitle C landfills <input type="checkbox"/>	
5.5.1B	Other landfills <input type="checkbox"/>	
5.5.2	Land treatment/application farming <input type="checkbox"/>	
5.5.3	Surface impoundment <input type="checkbox"/>	
5.5.4	Other disposal <input type="checkbox"/>	
SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS		
6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWS)		
6.1.A. Total Quantity Transferred to POTWs and Basis of Estimate		
6.1.A.1. Total Transfers (pounds/year) (enter range code or estimate)		6.1.A.2 Basis of Estimate (enter code)
6.1.B. ——— POTW Name		
POTW Address		
City	State	County Zip
6.1.B. ——— POTW Name		
POTW Address		
City	State	County Zip
<p>If additional pages of Part II, Section 6.1 are attached, indicate the total number of pages in this box <input type="text"/> and indicate which Part II, Section 6.1 page this is here <input type="text"/> (example: 1,2,3, etc.)</p>		
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
Is location under control of reporting facility or parent company? <input type="checkbox"/> Yes <input type="checkbox"/> No		

EPA Form 9350-1 (Rev. 04/97) - Previous editions are obsolete.

Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

EPA FORM R		TRI FACILITY ID NUMBER	
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)			
SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (continued)			
A. Total Transfers (pounds/year) (enter range code or estimate)		C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)	
B. Basis of Estimate (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
Is location under control of reporting facility or parent company? <input type="checkbox"/> Yes <input type="checkbox"/> No			
A. Total Transfers (pound/year) (enter range code or estimate)		C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)	
B. Basis of Estimate (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			
<input type="checkbox"/> 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
7A.1a	7A.1b	7A.1c	7A.1d
	1		Yes <input type="checkbox"/> No <input type="checkbox"/>
	4		%
	7		7A.1e
7A.2a	7A.2b	7A.2c	7A.2d
	1		Yes <input type="checkbox"/> No <input type="checkbox"/>
	4		%
	7		7A.3e
7A.3a	7A.3b	7A.3c	7A.3d
	1		Yes <input type="checkbox"/> No <input type="checkbox"/>
	4		%
	7		7A.4e
7A.4a	7A.4b	7A.4c	7A.4d
	1		Yes <input type="checkbox"/> No <input type="checkbox"/>
	4		%
	7		7A.5e
7A.5a	7A.5b	7A.5c	7A.5d
	1		Yes <input type="checkbox"/> No <input type="checkbox"/>
	4		%
	7		7A.5e

If additional pages of Part II, Sections 6.2/7A are attached, indicate the total number of pages in this box and indicate which Part II, Sections 6.2/7A page this is, here. (example: 1.2.3. etc.)

EPA FORM R		TRI FACILITY ID NUMBER
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)		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

	All quantity estimates can be reported using up to two significant figures.	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 on-site				
8.3	Quantity used for energy recovery off-site				
8.4	Quantity recycled on-site				
8.5	Quantity recycled off-site				
8.6	Quantity treated on-site				
8.7	Quantity treated off-site				
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				

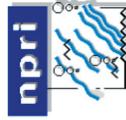
8.10 Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" in Section 8.10.1 and answer Section 8.11.

Source Reduction Activities [enter code(s)]	Methods to Identify Activity (enter codes)		
	a.	b.	c.

8.11 Is additional optional information on source reduction, recycling, or pollution control activities included with this report? (Check one box)

YES <input type="checkbox"/>	NO <input type="checkbox"/>
------------------------------	-----------------------------

* Report releases pursuant to EPCRA Section 329(b) including "any spillage, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment." Do not include any quantity treated on-site or off-site.



NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

All fields are mandatory unless otherwise noted.
Please print and refer to the guide for additional information.

Reporting Year :	1999
A1.1 NPRI ID :	
A1.4 Web Site Address	http:// (Optional)
A1.5 D&B D-U-N-S Number :	- - - - - (Optional)

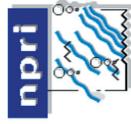
FACILITY IDENTIFICATION & SITE ADDRESS	
A2.1 Company Name :	
A2.2 Facility Name :	
A2.3 Street Address :	
A2.4 Street Address :	
A2.5 City / District :	
A2.6 Province / Territory :	
A2.7 Postal Code :	

PARENT COMPANY INFORMATION	
A3.0	
A3.1	Is the facility controlled by another company or companies ? () Y/N If Yes, please use Appendix A.

FACILITY PUBLIC CONTACT (Optional)	
A4.0	
A4.1 Title :	Dr () Mr () Mrs () Miss () Ms ()
A4.2 First Name :	
A4.3 Last Name :	
A4.4 Position :	
A4.5 Telephone No :	() - - Ext. :
A4.7 Facsimile No :	() - -
A4.8 E-mail Address :	

FACILITY PUBLIC CONTACT ADDRESS (Optional)	
A5.0	Is the mailing address for the public contact in A4.0 different from the facility's site address in A2.0 ? () Y/N If Yes, please provide the address below.
A5.1	Company Name :
A5.2	Facility Name :
A5.3	Mailing Address :
A5.4	Mailing Address :
A5.5	City / District :
A5.6	Province / Territory :
A5.8	State :
A5.10	Country :
	Postal Code :
	Zip Code/Other :





NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

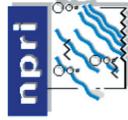
FACILITY TECHNICAL CONTACT	
A6.0	Title :
A6.1	Dr () Mr () Mrs () Miss () Ms ()
A6.2	First Name :
A6.3	Last Name :
A6.4	Position :
A6.5	Telephone No : () - Ext :
A6.7	Facsimile No : () -
A6.8	E-mail Address :

FACILITY TECHNICAL CONTACT ADDRESS	
A7.0	Is the mailing address for the technical contact in 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	Province / Territory
A7.8	State : Postal Code :
A7.10	Country : Zip Code/Other :

COMPANY COORDINATOR (Optional)	
A8.0	Do you wish that we send all correspondence to a company coordinator who will be responsible for all your facilities ? () 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	Telephone No : () - Ext.:
A8.7	Facsimile No : () -
A8.8	E-mail Address :

COMPANY COORDINATOR ADDRESS (Optional)	
A9.0	Is the mailing address for the company coordinator in A8.0 different from the facility's site address in A2.0 ? () Y/N If you answer 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	Province / Territory :
A9.8	State : Postal Code :
A9.10	Country : Zip Code/Other :



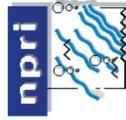


NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

COMPANY OFFICIAL CERTIFYING SUBMISSION	
A16.0	
A16.1	Title : _____ Dr () Mr () Mrs () Miss () Ms ()
A16.2	First Name :
A16.3	Last Name :
A16.4	Position :
A16.8	E-mail Address :
COMPANY OFFICIAL ADDRESS	
A17.0	Is the mailing address for the company official in A16.0 different from _____ () Y/N If Yes, please provide the address below. the facility's site address in A2.0 ?
A17.1	Company Name :
A17.2	Facility Name :
A17.3	Mailing Address :
A17.4	Mailing Address :
A17.5	City / District :
A17.6	Province/Territory :
A17.8	State : _____ Postal Code : _____ Zip Code/Other : _____
A17.10	Country :





NPRI - The National Pollutant Release Inventory

PART B – SUBSTANCE-SPECIFIC INFORMATION

Please photocopy Part B of the form for each reportable NPRI substance. All fields are mandatory unless otherwise noted. Please print and refer to the guide for additional information.

SUBSTANCE IDENTITY	
B1.0	
B1.1	CAS Registry Number :
B1.2	Substance Name :

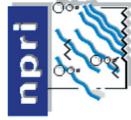
NATURE OF ACTIVITIES (Select at least one activity)	
B2.0	
B2.1	MANUFACTURE THE SUBSTANCE <input type="checkbox"/> For On-Site Use / Processing <input type="checkbox"/> For Sale / Distribution <input type="checkbox"/> As a By-product <input type="checkbox"/> As an Impurity
B2.2	PROCESS THE SUBSTANCE <input type="checkbox"/> As a Reactant <input type="checkbox"/> As a Formulation Component <input type="checkbox"/> As an Article Component <input type="checkbox"/> Repackaging Only <input type="checkbox"/> As a By-product
B2.3	OTHERWISE USE THE SUBSTANCE <input type="checkbox"/> As a Chemical Processing Aid <input type="checkbox"/> As a Manufacturing Aid <input type="checkbox"/> Ancillary / Other Use <input type="checkbox"/> As a By-product

ON-SITE RELEASES		
B10.0		
B10.1	Do you release this substance on site ?	<input type="checkbox"/> Y / N If No, go directly to section B14.0

REPORTING RELEASES LESS THAN ONE TONNE		
B11.0		
B11.1	If the total releases are less than one (1) tonne, are you reporting this amount as a sum for all media ?	<input type="checkbox"/> Y/N If Yes, go directly to section B12.5

ON-SITE RELEASES OF THE SUBSTANCE TO THE ENVIRONMENT		
AIR RELEASES		RELEASES (Tonnes / Year)
BASIS OF ESTIMATE (Select one method)		
a)	Stack / Point	C / E / M / O
b)	Storage / Handling	C / E / M / O
c)	Fugitive	C / E / M / O
d)	Spills	C / E / M / O
e)	Other Non-Point	C / E / M / O
B12.2	UNDERGROUND INJECTION	C / E / M / O





NPRI - The National Pollutant Release Inventory

PART B – SUBSTANCE-SPECIFIC INFORMATION

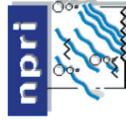
B12.3	RELEASES TO SURFACE WATERS	BASIS OF ESTIMATE (Select one method)	RELEASES (Tonnes / Year)	SURFACE WATER BODY CODES (Appendix B)
a)	Direct Discharges	C/E/M/O		
b)	Spills	C/E/M/O		
c)	Leaks	C/E/M/O		
B12.4	RELEASES TO LAND	BASIS OF ESTIMATE (Select one method)	RELEASES (Tonnes / Year)	
a)	Landfill	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 RELEASES	C/E/M/O		

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.)
	%	%	%	%

B14.0	REASONS FOR CHANGES IN QUANTITIES RELEASES FROM PREVIOUS YEAR (Select at least one reason)
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 Final 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 (Tonnes / Year)	
	2000	2001
	2003 (Optional)	2004 (Optional)





NPRI - The National Pollutant Release Inventory

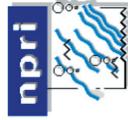
PART B – SUBSTANCE-SPECIFIC INFORMATION

B20.0	DO YOU TRANSFER THIS NPRI SUBSTANCE TO OFF-SITE LOCATIONS
B20.1	For Final Disposal ? () Y/N
B20.2	For Recycling ? (Now Mandatory) () Y/N
B21.0	REASONS WHY SUBSTANCE WAS TRANSFERRED OFF SITE FOR DISPOSAL or RECYCLING (Select at least one reason)
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

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 (Tonnes / Year)
a)	Physical Treatment	C/E/M/O	
b)	Chemical Treatment	C/E/M/O	
c)	Biological Treatment	C/E/M/O	
d)	Incineration / Thermal	C/E/M/O	
e i)	Containment: Landfill	C/E/M/O	
e ii)	Containment: Other Storage	C/E/M/O	
f)	Mun. 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 TRANSFERRED OFF SITE FOR DISPOSAL FROM PREVIOUS YEAR (Select at least one reason)
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)





NPRI - The National Pollutant Release Inventory

PART B – SUBSTANCE-SPECIFIC INFORMATION

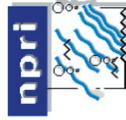
B23.2	COMMENTS ON OFF-SITE TRANSFERS FOR DISPOSAL (Optional)

B24.0	ANTICIPATED OFF-SITE TRANSFERS FOR DISPOSAL (Tonnes / Year)	
B24.1	2000	2001
		2002
	2003 (Optional)	2004 (Optional)

B25.0	OFF-SITE TRANSFERS FOR RECYCLING		
Fill in this section if you answered Yes at question B20.2			
B25.1	RECYCLING METHOD	BASIS OF ESTIMATE (Select one method)	AMOUNT (Tonnes/Year)
	a) Energy Recovery	C / E / M / O	OFF-SITE CODES (see Appendix C)
	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		

B26.0	REASONS FOR CHANGES IN QUANTITIES TRANSFERRED OFF SITE FOR RECYCLING
FROM PREVIOUS YEAR (Select at least one reason)	
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 Final Disposal
g)	Other (specify in comments field B26.2)
h)	No Significant Change (i.e < 10 %) or No Change
i)	Not Applicable (First year reporting this substance)





NPRI - The National Pollutant Release Inventory

PART B – SUBSTANCE-SPECIFIC INFORMATION

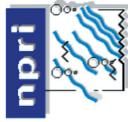
B26.2	COMMENTS ON TRANSFERS OFF SITE FOR RECYCLING (Optional)	

B27.0	ANTICIPATED TRANSFERS OFF SITE FOR RECYCLING (Tonnes / Year)	
B27.1	2000	2001
		2002
	2003 (Optional)	2004 (Optional)

B30.0	POLLUTION PREVENTION ACTIVITIES (P2) (Select at least one activity)	
a)	Materials or Feedstock Substitution	
b)	Product Design or Reformulation	
c)	Equipment or Process Modifications	
d)	Spill or Leak Prevention	
e)	On-site Recovery, Re-use or Recycling	
f)	Inventory Management or Purchasing Techniques	
g)	Good Operating Practice 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	





NPRI - The National Pollutant Release Inventory

APPENDIX A PARENT COMPANIES

NPRI ID :

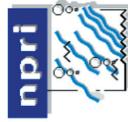
If you answered Yes in section A3.0, please list parent company or companies

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	Province / Territory : Postal Code :
P1.8	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	Province / Territory : Postal Code :
P1.8	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	Province / Territory : Postal Code :
P1.8	State : Zip Code / Other :
P1.10	Country :





NPRI - The National Pollutant Release Inventory

APPENDIX C OFF-SITE FACILITIES

NPRI ID :

OFF-SITE FACILITY	
S1.0	
S1.1	01 Use off-site codes (i.e. 01, 02, 03 etc...) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0
S1.2	Facility or MSTP Name :
S1.3	Mailing Address :
S1.4	Mailing Address :
S1.5	City / District :
S1.6	Province / Territory :
S1.8	State : Postal Code :
S1.10	Country : Zip Code / Other :

OFF-SITE FACILITY	
S1.0	
S1.1	02 Use off-site codes (i.e. 01, 02, 03 etc...) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0
S1.2	Facility or MSTP Name :
S1.3	Mailing Address :
S1.4	Mailing Address :
S1.5	City / District :
S1.6	Province / Territory :
S1.8	State : Postal Code :
S1.10	Country : Zip Code / Other :

OFF-SITE FACILITY	
S1.0	
S1.1	03 Use off-site codes (i.e. 01, 02, 03 etc...) to indicate off-site facilities or MSTPs in sections B22.0 and B25.0
S1.2	Facility or MSTP Name :
S1.3	Mailing Address :
S1.4	Mailing Address :
S1.5	City / District :
S1.6	Province / Territory :
S1.8	State : Postal Code :
S1.10	Country : Zip Code / Other :





ANNUAL CERTIFICATE FOR THE OPERATION OF INDUSTRIAL FACILITIES UNDER FEDERAL JURISDICTION FOR THE YEAR 1999

To be completed by SEMARNAP	
1) APPLICATION NUMBER:	2) ENVIRONMENTAL REGISTRATION NUMBER:
3) RECEIVED BY:	(Signature with date received)
Name and signature	
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.	Name and signature of the legal representative
PLACE AND DATE:	Name and signature of the technical officer

SECTION I. GENERAL TECHNICAL INFORMATION

As set forth in Articles 19 and 21 of the regulations of the LGEPPA under prevention and control of atmospheric pollution, the reporting of information contained in this section is obligatory.

1.1 CHANGE of NAME or TRADE NAME Day ___ ___ Month ___ ___ Year ___ ___

If this is the case, enter the date of the change of name or trade name of the facility. Changes in process and reductions and increases in production should be reported in the Operating License or Single Environmental License (LAU), giving prompt notification at the INE procession window or at the state delegations of Semarnap. In cases of change of domicile or industrial transfer, the facility must process a new License.

1.2 RISK and CONTINGENCIES

If applicable, write down the date on which the Environmental Impact Assessment was issued and/or the Accident Prevention Program or the Contingency Program was approved.

1.2.1 Date of submission of the last Risk Assessment: Day ___ ___ Month ___ ___ Year ___ ___

1.2.2 Date of the last update of the Accident Prevention Program or Contingency Program
Day ___ ___ Month ___ ___ Year ___ ___

1.3 OPERATIONS AND PROCESS DESCRIPTION

If necessary due to changes in the facility or if using this form for the first time, prepare the *General Operating Diagram* and *The Table of Consumption, generation and/or release points* following the example included in the General Instructions Catalogue, section VI.3, that comes with this form. The diagram (annex 1.3b) and the Summary Table (annex 1.3.c) shall include all areas (production, wastewater treatment, waste management, services, etc.) where there are points of raw materials, water or energy use, or where pollutants are generated, stored or released, for example, when:

- there is an input, as direct or indirect consumption, of some of the substances listed in table number 12 in the code catalogue,
- caloric energy is used or produced,
- water is used, or
- any of the substances contained in the list is generated, stored, or emitted to the environment.

In case there are different production processes, the facility should report and present them. Their identification should follow a consecutive increasing numeric order, as shown in the instruction section. The emission points (machinery, processes, services, control equipments, etc.) identified in these diagrams will be used throughout the whole form, so they should be clearly defined following the criteria cited before.

1.4 DIRECT and INDIRECT RAW MATERIALS including raw materials that contain any of the substances listed in Table 12 of the General Code Catalogue.

Commercial	Name ¹		Consumption Point ²	Physical state ³	Type of storage ⁴	Annual consumption	
	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), gasoline (GO), 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.
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), burning cane sugar pulp, cellulose, wood, other wastes (CDR) or other alternative energy sources (OM).
2. Units such as: J/s (joules/second), MJ/hr (megajoules/hour), W (watts), KW (kilowatts) or MW (megawatts) can be used.

2.3.2 Nitrogen oxide

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, HC¹

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 compounds¹

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 assignment, according to jurisdictional area of source used.
3. Indicate the name of administrative entity that granted concession or assignment.
4. Indicate the annual total amount of water used from each extracting source.
5. Volume units such as: lt. (liters), m³ (cubic meters), ft³ (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 <i>in situ</i> treatment	
				Permits and records	REPDA ⁶			Code ⁹	Amount ¹⁰

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), m³ (cubic meters), ft³ (cubic feet) or gal (gallons) shall be used.

3.2.2 Wastewater discharge quality description¹

Parameter ³	Release point ²			
Annual volume [cubic meters]				
Hydrogen potential (pH)				
Temperature [°C]				
Fats and oils [mg/l]				
Floating matter (present or absent)				
Sedimentable solids [ml/l]				
Total suspended solids [mg/l]				
Biochemical oxygen demand (DBO 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 GENERATION¹

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

- 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.
- Number corresponding to the Operating Diagrams and Summary Table as requested in section 1.3.
- Identification number of wastes according to NOM-052-ECOL-93.
- Code of the hazardous waste according to Table 9 in the General Code Catalogue.
- Annually generated amount, at the generating (process or activity) point, which is being reported.
- Use volume units, such as: lt. (litres), m³ (cubic meters), ft³ (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.
- 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.
- According to Table 8 of the General Code Catalogue.

4.2 HAZARDOUS WASTE STORAGE AT THE FACILITY SITE

Generation point ¹	Waste identification				Storage					
	NOM-052-ECOL-93 ²	Code ³	Form ⁴	Annual amount ⁵	Unit ⁶	Time ⁷ (days)	Storage characteristics ⁸			
							Local	Ventilation	Lighting	

- Number corresponding to the Operating Diagrams and Summary Table as requested in section 1.3.
- Waste identification number according to NOM-052-ECOL-93.
- Code of the hazardous waste according to Table 9 of the General Code Catalogue.
- According to Table 2 of the General Code Catalogue.
- 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.
- Use volume units, such as: lt. (litres), m³ (cubic meters), ft³ (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.
- Maximum storage time of the waste, indicated in days.
- According to Table 3 of the General Code Catalogue.

4.3 HAZARDOUS WASTE TRANSFER¹

Generation point ²	Waste identification		Handling company ⁵	Total annually transferred	
	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), m³ (cubic meters), ft³ (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	
		Amount ⁴	Unit ⁵
NOM-052-ECOL-93 ¹			

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), m³ (cubic meters), ft³ (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.

5.15.1 USE OF LISTED POLLUTANTS

5.15.1.1 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 wastewaters¹

Identification of listed substance Name ²	Code ²	Generator identification ³	Annual received amount	
			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		Release point ³	Annual discharge ²	
Name ¹	Code ¹		Amount ⁴	Unit ⁵

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		Release point ²	Annual discharge ²	
Name ¹	Code ¹		Amount ³	Unit ⁴

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 Tables 6, 7 and 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			
		Amount ²	Unit ³	Amount ²	Unit ³	Amount ²	Unit ³	Amount ²	Unit ³

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 m³ 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		
				Method's code(s) ⁴	Estimated efficiency (%) ⁵	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 Tables 6, 7 and 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).