TAKING STOCK 1998

North American Pollutant Releases and Transfers

SOURCEBOOK

COMMISSION FOR ENVIRONMENTAL COOPERATION

2001

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 this "locked" data set for annual summary reports. Each year, both countries issue revised databases that cover all reporting years.

The CEC follows a similar process. For the purposes of this report, the TRI data set of May 2000 and the NPRI data set of June 2000 were used. The CEC is aware that changes have occurred to both data sets for the reporting year 1998 since this time that are not reflected in this report. These changes will be reflected in the next report, which will summarize the 1999 data and make year-to-year comparisons with previous years' data.

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For more information about this or other publications from the CEC, contact:

COMMISSION FOR ENVIRONMENTAL COOPERATION

393, rue St-Jacques Ouest, bureau 200

Montréal (Québec) Canada H2Y 1N9

Tel: (514) 350-4300 • Fax: (514) 350-4314

http://www.cec.org

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TAKING STOCK

Preface

An important first step toward reducing toxic pollutants in our environment is to know where such substances are coming from, in what amounts, and in what forms. It is well known that toxic chemicals and other pollutants are transported across borders by wind and water and as shipments for recycling or disposal, sometimes to points far from the original source. Because of this and our shared ecosystems, people in North America have a need not only for local and national data but also for comparable international data that will provide all of us—governments, industry NGOs, and communities—with an informed basis for individual and collective action.

For the past five years, CEC has been tracking the sources and handling of industrial pollutants and making this information more accessible to the public through our annual *Taking Stock* reports. Our analyses draw upon data collected by the national governments under reporting systems referred to internationally as 'pollutant release and transfer registers' (PRTRs). Based on data reported each year by industrial facilities, PRTRs provide publicly accessible information on the amounts of certain toxic chemicals released to the air, water and land, as well as amounts sent to other locations for further management.

North America is fortunate to have publicly available data from the US Toxics Release Inventory (TRI) and the Canadian National Pollutant Release Inventory (NPRI), two of the world's most well-established PRTRs. As data become available from the evolving *Registro de Emisiones y Transferencia de Contaminantes* (RETC) in Mexico, we will be able to take a truly continental perspective on toxic substances of common concern.

This year's report provides the North American public with valuable new information, as a result of important developments in the national programs for the 1998 reporting year. Due to a recent expansion of TRI reporting, we now have comparable Canadian and US data for a handful of additional industries, including two important sectors: electric utilities and the hazardous waste management industry. The impact of this change is significant. The electric utility and hazardous waste sectors alone account for approximately one-quarter—more than 800 million kilograms—of the total reported amounts in the matched North American data set.

For the first time, *Taking Stock* also includes information on the amounts of chemicals that facilities sent for recycling, due to an improvement in the NPRI program. With recycling data now available for Canada and the United States, we are able to obtain a better picture of how chemicals from industrial activities are being managed in North America. In 1998, facilities in the matched data set sent almost one million tonnes, or roughly one-third of total reported amounts, for recycling.

These improvements in the national programs have led to greater comparability among the data collected under PRTRs in North America, and thus are bringing our common picture into sharper focus. The collaboration that is facilitated through the CEC PRTR project—the ongoing dialogue among the national PRTR programs and the active involvement of other interested stakeholders—creates a favorable climate for identifying additional opportunities to further sharpen that picture through increased comparability among our national systems.

North America is plowing new ground in the use of PRTR data on a continental scale. As a growing number of countries and regions around the world look to PRTRs as valuable tools, aiding environmental management and the public's right-to-know, we in North America will have much to share in the way of experience and practical expertise, both individually as nations and collectively as a region.

CEC is grateful for the interest and involvement of stakeholders throughout North America in the continued evolution of the *Taking Stock* series. As a result of suggestions they have made, this latest report features a new format, with chapters on releases on- and off-site, transfers to recycling and other transfers for further management, and total reported amounts of releases and transfers. Trends in pollutant releases and transfers from 1995–1998 are presented, as well as a special analysis of pollution prevention activity reporting.

We have also introduced a new two-volume format for the report. Complementary to the shorter "Summary" document, this *Taking Stock 1998* "Sourcebook" provides a more in-depth look at the data. This year we are also launching the *Taking Stock* web site, which allows you, the user, to create your own queries and analyses of the matched set of data on industrial pollutants. We look forward to your feedback on these new developments, and welcome your suggestions on ways in which *Taking Stock* can keep pace with your evolving 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, INE and the US EPA contributed vital information and assistance throughout the report's development. This past year we have worked with the following officials from these agencies: Canada— Alain Chung, François Lavallée and Steve McCauley; Mexico—Juan Barrera Cordero, Hilda Martínez Salgado and Luis Sánchez Cataño; and the United States—Maria Doa and John Harman.

Special thanks and recognition go to the team of consultants who worked tirelessly to put this report together: Catherine Miller, John Howay and John Young of Hampshire Research Associates (United States); Sarah Rang of Environmental Economics International (Canada); Isabel Kreiner of TÜV Latinoamerica and Rafael Ramos, formerly with Dames and Moore de México (Mexico).

A number of CEC Secretariat staff have been involved in the development and launching of this report. Erica Phipps, program manager for the CEC's PRTR project, oversaw the development of the report and coordinated the public consultations. The CEC's publications staff—Jeffrey Stoub, Douglas Kirk, Raymonde Lanthier and Miguel López—have handled the tremendous task of coordinating the editing, translation and publication of the document in the three languages.

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
CEPA	Canadian Environmental Protection Act
CMAP	*Clasificación Mexicana de Actividades y Productos* (Mexican Activities and Products Classification)
COA	*Cédula de Operación Anual* (Annual Certificate of Operation)
DOF	Mexican *Diario Oficial de la Federación* (Official Gazette of the Federation)
EPA	US Environmental Protection Agency
EPCRA	US Emergency Planning and Community Right-to-Know Act
HFC	Hydrofluorocarbon
HPV	High production volume
IARC	International Agency for Research on Cancer
IFCS	Intergovernmental Forum on Chemical Safety
INE	*Instituto Nacional de Ecología* (Mexican National Institute of Ecology)
INEGI	*Instituto Nacional de Estadística Geografía e Informática* (Mexican National Institute of Statistics, Geography and Informatics)
kg	Kilograms
MSDS	Material Safety Data Sheet
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
NAPRI	North American Pollutant Release Inventory
NOM	*Norma Oficial Mexicana* (Mexican Official Standard)
NO_x	Nitrogen oxides
NMX	*Norma Mexicana* (Mexican Standard)

NPRI	National Pollutant Release Inventory (PRTR for Canada)
NTP	US National Toxicological Program
OECD	Organization for Economic Cooperation and Development
OSHA	US Occupational Safety and Health Administration
PAH	Polycyclic aromatic hydrocarbons
PBT	Persistent bioaccumulative toxicant
POTWs	US publicly owned treatment works
PRTR	Pollutant release and transfer register
RETC	*Registro de Emisiones y Transferencia de Contaminantes* (PRTR for Mexico)
Semarnap	*Secretaría de Medio Ambiente, Recursos Naturales y Pesca* (Mexican Secretariat of the Environment, Natural Resources and Fisheries). Name changed in 2000 to Semarnat; see following entry.
Semarnat	*Secretaría de Medio Ambiente y Recursos Naturales* (Mexican Secretariat of the Environment and Natural Resources)
SIC	Standard Industrial Classification
TRI	Toxics Release Inventory (PRTR for US)
TCE	Trichloroethylene
TRIC	Trichloroethylene
US	United States
VOC	Volatile organic compound

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

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.

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 goups of activities or operations (and, therefore, the codes) differ from country to country. The North America Industrial Classification System (NAICS) has been established and is in the process of being adopted by the United States, Canada and Mexico.

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

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

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

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

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

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

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

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- **Chapter 5** presents data on **total releases and transfers**. These data show the total amount of chemicals that were reported for 1998, based on the matched North American data set. The data include amounts released on- or off-site, or transferred for recycling or for further management.
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1.1 Introduction

North Americans are concerned about the effect of chemicals on their health and the environment. Pollutant release and transfer registers (PRTRs) 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; they are a cornerstone in the effort to provide information to the public on the sources and handling of pollutants. Data on releases and transfers of chemicals are submitted by individual facilities. These data are then fed into a national, publicly available database. Many companies, as well as governments and communities, have used PRTR information as a basis for action to prevent and reduce chemical releases and transfers.

This report is the fifth in the annual *Taking Stock* series prepared by the Commission for Environmental Cooperation (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, including data on transfers to recycling and from new industry sectors: electric utilities, hazardous waste treatment and solvent recovery facilities, chemical wholesalers and coal mining. These data have been added to the national databases for 1998 and, therefore, can be included in the North American perspective of *Taking Stock*.

Through publication of its annual *Taking Stock* report, the CEC aims to:

- provide an overview of North American pollutant releases and transfers, thereby enabling citizens to better understand the sources and handling of industrial pollution;
- provide information to help national, state and provincial governments, as well as industry and communities, identify priorities for pollution reduction;
- invite reductions in North American pollutant releases and transfers through information comparison;
- facilitate a more informed dialogue among citizens, industry and government, and foster collaborative actions to achieve 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. In response to stakeholder suggestions, *Taking Stock 1998* has a new look. The presentation of the data has also been revised to include the following major groupings: total releases on- and off-site, transfers to recycling, and other transfers for further waste management (energy recovery, treatment and sewage) and total releases and transfers. In addition, there are two volumes to this report. Volume I summarizes the 1998 data and the 1995–1998 trends and Volume II contains the detailed analyses of the same data.

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. This includes 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 databasees 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 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. Such systems feature:

- reporting on individual substances,
- reporting by individual facilities,
- coverage of 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,

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:

- Disseminating 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 a public meeting of the Consultative Group, during which stakeholders have the opportunity to discuss the options for the upcoming report and to provide input on other relevant aspects of the North American PRTR Project.
- Receiving written comments from members of the Consultative Group and other interested individuals and organizations.
- Preparing and disseminating a "Response to Comments" based on the written and verbal comments received and explaining how the CEC plans to incorporate the comments into the report.

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

Erica Phipps
Program Manager
Commission for Environmental Cooperation
393, rue St-Jacques ouest, Bureau 200
Montréal (Québec) Canada H2Y 1N9
E-mail: ephipps@ccemtl.org

- standardized reporting using computerized data management,
- limited data confidentiality and indicating what is being held confidential,
- comprehensive scope, and
- a 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 those from another or to 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, including confidentiality or trade secrecy claims, should be limited. In cases where information is held as confidential, users of the PRTR must know what types of data are being held back from disclosure (for instance, if a facility substituted a generic name for a substance in order to conceal the identity of the specific chemical).

PRTRs Globally

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

- Chapter 19 of Agenda 21, adopted by some 150 heads of state and government during the 1992 United Nations Conference on Environment and Development (the "Earth Summit"), calls for the establishment of pollutant emission registers and promotes the principle of right-to-know;
- The OECD, through a 1996 Council Recommendation, has called on member countries to take steps to establish, implement and make publicly available a PRTR system and published a Guidance Manual for Governments which addressed the key factors countries should consider when developing a PRTR. 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 are developing them. OECD has undertaken a project to identify and review techniques currently in use or under development and make them widely available <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 da Bahia, Brazil, in October 2000. The meeting encouraged countries without PRTR systems to take steps to initiate a process to design national PRTRs that involve all affected and interested parties in the design, that take into account national circumstances and needs, and to link reporting requirements of international agreements to the national PRTRs <www.who.int/ifcs/forum3/index.html>.
- The Aarhus PRTR Task Force was created by the Aarhus Convention as part of the Economic Commission for Europe to promote the integration of national PRTRs, cleaner production activities and improvement of the "right-to-know" process. The Convention requires signatory parties to take steps to establish pollution inventories or registers. The task force is developing a discussion paper on the important options and issues concerning the development and promotion of PRTRs under the Convention <www.ecn.cz/PRTR-TF>.

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CEC's PRTR Support

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

At the Second 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 that 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 landmass 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.

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.

Only the data from Canada and the US, however, 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 this section is currently voluntary and, thus, the data currently yielded by the program 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. Therefore, 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 1998,* 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.

1.2.1 The US TRI

The 1998 reporting year is the twelfth year of 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 the manufacturing sectors, and required information on on-site releases and off-site transfers to disposal and 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. Also collected was 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, the most significant of which came with the addition of 286 chemicals and chemical categories for the 1995 reporting year.

Section 313 of EPCRA, the law that created the TRI, identified the manufacturing sector as the original set of industries required to submit TRI reports. Beginning with the 1994 reporting year, federal facilities were also required to report. 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. These 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* this year for the first time.

The United States also began correcting for a common reporting error for metals and metal compounds in their 1997 summary report. Facilities frequently reported transfers of these chemicals to other sites for treatment. Because metals are not destroyed by treatment processes, EPA has added two new transfer categories: 1) solidification/stabilization of metals and metal compounds and 2) wastewater treatment of metals and metal compounds. These are assigned to the category "transfers to disposal," described by EPA as off-site releases. EPA also includes transfers of metals to sewage in this category.

Present changes underway for TRI include a focus on chemicals that are persistent, bioaccumulative and toxic (PBTs). EPA issued a rule on 29 October 1999, that 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.

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, 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, the threshold is 100 pounds (45 kg) per year. (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 rule can be found on the Internet at <www.epa.gov/tri/pbtrule.htm>. This rule becomes effective with the 2000 reporting year.

Also within the PBT issue, EPA has proposed changing the reporting threshold for lead and lead compounds to 10 pounds (4.5 kg). It would also add tetraethyl lead as a listed TRI chemical at the lower reporting thresholds.

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.

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.

TRI also will benefit from a related program on chemicals testing. EPA is currently 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 co-operative action program among member countries (including Canada, the US and Mexico) <www.oecd.org/ehs/hpv.htm>.

The US EPA has also tried to make the TRI data available in a variety of formats. New with the 1998 data is an Internet tool called TRI Explorer, which EPA created to provide access to TRI data that are both easy to understand and flexible to use. TRI Explorer generates, online or for downloading, reports for facilities, chemicals, geographic areas, or industry sector at the county, state or national level. It can be accessed at <www.epa.gov/triexplorer/>.

1.2.2 Canada's NPRI

The 1998 data are the sixth set reported to NPRI. The NPRI was established with the help of a multi-stakeholder advisory committee that 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 are now mandatory, beginning with the 1998 reporting year. Facilities must report on the actual quantities of materials transferred off-site for recycling, the nature of recycling activities, and the name and address of the receiving facility. Transfers to recycling and energy recovery can now be included in this *Taking Stock* report for the first time.

Starting with the 1997 reporting year, Environment Canada also 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. Also, beginning with the 1997 reporting year, facilities are asked to provide voluntarily a production ratio or activity index for each substance. Such an index can assist in explaining year-to-year fluctuations in releases and transfers.

In 1998, Environment Canada created a multi-stakeholder group, the Ad Hoc Work Group on Substances to develop recommendations in three areas: additions and deletions for the 1999 reporting year, alternate reporting thresholds and future process for additions and deletions.

No additional substances were added to the NPRI list in 1998. However, as a result of the recommendations from the multi-stakeholder group, 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 a total of 246 substances including 20 substances 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. Acetone was removed from reporting for 2000, following a review by Environment Canada and similar deletion from TRI in 1995. 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. 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 five kg per year for manufacture, process or otherwise use. Employee thresholds were eliminated for certain sources, such as incinerators and wood preservation. This brings the total number of substances to 268 for the 2000 reporting year.

These changes to the NPRI program result from Environment Canada's ongoing consultations with industry, environmental groups and other federal and provincial governments. Current consultations focus on the permanent process for additions and deletions to the NPRI list. 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/npri_consult_e.cfm>.

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 National Institute of Ecology (*Instituto Nacional de Ecología*—INE) 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 of a list of 120 substances and is most comparable to the PRTR data from Canada and the US.

Section V is optional until the legal framework for its implementation is published as a Mexican Official Standard (*Norma Oficial Mexicana*—NOM). This is the section of the form that would contain data comparable to NPRI and TRI reporting and the basis of the RETC. It gives the individual substances and the amounts of those substances for the individual media, including on-site releases and off-site transfers to treatment and disposal. A new list of chemicals has been developed, along with reporting thresholds based on use for each group of chemicals (see **Appendix A**). The new list will be applicable for the reporting year 2000.

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.

Under the current legislation, only Sections I and II of the COA, which deal with the facilities' general information and air emissions of certain pollutants, respectively, are mandatory according to the agreement published in the Federal Official Publication (*Diario Oficial de la Federación*—DOF) on 9 April 1998. The air pollution section (Section II) covers those pollutants for which there are emission standards. These pollutants generally arise from combustion. They are of concern in such environmental problems as urban air pollution, including visibility and health effects of smog, climate change and acidification. For 1998, the COA required reporting on air emissions of sulfur dioxide, nitrogen dioxide, particulates and volatile organic compounds. Reporting on the other air criteria contaminants (unburned hydrocarbons, carbon monoxide and carbon dioxide) is voluntary until the Official Mexican Norms are issued.

Section III of the COA, "Water Usage and Wastewater Discharge," is optional. These data cover volumes of wastewater and concentrations of heavy metals rather than specific amounts of substances that are in the wastewater. Section IV, "Hazardous Waste Generation, Treatment and Transfer," is also optional but, when submitted, the facility is exempted from having to submit the corresponding hazardous waste manifests to the INE during the same period of the COA. The reports cover volumes of hazardous waste that contain hazardous substances, but do not detail the amounts of substances contained in the waste.

The latest COA form is available for downloading from the Internet at <www.ine.gob.mx/dggia/retc/coa/formato.html>. (Also see **Appendix H**.)

The first COA reporting cycle, with data collected for the year 1997, took place in 1998. The first National Pollutant Releases and Transfers Report describing the RETC process and objectives was issued in December 1999. This report is a summary of the status of the implementation of environmental policy tools for pollution control and prevention currently available and of the issues facing Mexico in its path to continued development of environmental policy.

While the first National Pollutant Release and Transfers Report did not contain data reported on the COA, it did present a summary of monitoring data on criteria air pollutants, average daily wastewater discharge volumes (both municipal and non-municipal), hazardous waste generation volumes from industrial facilities, and estimates of greenhouse gases from fuel consumption, industrial processes, agriculture and other sources. These summaries presented data from various recent time periods, as collected under different governmental programs, for the Mexican states and for industry categories. It can be found on the Internet at: <www.ine.gob.mx/dggia/retc/publicacion/informes/informe1/infor1.html>.

The last day of April 1999 was the deadline for industrial facilities to submit the second COA, covering the year 1998. The COA form for this second reporting cycle underwent minor changes, as a result of review of the COA forms from the previous year. There is more detail requested in Sections I and II, which includes annual air emissions estimations for criteria air pollutants; and Section III, which includes reporting of heavy metals in wastewater discharges. Other sections basically remained the same. (Also see **Appendix H**.)

The CEC launches new initiative on Criteria Air Pollutants

Responding to a suggestion from the PRTR Consultative Group and input received from the governments and scientific communities, the CEC has begun a project to compile existing information on criteria air pollutants in the three countries. The CEC will work with each of the countries, as well as with state/provincial and local agencies, to develop annual reports of criteria pollutant emissions information. Currently, Mexico collects criteria emissions data on four pollutants in Section II of its COA form. Reporting on three other air criteria pollutants is still voluntary. Canada is looking into including criteria air pollutants in its NPRI system in the future. The US collects these data under a separate program.

A goal of this CEC initiative is to foster further cooperation among the three countries in presenting emissions data already collected within each country in a comparable and consistent manner. The initiative will also promote public dissemination and understanding of criteria air pollutant emissions in North America and will be invaluable in assessing emission trends on a continental basis, resulting from the air quality programs in each country. For more information on this initiative, contact Paul Miller, CEC Air Quality Program Manager, at (514) 350-4326, <pmiller@ccemtl.org>.

The number of facilities submitting COA forms for the 1998 reporting year was 2,677, but less than 60 percent of the forms (1,529) were integrated into the database. The other forms were not because some were from facilities under state jurisdiction, others had no official environmental number (unregistered facilities) or contained erroneous or no information. Just three percent of the facilities in the database provided data on releases for the optional Section V (RETC) part of the form.

Nonetheless, this is an increase in the number of COA forms. For the 1997 reporting year, a total of 1,893 facilities submitted COA forms. About 60 percent of the documents (1,129 submissions) were considered complete COAs (that is, Section I and II data submitted)

Reporting under Mexican Annual Certificate of Operation (*Cédula de Operación Anual*—COA), 1998

Section of COA	Number of Facilities Reporting	Amount in tonnes
Section 1 General Facility Information	1,239	
Section 2 Atmospheric Pollution	805	
2.3.1 Sulfur dioxide	323	2,940,282
2.3.2 Nitrogen oxide	362	1,828,694
2.3.3 Particulates	573	959,272
2.3.7 Volatile organic compounds	149	15,030
2.3.4 Unburned hydrocarbons	123	Voluntary*
2.3.5 Carbon dioxide	223	Voluntary*
2.3.6 Carbon monoxide	317	Voluntary*
Section 3 Water Use and Discharge of Wastewaters	360	Voluntary*
Section 4 Hazardous Waste Generation, Treatment and Transfer	518	Voluntary*
Section 5 Annual Release and Transfer of Listed Pollutants		
5.2 Listed Pollutant Releases	48	Voluntary*
5.3 Listed Pollutant Transfers	20	Voluntary*

Note: Sections 5.2 and 5.3 are the sections of the COA that contain data similar to TRI and NPRI.
* Some data were reported in these sections. However the information was not considered to be representative, since it was reported on a voluntary basis.

To increase and improve the level of reporting, INE has issued guidance manuals for individual industrial sectors. The purpose of the manuals is to identify the facility's sources of pollution, identify chemicals used, processed or generated, and estimate the corresponding emissions. The manuals for individual industrial sectors can be downloaded at <www.ine.gob.mx/dggia/retc/coa/guias.html>.

In addition, INE and the Mexican Secretariat of the Environment and Natural Resources *(Secretaría de Medio Ambiente y Recursos Naturales*—Semarnat), in collaboration with Mexican industrial groups, academic institutions and professional associations, are organizing and conducting training courses and seminars at the national level on how to fill in the COA. An interactive computer program to assist in filling in data on the COA form is under development.

The final implementation of the RETC will depend upon making all of the COA sections mandatory. As a first step, in the first half of 2000, INE coordinated meetings with representatives of industrial associations, governmental organizations, academic and research institutions and stakeholders in general to reach an agreement for the issuance of a standard for the report on pollutant emissions and transfers. The agreement took the form of a Mexican Standard (*Norma Mexicana*—NMX), which establishes: (1) the applicability of the RETC report to stationary industrial facilities, (2) a list of substances to report and its reporting thresholds, (3) the reporting format (COA) and (4) the rationale for selection of the substances. The final list of substances comprises 104 chemicals grouped by category (see **Appendix A** for the list of substances). There is a reporting threshold (kg/yr) defined for each substance. The list of substances can be modified periodically to accommodate new substances or thresholds or the removal of substances from the list.

Under the NMX, public dissemination of the PRTR data will conform to the Law of Statistical Information and Geography (*Ley de Información Estadística y Geográfica)*. The data will be aggregated by municipality and state and will include the industrial sector, name of chemicals and amount of annual releases and transfers. Written authorization from the responsible party to Semarnat will be required for the information to be published by individual source.

Unlike the NOMs (Mexican Official Standards), which are mandatory, Mexican Standards (NMXs) are voluntary. However, the NMX is a step toward the final implementation of the RETC.

1.3 North American PRTR Contacts

PRTR data and summaries are available free of charge. The following boxes give contact telephone numbers and Internet sites for obtaining PRTR information in the three countries.

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_home_e.cfm>
NPRI data on the Internet, in French: <www.ec.gc.ca/pdb/npri/npri_home_f.cfm >
e-mail: npri@ec.gc.ca

Pollution Watch Scorecard <www.pollutionwatch.org>: an information service provided by the Canadian Institute for Environmental Law and Policy, the Canadian Environmental Law Association, and the Canadian Environmental Defence Fund and Environmental Defense.

Additional Information on Mexican RETC

Instituto Nacional de Ecología
Dirección de Gestión Ambiental
Av. Revolución 1425 – 9
Col. Tlacopac, San Angel
01040 Mexico, D.F.
Tel: (525) 624–3470
Fax: (525) 624–3584

Hilda Martínez Salgado <hsalgado@ine.gob.mx>
INE's web site for the RETC on the Internet, in Spanish:
<www.ine.gob.mx/dggia/retc/index.html>
RETC documents on the Internet, in English:
<www.ine.gob.mx/dggia/retc/ingles/ingles.html>

Semarnat on the Internet: <www.semarnat.gob.mx/index.shtml>

Public Access to US Toxics Release Inventory Data and Information

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

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) 234-8494 for information
National Library of Medicine's Toxnet (Toxicology Data Network) computer system: <toxnet.nlm.nih.gov/>

Environmental Defense Scorecard home page: <www.scorecard.org>

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Key Findings

- *Taking Stock* compiles comparable PRTR data from the US and Canadian 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. Approximately 65 percent of NPRI total reported amounts and 60 percent of TRI amounts are comparable and in the *Taking Stock* matched data set for 1998.
- The North American matched data set has grown for the 1998 reporting year with the addition of a number of new industrial sectors reporting to the US TRI and with the change to mandatory reporting of transfers to recycling and energy recovery under the Canadian NPRI.
- Also, for *Taking Stock 1998*, there is a new categorization of the data used: releases include both on- and off-site releases, and transfers for further management include transfers to recycling and other transfers for further management (to energy recovery, treatment and sewage).
- Data for previous years (1995 to 1997) are also included in this report. In order to compare these data with data for 1998, the data exclude the reporting by new TRI industries and transfers to recycling and energy recovery. Thus, there are two different 1998 matched data sets in this report identified as (1) 1995 matched chemicals and industries and (2) 1998 matched chemicals and industries.
- PRTR data are limited in what information they can provide. For example, information is not included on releases from other sources such as smaller sources (e.g., dry-cleaning establishments and service stations), from agricultural operations and transportation. Neither do they provide information on all chemicals of concern.
- An important point to remember in interpreting the analyses in this report is that PRTR data are not a measure of risk to humans or ecological populations from the releases and transfers of these chemicals. Additional data on exposure levels and the toxicological or hazardous nature of the chemicals are needed to begin to assess the potential impacts on human health and the environment of the releases and transfers.

2.1 Introduction

This chapter offers guidance on using the North American data, with specific references to the data from Canada and the United States. *Taking Stock 1998* summarizes PRTR data from reports that industrial facilities filed for the 1998 reporting year, the most recently available public data available at the time this report was written.

This chapter contains sections on:

- Understanding PRTR data (what types of data are in PRTRs, including a description of the new categorization of data used for the first time in *Taking Stock 1998*)
- Putting PRTR data to work (how can PRTR data be used, limitations of PRTR data)
- Putting PRTR data in context (what other types of data help broaden the perspective of PRTR data and where to find them)
- Creating the *Taking Stock 1998* matched data sets (there are two matched data sets, one for 1998 with the new industries and new transfer types and one for 1995–1998 comparisons that exclude the new industries and new transfer types in 1998).

2.2 Understanding PRTR Data

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

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

Major Data Elements	US Toxics Release Inventory (TRI)	Canadian National Pollutant Release Inventory (NPRI)	Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC)
Identification			
Type of facilities reporting	Manufacturing and federal facilities. Electric utilities, mining, hazardous waste treatment, solvent recovery, chemical wholesalers, petroleum bulk terminals, beginning in 1998.	Any facility manufacturing or using a listed chemical, except research, repair and retail sales. Agriculture, mining, well drilling also exempt, except if processing or otherwise using the substance.	All facilities under federal jurisdiction.
Industry classification	All US SIC codes applicable to facility operations.	One primary SIC code per facility. Facility reports both Canadian and US SIC code.	One CMAP code per facility.
List of chemicals	Chemicals manufactured or processed or used in manufacturing (606 substances and 28 chemical categories).	Chemicals used or manufactured in sufficient quantities (176 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 use10 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 *Registro de Emisiones y Transferencia de Contaminantes* (RETC)
On-site Releases (*continued*)			
On-site land releases	Amount to hazardous waste landfills, other on-site landfills, land treatment/application, surface Impoundments reported separately. Spills and leaks included. (Reporting of categories for landfills—hazardous waste and all other—began with 1996 reporting year.)	Amount to landfills, land treatment/application, spills, leaks, other reported separately.	Amount to land, includes wastewater infiltration and injection. Not mandatory.
Underground injection	Amount to on-site Class I wells and all other wells. Amount from spills included. (Amount to Class I wells reported separately from amount to all other wells began with 1996 reporting year.)	Amount to on-site wells. Amount from spills included.	Underground injection not practiced in Mexico.
Accidental spills	Included in release and transfer amounts. In different section of form reported as one amount.	Reported separately under air, water and on-site land releases. Included in underground injection and transfer amounts.	Reported as total amount. Not mandatory.
Off-site Transfers			
Transfers to municipal sewage	Total amount reported. List name/address of each municipal sewage treatment plant.	Total amount reported to each sewage treatment plant. List name/address of each municipal sewage treatment plant. (Reporting of separate amounts to each sewage plant began with 1996 reporting year.)	Reported as total amount. Not mandatory.
Transfers to treatment/disposal	Amount reported by method of treatment/disposal; amount reported for each transfer location with name/address.	Amount reported by method of treatment/disposal; amount reported for each transfer location with name/address. (Reporting of separate amounts to each transfer location began with 1996 reporting year.)	Amount reported by method of treatment/disposal; amount reported for each transfer location with name/address. Not mandatory.
Transfers to recycling/energy recovery	Amount reported by method of recycling/energy recovery; amount reported for each transfer location with name/address.	Amount reported by method of recycling/energy recovery; amount reported for each transfer location with name/address. Mandatory reporting began with 1998 reporting year.	Not 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.

2.2.1 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 will also have to report to TRI. Mexico requires any facility under federal jurisdiction to report. 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.

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.

The United States, Canada and Mexico are working together to develop a common North American Industry Classification System (NAICS) that, if used, will allow more far-reaching comparisons in the future. In reporting year 1998, NPRI facilities will begin reporting their NAICS codes, along with the Canadian and US SIC codes. TRI is expected to implement the NAICS sometime after the reporting year 2000. The Mexican RETC will use the NAICS code starting with the reporting year 2000. Information on NAICS is available from Statistics Canada on the Internet at <www.statcan.ca/english/Subjects/Standard/index.htm> and from the US government at <www.ntis.gov/product/naics.htm>.

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 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, 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 16 million chemical substances and identifies more than 210,000 of them as regulated or covered by chemical inventories worldwide <www.cas.org/cgi-bin/regreport.pl>. Of this immense universe, NPRI covers over 170 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 mandatory portion of the Mexican COA (Section II). These are sulfur oxides, nitrogen oxides, particulates, unburned hydrocarbons, carbon monoxide, carbon dioxide and volatile organic compounds, none of which is on the NPRI or TRI lists. There are 104 chemicals in the list for the voluntary Section V of the Mexican COA, which is the section of the COA that corresponds to the TRI and NPRI PRTR reporting. As explained below in **Section 2.5**, NPRI and TRI listed 165 substances in common in 1998. 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 (e.g., as a reagent or catalyst), or otherwise using a listed substance (e.g., 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 (the voluntary Section V of the COA list of 104 chemicals) has varying thresholds by type of substance. The mandatory portion 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- 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), it files a short certification statement that identifies the chemical but does not supply any quantitative information.

2.2.5 Reporting Forms

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

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."

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

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

2.2.7 Confidentiality Claims/Trade Secrecy

The purpose of the Canadian and US databases is to provide the public with data about chemicals in the environment, 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 11 TRI forms out of 87,328 submitted for 1998 contained such claims. The trade secrecy claims constitute 30 pounds (14 kg) of releases and no 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, four facilities and 38 forms out of the national total of 7,596 forms were given confidential status for the 1998 NPRI reporting year. This represented 3,624 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 cleanup activities to remedy earlier releases, or from other one-time events. This section gives general descriptions of the types of releases and transfers. Both the NPRI and TRI databases contain much

greater detail than is presented in these descriptions or in summary tables throughout *Taking Stock*.

Reporting instructions for NPRI and TRI give detailed information on the releases and transfers that facilities must report, and both systems supply guidance to specific industries in published manuals and/or training sessions. Reporting instructions are available on the NPRI and TRI web sites, respectively, at <www.ec.gc.ca/pdb/npri/npri_rep_e.cfm> for 1998 NPRI instructions and <www.epa.gov/tri/tri98/pdr/index.htm> for 1998 TRI instructions.

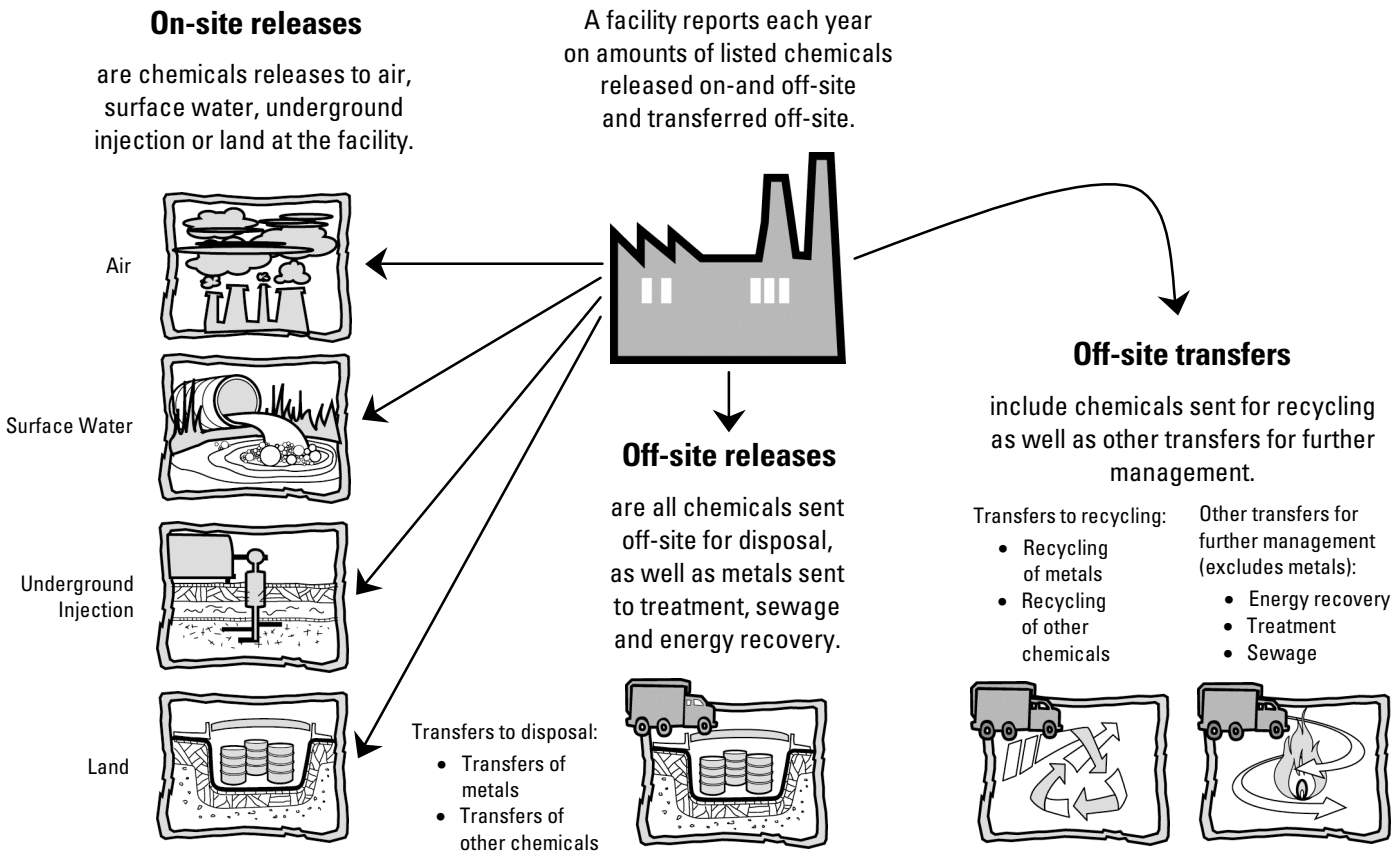
Updated Format for Presentation of *Taking Stock* Data

Taking Stock 1998 presents the PRTR data in a new format. Previous editions of *Taking Stock* divided the data into information about on-site releases and off-site transfers. With the addition of reporting on off-site transfers to recycling and energy recovery, a new organization of the data has been developed. In *Taking Stock 1998*, the data have been reorganized into:

- releases on- and off-site, and
- transfers for further management, including
  - transfers to recycling, and
  - other management activities (transfers to energy recovery, treatment and sewage/POTWs).

The new category of off-site releases includes off-site transfers to disposal and all transfers of metals, except for recycling, since these types of transfers include off-site disposal in landfills or underground injection similar to on-site releases to land and underground injection. Transfers for further waste management do not necessarily result in direct off-site releases; they may be recycled or treated and only a portion subsequently released. Therefore, these off-site transfers have been included in a separate category.

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



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 has been optional in NPRI until the 1998 reporting year. Transfer to recycling and energy recovery are included in this *Taking Stock* report for the first time.

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

It should be noted that PRTRs do not measure all environmental releases toccurring 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 will be aggregated by municipality and state in an annual report.

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.

2.3.2 Using PRTR Data Alone

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 1998 reporting year in NPRI and the 1991 reporting year in TRI), specific reductions in releases and transfers cannot be linked directly to any such activity reported in the PRTR data. TRI facilities also report a production index, showing how much production levels have increased or declined since the previous year; reporting a production index to NPRI is voluntary. Again, specific reductions cannot be linked to this index, since it reflects changes due to all factors, including, for example, 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 non-product output from production of goods (a byproduct of manufacture) 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 changes 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 specific environmental media at known locations under specific conditions. Prevailing winds, for example, shape the plume emitted from a stack, and the substances in that plume tend to travel a given distance in a given direction. Populations both near and far may potentially be affected. Reportable substances may also be shipped across town or out of the country for reuse/recycling/recovery or for treatment or disposal.

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 air emissions 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/mont_t.shtml> to begin investigating air emissions of those substances reported to NPRI and TRI.

A similar step is required to analyze NPRI or TRI data for carcinogens, endocrine disrupters, 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** through **6** of this report.)
- Endocrine disrupters—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. Fact sheets and other reference materials that supply toxicity data often summarize uses as well, and the Environmental Defense Scorecard also offers such information. Other resources include:

- US National Safety Council's Environment Writer—Chemical Backgrounder Index <www.crossroads.nsc.org/chemicals.cfm>,
- Environmental Chemicals Data and Information Network <ecdin.etomep.net/Ecdin/E_hinfo.html>,
- New Jersey's Right to Know Hazardous Substance Fact Sheets <www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm>, and
- ChemExpo <www.chemexpo.com>.

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

2.4.3 Toxicity and Human Health Effects

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

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

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

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

The NPRI web site <www.ec.gc.ca/pdb/npri/npri_links_e.cfm> directs users to the US Agency for Toxic Substances and Disease Registry for ToxFAQs summaries about hazardous substances <www.atsdr.cdc.gov/toxfaq.html> and 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/>, as well as to 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.crossroads.nsc.org/msds.cfm>.

In its Scorecard <www.scorecard.org>, Environmental Defense has mounted the most ambitious online source of 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 12 categories (cancer, cardiovascular or blood toxicity, developmental toxicity, endocrine toxicity, gastrointestinal or liver toxicity, immunotoxicity, kidney toxicity, musculoskeletal toxicity, neurotoxicity, reproductive toxicity, respiratory toxicity, and skin or sense organ toxicity).

Scorecard also supplies up to 12 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. Environmental Defense has added rankings that compare chemicals for their toxicity and potential for human exposure (labeled Toxic Equivalency Potential). These scores compare each chemical's cancer-causing potential—based on both its cancer-causing toxicity and its exposure potential—to benzene. Non-cancer health risks are similarly compared to toluene. (Three environmental organizations have initiated development of 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.)

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

Beyond PRTR Data: Risk and Exposure Assessment

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

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

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

2.4.4 Geographic Information

Every release originates in a particular place. What happens next depends on landforms, stream flow and air currents—as well as on the physico-chemical properties of the substances of concern. PRTR data can be aggregated by geographic location—postal code, municipality, county or census division, province or state. Data can be mapped. (Environmental Defense's Scorecard <www.scorecard.org> and US EPA's Envirofacts <www.epa.gov/enviro/index_java.html> map TRI data on the Internet. Canada's NPRI

web site <www.ec.gc.ca/pdb/npri> offers 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 does 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 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).

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

Building on this report and in response to a *Taking Stock* Consultative Group suggestion, CEC is initiating a project to compile existing sources of comparable data on criteria air pollutants in the three countries. CEC will work with the three countries to develop annual reports of criteria pollutant emissions information. 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 criteria air pollutant emissions and trends in North America.

2.5 Creating the *Taking Stock 1998* 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 1999. The US EPA released the TRI data to the public in May 2000. Environment Canada released the NPRI data in June 2000. At the same time, updated versions of previous years, PRTR data were also made available. *Taking Stock 1998* uses the updated versions of the databases for analyses that include 1995 through 1997.

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 1998*

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, the US TRI included reporting from several new 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 new 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 1998* includes four of the new TRI industry sectors:

- coal mining,
- electric utilities,
- chemical wholesalers, and
- hazardous waste treatment and solvent recovery facilities.

2.5.2 Chemicals

The matched data set for 1998 includes data on 165 substances. In creating the matched data set, specific differences between the two systems must be taken into account. One such issue is that while certain chemicals may be reportable in both systems, they may be defined differently. For sulfuric acid and hydrochloric acid, for example, the TRI definition has changed so that only aerosol forms are reportable; these are released only to air. All forms of these acids are still reportable to NPRI. For comparing TRI and NPRI data, then, the matched data set includes only air emissions of these two chemicals. The matched data set also excludes any substance on one list but not the other.

In addition, while ammonia and isopropyl alcohol appear on both lists, they are not included in the matched data set because the definition for these substances differs. Total ammonia is reportable to NPRI, while only 10 percent of aqueous forms of ammonia along with all anhydrous forms are reportable to TRI. Only forms of isopropyl alcohol manufactured by the strong acid process are reportable to TRI, while all forms are reportable to NPRI.

TRI facilities report separately for certain chemicals and their compounds, while in NPRI, a chemical and its compounds count as one category. For example, TRI lists both lead and lead compounds, counting them as two separate substances, while NPRI lists the single category, lead and its compounds. All the analyses in *Taking Stock 1998* add the TRI amount reported for the given chemical to the amount reported for its

compounds, to correspond with NPRI practice. The common set of chemicals thus derived numbers 165 substances. (See **Appendix B** for the list of 165 chemicals.)

2.5.3 Two Matched Data Sets: 1998 and 1995–1998

Because of the addition of new industry sectors in TRI and of transfers to recycling and energy recovery made mandatory in NPRI, this year's *Taking Stock* has two "matched" data sets: one for 1998 only and one for comparisons of 1995–1998 data. Briefly, the data for 1998 in the data set for 1995–1998 comparisons do not include the new industry data or transfers to recycling and energy recovery because such data are not available before 1998. The chemicals covered are the same for both matched data sets.

For comparisons across years, the year 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. Beginning with the 1997 data, TRI also adopted 1995 as an additional baseline for tracking progress because more than 250 additional 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 1998*, 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.

2.5.4 Effects of Matching Chemicals and Industries

In 1998, Canadian facilities in all industries reported 436.9 million kg of releases and transfers to NPRI. In the United States, facilities in the manufacturing sectors and the newly added industry sectors reported 5.0 billion kg of releases and transfers. However, not all of these reports match the reporting in the other country.

Table 2–2. All Releases and Transfers Reported to NPRI and TRI, 1998

	NPRI Number	TRI Number
Total Facilities	2,036	23,487
Total Forms	7,596	87,328
Releases On- and Off-site	**kg**	**kg**
On-site Releases	**159,586,739 ***	**3,112,503,837**
Air	107,448,766	931,292,785
Surface Water	16,626,348	104,960,429
Underground Injection	16,599,322	121,232,079
Land	18,724,696	1,955,018,544
Off-site Releases	**58,152,220**	**257,756,902**
Transfers to Disposal (except metals)	14,847,497	35,402,133
Transfers of Metals**	43,304,723	222,354,769
Total Releases	**217,738,959**	**3,370,260,739**
Off-site Transfers for Further Management		
Off-site Transfers to Recycling	**176,455,878 *****	**920,798,904**
Transfers to Recycling of Metals	91,336,389	770,068,885
Transfers to Recycling (except metals)	85,119,489	150,730,019
Other Off-site Transfers for Further Management	**42,725,411**	**683,793,591**
Energy Recovery (except metals)	13,042,673	414,650,011
Treatment (except metals)	20,424,146	147,496,854
Sewage/To POTWs (except metals)	9,258,592	121,646,726
Total Reported Amounts of Releases and Transfers	**436,920,248**	**4,974,853,234**

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

* 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.

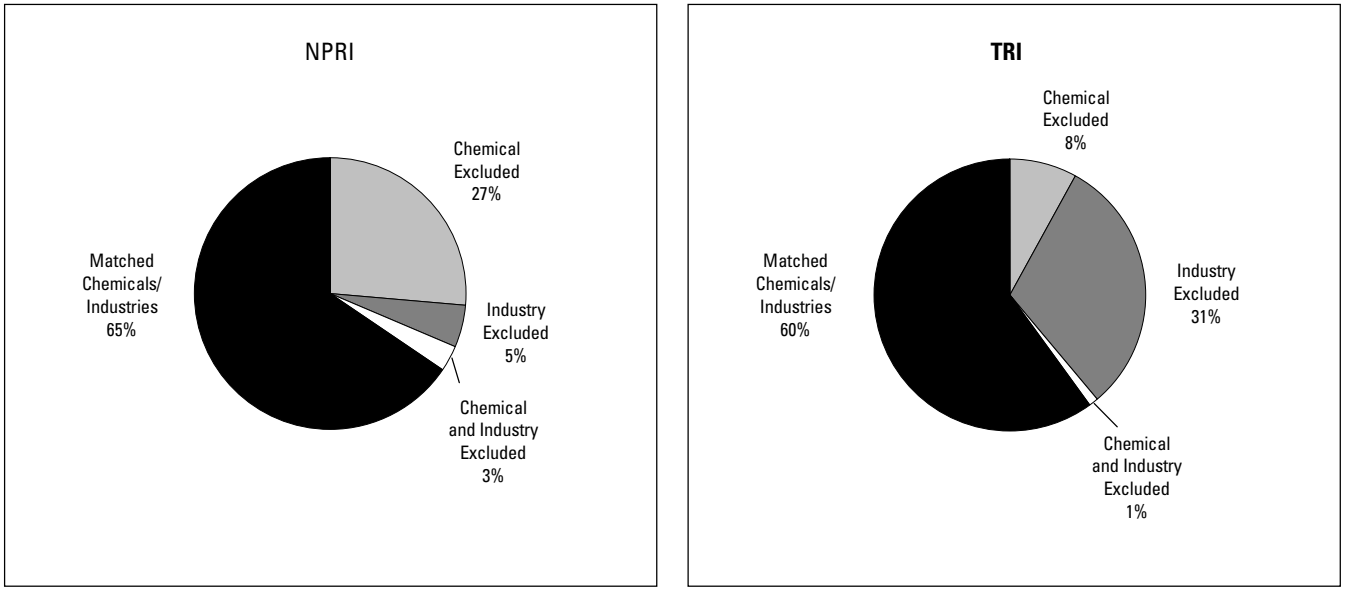
** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

*** One NPRI facility incorrectly reported transfers to recycling of metals in tonnes. Three NPRI facilities incorrectly reported transfers to recycling of metals in pounds. The amounts have been changed to kilograms. These changes have been made in all tables in this report.

Table 2–3. Creating the Matched Data Set for *Taking Stock 1998*: Effects of Matching NPRI and TRI for Chemicals and Industries, 1998

	NPRI				TRI			
	Forms		Total Releases and Transfers		Forms		Total Releases and Transfers	
	Number	%	kg	%	Number	%	kg	%
Total in Individual Database	**7,596**	**100**	**436,920,248**	**100**	**87,328**	**100**	**4,974,856,591**	**100**
Excluded Due to Chemical Only	**1,164**	**15**	**115,542,094**	**27**	**14,684**	**17**	**399,459,164**	**8**
Hydrochloric and sulfuric acid: non-air releases	427	6	73,196,136	17	445	1	8,888,764	0
Isopropyl alcohol	198	3	4,563,566	1	80	0	673,636	0
Ammonia	245	3	30,266,184	7	2,902	3	99,876,850	2
Other chemicals	294	4	7,516,208	2	11,257	13	290,019,913	6
Excluded Due to Industry Only	**1,013**	**13**	**23,783,190**	**5**	**4,347**	**5**	**1,554,844,697**	**31**
Excluded Due to Both Chemical and Industry	**184**	**2**	**12,817,497**	**3**	**737**	**1**	**51,075,866**	**1**
Total for Matched Chemicals/Industries	**5,235**	**69**	**284,777,467**	**65**	**67,560**	**77**	**2,969,476,864**	**60**

Figure 2–2. Percentage of Total Releases and Transfers Included/Excluded When Matching NPRI and TRI for Chemicals and Industries, 1998



In 1998, Canadian facilities in the matched industry sectors reported 115.5 million kg of releases and transfers for substances reportable to NPRI but not covered in TRI—or reportable in both systems but defined differently. These reports were eliminated from the matched data set ("excluded due to chemical only"). Canadian facilities in industry sectors not in the matched data set reported 23.8 million kg of releases and transfers for substances covered in both PRTRs ("excluded due to industry only"). In addition, some reports in the NPRI database fell into both categories ("excluded due to both industry and chemical"), and their 12.8 million kg of total releases and transfers were also excluded.

In TRI, matching for common chemicals eliminated 399.5 million kg of releases and transfers. Matching for industries excluded a much larger amount—1.6 billion kg. The metal mining industry's reporting accounted for the vast majority of this amount. A total of 51.1 million kg was excluded because both the chemical and the industry were not comparable to NPRI.

The 1998 matched data set thus included 65 percent of the matched releases and transfers in the NPRI database and 60 percent of those in the TRI database.

The resulting matched data set for 1998 is shown in **Table 2–4**. These data are presented in **Chapters 3, 4** and **5** 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.

Table 2–4. Summary of Releases and Transfers in North America, NPRI and TRI, 1998

	North America Number	NPRI* Number	TRI Number
Total Facilities	21,974	1,552	20,422
Total Forms	72,795	5,235	67,560
Releases On- and Off-site	**kg**	**kg**	**kg**
On-site Releases	**1,353,877,039**	**98,637,746**	**1,255,239,293**
Air	853,573,800	75,808,346	777,765,454
Surface Water	102,847,170	4,360,769	98,486,401
Underground Injection	86,263,932	3,701,129	82,562,803
Land	311,068,891	14,644,256	296,424,635
Off-site Releases	**283,026,205**	**51,173,125**	**231,853,080**
Transfers to Disposal (except metals)	37,593,132	9,567,199	28,025,933
Transfers of Metals**	245,433,073	41,605,926	203,827,147
Total Releases On- and Off-site	**1,636,903,244**	**149,810,871**	**1,487,092,373**
Off-site Transfers for Further Management			
Off-site Transfers to Recycling	**995,324,253**	**106,793,139**	**888,531,114**
Transfers to Recycling of Metals	854,533,236	89,043,876	765,489,360
Transfers to Recycling (except metals)	140,791,017	17,749,263	123,041,754
Other Off-site Transfers for Further Management	**622,026,834**	**28,173,457**	**593,853,377**
Energy Recovery (except metals)	388,129,038	12,022,819	376,106,219
Treatment (except metals)	126,365,275	10,736,041	115,629,234
Sewage/To POTWs (except metals)	107,532,521	5,414,597	102,117,924
Total Reported Amounts of Releases and Transfers	**3,254,254,331**	**284,777,467**	**2,969,476,864**

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

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

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

Table 2–5. Summary of Releases and Transfers in North America, NPRI and TRI 1995 and 1998

	North America		NPRI*		TRI	
	1995 Number	1998** Number	1995 Number	1998** Number	1995 Number	1998** Number
Total Facilities	21,438	20,681	1,302	1,488	20,136	19,193
Total Forms	65,498	63,611	4,164	4,797	61,334	58,814
	kg	kg	kg	kg	kg	kg
On-site Releases	**934,947,862**	**826,494,317**	**92,671,766**	**76,902,892**	**842,276,096**	**749,591,425**
Air	608,584,820	483,383,531	67,039,370	58,763,865	541,545,450	424,619,666
Surface Water	89,127,113	101,226,287	12,330,846	4,344,065	76,796,267	96,882,222
Underground Injection	88,987,387	76,604,161	3,556,927	3,701,129	85,430,460	72,903,032
Land	148,111,662	165,158,292	9,607,743	9,971,787	138,503,919	155,186,505
Off-site Disposal	**166,232,091**	**225,199,893**	**26,114,137**	**29,221,499**	**140,117,954**	**195,978,394**
Transfers to Disposal (except metals)	22,865,545	23,135,638	4,242,477	2,567,381	18,623,068	20,568,257
Transfers of Metals***	143,366,546	202,064,255	21,871,660	26,654,118	121,494,886	175,410,137
Total Releases On- and Off-site	**1,101,179,953**	**1,051,694,210**	**118,785,903**	**106,124,391**	**982,394,050**	**945,569,819**
Transfers to Treatment (except metals)	88,638,661	99,368,671	7,456,946	8,135,931	81,181,715	91,232,740
Transfers to Sewage/POTWs (except metals)	97,480,049	107,028,733	4,177,909	5,413,397	93,302,140	101,615,336
Total Transfers Off-site for Further Management	**186,118,710**	**206,397,404**	**11,634,855**	**13,549,328**	**174,483,855**	**192,848,076**
Total Reported Amounts of Releases and Transfers	**1,287,298,663**	**1,258,091,614**	**130,420,758**	**119,673,719**	**1,156,877,905**	**1,138,417,895**

Note: Canada and US data only. Mexico data not available for 1995–1998. 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 TRI industry sectors not included for 1998.

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

Data comparing the years 1995 to 1998 do not include reporting for 1998 by the new TRI industries (see box entitled "List of Industry Sectors Covered in the Matched Data Set of *Taking Stock 1998*"). These industries were required to report for the first time to TRI in 1998, although they have always been required to report to NPRI.

In addition, data comparing the years 1995 to 1998 exclude reporting on transfers to recycling and to energy recovery because such reporting was mandatory starting with the 1998 reporting year in NPRI. Such reporting has been required by TRI facilities since the 1991 reporting year.

These data are shown in **Table 2–5** and are presented in **Chapter 6** of this report. **Chapter 6** presents trends in releases and transfers from 1995 to 1998.

Analyses in **Chapters 7** and **8** are based on both the 1998 data set and the 1995–1998 data set. **Chapter 7** looks at off-site transfers, including off-site releases and transfers to recycling and other transfers for further management, where they originate and their destination. **Chapter 8** presents reporting on pollution prevention activities. Some tables in **Chapters 7** and **8** present trend data (1995 through 1998) and, therefore, are based on a subset of the data for 1998 that excludes reporting by the new TRI industries and transfers to recycling and energy recovery.

2.5.5 Effects of Revisions in Data for Previous Years

Facilities that report to PRTRs are free to revise their previous years' submissions at any time. They may correct previous errors, or they may re-calculate earlier years' data, using a different estimation method. Some facilities that adopt new methods of estimating reportable amounts find that their results for the current year give a very different picture of releases and transfers from previous years. They may appear to have made large increases or decreases in reportable amounts, when in fact only the estimation methods have changed. These facilities may choose to revise earlier submissions so that their totals over time reflect consistent assumptions and approaches.

Each year, some facilities miss the reporting deadline or certain quality-control issues affecting their submissions are unresolved at the time the database is used for preparation of the annual PRTR 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 not have understood 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.

Table 2–6. Changes in Data as Result of Revisions Since *Taking Stock 1997*, NPRI and TRI, 1997

	1997 Data, Reported in *Taking Stock 1997**		With Revisions Submitted Since *Taking Stock, 1997***	
	NPRI Number	TRI Number	NPRI Number	TRI Number
Total Facilities	1,973	21,490	1,989	21,927
Total Forms	7,375	71,670	7,415	73,076
Releases On- and Off-site	**kg**	**kg**	**kg**	**kg**
On-site Releases	**161,875,744**	**959,843,200**	**161,593,037**	**966,524,201**
Air Emissions	109,576,994	603,929,200	109,664,304	606,168,336
Surface Water Discharges	15,070,781	99,034,903	14,877,086	100,816,607
Underground Injection	18,224,597	99,552,788	18,224,597	100,559,030
On-site Land Releases	18,792,841	157,326,308	18,614,241	158,980,228
Off-site Releases	**67,093,673**	**213,329,482**	**67,259,998**	**206,719,958**
Transfers to Disposal (except Metals)	12,785,886	26,861,725	12,786,105	25,129,048
Transfers to Treatment/Sewage/Disposal of Metals	54,307,787	186,467,756	54,473,893	181,590,910
Total Releases	**228,969,417**	**1,173,172,681**	**228,853,035**	**1,173,244,159**
Transfers for Further Management				
Total Transfers for Further Management	**29,247,506**	**234,133,622**	**30,838,725**	**242,526,630**
Transfers to Treatment (except Metals)	19,330,533	113,107,404	20,921,752	119,012,749
Transfers to Sewage/To POTWs (except Metals)	9,916,973	121,026,218	9,916,973	123,513,881
Total Reported Amounts of Releases and Transfers	**258,216,923**	**1,407,306,303**	**259,691,760**	**1,415,770,789**
Transfers to Recycling/Reuse***	112,563,826	1,080,026,543	112,326,871	992,901,629
Transfers to Energy Recovery***	12,185,174	230,378,937	12,185,174	230,244,508

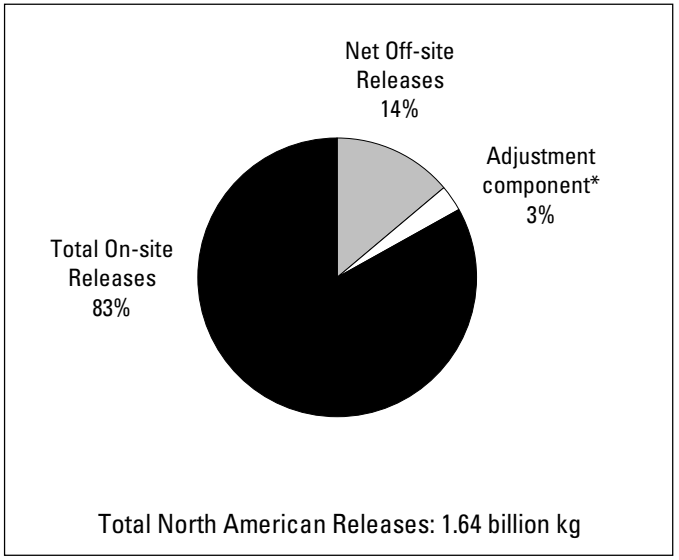
Note: Canada and US data only. Mexico data not collected for 1997.
* All 1997 chemical/industries reported in 1997 (in 1997 database).
** All 1997 chemicals/industries in 1998 database for 1997 (revised since 1997).
*** Required reporting for TRI, optional reporting for NPRI in 1997.

Table 2–7. Effect of Adjustment in Off-site Releases on North American Total Releases, NPRI and TRI, 1998

	North America		NPRI		TRI	
	kg	%	kg	%	kg	%
Total On-site Releases	**1,353,877,039**	**86**	**98,637,746**	**66**	**1,255,239,293**	**88**
Total Reported Off-site Releases	283,026,205		51,173,125		231,853,080	
Adjustment Component (Off-site transfers to disposal reported as on-site releases by other NPRI or TRI facilities)	(55,611,518)		(1,106,834)		(54,504,684)	
Adjusted Off-site Releases*	**227,414,687**	**14**	**50,066,291**	**34**	**177,348,396**	**12**
Total Adjusted Releases*	**1,581,291,726**	**100**	**148,704,037**	**100**	**1,432,587,689**	**100**

Note: Canada and US data only. Mexico data not available for 1998.
* Adjusted to exclude off-site releases reported as on-site releases by other NPRI or TRI facilities.

Figure 2–3. Effect of Adjustment in Off-site Releases on North American Total Releases, 1998



Note: Canada and US data only. Mexico data not available for 1998.
* Amount of off-site transfers to disposal also reported as on-site releases.

As a result, database totals for a given year change when revised reports, late reports, and withdrawals are received. *Taking Stock 1997* reported a total of 258.2 million kg of NPRI and 1.41 billion kg of TRI releases and transfers, reflecting the complete NPRI and TRI databases for that year. (As noted above, this excludes transfers to recycling and energy recovery.) Revisions received since the close of the 1997 reporting period raised the total to 259.7 million kg in NPRI and 1.42 billion kg in TRI.

Data for the previous years, 1995 to 1997, are presented in this report, *Taking Stock 1998*, for comparison purposes. Some of the data in previous editions of *Taking Stock* may have been revised so that readers should use the current report or the current databases.

2.5.6 Adjustment of Total Releases in North America for Off-site Releases also Reported as On-site Releases

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 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 for the first time, such on-site releases may now be included as well. When considering total releases, an adjustment should be made so that the release is only counted once.

The 1998 data were analyzed to determine how much of off-site releases were also reported as on-site releases at another facility. In all, 1.1 million kg of off-site releases in NPRI (of the total releases of 98.6 million kg) and 54.5 million kg of off-site releases in TRI (of the total releases of 1.3 billion kg) were found to match up with on-site releases also reported for 1998 by facilities in North America.

There are several reasons why off-site releases may not be reported as on-site releases, including: the transfer site did not meet 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.

The summary report for 1998 for TRI omits these off-site releases in tables that present complete US data. The summary report for NPRI does not. Because only small amounts of off-site releases were identified as matching on-site releases (0.7% of total releases in NPRI and 4.0% in TRI) and the matching varied so much for NPRI and TRI, the adjustment analysis was not incorporated into the 1998 *Taking Stock* report.

The CEC has undertaken to aid the governments in improving comparability in transfer site reporting so that, if improved matching can be done, such an adjustment factor will be considered for future reports. Feedback and suggestions on this approach are welcome.

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Key Findings

- In 1998, North American facilities released on- and off-site 1.6 billion kg of listed substances as reported to TRI and NPRI. These releases represent releases to air, water, land or underground injection wells at the site of the facility as well as off-site releases. Off-site releases include all transfers to disposal and transfers of metals to sewage, treatment and energy recovery.
- On-site releases accounted for 83 percent and off-site releases accounted for 17 percent of total releases in North America in 1998. Over half of total releases were on-site air emissions. On-site land releases accounted for 19 percent and transfers of metals (not including transfers of metals to recycling) for 15 percent of total releases in 1998.
- TRI facilities accounted for 93 percent and NPRI facilities for 7 percent of total North American releases of the 165 chemicals in the matched data set. TRI facilities were more likely to report on-site releases, particularly on-site land disposal, while NPRI facilities were more likely to report off-site releases. NPRI facilities accounted for 18 percent of off-site releases.
- One-quarter of all releases originated in three states and one province. Ohio ranked first with 138.1 million kg, Texas second with 108.2 million kg, Pennsylvania third with 96.0 million kg and Ontario fourth with 88.5 million kg.
- Ohio had the largest on-site air emissions and on-site land releases. Texas had the largest on-site underground injection. Pennsylvania had the largest on-site surface water discharges. Ontario had the largest off-site releases.
- Electric utilities (a new TRI industry) reported the largest total releases of all industry sectors in North America. The primary metals and chemicals sectors accounted for the second- and third-largest total releases. The hazardous waste management sector (also a new TRI industry) reported the fourth largest total releases.
- The facilities in the electric utility industry reported large air emissions of hydrochloric acid, and this chemical had the largest total releases in the matched data set for 1998.
- The 49 designated carcinogens in the matched data set accounted for 15 percent of total releases for 1998. Carcinogens were more likely to be on-site land releases or off-site releases and less likely to be released on-site to surface water or air than other matched chemicals.

3.1 Introduction

This chapter examines reporting of releases on- and off-site of the 165 matched chemicals in North America. The on-site releases—to air, water, land, or underground injection wells—occur at the facility, while the off-site releases represent transfers to other locations for disposal, and transfers of metals for disposal, sewage, treatment and energy recovery. As explained in **Chapter 2**, this chapter analyzes 1998 data for industries and chemicals that must be reported in both the US and Canada (the matched data set). Mexican data are not available for the 1998 reporting year.

In this chapter, the North American picture of 1998 releases on- and off-site is presented first, followed by separate sections for NPRI and TRI. Within each section the order of presentation is:

- States and provinces
- Industry sectors
- Facilities
- Chemicals
  - Chemicals with largest releases
  - Carcinogens
  - Metals

3.2 1998 Releases On- and Off-site in North America

For this year's *Taking Stock* report, a new method of classification is used. Releases include both on- and off-site releases.

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 site of the facilities to other locations for disposal, sewage, treatment or energy recovery. The terms **total releases on- and off-site** or simply **total releases** refer to the total of these three groups (see **Chapter 2**, Section 2.2.8 for further explanation of the categories used in this report).

In addition to this new classification, this chapter also contains data from matched industries reporting to TRI for the first time. Transfers to recycling are not included in this chapter, but are discussed in **Chapter 4**.

- In 1998, 21,974 North American facilities in industries covered by both the Canadian NPRI and the US TRI filed 72,795 reports on the substances that are common to both PRTRs. Facilities reporting to Canada's NPRI represented 7 percent of all North American facilities in the matched data set, while US TRI facilities accounted for 93 percent.

Table 3–1. Summary of Releases On- and Off-site in North America, NPRI and TRI, 1998

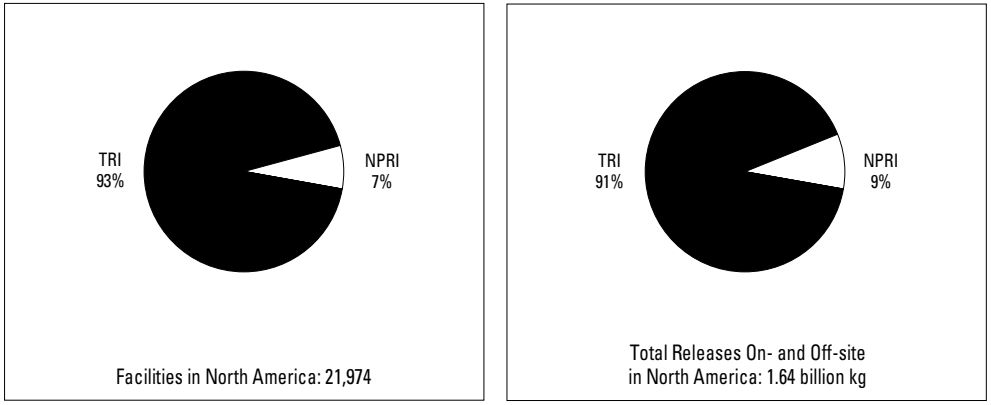
	North America		NPRI*		TRI		NPRI as % of North American Total	TRI as % of North American Total
	Number		Number		Number			
Total Facilities	21,974		1,552		20,422		7	93
Total Forms	72,795		5,235		67,560		7	93
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**	**%**	**%**
On-site Releases	**1,353,877,039**	**83**	**98,637,746**	**66**	**1,255,239,293**	**84**	**7**	**93**
Air	853,573,800	53	75,808,346	51	777,765,454	52	9	91
Surface Water	102,847,170	6	4,360,769	3	98,486,401	7	4	96
Underground Injection	86,263,932	5	3,701,129	2	82,562,803	5	4	96
Land	311,068,891	19	14,644,256	10	296,424,635	20	5	95
Off-site Releases	**283,026,205**	**17**	**51,173,125**	**34**	**231,853,080**	**16**	**18**	**82**
Transfers to Disposal (except metals)	37,593,132	2	9,567,199	6	28,025,933	2	25	75
Transfers of Metals**	245,433,073	15	41,605,926	28	203,827,147	14	17	83
Total Releases On- and Off-site	**1,636,903,244**	**100**	**149,810,871**	**100**	**1,487,092,373**	**100**	**9**	**91**

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

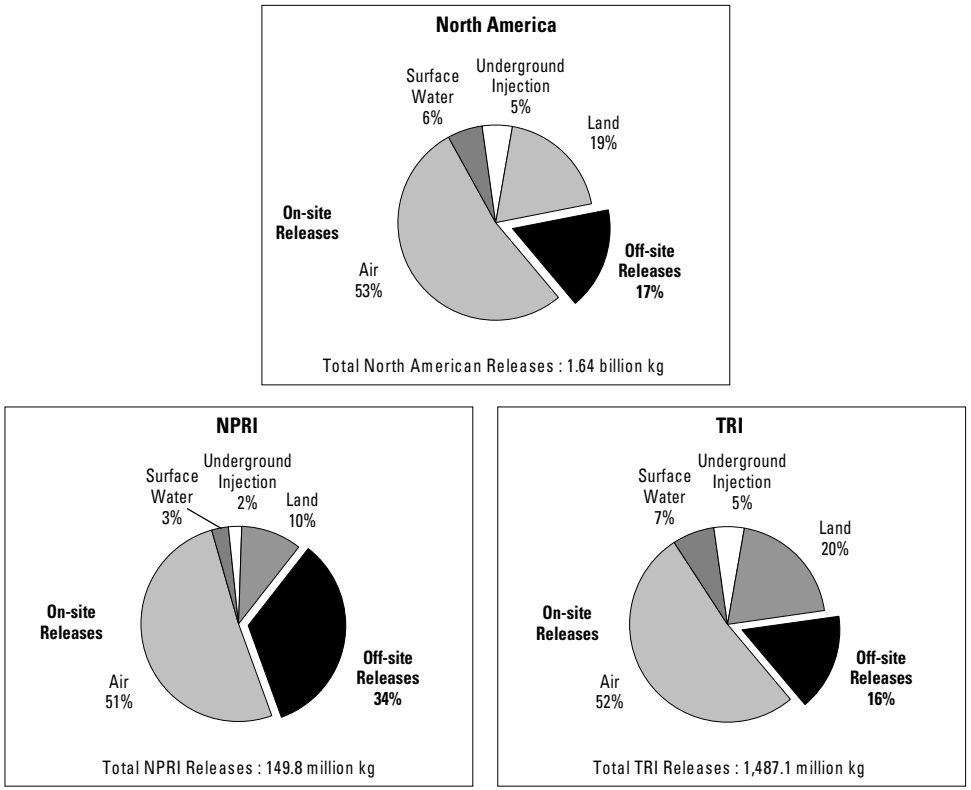
** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 3–1. Contribution of NPRI and TRI to Total Releases in North America, 1998



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

Figure 3–2. Percentage of Releases On- and Off-site in North America by Type, NPRI and TRI, 1998



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

- Total releases on- and off-site in North America were 1.6 billion kg in 1998 for the matched data set. Most of the North American reporting occurs in the United States, with its larger industrial base. NPRI facilities reported 9 percent of the North American releases, a somewhat larger portion of North American releases than indicated by the number of facilities.
- On-site releases were 1.4 billion kg, 83 percent of total releases, while off-site releases were 283.0 million kg, 17 percent of total releases in North America.
- For both NPRI and TRI, on-site air emissions were over 50 percent of total releases.
- However, for NPRI, off-site releases were 34 percent of the NPRI total releases, while TRI off-site releases were 16 percent of the TRI total. This was mainly due to proportionally larger off-site transfers of metals in NPRI (28 percent of NPRI total) and proportionally larger on-site land releases in TRI (20 percent of TRI total.
- In TRI, chemicals are more likely to be disposed of on-site, while in NPRI, chemicals are more likely to be sent off-site for disposal. TRI on-site land releases were 20 percent and off-site releases were 16 percent of the TRI total, while on-site land releases were 10 percent and off-site releases were 34 percent of the NPRI total).

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

More than one-quarter of all North American reported releases in the matched data set originated in three states and one province. Ohio reported 138.1 million kg (8 percent of total releases), Texas reported 108.2 million kg (7 percent), Pennsylvania reported 96.0 million kg (6 percent) and Ontario reported 88.5 million kg (5 percent).

- Ohio reported the largest on-site air emissions and land releases. Ohio had several electric generating facilities (a new TRI industry sector) that contributed significantly to its on-site air emissions total.
- Texas reported the largest on-site underground injection and second largest on-site air emissions.
- Pennsylvania reported the largest on-site surface water discharges. One facility in Pennsylvania reported 14.1 million kg of surface water discharges, or 14 percent of all surface water discharges in TRI.
- Ontario reported the largest off-site releases, the majority of which were transfers of metals. Ontario had four facilities, two of which are hazardous waste treatment facilities (a new TRI industry sector), reporting more than 6 million kg of off-site releases of metals.
- While the two states of Ohio and Texas reported more than 100 million kg in total releases, another eleven states and provinces reported more than 50 million kg. Only 7 US jurisdictions and Canadian provinces reported less than 500,000 kg.

Table 3–2. North American Releases, by State and Province, 1998

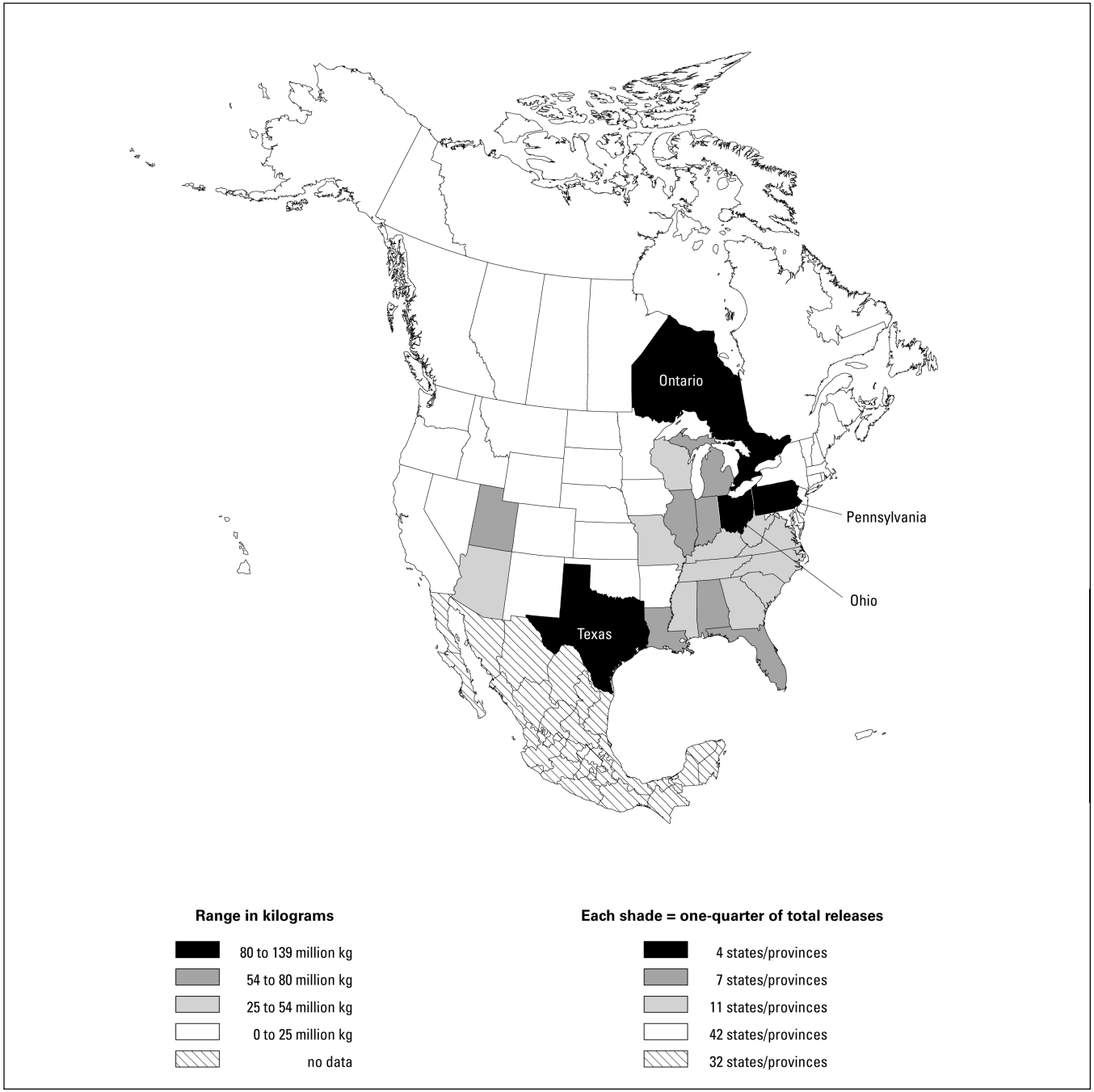
		On-site Releases					
		Air	Surface Water	Underground Injection	On-site Land Releases	Total On-site Releases	
State/Province	Number of Facilities	(kg)	(kg)	(kg)	(kg)	(kg)	Rank
Alabama	493	33,834,670	1,940,927	2	13,088,300	48,863,899	10
Alaska	8	224,543	27,833	113	727	253,216	60
Alberta	132	8,309,948	320,411	3,698,397	4,559,993	16,897,101	26
Arizona	195	3,858,747	680	1	22,210,593	26,070,021	20
Arkansas	354	8,256,881	736,791	483,979	968,682	10,446,333	35
British Columbia	83	4,869,503	604,627	0	109,013	5,591,826	42
California	1,236	6,980,552	1,718,002	9,702	7,943,898	16,652,154	27
Colorado	163	1,495,282	439,038	0	255,688	2,190,008	52
Connecticut	286	2,281,597	244,376	0	16,751	2,542,724	51
Delaware	63	4,494,034	355,272	0	293,844	5,143,150	43
District of Columbia	2	30,045	0	0	0	30,045	63
Florida	515	36,431,827	716,544	10,027,042	9,098,867	56,274,280	5
Georgia	654	36,845,339	2,724,094	0	2,776,938	42,346,371	13
Guam	1	0	0	0	0	0	64
Hawaii	19	1,494,445	189	0	0	1,494,634	54
Idaho	56	1,335,701	2,526,801	0	18,695,930	22,558,432	22
Illinois	1,206	31,234,155	2,808,462	113	20,540,369	54,583,099	6
Indiana	966	37,703,825	984,729	93,016	11,789,833	50,571,403	9
Iowa	390	10,182,595	1,332,765	0	1,544,984	13,060,344	31
Kansas	246	7,651,266	268,332	582,627	769,303	9,271,528	37
Kentucky	417	29,767,716	533,199	0	5,245,679	35,546,594	16
Louisiana	305	22,027,388	16,496,847	20,197,448	5,278,195	63,999,878	4
Maine	70	2,351,680	468,248	0	312,735	3,132,663	48
Manitoba	52	2,187,230	28,149	0	1,224,152	3,442,664	46
Maryland	171	13,548,027	1,049,353	20,408	908,159	15,525,947	28
Massachusetts	439	3,274,988	23,223	0	18,925	3,317,136	47
Michigan	825	30,781,954	185,887	1,429,124	4,211,660	36,608,625	15
Minnesota	452	5,645,598	325,824	0	1,218,903	7,190,325	38
Mississippi	281	16,040,616	5,021,623	3,112,279	2,801,365	26,975,883	19
Missouri	555	16,719,876	934,235	0	12,840,082	30,494,193	17
Montana	27	1,961,811	37,191	0	20,400,959	22,399,961	23
Nebraska	149	3,378,042	1,165,706	0	327,892	4,871,640	44
Nevada	50	1,110,938	0	0	1,979,701	3,090,639	49
New Brunswick	31	4,575,730	1,043,849	0	70,899	5,692,032	41
New Hampshire	102	2,735,848	47,346	0	32,403	2,815,597	50
New Jersey	528	6,722,704	2,572,299	0	223,985	9,518,988	36
New Mexico	46	932,825	9,474	0	11,068,852	12,011,151	33
New York	625	14,800,100	3,543,709	113	2,622,589	20,966,511	24
Newfoundland	8	467,678	808	0	2,900	471,686	58
North Carolina	749	37,901,873	2,900,478	13,197	10,108,937	50,924,485	8
North Dakota	35	958,620	29,060	0	708,440	1,696,120	53
Nova Scotia	29	3,532,989	56,205	0	872,796	4,463,245	45
Ohio	1,517	60,235,323	2,465,678	12,773,252	37,977,813	113,452,066	1
Oklahoma	287	7,320,636	325,956	1,991,643	3,261,528	12,899,763	32
Ontario	820	40,840,795	951,673	700	4,060,177	45,927,400	12
Oregon	239	6,257,574	1,135,695	0	6,509,895	13,903,164	30
Pennsylvania	1,243	41,173,251	20,772,857	35,738	4,234,986	66,216,832	3
Prince Edward Island	3	14,042	193,608	0	0	207,650	61
Puerto Rico	145	6,901,592	83,587	0	74,399	7,059,578	39
Quebec	372	10,301,937	1,141,800	0	3,744,296	15,210,340	29
Rhode Island	120	554,556	548	0	229	555,333	57
Saskatchewan	22	708,494	19,639	2,032	30	733,802	56
South Carolina	467	23,447,422	1,379,641	0	2,481,032	27,308,095	18
South Dakota	63	604,243	366,276	0	452,973	1,423,492	55
Tennessee	606	41,235,778	497,111	1,338,775	3,628,134	46,699,798	11
Texas	1,196	44,214,589	11,176,890	27,120,746	15,842,111	98,354,336	2
Utah	141	28,788,522	504,812	0	23,905,581	53,198,915	7
Vermont	29	56,477	65,633	0	455	122,565	62
Virgin Islands	3	401,849	12,705	0	681	415,235	59
Virginia	424	23,111,554	1,188,796	0	1,350,478	25,650,828	21
Washington	265	8,026,108	1,432,086	0	1,067,959	10,526,153	34
West Virginia	157	33,119,909	3,262,265	16	2,974,242	39,356,432	14
Wisconsin	811	15,950,702	1,644,702	0	839,658	18,435,062	25
Wyoming	30	1,369,261	2,626	3,333,469	1,518,313	6,223,669	40
Total	**21,974**	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**	

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

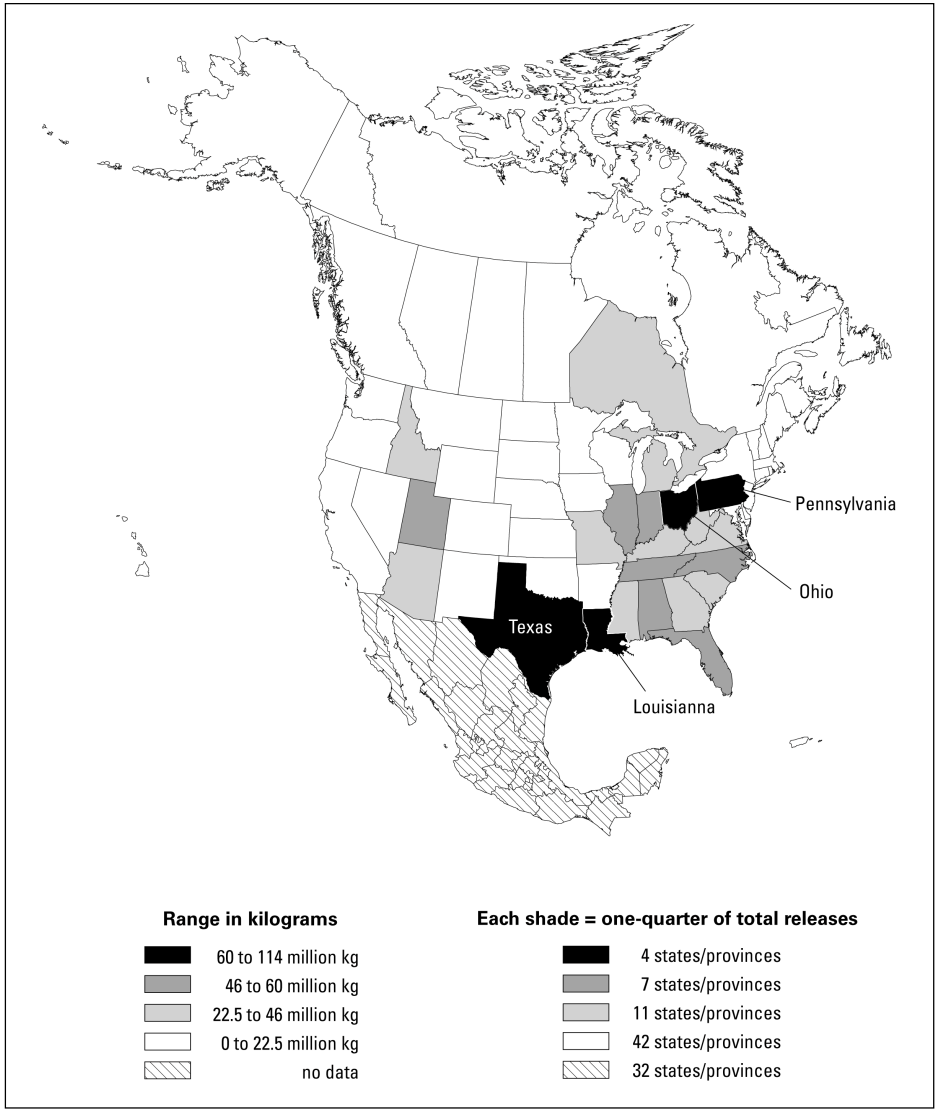
Table 3–2. (*continued*)

Off-site Releases										
Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Rank	Total Releases On- and Off-site (kg)	Rank	1998 Population	Land Area (sq km)	1998 Gross Domestic Product (US $ millions)	Rank
699,714	7,381,275	8,080,989	10	56,944,888	9	4,322,113	131,432	109,833	27
130	4,898	5,028	60	258,244	60	609,655	1,477,155	24,236	50
416,666	1,037,022	1,453,688	34	18,350,789	30	2,906,900	661,194	70,766	35
109,348	376,976	486,324	43	26,556,345	21	4,553,249	294,310	133,801	24
1,116,854	7,952,974	9,069,828	9	19,516,161	28	2,523,186	134,864	61,628	38
524,083	116,321	640,404	41	6,232,230	43	3,998,300	947,806	74,788	34
705,220	3,607,403	4,312,623	15	20,964,777	26	32,182,118	403,939	1,118,945	1
177,804	651,063	828,867	39	3,018,875	51	3,892,029	268,637	141,791	23
290,185	1,166,905	1,457,090	33	3,999,814	47	3,267,240	12,548	142,099	22
1,557	107,083	108,640	54	5,251,790	44	735,143	5,063	33,735	46
0	2	2	63	30,047	63	529,895	158	54,100	40
290,375	1,904,069	2,194,444	29	58,468,724	8	14,677,181	139,841	418,851	5
231,346	4,789,142	5,020,488	14	47,366,859	14	7,489,982	149,999	253,769	10
0	0	0	64	0	64	149,180	544	--	--
3,777	6,453	10,230	58	1,504,864	54	1,192,057	16,634	39,712	45
1,679	116,389	118,068	52	22,676,500	25	1,208,865	214,309	30,936	48
2,478,803	13,140,209	15,619,012	6	70,202,111	6	11,989,352	143,975	425,679	4
694,681	28,319,292	29,013,973	3	79,585,376	5	5,864,847	92,896	174,433	16
228,753	3,549,561	3,778,314	16	16,838,658	31	2,854,330	144,705	84,628	31
1,598,637	1,331,341	2,929,978	24	12,201,506	37	2,601,437	211,905	76,991	33
1,217,699	2,283,550	3,501,249	19	39,047,843	16	3,910,366	102,898	107,152	28
432,963	514,603	947,566	38	64,947,444	7	4,353,646	112,827	129,251	26
23,091	460,868	483,959	44	3,616,622	48	1,241,895	79,934	32,318	47
6,334	150,580	156,914	48	3,599,578	49	1,138,000	649,953	20,165	52
36,086	363,078	399,164	46	15,925,111	32	5,094,924	25,315	164,798	17
114,280	1,716,993	1,831,273	31	5,148,409	45	6,114,440	20,299	239,379	12
973,729	17,043,863	18,017,592	5	54,626,217	11	9,779,984	147,124	294,505	9
87,388	1,194,378	1,281,766	35	8,472,091	38	4,687,408	206,192	161,392	19
87,212	481,351	568,563	42	27,544,446	20	2,731,644	121,498	62,216	37
210,744	1,773,339	1,984,083	30	32,478,276	18	5,408,455	178,432	162,772	18
70	2,204,989	2,205,059	28	24,605,020	23	878,730	376,961	19,861	53
90,160	2,944,859	3,035,019	23	7,906,659	39	1,657,009	199,099	51,737	41
15,600	125,661	141,261	51	3,231,900	50	1,678,691	284,376	63,044	36
23,209	1,050,528	1,073,737	37	6,765,769	41	753,500	73,440	11,615	59
11,114	132,954	144,068	50	2,959,665	52	1,172,140	23,228	41,313	43
1,207,605	1,699,845	2,907,450	25	12,426,438	36	8,058,384	19,214	319,201	8
1,717	793,623	795,340	40	12,806,491	35	1,723,965	314,311	47,736	42
343,248	1,949,279	2,292,527	27	23,259,038	24	18,146,200	122,301	706,886	2
0	220	220	61	471,906	58	545,400	405,721	7,623	60
565,464	1,913,345	2,478,809	26	53,403,294	12	7,430,675	126,170	235,752	13
15,902	1,112,025	1,127,927	36	2,824,047	53	640,965	178,681	17,214	56
81,477	105,905	187,382	47	4,650,627	46	936,100	55,491	13,946	58
1,458,958	23,183,906	24,642,864	4	138,094,930	1	11,192,932	106,060	341,070	7
35,249	1,582,953	1,618,202	32	14,517,965	33	3,321,611	177,865	81,655	32
7,748,143	34,822,050	42,570,193	1	88,497,593	4	11,834,400	1,068,586	250,673	11
16,634	5,170,638	5,187,272	12	19,090,436	29	3,243,272	248,629	104,771	29
2,168,430	27,581,160	29,749,590	2	95,966,422	3	12,011,278	116,075	364,039	6
3	0	3	62	207,653	61	137,000	5,659	1,936	61
150,699	254,620	405,319	45	7,464,897	40	3,860,000	8,875	--	--
765,409	4,315,358	5,080,767	13	20,291,107	27	7,323,000	1,540,689	130,262	25
35,807	111,012	146,819	49	702,152	57	987,263	2,706	30,443	49
1,875	7,942	9,817	59	743,619	56	1,025,200	652,334	19,407	54
4,214,885	4,925,004	9,139,889	8	36,447,984	17	3,788,119	77,981	100,350	30
856	50,182	51,038	56	1,474,530	55	737,755	196,555	21,224	51
438,400	3,076,093	3,514,493	18	50,214,291	13	5,371,693	106,752	159,575	20
3,055,992	6,839,445	9,895,437	7	108,249,773	2	19,385,699	678,305	645,596	3
23,514	3,665,121	3,688,635	17	56,887,550	10	2,065,001	212,799	59,624	39
2,040	55,406	57,446	55	180,011	62	588,632	23,953	16,257	57
56	22,251	22,307	57	437,542	59	118,305	347	--	--
248,735	2,909,114	3,157,849	22	28,808,677	19	6,737,489	102,551	230,825	14
985,692	2,328,512	3,314,204	20	13,840,357	34	5,614,151	172,431	192,864	15
277,613	2,929,709	3,207,322	21	42,563,754	15	1,815,231	62,381	39,938	44
841,764	5,919,941	6,761,705	11	25,196,767	22	5,201,226	140,662	157,761	21
7,674	108,442	116,116	53	6,339,785	42	480,043	251,483	17,530	55
37,593,132	**245,433,073**	**283,026,205**		**1,636,903,244**					

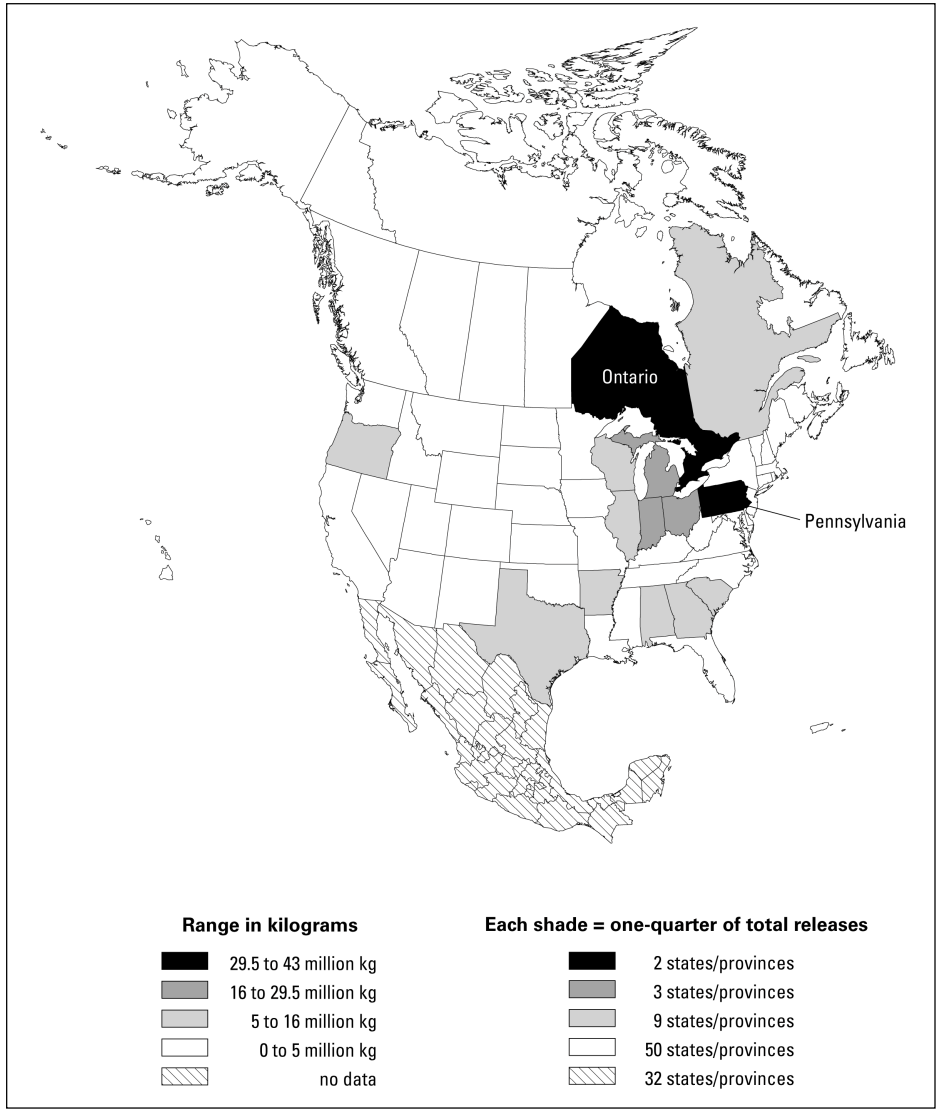
Map 3–1. Largest Total Releases On- and Off-site in North America, 1998: States and Provinces



Map 3–2. Largest On-site Releases in North America, 1998: States and Provinces



Map 3–3. States and Provinces in North America Sending Largest Amounts of Off-site Releases



3.2.2 Releases On- and Off-site by Industry Sector, 1998

Reporting for 1998 includes several new industry sectors reporting for the first time to TRI. Those sectors for which reporting now matches the NPRI reporting requirements and are, therefore, included in the matched data set are electric generating facilities (only those that combust oil and/or coal), hazardous waste management and solvent recovery facilities, chemical wholesalers and coal mines.

- The influence of the newly reporting industry sectors is clear. Electric utilities ranked first for total releases in 1998, and hazardous waste management and solvent recovery facilities ranked fourth. These two sectors reported over one-third of all releases in 1998.
- In 1998, electric utilities (a new TRI industry) reported 436.1 million kg of total releases on- and off-site, 27 percent of the North American total and the largest amount reported by any industry.
- Over 40 percent of all on-site air emissions in North America in 1998 were reported by electric utilities.
- The primary metals industry ranked second for total releases with 353.1 million kg. This included more than 38 percent of all on-site land releases and 62 percent of off-site releases of metals. Both of these types of releases are primarily land disposal (on- and off-site).

Table 3–3. Releases On- and Off-site in North America by Industry, 1998

Rank	US SIC Code	Industry	On-site Releases: Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	491/493	Electric Utilities	368,749,915	1,347,691	35,746	53,503,969	423,637,321
2	33	Primary Metals	53,977,919	24,673,376	242,000	118,779,573	197,688,170
3	28	Chemicals	102,799,690	42,492,102	75,673,049	32,829,836	253,851,126
4	495/738	Hazardous Waste Mgt./Solvent Recovery	535,601	261,972	9,603,617	90,430,726	100,833,116
5	26	Paper Products	92,711,097	10,523,568	13,197	6,597,568	109,846,444
6	30	Rubber and Plastics Products	45,583,423	9,792	0	251,994	45,855,930
7	37	Transportation Equipment	41,836,011	72,498	0	194,710	42,109,851
8	--	Multiple Codes 20-39*	29,505,528	6,680,208	228	2,107,045	38,293,009
9	34	Fabricated Metals Products	20,281,163	569,069	115	347,344	21,211,711
10	29	Petroleum and Coal Products	22,503,767	6,292,010	675,416	215,656	29,689,717
11	24	Lumber and Wood Products	15,844,568	24,265	0	165,009	16,037,021
12	32	Stone/Clay/Glass Products	11,117,507	63,096	0	1,360,662	12,543,894
13	20	Food Products	4,413,610	8,112,873	7	1,903,071	14,429,561
14	36	Electronic/Electrical Equipment	4,812,465	978,043	113	85,596	5,877,692
15	27	Printing and Publishing	11,064,676	3,594	0	113	11,068,383
16	25	Furniture and Fixtures	8,293,314	21	0	15,908	8,310,043
17	35	Industrial Machinery	5,053,467	4,343	0	43,895	5,103,313
18	22	Textile Mill Products	4,649,884	108,355	0	98,119	4,856,558
19	39	Misc. Manufacturing Industries	4,433,925	3,744	0	134,876	4,577,694
20	38	Measurement/Photographic Instruments	3,326,863	521,367	0	25,976	3,874,206
21	12	Coal Mining	457,565	6,285	20,408	1,948,351	2,432,609
22	31	Leather Products	483,899	21,401	36	1,339	506,675
23	21	Tobacco Products	535,218	72,562	0	0	607,780
24	5169	Chemical Wholesalers	447,188	4,935	0	27,553	479,676
25	23	Apparel and Other Textile Products	155,537	0	0	2	155,539
		Total	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**

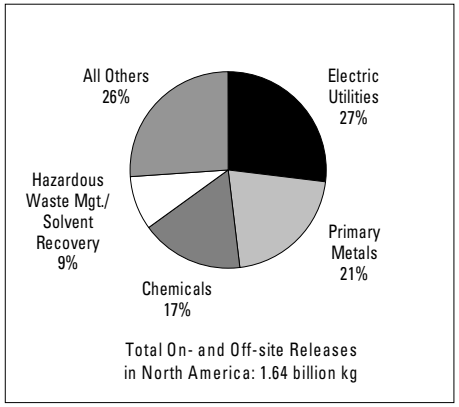
Note: Canada and US data only. Mexico data not available for 1998. * Multiple SIC codes reported only in TRI.

Table 3–3 (*continued*)

Off-site Releases					
Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	NPRI as % of North American Total	TRI as % of North American Total
97,095	12,373,088	12,470,183	436,107,504	5	95
2,902,883	152,523,362	155,426,245	353,114,415	12	88
9,671,791	10,620,478	20,292,269	274,143,395	7	93
14,313,275	30,900,890	45,214,165	146,047,281	16	84
459,237	1,811,210	2,270,447	112,116,891	15	85
1,287,299	3,602,084	4,889,383	50,745,313	13	87
2,549,707	3,095,651	5,645,358	47,755,209	13	87
1,180,393	6,413,190	7,593,583	45,886,592	0	100
1,465,740	10,728,805	12,194,545	33,406,256	11	89
1,663,467	721,481	2,384,948	32,074,665	15	85
57,036	96,492	153,528	16,190,549	15	85
350,199	2,478,306	2,828,505	15,372,399	6	94
311,361	253,250	564,611	14,994,172	6	94
610,786	5,400,330	6,011,116	11,888,808	3	97
22,479	52,644	75,123	11,143,506	14	86
37,338	43,660	80,998	8,391,041	13	87
220,268	2,282,627	2,502,895	7,606,208	7	93
137,837	196,812	334,649	5,191,207	9	91
153,101	360,854	513,955	5,091,649	13	87
41,939	445,491	487,430	4,361,636	0	100
0	0	0	2,432,609	0	100
0	972,960	972,960	1,479,635	2	98
1,780	0	1,780	609,560	0	100
47,124	51,878	99,002	578,678	4	96
10,997	7,530	18,527	174,066	0	100
37,593,132	**245,433,073**	**283,026,205**	**1,636,903,244**	**9**	**91**

- The chemical manufacturing sector, ranked third for largest releases on- and off-site in 1998, reported 274.1 million kg and the largest amounts of on-site surface water releases and underground injection.
- Another new TRI industry sector, hazardous waste management and solvent recovery facilities, ranked fourth with 146.0 million kg or 9 percent of the North American total releases. This sector reported the largest transfers to disposal of substances that are not metals.

Figure 3–3. Contribution of Top Industry Sectors to Releases On- and Off-site in North America, 1998



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

3.2.3 Facilities with the Largest Releases

Facilities with Largest Total Releases On- and Off-site

Fifty facilities in North America accounted for one-quarter of total releases on- and off-site in 1998.

- The 50 facilities with the largest total releases in North America reported 422.9 million kg, 26 percent of total releases for 1998. They reported 54 percent of all on-site land releases and 46 percent of all on-site underground injection.
- The electric utility industry, the sector with the largest total releases in North America for 1998, had 12 facilities among the 50 facilities with the largest total releases.
- The primary metals industry, the sector with the second-largest total releases, had 18 facilities among the top 50 facilities.
- The other two top-ranked industry sectors—chemical manufacturing and hazardous waste management—represented the remaining facilities in the top 50, with 10 facilities each.
- Seven TRI facilities reported more than 14 million kg each in 1998. Five of the seven were primary metals facilities and two were hazardous waste management facilities. Most of their releases were on-site.

Table 3–4. The 50 North American Facilities with the Largest Total Releases On- and Off-site, 1998

						On-site Releases				
Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	6	26,163,746	0	0	0	26,163,746
2	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	11	518	0	0	22,881,631	22,882,149
3	ASARCO Inc.	East Helena, MT		33	10	47,857	731	0	19,085,244	19,133,832
4	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ		33	11	71,443	0	0	20,787,234	20,858,677
5	Kennecott Utah Copper Smelter & Refy.	Magna, UT		33	16	141,488	3,536	0	15,042,630	15,187,654
6	Armco Inc. Butler Ops. (Rte 8S)	Butler, PA		33	14	55,377	14,060,975	0	0	14,116,352
7	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	13	5,424	0	0	14,094,786	14,100,210
8	Phelps Dodge Hidalgo Inc.	Playas, NM		33	16	127,441	5,668	0	9,806,485	9,939,594
9	Solutia Inc.	Gonzalez, FL		28	18	79,642	778	9,787,718	0	9,868,138
10	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	10	242	4	0	9,779,092	9,779,338
11	DuPont Victoria Plant	Victoria, TX		28	29	159,736	1,333	9,546,080	6,234	9,713,383
12	Zinc Corp. of America Monaca Smelter	Monaca, PA		33	13	426,769	1,293	0	0	428,062
13	PCS Nitrogen Fertilizer L.P.	Geismar, LA		28	12	52,663	8,920,211	0	269,176	9,242,050
14	Nucor Steel	Crawfordsville, IN		33	8	15,734	16	0	0	15,750
15	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	77	495/738	8	0	0	0	0	0
16	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	12	8,182,292	8,316	0	316,680	8,507,288
17	American Electric Power, John E. Amos Plant	Winfield, WV		491/493	12	7,577,375	1,993	0	203,105	7,782,473
18	Lenzing Fibers Corp.	Lowland, TN		28	5	7,875,401	3,158	0	117,959	7,996,518
19	Waste Management of Ohio Inc.	Vickery, OH		495/738	14	0	0	7,899,321	0	7,899,321
20	Cytec Inds. Inc. Fortier Plant	Westwego, LA		28	23	62,955	8,427	7,590,431	0	7,661,813
21	Rouge Steel Co.	Dearborn, MI		33	8	22,456	604	0	0	23,060
22	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC		491/493	12	6,863,418	3,384	0	440,273	7,307,075
23	Elementis Chromium L.P.	Corpus Christi, TX		28	2	2,176	793	0	6,893,424	6,896,393
24	BASF Corp.	Freeport, TX		28	27	274,878	6,807,961	16,405	0	7,099,244
25	Co-Steel Lasco	Whitby, ON	29	33	6	14,095	310	0	1,176,063	1,190,468
26	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	17	0	0	0	0	0
27	Dofasco Inc.	Hamilton, ON	29	33	18	402,320	1,493	0	0	403,813
28	Dayton Power & Light Co. J.M Stuart Station	Manchester, OH		491/493	13	5,806,513	2,688	0	864,853	6,674,054
29	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT		495/738	21	290	0	0	6,473,025	6,473,315
30	American Electric Power, Mitchell Plant	Moundsville, WV		491/493	13	5,925,307	3,700	0	353,006	6,282,013
31	USS Gary Works, USX Corp.	Gary, IN		33	33	582,009	9,575	0	5,086,841	5,678,425
32	Firstenergy, W.H. Sammis Plant	Stratton, OH		491/493	14	5,493,361	4,380	0	548	5,498,289
33	Northwestern Steel & Wire Co.	Sterling, IL		33	6	56,526	8,348	0	5,738,322	5,803,196
34	Cardinal Plant, Cardinal Operating Co.	Brilliant, OH		491/493	14	5,134,319	69,059	0	424,617	5,627,995
35	Chemical Waste Management of the Northwest Inc.	Arlington, OR		495/738	26	1,657	0	0	5,455,476	5,457,133
36	Brandon Shores & Wagner Complex, Baltimore Gas Electric Co.	Baltimore, MD		491/493	14	5,185,006	2,297	0	1,194	5,188,497
37	BP Chemicals Inc., BP America Inc.	Lima, OH		28	27	247,410	0	4,873,801	0	5,121,211
38	PSI Gibson Generating Station, Cinergy Corp.	Princeton, IN		491/493	13	3,656,341	0	0	1,464,013	5,120,354
39	Chemical Waste Management	Emelle, AL		495/738	15	153	0	0	5,043,764	5,043,917
40	Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke, ON	49	491/493	12	4,855,140	8,030	0	251,480	5,114,650
41	Nucor-Yamato Steel Co.	Blytheville, AR		33	8	8,509	2	0	0	8,511
42	Acordis Cellulosic Fibers Inc., Akzo Nobel Finance US	Axis, AL		28	4	4,835,375	7,347	0	190,476	5,033,198
43	Natl. Steel Corp., Greatlakes Div.	Ecorse, MI		33	18	83,835	18,539	0	0	102,374
44	Elkem Metals Co.	Marietta, OH		33	6	186,815	198,186	0	4,473,469	4,858,470
45	Chemical Waste Management Inc.	Kettleman City, CA		495/738	21	2,694	0	0	4,853,527	4,856,221
46	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	8	3,178,052	0	0	1,545,000	4,723,052
47	Scherer Steam Electric Generating Plant	Juliette, GA		491/493	14	4,041,640	9,085	0	667,487	4,718,212
48	Steel Dynamics Inc.	Butler, IN		33	3	15,015	0	0	0	15,015
49	Kentucky Utilities Co. - Ghentstation, LG&E Energy Corp.	Ghent, KY		491/493	13	3,841,543	26,134	0	781,633	4,649,310
50	Occidental Chemical Corp.	Castle Hayne, NC		28	1	2,888	17	0	4,535,150	4,538,055
	Subtotal				**668**	**111,765,844**	**30,198,371**	**39,713,756**	**169,103,897**	**350,781,868**
	% of Total				**1**	**13**	**29**	**46**	**54**	**26**
	Total				**72,795**	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**

Note: Canada and US data only. Mexico data not available for 1998. The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.

Table 3–4. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	0	0	26,163,746	Chlorine (air)
2	0	36,459	36,459	22,918,608	Zinc and compounds (land)
3	0	2,184,136	2,184,136	21,317,968	Zinc and compounds (land)
4	0	139	139	20,858,816	Copper/Zinc and compounds (land)
5	0	258,691	258,691	15,446,345	Copper/Zinc/Arsenic and compounds (land)
6	862	221,149	222,011	14,338,363	Nitric acid and nitrate compounds (water)
7	0	17	17	14,100,227	Zinc and compounds (land)
8	0	0	0	9,939,594	Zinc/Copper and compounds (land)
9	590	617	1,207	9,869,345	Nitric acid and nitrate compounds (UIJ)
10	0	3,086	3,086	9,782,424	Zinc and compounds (land)
11	38	215	253	9,713,636	Nitric acid and nitrate compounds (UIJ)
12	0	9,038,217	9,038,217	9,466,279	Zinc and compounds (transfers of metals)
13	0	0	0	9,242,050	Phosphoric acid (water)
14	0	8,843,001	8,843,001	8,858,751	Zinc and compounds (transfers of metals)
15	295,880	8,280,287	8,576,167	8,576,167	Zinc and compounds (transfers of metals)
16	0	8	8	8,507,296	Hydrochloric acid (air)
17	0	371,553	371,553	8,154,026	Hydrochloric acid (air)
18	0	0	0	7,996,518	Carbon disulfide (air)
19	28,440	143	28,583	7,927,904	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
20	208	15,263	15,471	7,677,284	Acetonitrile, Acrylic acid, Acrylamide (UIJ)
21	326,531	6,961,360	7,287,891	7,310,951	Zinc and compounds (transfers of metals)
22	0	0	0	7,307,075	Hydrochloric acid (air)
23	0	372,338	372,338	7,268,731	Chromium and compounds (land)
24	6,189	7,389	13,578	7,112,822	Nitric acid and nitrate compounds (water)
25	0	5,873,182	5,873,182	7,063,650	Zinc and compounds (transfers of metals)
26	3,520,241	3,427,991	6,948,232	6,948,232	Zinc and compounds (transfers of metals), Xylene, Toluene (transfers to disposal)
27	30	6,302,410	6,302,440	6,706,253	Zinc and compounds (transfers of metals)
28	0	5	5	6,674,059	Hydrochloric acid (air)
29	0	5,811	5,811	6,479,126	Zinc/Lead/Manganese/Copper and compounds (land)
30	0	364	364	6,282,377	Hydrochloric acid (air)
31	821	366,991	367,812	6,046,237	Zinc and compounds (land)
32	23,129	523,265	546,394	6,044,683	Hydrochloric acid, Sulfuric acid (air)
33	0	84,353	84,353	5,887,549	Zinc/Manganese and compounds (land)
34	0	489	489	5,628,484	Hydrochloric acid (air)
35	0	3,466	3,466	5,460,599	Asbestos, Aluminum (land)
36	41	2,763	2,804	5,191,301	Hydrochloric acid (air)
37	353	281	634	5,121,845	Acetonitrile, Acrylamide (UIJ)
38	0	1	1	5,120,355	Hydrochloric acid, Sulfuric acid (air), Zinc and compounds (land)
39	1,315	73,749	75,064	5,118,981	Lead/Zinc/Copper/Arsenic and compounds (land)
40	0	0	0	5,114,650	Hydrochloric acid (air)
41	0	5,095,164	5,095,164	5,103,675	Zinc and compounds (transfers of metals)
42	0	0	0	5,033,198	Carbon disulfide (air)
43	0	4,911,304	4,911,304	5,013,678	Zinc and compounds (transfers of metals)
44	0	34,467	34,467	4,892,937	Manganese and compounds (land)
45	0	1,491	1,491	4,857,712	Aluminum oxide, Lead and compounds, Asbestos, Aluminum (land)
46	0	0	0	4,723,052	Sulfuric acid (air), Chromium and compounds (land)
47	0	0	0	4,718,212	Hydrochloric acid, Hydrogen fluoride (air)
48	0	4,638,323	4,638,323	4,653,338	Zinc and compounds (transfers of metals)
49	0	0	0	4,649,310	Hydrochloric acid, Sulfuric acid (air)
50	0	5,896	5,896	4,543,951	Chromium and compounds (land)
	4,204,668	**67,945,834**	**72,150,502**	**422,932,370**	
	11	**28**	**25**	**26**	
	37,593,132	**245,433,073**	**283,026,205**	**1,636,903,244**	

UIJ=underground injection.

Four industry sectors reported almost three-quarters of total releases on- and off-site in North America in 1998.

The industry sector with the largest total releases was the electric utilities sector (a new TRI industry), reporting 436.1 million kg or 27 percent of total releases for 1998.

- The 15 facilities with the largest total releases in the electric utilities sector reported 86.4 million kg, 5 percent of total releases from all North American facilities in 1998, mostly as on-site air emissions.
- Each of these 15 facilities reported hydrochloric acid among the chemicals with the largest releases at the facility (only air emissions of hydrochloric acid are in the matched data set because only aerosol forms are reportable to TRI). Ohio was the state with the largest on-site air emissions, and three of the 15 facilities are located in Ohio.
- 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 enhance the acidity in clouds downwind from the facilities, contributing to the formation of acid rain.

The primary metals sector reported the second-largest total releases in North America in 1998, reporting 353.1 million kg or 21 percent of total releases for 1998.

Table 3–5. The 15 North American Facilities with the Largest Total Releases in the Electric Utilities Industry, 1998

				On-site Releases				
Rank	Facility	City, State/Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA	12	8,182,292	8,316	0	316,680	8,507,288
2	American Electric Power, John E. Amos Plant	Winfield, WV	12	7,577,375	1,993	0	203,105	7,782,473
3	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC	12	6,863,418	3,384	0	440,273	7,307,075
4	Dayton Power & Light Co. J.M Stuart Station	Manchester, OH	13	5,806,513	2,688	0	864,853	6,674,054
5	American Electric Power, Mitchell Plant	Moundsville, WV	13	5,925,307	3,700	0	353,006	6,282,013
6	Firstenergy, W.H. Sammis Plant	Stratton, OH	14	5,493,361	4,380	0	548	5,498,289
7	Cardinal Plant, Cardinal Operating Co.	Brilliant, OH	14	5,134,319	69,059	0	424,617	5,627,995
8	Brandon Shores & Wagner Complex, Baltimore Gas Electric Co.	Baltimore, MD	14	5,185,006	2,297	0	1,194	5,188,497
9	PSI Gibson Generating Station, Cinergy Corp.	Princeton, IN	13	3,656,341	0	0	1,464,013	5,120,354
10	Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke, ON	12	4,855,140	8,030	0	251,480	5,114,650
11	Scherer Steam Electric Generating Plant	Juliette, GA	14	4,041,640	9,085	0	667,487	4,718,212
12	Kentucky Utilities Co. - Ghentstation, LG&E Energy Corp.	Ghent, KY	13	3,841,543	26,134	0	781,633	4,649,310
13	U.S. TVA Paradise Fossil Plant	Drakesboro, KY	14	4,120,838	30,773	0	217,735	4,369,346
14	Gulf Power Co. - Plant Crist, Southern Co.	Pensacola, FL	11	4,205,900	736	0	140,100	4,346,736
15	Detroit Edison Monroe Power Plant, DTE Energy	Monroe, MI	11	3,649,648	1,592	0	624,519	4,275,759
	Subtotal		**192**	**78,538,641**	**172,167**	**0**	**6,751,243**	**85,462,051**
	% of Total		**0.3**	**9.2**	**0.2**	**0.0**	**2.2**	**6.3**
	Total		**72,795**	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**

Note: Canada and US data only. Mexico data not available for 1998. 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. The 15 North American Facilities with the Largest Total Releases in the Primary Metals Industry, 1998

				On-site Releases				
Rank	Facility	City, State/Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT	6	26,163,746	0	0	0	26,163,746
2	ASARCO Inc.	East Helena, MT	10	47,857	731	0	19,085,244	19,133,832
3	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ	11	71,443	0	0	20,787,234	20,858,677
4	Kennecott Utah Copper Smelter & Refy.	Magna, UT	16	141,488	3,536	0	15,042,630	15,187,654
5	Armco Inc. Butler Ops. (Rte 8S)	Butler, PA	14	55,377	14,060,975	0	0	14,116,352
6	Phelps Dodge Hidalgo Inc.	Playas, NM	16	127,441	5,668	0	9,806,485	9,939,594
7	Zinc Corp. of America Monaca Smelter	Monaca, PA	13	426,769	1,293	0	0	428,062
8	Nucor Steel	Crawfordsville, IN	8	15,734	16	0	0	15,750
9	Rouge Steel Co.	Dearborn, MI	8	22,456	604	0	0	23,060
10	Co-Steel Lasco	Whitby, ON	6	14,095	310	0	1,176,063	1,190,468
11	Dofasco Inc.	Hamilton, ON	18	402,320	1,493	0	0	403,813
12	USS Gary Works, USX Corp.	Gary, IN	33	582,009	9,575	0	5,086,841	5,678,425
13	Northwestern Steel & Wire Co.	Sterling, IL	6	56,526	8,348	0	5,738,322	5,803,196
14	Nucor-Yamato Steel Co.	Blytheville, AR	8	8,509	2	0	0	8,511
15	Natl. Steel Corp., Greatlakes Div.	Ecorse, MI	18	83,835	18,539	0	0	102,374
	Subtotal		**191**	**28,219,605**	**14,111,090**	**0**	**76,722,819**	**119,053,514**
	% of Total		**0.3**	**3**	**14**	**0**	**25**	**9**
	Total		**72,795**	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–5. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	8	8	8,507,296	Hydrochloric acid (air)
2	0	371,553	371,553	8,154,026	Hydrochloric acid (air)
3	0	0	0	7,307,075	Hydrochloric acid (air)
4	0	5	5	6,674,059	Hydrochloric acid (air)
5	0	364	364	6,282,377	Hydrochloric acid (air)
6	23,129	523,265	546,394	6,044,683	Hydrochloric acid, Sulfuric acid (air)
7	0	489	489	5,628,484	Hydrochloric acid (air)
8	41	2,763	2,804	5,191,301	Hydrochloric acid (air)
9	0	1	1	5,120,355	Hydrochloric acid, Sulfuric acid (air), Zinc and compounds (land)
10	0	0	0	5,114,650	Hydrochloric acid (air)
11	0	0	0	4,718,212	Hydrochloric acid, Hydrogen fluoride (air)
12	0	0	0	4,649,310	Hydrochloric acid, Sulfuric acid (air)
13	0	0	0	4,369,346	Sulfuric acid, Hydrochloric acid (air)
14	0	0	0	4,346,736	Hydrochloric acid (air)
15	0	25	25	4,275,784	Hydrochloric acid, Sulfuric acid (air)
	23,170	**898,473**	**921,643**	**86,383,694**	
	0.1	**0.4**	**0.3**	**5.3**	
	37,593,132	**245,433,073**	**283,026,205**	**1,636,903,244**	

Table 3–6. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	0	0	26,163,746	Chlorine (air)
2	0	2,184,136	2,184,136	21,317,968	Zinc and compounds (land)
3	0	139	139	20,858,816	Copper and compounds, Zinc and compounds (land)
4	0	258,691	258,691	15,446,345	Copper/Zinc/Arsenic and compounds (land)
5	862	221,149	222,011	14,338,363	Nitric acid and nitrate compounds (water)
6	0	0	0	9,939,594	Zinc and compounds, Copper and compounds (land)
7	0	9,038,217	9,038,217	9,466,279	Zinc and compounds (transfers of metals)
8	0	8,843,001	8,843,001	8,858,751	Zinc and compounds (transfers of metals)
9	326,531	6,961,360	7,287,891	7,310,951	Zinc and compounds (transfers of metals)
10	0	5,873,182	5,873,182	7,063,650	Zinc and compounds (transfers of metals)
11	30	6,302,410	6,302,440	6,706,253	Zinc and compounds (transfers of metals)
12	821	366,991	367,812	6,046,237	Zinc and compounds (land)
13	0	84,353	84,353	5,887,549	Zinc/Manganese and compounds (land)
14	0	5,095,164	5,095,164	5,103,675	Zinc and compounds (transfers of metals)
15	0	4,911,304	4,911,304	5,013,678	Zinc and compounds (transfers of metals)
	328,244	**50,140,097**	**50,468,341**	**169,521,855**	
	1	**20**	**18**	**10**	
	37,593,132	**245,433,073**	**283,026,205**	**1,636,903,244**	

- The 15 facilities with the largest releases in the primary metals sector, with 169.5 million kg, accounted for 10 percent of total releases in North America in 1998.
- While the first-ranked primary metals facility reported large on-site air releases (of chlorine), the others reported large on-site land disposal or off-site transfers of metals (primarily off-site land disposal).
- Most of these facilities reported zinc and its compounds as the major substance released. Zinc is used to galvanize metals (including steel) to prevent rust and is often in materials recycled by these facilities into steel and other products. While an essential nutrient, prolonged ingestion of excessive levels of zinc can cause anemia, damage to the pancreas, and reduction of beneficial cholesterol.

The chemicals industry reported the third-largest total releases in North America, reporting 274.1 million kg or 17 percent of total releases in 1998.

- The 15 facilities with the largest releases in the chemicals sector, with 92.9 million kg, accounted for 6 percent of total releases in North America in 1998.
- These 15 facilities accounted for half of all on-site underground injection in North America in 1998, with seven of the facilities reporting more than 3 million kg each of on-site underground injection.

Hazardous waste management and solvent recovery facilities reported the fourth largest total releases in North America in 1998, reporting 146.0 million kg or 9 percent of total releases in 1998.

- The 15 facilities with the largest releases in the hazardous waste management/solvent recovery sector, with 108.6 million kg, accounted for 7 percent of total releases in North America.
- These 15 facilities are disposal sites that receive wastes from manufacturing and other facilities. They accounted for 24 percent of on-site land disposal. They may also treat or consolidate wastes and transfer them to other disposal sites. The 15 facilities accounted for 21 percent of off-site transfers to disposal of chemicals that are not metals.

Table 3–7. The 15 North American Facilities with the Largest Total Releases in the Chemicals Industry, 1998

				On-site Releases				
Rank	Facility	City, State/ Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Solutia Inc.	Gonzalez, FL	18	79,642	778	9,787,718	0	9,868,138
2	DuPont Victoria Plant	Victoria, TX	29	159,736	1,333	9,546,080	6,234	9,713,383
3	PCS Nitrogen Fertilizer L.P.	Geismar, LA	12	52,663	8,920,211	0	269,176	9,242,050
4	Lenzing Fibers Corp.	Lowland, TN	5	7,875,401	3,158	0	117,959	7,996,518
5	Cytec Inds. Inc. Fortier Plant	Westwego, LA	23	62,955	8,427	7,590,431	0	7,661,813
6	Elementis Chromium L.P.	Corpus Christi, TX	2	2,176	793	0	6,893,424	6,896,393
7	BASF Corp.	Freeport, TX	27	274,878	6,807,961	16,405	0	7,099,244
8	BP Chemicals Inc., BP America Inc.	Lima, OH	27	247,410	0	4,873,801	0	5,121,211
9	Acordis Cellulosic Fibers Inc., Akzo Nobel Finance US	Axis, AL	4	4,835,375	7,347	0	190,476	5,033,198
10	Occidental Chemical Corp.	Castle Hayne, NC	1	2,888	17	0	4,535,150	4,538,055
11	Angus Chemical Co.	Sterlington, LA	11	73,581	164,921	4,159,850	327	4,398,679
12	BP Chemicals Inc. Green Lake Facility, BP America	Port Lavaca, TX	17	52,198	277	3,818,281	249	3,871,005
13	Vicksburg Chemical Co.	Vicksburg, MS	4	31,948	3,761,628	0	0	3,793,576
14	PCS Phosphate Co. Inc., Auroradiv.	Aurora, NC	5	157,769	0	0	3,482,247	3,640,016
15	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	11	278,804	0	3,228,253	3	3,507,060
	Subtotal		**196**	**14,187,424**	**19,676,851**	**43,020,819**	**15,495,245**	**92,380,339**
	% of Total		**0.3**	**2**	**19**	**50**	**5**	**7**
	Total		**72,795**	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**

Note: Canada and US data only. Mexico data not available for 1998. 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. The 15 North American Facilities with the Largest Total Releases in the Hazardous Waste Management Industry, 1998

				On-site Releases				
Rank	Facility	City, State/ Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH	11	518	0	0	22,881,631	22,882,149
2	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID	13	5,424	0	0	14,094,786	14,100,210
3	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL	10	242	4	0	9,779,092	9,779,338
4	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	8	0	0	0	0	0
5	Waste Management of Ohio Inc.	Vickery, OH	14	0	0	7,899,321	0	7,899,321
6	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	17	0	0	0	0	0
7	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT	21	290	0	0	6,473,025	6,473,315
8	Chemical Waste Management of the Northwest Inc.	Arlington, OR	26	1,657	0	0	5,455,476	5,457,133
9	Chemical Waste Management	Emelle, AL	15	153	0	0	5,043,764	5,043,917
10	Chemical Waste Management Inc.	Kettleman City, CA	21	2,694	0	0	4,853,527	4,856,221
11	Southeastern Chemical & Solvent Co. Inc., TBN Holdings	Sumter, SC	41	1,997	0	0	0	1,997
12	Envirite of Ohio Inc.	Canton, OH	9	465	459	0	0	924
13	Safety-Kleen Lone & Grassy Mtn. Inc.	Waynoka, OK	15	736	0	0	2,889,801	2,890,537
14	Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary, AB	1	0	0	0	2,802,160	2,802,160
15	Heritage Environmental Services L.L.C.	Indianapolis, IN	13	16	66	0	0	82
	Subtotal		**235**	**14,192**	**529**	**7,899,321**	**74,273,262**	**82,187,304**
	% of Total		**0.3**	**0.0**	**0.0**	**9**	**24**	**6**
	Total		**72,795**	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**

Note: Canada and US data only. Mexico data not available for 1998. 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	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	590	617	1,207	9,869,345	Nitric acid and nitrate compounds (UIJ)
2	38	215	253	9,713,636	Nitric acid and nitrate compounds (UIJ)
3	0	0	0	9,242,050	Phosphoric acid (water)
4	0	0	0	7,996,518	Carbon disulfide (air)
5	208	15,263	15,471	7,677,284	Acetonitrile, Acrylic acid, Acrylamide (UIJ)
6	0	372,338	372,338	7,268,731	Chromium and compounds (land)
7	6,189	7,389	13,578	7,112,822	Nitric acid and nitrate compounds (water)
8	353	281	634	5,121,845	Acetonitrile, Acrylamide (UIJ)
9	0	0	0	5,033,198	Carbon disulfide (air)
10	0	5,896	5,896	4,543,951	Chromium and compounds (land)
11	0	0	0	4,398,679	Nitric acid and nitrate compounds (UIJ)
12	3,079	94	3,173	3,874,178	Acetonitrile, Acrylamide, Acrylonitrile (UIJ)
13	0	0	0	3,793,576	Nitric acid and nitrate compounds (water)
14	0	0	0	3,640,016	Phosphoric acid (land)
15	94,800	31,014	125,814	3,632,874	Methanol (UIJ)
	105,257	**433,107**	**538,364**	**92,918,703**	
	0.3	**0.2**	**0.2**	**6**	
	37,593,132	**245,433,073**	**283,026,205**	**1,636,903,244**	

UIJ=underground injection.

Table 3–8. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	36,459	36,459	22,918,608	Zinc and compounds (land)
2	0	17	17	14,100,227	Zinc and compounds (land)
3	0	3,086	3,086	9,782,424	Zinc and compounds (land)
4	295,880	8,280,287	8,576,167	8,576,167	Zinc and compounds (transfers of metals)
5	28,440	143	28,583	7,927,904	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
6	3,520,241	3,427,991	6,948,232	6,948,232	Zinc and compounds (transfers of metals), Xylene, Toluene (transfers to disposal)
7	0	5,811	5,811	6,479,126	Zinc/Lead/Manganese/Copper and compounds (land)
8	0	3,466	3,466	5,460,599	Asbestos, Aluminum (land)
9	1,315	73,749	75,064	5,118,981	Lead/Zinc/Copper/Arsenic and compounds (land)
10	0	1,491	1,491	4,857,712	Aluminum oxide, Lead and compounds, Asbestos, Aluminum (land)
11	4,060,325	307,266	4,367,591	4,369,588	Ethylene glycol (transfers to disposal)
12	154,195	3,520,510	3,674,705	3,675,629	Nickel/Zinc/Chromium and compounds (transfers of metals)
13	0	1,599	1,599	2,892,136	Lead/Zinc/Cadmium/Chromium and compounds (land)
14	0	0	0	2,802,160	Asbestos (land)
15	0	2,707,242	2,707,242	2,707,324	Nickel/Zinc/Copper and compounds (transfers of metals)
	8,060,396	**18,369,117**	**26,429,513**	**108,616,817**	
	21	**7**	**9**	**7**	
	37,593,132	**245,433,073**	**283,026,205**	**1,636,903,244**	

UIJ=underground injection.

Facilities with Largest On-site Releases

The 50 facilities in North America with the largest on-site releases in the matched data set reported 391.3 million kg of on-site releases in 1998. Although they represented just 0.2 percent of the reporting facilities, these facilities contributed 29 percent of North American on-site releases.

- These 50 facilities with the largest on-site releases in 1998 reported more than half of North American on-site land releases and underground injection. They also contributed 30 percent of on-site releases to surface water and 16 percent of on-site releases to air in North America.
- Four of the 50 facilities reported more than 19 million kg of on-site releases, all located in the United States. Three are primary metals facilities and the fourth is a hazardous waste management facility (a new TRI industry sector).
- Of the 50 facilities, 27 are in new TRI industry sectors, with 19 electric generating facilities (US SIC code 491/493) and eight hazardous waste management facilities (US SIC codes 495/738). Also, 12 are in the primary metals sector (US SIC code 33) and 11 in the chemicals sector (US SIC code 28).

Table 3–9. The 50 North American Facilities with the Largest Total On-site Releases, 1998

						On-site Releases			
			SIC Codes						
Rank	Facility	City, State/ Province	Canada	US	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)
1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	6	26,163,746	0	0	0
2	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	11	518	0	0	22,881,631
3	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ		33	11	71,443	0	0	20,787,234
4	ASARCO Inc.	East Helena, MT		33	10	47,857	731	0	19,085,244
5	Kennecott Utah Copper Smelter & Refy.	Magna, UT		33	16	141,488	3,536	0	15,042,630
6	Armco Inc. Butler Ops. (Rte 8S)	Butler, PA		33	14	55,377	14,060,975	0	0
7	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	13	5,424	0	0	14,094,786
8	Phelps Dodge Hidalgo Inc.	Playas, NM		33	16	127,441	5,668	0	9,806,485
9	Solutia Inc.	Gonzalez, FL		28	18	79,642	778	9,787,718	0
10	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	10	242	4	0	9,779,092
11	DuPont Victoria Plant	Victoria, TX		28	29	159,736	1,333	9,546,080	6,234
12	PCS Nitrogen Fertilizer L.P.	Geismar, LA		28	12	52,663	8,920,211	0	269,176
13	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	12	8,182,292	8,316	0	316,680
14	Lenzing Fibers Corp.	Lowland, TN		28	5	7,875,401	3,158	0	117,959
15	Waste Management of Ohio Inc.	Vickery, OH		495/738	14	0	0	7,899,321	0
16	American Electric Power, John E. Amos Plant	Winfield, WV		491/493	12	7,577,375	1,993	0	203,105
17	Cytec Inds. Inc. Fortier Plant	Westwego, LA		28	23	62,955	8,427	7,590,431	0
18	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC		491/493	12	6,863,418	3,384	0	440,273
19	BASF Corp.	Freeport, TX		28	27	274,878	6,807,961	16,405	0
20	Elementis Chromium L.P.	Corpus Christi, TX		28	2	2,176	793	0	6,893,424
21	Dayton Power & Light Co. J.M Stuart Station	Manchester, OH		491/493	13	5,806,513	2,688	0	864,853
22	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT		495/738	21	290	0	0	6,473,025
23	American Electric Power, Mitchell Plant	Moundsville, WV		491/493	13	5,925,307	3,700	0	353,006
24	Northwestern Steel & Wire Co.	Sterling, IL		33	6	56,526	8,348	0	5,738,322
25	USS Gary Works, USX Corp.	Gary, IN		33	33	582,009	9,575	0	5,086,841
26	Cardinal Plant, Cardinal Operating Co.	Brilliant, OH		491/493	14	5,134,319	69,059	0	424,617
27	Firstenergy, W.H. Sammis Plant	Stratton, OH		491/493	14	5,493,361	4,380	0	548
28	Chemical Waste Management of the Northwest Inc.	Arlington, OR		495/738	26	1,657	0	0	5,455,476
29	Brandon Shores & Wagner Complex, Baltimore Gas Electric Co.	Baltimore, MD		491/493	14	5,185,006	2,297	0	1,194
30	BP Chemicals Inc.	Lima, OH		28	27	247,410	0	4,873,801	0
31	PSI Gibson Generating Station, Cinergy Corp.	Princeton, IN		491/493	13	3,656,341	0	0	1,464,013
32	Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke, ON	49	491/493	12	4,855,140	8,030	0	251,480
33	Chemical Waste Management	Emelle, AL		495/738	15	153	0	0	5,043,764
34	Acordis Cellulosic Fibers Inc., Akzo Nobel Finance US	Axis, AL		28	4	4,835,375	7,347	0	190,476
35	Elkem Metals Co.	Marietta, OH		33	6	186,815	198,186	0	4,473,469
36	Chemical Waste Management Inc.	Kettleman City, CA		495/738	21	2,694	0	0	4,853,527
37	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	8	3,178,052	0	0	1,545,000
38	Scherer Steam Electric Generating Plant	Juliette, GA		491/493	14	4,041,640	9,085	0	667,487
39	Kentucky Utilities Co. - Ghentstation, LG&E Energy Corp.	Ghent, KY		491/493	13	3,841,543	26,134	0	781,633
40	Occidental Chemical Corp.	Castle Hayne, NC		28	1	2,888	17	0	4,535,150
41	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	9	123,228	111	0	4,337,539
42	Angus Chemical Co.	Sterlington, LA		28	11	73,581	164,921	4,159,850	327
43	U.S. TVA Paradise Fossil Plant	Drakesboro, KY		491/493	14	4,120,838	30,773	0	217,735
44	Gulf Power Co. - Plant Crist, Southern Co.	Pensacola, FL		491/493	11	4,205,900	736	0	140,100
45	Detroit Edison Monroe Power Plant, DTE Energy	Monroe, MI		491/493	11	3,649,648	1,592	0	624,519
46	Doe Run Co. Glover Smelter, Renco Group Inc.	Annapolis, MO		33	7	19,744	12	0	4,220,682
47	Seminole Generating Station	Palatka, FL		491/493	11	3,803,251	1,118	0	405,381
48	Keystone Station	Shelocta, PA		491/493	10	3,954,757	3,938	0	219,775
49	Baldwin Power Station, Illinova Corp.	Baldwin, IL		491/493	22	3,830,609	0	0	318,368
50	EME Homer City Generation L.P.	Homer City, PA		491/493	11	4,011,984	3,016	0	109,070
	Subtotal				**678**	**138,570,651**	**30,382,331**	**43,873,606**	**178,521,330**
	% of Total				**1**	**16**	**30**	**51**	**57**
	Total				**72,795**	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–9. (*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 Releases On- and Off-site (kg)
1	26,163,746	Chlorine (air)	0	26,163,746
2	22,882,149	Zinc and compounds (land)	36,459	22,918,608
3	20,858,677	Copper/Zinc and compounds (land)	139	20,858,816
4	19,133,832	Zinc and compounds (land)	2,184,136	21,317,968
5	15,187,654	Copper/Zinc/Arsenic and compounds (land)	258,691	15,446,345
6	14,116,352	Nitric acid and nitrate compounds (water)	222,011	14,338,363
7	14,100,210	Zinc and compounds (land)	17	14,100,227
8	9,939,594	Zinc/Copper and compounds (land)	0	9,939,594
9	9,868,138	Nitric acid and nitrate compounds (UIJ)	1,207	9,869,345
10	9,779,338	Zinc and compounds (land)	3,086	9,782,424
11	9,713,383	Nitric acid and nitrate compounds (UIJ)	253	9,713,636
12	9,242,050	Phosphoric acid (water)	0	9,242,050
13	8,507,288	Hydrochloric acid (air)	8	8,507,296
14	7,996,518	Carbon disulfide (air)	0	7,996,518
15	7,899,321	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)	28,583	7,927,904
16	7,782,473	Hydrochloric acid (air)	371,553	8,154,026
17	7,661,813	Acetonitrile, Acrylic acid, Acrylamide (UIJ)	15,471	7,677,284
18	7,307,075	Hydrochloric acid (air)	0	7,307,075
19	7,099,244	Nitric acid and nitrate compounds (water)	13,578	7,112,822
20	6,896,393	Chromium and compounds (land)	372,338	7,268,731
21	6,674,054	Hydrochloric acid (air)	5	6,674,059
22	6,473,315	Zinc/Lead/Manganese/Copper and compounds (land)	5,811	6,479,126
23	6,282,013	Hydrochloric acid (air)	364	6,282,377
24	5,803,196	Zinc/Manganese and compounds (land)	84,353	5,887,549
25	5,678,425	Zinc and compounds (land)	367,812	6,046,237
26	5,627,995	Hydrochloric acid (air)	489	5,628,484
27	5,498,289	Hydrochloric acid (air)	546,394	6,044,683
28	5,457,133	Asbestos, Aluminum (land)	3,466	5,460,599
29	5,188,497	Hydrochloric acid (air)	2,804	5,191,301
30	5,121,211	Acetonitrile, Acrylamide (UIJ)	634	5,121,845
31	5,120,354	Hydrochloric acid, Sulfuric acid (air), Zinc and compounds (land)	1	5,120,355
32	5,114,650	Hydrochloric acid (air)	0	5,114,650
33	5,043,917	Lead/Zinc/Copper/Arsenic and compounds (land)	75,064	5,118,981
34	5,033,198	Carbon disulfide (air)	0	5,033,198
35	4,858,470	Manganese and compounds (land)	34,467	4,892,937
36	4,856,221	Aluminum oxide, Lead and compounds, Asbestos, Aluminum (land)	1,491	4,857,712
37	4,723,052	Sulfuric acid, Chromium and compounds (land)	0	4,723,052
38	4,718,212	Hydrochloric acid, Hydrogen fluoride (air)	0	4,718,212
39	4,649,310	Hydrochloric acid, Sulfuric acid (air)	0	4,649,310
40	4,538,055	Chromium and compounds (land)	5,896	4,543,951
41	4,460,878	Zinc and compounds (land)	16,520	4,477,398
42	4,398,679	Nitric acid and nitrate compounds (UIJ)	0	4,398,679
43	4,369,346	Sulfuric acid, Hydrochloric acid (air)	0	4,369,346
44	4,346,736	Hydrochloric acid (air)	0	4,346,736
45	4,275,759	Hydrochloric acid, Sulfuric acid (air)	25	4,275,784
46	4,240,438	Zinc/Lead and compounds (land)	149	4,240,587
47	4,209,750	Sulfuric acid (air)	0	4,209,750
48	4,178,470	Hydrochloric acid (air)	0	4,178,470
49	4,148,977	Hydrochloric acid, Sulfuric acid (air)	0	4,148,977
50	4,124,070	Hydrochloric acid (air)	0	4,124,070
	391,347,918		**4,653,275**	**396,001,193**
	29		**2**	**24**
	1,353,877,039		**283,026,205**	**1,636,903,244**

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 150.2 million kg of off-site releases in 1998. These facilities contributed 53 percent of North American off-site releases.

- The 50 facilities with the largest off-site releases in 1998 reported more than half of transfers of metals. These are transfers of metals primarily to land disposal, but also include transfers to treatment, sewage, and energy recovery facilities.
- Of the 50 facilities, 38 are in the primary metals sector (US SIC code 33), nine are hazardous waste management facilities (US SIC code 495/738), and three are chemical manufacturing facilities (US SIC code 28).

Table 3–10. The 50 North American Facilities with the Largest Off-site Releases, 1998

Rank	Facility	City, State Province	SIC Codes Canada	SIC Codes US	Number of Forms	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)
1	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA		33	13	0	9,038,217	9,038,217
2	Nucor Steel	Crawfordsville, IN		33	8	0	8,843,001	8,843,001
3	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	77	495/738	8	295,880	8,280,287	8,576,167
4	Rouge Steel Co.	Dearborn, MI		33	8	326,531	6,961,360	7,287,891
5	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	17	3,520,241	3,427,991	6,948,232
6	Dofasco Inc.	Hamilton, ON	29	33	18	30	6,302,410	6,302,440
7	Co-Steel Lasco	Whitby, ON	29	33	6	0	5,873,182	5,873,182
8	Nucor-Yamato Steel Co.	Blytheville, AR		33	8	0	5,095,164	5,095,164
9	Natl. Steel Corp., Great Lakes Div.	Ecorse, MI		33	18	0	4,911,304	4,911,304
10	Steel Dynamics Inc.	Butler, IN		33	3	0	4,638,323	4,638,323
11	Southeastern Chemical & Solvent Co. Inc., TBN Holdings	Sumter, SC		495/738	41	4,060,325	307,266	4,367,591
12	Cerro Wire & Cable Co. Inc.	Hartselle, AL		33	3	0	3,926,768	3,926,768
13	Envirite of Ohio Inc.	Canton, OH		495/738	9	154,195	3,520,510	3,674,705
14	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville, OR		33	5	0	3,019,351	3,019,351
15	Nucor Corp. Nucor Steel	Plymouth, UT		33	7	0	2,963,002	2,963,002
16	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	13	0	2,707,242	2,707,242
17	Crystal Clean Services L.L.C.	Indianapolis, IN		495/738	14	0	2,707,239	2,707,239
18	American Steel Foundries, Alliance Plant, Amsted Inds. Inc.	Alliance, OH		33	3	0	2,666,929	2,666,929
19	USS Mon Valley Works - Edgar Thomson Plant, USX Corp.	Braddock, PA		33	7	0	2,655,575	2,655,575
20	Nucor Steel, Nebraska	Norfolk, NE		33	8	0	2,582,536	2,582,536
21	Bar Tech. S. Inc. Primary Ops.	Johnstown, PA		33	6	1,088	2,427,575	2,428,663
22	Keystone Steel & Wire Co., Keystone Consolidated Inds. Inc.	Peoria, IL		33	6	0	2,395,192	2,395,192
23	Nucor Steel	Huger, SC		33	6	0	2,344,473	2,344,473
24	Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais, IL		33	6	0	2,288,063	2,288,063
25	ASARCO Inc.	East Helena, MT		33	10	0	2,184,136	2,184,136
26	Ipsco Steel Inc.	Muscatine, IA		33	6	0	2,083,648	2,083,648
27	Birmingham Steel Corp. Seattle WA Steel Div.	Seattle, WA		33	6	0	1,949,912	1,949,912
28	Wheeling-Pittsburgh Steel Corp. Mingo Junction	Mingo Junction, OH		33	9	0	1,896,554	1,896,554
29	Timken Co. - Faircrest Steel Plant	Canton, OH		33	7	0	1,864,852	1,864,852
30	Quemetco Inc., RSR Corp.	City of Industry, CA		33	5	0	1,852,321	1,852,321
31	Ivaco Rolling Mills	L'Orignal, ON	29	33	7	0	1,840,990	1,840,990
32	Nucor Steel, Arkansas Plant	Blytheville, AR		33	10	0	1,787,393	1,787,393
33	Zinc Corp. of America, Horsehead Ind. Inc.	Palmerton, PA		33	6	0	1,777,590	1,777,590
34	Stelco McMaster Ltée	Contrecœur, QC	29	33	5	0	1,776,970	1,776,970
35	Koppers Inds. Inc.	Cicero, IL		28	10	1,736,034	0	1,736,034
36	Weirton Steel Corp.	Weirton, WV		33	14	0	1,730,750	1,730,750
37	Birmingham Southeast LLC, Birmingham Steel Corp.	Cartersville, GA		33	7	0	1,719,793	1,719,793
38	Oregon Steel Mills Inc.	Portland, OR		33	6	0	1,627,130	1,627,130
39	FMC Corp. Phosphorus Chemicals Div.	Lawrence, KS		28	2	1,532,653	0	1,532,653
40	Roanoke Electric Steel Corp.	Roanoke, VA		33	7	0	1,498,104	1,498,104
41	Eveready Battery Co. Inc., Ralston Purina Co.	Marietta, OH		28	1	0	1,423,878	1,423,878
42	Philip Enterprises Inc., Rexdale Facility	Etobicoke, ON	77	495/738	7	1,372,400	0	1,372,400
43	CSC Ltd., SBQ Ltd.	Warren, OH		33	7	0	1,350,431	1,350,431
44	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	5	608,990	712,700	1,321,690
45	Encycle Texas Inc., ASARCO Inc.	Corpus Christi, TX		495/738	7	0	1,317,793	1,317,793
46	Grede Foundries Inc. Milwaukee Steel Div.	Milwaukee, WI		33	7	780	1,304,711	1,305,491
47	Southwire Co.	Carrollton, GA		33	33	3,960	1,293,320	1,297,280
48	Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor, ON	29	33	8	0	1,279,315	1,279,315
49	Slater Steels, Hamilton Specialty Bar Division	Hamilton, ON	29	33	9	175	1,263,649	1,263,824
50	Quemetco Inc., RSR Corp.	Indianapolis, IN		33	6	0	1,179,879	1,179,879
	Subtotal				**448**	**13,613,282**	**136,598,779**	**150,212,061**
	% of Total				**1**	**36**	**56**	**53**
	Total				**72,795**	**37,593,132**	**245,433,073**	**283,026,205**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–10. (*continued*)

Rank	Major Chemicals Reported (Primary Transfers) (chemicals accounting for more than 70% of off-site releases transferred from the facility)	Total On-site Releases (kg)	Total Releases On - and Off-site (kg)
1	Zinc and compounds (transfers of metals)	428,062	9,466,279
2	Zinc and compounds (transfers of metals)	15,750	8,858,751
3	Zinc and compounds (transfers of metals)	0	8,576,167
4	Zinc and compounds (transfers of metals)	23,060	7,310,951
5	Zinc and compounds (transfers of metals), Xylene, Toluene (transfers to disposal)	0	6,948,232
6	Zinc and compounds (transfers of metals)	403,813	6,706,253
7	Zinc and compounds (transfers of metals)	1,190,468	7,063,650
8	Zinc and compounds (transfers of metals)	8,511	5,103,675
9	Zinc and compounds (transfers of metals)	102,374	5,013,678
10	Zinc and compounds (transfers of metals)	15,015	4,653,338
11	Ethylene glycol (transfers to disposal)	1,997	4,369,588
12	Copper and compounds (transfers of metals)	15	3,926,783
13	Nickel/Zinc/Chromium and compounds (transfers of metals)	924	3,675,629
14	Zinc and compounds (transfers of metals)	3,928	3,023,279
15	Zinc and compounds (transfers of metals)	16,968	2,979,970
16	Nickel/Zinc/Copper and compounds (transfers of metals)	82	2,707,324
17	Nickel/Zinc/Copper and compounds (transfers of metals)	82	2,707,321
18	Chromium and compounds (transfers of metals)	10,577	2,677,506
19	Zinc and compounds (transfers of metals)	2,783	2,658,358
20	Zinc and compounds (transfers of metals)	6,121	2,588,657
21	Zinc and compounds (transfers of metals)	5,978	2,434,641
22	Zinc and compounds (transfers of metals)	43,029	2,438,221
23	Zinc and compounds (transfers of metals)	5,881	2,350,354
24	Zinc and compounds (transfers of metals)	3,356	2,291,419
25	Lead/Cadmium and compounds (transfers of metals)	19,133,832	21,317,968
26	Zinc and compounds (transfers of metals)	1,185	2,084,833
27	Zinc and compounds (transfers of metals)	11,902	1,961,814
28	Zinc and compounds (transfers of metals)	28,575	1,925,129
29	Zinc/Manganese and compounds (transfers of metals)	2,823	1,867,675
30	Lead/Antimony and compounds (transfers of metals)	817	1,853,138
31	Zinc and compounds (transfers of metals)	9,648	1,850,638
32	Zinc and compounds (transfers of metals)	8,469	1,795,862
33	Lead and compounds (transfers of metals)	4,331	1,781,921
34	Zinc and compounds (transfers of metals)	18,122	1,795,092
35	Phthalic anhydride (transfers to disposal)	83,234	1,819,268
36	Manganese and compounds (transfers of metals)	124,793	1,855,543
37	Zinc and compounds (transfers of metals)	18,065	1,737,858
38	Zinc and compounds (transfers of metals)	3,492	1,630,622
39	Phosphoric acid (transfers to disposal)	19,673	1,552,326
40	Zinc and compounds (transfers of metals)	2,846	1,500,950
41	Manganese and compounds (transfers of metals)	5,830	1,429,708
42	Xylene, Toluene (transfers to disposal)	0	1,372,400
43	Zinc and compounds (transfers of metals)	40,384	1,390,815
44	Nitric acid and nitrate compounds (transfers to disposal), Chromium and compounds (transfers of metals)	0	1,321,690
45	Lead/Zinc and compounds (transfers of metals)	2,100	1,319,893
46	Manganese/Chromium and compounds (transfers of metals)	2,042	1,307,533
47	Zinc and compounds (transfers of metals)	19,625	1,316,905
48	Zinc/Copper and compounds (transfers of metals)	312	1,279,627
49	Zinc and compounds (transfers of metals)	12,793	1,276,617
50	Lead/Antimony and compounds (transfers of metals)	728	1,180,607
		21,844,395	**172,056,456**
		2	**11**
		1,353,877,039	**1,636,903,244**

3.2.4 Releases by Chemical

There are 165 substances in the matched data set. These are the substances reported both to NPRI and TRI.

- Only a few chemicals account for most releases on- and off-site in North America. Just 25 of the 165 matched chemicals, with 1.5 billion kg of releases, represented 91 percent of the total releases on- and off-site in North America.
- Hydrochloric acid had the largest releases in North America—278.7 million kg or 17 percent of total North American releases. Only air emissions of hydrochloric acid are included in the matched data set because only aerosol forms of the chemical are reportable to TRI.
- Zinc and its compounds ranked second for total releases, with 249.1 million kg (15 percent of the total), including 119.2 million kg of on-site land releases and 122.8 million kg of off-site releases of metals.
- Nitric acid and nitrate compounds ranked third overall and first for both surface water discharges and underground injection.
- Asbestos was the substance with the largest reported transfers off-site to disposal (of substances not including metals).

Carcinogens

Of the 165 chemicals in the matched data set, 49 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 Toxicological Program (NTP) <http://ntp-server.niehs.nih.gov/>.

Table 3–11. The 25 Chemicals with the Largest Total On- and Off-site Releases in North America, 1998

		On-site Releases					Off-site Releases					
CAS Number	Chemical	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	NPRI as % of North American Total	TRI as % of North American Total
7647-01-0	Hydrochloric acid	278,692,433	0	0	0	278,692,433	0	0	0	278,692,433	4	96
--	Zinc (and its compounds)*	5,710,960	921,871	411,127	119,240,130	126,292,996	0	122,826,514	122,826,514	249,119,510	12	88
--	Nitric acid and nitrate compounds	1,478,024	80,326,143	35,878,043	1,961,291	119,644,549	3,232,185	0	3,232,185	122,876,734	3	97
67-56-1	Methanol	100,610,635	3,708,431	10,202,083	863,779	115,395,636	916,442	0	916,442	116,312,078	16	84
--	Manganese (and its compounds)*	1,422,608	2,902,625	3,584,134	50,205,396	58,123,866	0	38,299,276	38,299,276	96,423,142	10	90
7664-93-9	Sulfuric acid	96,336,241	0	0	0	96,336,241	0	0	0	96,336,241	9	91
--	Copper (and its compounds)*	2,476,804	221,879	206,125	35,569,417	38,478,264	0	18,606,996	18,606,996	57,085,260	4	96
108-88-3	Toluene	50,172,525	23,571	301,702	67,546	50,571,480	2,490,055	0	2,490,055	53,061,535	15	85
--	Lead (and its compounds)*▼	1,129,422	65,137	88,807	24,973,221	26,261,590	0	25,106,602	25,106,602	51,368,192	9	91
--	Chromium (and its compounds)*▼	547,232	131,102	818,005	22,961,100	24,465,076	0	19,760,910	19,760,910	44,225,986	11	89
7664-39-3	Hydrogen fluoride	39,846,680	10,804	1,315,893	253,054	41,426,440	57,898	0	57,898	41,484,338	8	92
1330-20-7	Xylene (mixed isomers)	36,969,553	25,002	69,832	43,630	37,116,608	3,955,104	0	3,955,104	41,071,712	23	77
7782-50-5	Chlorine	27,586,950	188,706	40,488	149,931	27,968,796	13,638	0	13,638	27,982,434	2	98
78-93-3	Methyl ethyl ketone	25,409,766	24,835	565,442	43,599	26,049,519	1,125,697	0	1,125,697	27,175,216	20	80
7664-38-2	Phosphoric acid	567,702	12,569,018	1,095,215	9,689,837	23,922,851	2,944,717	0	2,944,717	26,867,568	2	98
100-42-5	Styrene▼	25,242,349	6,107	230,407	152,359	25,637,011	927,959	0	927,959	26,564,970	4	96
--	Nickel (and its compounds)*▼	967,073	216,342	270,622	9,824,659	11,282,241	0	10,240,282	10,240,282	21,522,523	5	95
75-09-2	Dichloromethane▼	20,229,565	7,114	222,524	83,574	20,544,599	204,606	0	204,606	20,749,205	11	89
75-15-0	Carbon disulfide	19,716,648	2,124	7,528	748	19,727,948	2,958	0	2,958	19,730,906	0.1	100
74-85-1	Ethylene	16,372,799	1,692	1,912	133	16,377,586	823	0	823	16,378,409	15	85
1332-21-4	Asbestos (friable)▼	1,235	0	0	9,426,487	9,427,722	6,715,223	0	6,715,223	16,142,945	30	70
71-36-3	n-Butyl alcohol	10,782,219	42,868	1,437,432	2,971	12,269,391	259,647	0	259,647	12,529,038	9	91
50-00-0	Formaldehyde▼	7,319,162	155,810	4,450,636	130,517	12,059,084	233,120	0	233,120	12,292,204	11	89
--	Arsenic (and its compounds)*▼	280,481	76,799	198,818	8,128,393	8,685,335	0	1,803,563	1,803,563	10,488,898	5	95
75-05-8	Acetonitrile	475,638	13,088	9,402,808	14	9,891,548	543,805	0	543,805	10,435,353	0.1	100
	Subtotal	**770,344,704**	**101,641,068**	**70,799,583**	**293,771,786**	**1,236,648,810**	**23,623,877**	**236,644,143**	**260,268,020**	**1,496,916,830**	**9**	**91**
	% of Total	**90**	**99**	**82**	**94**	**91**	**63**	**96**	**92**	**91**		
	Total	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**	**37,593,132**	**245,433,073**	**283,026,205**	**1,636,903,244**	**9**	**91**

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

Table 3–12. On- and Off-site Releases in North America of Known or Suspected Carcinogens,▼ 1998

CAS Number	Chemical	On-site Releases: Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases: Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	NPRI as % of North American Total	TRI as % of North American Total
--	Lead (and its compounds)	1,129,422	65,137	88,807	24,973,221	26,261,590	0	25,106,602	25,106,602	51,368,192	8.7	91.3
--	Chromium (and its compounds)	547,232	131,102	818,005	22,961,100	24,465,076	0	19,760,910	19,760,910	44,225,986	11.0	89.0
100-42-5	Styrene	25,242,349	6,107	230,407	152,359	25,637,011	927,959	0	927,959	26,564,970	4.1	95.9
--	Nickel (and its compounds)	967,073	216,342	270,622	9,824,659	11,282,241	0	10,240,282	10,240,282	21,522,523	5.4	94.6
75-09-2	Dichloromethane	20,229,565	7,114	222,524	83,574	20,544,599	204,606	0	204,606	20,749,205	10.7	89.3
1332-21-4	Asbestos (friable)	1,235	0	0	9,426,487	9,427,722	6,715,223	0	6,715,223	16,142,945	30.1	69.9
50-00-0	Formaldehyde	7,319,162	155,810	4,450,636	130,517	12,059,084	233,120	0	233,120	12,292,204	11.0	89.0
--	Arsenic (and its compounds)	280,481	76,799	198,818	8,128,393	8,685,335	0	1,803,563	1,803,563	10,488,898	5.2	94.8
79-01-6	Trichloroethylene	6,728,726	392	269	363	6,731,053	59,242	0	59,242	6,790,295	12.7	87.3
75-07-0	Acetaldehyde	5,914,751	88,765	187,567	9,759	6,200,977	2,580	0	2,580	6,203,557	3.2	96.8
71-43-2	Benzene	4,560,376	8,733	303,557	22,645	4,895,311	356,858	0	356,858	5,252,169	26.2	73.8
--	Cadmium (and its compounds)	75,897	1,916	134,532	2,941,420	3,154,615	0	1,533,161	1,533,161	4,687,776	5.1	94.9
67-66-3	Chloroform	3,101,611	66,754	20,003	5,590	3,194,676	27,353	0	27,353	3,222,029	6.5	93.5
79-06-1	Acrylamide	18,588	1,030	2,872,366	0	2,892,184	3,498	0	3,498	2,895,682	0.0	100.0
--	Cobalt (and its compounds)	66,115	29,062	14,946	2,151,260	2,261,483	0	623,142	623,142	2,884,625	3.3	96.7
127-18-4	Tetrachloroethylene	2,506,749	808	2,975	9,967	2,521,121	84,767	0	84,767	2,605,888	2.1	97.9
107-13-1	Acrylonitrile	524,966	497	1,816,459	145	2,343,322	5,349	0	5,349	2,348,671	0.3	99.7
108-05-4	Vinyl acetate	1,659,785	1,661	289,316	26,058	1,977,213	90,269	0	90,269	2,067,482	14.4	85.6
106-99-0	1,3-Butadiene	1,343,548	4,007	332	3,626	1,351,760	1,164	0	1,164	1,352,924	7.5	92.5
117-81-7	Di(2-ethylhexyl) phthalate	104,283	301	0	11,103	115,693	487,108	0	487,108	602,801	9.8	90.2
107-06-2	1,2-Dichloroethane	358,298	1,347	26,755	753	387,153	92,100	0	92,100	479,253	5.6	94.4
75-01-4	Vinyl chloride	427,367	113	70	0	428,009	31,392	0	31,392	459,401	5.7	94.3
75-56-9	Propylene oxide	349,775	509	6,940	313	357,537	7,639	0	7,639	365,176	3.9	96.1
123-91-1	1,4-Dioxane	57,280	66,648	113	14,566	138,607	216,842	0	216,842	355,449	0.8	99.2
75-21-8	Ethylene oxide	294,888	167	10,557	793	307,362	843	0	843	308,205	5.7	94.3
98-95-3	Nitrobenzene	36,484	522	191,665	28	228,699	5,616	0	5,616	234,315	0.0	100.0
56-23-5	Carbon tetrachloride	125,747	1,284	10,507	761	138,299	13,096	0	13,096	151,395	0.8	99.2
106-89-8	Epichlorohydrin	89,881	196	5,516	936	96,532	7,531	0	7,531	104,063	0.0	100.0
106-46-7	1,4-Dichlorobenzene	91,720	774	1,406	209	94,209	37	0	37	94,246	9.7	90.3
140-88-5	Ethyl acrylate	57,209	49	0	237	57,591	15,638	0	15,638	73,229	0.1	99.9
26471-62-5	Toluenediisocyanate (mixed isomers)	25,910	0	0	242	26,458	14,921	0	14,921	41,379	3.1	96.9
95-80-7	2,4-Diaminotoluene	715	0	0	0	715	38,220	0	38,220	38,935	0.0	100.0
101-77-9	4,4'-Methylenedianiline	4,117	2,286	23,220	0	29,623	3,113	0	3,113	32,736	0.0	100.0
302-01-2	Hydrazine	5,140	85	12,159	167	17,551	12,370	0	12,370	29,921	0.2	99.8
100-44-7	Benzyl chloride	12,216	270	68	119	12,803	2,044	0	2,044	14,847	0.9	99.1
139-13-9	Nitrilotriacetic acid	2,338	4,627	1,088	5,268	13,416	100	0	100	13,516	14.0	86.0
79-46-9	2-Nitropropane	10,810	253	0	0	11,063	87	0	87	11,150	0.0	100.0
121-14-2	2,4-Dinitrotoluene	903	281	0	4,535	5,719	3,965	0	3,965	9,684	2.0	98.0
77-78-1	Dimethyl sulfate	4,926	21	0	0	4,947	458	0	458	5,405	0.2	99.8
584-84-9	Toluene-2,4-diisocyanate	3,060	2	0	0	3,072	1,995	0	1,995	5,067	0.2	99.8
62-56-6	Thiourea	758	162	567	113	1,600	2,673	0	2,673	4,273	0.0	100.0
96-45-7	Ethylene thiourea	137	2	0	0	139	2,896	0	2,896	3,035	0.0	100.0
64-67-5	Diethyl sulfate	2,806	0	0	0	2,806	80	0	80	2,886	0.0	100.0
91-08-7	Toluene-2,6-diisocyanate	708	0	0	0	710	489	0	489	1,199	0.2	99.8
96-09-3	Styrene oxide	4	0	0	0	347	0	0	0	347	98.8	1.2
606-20-2	2,6-Dinitrotoluene	214	28	0	0	242	0	0	0	242	0.0	100.0
90-94-8	Michler's ketone	232	0	0	0	232	0	0	0	232	0.0	100.0
101-14-4	4,4'-Methylenebis(2-chloroaniline)	7	0	0	0	12	0	0	0	12	41.7	58.3
94-59-7	Safrole	5	0	0	0	5	0	0	0	5	0.0	100.0
	Subtotal	**84,285,569**	**941,963**	**12,212,772**	**80,891,286**	**178,367,524**	**9,673,241**	**59,067,660**	**68,740,901**	**247,108,425**	**9.8**	**90.2**
	% of Total	**10**	**1**	**14**	**26**	**13**	**26**	**24**	**24**	**15**		
	Total	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**	**37,593,132**	**245,433,073**	**283,026,205**	**1,636,903,244**	**9.2**	**90.8**

Note: Canada and US data only. Mexico data not available for 1998. A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.

▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

- Fifteen percent of all releases on- and off-site in North America in 1998 were of designated carcinogens. Total releases on- and off-site of carcinogens were 247.1 million kg.
- Carcinogenic substances showed a different pattern from other matched chemicals. They were more likely to be land releases—both on- and off-site as transfers to disposal and of metals (which are primarily to landfills)—and less likely to be released on-site to surface water and air than other matched chemicals.
- Lead and its compounds were released in the largest amounts—with 25.0 million kg of on-site land releases and 25.1 million kg of off-site releases. Chromium and its compounds ranked second, with 23.0 million kg of on-site land releases and 19.8 million kg of off-site releases. Both lead and chromium are metals, and a metal is included as a designated carcinogen if it or any of its compounds are designated carcinogens.
- Styrene had the largest on-site air emissions—25.2 million kg. Dichloromethane had the second largest on-site air emissions, with 20.2 million kg.
- Overall, TRI facilities reported 90 percent of the total releases on- and off-site of carcinogens in North America, with NPRI facilities reporting 10 percent. However, NPRI facilities reported 30 percent of total releases of asbestos and 26 percent of total releases of benzene.

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

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

A small number of facilities account for a substantial share of releases of carcinogens. The 50 facilities in North America with the largest total releases of known or suspected carcinogens in the matched data set accounted for 36 percent of all carcinogen releases.

- These 50 facilities accounted for 70 percent of on-site underground injection of designated carcinogens, with four facilities reporting more than 1.0 million kg.
- The 50 facilities also accounted for 66 percent of the on-site land releases of carcinogens in 1998, with 19 facilities reporting more than 1.0 million kg. Twenty-one of the 50 facilities were hazardous waste management facilities, which receive wastes for treatment and/or disposal. These facilities reported substantial amounts of on-site land disposal.
- The 50 facilities accounted for 29 percent of all off-site releases of designated carcinogens. Off-site releases consist of transfers to disposal and other transfers of metals to treatment, sewage and energy recovery. One facility reported more than 1.0 million kg of transfers to disposal of asbestos, and seven facilities reported more than 1.0 million kg of transfers of metals.

Table 3–13. The 50 North American Facilities with the Largest Total Releases of Known or Suspected Carcinogens,▼ 1998

Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Number of Forms	On-site Releases Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Elementis Chromium L.P.	Corpus Christi, TX		28	1	2,063	113	0	6,893,424	6,895,600
2	Kennecott Utah Copper Smelter & Refy.	Magna, UT		33	6	53,339	1,223	0	6,353,061	6,407,623
3	Occidental Chemical Corp.	Castle Hayne, NC		28	1	2,888	17	0	4,535,150	4,538,055
4	Chemical Waste Management of the Northwest Inc.	Arlington, OR		495/738	11	300	0	0	4,328,519	4,328,819
5	ASARCO Inc.	East Helena, MT		33	4	24,665	30	0	2,069,543	2,094,238
6	Monsanto - Luling	Luling, LA		28	2	17,506	0	3,039,637	0	3,057,143
7	Chemical Waste Management	Emelle, AL		495/738	6	133	0	0	2,908,125	2,908,258
8	Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary, AB	99	495/738	1	0	0	0	2,802,160	2,802,160
9	American Steel Foundries, Alliance Plant, Amsted Inds. Inc.	Alliance, OH		33	1	3,810	0	0	0	3,810
10	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT		495/738	8	113	0	0	2,536,071	2,536,184
11	Envirite of Ohio Inc.	Canton, OH		495/738	5	125	4	0	0	129
12	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	6	1,140	0	0	2,192,744	2,193,884
13	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	4	42	0	0	2,044,444	2,044,486
14	Chemical Waste Management Inc.	Kettleman City, CA		495/738	9	808	0	0	2,032,940	2,033,748
15	Safety-Kleen Lone & Grassy Mtn. Inc.	Waynoka, OK		495/738	6	494	0	0	1,882,993	1,883,487
16	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	5	270,626	0	0	1,545,000	1,815,626
17	Aguaglass Corp.	Adamsville, TN		30	1	1,688,553	0	0	16,460	1,705,013
18	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	4	8	5	0	0	13
19	Crystal Clean Services L.L.C.	Indianapolis, IN		495/738	4	8	5	0	0	13
20	Wayne Disposal Inc., The Environmental Quality Co.	Belleville, MI		495/738	9	567	0	0	1,319,274	1,319,841
21	Quemetco Inc.	City of Industry, CA		33	3	766	0	0	0	766
22	BP Chemicals Inc. Green Lake Facility, BP America	Port Lavaca, TX		28	5	18,014	0	1,442,045	41	1,460,100
23	Zinc Corp. of America, Horsehead Ind. Inc.	Palmerton, PA		33	3	9	39	0	0	48
24	Safety-Kleen (Buttonwillow) Inc.	Buttonwillow, CA		495/738	7	126	0	0	1,371,267	1,371,393
25	Cytec Inds. Inc. Fortier Plant	Westwego, LA		28	5	4,583	70	1,360,318	0	1,364,971
26	Doe Run Co. Glover Smelter, Renco Group Inc.	Annapolis, MO		33	4	16,719	5	0	1,303,602	1,320,326
27	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ		33	5	10,154	0	0	1,306,493	1,316,647
28	Angus Chemical Co.	Sterlington, LA		28	4	11,712	759	1,172,501	327	1,185,299
29	CWM Chemical Services L.L.C	Model City, NY		495/738	7	2	34	0	1,131,065	1,131,101
30	Waste Control Specialist L.L.C.	Andrews, TX		495/738	5	1,224	0	0	1,098,030	1,099,254
31	LTV Steel Co. Inc. Pittsburghworks	Pittsburgh, PA		33	3	1,587	0	0	0	1,587
32	Safety-Kleen (Westmorland) Inc.	Westmorland, CA		495/738	6	35	0	0	980,349	980,384
33	S&W Waste Inc.	South Kearny, NJ		495/738	8	559	271	0	0	830
34	Quemetco Inc., RSR Corp.	Indianapolis, IN		33	4	677	6	0	0	683
35	Carpenter Co.	Russellville, KY		Mult	5	905,682	0	0	0	905,682
36	Federal Mogul Friction Prods.	Manila, AR		37	1	113	0	0	0	113
37	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	5	11	2	0	867,664	867,677
38	Foamex L.P.	Corry, PA		30	2	849,850	0	0	0	849,850
39	BP Chemicals Inc., BP America Inc.	Lima, OH		28	10	30,303	0	783,891	0	814,194
40	Eastman Kodak Co. Kodak Park	Rochester, NY		38	8	790,799	16,966	0	2,086	809,851
41	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	77	495/738	4	0	0	0	0	0
42	Solutia - Chocolate Bayou	Alvin, TX		28	3	12,349	0	753,877	0	766,226
43	Indian River Power Plant	Titusville, FL		491/493	2	745,579	226	0	0	745,805
44	C & D Techs. Inc.	Conyers, GA		36	1	535	0	0	0	535
45	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	5	105,523	69	0	625,981	731,573
46	Carpenter Co. ,Tupelo Div.	Verona, MS		30	3	732,886	0	0	0	732,886
47	Safety-Kleen (Pinewood)	Pinewood, SC		495/738	8	231	0	0	730,445	730,676
48	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	29	33	2	2,453	100	0	0	2,653
49	Pollution Control Inds. Inc.	East Chicago, IN		495/738	20	2,262	0	0	0	2,262
50	Glenbrook Nickel Co.	Riddle, OR		33	1	7,868	7	0	700,695	708,570
	Subtotal				**243**	**6,319,799**	**19,951**	**8,552,269**	**53,577,953**	**68,470,072**
	% of Total				**1**	**7**	**2**	**70**	**66**	**38**
	Total for Carcinogens				**19,685**	**84,285,569**	**941,963**	**12,212,772**	**80,891,286**	**178,367,524**

Note: Canada and US data only. Mexico data not available for 1998. 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. A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.

▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 3–13. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total 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)
1	0	372,338	372,338	7,267,938	Chromium and compounds (land)
2	0	106,531	106,531	6,514,154	Arsenic/Lead and compounds (land)
3	0	5,896	5,896	4,543,951	Chromium and compounds (land)
4	0	993	993	4,329,812	Asbestos (land)
5	0	1,603,235	1,603,235	3,697,473	Lead and compounds (land, transfers of metals)
6	0	0	0	3,057,143	Formaldehyde (UIJ)
7	0	56,348	56,348	2,964,606	Lead/Arsenic/Cadmium and compounds (land)
8	0	0	0	2,802,160	Asbestos (land)
9	0	2,630,385	2,630,385	2,634,195	Chromium and compounds (transfers of metals)
10	0	3,144	3,144	2,539,328	Lead/Cadmium and compounds, Asbestos (land)
11	0	2,265,725	2,265,725	2,265,854	Nickel/Chromium and compounds (transfers of metals)
12	0	11	11	2,193,895	Lead and compounds (land)
13	0	3,959	3,959	2,048,445	Lead and compounds (land)
14	0	917	917	2,034,665	Lead and compounds, Asbestos (land)
15	0	1,436	1,436	1,884,923	Lead/Cadmium/Chromium and compounds (land)
16	0	0	0	1,815,626	Chromium and compounds (land)
17	0	0	0	1,705,013	Styrene (air)
18	0	1,515,151	1,515,151	1,515,164	Nickel/Chromium and compounds (transfers of metals)
19	0	1,515,150	1,515,150	1,515,163	Nickel/Chromium and compounds (transfers of metals)
20	6,285	176,319	182,604	1,502,445	Lead/Nickel/Arsenic and compounds (land)
21	0	1,483,052	1,483,052	1,483,818	Lead and compounds (transfers of metals)
22	0	94	94	1,460,194	Acrylamide, Acrylonitrile (UIJ)
23	0	1,433,758	1,433,758	1,433,806	Lead and compounds (transfers of metals)
24	0	6	6	1,371,399	Asbestos (land)
25	2	533	535	1,365,506	Acrylamide, Acrylonitrile (UIJ)
26	0	149	149	1,320,475	Lead and compounds (land)
27	0	14	14	1,316,661	Lead and compounds (land)
28	0	0	0	1,185,299	Formaldehyde (UIJ)
29	0	13,982	13,982	1,145,083	Asbestos, Lead and compounds (land)
30	0	0	0	1,099,254	Lead/Cadmium and compounds (land)
31	1,009,569	0	1,009,569	1,011,156	Asbestos (transfers to disposal)
32	0	5	5	980,389	Arsenic/Nickel and compounds (land)
33	901,483	71,285	972,768	973,598	Asbestos (transfers to disposal)
34	0	905,235	905,235	905,918	Lead and compounds (transfers of metals)
35	0	0	0	905,682	Dichloromethane (air)
36	875,102	0	875,102	875,215	Asbestos (transfers to disposal)
37	0	341	341	868,018	Lead and compounds (land)
38	0	0	0	849,850	Dichloromethane (air)
39	240	159	399	814,593	Acrylamide (UIJ)
40	213	3,829	4,042	813,893	Dichloromethane (air)
41	285,440	494,160	779,600	779,600	Lead and compounds (transfers of metals), Asbestos (transfers to disposal)
42	0	0	0	766,226	Acrylonitrile (UIJ)
43	0	0	0	745,805	Formaldehyde (air)
44	0	744,693	744,693	745,228	Lead and compounds (transfers of metals)
45	0	11,920	11,920	743,493	Lead and compounds (land)
46	0	0	0	732,886	Dichloromethane (air)
47	0	0	0	730,676	Lead/Chromium/Arsenic/Lead and compounds (land)
48	0	724,670	724,670	727,323	Chromium and compounds (transfers of metals)
49	0	719,187	719,187	721,449	Lead and compounds (transfers of metals)
50	0	0	0	708,570	Nickel and compounds (land)
	3,078,334	**16,864,610**	**19,942,944**	**88,413,016**	
	32	**29**	**29**	**36**	
	9,673,241	**59,067,660**	**68,740,901**	**247,108,425**	

UIJ=underground injection.

Metals

Over one-third of the total releases on- and off-site in North America in 1998 were of metals and metal compounds. Total releases of the 15 metals and their compounds reportable to both NPRI and TRI totaled 551.9 million kg in North America in 1998, 34 percent of total releases. 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.

- Most metals are released to land. On-site land releases were 282.2 million kg and transfers off-site were 245.4 million kg. Since transfers off-site of metals are primarily to landfills, land releases represented 96 percent of the 551.9 million kg of total releases of metals.
- On-site land releases of metals and their compounds accounted for 91 percent of all on-site land releases in North America. Off-site releases of metals (which are primarily transfers to land disposal) were 87 percent of all off-site releases in 1998.
- Zinc and its compounds, with 249.1 million kg, ranked first for total releases. It had the largest on-site air emissions, on-site land releases and off-site releases of the metals group. Manganese and its compounds ranked second, with 96.4 million kg, and had the largest on-site releases to surface water and underground injection.

Table 3–14. Releases On- and Off-site in North America of Metals and Their Compounds, 1998

		On-site Releases				
CAS Number	Chemical	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
--	Zinc (and its compounds)	5,710,960	921,871	411,127	119,240,130	126,292,996
--	Manganese (and its compounds)	1,422,608	2,902,625	3,584,134	50,205,396	58,123,866
--	Copper (and its compounds)	2,476,804	221,879	206,125	35,569,417	38,478,264
--	Lead (and its compounds)	1,129,422	65,137	88,807	24,973,221	26,261,590
--	Chromium (and its compounds)	547,232	131,102	818,005	22,961,100	24,465,076
--	Nickel (and its compounds)	967,073	216,342	270,622	9,824,659	11,282,241
--	Arsenic (and its compounds)	280,481	76,799	198,818	8,128,393	8,685,335
7429-90-5	Aluminum (fume or dust)	618,587	1,727	2	3,221,903	3,843,048
--	Cadmium (and its compounds)	75,897	1,916	134,532	2,941,420	3,154,615
--	Antimony (and its compounds)	50,747	33,759	13,738	1,256,888	1,356,079
--	Cobalt (and its compounds)	66,115	29,062	14,946	2,151,260	2,261,483
--	Selenium (and its compounds)	284,537	19,952	25,382	1,089,891	1,420,251
7440-62-2	Vanadium (fume or dust)	125,124	299	0	368,996	495,001
--	Silver (and its compounds)	9,665	2,790	7,025	220,939	240,919
--	Mercury (and its compounds)	7,529	136	0	86,954	94,636
	Subtotal	**13,772,781**	**4,625,396**	**5,773,263**	**282,240,567**	**306,455,400**
	% of Total	**2**	**4**	**7**	**91**	**23**
	Total	**853,573,800**	**102,847,170**	**86,263,932**	**311,068,891**	**1,353,877,039**

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

Table 3–14. (*continued*)

Off-site Releases					
Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	NPRI as % of North American Total	TRI as % of North American Total
0	122,826,514	122,826,514	249,119,510	12	88
0	38,299,276	38,299,276	96,423,142	10	90
0	18,606,996	18,606,996	57,085,260	4	96
0	25,106,602	25,106,602	51,368,192	9	91
0	19,760,910	19,760,910	44,225,986	11	89
0	10,240,282	10,240,282	21,522,523	5	95
0	1,803,563	1,803,563	10,488,898	5	95
0	3,478,936	3,478,936	7,321,984	14	86
0	1,533,161	1,533,161	4,687,776	5	95
0	2,054,854	2,054,854	3,410,933	1	99
0	623,142	623,142	2,884,625	3	97
0	388,904	388,904	1,809,155	3	97
0	57,248	57,248	552,249	19	81
0	274,286	274,286	515,205	7	93
0	378,399	378,399	473,035	68	32
0	**245,433,073**	**245,433,073**	**551,888,473**	**10**	**90**
0	**100**	**87**	**34**		
37,593,132	**245,433,073**	**283,026,205**	**1,636,903,244**	**9**	**91**

- Overall, TRI facilities reported 90 percent of the total releases of metals in North America, with NPRI facilities reporting 10 percent. However, NPRI facilities reported 68 percent of total releases of mercury and its compounds (mainly as off-site releases) and 19 percent of total releases of vanadium (mainly as on-site land releases). TRI facilities reported 99 percent of total releases of antimony and its compounds.

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

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

A small number of facilities account for a substantial share of releases of metals and their compounds. The 50 facilities in North America with the largest total releases of metals and their compounds in the matched data set accounted for 53 percent of all metals releases.

- The 50 facilities with the largest releases on- and off-site of metals and their compounds accounted for 53 percent of total releases, 61 percent of on-site releases and 43 percent of off-site releases.
- These 50 facilities reported 64 percent of on-site releases to land, including five facilities that reported more than 14 million kg.
- These 50 facilities reported 82 percent of off-site transfers of metals, including seven facilities that reported more than 5 million kg.

Table 3–15. The 50 North American Facilities with the Largest Total Releases On- and Off-site of Metals and their Compounds, 1998

Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Number of Forms	On-site Releases Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	10	518	0	0	22,781,858	22,782,376
2	ASARCO Inc.	East Helena, MT		33	9	39,769	731	0	19,085,244	19,125,744
3	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ		33	10	49,258	0	0	20,787,234	20,836,492
4	Kennecott Utah Copper Smelter & Refy.	Magna, UT		33	12	95,252	3,196	0	15,039,841	15,138,289
5	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	11	5,419	0	0	14,046,260	14,051,679
6	Phelps Dodge Hidalgo Inc.	Playas, NM		33	11	54,488	5,668	0	9,796,508	9,856,664
7	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	9	242	4	0	9,773,151	9,773,397
8	Zinc Corp. of America Monaca Smelter	Monaca, PA		33	9	198,650	159	0	0	198,809
9	Nucor Steel	Crawfordsville, IN		33	6	1,064	16	0	0	1,080
10	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	77	495/738	6	0	0	0	0	0
11	Elementis Chromium L.P.	Corpus Christi, TX		28	1	2,063	113	0	6,893,424	6,895,600
12	Co-Steel Lasco	Whitby, ON	29	33	6	14,095	310	0	1,176,063	1,190,468
13	Rouge Steel Co.	Dearborn, MI		33	6	22,324	604	0	0	22,928
14	Dofasco Inc.	Hamilton, ON	29	33	6	19,811	1,490	0	0	21,301
15	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT		495/738	15	276	0	0	6,154,603	6,154,879
16	Northwestern Steel & Wire Co.	Sterling, IL		33	4	50,812	1,092	0	5,738,322	5,790,226
17	USS Gary Works, USX Corp.	Gary, IN		33	12	98,363	4,997	0	5,074,461	5,177,821
18	Nucor-Yamato Steel Co.	Blytheville, AR		33	7	8,509	2	0	0	8,511
19	Natl. Steel Corp., Greatlakes Div.	Ecorse, MI		33	5	46,292	3,901	0	0	50,193
20	Elkem Metals Co.	Marietta, OH		33	5	186,589	198,186	0	4,473,469	4,858,244
21	Chemical Waste Management	Emelle, AL		495/738	12	153	0	0	4,812,386	4,812,539
22	Steel Dynamics Inc.	Butler, IN		33	3	15,015	0	0	0	15,015
23	Occidental Chemical Corp.	Castle Hayne, NC		28	1	2,888	17	0	4,535,150	4,538,055
24	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO		33	8	122,598	111	0	4,337,539	4,460,248
25	Doe Run Co. Glover Smelter, Renco Group Inc.	Annapolis, MO		33	7	19,744	12	0	4,220,682	4,240,438
26	Cerro Wire & Cable Co. Inc.	Hartselle, AL		33	3	9	6	0	0	15
27	Envirite of Ohio Inc.	Canton, OH		495/738	7	465	119	0	0	584
28	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	5	0	0	0	0	0
29	DuPont Delisle Plant	Pass Christian, MS		28	7	114	0	3,107,029	0	3,107,143
30	Sikeston Power Station	Sikeston, MO		491/493	4	16,492	0	0	3,071,167	3,087,659
31	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville, OR		33	5	3,910	18	0	0	3,928
32	Nucor Corp. Nucor Steel	Plymouth, UT		33	6	4,571	0	0	12,397	16,968
33	GM Powertrain Defiance, General Motors Corp.	Defiance, OH		33	6	35,864	541	0	2,814,354	2,850,759
34	Safety-Kleen Lone & Grassy Mtn. Inc.	Waynoka, OK		495/738	10	707	0	0	2,845,805	2,846,512
35	Heritage Environmental Services L.L.C.	Indianapolis, IN		495/738	8	16	32	0	0	48
36	Crystal Clean Services L.L.C.	Indianapolis, IN		495/738	8	16	32	0	0	48
37	American Steel Foundries, Alliance Plant, Amsted Inds. Inc.	Alliance, OH		33	3	10,577	0	0	0	10,577
38	USS Mon Valley Works - Edgar Thomson Plant	Braddock, PA		33	5	1,678	334	0	0	2,012
39	Granite City Steel, Natl. Steel Corp.	Granite City, IL		33	6	21,934	4,896	0	2,613,446	2,640,276
40	Nucor Steel, Nebraska	Norfolk, NE		33	7	5,973	148	0	0	6,121
41	USS Fairfield Works, USX Corp.	Fairfield, AL		33	6	5,261	1,986	0	2,557,839	2,565,086
42	Ispat Sidbec Inc. Acierie, Ispat Mexicana	Contrecœur, QC	29	33	5	9,580	1,333	0	2,424,930	2,435,843
43	Bar Tech. S. Inc. Primary Ops.	Johnstown, PA		33	5	5,858	115	0	0	5,973
44	Keystone Steel & Wire Co., Keystone Consolidated Inds. Inc.	Peoria, IL		33	5	27,928	420	0	169	28,517
45	Nucor Steel	Huger, SC		33	6	5,725	156	0	0	5,881
46	Chemical Waste Management of the Northwest Inc.	Arlington, OR		495/738	18	247	0	0	2,312,304	2,312,551
47	Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais, IL		33	5	3,356	0	0	0	3,356
48	Wayne Disposal Inc., The Environmental Quality Co.	Belleville, MI		495/738	10	0	0	0	1,986,848	1,986,848
49	Chemical Waste Management Inc.	Kettleman City, CA		495/738	13	2,230	0	0	2,126,772	2,129,002
50	Ipsco Steel Inc.	Muscatine, IA		33	6	1,179	6	0	0	1,185
	Subtotal				**360**	**1,217,882**	**230,751**	**3,107,029**	**181,492,226**	**186,047,888**
	% of Total				**1**	**9**	**5**	**54**	**64**	**61**
	Total for All Matched Metals				**25,240**	**13,772,781**	**4,625,396**	**5,773,263**	**282,240,567**	**306,455,400**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–15. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases of metals and their compounds from the facility)
1	0	36,459	36,459	22,818,835	Zinc and compounds (land)
2	0	2,184,136	2,184,136	21,309,880	Zinc and compounds (land)
3	0	139	139	20,836,631	Copper/Zinc and compounds (land)
4	0	258,691	258,691	15,396,980	Copper/Zinc/Arsenic and compounds (land)
5	0	17	17	14,051,696	Zinc and compounds (land)
6	0	0	0	9,856,664	Zinc/Copper and compounds (land)
7	0	3,086	3,086	9,776,483	Zinc and compounds (land)
8	0	9,038,217	9,038,217	9,237,026	Zinc and compounds (transfers of metals)
9	0	8,843,001	8,843,001	8,844,081	Zinc and compounds (transfers of metals)
10	0	8,280,287	8,280,287	8,280,287	Zinc and compounds (transfers of metals)
11	0	372,338	372,338	7,267,938	Chromium and compounds (land)
12	0	5,873,182	5,873,182	7,063,650	Zinc and compounds (transfers of metals)
13	0	6,961,360	6,961,360	6,984,288	Zinc and compounds (transfers of metals)
14	0	6,302,410	6,302,410	6,323,711	Zinc and compounds (transfers of metals)
15	0	5,811	5,811	6,160,690	Zinc/Lead/Manganese/Copper and compounds (land)
16	0	84,353	84,353	5,874,579	Zinc/Manganese and compounds (land)
17	0	366,991	366,991	5,544,812	Zinc and compounds (land)
18	0	5,095,164	5,095,164	5,103,675	Zinc and compounds (transfers of metals)
19	0	4,911,304	4,911,304	4,961,497	Zinc and compounds (transfers of metals)
20	0	34,467	34,467	4,892,711	Manganese and compounds (land)
21	0	73,749	73,749	4,886,288	Lead/Zinc/Copper/Arsenic and compounds (land)
22	0	4,638,323	4,638,323	4,653,338	Zinc and compounds (transfers of metals)
23	0	5,896	5,896	4,543,951	Chromium and compounds (land)
24	0	16,520	16,520	4,476,768	Zinc and compounds (land)
25	0	149	149	4,240,587	Zinc/Lead and compounds (land)
26	0	3,926,768	3,926,768	3,926,783	Copper and compounds (transfers of metals)
27	0	3,520,510	3,520,510	3,521,094	Nickel/Zinc and compounds (transfers of metals)
28	0	3,427,991	3,427,991	3,427,991	Zinc/Manganese and compounds (transfers of metals)
29	0	0	0	3,107,143	Manganese and compounds (UIJ)
30	0	0	0	3,087,659	Zinc and compounds (land)
31	0	3,019,351	3,019,351	3,023,279	Zinc and compounds (transfers of metals)
32	0	2,963,002	2,963,002	2,979,970	Zinc and compounds (transfers of metals)
33	0	579	579	2,851,338	Zinc and compounds (land)
34	0	1,599	1,599	2,848,111	Lead/Zinc/Cadmium/Chromium and compounds (land)
35	0	2,707,242	2,707,242	2,707,290	Nickel/Zinc/Copper and compounds (transfers of metals)
36	0	2,707,239	2,707,239	2,707,287	Nickel/Zinc/Copper and compounds (transfers of metals)
37	0	2,666,929	2,666,929	2,677,506	Chromium and compounds (transfers of metals)
38	0	2,655,575	2,655,575	2,657,587	Zinc and compounds (transfers of metals)
39	0	120	120	2,640,396	Zinc and compounds (land)
40	0	2,582,536	2,582,536	2,588,657	Zinc and compounds (transfers of metals)
41	0	1,157	1,157	2,566,243	Zinc/Manganese and compounds (land)
42	0	0	0	2,435,843	Zinc and compounds (land)
43	0	2,427,575	2,427,575	2,433,548	Zinc and compounds (transfers of metals)
44	0	2,395,192	2,395,192	2,423,709	Zinc and compounds (transfers of metals)
45	0	2,344,473	2,344,473	2,350,354	Zinc and compounds (transfers of metals)
46	0	3,466	3,466	2,316,017	Aluminum, Lead/Cadmium and compounds (land)
47	0	2,288,063	2,288,063	2,291,419	Zinc and compounds (transfers of metals)
48	0	261,771	261,771	2,248,619	Lead/Selenium/Nickel/Arsenic and compounds (land)
49	0	1,491	1,491	2,130,493	Lead/Nickel/Zinc and compounds, Aluminum (land)
50	0	2,083,648	2,083,648	2,084,833	Zinc and compounds (transfers of metals)
	0	**105,372,327**	**105,372,327**	**291,420,215**	
	--	**82**	**43**	**53**	
	0	**127,791,562**	**245,433,073**	**551,888,473**	

UIJ=underground injection.

3.2.5 NPRI and TRI Releases On- and Off-site, 1998

In the matched data set, TRI facilities were 93 percent and NPRI facilities were 7 percent of all reporting facilities in North America. A total of 1,552 facilities submitted NPRI reports in 1998, while 20,422 facilities reported to TRI. NPRI submissions totaled 5,235 forms; the TRI total was 67,560, an average of over three forms per facility in each country.

- On-site air releases were over half of total releases on- and off-site in both Canada and the United States.
- In TRI, 84 percent of chemicals were released at the site of the facility, whereas in NPRI, on-site releases were 66 percent of the total. The difference is due to higher on-site land disposal for TRI facilities (20 percent for TRI and 10 percent for NPRI) and higher off-site disposal for NPRI facilities (16 percent for TRI and 34 percent for NPRI). Off-site releases are also releases to land, since off-site transfers to disposal and of metals are primarily to landfills.
- NPRI facilities reported, on average, 1.3 times the amount of kilograms per facility of total releases than did TRI facilities. TRI and NPRI facilities had approximately the same average kilograms per facility of on-site releases.
- However, reflecting the difference in on- and off-site release amounts, NPRI facilities reported, on average, almost three times the amount of off-site releases as TRI facilities.

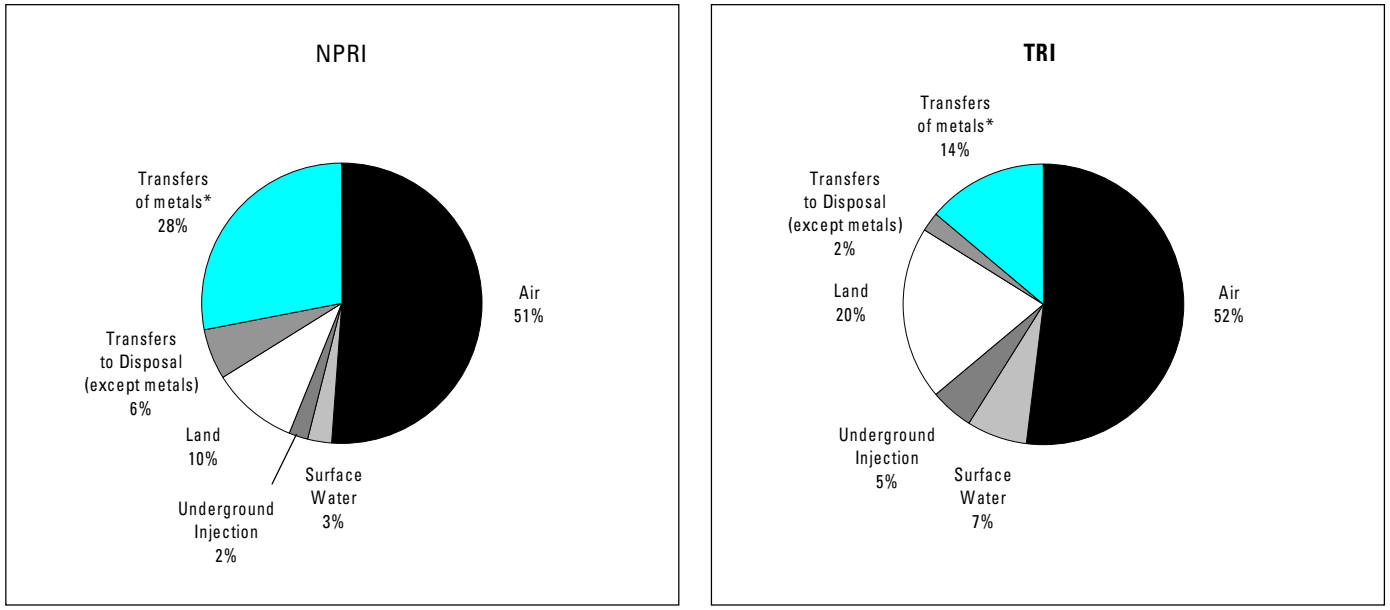
Table 3–16. Releases On- and Off-site and Average Releases per Facility, NPRI and TRI, 1998

	NPRI*			TRI			
	Number		Forms/Facility	Number		Forms/Facility	
Total Facilities	1,552		3.4	20,422		3.3	
Total Forms	5,235			67,560			
	kg	%	kg/facility	kg	%	kg/facility	Ratio of Average Per Facility (NPRI/TRI)
On-site Releases	**98,637,746**	**66**	**63,555**	**1,255,239,293**	**84**	**61,465**	**1.0**
Air	75,808,346	51	48,846	777,765,454	52	38,085	1.3
Surface Water	4,360,769	3	2,810	98,486,401	7	4,823	0.6
Underground Injection	3,701,129	2	2,385	82,562,803	5	4,043	0.6
Land	14,644,256	10	9,436	296,424,635	20	14,515	0.7
Off-site Releases	**51,173,125**	**34**	**32,972**	**231,853,080**	**16**	**11,353**	**2.9**
Transfers to Disposal (except metals)	9,567,199	6	6,164	28,025,933	2	1,372	4.5
Transfers of Metals**	41,605,926	28	26,808	203,827,147	14	9,981	2.7
Total Releases On- and Off-site	**149,810,871**	**100**	**96,528**	**1,487,092,373**	**100**	**72,818**	**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.

Figure 3–4. Distribution of Releases On- and Off-site, NPRI and TRI, 1998



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

Geographic Distribution

- For the 10 provinces of Canada, Ontario had the largest number of facilities and the largest reported total releases on- and off-site.
- Over half of the NPRI facilities in the matched data set are located in Ontario, and they reported 59 percent of the total NPRI releases for 1998. Ontario facilities use off-site disposal more than those in other provinces. Almost half (48 percent) of their releases were transfers off-site, while facilities located in other provinces reported 86 percent of their releases as on-site releases.
- Off-site releases in NPRI are concentrated in just a few facilities. Four facilities (two Philip Enterprises facilities and Dofasco Inc. in Hamilton, and Co-Steel Lasco in Whitby) accounted for 27.7 million kg of off-site releases, half of all NPRI off-site releases and two-thirds of all Ontario's off-site releases.
- Quebec had the second largest releases, representing 14 percent of total NPRI releases in the matched data set and 24 percent of the facilities. Facilities in Quebec reported 75 percent of their total releases as on-site releases and 25 percent as off-site releases.

Table 3–17. NPRI Releases On- and Off-site by Province, 1998

		On-site Releases					Off-site Releases			
Province	Number of Facilities	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)
Ontario	820	40,840,795	951,673	700	4,060,177	45,927,400	7,748,143	34,822,050	42,570,193	88,497,593
Quebec	372	10,301,937	1,141,800	0	3,744,296	15,210,340	765,409	4,315,358	5,080,767	20,291,107
Alberta	132	8,309,948	320,411	3,698,397	4,559,993	16,897,101	416,666	1,037,022	1,453,688	18,350,789
New Brunswick	31	4,575,730	1,043,849	0	70,899	5,692,032	23,209	1,050,528	1,073,737	6,765,769
British Columbia	83	4,869,503	604,627	0	109,013	5,591,826	524,083	116,321	640,404	6,232,230
Nova Scotia	29	3,532,989	56,205	0	872,796	4,463,245	81,477	105,905	187,382	4,650,627
Manitoba	52	2,187,230	28,149	0	1,224,152	3,442,664	6,334	150,580	156,914	3,599,578
Saskatchewan	22	708,494	19,639	2,032	30	733,802	1,875	7,942	9,817	743,619
Newfoundland	8	467,678	808	0	2,900	471,686	0	220	220	471,906
Prince Edward Island	3	14,042	193,608	0	0	207,650	3	0	3	207,653
Total	**1,552**	**75,808,346**	**4,360,769**	**3,701,129**	**14,644,256**	**98,637,746**	**9,567,199**	**41,605,926**	**51,173,125**	**149,810,871**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–18. TRI Releases On- and Off-site by State, 1998

State	Number of Facilities	On-site Releases: Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases: Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)
Ohio	1,517	60,235,323	2,465,678	12,773,252	37,977,813	113,452,066	1,458,958	23,183,906	24,642,864	138,094,930
Texas	1,196	44,214,589	11,176,890	27,120,746	15,842,111	98,354,336	3,055,992	6,839,445	9,895,437	108,249,773
Pennsylvania	1,243	41,173,251	20,772,857	35,738	4,234,986	66,216,832	2,168,430	27,581,160	29,749,590	95,966,422
Indiana	966	37,703,825	984,729	93,016	11,789,833	50,571,403	694,681	28,319,292	29,013,973	79,585,376
Illinois	1,206	31,234,155	2,808,462	113	20,540,369	54,583,099	2,478,803	13,140,209	15,619,012	70,202,111
Louisiana	305	22,027,388	16,496,847	20,197,448	5,278,195	63,999,878	432,963	514,603	947,566	64,947,444
Florida	515	36,431,827	716,544	10,027,042	9,098,867	56,274,280	290,375	1,904,069	2,194,444	58,468,724
Alabama	493	33,834,670	1,940,927	2	13,088,300	48,863,899	699,714	7,381,275	8,080,989	56,944,888
Utah	141	28,788,522	504,812	0	23,905,581	53,198,915	23,514	3,665,121	3,688,635	56,887,550
Michigan	825	30,781,954	185,887	1,429,124	4,211,660	36,608,625	973,729	17,043,863	18,017,592	54,626,217
North Carolina	749	37,901,873	2,900,478	13,197	10,108,937	50,924,485	565,464	1,913,345	2,478,809	53,403,294
Tennessee	606	41,235,778	497,111	1,338,775	3,628,134	46,699,798	438,400	3,076,093	3,514,493	50,214,291
Georgia	654	36,845,339	2,724,094	0	2,776,938	42,346,371	231,346	4,789,142	5,020,488	47,366,859
West Virginia	157	33,119,909	3,262,265	16	2,974,242	39,356,432	277,613	2,929,709	3,207,322	42,563,754
Kentucky	417	29,767,716	533,199	0	5,245,679	35,546,594	1,217,699	2,283,550	3,501,249	39,047,843
South Carolina	467	23,447,422	1,379,641	0	2,481,032	27,308,095	4,214,885	4,925,004	9,139,889	36,447,984
Missouri	555	16,719,876	934,235	0	12,840,082	30,494,193	210,744	1,773,339	1,984,083	32,478,276
Virginia	424	23,111,554	1,188,796	0	1,350,478	25,650,828	248,735	2,909,114	3,157,849	28,808,677
Mississippi	281	16,040,616	5,021,623	3,112,279	2,801,365	26,975,883	87,212	481,351	568,563	27,544,446
Arizona	195	3,858,747	680	1	22,210,593	26,070,021	109,348	376,976	486,324	26,556,345
Wisconsin	811	15,950,702	1,644,702	0	839,658	18,435,062	841,764	5,919,941	6,761,705	25,196,767
Montana	27	1,961,811	37,191	0	20,400,959	22,399,961	70	2,204,989	2,205,059	24,605,020
New York	625	14,800,100	3,543,709	113	2,622,589	20,966,511	343,248	1,949,279	2,292,527	23,259,038
Idaho	56	1,335,701	2,526,801	0	18,695,930	22,558,432	1,679	116,389	118,068	22,676,500
California	1,236	6,980,552	1,718,002	9,702	7,943,898	16,652,154	705,220	3,607,403	4,312,623	20,964,777
Arkansas	354	8,256,881	736,791	483,979	968,682	10,446,333	1,116,854	7,952,974	9,069,828	19,516,161
Oregon	239	6,257,574	1,135,695	0	6,509,895	13,903,164	16,634	5,170,638	5,187,272	19,090,436
Iowa	390	10,182,595	1,332,765	0	1,544,984	13,060,344	228,753	3,549,561	3,778,314	16,838,658
Maryland	171	13,548,027	1,049,353	20,408	908,159	15,525,947	36,086	363,078	399,164	15,925,111
Oklahoma	287	7,320,636	325,956	1,991,643	3,261,528	12,899,763	35,249	1,582,953	1,618,202	14,517,965
Washington	265	8,026,108	1,432,086	0	1,067,959	10,526,153	985,692	2,328,512	3,314,204	13,840,357
New Mexico	46	932,825	9,474	0	11,068,852	12,011,151	1,717	793,623	795,340	12,806,491
New Jersey	528	6,722,704	2,572,299	0	223,985	9,518,988	1,207,605	1,699,845	2,907,450	12,426,438
Kansas	246	7,651,266	268,332	582,627	769,303	9,271,528	1,598,637	1,331,341	2,929,978	12,201,506
Minnesota	452	5,645,598	325,824	0	1,218,903	7,190,325	87,388	1,194,378	1,281,766	8,472,091
Nebraska	149	3,378,042	1,165,706	0	327,892	4,871,640	90,160	2,944,859	3,035,019	7,906,659
Puerto Rico	145	6,901,592	83,587	0	74,399	7,059,578	150,699	254,620	405,319	7,464,897
Wyoming	30	1,369,261	2,626	3,333,469	1,518,313	6,223,669	7,674	108,442	116,116	6,339,785
Delaware	63	4,494,034	355,272	0	293,844	5,143,150	1,557	107,083	108,640	5,251,790
Massachusetts	439	3,274,988	23,223	0	18,925	3,317,136	114,280	1,716,993	1,831,273	5,148,409
Connecticut	286	2,281,597	244,376	0	16,751	2,542,724	290,185	1,166,905	1,457,090	3,999,814
Maine	70	2,351,680	468,248	0	312,735	3,132,663	23,091	460,868	483,959	3,616,622
Nevada	50	1,110,938	0	0	1,979,701	3,090,639	15,600	125,661	141,261	3,231,900
Colorado	163	1,495,282	439,038	0	255,688	2,190,008	177,804	651,063	828,867	3,018,875
New Hampshire	102	2,735,848	47,346	0	32,403	2,815,597	11,114	132,954	144,068	2,959,665
North Dakota	35	958,620	29,060	0	708,440	1,696,120	15,902	1,112,025	1,127,927	2,824,047
Hawaii	19	1,494,445	189	0	0	1,494,634	3,777	6,453	10,230	1,504,864
South Dakota	63	604,243	366,276	0	452,973	1,423,492	856	50,182	51,038	1,474,530
Rhode Island	120	554,556	548	0	229	555,333	35,807	111,012	146,819	702,152
Virgin Islands	3	401,849	12,705	0	681	415,235	56	22,251	22,307	437,542
Alaska	8	224,543	27,833	113	727	253,216	130	4,898	5,028	258,244
Vermont	29	56,477	65,633	0	455	122,565	2,040	55,406	57,446	180,011
District of Columbia	2	30,045	0	0	0	30,045	0	2	2	30,047
Guam	1	0	0	0	0	0	0	0	0	0
Total	**20,422**	**777,765,454**	**98,486,401**	**82,562,803**	**296,424,635**	**1,255,239,293**	**28,025,933**	**203,827,147**	**231,853,080**	**1,487,092,373**

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

- For the 54 US states and territories reporting in the matched data set, Ohio had both the largest number of facilities and the largest total releases, with 7 percent of the TRI facilities and 9 percent of total releases. Ohio also had the largest on-site air emissions and on-site land releases.
- Texas had the second-largest total releases (7 percent of the TRI total), but had the fifth-largest number of facilities reporting. Texas facilities reported the largest on-site underground injection and second-largest on-site air emissions.

Industry Distribution

In both Canada and the US in 1998, the same four industry sectors reported the largest total releases on- and off-site, but the rank order differed.

- In 1998 for NPRI, the industry sectors reporting the largest releases on- and off-site were primary metals, with 41.1 million kg, and hazardous waste management and solvent recovery facilities, with 23.6 million kg. Electric utilities reported the third-largest releases on- and off-site, with 20.1 million kg, and the chemicals manufacturing industry reported the fourth-largest releases, with 17.9 million kg.
- Two of the top-ranking sectors—hazardous waste management and electric utilities—are new TRI industry sectors, included in the matched data set for the first time for 1998.

Table 3–19. NPRI Releases On- and Off-site by Industry, 1998

			On-site Releases					Off-site Releases			
US SIC Code	Industry	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total on-site Releases (kg)	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)
33	Primary Metals	656	8,586,797	578,536	700	9,110,349	18,291,684	410,803	22,381,147	22,791,950	41,083,634
495/738	Hazardous Waste Mgt./Solvent Recovery	204	9,504	0	0	2,890,400	2,901,104	6,977,378	13,692,821	20,670,199	23,571,303
491/493	Electric Utilities	164	17,013,969	16,704	0	1,782,069	18,812,742	22,190	1,216,025	1,238,215	20,050,957
28	Chemicals	1,494	11,079,552	796,896	3,629,099	407,035	15,969,031	713,701	1,198,383	1,912,084	17,881,115
26	Paper Products	335	14,597,816	1,849,671	0	326,227	16,774,728	82,244	327,058	409,302	17,184,030
30	Rubber and Plastics Products	289	6,116,720	398	0	16,960	6,144,799	60,262	414,306	474,568	6,619,367
37	Transportation Equipment	387	5,849,352	159	0	18,260	5,874,403	67,991	337,854	405,845	6,280,248
29	Petroleum and Coal Products	378	3,480,748	366,334	71,330	8,491	3,929,771	738,039	64,217	802,256	4,732,027
34	Fabricated Metals Products	428	2,168,943	142	0	100	2,183,205	296,755	1,101,260	1,398,015	3,581,220
24	Lumber and Wood Products	210	2,262,879	18,779	0	20,175	2,305,012	30,031	13,213	43,244	2,348,256
27	Printing and Publishing	36	1,533,865	3,328	0	0	1,537,193	0	979	979	1,538,172
25	Furniture and Fixtures	55	1,064,429	0	0	0	1,065,229	191	26,720	26,911	1,092,140
20	Food Products	127	124,993	723,211	0	20,729	868,933	173	49,697	49,870	918,803
32	Stone/Clay/Glass Products	101	794,835	1,128	0	1,405	799,997	546	93,432	93,978	893,975
39	Misc. Manufacturing Industries	132	432,241	320	0	37,810	475,520	47,778	125,287	173,065	648,585
35	Industrial Machinery	62	171,069	13	0	0	172,690	15,601	368,066	383,667	556,357
22	Textile Mill Products	14	431,281	0	0	0	431,481	34,001	576	34,577	466,058
36	Electronic/Electrical Equipment	89	49,045	5,150	0	4,246	59,916	69,265	188,960	258,225	318,141
31	Leather Products	3	19,300	0	0	0	19,300	0	5,900	5,900	25,200
56	Chemical Wholesalers	70	21,008	0	0	0	21,008	250	0	250	21,258
38	Measurement/Photographic Instruments	1	0	0	0	0	0	0	25	25	25
12	Coal Mining	0	0	0	0	0	0	0	0	0	0
21	Tobacco Products	0	0	0	0	0	0	0	0	0	0
23	Apparel and Other Textile Products	0	0	0	0	0	0	0	0	0	0
	Total	**5,235**	**75,808,346**	**4,360,769**	**3,701,129**	**14,644,256**	**98,637,746**	**9,567,199**	**41,605,926**	**51,173,125**	**149,810,871**

Figure 3–5. Contribution of Top Industry Sectors to Releases On- and Off-site, NPRI and TRI, 1998

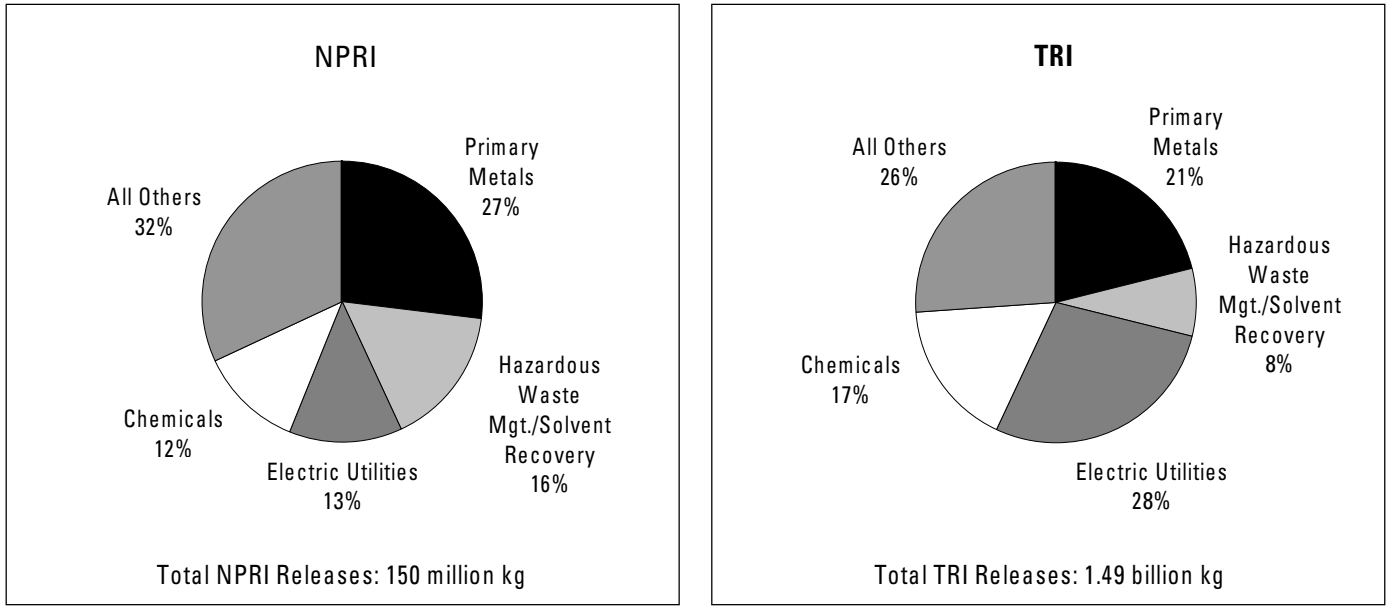


Table 3–20. TRI Releases On- and Off-site by Industry, 1998

US SIC Code	Industry	Number of Forms	On-site Releases: Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)	Off-site Releases: Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)
491/493	Electric Utilities	3,645	351,735,946	1,330,987	35,746	51,721,900	404,824,579	74,905	11,157,063	11,231,968	416,056,547
33	Primary Metals	6,176	45,391,122	24,094,840	241,300	109,669,224	179,396,486	2,492,080	130,142,215	132,634,295	312,030,781
28	Chemicals	16,191	91,720,138	41,695,206	72,043,950	32,422,801	237,882,095	8,958,090	9,422,095	18,380,185	256,262,280
495/738	Hazardous Waste Mgt./Solvent Recovery	1,891	526,097	261,972	9,603,617	87,540,326	97,932,012	7,335,897	17,208,069	24,543,966	122,475,978
26	Paper Products	2,117	78,113,281	8,673,897	13,197	6,271,341	93,071,716	376,993	1,484,152	1,861,145	94,932,861
	Multiple codes 20-39	3,728	29,505,528	6,680,208	228	2,107,045	38,293,009	1,180,393	6,413,190	7,593,583	45,886,592
30	Rubber and Plastics Products	3,036	39,466,703	9,394	0	235,034	39,711,131	1,227,037	3,187,778	4,414,815	44,125,946
37	Transportation Equipment	3,961	35,986,659	72,339	0	176,450	36,235,448	2,481,716	2,757,797	5,239,513	41,474,961
34	Fabricated Metals Products	6,782	18,112,220	568,927	115	347,244	19,028,506	1,168,985	9,627,545	10,796,530	29,825,036
29	Petroleum and Coal Products	2,940	19,023,019	5,925,676	604,086	207,165	25,759,946	925,428	657,264	1,582,692	27,342,638
32	Stone/Clay/Glass Products	1,586	10,322,672	61,968	0	1,359,257	11,743,897	349,653	2,384,874	2,734,527	14,478,424
20	Food Products	2,829	4,288,617	7,389,662	7	1,882,342	13,560,628	311,188	203,553	514,741	14,075,369
24	Lumber and Wood Products	1,609	13,581,689	5,486	0	144,834	13,732,009	27,005	83,279	110,284	13,842,293
36	Electronic/Electrical Equipment	2,503	4,763,420	972,893	113	81,350	5,817,776	541,521	5,211,370	5,752,891	11,570,667
27	Printing and Publishing	331	9,530,811	266	0	113	9,531,190	22,479	51,665	74,144	9,605,334
25	Furniture and Fixtures	817	7,228,885	21	0	15,908	7,244,814	37,147	16,940	54,087	7,298,901
35	Industrial Machinery	2,540	4,882,398	4,330	0	43,895	4,930,623	204,667	1,914,561	2,119,228	7,049,851
22	Textile Mill Products	414	4,218,603	108,355	0	98,119	4,425,077	103,836	196,236	300,072	4,725,149
39	Misc. Manufacturing Industries	590	4,001,684	3,424	0	97,066	4,102,174	105,323	235,567	340,890	4,443,064
38	Measurement/Photographic Instruments	512	3,326,863	521,367	0	25,976	3,874,206	41,939	445,466	487,405	4,361,611
12	Coal Mining	140	457,565	6,285	20,408	1,948,351	2,432,609	0	0	0	2,432,609
31	Leather Products	102	464,599	21,401	36	1,339	487,375	0	967,060	967,060	1,454,435
21	Tobacco Products	22	535,218	72,562	0	0	607,780	1,780	0	1,780	609,560
56	Chemical Wholesalers	3,070	426,180	4,935	0	27,553	458,668	46,874	51,878	98,752	557,420
23	Apparel and Other Textile Products	28	155,537	0	0	2	155,539	10,997	7,530	18,527	174,066
	Total	**67,560**	**777,765,454**	**98,486,401**	**82,562,803**	**296,424,635**	**1,255,239,293**	**28,025,933**	**203,827,147**	**231,853,080**	**1,487,092,373**

- For TRI, the same four industry sectors as in NPRI reported the largest releases on- and off-site. However, in TRI, electric utilities reported the largest, followed by primary metals and chemical manufacturing, with hazardous waste management and solvent recovery facilities ranked fourth. In TRI, electric utilities reported 416.1 million kg, the primary metals sector reported 312.0 million kg, the chemical manufacturing sector reported 256.3 million kg and hazardous waste management facilities reported 122.5 million kg total releases on- and off-site
- For both NPRI and TRI, electric utilities reported the largest on-site air emissions.
- Also, in both countries the chemical manufacturing sector reported the largest on-site underground injection and the primary metals sector reported the largest on-site land releases and off-site transfers of metals.
- The four industry sectors with the largest total NPRI releases accounted for over two-thirds (68 percent) of total NPRI releases in the matched data set for 1998. For TRI the same four industry sectors accounted for almost three-fourths (74 percent) of the TRI total releases.
- For the industry reporting the largest total releases in each country, the primary metals industry accounted for 27 percent of total NPRI releases, while, for TRI, it accounted for 21 percent. TRI electric utilities accounted for 28 percent of total TRI releases, while NPRI electric utilities accounted for 13 percent of the NPRI total.

The NPRI and TRI Facilities with Largest Total Releases On- and Off-site by Industry Sector

Two new TRI industry sectors (electric utilities and hazardous waste management) were among the four industry sectors reporting the largest total releases. The other two were the manufacturing sectors, primary metals and chemicals.

- The electric utility industry ranked first in TRI and third in NPRI for total on- and off-site releases.
- In NPRI, the 15 electric generating facilities with the largest total releases reported 18.0 million kg of total releases, 12 percent of the total NPRI releases. Most of the releases for these 15 facilities were on-site air emissions. They accounted for 20 percent of all on-site NPRI air emissions in the matched data set for 1998.
- In TRI, 15 electric generating facilities reported 85.5 million kg of total releases, 6 percent of the total TRI releases for 1998. Like the top NPRI electric generating facilities, most of the releases for these 15 facilities were on-site air emissions. These 15 facilities accounted for 10 percent of all TRI on-site air emissions in the matched data set.

Table 3–21. The 15 NPRI Facilities with the Largest Total Releases in the Electric Utilities Industry, 1998

				On-site Releases				
Rank	Facility	City, Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke, ON	12	4,855,140	8,030	0	251,480	5,114,650
2	Nova Scotia Power Inc., Lingan Generating Station	New Waterford, NS	8	2,044,050	0	0	173,700	2,217,750
3	Ontario Power Generation Inc., Lambton Generating Station	Courtright, ON	11	1,754,050	4,610	0	216,030	1,974,690
4	TransAlta Utilities Corporation, Sundance Thermal Generating	Duffield, AB	12	848,990	0	0	498,900	1,347,890
5	Ontario Power Generation Inc, Lakeview GS	Mississauga, ON	8	1,226,000	2,170	0	8,370	1,236,540
6	New Brunswick Power, Coleson Cove Generating Station	Saint John, NB	5	1,061,850	37	0	27,990	1,089,877
7	Nova Scotia Power Inc., Point Aconi Generating Station	Point Aconi, NS	7	615,000	0	0	201,400	816,400
8	Edmonton Power Inc., Genesee Thermal Generating Station	Warburg, AB	13	285,980	0	0	0	285,980
9	New Brunswick Power, Belledune Thermal Generating Station	Belledune, NB	7	395,233	95	0	0	395,328
10	New Brunswick Power, Dalhousie Generating Station	Dalhousie, NB	3	548,918	136	0	0	549,054
11	TransAlta Utilities Corporation, Keephills Thermal Generating	Duffield, AB	10	305,810	0	0	206,800	512,610
12	Alberta Power Limited, Battle River Generating Station	Forestburg, AB	10	219,442	0	0	0	219,442
13	TransAlta Utilities Corporation, Wabamun Thermal Generating	Wabamun, AB	4	376,630	20	0	68,800	445,450
14	New Brunswick Power, Grand Lake Generation Station	Minto, NB	6	348,253	1,582	0	42,909	392,744
15	Manitoba Hydro, Selkirk Generating Station	St. Clements, MB	4	345,600	0	0	14,600	360,200
	Subtotal		**120**	**15,230,946**	**16,680**	**0**	**1,710,979**	**16,958,605**
	% of Total		**2**	**20**	**0**	**0**	**12**	**17**
	Total for NPRI		**5,235**	**75,808,346**	**4,360,769**	**3,701,129**	**14,644,256**	**98,637,746**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–22. The 15 TRI Facilities with the Largest Total Releases in the Electric Utilities Industry, 1998

				On-site Releases				
Rank	Facility	City, State	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA	12	8,182,292	8,316	0	316,680	8,507,288
2	American Electric Power, John E. Amos Plant	Winfield, WV	12	7,577,375	1,993	0	203,105	7,782,473
3	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC	12	6,863,418	3,384	0	440,273	7,307,075
4	Dayton Power & Light Co. J.M Stuart Station	Manchester, OH	13	5,806,513	2,688	0	864,853	6,674,054
5	American Electric Power, Mitchell Plant	Moundsville, WV	13	5,925,307	3,700	0	353,006	6,282,013
6	Firstenergy, W.H. Sammis Plant	Stratton, OH	14	5,493,361	4,380	0	548	5,498,289
7	Cardinal Plant, Cardinal Operating Co.	Brilliant, OH	14	5,134,319	69,059	0	424,617	5,627,995
8	Brandon Shores & Wagner Complex, Baltimore Gas Electric Co.	Baltimore, MD	14	5,185,006	2,297	0	1,194	5,188,497
9	PSI Gibson Generating Station, Cinergy Corp.	Princeton, IN	13	3,656,341	0	0	1,464,013	5,120,354
10	Scherer Steam Electric Generating Plant	Juliette, GA	14	4,041,640	9,085	0	667,487	4,718,212
11	Kentucky Utilities Co. - Ghentstation, LG&E Energy Corp.	Ghent, KY	13	3,841,543	26,134	0	781,633	4,649,310
12	U.S. TVA Paradise Fossil Plant	Drakesboro, KY	14	4,120,838	30,773	0	217,735	4,369,346
13	Gulf Power Co. - Plant Crist, Southern Co.	Pensacola, FL	11	4,205,900	736	0	140,100	4,346,736
14	Detroit Edison Monroe Power Plant, DTE Energy	Monroe, MI	11	3,649,648	1,592	0	624,519	4,275,759
15	Seminole Generating Station	Palatka, FL	11	3,803,251	1,118	0	405,381	4,209,750
	Subtotal		**191**	**77,486,752**	**165,255**	**0**	**6,905,144**	**84,557,151**
	% of Total		**0.3**	**10**	**0.2**	**0.0**	**2**	**7**
	Total for TRI		**67,560**	**777,765,454**	**98,486,401**	**82,562,803**	**296,424,635**	**1,255,239,293**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–21. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	0	0	5,114,650	Hydrochloric acid (air)
2	0	0	0	2,217,750	Hydrochloric acid (air)
3	0	0	0	1,974,690	Hydrochloric acid, Sulfuric acid (air)
4	730	0	730	1,348,620	Sulfuric acid, Hydrogen fluoride (air), Manganese and compounds (land)
5	0	0	0	1,236,540	Hydrochloric acid (air)
6	0	0	0	1,089,877	Sulfuric acid (air)
7	0	0	0	816,400	Hydrochloric acid (air)
8	0	510,360	510,360	796,340	Manganese and compounds (transfers of metals), Sulfuric acid, Hydrogen fluoride (air)
9	0	254,999	254,999	650,327	Sulfuric acid (air), Manganese and compounds (transfers of metals)
10	0	62,670	62,670	611,724	Sulfuric acid (air)
11	110	0	110	512,720	Sulfuric acid, Hydrogen fluoride (air), Manganese and compounds (land)
12	11,250	242,923	254,173	473,615	Hydrochloric acid, hydrogen fluoride (air), Manganese/Chromium and compounds (transfers of metals)
13	0	0	0	445,450	Hydrogen fluoride, Sulfuric acid (air)
14	0	0	0	392,744	Sulfuric acid, Hydrochloric acid (air)
15	0	0	0	360,200	Hydrochloric acid (air)
	12,090	**1,070,952**	**1,083,042**	**18,041,647**	
	0	**3**	**2**	**12**	
	9,567,199	**41,605,926**	**51,173,125**	**149,810,871**	

Table 3–22. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	8	8	8,507,296	Hydrochloric acid (air)
2	0	371,553	371,553	8,154,026	Hydrochloric acid (air)
3	0	0	0	7,307,075	Hydrochloric acid (air)
4	0	5	5	6,674,059	Hydrochloric acid (air)
5	0	364	364	6,282,377	Hydrochloric acid (air)
6	23,129	523,265	546,394	6,044,683	Hydrochloric acid, Sulfuric acid (air)
7	0	489	489	5,628,484	Hydrochloric acid (air)
8	41	2,763	2,804	5,191,301	Hydrochloric acid (air)
9	0	1	1	5,120,355	Hydrochloric acid, Sulfuric acid (air), Zinc and compounds (land)
10	0	0	0	4,718,212	Hydrochloric acid, Hydrogen fluoride (air)
11	0	0	0	4,649,310	Hydrochloric acid, Sulfuric acid (air)
12	0	0	0	4,369,346	Sulfuric acid, Hydrochloric acid (air)
13	0	0	0	4,346,736	Hydrochloric acid (air)
14	0	25	25	4,275,784	Hydrochloric acid, Sulfuric acid (air)
15	0	0	0	4,209,750	Sulfuric acid (air)
	23,170	**898,473**	**921,643**	**85,478,794**	
	0.1	**0.4**	**0.4**	**6**	
	28,025,933	**203,827,147**	**231,853,080**	**1,487,092,373**	

The primary metals industry had the largest releases on- and off-site of all industry sectors in NPRI and was the second-largest in TRI.

- In NPRI, the 15 facilities in the primary metals industry with the largest total releases reported 32.7 million kg, representing 22 percent of all releases in NPRI for the matched data set for 1998. Most (62 percent) of the releases reported by the 15 facilities were off-site releases as transfers of metals. These 15 facilities reported almost half (49 percent) of all transfers of metals and almost half (48 percent) of all on-site land releases reported to NPRI in 1998.
- In TRI, the 15 facilities with the largest total releases in the primary metals industry reported 165.3 million kg, 11 percent of total releases reported to TRI in 1998. Three-quarters of the releases for these 15 facilities were on-site releases. On-site land releases were 27 percent of all on-site land releases reported to TRI in 1998. These facilities also reported 21 percent of transfers of metals reported to TRI.

In both NPRI and TRI, on-site land releases and off-site transfers of metals are both primarily land disposal, whether on- or off-site.

Table 3–23. The 15 NPRI Facilities with the Largest Total Releases in the Primary Metals Industry, 1998

				On-site Releases				
Rank	Facility	City, Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Co-Steel Lasco	Whitby, ON	6	14,095	310	0	1,176,063	1,190,468
2	Dofasco Inc.	Hamilton, ON	18	402,320	1,493	0	0	403,813
3	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	8	3,178,052	0	0	1,545,000	4,723,052
4	Ispat Sidbec Inc. Acierie, Ispat Mexicana	Contrecœur, QC	5	9,580	1,333	0	2,424,930	2,435,843
5	Ivaco Rolling Mills	L'Orignal, ON	7	8,789	3	0	0	9,648
6	Stelco McMaster Ltée	Contrecœur, QC	5	16,940	0	0	0	18,122
7	Zalev Brothers Co.	Windsor, ON	8	305	7	0	0	312
8	Slater Steels, Hamilton Specialty Bar Division	Hamilton, ON	9	11,893	0	0	300	12,793
9	Gerdau MRM Steel Inc.	Selkirk, MB	6	12,910	85	0	1,154,320	1,167,315
10	Aciers Atlas Inc., Aciers Inoxydables Atlas	Tracy, QC	10	21,716	373,410	0	0	395,126
11	Gerdau Courtice Steel Inc.	Cambridge, ON	5	11,704	0	0	0	11,704
12	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	4	2,453	100	0	0	2,753
13	AltaSteel Ltd., Stelco Inc.	Edmonton, AB	6	12,234	47	0	665,982	678,263
14	Stelco Inc., Hilton Works	Hamilton, ON	20	251,960	10,920	0	300	264,430
15	Alcan Smelters and Chemicals Ltd, Kitimat Works	Kitimat, BC	6	616,000	0	0	0	616,000
	Subtotal		**123**	**4,570,951**	**387,708**	**0**	**6,966,895**	**11,929,642**
	% of Total		**2**	**6**	**9**	**0**	**48**	**12**
	Total for NPRI		**5,235**	**75,808,346**	**4,360,769**	**3,701,129**	**14,644,256**	**98,637,746**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–24. The 15 TRI Facilities with the Largest Total Releases in the Primary Metals Industry, 1998

				On-site Releases				
Rank	Facility	City, State	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT	6	26,163,746	0	0	0	26,163,746
2	ASARCO Inc.	East Helena, MT	10	47,857	731	0	19,085,244	19,133,832
3	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ	11	71,443	0	0	20,787,234	20,858,677
4	Kennecott Utah Copper Smelter & Refy.	Magna, UT	16	141,488	3,536	0	15,042,630	15,187,654
5	Armco Inc. Butler Ops. (Rte 8S)	Butler, PA	14	55,377	14,060,975	0	0	14,116,352
6	Phelps Dodge Hidalgo Inc.	Playas, NM	16	127,441	5,668	0	9,806,485	9,939,594
7	Zinc Corp. of America Monaca Smelter	Monaca, PA	13	426,769	1,293	0	0	428,062
8	Nucor Steel	Crawfordsville, IN	8	15,734	16	0	0	15,750
9	Rouge Steel Co.	Dearborn, MI	8	22,456	604	0	0	23,060
10	USS Gary Works, USX Corp.	Gary, IN	33	582,009	9,575	0	5,086,841	5,678,425
11	Northwestern Steel & Wire Co.	Sterling, IL	6	56,526	8,348	0	5,738,322	5,803,196
12	Nucor-Yamato Steel Co.	Blytheville, AR	8	8,509	2	0	0	8,511
13	Natl. Steel Corp., Greatlakes Div.	Ecorse, MI	18	83,835	18,539	0	0	102,374
14	Elkem Metals Co.	Marietta, OH	6	186,815	198,186	0	4,473,469	4,858,470
15	Steel Dynamics Inc.	Butler, IN	3	15,015	0	0	0	15,015
	Subtotal		**176**	**28,005,020**	**14,307,473**	**0**	**80,020,225**	**122,332,718**
	% of Total		**0.3**	**4**	**15**	**0**	**27**	**10**
	Total for TRI		**67,560**	**777,765,454**	**98,486,401**	**82,562,803**	**296,424,635**	**1,255,239,293**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–23. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	5,873,182	5,873,182	7,063,650	Zinc and compounds (transfers of metals)
2	30	6,302,410	6,302,440	6,706,253	Zinc and compounds (transfers of metals)
3	0	0	0	4,723,052	Sulfuric acid (air), Chromium and compounds (land)
4	0	0	0	2,435,843	Zinc and compounds (land)
5	0	1,840,990	1,840,990	1,850,638	Zinc and compounds (transfers of metals)
6	0	1,776,970	1,776,970	1,795,092	Zinc and compounds (transfers of metals)
7	0	1,279,315	1,279,315	1,279,627	Zinc/Copper and compounds (transfers of metals)
8	175	1,263,649	1,263,824	1,276,617	Zinc and compounds (transfers of metals)
9	0	0	0	1,167,315	Zinc and compounds (land)
10	0	490,540	490,540	885,666	Nitric acid and nitrate compounds (water), Chromium /Nickel and compounds (transfers of metals)
11	0	787,745	787,745	799,449	Zinc and compounds (transfers of metals)
12	0	737,410	737,410	740,163	Chromium and compounds (transfers of metals)
13	0	0	0	678,263	Zinc/Manganese and compounds (land)
14	379,000	11,800	390,800	655,230	Asbestos (transfers to disposal), Benzene (air)
15	0	0	0	616,000	Hydrogen fluoride (air)
	379,205	**20,364,011**	**20,743,216**	**32,672,858**	
	4	**49**	**41**	**22**	
	9,567,199	**41,605,926**	**51,173,125**	**149,810,871**	

Table 3–24. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	0	0	26,163,746	Chlorine (air)
2	0	2,184,136	2,184,136	21,317,968	Zinc and compounds (land)
3	0	139	139	20,858,816	Copper and compounds, Zinc and compounds (land)
4	0	258,691	258,691	15,446,345	Copper/Zinc/Arsenic and compounds (land)
5	862	221,149	222,011	14,338,363	Nitric acid and nitrate compounds (water)
6	0	0	0	9,939,594	Zinc and compounds, Copper and compounds (land)
7	0	9,038,217	9,038,217	9,466,279	Zinc and compounds (transfers of metals)
8	0	8,843,001	8,843,001	8,858,751	Zinc and compounds (transfers of metals)
9	326,531	6,961,360	7,287,891	7,310,951	Zinc and compounds (transfers of metals)
10	821	366,991	367,812	6,046,237	Zinc and compounds (land)
11	0	84,353	84,353	5,887,549	Zinc/Manganese and compounds (land)
12	0	5,095,164	5,095,164	5,103,675	Zinc and compounds (transfers of metals)
13	0	4,911,304	4,911,304	5,013,678	Zinc and compounds (transfers of metals)
14	0	34,467	34,467	4,892,937	Manganese and compounds (land)
15	0	4,638,323	4,638,323	4,653,338	Zinc and compounds (transfers of metals)
	328,214	**42,637,295**	**42,965,509**	**165,298,227**	
	1	**21**	**19**	**11**	
	28,025,933	**203,827,147**	**231,853,080**	**1,487,092,373**	

The chemicals manufacturing industry reported the third-largest total releases on- and off-site in TRI and the fourth-largest in NPRI.

- The 15 facilities with the largest total releases in the NPRI chemicals manufacturing industry reported 12.4 million kg, or 8 percent of total NPRI releases in 1998. Ninety percent of the releases by these 15 facilities were on-site releases, with 60 percent of on-site releases as air emissions and almost one-third as on-site underground injection. One of these facilities (Celanese Canada Inc. in Edmonton, Alberta) alone reported 3.2 million kg, 87 percent of all NPRI on-site underground injection.
- The 15 TRI chemical manufacturing facilities with the largest releases in 1998 reported 92.7 million kg, 6 percent of total TRI releases. These releases were primarily on-site, with 42.9 million kg of on-site underground injection. These 15 facilities reported 52 percent of all TRI on-site underground injection in 1998. Their on-site surface water discharges of 19.7 million kg represented 20 percent of all such TRI releases.

Table 3–25. The 15 NPRI Facilities with the Largest Total Releases in the Chemicals Industry, 1998

				On-site Releases				
Rank	Facility	City, Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	11	278,804	0	3,228,253	3	3,507,060
2	Bayer Inc., Sarnia Site	Sarnia, ON	18	1,262,296	24,144	0	2,500	1,289,003
3	Nova Chemicals Ltd., St. Clair River Site	Corunna, ON	5	1,133,950	827	0	0	1,134,777
4	Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan, AB	32	829,183	1	69,846	908	899,938
5	Maple Roll Leaf, Illinois Tool Works Canada Inc.	Windsor, ON	9	826,291	0	0	0	826,291
6	Kronos Canada, Inc.	Varennes, QC	7	15,447	11,000	0	0	26,447
7	Agrium Products Inc., Redwater Fertilizer Operations	Redwater, AB	15	95,780	96,575	312,182	11,690	516,227
8	Canadian Fertilizers Limited	Medicine Hat, AB	2	516,668	0	0	0	516,765
9	Pétromont, société en commandite	Varennes, QC	11	450,905	740	0	0	451,645
10	Union Carbide Canada Inc., Prentiss Chemical Manufacturing Plant	Lacombe County, AB	7	346,743	0	0	71,480	418,323
11	ICI Canada Inc, McMasterville Complex	McMasterville, QC	1	0	399,000	0	0	399,000
12	Methanex Corporation, Medicine Hat Plant	Medicine Hat, AB	3	351,320	0	0	3,120	354,440
13	AT Plastics Inc., Edmonton Site	Edmonton, AB	4	346,580	32	1,456	1,660	349,728
14	Dow Chemical Canada Inc., Sarnia	Sarnia, ON	24	172,446	1,422	0	143,122	319,460
15	Imperial Oil, Sarnia Chemical Plant	Sarnia, ON	23	128,275	2,110	0	0	130,919
	Subtotal		**172**	**6,754,688**	**535,851**	**3,611,737**	**234,483**	**11,140,023**
	% of Total		**3**	**9**	**12**	**98**	**2**	**11**
	Total for NPRI		**5,235**	**75,808,346**	**4,360,769**	**3,701,129**	**14,644,256**	**98,637,746**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–26. The 15 TRI Facilities with the Largest Total Releases in the Chemicals Industry, 1998

				On-site Releases				
Rank	Facility	City, State	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Solutia Inc.	Gonzalez, FL	18	79,642	778	9,787,718	0	9,868,138
2	DuPont Victoria Plant	Victoria, TX	29	159,736	1,333	9,546,080	6,234	9,713,383
3	PCS Nitrogen Fertilizer L.P.	Geismar, LA	12	52,663	8,920,211	0	269,176	9,242,050
4	Lenzing Fibers Corp.	Lowland, TN	5	7,875,401	3,158	0	117,959	7,996,518
5	Cytec Inds. Inc. Fortier Plant	Westwego, LA	23	62,955	8,427	7,590,431	0	7,661,813
6	Elementis Chromium L.P.	Corpus Christi, TX	2	2,176	793	0	6,893,424	6,896,393
7	BASF Corp.	Freeport, TX	27	274,878	6,807,961	16,405	0	7,099,244
8	BP Chemicals Inc., BP America Inc.	Lima, OH	27	247,410	0	4,873,801	0	5,121,211
9	Acordis Cellulosic Fibers Inc., Akzo Nobel Finance US	Axis, AL	4	4,835,375	7,347	0	190,476	5,033,198
10	Occidental Chemical Corp.	Castle Hayne, NC	1	2,888	17	0	4,535,150	4,538,055
11	Angus Chemical Co.	Sterlington, LA	11	73,581	164,921	4,159,850	327	4,398,679
12	BP Chemicals Inc. Green Lake Facility, BP America	Port Lavaca, TX	17	52,198	277	3,818,281	249	3,871,005
13	Vicksburg Chemical Co.	Vicksburg, MS	4	31,948	3,761,628	0	0	3,793,576
14	PCS Phosphate Co. Inc., Auroradiv.	Aurora, NC	5	157,769	0	0	3,482,247	3,640,016
15	DuPont Delisle Plant	Pass Christian, MS	13	310,073	0	3,107,029	0	3,417,102
	Subtotal		**198**	**14,218,693**	**19,676,851**	**42,899,595**	**15,495,242**	**92,290,381**
	% of Total		**0.3**	**2**	**20**	**52**	**5**	**7**
	Total for TRI		**67,560**	**777,765,454**	**98,486,401**	**82,562,803**	**296,424,635**	**1,255,239,293**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–25. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	94,800	31,014	125,814	3,632,874	Methanol (UIJ)
2	106,000	0	106,000	1,395,003	Cyclohexane, Chloromethane, Hydrochloric acid (air)
3	13,670	0	13,670	1,148,447	Cyclohexane (air)
4	51,435	0	51,435	951,373	Ethylene (air)
5	0	0	0	826,291	Methyl ethyl ketone, Toluene, Methanol (air)
6	0	720,000	720,000	746,447	Manganese and compounds (transfers of metals)
7	33,020	70	33,090	549,317	Nitric acid and nitrate compounds (UIJ, water), Methanol (UIJ)
8	0	0	0	516,765	Methanol (air)
9	0	0	0	451,645	Propylene, Ethylene (air)
10	1,325	0	1,325	419,648	Ethylene glycol (air, land), Ethylene (air)
11	0	0	0	399,000	Nitric acid and nitrate compounds (water)
12	0	11,196	11,196	365,636	Methanol (air)
13	0	0	0	349,728	Ethylene (air)
14	315	0	315	319,775	Asbestos (land), Ethylene (air)
15	180,000	0	180,000	310,919	Phosphoric acid (transfers to disposal), Ethylene (air)
	480,565	**762,280**	**1,242,845**	**12,382,868**	
	5	**2**	**2**	**8**	
	9,567,199	**41,605,926**	**51,173,125**	**149,810,871**	

UIJ=underground injection.

Table 3–26. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	590	617	1,207	9,869,345	Nitric acid and nitrate compounds (UIJ)
2	38	215	253	9,713,636	Nitric acid and nitrate compounds (UIJ)
3	0	0	0	9,242,050	Phosphoric acid (water)
4	0	0	0	7,996,518	Carbon disulfide (air)
5	208	15,263	15,471	7,677,284	Acetonitrile, Acrylic acid, Acrylamide (UIJ)
6	0	372,338	372,338	7,268,731	Chromium and compounds (land)
7	6,189	7,389	13,578	7,112,822	Nitric acid and nitrate compounds (water)
8	353	281	634	5,121,845	Acetonitrile, Acrylamide (UIJ)
9	0	0	0	5,033,198	Carbon disulfide (air)
10	0	5,896	5,896	4,543,951	Chromium and compounds (land)
11	0	0	0	4,398,679	Nitric acid and nitrate compounds (UIJ)
12	3,079	94	3,173	3,874,178	Acetonitrile, Acrylamide, Acrylonitrile (UIJ)
13	0	0	0	3,793,576	Nitric acid and nitrate compounds (water)
14	0	0	0	3,640,016	Phosphoric acid (land)
15	0	0	0	3,417,102	Manganese and compounds (UIJ)
	10,457	**402,093**	**412,550**	**92,702,931**	
	0.0	**0.2**	**0.2**	**6**	
	28,025,933	**203,827,147**	**231,853,080**	**1,487,092,373**	

UIJ=underground injection.

The hazardous waste management sector had the second-largest total NPRI releases and the fourth-largest total TRI releases for 1998 in the matched data set.

- The 15 NPRI hazardous waste management facilities with the largest total releases accounted for 16 percent of all NPRI releases in 1998. These 15 facilities reported 23.5 million kg, with 13.7 million kg as off-site transfers of metals and 7.0 million kg of off-site transfers to disposal of other substances. These 15 facilities accounted for 40 percent of all NPRI off-site releases.
- For TRI, the 15 hazardous waste management facilities with the largest total releases reported 97.6 million kg, 7 percent of all TRI releases for 1998. Unlike the NPRI hazardous waste management facilities, these 15 facilities reported mostly on-site releases. They reported 75.8 million kg of on-site land releases, representing 26 percent of all such TRI releases.

Table 3–27. The 15 NPRI Facilities with the Largest Total Releases in the Hazardous Waste Management Industry, 1998

				On-site Releases				
Rank	Facility	City, Province	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	8	0	0	0	0	0
2	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	17	0	0	0	0	0
3	Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary, AB	1	0	0	0	2,802,160	2,802,160
4	Philip Enterprises Inc., Rexdale Facility	Etobicoke, ON	7	0	0	0	0	0
5	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	5	0	0	0	0	0
6	Safety-Kleen Ltd., Safety-Kleen (Niagara)	Thorold, ON	25	0	0	0	0	0
7	Philip Enterprises Inc., Barrie Facility	Barrie, ON	19	0	0	0	0	0
8	Philip Services Corp., Windsor Facility	Windsor, ON	4	0	0	0	0	0
9	Les Services Safety-Kleen (Mercier) Ltée	Mercier, QC	13	500	0	0	0	500
10	Safety-Kleen (Ryley) Ltd., Ryley Facility	Ryley, AB	3	0	0	0	88,240	88,240
11	Les Services Safety-Kleen (Québec) Ltée, Ville Ste-Catherine	Ste-Catherine, QC	8	2,530	0	0	0	2,530
12	Safety-Kleen Ltd., Mississauga Service Centre	Mississauga, ON	9	0	0	0	0	0
13	Wasteco Environmental Services Ltd., Ceda-Reactor Ltd.	Edmonton, AB	4	0	0	0	0	0
14	Safety-Kleen (Atlantic) Limited, Safety-Kleen Debert	Debert, NS	2	0	0	0	0	0
15	Philip Enterprises, Delta Facility	Delta, BC	11	0	0	0	0	900
	Subtotal		**136**	**3,030**	**0**	**0**	**2,890,400**	**2,894,330**
	% of Total		**3**	**0.0**	**0.0**	**0.0**	**20**	**3**
	Total for NPRI		**5,235**	**75,808,346**	**4,360,769**	**3,701,129**	**14,644,256**	**98,637,746**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–28. The 15 TRI Facilities with the Largest Total Releases in the Hazardous Waste Management Industry, 1998

				On-site Releases				
Rank	Facility	City, State	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH	11	518	0	0	22,881,631	22,882,149
2	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID	13	5,424	0	0	14,094,786	14,100,210
3	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL	10	242	4	0	9,779,092	9,779,338
4	Waste Management of Ohio Inc.	Vickery, OH	14	0	0	7,899,321	0	7,899,321
5	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT	21	290	0	0	6,473,025	6,473,315
6	Chemical Waste Management of the Northwest Inc.	Arlington, OR	26	1,657	0	0	5,455,476	5,457,133
7	Chemical Waste Management	Emelle, AL	15	153	0	0	5,043,764	5,043,917
8	Chemical Waste Management Inc.	Kettleman City, CA	21	2,694	0	0	4,853,527	4,856,221
9	Southeastern Chemical & Solvent Co. Inc., TBN Holdings	Sumter, SC	41	1,997	0	0	0	1,997
10	Envirite of Ohio Inc.	Canton, OH	9	465	459	0	0	924
11	Safety-Kleen Lone & Grassy Mtn. Inc.	Waynoka, OK	15	736	0	0	2,889,801	2,890,537
12	Heritage Environmental Services L.L.C.	Indianapolis, IN	13	16	66	0	0	82
13	Crystal Clean Services L.L.C.	Indianapolis, IN	14	16	66	0	0	82
14	Wayne Disposal Inc., The Environmental Quality Co.	Belleville, MI	23	3,715	0	0	2,199,728	2,203,443
15	CWM Chemical Services L.L.C	Model City, NY	14	5	360	0	2,122,712	2,123,077
	Subtotal		**260**	**17,928**	**955**	**7,899,321**	**75,793,542**	**83,711,746**
	% of Total		**0.4**	**0.0**	**0.0**	**10**	**26**	**7**
	Total for TRI		**67,560**	**777,765,454**	**98,486,401**	**82,562,803**	**296,424,635**	**1,255,239,293**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–27. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	295,880	8,280,287	8,576,167	8,576,167	Zinc and compounds (transfers of metals)
2	3,520,241	3,427,991	6,948,232	6,948,232	Zinc and compounds (transfers of metals), Xylene, Toluene (transfers to disposal)
3	0	0	0	2,802,160	Asbestos (land)
4	1,372,400	0	1,372,400	1,372,400	Xylene, Toluene (transfers to disposal)
5	608,990	712,700	1,321,690	1,321,690	Nitric acid and nitrate compounds (transfers to disposal), Chromium and compounds (transfers of metals)
6	16,784	816,803	833,587	833,587	Mercury/Chromium/Lead and compounds (transfers of metals)
7	455,262	240,216	695,478	695,478	Xylene, Toluene (transfers to disposal), Zinc/Chromium and compounds (transfers of metals)
8	377,746	0	377,746	377,746	Methyl ethyl ketone, Toluene, Xylene (transfers to disposal)
9	88,000	67,652	155,652	156,152	Toluene, Xylene (transfers to disposal), Lead/Zinc/Chromium/Copper and compounds (transfers of metals)
10	50,600	0	50,600	138,840	Asbestos (land), Methanol (transfers to disposal)
11	101,680	0	101,680	104,210	Toluene, Xylene, Methyl ethyl ketone (transfers to disposal)
12	0	98,000	98,000	98,000	Lead and compounds (transfers of metals)
13	63,645	0	63,645	63,645	Ethylene glycol, Asbestos (transfers to disposal)
14	26,150	0	26,150	26,150	Formaldehyde (transfers to disposal)
15	0	18,517	18,517	19,417	Chromium and compounds (transfers of metals)
	6,977,378	**13,662,166**	**20,639,544**	**23,533,874**	
	73	**33**	**40**	**16**	
	9,567,199	**41,605,926**	**51,173,125**	**149,810,871**	

Table 3–28. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases from the facility)
1	0	36,459	36,459	22,918,608	Zinc and compounds (land)
2	0	17	17	14,100,227	Zinc and compounds (land)
3	0	3,086	3,086	9,782,424	Zinc and compounds (land)
4	28,440	143	28,583	7,927,904	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
5	0	5,811	5,811	6,479,126	Zinc/Lead/Manganese/Copper and compounds (land)
6	0	3,466	3,466	5,460,599	Asbestos, Aluminum (land)
7	1,315	73,749	75,064	5,118,981	Lead/Zinc/Copper/Arsenic and compounds (land)
8	0	1,491	1,491	4,857,712	Aluminum oxide, Lead and compounds, Asbestos, Aluminum (land)
9	4,060,325	307,266	4,367,591	4,369,588	Ethylene glycol (transfers to disposal)
10	154,195	3,520,510	3,674,705	3,675,629	Nickel/Zinc/Chromium and compounds (transfers of metals)
11	0	1,599	1,599	2,892,136	Lead/Zinc/Cadmium/Chromium and compounds (land)
12	0	2,707,242	2,707,242	2,707,324	Nickel/Zinc/Copper and compounds (transfers of metals)
13	0	2,707,239	2,707,239	2,707,321	Nickel/Zinc/Copper and compounds (transfers of metals)
14	26,791	261,771	288,562	2,492,005	Lead/Selenium/Nickel/Arsenic and compounds (land)
15	159	16,711	16,870	2,139,947	Zinc/Lead and compounds, Asbestos (land)
	4,271,225	**9,646,560**	**13,917,785**	**97,629,531**	
	15	**5**	**6**	**7**	
	28,025,933	**203,827,147**	**231,853,080**	**1,487,092,373**	

UIJ=underground injection.

Facilities with Largest On-site Releases

Just 50 facilities accounted for half of all on-site releases in Canada and almost one-third of all on-site releases in the US in 1998.

- The 50 NPRI facilities with the largest on-site releases in 1998 reported 55 percent—54.5 million kg—of NPRI's on-site releases. These facilities reported 98 percent of all NPRI on-site underground injection, 86 percent of on-site land releases, 49 percent of on-site air emissions and 31 percent of on-site surface water discharges.
- The two facilities with the largest on-site releases were located in Ontario, the province with the largest on-site releases for 1998. Twenty of the 50 facilities with the largest on-site NPRI releases were located in Ontario. The third- and fourth-ranked facilities were located in Alberta, the province with the second-largest on-site releases. Eleven of the 50 facilities were located in Alberta.
- The electric utility industry had the largest on-site releases among NPRI industry sectors and 10 electric utilities appeared among the 50 facilities with the largest on-site NPRI releases. There were also 10 primary metals facilities and nine chemical manufacturers.
- Only one NPRI facility, the electric utility Ontario Power Generation Inc. in Nanticoke, Ontario, reported over 5 million kg of on-site releases.

Table 3–29. The 50 NPRI Facilities with the Largest Total On-site Releases, 1998

			SIC Codes			On-site Releases			
Rank	Facility	City, Province	Canada	US	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)
1	Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke, ON	49	491/493	12	4,855,140	8,030	0	251,480
2	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	8	3,178,052	0	0	1,545,000
3	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28	11	278,804	0	3,228,253	3
4	Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary, AB	99	495/738	1	0	0	0	2,802,160
5	Ispat Sidbec Inc. Acierie, Ispat Mexicana	Contrecœur, QC	29	33	5	9,580	1,333	0	2,424,930
6	Nova Scotia Power Inc., Lingan Generating Station	New Waterford, NS	41	491/493	8	2,044,050	0	0	173,700
7	Ontario Power Generation Inc., Lambton Generating Station	Courtright, ON	49	491/493	11	1,754,050	4,610	0	216,030
8	TransAlta Utilities Corporation, Sundance Thermal Generating Plant	Duffield, AB	49	491/493	12	848,990	0	0	498,900
9	Bayer Inc., Sarnia Site	Sarnia, ON	37	28	18	1,262,296	24,144	0	2,500
10	General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa, ON	32	37	13	1,248,025	0	0	0
11	Ontario Power Generation Inc, Lakeview GS	Mississauga, ON	49	491/493	8	1,226,000	2,170	0	8,370
12	Co-Steel Lasco	Whitby, ON	29	33	6	14,095	310	0	1,176,063
13	Gerdau MRM Steel Inc.	Selkirk, MB	29	33	6	12,910	85	0	1,154,320
14	Nova Chemicals Ltd., St. Clair River Site	Corunna, ON	37	28	5	1,133,950	827	0	0
15	Fraser Papers Inc. (Canada), Edmundston Operations	Edmundston, NB	27	26	10	1,054,952	39,590	0	0
16	New Brunswick Power, Coleson Cove Generating Station	Saint John, NB	49	491/493	5	1,061,850	37	0	27,990
17	Irving Pulp & Paper, Ltd/Irving Tissue Company	Saint John, NB	27	26	2	257,306	745,610	0	0
18	Daishowa-Marubeni Int'l, Peace River Pulp Division	Peace River, AB	27	26	9	839,680	14,158	0	95,198
19	Bowater Pulp & Paper Canada Inc., Thunder Bay Operations	Thunder Bay, ON	27	26	9	904,600	881	0	0
20	Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan, AB	37	28	32	829,183	1	69,846	908
21	Canadian General - Tower Ltd.	Cambridge, ON	16	30	8	887,536	0	0	0
22	Maple Roll Leaf, Illinois Tool Works Canada Inc.	Windsor, ON	37	28	9	826,291	0	0	0
23	Imperial Home Decor Group (Canada) ULC	Brampton, ON	27	26	2	821,620	0	0	0
24	Nova Scotia Power Inc., Point Aconi Generating Station	Point Aconi, NS	41	491/493	7	615,000	0	0	201,400
25	Morbern Incorporated	Cornwall, ON	16	30	3	787,500	0	0	0
26	International Wallcoverings Ltd, Brampton Plant	Brampton, ON	28	27	4	755,700	0	0	0
27	AltaSteel Ltd., Stelco Inc.	Edmonton, AB	29	33	6	12,234	47	0	665,982
28	Imperial Oil, IOL Sarnia Refinery	Sarnia, ON	36	29	23	426,543	235,458	0	1,946
29	Alcan Smelters and Chemicals Ltd, Kitimat Works	Kitimat, BC	29	33	6	616,000	0	0	0
30	Paintplas Inc.	Ajax, ON	32	30	8	604,800	0	0	0
31	Domtar Papers, Cornwall Business Unit	Cornwall, ON	27	26	7	546,415	50,899	0	0
32	Papiers Domtar - Centre d'affaires Windsor	Windsor, QC	27	26	3	524,260	61,900	0	0
33	Fletcher Challenge Canada, Elk Falls Mill	Campbell River, BC	27	26	4	580,400	0	0	0
34	New Brunswick Power, Dalhousie Generating Station	Dalhousie, NB	49	491/493	3	548,918	136	0	0
35	Canadian Fertilizers Limited	Medicine Hat, AB	37	28	2	516,668	0	0	0
36	Agrium Products Inc., Redwater Fertilizer Operations	Redwater, AB	37	28	15	95,780	96,575	312,182	11,690
37	TransAlta Utilities Corporation, Keephills Thermal Generating Plant	Duffield, AB	49	491/493	10	305,810	0	0	206,800
38	Recyclage d'aluminium, Philip Services Corp.	Bécancour, QC	29	33	1	0	0	0	500,000
39	Cartons St-Laurent Inc.	Latuque, QC	27	26	8	457,037	27,413	0	0
40	Sydney Steel Corporation	Sydney, NS	29	33	8	0	560	0	479,000
41	Ford Motor Company, St. Thomas Assembly Plant	St. Thomas, ON	32	37	11	477,480	130	0	0
42	Ford Motor Company, Oakville Assembly Plant	Oakville, ON	32	37	12	472,135	0	0	0
43	Pacifica Papers Inc., Powell River Division	Powell River, BC	27	26	4	471,000	0	0	0
44	Pétromont, société en commandite	Varennes, QC	37	28	11	450,905	740	0	0
45	TransAlta Utilities Corporation, Wabamun Thermal Generating Plant	Wabamun, AB	49	491/493	4	376,630	20	0	68,800
46	Canfor, Prince George Pulp & Paper Mills	Prince George, BC	27	26	4	439,000	0	0	0
47	Hudson Bay Mining and Smelting, Metallurgical Complex	Flin Flon, MB	29	33	6	421,266	4,472	0	0
48	Witco Canada Inc., West Hill Plant	Scarborough, ON	36	29	2	423,000	0	0	0
49	Union Carbide Canada Inc., Prentiss Chemical Manufacturing Plant	Lacombe County, AB	37	28	7	346,743	0	0	71,480
50	Noranda Inc, Fonderie Horne	Rouyn-Noranda, QC	29	33	12	394,568	14,122	0	0
	Subtotal				**401**	**37,014,752**	**1,334,258**	**3,610,281**	**12,584,650**
	% of Total				**8**	**49**	**31**	**98**	**86**
	Total for NPRI				**5,235**	**75,808,346**	**4,360,769**	**3,701,129**	**14,644,256**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–29. (*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 Releases On- and Off-site (kg)
1	5,114,650	Hydrochloric acid (air)	0	5,114,650
2	4,723,052	Sulfuric acid (air), Chromium and compounds (land)	0	4,723,052
3	3,507,060	Methanol (UIJ)	125,814	3,632,874
4	2,802,160	Asbestos (land)	0	2,802,160
5	2,435,843	Zinc and compounds (land)	0	2,435,843
6	2,217,750	Hydrochloric acid (air)	0	2,217,750
7	1,974,690	Hydrochloric acid, Sulfuric acid (air)	0	1,974,690
8	1,347,890	Sulfuric acid, Hydrogen fluoride (air), Manganese and compounds (land)	730	1,348,620
9	1,289,003	Cyclohexane, Chloromethane (air)	106,000	1,395,003
10	1,248,025	Xylene, Toluene, n-Butyl alcohol (air)	12,287	1,260,312
11	1,236,540	Hydrochloric acid (air)	0	1,236,540
12	1,190,468	Zinc and compounds (land)	5,873,182	7,063,650
13	1,167,315	Zinc and compounds (land)	0	1,167,315
14	1,134,777	Cyclohexane (air)	13,670	1,148,447
15	1,094,542	Methanol (air)	172,494	1,267,036
16	1,089,877	Sulfuric acid (air)	0	1,089,877
17	1,002,916	Methanol (water)	0	1,002,916
18	949,036	Methanol (air)	0	949,036
19	905,481	Methanol (air)	0	905,481
20	899,938	Ethylene (air)	51,435	951,373
21	887,536	Methyl ethyl ketone (air)	0	887,536
22	826,291	Methyl ethyl ketone, Toluene, Methanol (air)	0	826,291
23	821,620	Methyl ethyl ketone, Toluene (air)	25,490	847,110
24	816,400	Hydrochloric acid (air)	0	816,400
25	787,500	Methyl ethyl ketone (air)	0	787,500
26	755,700	Methyl ethyl ketone, Toluene (air)	0	755,700
27	678,263	Zinc/Manganese and compounds (land)	0	678,263
28	663,947	Nitric acid and nitrate compounds (water), Methyl isobutyl ketone, Methanol, Vanadium, Propylene (air)	44,475	708,422
29	616,000	Hydrogen fluoride (air)	0	616,000
30	604,800	Xylene, Toluene (air)	0	604,800
31	597,314	Methanol, Chlorine dioxide (air)	0	597,314
32	586,160	Methanol (air)	0	586,160
33	580,400	Methanol (air)	0	580,400
34	549,054	Sulfuric acid (air)	62,670	611,724
35	516,765	Methanol (air)	0	516,765
36	516,227	Nitric acid and nitrate compounds (UIJ, water), Methanol (UIJ)	33,090	549,317
37	512,610	Sulfuric acid, Hydrogen fluoride (air), Manganese and compounds (land)	110	512,720
38	500,000	Aluminum (land)	0	500,000
39	484,450	Methanol (air)	6,592	491,042
40	480,780	Zinc and compounds, Manganese and compounds (land)	0	480,780
41	477,610	Xylene, n-Butyl alcohol, Methyl isobutyl ketone (air)	6,266	483,876
42	472,135	Xylene, 1,2,4-Trimethylbenzene, n-Butyl alcohol (air)	7,184	479,319
43	471,260	Methanol (air)	0	471,260
44	451,645	Propylene, Ethylene (air)	0	451,645
45	445,450	Hydrogen fluoride, Sulfuric acid (air)	0	445,450
46	439,000	Methanol (air)	0	439,000
47	425,738	Zinc/Lead/Copper and compounds (air)	0	425,738
48	423,000	Methanol (air)	0	423,000
49	418,323	Ethylene glycol (air, land), Ethylene (air)	1,325	419,648
50	408,690	Lead/Copper/Arsenic and compounds (air)	0	408,690
	54,545,681		**6,542,814**	**61,088,495**
	55		**13**	**41**
	98,637,746		**51,173,125**	**149,810,871**

UIJ=underground injection.

- The 50 TRI facilities with the largest on-site releases in 1998 reported 389.4 million kg—31 percent—of TRI's on-site releases. These 50 facilities reported 60 percent of all TRI on-site land releases, 53 percent of on-site underground injection, 31 percent of on-site surface water discharges, and 18 percent of on-site air emissions.
- In contrast to NPRI, where the largest on-site release by any facility was 5 million kg, seven TRI facilities reported more than 10 million kg of on-site releases. Five of the seven were in the primary metals industry, and two were hazardous waste management facilities.
- These seven TRI facilities reported a total of 132.4 million kg of on-site releases, more than all of the approximately 1,500 facilities reporting to NPRI in 1998.
- Like NPRI, the electric utility industry had the largest on-site releases among TRI industry sectors. Twenty of the 50 facilities were electric generating facilities. There were also 11 primary metals facilities and 11 chemical manufacturers.
- Seven of the 50 facilities were located in Ohio, the state reporting the largest on-site releases. Three of the 20 electric generating facilities were in Ohio. The next three states with the largest on-site releases, Texas, Pennsylvania and Louisiana, each had three facilities among the top 50 for on-site releases.

Table 3–30. The 50 TRI Facilities with the Largest Total On-site Releases, 1998

					On-site Releases			
Rank	Facility	City, State	US SIC Codes	Number of Forms	Air (kg)	Surface Water (kg)	Underground Injection (kg)	Land (kg)
1	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT	33	6	26,163,746	0	0	0
2	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH	495/738	11	518	0	0	22,881,631
3	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ	33	11	71,443	0	0	20,787,234
4	ASARCO Inc.	East Helena, MT	33	10	47,857	731	0	19,085,244
5	Kennecott Utah Copper Smelter & Refy.	Magna, UT	33	16	141,488	3,536	0	15,042,630
6	Armco Inc. Butler Ops. (Rte 8S)	Butler, PA	33	14	55,377	14,060,975	0	0
7	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID	495/738	13	5,424	0	0	14,094,786
8	Phelps Dodge Hidalgo Inc.	Playas, NM	33	16	127,441	5,668	0	9,806,485
9	Solutia Inc.	Gonzalez, FL	28	18	79,642	778	9,787,718	0
10	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL	495/738	10	242	4	0	9,779,092
11	DuPont Victoria Plant	Victoria, TX	28	29	159,736	1,333	9,546,080	6,234
12	PCS Nitrogen Fertilizer L.P.	Geismar, LA	28	12	52,663	8,920,211	0	269,176
13	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA	491/493	12	8,182,292	8,316	0	316,680
14	Lenzing Fibers Corp.	Lowland, TN	28	5	7,875,401	3,158	0	117,959
15	Waste Management of Ohio Inc.	Vickery, OH	495/738	14	0	0	7,899,321	0
16	American Electric Power, John E. Amos Plant	Winfield, WV	491/493	12	7,577,375	1,993	0	203,105
17	Cytec Inds. Inc. Fortier Plant	Westwego, LA	28	23	62,955	8,427	7,590,431	0
18	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC	491/493	12	6,863,418	3,384	0	440,273
19	BASF Corp.	Freeport, TX	28	27	274,878	6,807,961	16,405	0
20	Elementis Chromium L.P.	Corpus Christi, TX	28	2	2,176	793	0	6,893,424
21	Dayton Power & Light Co. J.M Stuart Station	Manchester, OH	491/493	13	5,806,513	2,688	0	864,853
22	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT	495/738	21	290	0	0	6,473,025
23	American Electric Power, Mitchell Plant	Moundsville, WV	491/493	13	5,925,307	3,700	0	353,006
24	Northwestern Steel & Wire Co.	Sterling, IL	33	6	56,526	8,348	0	5,738,322
25	USS Gary Works, USX Corp.	Gary, IN	33	33	582,009	9,575	0	5,086,841
26	Cardinal Plant, Cardinal Operating Co.	Brilliant, OH	491/493	14	5,134,319	69,059	0	424,617
27	Firstenergy, W.H. Sammis Plant	Stratton, OH	491/493	14	5,493,361	4,380	0	548
28	Chemical Waste Management of the Northwest Inc.	Arlington, OR	495/738	26	1,657	0	0	5,455,476
29	Brandon Shores & Wagner Complex, Baltimore Gas Electric Co.	Baltimore, MD	491/493	14	5,185,006	2,297	0	1,194
30	BP Chemicals Inc.	Lima, OH	28	27	247,410	0	4,873,801	0
31	PSI Gibson Generating Station, Cinergy Corp.	Princeton, IN	491/493	13	3,656,341	0	0	1,464,013
32	Chemical Waste Management	Emelle, AL	495/738	15	153	0	0	5,043,764
33	Acordis Cellulosic Fibers Inc., Akzo Nobel Finance US	Axis, AL	28	4	4,835,375	7,347	0	190,476
34	Elkem Metals Co.	Marietta, OH	33	6	186,815	198,186	0	4,473,469
35	Chemical Waste Management Inc.	Kettleman City, CA	495/738	21	2,694	0	0	4,853,527
36	Scherer Steam Electric Generating Plant	Juliette, GA	491/493	14	4,041,640	9,085	0	667,487
37	Kentucky Utilities Co. - Ghentstation, LG&E Energy Corp.	Ghent, KY	491/493	13	3,841,543	26,134	0	781,633
38	Occidental Chemical Corp.	Castle Hayne, NC	28	1	2,888	17	0	4,535,150
39	Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum, MO	33	9	123,228	111	0	4,337,539
40	Angus Chemical Co.	Sterlington, LA	28	11	73,581	164,921	4,159,850	327
41	U.S. TVA Paradise Fossil Plant	Drakesboro, KY	491/493	14	4,120,838	30,773	0	217,735
42	Gulf Power Co. - Plant Crist, Southern Co.	Pensacola, FL	491/493	11	4,205,900	736	0	140,100
43	Detroit Edison Monroe Power Plant, DTE Energy	Monroe, MI	491/493	11	3,649,648	1,592	0	624,519
44	Doe Run Co. Glover Smelter, Renco Group Inc.	Annapolis, MO	33	7	19,744	12	0	4,220,682
45	Seminole Generating Station	Palatka, FL	491/493	11	3,803,251	1,118	0	405,381
46	Keystone Station	Shelocta, PA	491/493	10	3,954,757	3,938	0	219,775
47	Baldwin Power Station, Illinova Corp.	Baldwin, IL	491/493	22	3,830,609	0	0	318,368
48	EME Homer City Generation L.P.	Homer City, PA	491/493	11	4,011,984	3,016	0	109,070
49	U.S. TVA Kingston Fossil Plant	Harriman, TN	491/493	13	3,544,355	16,665	0	385,715
50	American Electric Power, Mountaineer Plant	New Haven, WV	491/493	13	3,651,879	1,652	0	291,682
	Subtotal			**684**	**137,733,693**	**30,392,618**	**43,873,606**	**177,402,247**
	% of Total			**1**	**18**	**31**	**53**	**60**
	Total for TRI			**67,560**	**777,765,454**	**98,486,401**	**82,562,803**	**296,424,635**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–30. (*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 Releases On- and Off-site (kg)
1	26,163,746	Chlorine (air)	0	26,163,746
2	22,882,149	Zinc and compounds (land)	36,459	22,918,608
3	20,858,677	Copper/Zinc and compounds (land)	139	20,858,816
4	19,133,832	Zinc and compounds (land)	2,184,136	21,317,968
5	15,187,654	Copper/Zinc/Arsenic and compounds (land)	258,691	15,446,345
6	14,116,352	Nitric acid and nitrate compounds (water)	222,011	14,338,363
7	14,100,210	Zinc and compounds (land)	17	14,100,227
8	9,939,594	Zinc/Copper and compounds (land)	0	9,939,594
9	9,868,138	Nitric acid and nitrate compounds (UIJ)	1,207	9,869,345
10	9,779,338	Zinc and compounds (land)	3,086	9,782,424
11	9,713,383	Nitric acid and nitrate compounds (UIJ)	253	9,713,636
12	9,242,050	Phosphoric acid (water)	0	9,242,050
13	8,507,288	Hydrochloric acid (air)	8	8,507,296
14	7,996,518	Carbon disulfide (air)	0	7,996,518
15	7,899,321	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)	28,583	7,927,904
16	7,782,473	Hydrochloric acid (air)	371,553	8,154,026
17	7,661,813	Acetonitrile, Acrylic acid, Acrylamide (UIJ)	15,471	7,677,284
18	7,307,075	Hydrochloric acid (air)	0	7,307,075
19	7,099,244	Nitric acid and nitrate compounds (water)	13,578	7,112,822
20	6,896,393	Chromium and compounds (land)	372,338	7,268,731
21	6,674,054	Hydrochloric acid (air)	5	6,674,059
22	6,473,315	Zinc/Lead/Manganese/Copper and compounds (land)	5,811	6,479,126
23	6,282,013	Hydrochloric acid (air)	364	6,282,377
24	5,803,196	Zinc/Manganese and compounds (land)	84,353	5,887,549
25	5,678,425	Zinc and compounds (land)	367,812	6,046,237
26	5,627,995	Hydrochloric acid (air)	489	5,628,484
27	5,498,289	Hydrochloric acid (air)	546,394	6,044,683
28	5,457,133	Asbestos, Aluminum (land)	3,466	5,460,599
29	5,188,497	Hydrochloric acid (air)	2,804	5,191,301
30	5,121,211	Acetonitrile, Acrylamide (UIJ)	634	5,121,845
31	5,120,354	Hydrochloric acid, Sulfuric acid (air), Zinc and compounds (land)	1	5,120,355
32	5,043,917	Lead/Zinc/Copper/Arsenic and compounds (land)	75,064	5,118,981
33	5,033,198	Carbon disulfide (air)	0	5,033,198
34	4,858,470	Manganese and compounds (land)	34,467	4,892,937
35	4,856,221	Aluminum oxide, Lead and compounds, Asbestos, Aluminum (land)	1,491	4,857,712
36	4,718,212	Hydrochloric acid, Hydrogen fluoride (air)	0	4,718,212
37	4,649,310	Hydrochloric acid, Sulfuric acid (air)	0	4,649,310
38	4,538,055	Chromium and compounds (land)	5,896	4,543,951
39	4,460,878	Zinc and compounds (land)	16,520	4,477,398
40	4,398,679	Nitric acid and nitrate compounds (UIJ)	0	4,398,679
41	4,369,346	Sulfuric acid, Hydrochloric acid (air)	0	4,369,346
42	4,346,736	Hydrochloric acid (air)	0	4,346,736
43	4,275,759	Hydrochloric acid, Sulfuric acid (air)	25	4,275,784
44	4,240,438	Zinc/Lead and compounds (land)	149	4,240,587
45	4,209,750	Sulfuric acid (air)	0	4,209,750
46	4,178,470	Hydrochloric acid (air)	0	4,178,470
47	4,148,977	Hydrochloric acid, Sulfuric acid (air)	0	4,148,977
48	4,124,070	Hydrochloric acid (air)	0	4,124,070
49	3,946,735	Hydrochloric acid, Sulfuric acid (air)	12	3,946,747
50	3,945,213	Hydrochloric acid (air)	67	3,945,280
	389,402,164		**4,653,354**	**394,055,518**
	31		**2**	**26**
	1,255,239,293		**231,853,080**	**1,487,092,373**

UIJ=underground injection.

Facilities with Largest Off-site Releases

Just 50 facilities accounted for almost all off-site releases in Canada and for more than half of all off-site releases in the US in 1998. Off-site releases include all transfers to disposal as well as transfers of metals to sewage, treatment and energy recovery.

- The 50 NPRI facilities with the largest off-site releases in 1998 reported 93 percent of NPRI's off-site releases.
- The 13 of the 15 facilities with the largest NPRI off-site releases were located in Ontario, the province with the largest off-site releases in 1998. Twenty-eight of the 50 facilities with the largest off-site releases in NPRI were located in Ontario.
- The primary metals sector (US SIC 33) had the largest off-site releases in NPRI, and 17 primary metals facilities appeared among the 50 facilities with the largest off-site NPRI releases. There were also 10 hazardous waste management facilities, the industry sector with the second-largest off-site releases in NPRI.

Table 3–31. The 50 NPRI Facilities with the Largest Off-site Releases, 1998

Rank	Facility	City, Province	SIC Codes		Number	Transfers to Disposal (except metals)	Transfers of Metals	Total Off-site Releases
			Canada	US	of Forms	(kg)	(kg)	(kg)
1	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	77	495/738	8	295,880	8,280,287	8,576,167
2	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	17	3,520,241	3,427,991	6,948,232
3	Dofasco Inc.	Hamilton, ON	29	33	18	30	6,302,410	6,302,440
4	Co-Steel Lasco	Whitby, ON	29	33	6	0	5,873,182	5,873,182
5	Ivaco Rolling Mills	L'Orignal, ON	29	33	7	0	1,840,990	1,840,990
6	Stelco McMaster Ltée	Contrecœur, QC	29	33	5	0	1,776,970	1,776,970
7	Philip Enterprises Inc., Rexdale Facility	Etobicoke, ON	77	495/738	7	1,372,400	0	1,372,400
8	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	5	608,990	712,700	1,321,690
9	Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor, ON	29	33	8	0	1,279,315	1,279,315
10	Slater Steels, Hamilton Specialty Bar Division	Hamilton, ON	29	33	9	175	1,263,649	1,263,824
11	Safety-Kleen Ltd. (Niagara)	Thorold, ON	49	495/738	25	16,784	816,803	833,587
12	Gerdau Courtice Steel Inc.	Cambridge, ON	29	33	5	0	787,745	787,745
13	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	29	33	4	0	737,410	737,410
14	Kronos Canada, Inc., N.L. Industries, Inc.	Varennes, QC	37	28	7	0	720,000	720,000
15	Philip Enterprises Inc., Barrie Facility	Barrie, ON	77	495/738	19	455,262	240,216	695,478
16	Noranda Inc., Brunswick Smelter	Belledune, NB	29	33	8	0	528,000	528,000
17	Edmonton Power Inc., Genesee Thermal Generating Station	Warburg, AB	41	491/493	13	0	510,360	510,360
18	Aciers Atlas Inc., Aciers Inoxydables Atlas	Tracy, QC	29	33	10	0	490,540	490,540
19	Petro-Canada, Burrard Products Terminal	Port Moody, BC	36	29	8	472,830	0	472,830
20	Ford Motor Company, Windsor Casting Plant	Windsor, ON	29	33	9	100	426,630	426,730
21	Stelco Inc., Hilton Works	Hamilton, ON	29	33	20	379,000	11,800	390,800
22	Philip Services Corp., Windsor Facility	Windsor, ON	77	495/738	4	377,746	0	377,746
23	Fonderies Canadiennes d'Acier Lté, Atchison Casting Corp.	Montreal, QC	31	35	3	0	322,874	322,874
24	Dominion Colour Corporation, Kikuchi Color & Chemical	Ajax, ON	37	28	6	0	305,700	305,700
25	Ifastgroupe Inc., Infasco Div.	Marieville, QC	30	34	1	265,000	0	265,000
26	New Brunswick Power, Belledune Thermal Generating Station	Belledune, NB	49	491/493	7	0	254,999	254,999
27	Alberta Power Limited, Battle River Generating Station	Forestburg, AB	49	491/493	10	11,250	242,923	254,173
28	Atlas Steels Inc., Atlas Specialty Steels	Welland, ON	29	33	11	5,990	200,741	206,731
29	Imperial Oil, Sarnia Chemical Plant	Sarnia, ON	37	28	23	180,000	0	180,000
30	Kuntz Electroplating Inc.	Kitchener, ON	30	34	8	0	175,143	175,143
31	Fraser Papers Inc. (Canada), Nexfor Inc.	Edmundston, NB	27	26	10	10,838	161,656	172,494
32	Tonolli Canada Limited	Mississauga, ON	29	33	1	0	157,376	157,376
33	Les Services Safety-Kleen (Mercier) Ltée	Mercier, QC	99	495/738	13	88,000	67,652	155,652
34	New Flyer Industries Limited	Winnipeg, MB	32	37	4	0	129,100	129,100
35	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28	11	94,800	31,014	125,814
36	Stelwire Ltd., Parkdale Works	Hamilton, ON	30	34	6	1,907	121,068	122,975
37	Stelfil Ltée, Stelco Inc.	Lachine, QC	30	33	3	0	111,820	111,820
38	Bayer Inc., Sarnia Site	Sarnia, ON	37	28	18	106,000	0	106,000
39	Les Services Safety-Kleen (Québec) Ltée, Ville Ste-Catherine	Ste-Catherine, QC	99	495/738	8	101,680	0	101,680
40	Safety-Kleen Ltd., Mississauga Service Centre	Mississauga, ON	99	495/738	9	0	98,000	98,000
41	Alberta Power Limited, H.R.Milner Generating Station	Grande Cache, AB	49	491/493	7	0	93,773	93,773
42	Metal Koting, Continuous Colour Coat Ltd.	Rexdale, ON	30	34	8	0	91,828	91,828
43	Coatings 85 Ltd.,	Mississauga, ON	30	34	3	0	89,822	89,822
44	Métallurgie Noranda, Affinerie CCR	Montréal-Est, QC	29	33	12	0	74,830	74,830
45	Petro-Canada, Edmonton Refinery	Edmonton, AB	36	29	19	55,200	17,641	72,841
46	Les Forges de Sorel Inc., Slater Industries Inc.	St-Joseph-de-Sorel, QC	30	34	4	20,480	49,150	69,630
47	Ethyl Canada Inc.	Corunna, ON	37	28	8	67,900	4	67,904
48	Sivaco Québec	Marieville, QC	30	33	4	0	67,514	67,514
49	AlliedSignal Canada Inc., Amherstburg Plant	Amherstburg, ON	37	28	2	0	66,700	66,700
50	Viasystems Canada Inc.	Pointe-Claire, QC	33	36	3	0	66,457	66,457
	Subtotal				**444**	**8,508,483**	**39,024,783**	**47,533,266**
	% of Total				**8**	**89**	**94**	**93**
	Total for NPRI				**5,235**	**9,567,199**	**41,605,926**	**51,173,125**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–31. (*continued*)

Rank	Major Chemicals Reported (Primary Transfers) (chemicals accounting for more than 70% of off-site releases transferred from the facility)	TotalOn-site Releases (kg)	Total Releases On- and Off-site (kg)
1	Zinc and compounds (transfers of metals)	0	8,576,167
2	Zinc and compounds (transfers of metals), Xylene, Toluene (transfers to disposal)	0	6,948,232
3	Zinc and compounds (transfers of metals)	403,813	6,706,253
4	Zinc and compounds (transfers of metals)	1,190,468	7,063,650
5	Zinc and compounds (transfers of metals)	9,648	1,850,638
6	Zinc and compounds (transfers of metals)	18,122	1,795,092
7	Xylene, Toluene (transfers to disposal)	0	1,372,400
8	Nitric acid and nitrate compounds (transfers to disposal), Chromium and compounds (transfers of metals)	0	1,321,690
9	Zinc/Copper and compounds (transfers of metals)	312	1,279,627
10	Zinc and compounds (transfers of metals)	12,793	1,276,617
11	Mercury/Chromium/Lead and compounds (transfers of metals)	0	833,587
12	Zinc and compounds (transfers of metals)	11,704	799,449
13	Chromium and compounds (transfers of metals)	2,753	740,163
14	Manganese and compounds (transfers of metals)	26,447	746,447
15	Xylene, Toluene (transfers to disposal), Zinc/Chromium and compounds (transfers of metals)	0	695,478
16	Lead and compounds (transfers of metals)	49,244	577,244
17	Manganese/Zinc/Chromium/Lead/Copper/Nickel and compounds (transfers of metals)	285,980	796,340
18	Chromium/Nickel/Manganese/Zinc and compounds (transfers of metals)	395,126	885,666
19	Asbestos (transfers to disposal)	10,041	482,871
20	Zinc/Manganese and compounds (transfers of metals)	27,511	454,241
21	Asbestos, Naphthalene (transfers to disposal), Aluminum, Chromium and compounds (transfers of metals)	264,430	655,230
22	Methyl ethyl ketone, Toluene, Xylene (transfers to disposal)	0	377,746
23	Chromium and compounds (transfers of metals)	0	322,874
24	Lead and compounds (transfers of metals)	29	305,729
25	Phosphoric acid (transfers to disposal)	0	265,000
26	Manganese/Arsenic/Zinc/Chromium/Nickel/Copper and compounds (transfers of metals)	395,328	650,327
27	Manganese/Chromium/Zinc/Nickel/Lead/Copper and compounds (transfers of metals), Asbestos (transfers to disposal)	219,442	473,615
28	Chromium/Manganese/Nickel/Copper/Lead and compounds, Aluminum, Vanadium (transfers of metals), Molybdenum trioxide (transfers to disposal)	282,491	489,222
29	Phosphoric acid (transfers to disposal)	130,919	310,919
30	Nickel/Chromium and compounds (transfers of metals)	660	175,803
31	Manganese/Zinc and compounds (transfers of metals), Asbestos, Methanol (transfers to disposal)	1,094,542	1,267,036
32	Lead and compounds (transfers of metals)	2,009	159,385
33	Toluene, Xylene (transfers to disposal), Lead/Zinc/Chromium/Copper and compounds (transfers of metals)	500	156,152
34	Zinc and compounds (transfers of metals)	61,100	190,200
35	Asbestos, Formaldehyde (transfers to disposal), Chromium and compounds (transfers of metals)	3,507,060	3,632,874
36	Zinc and compounds (transfers of metals)	7,300	130,275
37	Zinc and compounds (transfers of metals)	446	112,266
38	Asbestos (transfers to disposal)	1,289,003	1,395,003
39	Toluene, Xylene, Methyl ethyl ketone (transfers to disposal)	2,530	104,210
40	Lead and compounds (transfers of metals)	0	98,000
41	Manganese/Chromium/Zinc/Nickel and compounds (transfers of metals)	89,445	183,218
42	Zinc and compounds (transfers of metals)	3,336	95,164
43	Zinc and compounds (transfers of metals)	0	89,822
44	Arsenic/Selenium/Antimony and compounds (transfers of metals)	6,917	81,747
45	Asbestos (transfers to disposal), Nickel and compounds (transfers of metals)	95,586	168,427
46	Chromium/Manganese and compounds (transfers of metals), Molybdenum trioxide (transfers to disposal)	262	69,892
47	Nitric acid and nitrate compounds (transfers to disposal)	402	68,306
48	Zinc and compounds (transfers of metals)	5,484	72,998
49	Arsenic and compounds (transfers of metals)	1,900	68,600
50	Copper and compounds (transfers of metals)	2,269	68,726
		9,907,352	**57,440,618**
		10	**38**
		98,637,746	**149,810,871**

- The 50 TRI facilities with the largest off-site releases in 1998 reported 53 percent of TRI's off-site releases in 1998.
- The facility with the largest TRI off-site releases was located in Pennsylvania, the state with the largest off-site releases in 1998. In all, seven of the 50 facilities were located in Pennsylvania.
- The primary metals sector (US SIC 33) had the largest off-site releases in TRI, and 36 primary metals facilities appeared among the 50 facilities with the largest off-site TRI releases. There were also eight hazardous waste management facilities, the industry sector with the second-largest off-site releases in TRI.

Table 3–32. The 50 TRI Facilities with the Largest Off-site Releases, 1998

Rank	Facility	City, State	US SIC Codes	Number of Forms	Transfers to Disposal (except metals) (kg)	Transfers of Metals (kg)	Total Off-site Releases (kg)
1	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA	33	13	0	9,038,217	9,038,217
2	Nucor Steel	Crawfordsville, IN	33	8	0	8,843,001	8,843,001
3	Rouge Steel Co.	Dearborn, MI	33	8	326,531	6,961,360	7,287,891
4	Nucor-Yamato Steel Co.	Blytheville, AR	33	8	0	5,095,164	5,095,164
5	Natl. Steel Corp., Great Lakes Div.	Ecorse, MI	33	18	0	4,911,304	4,911,304
6	Steel Dynamics Inc.	Butler, IN	33	3	0	4,638,323	4,638,323
7	Southeastern Chemical & Solvent Co. Inc., TBN Holdings	Sumter, SC	495/738	41	4,060,325	307,266	4,367,591
8	Cerro Wire & Cable Co. Inc.	Hartselle, AL	33	3	0	3,926,768	3,926,768
9	Envirite of Ohio Inc.	Canton, OH	495/738	9	154,195	3,520,510	3,674,705
10	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville, OR	33	5	0	3,019,351	3,019,351
11	Nucor Corp. Nucor Steel	Plymouth, UT	33	7	0	2,963,002	2,963,002
12	Heritage Environmental Services L.L.C.	Indianapolis, IN	495/738	13	0	2,707,242	2,707,242
13	Crystal Clean Services L.L.C.	Indianapolis, IN	495/738	14	0	2,707,239	2,707,239
14	American Steel Foundries, Alliance Plant, Amsted Inds. Inc.	Alliance, OH	33	3	0	2,666,929	2,666,929
15	USS Mon Valley Works - Edgar Thomson Plant, USX Corp.	Braddock, PA	33	7	0	2,655,575	2,655,575
16	Nucor Steel, Nebraska	Norfolk, NE	33	8	0	2,582,536	2,582,536
17	Bar Tech. S. Inc. Primary Ops.	Johnstown, PA	33	6	1,088	2,427,575	2,428,663
18	Keystone Steel & Wire Co., Keystone Consolidated Inds. Inc.	Peoria, IL	33	6	0	2,395,192	2,395,192
19	Nucor Steel	Huger, SC	33	6	0	2,344,473	2,344,473
20	Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais, IL	33	6	0	2,288,063	2,288,063
21	ASARCO Inc.	East Helena, MT	33	10	0	2,184,136	2,184,136
22	Ipsco Steel Inc.	Muscatine, IA	33	6	0	2,083,648	2,083,648
23	Birmingham Steel Corp. Seattle WA Steel Div.	Seattle, WA	33	6	0	1,949,912	1,949,912
24	Wheeling-Pittsburgh Steel Corp. Mingo Junction	Mingo Junction, OH	33	9	0	1,896,554	1,896,554
25	Timken Co. - Faircrest Steel Plant	Canton, OH	33	7	0	1,864,852	1,864,852
26	Quemetco Inc., RSR Corp.	City of Industry, CA	33	5	0	1,852,321	1,852,321
27	Nucor Steel, Arkansas Plant	Blytheville, AR	33	10	0	1,787,393	1,787,393
28	Zinc Corp. of America, Horsehead Ind. Inc.	Palmerton, PA	33	6	0	1,777,590	1,777,590
29	Koppers Inds. Inc.	Cicero, IL	28	10	1,736,034	0	1,736,034
30	Weirton Steel Corp.	Weirton, WV	33	14	0	1,730,750	1,730,750
31	Birmingham Southeast LLC, Birmingham Steel Corp.	Cartersville, GA	33	7	0	1,719,793	1,719,793
32	Oregon Steel Mills Inc.	Portland, OR	33	6	0	1,627,130	1,627,130
33	FMC Corp. Phosphorus Chemicals Div.	Lawrence, KS	28	2	1,532,653	0	1,532,653
34	Roanoke Electric Steel Corp.	Roanoke, VA	33	7	0	1,498,104	1,498,104
35	Eveready Battery Co. Inc., Ralston Purina Co.	Marietta, OH	28	1	0	1,423,878	1,423,878
36	CSC Ltd., SBQ Ltd.	Warren, OH	33	7	0	1,350,431	1,350,431
37	Encycle Texas Inc., ASARCO Inc.	Corpus Christi, TX	495/738	7	0	1,317,793	1,317,793
38	Grede Foundries Inc. Milwaukee Steel Div.	Milwaukee, WI	33	7	780	1,304,711	1,305,491
39	Southwire Co.	Carrollton, GA	33	33	3,960	1,293,320	1,297,280
40	Quemetco Inc., RSR Corp.	Indianapolis, IN	33	6	0	1,179,879	1,179,879
41	Timken Co. Harrison Steel Plant	Canton, OH	33	7	0	1,125,908	1,125,908
42	LTV Steel Co. Inc. Pittsburgh Works	Pittsburgh, PA	33	16	1,013,832	0	1,013,832
43	S&W Waste Inc.	South Kearny, NJ	495/738	22	915,116	75,889	991,005
44	Envirite of Illinois Inc.	Harvey, IL	495/738	8	6,077	926,945	933,022
45	Acme Steel Co., Riverdale Plant	Riverdale, IL	Mult.	7	122	925,886	926,008
46	Federal Mogul Friction Prods.	Manila, AR	37	1	875,102	0	875,102
47	Inspec USA Inc.	Galena, KS	28	14	24,016	786,603	810,619
48	Envirite of Pennsylvania Inc.	York, PA	495/738	9	72,562	717,643	790,205
49	Koppel Steel Corp., NS Group Inc.	Koppel, PA	33	6	0	783,497	783,497
50	Laclede Steel Co., Ivaco	Alton, IL	33	10	0	757,020	757,020
	Subtotal			**458**	**10,722,393**	**111,940,676**	**122,663,069**
	% of Total			**1**	**38**	**55**	**53**
	Total for TRI			**67,560**	**28,025,933**	**203,827,147**	**231,853,080**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–32. (*continued*)

Rank	Major Chemicals Reported (Primary Transfers) (chemicals accounting for more than 70% of off-site releases transferred from the facility)	Total On-site Releases (kg)	Total Releases On- and Off-site (kg)
1	Zinc and compounds (transfers of metals)	428,062	9,466,279
2	Zinc and compounds (transfers of metals)	15,750	8,858,751
3	Zinc and compounds (transfers of metals)	23,060	7,310,951
4	Zinc and compounds (transfers of metals)	8,511	5,103,675
5	Zinc and compounds (transfers of metals)	102,374	5,013,678
6	Zinc and compounds (transfers of metals)	15,015	4,653,338
7	Ethylene glycol (transfers to disposal)	1,997	4,369,588
8	Copper and compounds (transfers of metals)	15	3,926,783
9	Nickel/Zinc/Chromium and compounds (transfers of metals)	924	3,675,629
10	Zinc and compounds (transfers of metals)	3,928	3,023,279
11	Zinc and compounds (transfers of metals)	16,968	2,979,970
12	Nickel/Zinc/Copper and compounds (transfers of metals)	82	2,707,324
13	Nickel/Zinc/Copper and compounds (transfers of metals)	82	2,707,321
14	Chromium and compounds (transfers of metals)	10,577	2,677,506
15	Zinc and compounds (transfers of metals)	2,783	2,658,358
16	Zinc and compounds (transfers of metals)	6,121	2,588,657
17	Zinc and compounds (transfers of metals)	5,978	2,434,641
18	Zinc and compounds (transfers of metals)	43,029	2,438,221
19	Zinc and compounds (transfers of metals)	5,881	2,350,354
20	Zinc and compounds (transfers of metals)	3,356	2,291,419
21	Lead/Cadmium and compounds (transfers of metals)	19,133,832	21,317,968
22	Zinc and compounds (transfers of metals)	1,185	2,084,833
23	Zinc and compounds (transfers of metals)	11,902	1,961,814
24	Zinc and compounds (transfers of metals)	28,575	1,925,129
25	Zinc/Manganese and compounds (transfers of metals)	2,823	1,867,675
26	Lead/Antimony and compounds (transfers of metals)	817	1,853,138
27	Zinc and compounds (transfers of metals)	8,469	1,795,862
28	Lead and compounds (transfers of metals)	4,331	1,781,921
29	Phthalic anhydride (transfers to disposal)	83,234	1,819,268
30	Manganese and compounds (transfers of metals)	124,793	1,855,543
31	Zinc and compounds (transfers of metals)	18,065	1,737,858
32	Zinc and compounds (transfers of metals)	3,492	1,630,622
33	Phosphoric acid (transfers to disposal)	19,673	1,552,326
34	Zinc and compounds (transfers of metals)	2,846	1,500,950
35	Manganese and compounds (transfers of metals)	5,830	1,429,708
36	Zinc and compounds (transfers of metals)	40,384	1,390,815
37	Lead/Zinc and compounds (transfers of metals)	2,100	1,319,893
38	Manganese/Chromium and compounds (transfers of metals)	2,042	1,307,533
39	Zinc and compounds (transfers of metals)	19,625	1,316,905
40	Lead/Antimony and compounds (transfers of metals)	728	1,180,607
41	Zinc and compounds (transfers of metals)	12,482	1,138,390
42	Asbestos (transfers to disposal)	3,285	1,017,117
43	Asbestos (transfers to disposal)	2,239	993,244
44	Zinc/Chromium/Copper and compounds (transfers of metals)	42	933,064
45	Zinc and compounds (transfers of metals)	15,884	941,892
46	Asbestos (transfers to disposal)	113	875,215
47	Manganese and compounds (transfers of metals)	14,543	825,162
48	Zinc/Chromium/Copper and compounds (transfers of metals)	473	790,678
49	Zinc and compounds (transfers of metals)	439	783,936
50	Zinc and compounds (transfers of metals)	11,192	768,212
		20,269,931	**142,933,000**
		2	**10**
		1,255,239,293	**1,487,092,373**

Releases of Carcinogens

There are 49 substances in the matched data set designated as known or suspected carcinogens by the International Agency for Research on Cancer (IARC) <http://www.iarc.fr/> or by the US National Toxicological Program (NTP) <http://ntp-server.niehs.nih.gov/>.

- NPRI facilities reported total releases on- and off-site of 24.2 million kg, and TRI facilities reported 222.9 million kg of known or suspected carcinogens in the matched data set for 1998. This represented 16 percent of total NPRI releases and 15 percent of total TRI releases.
- Over 61 percent of NPRI releases of designated carcinogens were released on-site, including over one-third released on-site as air emissions. Another 30 percent were transfers of metals.
- Almost three-quarters of TRI designated carcinogens releases were released on-site. One-third were on-site air emissions, and one-third were on-site land releases.
- A few facilities accounted for the majority of total releases on- and off-site of designated carcinogens in Canada. The 15 NPRI facilities with the largest total releases of designated carcinogens reported 11.3 million kg, representing 47 percent of all NPRI releases of designated carcinogens in 1998. Of the total, 5.9 million kg were on-site releases and 5.4 million kg were off-site releases. These 15 facilities reported 78 percent of all on-site underground injection, 73 percent of all on-site land releases and 58 percent of off-site releases of the designated carcinogens.

Table 3–33. The 15 NPRI Facilities with the Largest Total Releases On- and Off-site of Known or Suspected Carcinogens,▼ 1998

						On-site Releases				
			SIC Codes		Number	Air	Surface Water	Underground Injection	Land	Total On-site Releases
Rank	Facility	City, Province	Canada	US	of Forms	(kg)	(kg)	(kg)	(kg)	(kg)
1	Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary, AB	99	495/738	1	0	0	0	2,802,160	2,802,160
2	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	5	270,626	0	0	1,545,000	1,815,626
3	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	77	495/738	4	0	0	0	0	0
4	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	29	33	2	2,453	100	0	0	2,653
5	Co-Steel Lasco	Whitby, ON	29	33	3	1,221	101	0	83,393	84,715
6	Stelco Inc., Hilton Works	Hamilton, ON	29	33	6	182,900	1,420	0	0	185,570
7	Noranda Inc., Brunswick Smelter	Belledune, NB	29	33	3	17,880	732	0	0	18,612
8	Dofasco Inc.	Hamilton, ON	29	33	5	292,401	193	0	0	292,594
9	Petro-Canada, Burrard Products Terminal	Port Moody, BC	36	29	2	1,885	0	0	0	1,885
10	Celanese Canada Inc., Edmonton Facility	Edmonton, AB	37	28	6	126,461	0	192,253	0	318,714
11	Safety-Kleen Ltd. (Niagara)	Thorold, ON	49	495/738	10	0	0	0	0	0
12	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	77	495/738	3	0	0	0	0	0
13	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	5	0	0	0	0	0
14	Aciers Atlas Inc., Aciers Inoxydables Atlas	Tracy, QC	29	33	3	20,680	320	0	0	21,000
15	Carpenter Canada Limited	Woodbridge, ON	16	30	2	374,612	0	0	0	374,612
	Subtotal				**60**	**1,291,119**	**2,866**	**192,253**	**4,430,553**	**5,918,141**
	% of Total				**4**	**15**	**4**	**78**	**73**	**40**
	Total for NPRI Carcinogens				**1,349**	**8,419,684**	**80,701**	**246,431**	**6,036,353**	**14,819,103**

Note: Canada and US data only. Mexico data not available for 1998. 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.
A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.
▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 3–34. The 15 TRI Facilities with the Largest Total Releases On- and Off-site of Known or Suspected Carcinogens,▼ 1998

					On-site Releases				
						Surface	Underground		Total On-site
			US SIC	Number	Air	Water	Injection	Land	Releases
Rank	Facility	City, State	Code	of Forms	(kg)	(kg)	(kg)	(kg)	(kg)
1	Elementis Chromium L.P.	Corpus Christi, TX	28	1	2,063	113	0	6,893,424	6,895,600
2	Kennecott Utah Copper Smelter & Refy.	Magna, UT	33	6	53,339	1,223	0	6,353,061	6,407,623
3	Occidental Chemical Corp.	Castle Hayne, NC	28	1	2,888	17	0	4,535,150	4,538,055
4	Chemical Waste Management of the Northwest Inc.	Arlington, OR	495/738	11	300	0	0	4,328,519	4,328,819
5	ASARCO Inc.	East Helena, MT	33	4	24,665	30	0	2,069,543	2,094,238
6	Monsanto - Luling	Luling, LA	28	2	17,506	0	3,039,637	0	3,057,143
7	Chemical Waste Management	Emelle, AL	495/738	6	133	0	0	2,908,125	2,908,258
8	American Steel Foundries, Alliance Plant, Amsted Inds. Inc.	Alliance, OH	33	1	3,810	0	0	0	3,810
9	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT	495/738	8	113	0	0	2,536,071	2,536,184
10	Envirite of Ohio Inc.	Canton, OH	495/738	5	125	4	0	0	129
11	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID	495/738	6	1,140	0	0	2,192,744	2,193,884
12	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH	495/738	4	42	0	0	2,044,444	2,044,486
13	Chemical Waste Management Inc.	Kettleman City, CA	495/738	9	808	0	0	2,032,940	2,033,748
14	Safety-Kleen Lone & Grassy Mtn. Inc.	Waynoka, OK	495/738	6	494	0	0	1,882,993	1,883,487
15	Aguaglass Corp.	Adamsville, TN	30	1	1,688,553	0	0	16,460	1,705,013
	Subtotal			**71**	**1,795,979**	**1,387**	**3,039,637**	**37,793,474**	**42,630,477**
	% of Total			**0.4**	**2**	**0.2**	**25**	**50**	**26**
	Total for TRI Carcinogens			**18,336**	**75,865,885**	**861,262**	**11,966,341**	**74,854,933**	**163,548,421**

Note: Canada and US data only. Mexico data not available for 1998. 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.
A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.
▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 3–33. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total 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)
1	0	0	0	2,802,160	Asbestos (land)
2	0	0	0	1,815,626	Chromium and compounds (land)
3	285,440	494,160	779,600	779,600	Lead and compounds (transfers of metals), Asbestos (transfers to disposal)
4	0	724,670	724,670	727,323	Chromium and compounds (transfers of metals)
5	0	575,883	575,883	660,598	Lead and compounds (transfers of metals)
6	354,000	500	354,500	540,070	Asbestos (transfers to disposal), Benzene (air)
7	0	520,000	520,000	538,612	Lead and compounds (transfers of metals)
8	0	213,990	213,990	506,584	Benzene (air), Lead and compounds (transfers of metals)
9	472,830	0	472,830	474,715	Asbestos (transfers to disposal)
10	94,800	31,014	125,814	444,528	Vinyl acetate (UIJ), Asbestos (transfers to disposal), Formaldehyde (UIJ, air)
11	0	438,274	438,274	438,274	Chromium/Lead and compounds (transfers of metals)
12	0	431,840	431,840	431,840	Chromium and compounds (transfers of metals)
13	96,724	316,752	413,476	413,476	Lead and compounds, Chromium and compounds (transfers of metals)
14	0	359,630	359,630	380,630	Chromium/Nickel and compounds (transfers of metals)
15	0	0	0	374,612	Dichloromethane (air)
	1,303,794	**4,106,713**	**5,410,507**	**11,328,648**	
	61	**57**	**58**	**47**	
	2,133,341	**7,228,694**	**9,362,035**	**24,181,138**	

UIJ=underground injection.

- In contrast to NPRI, total releases of designated carcinogens in TRI were not the result of a few facilities. The 15 TRI facilities with the largest total releases of designated carcinogens reported 49.7 million kg, or 22 percent of all TRI releases of designated carcinogens.
- These 15 facilities reported 42.6 million kg released on-site, primarily as on-site land releases. These facilities accounted for half of all TRI on-site land releases of designated carcinogens.

Table 3–34. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total 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)
1	0	372,338	372,338	7,267,938	Chromium and compounds (land)
2	0	106,531	106,531	6,514,154	Arsenic/Lead and compounds (land)
3	0	5,896	5,896	4,543,951	Chromium and compounds (land)
4	0	993	993	4,329,812	Asbestos (land)
5	0	1,603,235	1,603,235	3,697,473	Lead and compounds (land, transfers of metals)
6	0	0	0	3,057,143	Formaldehyde (UIJ)
7	0	56,348	56,348	2,964,606	Lead/Arsenic/Cadmium and compounds (land)
8	0	2,630,385	2,630,385	2,634,195	Chromium and compounds (transfers of metals)
9	0	3,144	3,144	2,539,328	Lead/Cadmium and compounds, Asbestos (land)
10	0	2,265,725	2,265,725	2,265,854	Nickel/Chromium and compounds (transfers of metals)
11	0	11	11	2,193,895	Lead and compounds (land)
12	0	3,959	3,959	2,048,445	Lead and compounds (land)
13	0	917	917	2,034,665	Lead and compounds, Asbestos (land)
14	0	1,436	1,436	1,884,923	Lead/Cadmium/Chromium and compounds (land)
15	0	0	0	1,705,013	Styrene (air)
	0	**7,050,918**	**7,050,918**	**49,681,395**	
	0	**14**	**12**	**22**	
	7,539,900	**51,838,966**	**59,378,866**	**222,927,287**	

UIJ=underground injection.

Releases of Metals

There are 15 metals and their compounds in the matched data set.

- NPRI and TRI facilities reported total releases on and off-site of 55.6 million kg and 496.3 million kg of metals and their compounds respectively in 1998. This represented 37 percent of total NPRI releases and 33 percent of total TRI releases.
- Almost 75 percent of NPRI releases of metals were released off-site, primarily to land disposal. Twenty percent of NPRI releases of metals were on-site land releases.
- A few facilities accounted for the majority of total releases on- and off-site of metals in Canada. The 15 NPRI facilities with the largest total releases of metals accounted for 72 percent of total releases of all metals in 1998.
- In contrast to NPRI, the majority of metals reported to TRI were released on-site rather than off-site. Almost 59 percent of TRI releases of metals were released on-site, with 55 percent of total releases as on-site land releases.
- The 15 TRI facilities with the largest total releases of metals accounted for 34 percent of total releases of all metals in 1998. These facilities accounted for 50 percent of all on-site land releases of metals in TRI.

Table 3–35. The 15 NPRI Facilities with the Largest Total Releases On- and Off-site of Metals and their Compounds, 1998

						On-site Releases				
			SIC Codes		Number	Air	Surface Water	Underground Injection	Land	Total On-site Releases
Rank	Facility	City, Province	Canada	US	of Forms	(kg)	(kg)	(kg)	(kg)	(kg)
1	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	77	495/738	6	0	0	0	0	0
2	Co-Steel Lasco	Whitby, ON	29	33	6	14,095	310	0	1,176,063	1,190,468
3	Dofasco Inc.	Hamilton, ON	29	33	6	19,811	1,490	0	0	21,301
4	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	5	0	0	0	0	0
5	Ispat Sidbec Inc. Acierie, Ispat Mexicana	Contrecœur, QC	29	33	5	9,580	1,333	0	2,424,930	2,435,843
6	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	7	382,052	0	0	1,545,000	1,927,052
7	Ivaco Rolling Mills	L'Orignal, ON	29	33	7	8,789	3	0	0	9,648
8	Stelco McMaster Ltée	Contrecœur, QC	29	33	5	16,940	0	0	0	18,122
9	Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor, ON	29	33	8	305	7	0	0	312
10	Slater Steels, Hamilton Specialty Bar Division	Hamilton, ON	29	33	8	11,893	0	0	300	12,693
11	Gerdau MRM Steel Inc.	Selkirk, MB	29	33	5	12,910	85	0	1,154,320	1,167,315
12	Safety-Kleen Ltd. (Niagara)	Thorold, ON	49	495/738	9	0	0	0	0	0
13	Gerdau Courtice Steel Inc.	Cambridge, ON	29	33	5	11,704	0	0	0	11,704
14	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	29	33	3	2,453	100	0	0	2,753
15	Kronos Canada, Inc., N.L. Industries, Inc.	Varennes, QC	37	28	1	0	11,000	0	0	11,000
	Subtotal				**86**	**490,532**	**14,328**	**0**	**6,300,613**	**6,808,211**
	% of Total				**5**	**21**	**3**	**0**	**56**	**49**
	Total for NPRI Matched Metals				**1,784**	**2,309,412**	**435,523**	**2,550**	**11,171,390**	**13,962,268**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–36. The 15 TRI Facilities with the Largest Total Releases On- and Off-site of Metals and their Compounds, 1998

					On-site Releases				
			US SIC	Number	Air	Surface Water	Underground Injection	Land	Total On-site Releases
Rank	Facility	City, State	Codes	of Forms	(kg)	(kg)	(kg)	(kg)	(kg)
1	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH	495/738	10	518	0	0	22,781,858	22,782,376
2	ASARCO Inc.	East Helena, MT	33	9	39,769	731	0	19,085,244	19,125,744
3	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ	33	10	49,258	0	0	20,787,234	20,836,492
4	Kennecott Utah Copper Smelter & Refy.	Magna, UT	33	12	95,252	3,196	0	15,039,841	15,138,289
5	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID	495/738	11	5,419	0	0	14,046,260	14,051,679
6	Phelps Dodge Hidalgo Inc.	Playas, NM	33	11	54,488	5,668	0	9,796,508	9,856,664
7	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL	495/738	9	242	4	0	9,773,151	9,773,397
8	Zinc Corp. of America Monaca Smelter	Monaca, PA	33	9	198,650	159	0	0	198,809
9	Nucor Steel	Crawfordsville, IN	33	6	1,064	16	0	0	1,080
10	Elementis Chromium L.P.	Corpus Christi, TX	28	1	2,063	113	0	6,893,424	6,895,600
11	Rouge Steel Co.	Dearborn, MI	33	6	22,324	604	0	0	22,928
12	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT	495/738	15	276	0	0	6,154,603	6,154,879
13	Northwestern Steel & Wire Co.	Sterling, IL	33	4	50,812	1,092	0	5,738,322	5,790,226
14	USS Gary Works, USX Corp.	Gary, IN	33	12	98,363	4,997	0	5,074,461	5,177,821
15	Nucor-Yamato Steel Co.	Blytheville, AR	33	7	8,509	2	0	0	8,511
	Subtotal			**132**	**627,007**	**16,582**	**0**	**135,170,906**	**135,814,495**
	% of Total			**1**	**5**	**0**	**0**	**50**	**46**
	Total for TRI Matched Metals			**23,456**	**11,463,369**	**4,189,873**	**5,770,713**	**271,069,177**	**292,493,132**

Note: Canada and US data only. Mexico data not available for 1998. 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 3–35. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases of metals and their compounds from the facility)
1	0	8,280,287	8,280,287	8,280,287	Zinc and compounds (transfers of metals)
2	0	5,873,182	5,873,182	7,063,650	Zinc and compounds (transfers of metals)
3	0	6,302,410	6,302,410	6,323,711	Zinc and compounds (transfers of metals)
4	0	3,427,991	3,427,991	3,427,991	Zinc/Manganese and compounds (transfers of metals)
5	0	0	0	2,435,843	Zinc and compounds (land)
6	0	0	0	1,927,052	Chromium and compounds (land)
7	0	1,840,990	1,840,990	1,850,638	Zinc and compounds (transfers of metals)
8	0	1,776,970	1,776,970	1,795,092	Zinc and compounds (transfers of metals)
9	0	1,279,315	1,279,315	1,279,627	Zinc/Copper and compounds (transfers of metals)
10	0	1,263,649	1,263,649	1,276,342	Zinc and compounds (transfers of metals)
11	0	0	0	1,167,315	Zinc and compounds (land)
12	0	816,803	816,803	816,803	Mercury/Chromium/Lead and compounds (transfers of metals)
13	0	787,745	787,745	799,449	Zinc and compounds (transfers of metals)
14	0	737,410	737,410	740,163	Chromium and compounds (transfers of metals)
15	0	720,000	720,000	731,000	Manganese and compounds (transfers of metals)
	0	**33,106,752**	**33,106,752**	**39,914,963**	
	--	**80**	**80**	**72**	
	0	**41,605,926**	**41,605,926**	**55,568,194**	

Table 3–36. (*continued*)

Rank	Off-site Releases: Transfers to Disposal (except metals) (kg)	Off-site Releases: Transfers of Metals (kg)	Off-site Releases: Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total releases of metals and their compounds from the facility)
1	0	36,459	36,459	22,818,835	Zinc and compounds (land)
2	0	2,184,136	2,184,136	21,309,880	Zinc and compounds (land)
3	0	139	139	20,836,631	Copper/Zinc and compounds (land)
4	0	258,691	258,691	15,396,980	Copper/Zinc/Arsenic and compounds (land)
5	0	17	17	14,051,696	Zinc and compounds (land)
6	0	0	0	9,856,664	Zinc/Copper and compounds (land)
7	0	3,086	3,086	9,776,483	Zinc and compounds (land)
8	0	9,038,217	9,038,217	9,237,026	Zinc and compounds (transfers of metals)
9	0	8,843,001	8,843,001	8,844,081	Zinc and compounds (transfers of metals)
10	0	372,338	372,338	7,267,938	Chromium and compounds (land)
11	0	6,961,360	6,961,360	6,984,288	Zinc and compounds (transfers of metals)
12	0	5,811	5,811	6,160,690	Zinc/Lead/Manganese/Copper and compounds (land)
13	0	84,353	84,353	5,874,579	Zinc/Manganese and compounds (land)
14	0	366,991	366,991	5,544,812	Zinc and compounds (land)
15	0	5,095,164	5,095,164	5,103,675	Zinc and compounds (transfers of metals)
	0	**33,249,763**	**33,249,763**	**169,064,258**	
	--	**16**	**16**	**34**	
	0	**203,827,147**	**203,827,147**	**496,320,279**	

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Key Findings

Transfers to Recycling

- In 1998, North American facilities sent 995.3 million kg of chemicals in the matched data set to off-site locations for recycling. These are transfers from the industries in the 1998 matched data set.
- Transfers of metals and their compounds represented the majority of all substances sent for recycling, 86 percent of all transfers to recycling.
- The primary metals industry reported sending the largest amounts of chemicals for recycling (346.8 million kg), primarily metals and their compounds. TRI facilities reported 90 percent of this amount.
- The fabricated metals industry reported the second-largest amount (181.7 million kg), also primarily as metals and their compounds. NPRI facilities reported 17 percent of this amount.
- TRI facilities in the states of Ohio and Indiana reported transferring the largest amounts (81.5 million kg and 81.4 million kg, respectively) to recycling, each reporting 8 percent of all such transfers in North America in 1998.
- NPRI facilities in the province of Ontario reported the third-largest amount of transfers to recycling, 75.1 million kg or 7.5 percent of all such transfers reported in North America in 1998.

Other Transfers for Further Management

- North American facilities reported transferring 622.0 million kg off-site for other types of management, including transfers to energy recovery (388.1 million kg), treatment (126.4 million kg) and sewage (107.5 million kg). These transfers do not include metals and metal compounds. Transfers of metals and their compounds are included as off-site releases (see **Chapter 3**).
- The chemical manufacturing sector reported the largest total other transfers for further management (277.3 million kg). Hazardous waste management/solvent recovery facilities, one of the new TRI industries, reported the second-largest such transfers (210.0 million kg), including the largest transfers to energy recovery.

4.1 Introduction

This chapter examines reporting of off-site transfers for further management of PRTR-listed substances in North America in 1998. Such transfers include transfers to recycling, as well as other transfers to energy recovery, to treatment and to sewage. Transfers to recycling and to energy recovery were reported on a mandatory basis to NPRI, beginning with the 1998 reporting year and are, therefore, included in this *Taking Stock* report for the first time.

The category **"transfers to recycling"** includes all substances in the matched data set transferred off-site for recycling. The term **"other transfers for further management"** refers to chemicals in the matched data set, except for metals and their compounds, transferred off-site for energy recovery, treatment or to sewage. Off-site transfers of metals and their compounds to energy recovery, treatment and sewage are included 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.

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 where they originate. **Chapter 7** examines the destinations of the transfers.

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). Mexican data are not available for the 1998 reporting year.

The data on recycling are presented first, followed by other transfers for further management (transfers to energy recovery, treatment and sewage).

4.2 Transfers to Recycling, 1998

Transfers to recycling are transfers of chemicals from a facility to other sites that recycle the chemical. This section analyzes transfers to recycling, both for the group of metals and their compounds, and for the group of other chemicals in the matched data set for 1998.

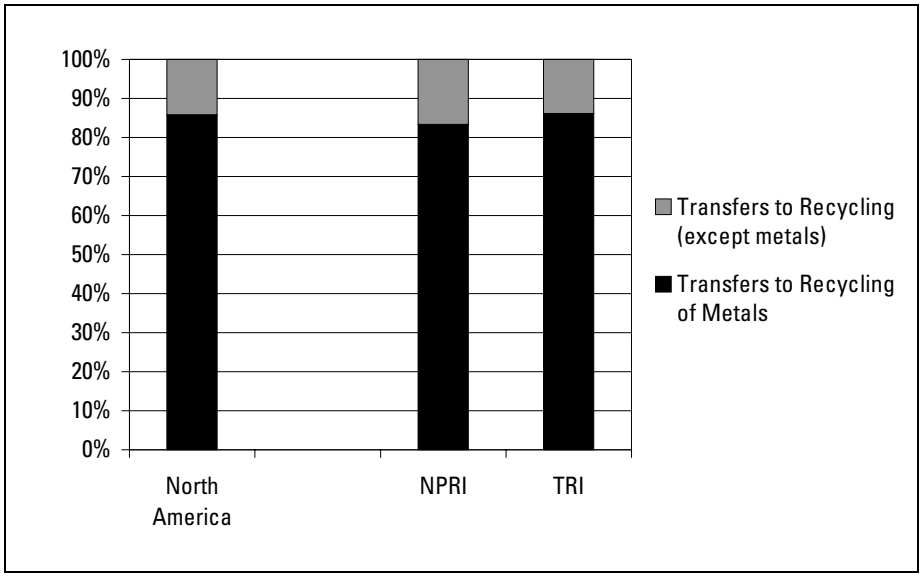
- In 1998, the matched industries sent 995.3 million kg of matched chemicals for recycling in North America in 1998.
- Most chemicals sent off-site for recycling were metals and their compounds. Overall, transfers of metals to recycling were 86 percent of all transfers to recycling in North America in 1998.

Table 4–1. Summary of Transfers to Recycling in North America, NPRI and TRI, 1998

	North America		NPRI		TRI		NPRI as % of North American Total	TRI as % of North American Total
	kg	%	kg	%	kg	%		
Total Facilities	21,974		1,552		20,422		7	93
Total Forms	72,795		5,235		67,560		7	93
Total Transfers to Recycling	**995,324,253**	**100**	**106,793,139**	**100**	**888,531,114**	**100**	**11**	**89**
Transfers to Recycling of Metals	854,533,236	86	89,043,876	83	765,489,360	86	10	90
Transfers to Recycling (except metals)	140,791,017	14	17,749,263	17	123,041,754	14	13	87

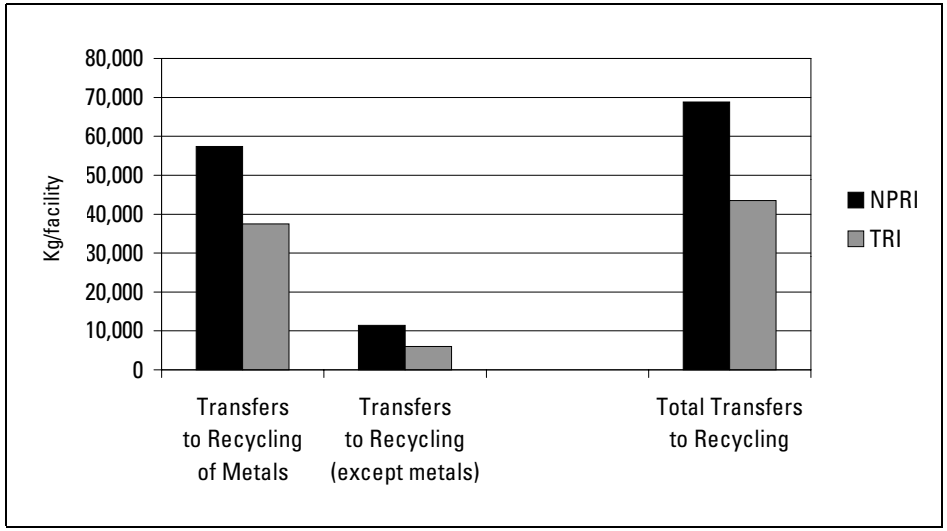
Note: Canada and US data only. Mexico data not available for 1998. Data include 165 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data in combination 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 4–1. Percentage of Transfers to Recycling in North America by Type, NPRI and TRI, 1998



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

Figure 4–2. Average Kilograms per Facility of Transfers to Recycling, NPRI and TRI, 1998



- NPRI facilities reported, on average, higher amounts of transfers to recycling than did TRI facilities. NPRI facilities reported over one and one-half times (1.6 times) the average kilograms per facility more than TRI facilities.
- The average kilograms per NPRI facility of transfers to recycling of metals was 1.5 times the average for TRI.
- The average kilograms per NPRI facility of transfers to recycling of other chemicals was almost twice (1.9 times) the average for TRI.
- Average kilograms per facility can indicate that the set of facilities with higher average amounts have a different mix of industries or processes, have a higher proportion of facilities generating larger amounts of chemicals requiring further management, and/or chose 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 the two countries is key to the average kilograms per facility differences. As seen in **Chapter 3**, NPRI facilities had average total releases 1.3 times those of TRI facilities. NPRI facilities also reported higher amounts of off-site disposal as well as off-site recycling, on average, than did TRI facilities.

4.2.1 Transfers to Recycling by State and Province, 1998

Facilities in the matched data set for 1998 reported sending 995.3 million kg of chemicals off-site for recycling in 1998. 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 7** presents information on the destinations of these transfers.

- TRI facilities located in the state of Ohio reported the largest amount of total transfers to recycling, 81.5 million kg or 8 percent of all such transfers reported in North America in 1998.
- TRI facilities located in the state of Indiana reported the second-largest amount of total transfers to recycling, 81.4 million kg or 8 percent of all such transfers.
- NPRI facilities located in the province of Ontario reported the third-largest amount, transferring 75.1 million kg off-site for recycling, or 7.5 percent.
- Indiana facilities reported the largest amounts of transfers to recycling of metals and their compounds (74.6 million kg), while Ontario facilities reported the largest amounts of transfers of other chemicals to recycling (12.6 million kg).
- Three jurisdictions reported no transfers to recycling: Newfoundland, Prince Edward Island and Guam.

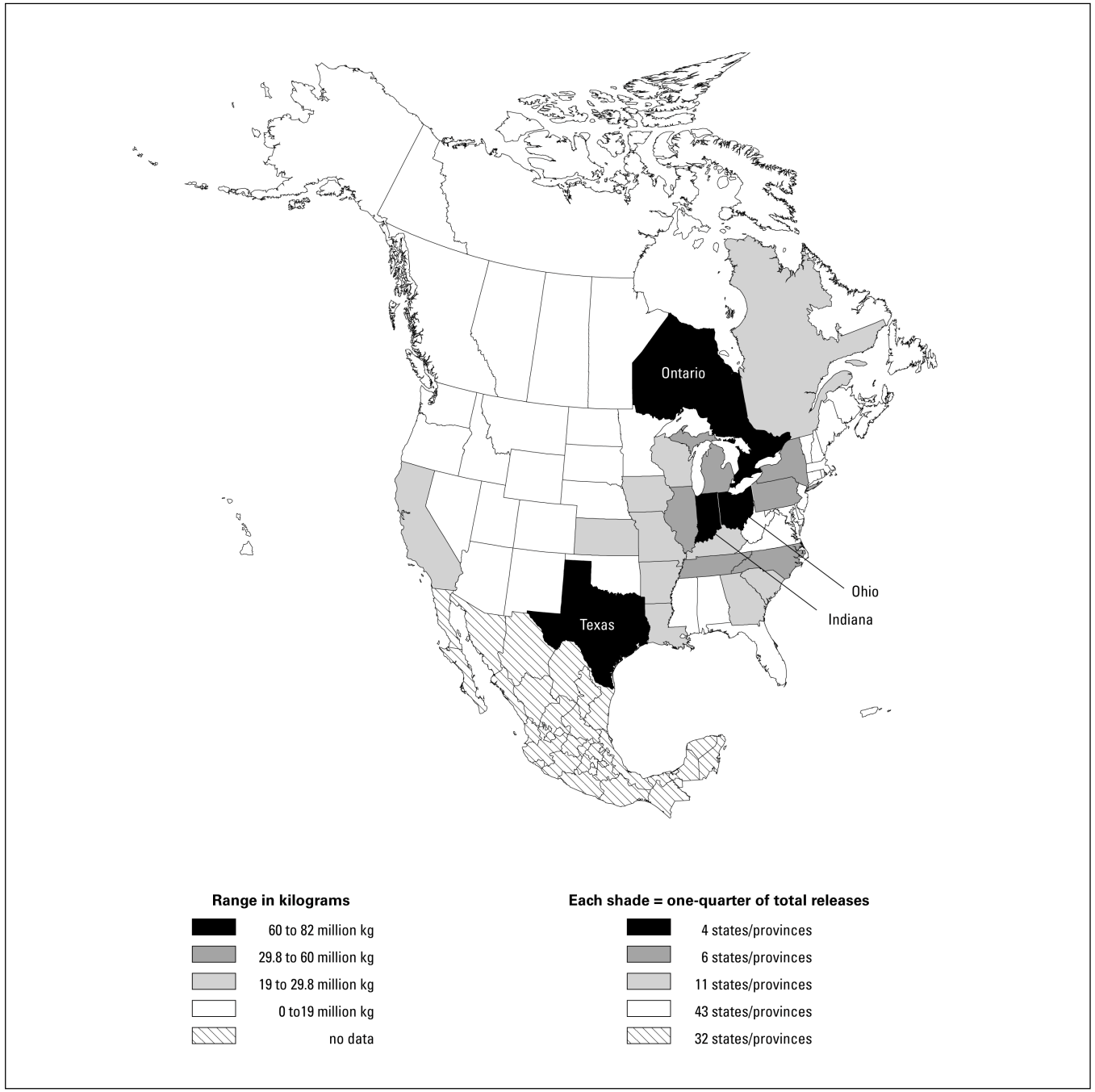
***Note**: One facility in Ontario incorrectly reported transfers to recycling of metals in tonnes. Three facilities in Ontario incorrectly reported transfers to recycling of metals in pounds. The amounts have been changed to kilograms. These changes have been made in all tables in this report.*

Table 4–2. Transfers to Recycling in North America, by State and Province, 1998

State/Province	Transfers to Recycling of Metals (kg)	Rank	Transfers to Recycling (except metals) (kg)	Rank	Total Off-site Transfers to Recycling (kg)	Rank
Alabama	14,783,066	21	1,193,030	27	15,976,096	23
Alaska	11,791	60	510	57	12,301	60
Alberta	1,429,756	44	1,932,223	24	3,361,979	39
Arizona	12,610,612	23	169,904	40	12,780,516	24
Arkansas	19,399,825	19	321,250	37	19,721,075	21
British Columbia	268,851	52	217,843	38	486,694	50
California	26,480,871	10	3,300,394	15	29,781,265	11
Colorado	8,688,029	28	47,981	50	8,736,010	31
Connecticut	8,082,705	31	325,066	36	8,407,771	32
Delaware	4,285,010	36	1,145,233	28	5,430,243	37
District of Columbia	3,311	61	0	--	3,311	61
Florida	8,938,150	27	338,657	34	9,276,807	30
Georgia	19,798,996	16	3,187,640	17	22,986,636	16
Guam	0	--	0	--	0	--
Hawaii	21,571	57	23,789	52	45,360	58
Idaho	802,575	48	140,714	41	943,289	48
Illinois	31,354,756	8	6,389,763	9	37,744,519	7
Indiana	74,623,794	1	6,732,106	7	81,355,900	2
Iowa	22,578,475	14	578,080	32	23,156,555	15
Kansas	24,256,401	12	2,788,526	20	27,044,927	12
Kentucky	19,676,344	17	3,278,676	16	22,955,020	17
Louisiana	8,295,374	29	11,614,845	2	19,910,219	20
Maine	929,875	47	46,349	51	976,224	47
Manitoba	3,051,696	37	165	58	3,051,861	40
Maryland	1,562,187	43	364,305	33	1,926,492	43
Massachusetts	9,478,277	25	1,381,692	26	10,859,969	26
Michigan	39,901,478	6	9,824,548	5	49,726,026	6
Minnesota	8,037,621	32	1,966,977	23	10,004,598	27
Mississippi	6,761,762	33	760,180	31	7,521,942	33
Missouri	22,660,633	13	3,646,218	12	26,306,851	13
Montana	21,020	58	69	59	21,089	59
Nebraska	10,831,486	24	81,633	43	10,913,119	25
Nevada	1,209,181	45	2,308	56	1,211,489	45
New Brunswick	154,154	55	64,149	47	218,303	54
New Hampshire	6,129,320	35	66,223	45	6,195,543	35
New Jersey	15,023,150	20	3,391,077	14	18,414,227	22
New Mexico	31,709	56	19,578	53	51,287	57
New York	34,275,122	7	2,426,724	21	36,701,846	9
Newfoundland	0	--	0	--	0	--
North Carolina	27,947,776	9	8,782,233	6	36,730,009	8
North Dakota	307,396	51	3,678	55	311,074	52
Nova Scotia	1,657,767	42	5,149	54	1,662,916	44
Ohio	71,146,623	2	10,393,315	4	81,539,938	1
Oklahoma	8,950,311	26	934,007	29	9,884,318	29
Ontario	62,450,407	3	12,636,902	1	75,087,309	3
Oregon	6,290,768	34	170,445	39	6,461,213	34
Pennsylvania	57,692,667	4	2,076,363	22	59,769,030	5
Prince Edward Island	0	--	0	--	0	--
Puerto Rico	1,662,383	41	4,225,490	10	5,887,873	36
Quebec	19,612,080	18	2,824,804	19	22,436,884	18
Rhode Island	1,833,319	40	3,178,279	18	5,011,598	38
Saskatchewan	419,165	49	68,028	44	487,193	49
South Carolina	14,455,501	22	6,475,103	8	20,930,604	19
South Dakota	398,760	50	65,475	46	464,235	51
Tennessee	25,829,700	11	4,022,222	11	29,851,922	10
Texas	51,458,885	5	10,453,577	3	61,912,462	4
Utah	1,039,221	46	105,113	42	1,144,334	46
Vermont	175,339	54	52,607	48	227,946	53
Virgin Islands	15,378	59	50,601	49	65,979	56
Virginia	8,283,321	30	1,664,735	25	9,948,056	28
Washington	1,906,856	39	875,340	30	2,782,196	42
West Virginia	2,539,355	38	336,451	35	2,875,806	41
Wisconsin	21,824,477	15	3,622,654	13	25,447,131	14
Wyoming	186,847	53	21	60	186,868	55
Total	**854,533,236**		**140,791,017**		**995,324,253**	

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

Map 4–1. States and Provinces in North America with Largest Transfers to Recycling, 1998



4.2.2 Transfers to Recycling by Industry Sector, 1998

Facilities in three manufacturing industries reported the largest amounts of transfers to recycling in 1998.

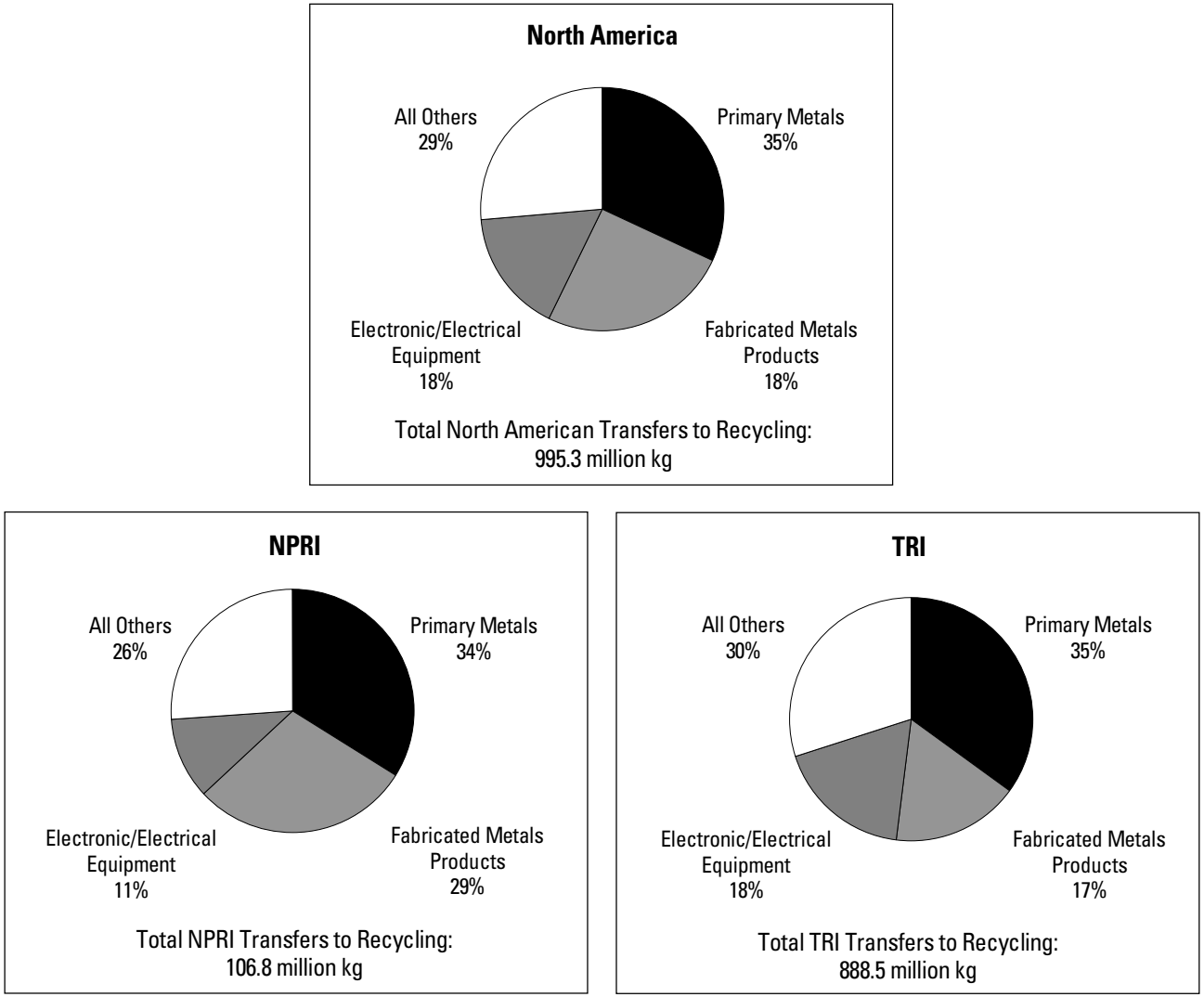
- The primary metals industry (US SIC code 33) reported the largest amounts of transfers to recycling (346.8 million kg), primarily as metals and their compounds.
- The fabricated metals industry (US SIC code 34) reported the second-largest amount (181.7 million kg), also primarily as metals and their compounds.
- The electronic/electrical equipment industry (US SIC code 36) reported the third-largest amount with 174.6 million kg, also primarily as metals and their compounds.
- The chemicals manufacturing industry (US SIC code 28) reported the largest amount of transfers to recycling of chemicals other than metals.
- Three industry sectors (tobacco, apparel and coal mining) reported less than 20,000 kg of transfers to recycling in 1998.

Table 4–3. Transfers to Recycling in North America by Industry, 1998

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	343,829,232	2,943,197	346,772,429	10.4	89.6
34	Fabricated Metals Products	174,718,106	7,022,246	181,740,352	17.1	82.9
36	Electronic/Electrical Equipment	171,777,703	2,866,500	174,644,203	6.4	93.6
28	Chemicals	9,789,579	62,761,122	72,550,701	16.8	83.2
--	Multiple codes 20-39*	57,579,064	11,352,735	68,931,799	0.0	100.0
37	Transportation Equipment	41,300,492	16,880,570	58,181,062	12.8	87.2
35	Industrial Machinery	29,100,737	1,486,245	30,586,982	2.1	97.9
29	Petroleum and Coal Products	1,186,319	8,451,367	9,637,686	41.8	58.2
30	Rubber and Plastics Products	3,365,273	5,995,021	9,360,294	6.7	93.3
495/738	Hazardous Waste Mgt./Solvent Recovery	2,318,549	6,857,373	9,175,922	11.9	88.1
39	Misc. Manufacturing Industries	7,422,465	1,736,901	9,159,366	28.8	71.2
38	Measurement/Photographic Instruments	2,783,704	2,049,511	4,833,215	0.1	99.9
27	Printing and Publishing	361,607	4,460,694	4,822,301	6.5	93.5
25	Furniture and Fixtures	2,187,307	2,047,885	4,235,192	50.1	49.9
491/493	Electric Utilities	3,163,383	4,667	3,168,050	20.2	79.8
32	Stone/Clay/Glass Products	2,047,960	64,013	2,111,973	8.2	91.8
20	Food Products	1,076,618	357,658	1,434,276	19.1	80.9
26	Paper Products	287,034	1,100,191	1,387,225	13.5	86.5
56	Chemical Wholesalers	1,877	1,199,488	1,201,365	0.0	100.0
22	Textile Mill Products	37,897	686,630	724,527	6.3	93.7
24	Lumber and Wood Products	52,524	441,037	493,561	0.0	100.0
31	Leather Products	144,445	3,227	147,672	0.0	100.0
12	Coal Mining	0	19,834	19,834	0.0	100.0
23	Apparel and Other Textile Products	1,361	2,905	4,266	0.0	100.0
21	Tobacco Products	0	0	0	0.0	100.0
	Total	**854,533,236**	**140,791,017**	**995,324,253**	**13**	**87**

Note: Canada and US data only. Mexico data not collected for 1998. * Multiple SIC codes reported only in US data.

Figure 4–3. Percentage Contribution of Top Industry Sectors to Transfers to Recycling, NPRI and TRI, 1998



- Facilities in the primary metals industry (US SIC code 33) reported the largest amounts of transfers to recycling in North America in 1998. This was true for both NPRI and TRI industries.
- Facilities in the fabricated metals industry (US SIC code 34) reported the second-largest amount of transfers to recycling in North America in 1998, representing 18 percent of all such transfers.
- The fabricated metals industry, while still ranked second to the primary metals industry, represented a larger portion of NPRI transfers to recycling (29 percent) than in TRI (17 percent).

4.2.3 Facilities with the Largest Transfers to Recycling, 1998

The 50 facilities in North America reporting the largest transfers to recycling reported 237.5 million kg, 24 percent of all transfers to recycling in the matched data set for 1998.

- One facility (Exide Corp. in Manchester, Iowa) reported more than 10 million kg, primarily as transfers to recycling of lead and its compounds. Exide Corp. manufactures storage batteries.
- Of these 50 facilities, 19 were primary metals facilities (US SIC code 33), 14 were electronic/electrical equipment manufacturing facilities (US SIC code 36), and five were fabricated metals facilities (US SIC Code 34). These industry sectors reported the largest amounts of transfers to recycling in North America in 1998.
- Thirty-nine of the 50 facilities reported only transfers to recycling of metals and their compounds.

Table 4–4. The 50 Facilities with the Largest Transfers to Recycling in North America, 1998

Rank	Facility	City, State/Province	SIC Codes		Number of Forms
			Canada	US	
1	Exide Corp.	Manchester, IA		36	4
2	Delta Faucet Co., Masco Corp. of Indiana	Greensburg, IN		34	6
3	Exide Corp.	Bristol, TN		36	3
4	J & L Specialty Steel Inc.	Louisville, OH		33	6
5	Republic Engrd Steels Inc.	Canton, OH		33	9
6	Parker Hannifin, Brass Prods. Div.	Otsego, MI		34	2
7	Johnson Controls Inc., Battery Group	Saint Joseph, MO		36	3
8	Rea Magnet Wire Co.	Lafayette, IN		33	7
9	Chaparral Steel Midlothian L.P., Texas Inds. Inc.	Midlothian, TX		33	5
10	North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta, OH		33	8
11	HNA Holdings Inc. - Shelby Plant	Shelby, NC		28	6
12	Raw Materials Corporation	Port Colborne, ON	33	36	1
13	Lucent Techs. Inc.	Omaha, NE		Mult.	7
14	Jessop Steel Co., Allegheny Teledyne Inc.	Washington, PA		33	8
15	Exide Corp.	Salina, KS		36	3
16	Métallurgie Noranda, Affinerie CCR	Montréal-Est, QC	29	33	12
17	Douglas Battery Mfg. Co.	Winston-Salem, NC		36	3
18	Nucor Steel, Arkansas Plant	Blytheville, AR		33	10
19	GNB Tech. Inc., Pacific Dunlop GNB Corp.	Leavenworth, KS		36	2
20	Delphi Automotive Sys. L.L.C., General Motors Corp.	New Brunswick, NJ		36	4
21	Formosa Plastics Corp. Texas	Point Comfort, TX		28	30
22	Thomas & Betts Corp.	Horseheads, NY		36	5
23	Exide Corp., General Battery	Muncie, IN		33	3
24	Johnson Controls Inc., Battery Group	Holland, OH		36	2
25	Firestone Synthetic Rubber & Latex Co., Bridgestone/Firestone Inc.	Sulphur, LA		28	3
26	Co-Steel Raritan	Perth Amboy, NJ		33	4
27	Noranda Inc. CEZinc, Usine d'extraction de zinc	Salaberry-de-Valleyfield, QC	29	33	9
28	ASARCO Inc. El Paso	El Paso, TX		33	9
29	Engineered Controls Intl. Inc.	Whitsett, NC		34	4
30	PMX Inds. Inc.	Euclid, OH		33	4
31	Quanex Macsteel	Fort Smith, AR		33	7
32	Mitsubishi Polyester Film L.L.C.	Greer, SC		Mult.	6
33	Formosa Plastics Corp. Louisiana	Baton Rouge, LA		28	18
34	Kwikset Corp., Black & Decker Corp.	Denison, TX		34	2
35	Safety-Kleen Oil Recovery Co.	East Chicago, IN		29	5
36	Rome Cable Corp., Rome Group Inc.	Rome, NY		33	4
37	U.S. Mint, U.S. Department of the Treasury	Denver, CO		34	2
38	General Cable Corp.	Watkinsville, GA		33	4
39	Mueller Brass Co., Mueller Inds. Inc.	Port Huron, MI		Mult.	6
40	Johnson Controls Inc., Battery Group.	Kernersville, NC		36	2
41	Essex Group Inc., Superior Telecom Inc.	Columbia City, IN		33	3
42	Johnson Controls Inc., Battery Group	Tampa, FL		36	2
43	Delphi Packard Electric Sys. N. River Rd. Facility, General Motors	Warren, OH		37	4
44	Nucor Steel - Texas	Jewett, TX		33	8
45	Boeing Co. - Wichita Div.	Wichita, KS		Mult.	20
46	Lukens Steel Co., Bethlehem Steel Corp.	Coatesville, PA		33	7
47	Delphi Energy & Engine Mgmt. Sys., General Motors Corp.	Fitzgerald, GA		36	4
48	GNB Techs. Inc., Pacific Dumlop GNB Corp.	Shreveport, LA		36	2
49	Cardell Corp., Molex Corp.	Auburn Hills, MI		Mult.	6
50	Toray Plastics (America) Inc.	North Kingstown, RI		30	4
	Subtotal				**298**
	% of Total				**0.4**
	Total				**72,795**

Note: Canada and US data only. Mexico data not available for 1998. 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 of Metals (kg)	Transfers to Recycling (except metals) (kg)	Total Off-site Transfers to Recycling (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of off-site transfers to recycling from the facility)
1	10,527,924	0	10,527,924	Lead and compounds
2	8,935,537	0	8,935,537	Copper/Zinc and compounds
3	7,949,658	0	7,949,658	Lead and compounds
4	7,755,102	0	7,755,102	Chromium/Nickel and compounds
5	6,977,659	2,145	6,979,804	Zinc and compounds
6	6,535,547	0	6,535,547	Copper and compounds
7	6,364,281	0	6,364,281	Lead and compounds
8	6,201,048	0	6,201,048	Copper and compounds
9	5,751,707	0	5,751,707	Zinc and compounds
10	5,727,165	0	5,727,165	Zinc and compounds
11	0	5,526,077	5,526,077	Ethylene glycol
12	5,304,500	0	5,304,500	Lead and compounds
13	5,228,346	22,569	5,250,915	Copper and compounds
14	5,008,980	0	5,008,980	Chromium/Nickel and compounds
15	5,004,087	0	5,004,087	Lead and compounds
16	4,993,290	0	4,993,290	Copper/Lead and compounds
17	4,835,828	0	4,835,828	Lead and compounds
18	4,541,882	0	4,541,882	Zinc and compounds
19	4,512,164	0	4,512,164	Lead and compounds
20	4,469,751	0	4,469,751	Lead and compounds
21	0	4,425,926	4,425,926	1,1,2-Trichloroethane, Carbon tetrachloride, Chloroform, Tetrachloroethylene
22	4,398,733	0	4,398,733	Copper and compounds
23	4,377,111	0	4,377,111	Lead and compounds
24	4,332,611	0	4,332,611	Lead and compounds
25	0	4,272,873	4,272,873	1,3-Butadiene
26	4,261,994	0	4,261,994	Zinc and compounds
27	4,255,702	0	4,255,702	Copper/Lead and compounds
28	4,204,077	0	4,204,077	Copper and compounds
29	4,152,948	0	4,152,948	Copper and compounds
30	4,086,587	0	4,086,587	Copper and compounds
31	4,063,088	872	4,063,960	Manganese and compounds
32	0	4,055,301	4,055,301	Ethylene glycol
33	0	4,050,130	4,050,130	1,2-Dichloroethane, 1,1,2-Trichloroethane
34	3,978,242	0	3,978,242	Zinc/Copper and compounds
35	7,235	3,954,572	3,961,807	Ethylene glycol
36	3,938,449	0	3,938,449	Copper and compounds
37	3,914,043	0	3,914,043	Copper and compounds
38	3,911,452	0	3,911,452	Copper and compounds
39	3,693,423	0	3,693,423	Zinc/Copper and compounds
40	3,608,933	0	3,608,933	Lead and compounds
41	3,582,946	0	3,582,946	Copper and compounds
42	3,484,995	0	3,484,995	Lead and compounds
43	3,471,343	0	3,471,343	Copper and compounds
44	3,441,410	0	3,441,410	Zinc and compounds
45	895,284	2,504,081	3,399,365	Tetrachloroethylene, Zinc and compounds
46	3,297,960	0	3,297,960	Zinc and compounds
47	3,229,479	0	3,229,479	Lead and compounds
48	3,191,837	0	3,191,837	Lead and compounds
49	3,156,903	0	3,156,903	Copper and compounds
50	0	3,144,252	3,144,252	Ethylene glycol
	205,561,241	**31,958,798**	**237,520,039**	
	24	**23**	**24**	
	854,533,236	**140,791,017**	**995,324,253**	

4.2.4 Transfers to Recycling by Chemical, 1998

The 25 chemicals with the largest transfers to recycling in North America represented 98 percent of all transfers to recycling in the matched data set for 1998.

- 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) was the substance with the largest transfers to recycling in 1998 in North America. TRI facilities reported 93 percent of the total for copper and its compounds, a larger proportion than for all substances (89 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, in printing and photocopying, and un pigments for glass and ceramic production.

Table 4–5. The 25 Chemicals with the Largest Transfers to Recycling in North America, 1998

Rank	CAS Number	Chemical	Number of Forms	Transfers to Recycling of Metals (kg)	Transfers to Recycling (except metals) (kg)
1	--	Copper (and its compounds)*	4,883	341,213,941	0
2	--	Lead (and its compounds)*▼	2,021	161,705,069	0
3	--	Zinc (and its compounds)*	3,965	158,684,396	0
4	--	Chromium (and its compounds)*▼	3,949	60,952,274	0
5	--	Manganese (and its compounds)*	3,616	59,284,943	0
6	--	Nickel (and its compounds)*▼	3,649	51,159,686	0
7	107-21-1	Ethylene glycol	1,769	0	28,707,814
8	1330-20-7	Xylene (mixed isomers)	3,371	0	20,447,007
9	108-88-3	Toluene	3,555	0	15,890,481
10	7429-90-5	Aluminum (fume or dust)*	372	11,817,972	0
11	78-93-3	Methyl ethyl ketone	2,303	0	10,858,130
12	75-09-2	Dichloromethane▼	878	0	7,626,816
13	67-56-1	Methanol	2,828	0	6,322,430
14	108-10-1	Methyl isobutyl ketone	1,089	0	5,736,857
15	107-06-2	1,2-Dichloroethane▼	96	0	5,111,505
16	79-00-5	1,1,2-Trichloroethane	39	0	4,708,961
17	127-18-4	Tetrachloroethylene▼	548	0	4,621,848
18	106-99-0	1,3-Butadiene	202	0	4,588,810
19	--	Cobalt (and its compounds)*▼	707	3,982,152	0
20	100-41-4	Ethylbenzene	1,234	0	3,264,418
21	7664-38-2	Phosphoric acid	3,121	0	3,007,460
22	--	Nitric acid and nitrate compounds	3,182	0	2,630,949
23	79-01-6	Trichloroethylene▼	756	0	2,441,019
24	--	Antimony (and its compounds)*	779	2,204,283	0
25	1313-27-5	Molybdenum trioxide	201	0	1,617,636
		Subtotal	**49,113**	**851,004,716**	**127,582,141**
		% of Total	**67**	**99.6**	**91**
		Total for All Chemicals	**72,795**	**854,533,236**	**140,791,017**

Note: Canada and US data only. Mexico data not available for 1998. * 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
341,213,941	7	93
161,705,069	9	91
158,684,396	12	88
60,952,274	13	87
59,284,943	27	73
51,159,686	8	92
28,707,814	7	93
20,447,007	20	80
15,890,481	25	75
11,817,972	19	81
10,858,130	19	81
7,626,816	2	98
6,322,430	6	94
5,736,857	12	88
5,111,505	0	100
4,708,961	0	100
4,621,848	3	97
4,588,810	0	100
3,982,152	1	99
3,264,418	9	91
3,007,460	54	46
2,630,949	18	82
2,441,019	5	95
2,204,283	10	90
1,617,636	13	87
978,586,857	**11**	**89**
98		
995,324,253	**11**	**89**

- Lead and its compounds had the second-largest transfers to recycling. TRI facilities reported 91 percent of the total for lead and its compounds, a somewhat larger proportion than for all substances (89 percent). The most important use for lead is in producing batteries. Lead is 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.

4.3 Other Transfers for Further Management, 1998

Other transfers for further management include transfers of chemicals (except metals) to energy recovery, treatment and sewage. This section presents information on transfers to energy recovery, treatment and sewage of the 150 chemicals in the matched data set that do not include the group of metals and their compounds. The term **"other transfers for further management"** refers to chemicals in the matched data set, except for metals and their compounds, transferred off-site for energy recovery, treatment or to sewage. Off-site transfers of metals and their compounds to energy recovery, treatment and sewage are included 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.

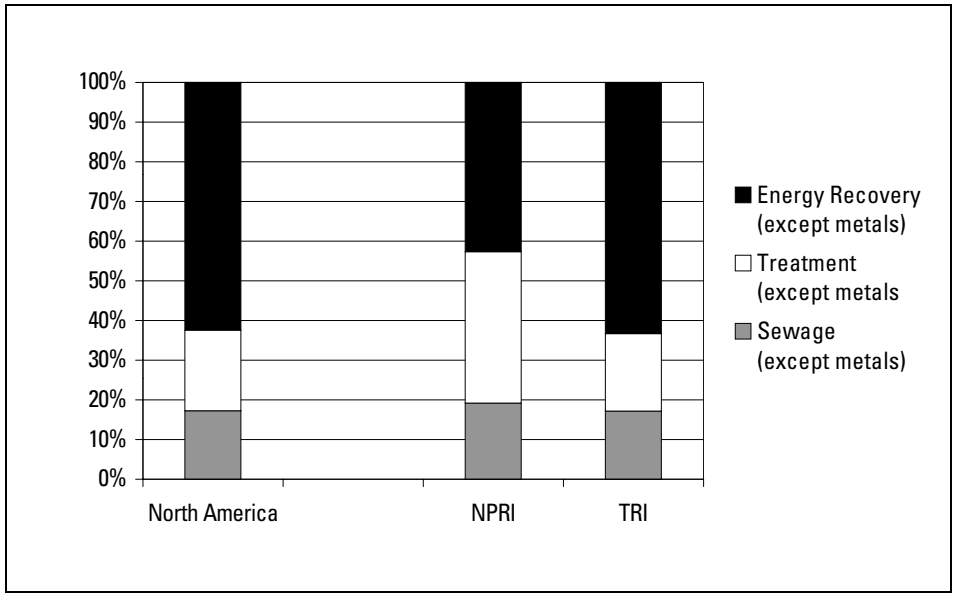
- In 1998, facilities in North America sent 622.0 million kg of chemicals (except metals) in the matched data set to off-site locations for energy recovery, treatment and sewage.
- Transfers to energy recovery represented 62 percent of the total in North America; however, they represented 43 percent of the NPRI total and 63 percent of the TRI total.

Table 4–6. Summary of Other Transfers for Further Management in North America, NPRI and TRI, 1998

	North America		NPRI		TRI		NPRI as % of North American Total	TRI as % of North American Total
	kg	%	kg	%	kg	%		
Total Facilities	21,974		1,552		20,422		7	93
Total Forms	72,795		5,235		67,560		7	93
Total Other Transfers for Further Management (not including Recycling)	**622,026,834**	**100**	**28,173,457**	**100**	**593,853,377**	**100**	**5**	**95**
Energy Recovery (except metals)	388,129,038	62	12,022,819	43	376,106,219	63	3	97
Treatment (except metals)	126,365,275	20	10,736,041	38	115,629,234	19	8	92
Sewage/To POTWs (except metals)	107,532,521	17	5,414,597	19	102,117,924	17	5	95

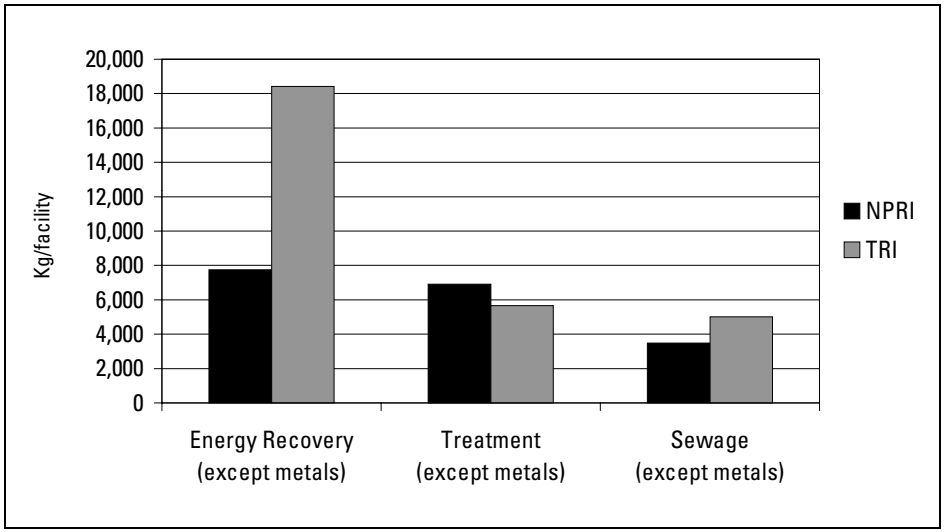
Note: Canada and US data only. Mexico data not available for 1998. Data include 165 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data in combination 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 4–4. Percentage of Other Transfers for Further Management in North America by Type, NPRI and TRI, 1998



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

Figure 4–5. Average Kilograms per Facility of Other Transfers for Further Management, NPRI and TRI, 1998



- Transfers to treatment represented 20 percent of the total in North America, but 38 percent of the NPRI total and 19 percent of the TRI total.
- Transfers to sewage represented 17 percent of the total in North America, and 19 percent of the NPRI total and 17 percent of the TRI total.
- On average, TRI facilities reported greater amounts of transfers to energy recovery than did NPRI facilities. TRI facilities reported almost two and one-half times (2.4 times) the average amount of transfers to energy recovery than did NPRI facilities.
- Also, for transfers to sewage, TRI facilities, on average, reported almost one and one-half times (1.4 times) the average reported transfers to sewage for NPRI facilities.
- However, for transfers to treatment, the average was about the same, with NPRI facilities reporting about 1.2 times the average transfers to treatment of TRI facilities.

4.3.1 Other Transfers for Further Management by State and Province, 1998

Facilities in the matched data set for 1998 reported sending 622.0 million kg of chemicals, other than metals and their compounds, off-site for further management by energy recovery, treatment or sewage treatment plants in 1998. Such off-site transfers can be sent to nearby locations, out of the state or province, or out of the country. **Chapter 7** presents information on where these transfers are destined. This section shows where the transfers originated.

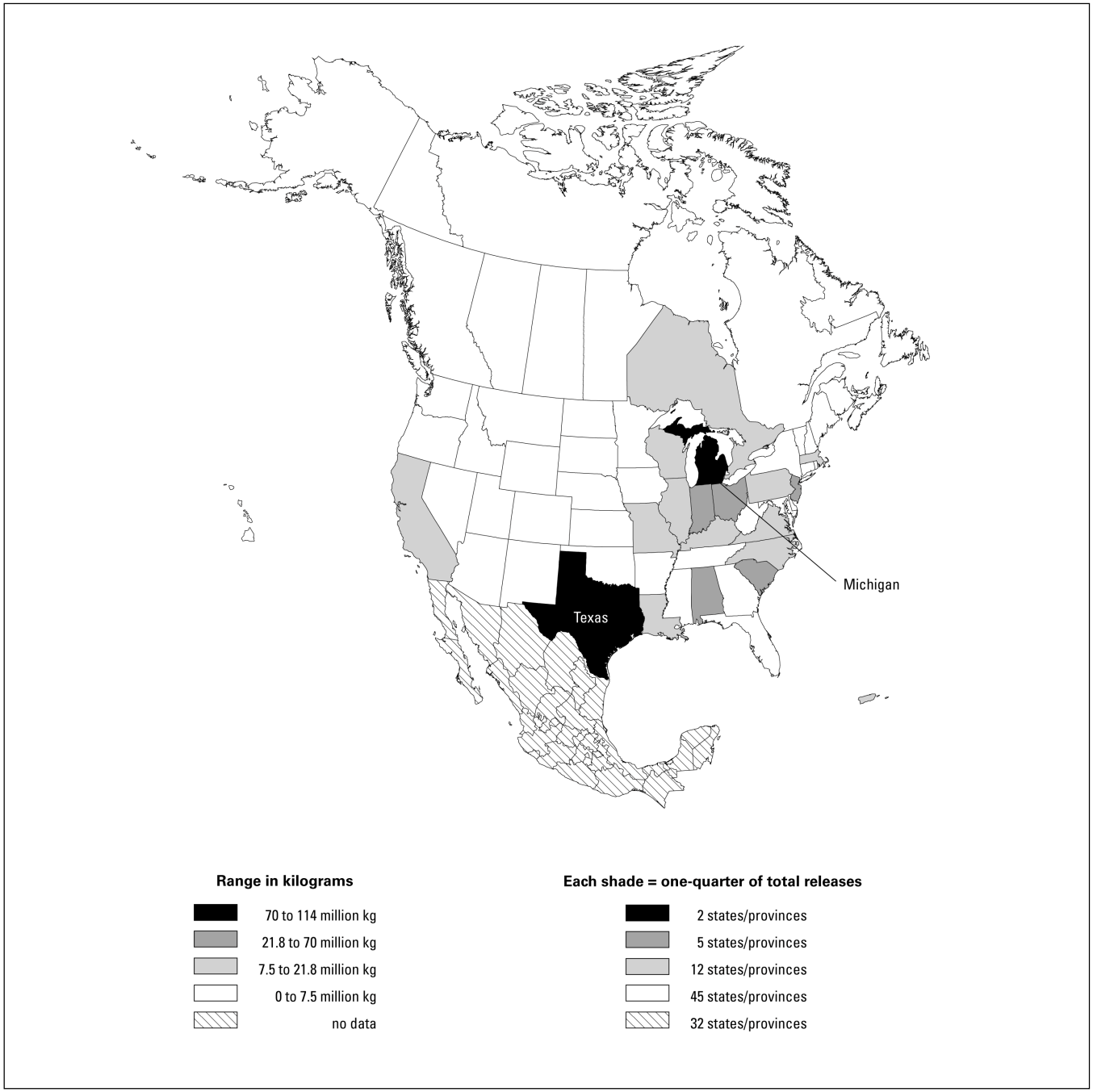
- TRI facilities located in the state of Michigan reported transferring a total of 113.6 million kg to energy recovery, treatment and sewage in 1998, making Michigan the jurisdiction with the largest other transfers for further management and representing 18 percent of the total in North America. Michigan had the largest transfers to energy recovery and to treatment in North America in 1998.
- Texas TRI facilities reported a total of 80.1 million kg and the largest transfers to sewage, the second-largest transfers to energy recovery and to treatment, making Texas the state with the second-largest total other transfers for further management.
- Ohio TRI facilities reported a total of 58.4 million kg and the third-largest transfers to energy recovery and to treatment, making Ohio the state with the third-largest total transfers for further management.

Table 4–7. Other Transfers for Further Management in North America, by State and Province, 1998

State/Province	Transfers to Energy Recovery (except metals) (kg)	Rank	Transfers to Treatment (except metals) (kg)	Rank	Transfers to Sewage/POTWs (except metals) (kg)	Rank	Total Other Transfers for Further Management (kg)	Rank
Alabama	17,939,907	6	3,476,899	13	392,377	32	21,809,183	7
Alaska	2,224	55	89	61	0	--	2,313	60
Alberta	551,907	37	603,288	31	317,632	35	1,472,827	38
Arizona	198,454	43	201,247	41	738,250	27	1,137,951	40
Arkansas	4,943,492	17	653,801	30	42,405	49	5,639,698	25
British Columbia	415,178	39	88,345	47	2,068	51	505,591	43
California	6,322,165	14	2,061,666	19	6,345,804	5	14,729,635	12
Colorado	1,393,618	30	780,059	29	304,116	36	2,477,793	34
Connecticut	999,996	33	3,105,593	15	456,734	31	4,562,323	30
Delaware	465,845	38	168,991	42	1,164,709	23	1,799,545	37
District of Columbia	0	--	0	--	0	--	0	--
Florida	1,828,495	27	933,142	27	2,767,139	12	5,528,776	26
Georgia	4,475,101	19	1,564,332	23	1,081,780	24	7,121,213	21
Guam	0	--	0	--	0	--	0	--
Hawaii	296	56	1,340	58	0	--	1,636	61
Idaho	52,501	46	12,234	54	326,360	34	391,095	45
Illinois	14,741,363	8	4,328,917	11	2,676,770	13	21,747,050	8
Indiana	33,839,766	4	4,632,802	9	2,325,432	14	40,798,000	4
Iowa	1,621,046	28	1,441,553	24	2,247,339	15	5,309,938	27
Kansas	1,580,185	29	323,240	37	208,794	40	2,112,219	36
Kentucky	7,978,391	13	3,156,722	14	474,324	30	11,609,437	15
Louisiana	6,172,669	15	6,429,541	4	109,169	45	12,711,379	14
Maine	124,191	44	32,660	53	103,140	47	259,991	49
Manitoba	73,970	45	275,233	39	4	56	349,207	46
Maryland	324,043	40	2,597,055	17	1,199,341	21	4,120,439	31
Massachusetts	3,130,561	24	1,941,324	20	2,781,305	11	7,853,190	19
Michigan	83,077,257	1	23,859,096	1	6,708,213	3	113,644,566	1
Minnesota	969,982	34	496,194	33	3,425,748	9	4,891,924	28
Mississippi	2,602,073	25	468,253	35	230,638	37	3,300,964	32
Missouri	4,777,587	18	3,642,975	12	752,117	26	9,172,679	17
Montana	25,619	48	2,928	56	1,289	52	29,836	57
Nebraska	248,971	41	35,881	52	128,398	42	413,250	44
Nevada	10,125	52	4,384	55	20,413	50	34,922	56
New Brunswick	0	--	56,269	50	0	--	56,269	55
New Hampshire	1,046,614	32	135,699	44	131,319	41	1,313,632	39
New Jersey	20,010,566	5	2,386,099	18	7,737,801	2	30,134,466	5
New Mexico	18,464	51	65,053	49	125,306	43	208,823	51
New York	3,327,767	23	1,601,418	22	1,713,009	19	6,642,194	22
Newfoundland	0	--	0	--	0	--	0	--
North Carolina	5,902,779	16	1,627,097	21	490,547	29	8,020,423	18
North Dakota	23,490	49	1,321	59	228,525	38	253,336	50
Nova Scotia	0	--	292,099	38	1,200	53	293,299	48
Ohio	43,870,249	3	8,040,888	3	6,528,474	4	58,439,611	3
Oklahoma	1,972,595	26	135,182	45	216,370	39	2,324,147	35
Ontario	9,697,382	9	6,374,257	5	4,758,656	8	20,830,295	9
Oregon	781,344	36	483,638	34	5,288,658	7	6,553,640	23
Pennsylvania	8,855,227	10	4,356,474	10	2,791,303	10	16,003,004	10
Prince Edward Island	0	--	71,041	48	0	--	71,041	54
Puerto Rico	8,255,370	11	4,800,672	7	955,263	25	14,011,305	13
Quebec	1,284,382	31	2,973,009	16	334,982	33	4,592,373	29
Rhode Island	236,997	42	465,019	36	86,528	48	788,544	41
Saskatchewan	0	--	2,500	57	55	55	2,555	59
South Carolina	16,859,909	7	4,670,165	8	2,025,019	17	23,555,093	6
South Dakota	28,874	47	108,881	46	507,894	28	645,649	42
Tennessee	3,504,544	21	1,425,863	25	2,234,533	16	7,164,940	20
Texas	45,386,282	2	11,249,817	2	23,500,251	1	80,136,350	2
Utah	18,764	50	214,667	40	106,400	46	339,831	47
Vermont	7,717	53	42,035	51	109,636	44	159,388	52
Virgin Islands	0	--	154,972	43	0	--	154,972	53
Virginia	3,469,478	22	804,536	28	5,811,284	6	10,085,298	16
Washington	823,550	35	539,105	32	1,185,069	22	2,547,724	33
West Virginia	3,769,499	20	942,819	26	1,440,046	20	6,152,364	24
Wisconsin	8,085,719	12	5,024,701	6	1,892,472	18	15,002,892	11
Wyoming	4,498	54	195	60	113	54	4,806	58
Total	**388,129,038**		**126,365,275**		**107,532,521**		**622,026,834**	

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

Map 4–2. States and Provinces in North America with Largest Other Transfers for Further Management, 1998



4.3.2 Other Transfers for Further Management by Industry Sector, 1998

Facilities in the chemical manufacturing sector and in the hazardous waste management/solvent recovery sector reported the largest amounts of other transfers for further management in North America in 1998.

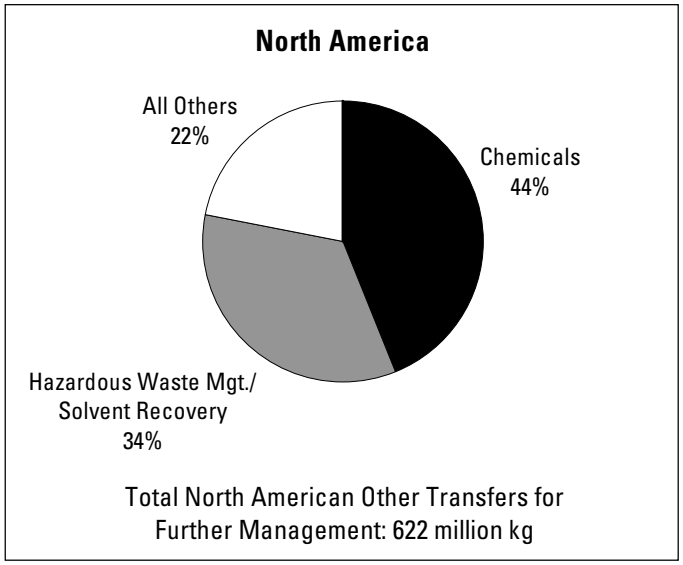
- The chemical manufacturing sector reported the largest total other transfers for further management (277.3 million kg), including the largest transfers to treatment and to sewage, and the second-largest transfers to energy recovery.
- Hazardous waste management/solvent recovery facilities reported the second-largest such transfers (210.0 million kg), including the largest transfers to energy recovery
- All other industry sectors reported less than 25 million kg of total transfers to energy recovery, treatment and sewage.

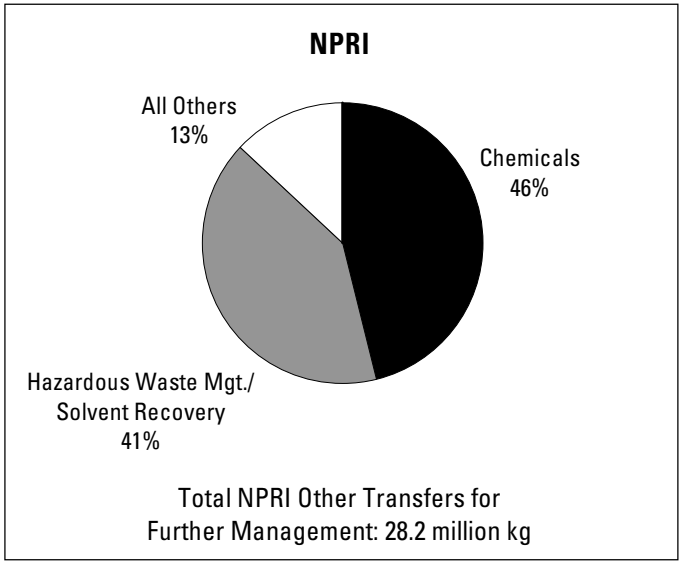
Table 4–8. Other Transfers for Further Management in North America by Industry, 1998

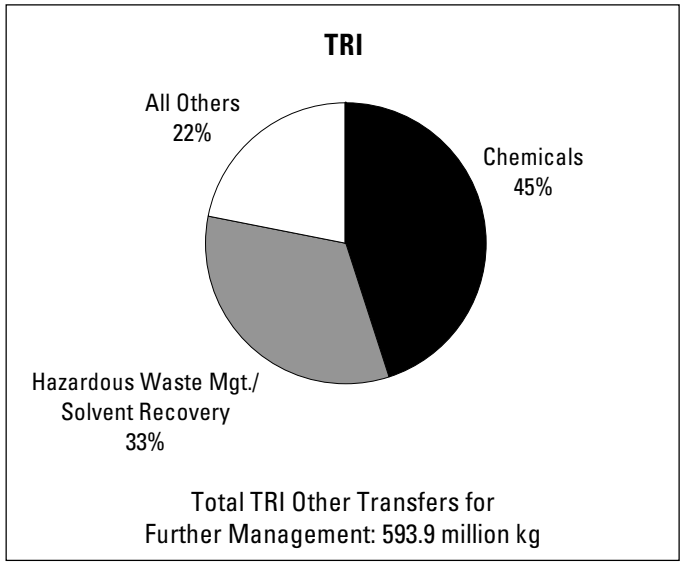
US SIC Code	Industry	Transfers to Energy Recovery (except metals) (kg)	Transfers to Treatment (except metals) (kg)	Transfers to Sewage/POTWs (except metals) (kg)	Total Other Transfers for Further Management (kg)	NPRI as % of North American Total	TRI as % of North American Total
28	Chemicals	154,872,855	71,187,751	51,242,620	277,303,226	4.6	95.4
495/738	Hazardous Waste Mgt./Solvent Recovery	184,078,677	25,504,268	441,954	210,024,899	5.6	94.4
26	Paper Products	2,970,634	4,159,242	17,208,292	24,338,168	0.9	99.1
--	Multiple codes 20-39*	6,336,195	6,809,791	7,138,515	20,284,501	0.0	100.0
56	Chemical Wholesalers	10,653,506	1,492,008	57,502	12,203,016	1.0	99.0
20	Food Products	176,909	397,036	11,134,303	11,708,248	5.9	94.1
37	Transportation Equipment	5,280,925	2,514,361	2,285,476	10,080,762	6.9	93.1
33	Primary Metals	1,480,207	3,336,147	4,102,417	8,918,771	3.5	96.5
34	Fabricated Metals Products	4,359,242	1,891,699	2,334,126	8,585,067	2.8	97.2
36	Electronic/Electrical Equipment	2,084,104	1,285,502	5,113,666	8,483,272	0.3	99.7
29	Petroleum and Coal Products	2,315,635	1,980,479	2,903,912	7,200,026	4.1	95.9
30	Rubber and Plastics Products	3,012,986	1,971,748	1,312,991	6,297,725	5.4	94.6
32	Stone/Clay/Glass Products	2,379,452	660,098	306,300	3,345,850	1.7	98.3
38	Measurement/Photographic Instruments	814,711	1,495,315	263,750	2,573,776	0.0	100.0
25	Furniture and Fixtures	1,880,548	423,250	15,437	2,319,235	8.6	91.4
39	Misc. Manufacturing Industries	1,443,051	266,381	542,970	2,252,402	6.1	93.9
35	Industrial Machinery	1,003,256	291,017	596,360	1,890,633	2.3	97.7
27	Printing and Publishing	1,226,410	436,853	42,642	1,705,905	11.5	88.5
22	Textile Mill Products	675,814	161,273	467,898	1,304,985	0.5	99.5
24	Lumber and Wood Products	1,031,775	91,107	4,616	1,127,498	6.0	94.0
31	Leather Products	10,735	8,781	12,298	31,814	13.9	86.1
23	Apparel and Other Textile Products	30,073	113	49	30,235	0.0	100.0
491/493	Electric Utilities	11,338	328	4,332	15,998	0.0	100.0
21	Tobacco Products	0	727	95	822	0.0	100.0
12	Coal Mining	0	0	0	0	--	--
	Total	**388,129,038**	**126,365,275**	**107,532,521**	**622,026,834**	**5**	**95**

Note: Canada and US data only. Mexico data not collected for 1998. * Multiple SIC codes reported only in US data.

Figure 4–6. Percentage Contribution of Top Industry Sectors to Other Transfers for Further Management, NPRI and TRI, 1998







- Facilities in the chemical manufacturing sector reported the largest amounts of total transfers to energy recovery, treatment and sewage in North America in 1998. This sector represented 45 percent of the total for both NPRI and TRI.
- Hazardous waste management/solvent recovery facilities reported the second-largest amounts of other transfers for further management. This sector represented 41 percent of the NPRI total and 33 percent of the TRI total.

4.3.3 Facilities Reporting the Largest Amounts of Transfers to Energy Recovery, Treatment and Sewage, 1998

The 50 facilities in North America reporting the largest transfers to energy recovery, treatment and sewage reported over half of each of these types of transfers of chemicals (other than the group of metals and their compounds) in the matched data set for 1998. 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, 1998

The 50 facilities in North America reporting the largest transfers to energy recovery accounted for two-thirds of all such transfers.

- One facility, a TRI hazardous waste management/solvent recovery facility located in Michigan, reported more than 48 million kg of transfers to energy recovery, over 12 percent of all such transfers in 1998. Michigan reported the largest amount of transfers to energy recovery in 1998.
- A second TRI hazardous waste management/solvent recovery facility, located in Indiana, reported more than 27 million kg of transfers to energy recovery.
- Of the 50 facilities with the largest transfers to energy recovery, 27 were chemical manufacturing facilities and 20 were hazardous waste management/solvent recovery facilities.

Table 4–9. The 50 North American Facilities with the Largest Transfers to Energy Recovery (except metals), 1998

Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Number of Forms	Transfers to Energy Recovery (except metals) (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of transfers to energy recovery from the facility)
1	Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit, MI		495/738	34	48,365,892	Xylene, Toluene, Naphthalene, Ethylbenzene, Benzene, n-Butyl alcohol
2	Pollution Control Inds. Inc.	East Chicago, IN		495/738	52	27,406,697	Naphthalene, Acetaldehyde, Toluene, Methanol, Methyl ethyl ketone,n-Butyl alcohol, Benzene, Xylene
3	Systech Environmental Corp., Lafarge Corp.	Demopolis, AL		495/738	15	11,085,260	Xylene, Toluene, Methyl ethyl ketone
4	Southeastern Chemical & Solvent Co. Inc., TBN Holdings	Sumter, SC		495/738	41	11,075,060	Toluene, Methyl ethyl ketone, Methanol, Xylene, tert-Butyl alcohol
5	North East Chemical Corp., TBN Holdings Inc.	Cleveland, OH		495/738	28	10,146,613	Toluene, Xylene, Methyl ethyl ketone, Trichloroethylene, Acrylonitrile
6	CWM Resource Recovery Inc., Waste Management Inc.	West Carrollton, OH		495/738	8	9,935,600	Methanol, Methyl isobutyl ketone, Xylene
7	Marisol Inc.	Middlesex, NJ		495/738	17	8,854,042	Toluene, Methanol, Xylene, Methyl ethyl ketone
8	Hukill Chemical Corp.	Bedford, OH		5169	18	8,504,108	Xylene, Methyl ethyl ketone, Toluene
9	Pharmacia & Upjohn	Kalamazoo, MI		28	24	7,670,034	Methanol, Toluene
10	Michigan Recovery Sys. Inc., The Environmental Quality Co.	Romulus, MI		495/738	22	7,084,177	Toluene, Xylene
11	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	17	6,481,459	Xylene, Toluene
12	Celanese Ltd.- Clear Lake Plant, Hoechst	Pasadena, TX		28	18	6,064,035	Diethyl sulfate, Acrylic acid
13	Safety-Kleen Corp.	San Antonio, TX		495/738	9	5,826,336	Toluene, Xylene, Methyl ethyl ketone
14	Equistar Chemicals L.P. Victoria Facility	Victoria, TX		28	4	5,785,212	Ethylene
15	Safety-Kleen Sys. Inc.	Dolton, IL		495/738	7	5,713,729	Toluene, Xylene, Methyl ethyl ketone
16	Warner-Lambert Co., Parke-Davis Div.	Holland, MI		28	11	4,991,430	Toluene, Methanol
17	Gage Prods. Co.	Ferndale, MI		28	11	4,622,837	Xylene, Methanol, 1,2,4-Trimethylbenzene
18	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	6	4,242,503	Toluene, Methanol, Xylene
19	Safety-Kleen Envirosystem Co. of Puerto Rico Inc.	Manati, PR		495/738	5	3,875,680	Acetonitrile, Methanol, Xylene
20	Safety-Kleen Corp.	Denton, TX		495/738	27	3,360,989	Vinyl acetate, Toluene, Methyl ethyl ketone, Methanol
21	Lyondell Chemical Worldwide Inc. Bayport Plant	Pasadena, TX		28	11	3,253,690	tert-Butyl alcohol
22	Hydrite Chemical Co.	Cottage Grove, WI		28	21	3,203,940	Toluene, Methanol, Xylene
23	Equistar Chemicals L.P. La Porte Plant	La Porte, TX		28	16	3,176,969	Vinyl acetate
24	Heat Energy Advanced Technology Inc.	Dallas, TX		495/738	10	2,575,982	Xylene, Toluene, Cyclohexane
25	Merck & Co. Inc.	Albany, GA		28	12	2,559,879	Methanol, Toluene
26	DuPont Cape Fear	Leland, NC		28	21	2,379,117	Ethylene glycol
27	Teva Pharmaceuticals USA	Mexico, MO		28	6	2,320,565	Methanol
28	Wyckoff Chemical Co. Inc.	South Haven, MI		28	8	2,150,073	Toluene, Methanol
29	Chemical Solvents - Denison Avenue Facility	Cleveland, OH		28	12	2,119,002	Xylene, Toluene
30	Onyx Environmental Services L.L.C.	Azusa, CA		495/738	10	2,113,826	Toluene, Methyl ethyl ketone, Methyl isobutyl ketone, Xylene
31	M & M Chemical & Equipment Co., Giant Cement Holding Inc.	Attalla, AL		495/738	1	2,094,048	Methyl ethyl ketone
32	Lyondell Chemical Worldwide Inc.	Westlake, LA		28	15	2,047,402	Chlorobenzene, Toluenediisocyanate
33	Abbott Labs., North Chicago Plant	North Chicago, IL		28	16	2,031,395	Methanol, Toluene
34	Merck & Co. Inc.	Rahway, NJ		28	13	2,027,911	Methanol, Toluene
35	Dow Corning Corp.	Midland, MI		28	24	1,990,149	Methanol, Toluene
36	Exxon Chemical Baton Rouge Chemical Plant, Exxon Corp.	Baton Rouge, LA		28	37	1,899,102	Phthalic anhydride, sec-Butyl alcohol
37	Merck & Co. Inc. Cherokee Site	Riverside, PA		28	9	1,856,623	Methanol, Toluene
38	Consolidated Recycling Co. Inc.	Troy, IN		29	1	1,632,678	Ethylene glycol
39	Excel TSD Inc.	Memphis, TN		495/738	25	1,602,641	Toluene, Methyl ethyl ketone, 2-Ethoxyethanol, n-Butyl alcohol, Methyl isobutyl ketone, o-Xylene, m-Xylene, p-Xylene
40	Baker Petrolite Corp., Baker Hughes Inc.	Sand Springs, OK		28	14	1,567,269	Toluene, Methanol, Xylene
41	Holnam Inc. Holly Hill SC Plant	Holly Hill, SC		32	18	1,548,074	Toluene, Xylene, Methyl ethyl ketone, Methanol
42	Rineco	Benton, AR		495/738	11	1,465,633	Methyl ethyl ketone, Toluene, Xylene
43	Ciba Specialty Chemicals Corp.	McIntosh, AL		28	33	1,394,340	o-Xylene, Xylene, Methanol
44	Esco Co. Ltd. Ptnr.	Muskegon, MI		28	5	1,365,289	Methanol, Toluene
45	Noltex L.L.C., Mitsubishi Chemical America Inc.	La Porte, TX		28	2	1,293,126	Methanol, Vinyl acetate
46	Abbott Health Prods. Inc.	Barceloneta, PR		28	7	1,210,965	Acetonitrile
47	Philip Enterprises Inc., Barrie Facility	Barrie, ON	77	495/738	19	1,197,702	Xylene, Toluene, Dichloromethane
48	Roche Colorado Corp., Syntex (USA) Inc.	Boulder, CO		28	5	1,191,383	Toluene
49	Specialtychem Prods. Corp., Bayer Corp.	Marinette, WI		28	15	1,174,635	Toluene, Methanol, Xylene
50	Creanova Inc., Veba Corp.	Theodore, AL		28	17	1,137,480	Methanol
	Subtotal				**788**	**258,672,581**	
	% of Total				**1**	**67**	
	Total				**72,795**	**388,129,038**	

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

Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Number of Forms	Transfers to Treatment (except metals) (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of transfers to treatment from the facility)
1	Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit, MI		495/738	34	11,690,585	Dichloromethane, 1,2-Dichlorobenzene, Hexachlorocyclopentadiene, Tetrachloroethylene, Carbon tetrachloride, 1,1,2,2-Tetrachloroethane
2	CPI - Kraft Div., Consolidated Papers Inc.	Wisconsin Rapids, WI		26	14	3,155,711	Methanol
3	FMC Corp.	Baltimore, MD		28	18	2,409,636	Toluene, Methanol
4	Dow Corning Corp.	Midland, MI		28	24	2,330,014	Toluene, Benzene, Xylene, Acetonitrile
5	Pfizer Inc. - Groton Site	Groton, CT		28	17	2,328,677	Methanol
6	Pharmacia & Upjohn	Kalamazoo, MI		28	24	2,327,535	Dichloromethane
7	Norco Chemical Plant - East Site, Shell Oil Co.	Norco, LA		28	24	2,291,065	Propylene, 1,3-Butadiene
8	Michigan Recovery Sys. Inc., The Environmental Quality Co.	Romulus, MI		495/738	22	2,285,245	Toluene, Xylene
9	Dow Chemical Co. - Midland Ops.	Midland, MI		28	56	1,796,665	Acetonitrile, Methanol, Methyl isobutyl ketone
10	HNA Holdings Inc., Hoechst Corp.	Spartanburg, SC		Mult.	13	1,768,707	Methanol
11	Warner-Lambert Co., Parke-Davis Div.	Holland, MI		28	11	1,534,334	Toluene, Methanol
12	DuPont Agricultural Caribe Inds. Ltd.	Manati, PR		28	5	1,449,410	Xylene, Methanol
13	Ciba Specialty Chemicals Corp.	McIntosh, AL		28	33	1,421,823	Methanol
14	Tippecanoe Labs., Eli Lilly & Co.	Lafayette, IN		28	20	1,365,126	Methanol, Acetonitrile, Dichloromethane
15	Lilly Tech. Center, Eli Lilly & Co.	Indianapolis, IN		28	9	1,261,837	Acetonitrile
16	Armco Inc., Zanesville Ops.	Zanesville, OH		33	7	1,229,025	Nitric acid and nitrate compounds
17	DuPont Beaumont Plant	Beaumont, TX		28	21	1,199,945	Aniline
18	Safety-Kleen Sys. Inc.	Dolton, IL		495/738	7	1,194,415	Toluene, Xylene, Methyl ethyl ketone
19	Chevron Chemical Co.	Port Arthur, TX		28	14	1,190,264	Benzene, 1,3-Butadiene, Styrene
20	Malllinckrodt Inc.	Saint Louis, MO		28	18	1,041,360	1,1,2-Trichloroethane
21	3M Springfield Mo	Springfield, MO		28	10	1,038,871	Toluene
22	Archimica Inc.	Rock Hill, SC		28	7	1,037,404	Methanol
23	Squibb Mfg. Inc., Bristol Myers Squibb Co.	Humacao, PR		28	14	1,036,963	Dichloromethane, Methanol, Methyl isobutyl ketone, Methyl tert-butyl ether, Toluene, 1,4-Dioxane, n-Butyl alcohol, Cyclohexane
24	Safety-Kleen Ltd. (Niagara)	Thorold, ON	49	495/738	25	1,004,943	Toluene, Xylene, Methanol, Cyclohexane, Methyl ethyl ketone
25	DuPont Mobile Plant	Axis, AL		28	18	984,859	Xylene, Methanol, Toluene, Ethylene glycol
26	Safety-Kleen Envirosystem Co. of Puerto Rico Inc.	Manati, PR		495/738	5	951,689	Methanol, Dichloromethane
27	Pollution Control Inds. Inc.	East Chicago, IN		495/738	52	948,678	Naphthalene, Methyl ethyl ketone, Toluene, Xylene, Formaldehyde
28	Motiva Norco Refy. Co., Motiva Ents. L.L.C.	Norco, LA		29	28	848,006	1,3-Butadiene
29	Shell Chemical Co.	Belpre, OH		Mult.	11	829,718	Cyclohexane
30	Aimco Solrec Ltd., Morobel Dr.	Milton, ON	37	28	7	807,560	Xylene, Toluene, Methyl ethyl ketone
31	Les Produits Chimiques Delmar Inc.	Lasalle, QC	37	28	5	807,000	Toluene, Methanol
32	WRR Environmental Services Co. Inc., Caribou Corp.	Washington, WI		495/738	10	795,826	Trichloroethylene, Tetrachloroethylene
33	Ruetgers Organics Corp.	State College, PA		28	12	777,495	Chlorobenzene
34	Tennessee Eastman Div., Eastman Chemical Co.	Kingsport, TN		28	56	762,195	Xylene
35	Bayer Inc., Sarnia Site	Sarnia, ON	37	28	18	748,800	Cyclohexane, Acetonitrile
36	DDE Louisville, DuPont Dow Elastomers	Louisville, KY		28	7	728,487	Toluene
37	Chemdesign Corp., Bayer Corp.	Fitchburg, MA		28	14	706,815	Toluene, Dichloromethane, Methanol
38	Union Carbide Corp., Cypress Catalyst Plant	Norco, LA		28	4	678,767	Chlorobenzene
39	DuPont Cedar Creek Site	Fayetteville, NC		28	8	678,277	Ethylene glycol, Methanol
40	Solutia Canada Inc., Produits Chimiques	Lasalle, QC	37	28	6	673,232	n-Butyl alcohol, Xylene
41	DuPont Chambers Works	Deepwater, NJ		28	50	651,694	Methanol, 1,2-Dichlorobenzene, Ethylene glycol, Toluene, Cyclohexane
42	Quality Chemicals Inc., Chemfirst Corp.	Tyrone, PA		28	14	623,991	Methanol, Toluene, Xylene
43	Chemtron Corp.	Avon, OH		495/738	20	600,628	Ethylene glycol, Xylene, Toluene, Methyl ethyl ketone, Naphthalene, Styrene
44	DuPont La Porte Plant	La Porte, TX		28	20	595,950	Methanol, Toluene, n-Butyl alcohol
45	CWM Resource Recovery Inc., Waste Management Inc.	West Carrollton, OH		495/738	8	591,247	Methanol, Dichloromethane, Xylene, Toluene
46	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	6	585,781	Toluene, Methanol, Xylene
47	3M Nevada Plant	Nevada, MO		30	11	584,160	Methyl ethyl ketone, Xylene
48	Witco Corp.	Friendly, WV		28	17	568,372	Toluene, Methanol
49	Hukill Chemical Corp.	Bedford, OH		5169	18	563,862	Xylene, Methyl ethyl ketone, Toluene
50	Huntsman Petrochemical Corp.	Cantonment, FL		28	5	561,057	Maleic anhydride
	Subtotal				**877**	**68,043,706**	
	% of Total				**1**	**54**	
	Total				**72,795**	**126,365,275**	

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

The 50 facilities in North America reporting the largest transfers to treatment accounted for over half of all such transfers.

- One facility, a TRI hazardous waste management/solvent recovery facility located in Michigan, reported more than 11.7 million kg of transfers to treatment, over 9 percent of all such transfers in 1998. This was the same facility that reported the largest transfers to energy recovery. Michigan reported the largest amount of transfers to treatment in 1998.
- Of the 50 facilities with the largest transfers to treatment, 10 were hazardous waste management/ solvent recovery facilities and 33 were chemical manufacturing facilities.

Facilities Reporting the Largest Transfers to Sewage, 1998

The 50 facilities in North America reporting the largest transfers to sewage accounted for almost two-thirds of all such transfers.

- One TRI chemical manufacturing facility located in Texas reported more than 9.5 million kg of transfers to sewage, almost 9 percent of all such transfers in 1998. Texas reported the largest amount of transfers to sewage in 1998.
- Three of the five facilities reporting the largest transfers to sewage were located in Texas.
- Of the 50 facilities with the largest transfers to sewage, 27 were chemical manufacturing facilities.

4.3.4 Other Transfers for Further Management by Chemical, 1998

There are 165 chemicals in the matched data set and 150 chemicals that 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 each represented over 85 percent of these types of transfers in the matched data set for 1998. 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.

Largest Transfers to Energy Recovery by Chemical, 1998

The 25 chemicals with the largest transfers to energy recovery accounted for 93 percent of all such transfers in North America in 1998.

- Toluene was the chemical with the largest transfers to energy recovery, with 76.5 million kg. Transfers to

Table 4–11. The 50 North American Facilities with the Largest Transfers to Sewage (except metals), 1998

Rank	Facility	City, State/ Province	SIC Codes Canada	SIC Codes US	Number of Forms	Transfers to Sewage (except metals) (kg)	Major Chemicals Reported (chemicals accounting for more than 70% of transfers to sewage from the facility)
1	Air Prods. Inc., Air Prods. & Chemicals Inc.	Pasadena, TX		28	10	9,580,575	Nitric acid and nitrate compounds
2	Celanese Ltd.- Clear Lake Plant, Hoechst	Pasadena, TX		28	18	4,566,499	Ethylene glycol
3	Dominion Colour Corporation, Kikuchi Color & Chemical	Ajax, ON	37	28	6	3,616,000	Nitric acid and nitrate compounds
4	Boise Cascade Corp.	Saint Helens, OR		26	10	3,179,275	Methanol
5	Simpson Pasadena Paper Co., Simpson Investment Co.	Pasadena, TX		26	8	3,149,842	Methanol
6	Hercules Inc.	Hopewell, VA		28	12	2,964,145	Nitric acid and nitrate compounds, Ethylene glycol
7	Stone Container Corp.	Panama City, FL		26	10	2,551,048	Methanol
8	Potlatch Corp. MN P&P Div.	Cloquet, MN		26	8	2,036,939	Methanol
9	Solutia Inc.	Springfield, MA		Mult.	15	1,917,178	Nitric acid and nitrate compounds, Formaldehyde, Methanol
10	S. D. Warren Co., Sappi Ltd.	Muskegon, MI		26	8	1,842,907	Methanol
11	Shepherd Chemical Co.	Cincinnati, OH		28	11	1,837,197	Nitric acid and nitrate compounds
12	Stone Container Corp.	Hopewell, VA		26	10	1,702,495	Methanol
13	Penford Prods. Co.	Cedar Rapids, IA		20	5	1,601,696	Ethylene glycol
14	Degussa Corp. Metal Group	South Plainfield, NJ		33	10	1,555,102	Methanol
15	Pharmacia & Upjohn	Kalamazoo, MI		28	24	1,508,929	Methanol
16	A. E. Staley Mfg. Co. Sagamore Ops.	Lafayette, IN		20	6	1,506,725	Nitric acid and nitrate compounds
17	Union Carbide Corp. Texas City Plant	Texas City, TX		28	36	1,362,608	Methanol
18	International Paper Erie Mill	Erie, PA		26	10	1,318,775	Methanol
19	Westvaco Corp. Fine Papers Div.	Luke, MD		26	13	1,096,798	Methanol
20	Ciba Specialty Chemicals Corp.	Newport, DE		28	5	987,417	Methanol
21	Equistar Chemicals - Bayport Chemicals Plant	Pasadena, TX		28	11	960,091	2-Ethoxyethanol, Ethylene glycol
22	Great Lakes Chemical Corp.	Newport, TN		28	18	907,500	Methanol
23	Penick Corp., Penick Pharmaceuticals	Newark, NJ		28	1	905,854	Methanol
24	Albright & Wilson Americas	Charleston, SC		28	19	885,967	Methanol
25	Lyondell Chemical Worldwide Inc. Bayport Plant	Pasadena, TX		28	11	880,662	Methanol, Propylene oxide
26	Lyondell-Citgo Refining Co. Ltd.	Houston, TX		29	23	869,938	Diethanolamine
27	HMT Technology Corp.	Eugene, OR		Mult.	4	815,911	Nitric acid and nitrate compounds
28	Demenno / Kerdoon, World Oil Corp.	Compton, CA		29	1	725,624	Ethylene glycol
29	Fairmount Chemical Co. Inc.	Newark, NJ		28	4	711,840	Methanol
30	Lomac Inc., PCL Group Inc.	Muskegon, MI		28	9	680,308	Nitric acid and nitrate compounds
31	Procter & Gamble Mfg. Co.	Sacramento, CA		28	3	680,272	Methanol
32	Sun Chemical Corp., DIC Americas Inc.	Newark, NJ		28	2	634,921	Methanol
33	BASF Corp.	Huntington, WV		28	5	572,957	Aniline, Nitric acid and nitrate compounds
34	Sunoco Inc. Frankford Plant	Philadelphia, PA		28	7	550,192	Methanol, Cumene hydroperoxide
35	Henkel Corp. Chemicals Group Cincinnati	Cincinnati, OH		28	9	546,621	Methanol
36	Hoffmann-La Roche Inc., Roche Holdings Inc.	Nutley, NJ		28	5	534,762	Methanol
37	Flexsys America L.P. Krummrich	Sauget, IL		28	5	510,666	4-Nitrophenol, Methyl ethyl ketone
38	Seagate Recording Media, Seagate Tech. Inc.	Anaheim, CA		36	4	503,795	Nitric acid and nitrate compounds
39	Hercules Inc., Aqualon Div.	Parlin, NJ		28	5	500,874	Ethylene glycol
40	Seh-America Inc.	Vancouver, WA		Mult.	5	498,415	Nitric acid and nitrate compounds
41	Cincinnati Specialties Inc.	Cincinnati, OH		28	8	445,837	Methanol
42	Pfister Chemical Inc.	Ridgefield, NJ		28	6	444,533	Methanol
43	Ford Motor Co. Livonia Transmission Plant	Livonia, MI		37	6	426,304	Nitric acid and nitrate compounds
44	Fuji Photo Film Inc.	Greenwood, SC		Mult.	8	415,763	Nitric acid and nitrate compounds
45	Saft America Inc.	Valdosta, GA		36	5	393,295	Nitric acid and nitrate compounds
46	Siemens Power Corp.	Richland, WA		28	3	390,476	Nitric acid and nitrate compounds
47	Tremco Inc., RPM Inc.	Ashland, OH		30	2	380,952	Nitric acid and nitrate compounds
48	Davisco Lake Norden Food Ingredient Co.	Lake Norden, SD		20	3	374,851	Nitric acid and nitrate compounds
49	Pharmacia & Upjohn Caribe Inc.	Arecibo, PR		28	8	370,828	Methanol, n-Butyl alcohol
50	Inco Alloys Intl. Inc., Special Metals Corp.	Huntington, WV		33	9	367,601	Nitric acid and nitrate compounds
	Subtotal				**444**	**67,769,760**	
	% of Total				**1**	**63**	
	Total				**72,795**	**107,532,521**	

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

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	3,555	76,531,477	4.0	96.0
1330-20-7	Xylene (mixed isomers)	3,371	72,215,460	7.4	92.6
67-56-1	Methanol	2,828	58,124,681	0.3	99.7
78-93-3	Methyl ethyl ketone	2,303	35,172,723	3.4	96.6
108-10-1	Methyl isobutyl ketone	1,089	12,883,017	2.2	97.8
91-20-3	Naphthalene	676	11,159,312	0.1	99.9
107-21-1	Ethylene glycol	1,769	10,267,344	1.8	98.2
100-41-4	Ethylbenzene	1,234	10,218,041	3.0	97.0
71-36-3	n-Butyl alcohol	1,264	9,610,564	0.7	99.3
108-05-4	Vinyl acetate▼	218	7,648,481	3.6	96.4
75-07-0	Acetaldehyde▼	291	5,986,235	0.0	100.0
74-85-1	Ethylene	357	5,885,749	0.0	100.0
75-65-0	tert-Butyl alcohol	103	5,855,721	0.0	100.0
100-42-5	Styrene▼	1,714	5,207,947	0.1	99.9
75-05-8	Acetonitrile	132	5,100,308	0.0	100.0
71-43-2	Benzene▼	561	4,813,446	2.8	97.2
75-09-2	Dichloromethane▼	878	4,570,472	6.7	93.3
108-95-2	Phenol	864	3,881,141	0.0	100.0
110-82-7	Cyclohexane	472	3,748,242	0.3	99.7
64-67-5	Diethyl sulfate▼	35	3,123,734	0.0	100.0
79-10-7	Acrylic acid	219	2,842,097	0.0	100.0
79-01-6	Trichloroethylene▼	756	2,029,738	4.6	95.4
1634-04-4	Methyl tert-butyl ether	229	1,734,301	0.0	100.0
127-18-4	Tetrachloroethylene▼	548	1,711,008	5.8	94.2
95-63-6	1,2,4-Trimethylbenzene	1,123	1,656,981	1.8	98.2
	Subtotal	**26,589**	**361,978,220**	**3.2**	**96.8**
	% of Total	**37**	**93**		
	Total	**72,795**	**388,129,038**	**3.1**	**96.9**

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

energy recovery of toluene accounted for almost 20 percent of all transfers to energy recovery. Toluene also ranked eighth for total releases and ninth for transfers to recycling. Toluene is a byproduct of gasoline production, the manufacture of coke from coal and the production of styrene. Uses of toluene include paints, lacquers, thinners and strippers, adhesives, and cosmetic nail products.

- Xylene (mixed isomers) had the second largest total, with 72.2 million kg. NPRI facilities accounted for 7 percent of these transfers of xylene, twice the average (3 percent) for all such transfers. Xylene also ranked twelfth for total releases and eighth for transfers to recycling. Xylene is used as a solvent in the printing, rubber and leather industries, and also as a cleaning agent, a paint thinner, and in paints and varnishes.
- Methanol had the third-largest total, with 58.1 million kg. TRI facilities accounted for almost all (99.7 percent) transfers of methanol to energy recovery in 1998. Methanol ranked fourth for total releases and thirteenth for transfers to recycling. The largest use of methanol in the United States has been in the 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). 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.

Largest Transfers to Treatment by Chemical, 1998

The 25 chemicals with the largest transfers to treatment accounted for 86 percent of all such transfers in North America in 1998.

- Methanol was the chemical with the largest transfers to treatment, with 23.3 million kg. Transfers to treatment of methanol accounted for over 18 percent of all transfers to treatment in 1998. Methanol ranked third for transfers to energy recovery, fourth for total releases and 13th for transfers to recycling.
- Toluene had the second-largest total, with 15.2 million kg. NPRI facilities accounted for 19 percent of these transfers of toluene, more than twice the average (8.5 percent) for all such transfers. Toluene ranked first for transfers to energy recovery, eighth for total releases and ninth for transfers to recycling.
- Eight of the 25 chemicals with the largest transfers to treatment were known or suspected carcinogens, including the fourth-ranked dichloromethane. Dichloromethane ranked fifth for total releases of designated carcinogens and is used as a solvent and degreasing agent in metal cleaning and as a process solvent in pharmaceutical production.

Largest Transfers to Sewage by Chemical, 1998

The 25 chemicals with the largest transfers to sewage accounted for 98 percent of all such transfers in North America in 1998.

- Nitric acid (and nitrate compounds) was the substance with the largest transfers to sewage, with 45.8 million kg. Transfers to sewage of nitric acid and nitrate compounds

Table 4–13. The 25 Chemicals with the Largest Transfers to Treatment (except metals) in North America, 1998

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	2,828	23,301,446	5.5	94.5
108-88-3	Toluene	3,555	15,177,086	18.8	81.2
1330-20-7	Xylene (mixed isomers)	3,371	10,105,613	15.8	84.2
75-09-2	Dichloromethane▼	878	9,034,537	2.2	97.8
--	Nitric acid and nitrate compounds	3,182	6,855,686	2.2	97.8
78-93-3	Methyl ethyl ketone	2,303	5,504,229	15.5	84.5
75-05-8	Acetonitrile	132	3,740,893	6.4	93.6
107-21-1	Ethylene glycol	1,769	3,272,774	18.3	81.7
110-82-7	Cyclohexane	472	2,801,145	26.2	73.8
127-18-4	Tetrachloroethylene▼	548	2,558,422	2.2	97.8
95-50-1	1,2-Dichlorobenzene	48	2,381,086	0.4	99.6
100-42-5	Styrene▼	1,714	2,315,569	7.5	92.5
108-90-7	Chlorobenzene	94	2,177,008	0.1	99.9
79-01-6	Trichloroethylene▼	756	2,127,543	4.2	95.8
71-43-2	Benzene▼	561	1,807,738	5.4	94.6
106-99-0	1,3-Butadiene▼	202	1,785,195	0.2	99.8
67-66-3	Chloroform▼	177	1,690,347	2.5	97.5
71-36-3	n-Butyl alcohol	1,264	1,612,971	34.0	66.0
108-95-2	Phenol	864	1,584,046	16.2	83.8
7664-38-2	Phosphoric acid	3,121	1,563,831	2.7	97.3
108-10-1	Methyl isobutyl ketone	1,089	1,474,678	8.5	91.5
56-23-5	Carbon tetrachloride▼	76	1,396,183	1.5	98.5
100-41-4	Ethylbenzene	1,234	1,294,903	7.2	92.8
77-47-4	Hexachlorocyclopentadiene	8	1,269,904	0.0	100.0
115-07-1	Propylene	407	1,258,894	0.0	100.0
	Subtotal	**30,653**	**108,091,727**	**9.3**	**90.7**
	% of Total	**42**	**86**		
	Total	**72,795**	**126,365,275**	**8.5**	**91.5**

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

Table 4–14. The 25 Chemicals with the Largest Transfers to Sewage (except metals) in North America, 1998

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	3,182	45,816,555	9.9	90.1
67-56-1	Methanol	2,828	37,111,447	1.5	98.5
107-21-1	Ethylene glycol	1,769	11,123,147	0.3	99.7
7664-38-2	Phosphoric acid	3,121	1,459,657	3.5	96.5
50-00-0	Formaldehyde▼	950	1,369,678	1.7	98.3
71-36-3	n-Butyl alcohol	1,264	1,273,242	1.3	98.7
108-95-2	Phenol	864	1,268,327	12.4	87.6
111-42-2	Diethanolamine	465	1,074,599	0.1	99.9
75-07-0	Acetaldehyde▼	291	634,298	0.0	100.0
62-53-3	Aniline	85	617,934	0.0	100.0
75-65-0	tert-Butyl alcohol	103	362,248	0.7	99.3
110-80-5	2-Ethoxyethanol	44	359,414	0.0	100.0
75-09-2	Dichloromethane▼	878	300,930	0.0	100.0
7782-50-5	Chlorine	1,413	286,339	0.0	100.0
75-56-9	Propylene oxide▼	127	280,372	0.0	100.0
100-02-7	4-Nitrophenol	8	272,207	0.0	100.0
108-88-3	Toluene	3,555	238,894	0.6	99.4
78-93-3	Methyl ethyl ketone	2,303	237,415	7.2	92.8
67-66-3	Chloroform▼	177	214,546	0.0	100.0
75-05-8	Acetonitrile	132	195,069	0.0	100.0
123-72-8	Butyraldehyde	34	173,369	0.0	100.0
1330-20-7	Xylene (mixed isomers)	3,371	156,661	0.1	99.9
109-86-4	2-Methoxyethanol	61	141,444	0.0	100.0
123-91-1	1,4-Dioxane▼	58	138,727	0.0	100.0
7664-39-3	Hydrogen fluoride	1,068	137,210	0.0	100.0
	Subtotal	**28,151**	**105,243,729**	**5.1**	**94.9**
	% of Total	**39**	**98**		
	Total	**72,795**	**107,532,521**	**5.0**	**95.0**

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

accounted for 43 percent of all transfers to sewage in 1998. NPRI facilities accounted for 10 percent of these transfers. Nitric acid and nitrate compounds ranked third for total releases, 22nd for transfers to recycling and fifth for 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 37.1 million kg—over 34 percent of all transfers to sewage in 1998. TRI facilities accounted for 98.5 percent of these transfers. Methanol ranked third for transfers to energy recovery, fourth for total releases and 13th for transfers to recycling.
- Ethylene glycol had the third-largest total, with 11.1 million kg. TRI facilities accounted for almost all (99.7 percent) of these transfers. Ethylene glycol ranked seventh for transfers to recycling and to energy recovery and eighth for transfers to treatment. The primary use of ethylene glycol is in antifreeze and de-icing solutions (for cars, airplanes, 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 1.5 million kg.
- Six of the 25 chemicals with the largest transfers to sewage were known or suspected carcinogens.
- 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, found in **Chapter 3**.

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Key Findings

- In 1998, total reported amounts of releases and transfers in North America were 3.25 billion kg for the matched data set of industries and chemicals. This includes transfers to recycling and energy recovery, as well as amounts for new industries.
- Releases represented 50 percent of all reported amounts of releases and transfers. On-site releases were 42 percent and off-site releases were 9 percent.
- The pattern of releases in NPRI differed from that for North America as a whole. Off-site releases were a larger proportion in NPRI than for North America (18 percent vs. 9 percent), while on-site releases were a smaller percentage (35 percent vs. 42 percent). Total NPRI releases represented 53 percent of the total reported amounts to NPRI.
- For TRI, off-site releases were 8 percent of the TRI total and on-site releases were 42 percent. Total TRI releases represented 50 percent of the total reported amounts to TRI.
- Off-site transfers to recycling were 31 percent of the total reported amounts of releases and transfers in North America, while other off-site transfers for further management were 19 percent.
- For NPRI, off-site transfers to recycling were 38 percent of the NPRI total, a larger proportion than for TRI, where transfers to recycling were 30 percent of the TRI total.
- Four US states (Ohio, Texas, Michigan and Indiana) and one Canadian province (Ontario) each reported more than 180 million kg. Together, these five jurisdictions reported more than one-third (35 percent) of total reported amounts of releases and transfers in North America in 1998.
- Two manufacturing industries (primary metals and chemicals) reported more than 600 million kg each in total releases and transfers, 41 percent of the total reported amounts in 1998 in North America.
- Two of the industries reporting for the first time in 1998 to TRI (electric utilities and hazardous waste management/solvent recovery facilities) each reported more than 350 million kg. Together, these two industries accounted for 25 percent of the total reported amounts in 1998 in North America.

5.1 Introduction

This chapter examines total reported amounts of releases and transfers in North America for 1998.

Releases include on-site releases (releases to air, water, land and underground injection wells) and off-site releases (off-site transfers to disposal and all transfers of metals except those sent for recycling). Releases are presented in **Chapter 3**.

Transfers include off-site transfers to recycling and other off-site transfers to energy recovery, to treatment and to sewage. These transfers are presented in **Chapter 4**. Off-site transfers to recycling and to energy recovery are included for the first time in *Taking Stock* reports for 1998 because reporting of such transfers became mandatory under NPRI in that 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). This includes industries reporting to TRI for the first time for 1998. Comparable Mexican data are not available for the 1998 reporting year.

5.2 1998 Total Reported Amounts of Releases and Transfers

Total reported amounts of 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, to treatment and to sewage).

- In 1998, total reported amounts of releases and transfers in North America were 3.25 billion kg for the matched data set of industries and chemicals.
- Releases represented 50 percent of all reported amounts of releases and transfers in North America. On-site releases were 42 percent and off-site releases were 9 percent.
- The pattern of releases in NPRI differed from that for North America as a whole. Off-site releases were a larger proportion in NPRI than for North America (18 percent vs. 9 percent), while on-site releases were a smaller percentage (35 percent vs. 42 percent). Total NPRI releases represented 53 percent of the total reported amounts to NPRI.
- Off-site transfers to recycling were 31 percent of the total reported amounts of releases and transfers in North America.
- Other off-site transfers for further management (transfers to energy recovery, treatment and sewage) were 19 percent.

Table 5–1. Summary of Total Reported Amounts of Releases and Transfers in North America, NPRI and TRI, 1998

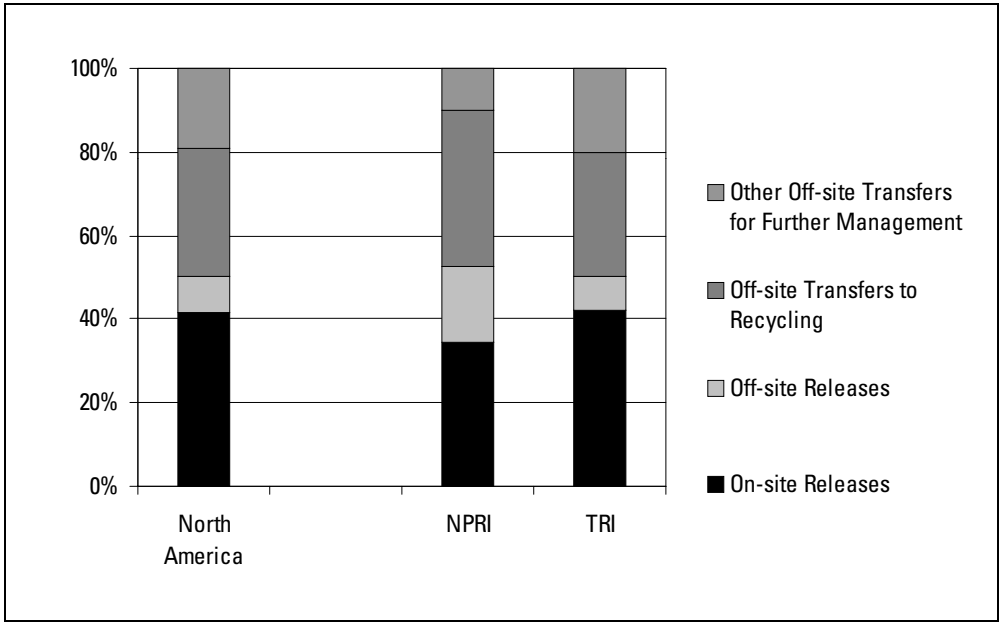
	North America		NPRI*		TRI		NPRI as % of North American Total	TRI as % of North American Total
	Number		Number		Number			
Total Facilities	21,974		1,552		20,422		7	93
Total Forms	72,795		5,235		67,560		7	93
Releases On- and Off-site	**kg**	**%**	**kg**	**%**	**kg**	**%**	**%**	**%**
On-site Releases	**1,353,877,039**	**42**	**98,637,746**	**35**	**1,255,239,293**	**42**	**7**	**93**
Air	853,573,800	26	75,808,346	27	777,765,454	26	9	91
Surface Water	102,847,170	3	4,360,769	2	98,486,401	3	4	96
Underground Injection	86,263,932	3	3,701,129	1	82,562,803	3	4	96
Land	311,068,891	10	14,644,256	5	296,424,635	10	5	95
Off-site Releases	**283,026,205**	**9**	**51,173,125**	**18**	**231,853,080**	**8**	**18**	**82**
Transfers to Disposal (except metals)	37,593,132	1	9,567,199	3	28,025,933	1	25	75
Transfers of Metals**	245,433,073	8	41,605,926	15	203,827,147	7	17	83
Total Releases On- and Off-site	**1,636,903,244**	**50**	**149,810,871**	**53**	**1,487,092,373**	**50**	**9**	**91**
Off-site Transfers for Further Management								
Off-site Transfers to Recycling	**995,324,253**	**31**	**106,793,139**	**38**	**888,531,114**	**30**	**11**	**89**
Transfers to Recycling of Metals	854,533,236	26	89,043,876	31	765,489,360	26	10	90
Transfers to Recycling (except metals)	140,791,017	4	17,749,263	6	123,041,754	4	13	87
Other Off-site Transfers for Further Management	**622,026,834**	**19**	**28,173,457**	**10**	**593,853,377**	**20**	**5**	**95**
Energy Recovery (except metals)	388,129,038	12	12,022,819	4	376,106,219	13	3	97
Treatment (except metals)	126,365,275	4	10,736,041	4	115,629,234	4	8	92
Sewage/To POTWs (except metals)	107,532,521	3	5,414,597	2	102,117,924	3	5	95
Total Reported Amounts of Releases and Transfers	**3,254,254,331**	**100**	**284,777,467**	**100**	**2,969,476,864**	**100**	**9**	**91**

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

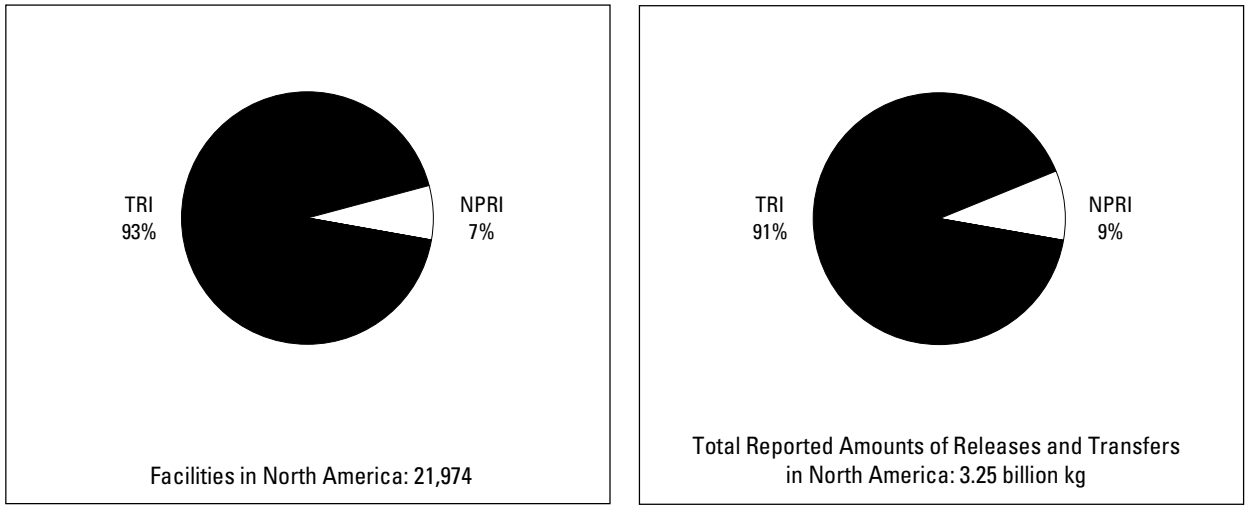
** Includes transfers of metals and metal compounds to energy recovery, treatment, sewage and disposal.

Figure 5–1. Percentage of Total Reported Amounts of Releases and Transfers in North America by Type, NPRI and TRI, 1998



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

Figure 5–2. Contribution of NPRI and TRI to Total Reported Amounts of Releases and Transfers in North America, 1998



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

- For NPRI, off-site transfers to recycling were 38 percent of the NPRI total. For TRI, transfers to recycling were 30 percent of the TRI total.
- While TRI facilities accounted for 93 percent of the facilities in North America and NPRI accounted for 7 percent, TRI represented 90 percent of the North American total reported amounts of releases and transfers and NPRI represented 10 percent.

5.2.1 Total Reported Amounts of Releases and Transfers by State and Province, 1998

Facilities in the matched data set for 1998 reported 3.25 billion kg of chemicals released and transferred. Total reported amounts of releases and transfers consist of on-site releases (to air, surface water, underground injection and land) occurring at the reporting facility; off-site releases as transfers to disposal; transfers to recycling; and other transfers for further management, as transfers to energy recovery, treatment and sewage.

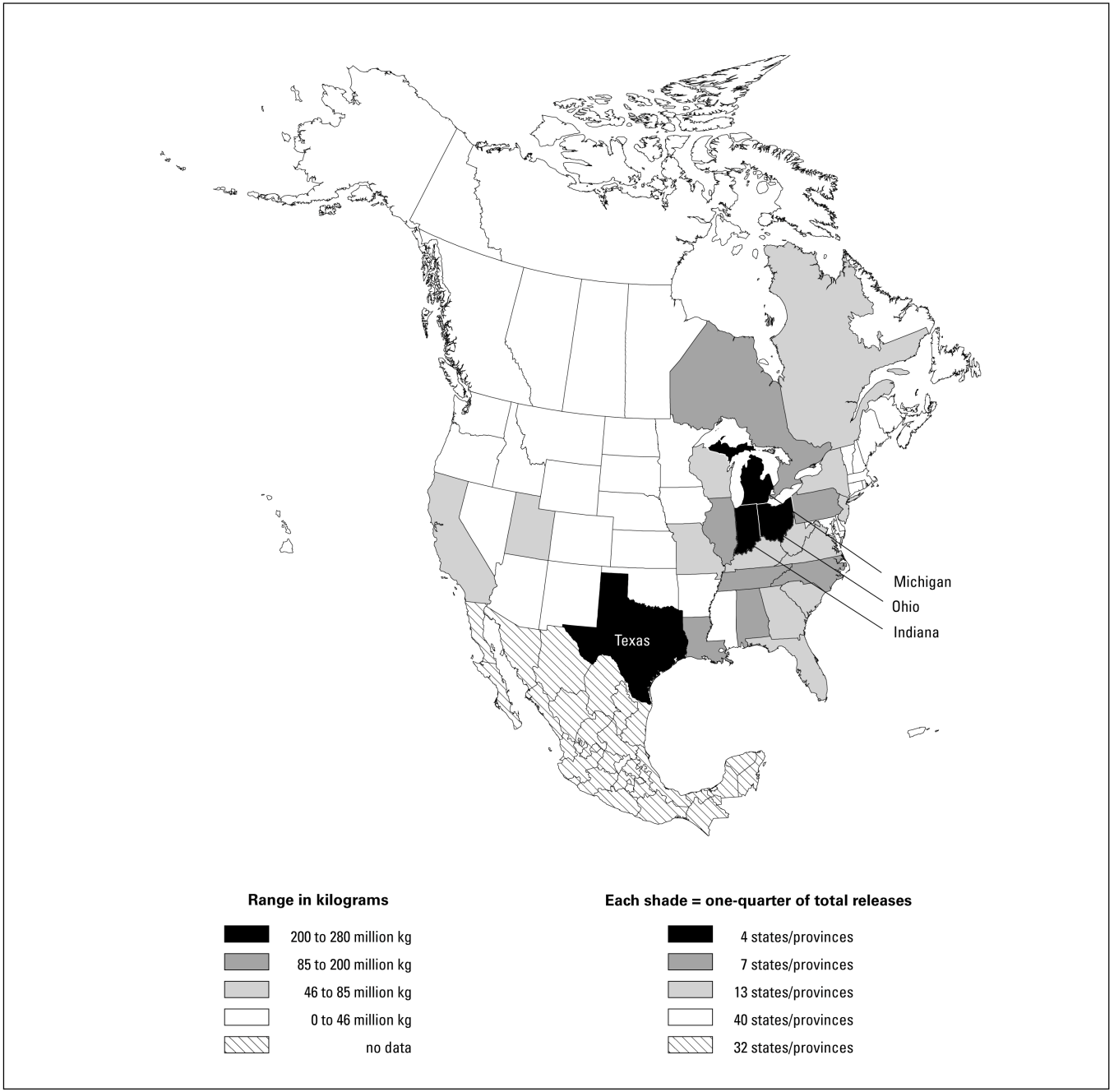
- TRI facilities located in the state of Ohio reported 278.1 million kg of total releases and transfers, 9 percent of all releases and transfers reported in North America in 1998. Ohio facilities reported the largest total releases.
- Texas facilities reported the second-largest amounts of releases and transfers (250.3 million kg). Texas reported the second-largest total releases and other transfers for further management.
- Michigan facilities reported the third-largest amounts of releases and transfers (218.0 million kg). Michigan reported the largest off-site transfers for further management, which include off-site transfers to energy recovery.
- TRI facilities in Indiana reported the fourth-largest amounts of releases and transfers (201.7 million kg). Indiana reported the second-largest transfers to recycling.

Table 5–2. Total Reported Amounts of Releases and Transfers in North America, by Province and State, 1998

		Releases On- and Off-site				Off-site Transfers for Further Management									
State/Province	Number of Facilities	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Rank	Total Transfers to Recycling (kg)	Rank	Total Other Transfers for Further Management* (kg)	Rank	Total Reported Amounts of Releases and Transfers (kg)	Rank	1998 Population	Land Area (sq km)	1998 Gross Domestic Product (US $ millions)	Rank
Alabama	493	48,863,899	8,080,989	56,944,888	9	15,976,096	23	21,809,183	7	94,730,167	10	4,322,113	131,432	109,833	27
Alaska	8	253,216	5,028	258,244	60	12,301	60	2,313	60	272,858	62	609,655	1,477,155	24,236	50
Alberta	132	16,897,101	1,453,688	18,350,789	30	3,361,979	39	1,472,827	38	23,185,595	37	2,906,900	661,194	70,766	35
Arizona	195	26,070,021	486,324	26,556,345	21	12,780,516	24	1,137,951	40	40,474,812	28	4,553,249	294,310	133,801	24
Arkansas	354	10,446,333	9,069,828	19,516,161	28	19,721,075	21	5,639,698	25	44,876,934	26	2,523,186	134,864	61,628	38
British Columbia	83	5,591,826	640,404	6,232,230	43	486,694	50	505,591	43	7,224,515	46	3,998,300	947,806	74,788	34
California	1,236	16,652,154	4,312,623	20,964,777	26	29,781,265	11	14,729,635	12	65,475,677	19	32,182,118	403,939	1,118,945	1
Colorado	163	2,190,008	828,867	3,018,875	51	8,736,010	31	2,477,793	34	14,232,678	42	3,892,029	268,637	141,791	23
Connecticut	286	2,542,724	1,457,090	3,999,814	47	8,407,771	32	4,562,323	30	16,969,908	41	3,267,240	12,548	142,099	22
Delaware	63	5,143,150	108,640	5,251,790	44	5,430,243	37	1,799,545	37	12,481,578	44	735,143	5,063	33,735	46
District of Columbia	2	30,045	2	30,047	63	3,311	61	0	62	33,358	63	529,895	158	54,100	40
Florida	515	56,274,280	2,194,444	58,468,724	8	9,276,807	30	5,528,776	26	73,274,307	15	14,677,181	139,841	418,851	5
Georgia	654	42,346,371	5,020,488	47,366,859	14	22,986,636	16	7,121,213	21	77,474,708	13	7,489,982	149,999	253,769	10
Guam	1	0	0	0	--	0	--	0	--	0	--	149,180	544	--	--
Hawaii	19	1,494,634	10,230	1,504,864	54	45,360	58	1,636	61	1,551,860	56	1,192,057	16,634	39,712	45
Idaho	56	22,558,432	118,068	22,676,500	25	943,289	48	391,095	45	24,010,884	34	1,208,865	214,309	30,936	48
Illinois	1,206	54,583,099	15,619,012	70,202,111	6	37,744,519	7	21,747,050	8	129,693,680	7	11,989,352	143,975	425,679	4
Indiana	966	50,571,403	29,013,973	79,585,376	5	81,355,900	2	40,798,000	4	201,739,276	4	5,864,847	92,896	174,433	16
Iowa	390	13,060,344	3,778,314	16,838,658	31	23,156,555	15	5,309,938	27	45,305,151	25	2,854,330	144,705	84,628	31
Kansas	246	9,271,528	2,929,978	12,201,506	37	27,044,927	12	2,112,219	36	41,358,652	27	2,601,437	211,905	76,991	33
Kentucky	417	35,546,594	3,501,249	39,047,843	16	22,955,020	17	11,609,437	15	73,612,300	14	3,910,366	102,898	107,152	28
Louisiana	305	63,999,878	947,566	64,947,444	7	19,910,219	20	12,711,379	14	97,569,042	9	4,353,646	112,827	129,251	26
Maine	70	3,132,663	483,959	3,616,622	48	976,224	47	259,991	49	4,852,837	52	1,241,895	79,934	32,318	47
Manitoba	52	3,442,664	156,914	3,599,578	49	3,051,861	40	349,207	46	7,000,646	48	1,138,000	649,953	20,165	52
Maryland	171	15,525,947	399,164	15,925,111	32	1,926,492	43	4,120,439	31	21,972,042	38	5,094,924	25,315	164,798	17
Massachusetts	439	3,317,136	1,831,273	5,148,409	45	10,859,969	26	7,853,190	19	23,861,568	35	6,114,440	20,299	239,379	12
Michigan	825	36,608,625	18,017,592	54,626,217	11	49,726,026	6	113,644,566	1	217,996,809	3	9,779,984	147,124	294,505	9
Minnesota	452	7,190,325	1,281,766	8,472,091	38	10,004,598	27	4,891,924	28	23,368,613	36	4,687,408	206,192	161,392	19
Mississippi	281	26,975,883	568,563	27,544,446	20	7,521,942	33	3,300,964	32	38,367,352	29	2,731,644	121,498	62,216	37
Missouri	555	30,494,193	1,984,083	32,478,276	18	26,306,851	13	9,172,679	17	67,957,806	16	5,408,455	178,432	162,772	18
Montana	27	22,399,961	2,205,059	24,605,020	23	21,089	59	29,836	57	24,655,945	33	878,730	376,961	19,861	53
Nebraska	149	4,871,640	3,035,019	7,906,659	39	10,913,119	25	413,250	44	19,233,028	39	1,657,009	199,099	51,737	41
Nevada	50	3,090,639	141,261	3,231,900	50	1,211,489	45	34,922	56	4,478,311	53	1,678,691	284,376	63,044	36
New Brunswick	31	5,692,032	1,073,737	6,765,769	41	218,303	54	56,269	55	7,040,341	47	753,500	73,440	11,615	59
New Hampshire	102	2,815,597	144,068	2,959,665	52	6,195,543	35	1,313,632	39	10,468,840	45	1,172,140	23,228	41,313	43
New Jersey	528	9,518,988	2,907,450	12,426,438	36	18,414,227	22	30,134,466	5	60,975,131	20	8,058,384	19,214	319,201	8
New Mexico	46	12,011,151	795,340	12,806,491	35	51,287	57	208,823	51	13,066,601	43	1,723,965	314,311	47,736	42
New York	625	20,966,511	2,292,527	23,259,038	24	36,701,846	9	6,642,194	22	66,603,078	17	18,146,200	122,301	706,886	2
Newfoundland	8	471,686	220	471,906	58	0	--	0	63	471,906	60	545,400	405,721	7,623	60
North Carolina	749	50,924,485	2,478,809	53,403,294	12	36,730,009	8	8,020,423	18	98,153,726	8	7,430,675	126,170	235,752	13
North Dakota	35	1,696,120	1,127,927	2,824,047	53	311,074	52	253,336	50	3,388,457	54	640,965	178,681	17,214	56
Nova Scotia	29	4,463,245	187,382	4,650,627	46	1,662,916	44	293,299	48	6,606,842	49	936,100	55,491	13,946	58
Ohio	1,517	113,452,066	24,642,864	138,094,930	1	81,539,938	1	58,439,611	3	278,074,479	1	11,192,932	106,060	341,070	7
Oklahoma	287	12,899,763	1,618,202	14,517,965	33	9,884,318	29	2,324,147	35	26,726,430	32	3,321,611	177,865	81,655	32
Ontario	820	45,927,400	42,570,193	88,497,593	4	75,087,309	3	20,830,295	9	184,415,197	5	11,834,400	1,068,586	250,673	11
Oregon	239	13,903,164	5,187,272	19,090,436	29	6,461,213	34	6,553,640	23	32,105,289	30	3,243,272	248,629	104,771	29
Pennsylvania	1,243	66,216,832	29,749,590	95,966,422	3	59,769,030	5	16,003,004	10	171,738,456	6	12,011,278	116,075	364,039	6
Prince Edward Island	3	207,650	3	207,653	61	0	--	71,041	54	278,694	61	137,000	5,659	1,936	61
Puerto Rico	145	7,059,578	405,319	7,464,897	40	5,887,873	36	14,011,305	13	27,364,075	31	3,860,000	8,875	--	--
Quebec	372	15,210,340	5,080,767	20,291,107	27	22,436,884	18	4,592,373	29	47,320,364	24	7,323,000	1,540,689	130,262	25
Rhode Island	120	555,333	146,819	702,152	57	5,011,598	38	788,544	41	6,502,294	51	987,263	2,706	30,443	49
Saskatchewan	22	733,802	9,817	743,619	56	487,193	49	2,555	59	1,233,367	57	1,025,200	652,334	19,407	54
South Carolina	467	27,308,095	9,139,889	36,447,984	17	20,930,604	19	23,555,093	6	80,933,681	12	3,788,119	77,981	100,350	30
South Dakota	63	1,423,492	51,038	1,474,530	55	464,235	51	645,649	42	2,584,414	55	737,755	196,555	21,224	51
Tennessee	606	46,699,798	3,514,493	50,214,291	13	29,851,922	10	7,164,940	20	87,231,153	11	5,371,693	106,752	159,575	20
Texas	1,196	98,354,336	9,895,437	108,249,773	2	61,912,462	4	80,136,350	2	250,298,585	2	19,385,699	678,305	645,596	3
Utah	141	53,198,915	3,688,635	56,887,550	10	1,144,334	46	339,831	47	58,371,715	21	2,065,001	212,799	59,624	39
Vermont	29	122,565	57,446	180,011	62	227,946	53	159,388	52	567,345	59	588,632	23,953	16,257	57
Virgin Islands	3	415,235	22,307	437,542	59	65,979	56	154,972	53	658,493	58	118,305	347	--	--
Virginia	424	25,650,828	3,157,849	28,808,677	19	9,948,056	28	10,085,298	16	48,842,031	23	6,737,489	102,551	230,825	14
Washington	265	10,526,153	3,314,204	13,840,357	34	2,782,196	42	2,547,724	33	19,170,277	40	5,614,151	172,431	192,864	15
West Virginia	157	39,356,432	3,207,322	42,563,754	15	2,875,806	41	6,152,364	24	51,591,924	22	1,815,231	62,381	39,938	44
Wisconsin	811	18,435,062	6,761,705	25,196,767	22	25,447,131	14	15,002,892	11	65,646,790	18	5,201,226	140,662	157,761	21
Wyoming	30	6,223,669	116,116	6,339,785	42	186,868	55	4,806	58	6,531,459	50	480,043	251,483	17,530	55
Total	**21,974**	**1,353,877,039**	**283,026,205**	**1,636,903,244**		**995,324,253**		**622,026,834**		**3,254,254,331**					

Note: Canada and US data only. Mexico data not available for 1998. 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.
* Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

Map 5–1. Total Releases and Transfers in North America, 1998: States and Provinces



- NPRI facilities in Ontario reported the fifth-largest amounts of releases and transfers (184.4 million kg). Ontario facilities reported the third-largest transfers to recycling.
- These four states and one province each reported more than 180 million kg. Together, these five jurisdictions reported more than one-third (35 percent) of total reported amounts of releases and transfers in North America in 1998.
- Five jurisdictions reported less than 500,000 kg in 1998: Guam, District of Columbia, Alaska, Prince Edward Island and Newfoundland.

5.2.2 Total Reported Amounts of Releases and Transfers by Industry Sector, 1998

Facilities in two manufacturing industries and two of the new TRI industries reported the largest amounts of total releases and transfers to recycling in 1998.

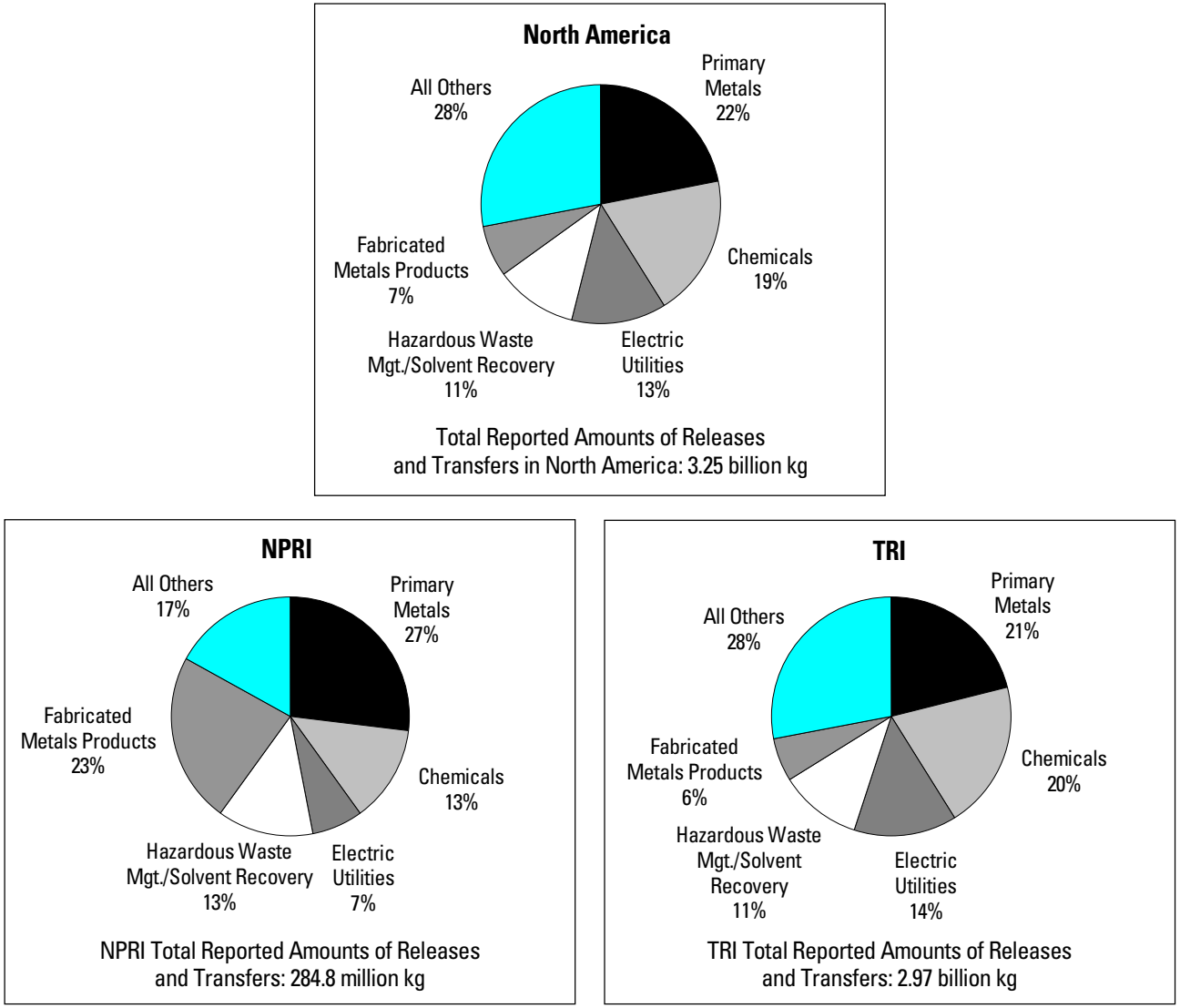
- The primary metals industry (US SIC code 33) reported the largest amounts of total releases and transfers (708.8 million kg), primarily as total releases and as transfers to recycling. This amount represents 22 percent of all releases and transfers for 1998. TRI facilities reported 89 percent of this amount.
- The chemicals manufacturing industry (US SIC code 28) reported the second-largest amount (624.0 million kg), primarily as other off-site transfers for further management and on-site releases. TRI facilities reported 94 percent of this amount.
- The electric utility industry, a new TRI industry, reported the third-largest amount, with 439.3 million kg. This industry reported the largest amount of on-site releases and total releases. TRI facilities reported 95 percent of releases and transfers by the electric utilities industry.
- Hazardous waste management and solvent recovery facilities, another new TRI industry, reported the fourth-largest amount, with 365.2 million kg, primarily as other off-site transfers for further management and total releases. TRI facilities reported 90 percent of this amount.

Table 5–3. Total Reported Amounts of Releases and Transfers in North America by Industry, 1998

			Releases On- and Off-site			Off-site Transfers for Further Management				
Rank	US SIC Code	Industry	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Releases On-and Off-site (kg)	Total Transfers to Recycling (kg)	Total Other Transfers for Further Management** (kg)	Total Reported Amounts of Releases and Transfers (kg)	NPRI as % of North American Total	TRI as % of North American Total
1	33	Primary Metals	197,688,170	155,426,245	353,114,415	346,772,429	8,918,771	708,805,615	11	89
2	28	Chemicals	253,851,126	20,292,269	274,143,395	72,550,701	277,303,226	623,997,322	6	94
3	491/493	Electric Utilities	423,637,321	12,470,183	436,107,504	3,168,050	15,998	439,291,552	5	95
4	495/738	Hazardous Waste Mgt./Solvent Recovery	100,833,116	45,214,165	146,047,281	9,175,922	210,024,899	365,248,102	10	90
5	34	Fabricated Metals Products	21,211,711	12,194,545	33,406,256	181,740,352	8,585,067	223,731,675	16	84
6	36	Electronic/Electrical Equipment	5,877,692	6,011,116	11,888,808	174,644,203	8,483,272	195,016,283	6	94
7	26	Paper Products	109,846,444	2,270,447	112,116,891	1,387,225	24,338,168	137,842,284	13	87
8	--	Multiple Codes 20-39*	38,293,009	7,593,583	45,886,592	68,931,799	20,284,501	135,102,892	0	100
9	37	Transportation Equipment	42,109,851	5,645,358	47,755,209	58,181,062	10,080,762	116,017,033	13	87
10	30	Rubber and Plastics Products	45,855,930	4,889,383	50,745,313	9,360,294	6,297,725	66,403,332	13	87
11	29	Petroleum and Coal Products	29,689,717	2,384,948	32,074,665	9,637,686	7,200,026	48,912,377	15	85
12	35	Industrial Machinery	5,103,313	2,502,895	7,606,208	30,586,982	1,890,633	40,083,823	3	97
13	20	Food Products	14,429,561	564,611	14,994,172	1,434,276	11,708,248	28,136,696	8	92
14	32	Stone/Clay/Glass Products	12,543,894	2,828,505	15,372,399	2,111,973	3,345,850	20,830,222	6	94
15	24	Lumber and Wood Products	16,037,021	153,528	16,190,549	493,561	1,127,498	17,811,608	14	86
16	27	Printing and Publishing	11,068,383	75,123	11,143,506	4,822,301	1,705,905	17,671,712	22	78
17	39	Misc. Manufacturing Industries	4,577,694	513,955	5,091,649	9,159,366	2,252,402	16,503,417	22	78
18	25	Furniture and Fixtures	8,310,043	80,998	8,391,041	4,235,192	2,319,235	14,945,468	21	79
19	5169	Chemical Wholesalers	479,676	99,002	578,678	1,201,365	12,203,016	13,983,059	1	99
20	38	Measurement/Photographic Instruments	3,874,206	487,430	4,361,636	4,833,215	2,573,776	11,768,627	0	100
21	22	Textile Mill Products	4,856,558	334,649	5,191,207	724,527	1,304,985	7,220,719	7	93
22	12	Coal Mining	2,432,609	0	2,432,609	19,834	0	2,452,443	0	100
23	31	Leather Products	506,675	972,960	1,479,635	147,672	31,814	1,659,121	2	98
24	21	Tobacco Products	607,780	1,780	609,560	0	822	610,382	0	100
25	23	Apparel and Other Textile Products	155,539	18,527	174,066	4,266	30,235	208,567	0	100
		Total	**1,353,877,039**	**283,026,205**	**1,636,903,244**	**995,324,253**	**622,026,834**	**3,254,254,331**	**9**	**91**

Note: Canada and US data only. Mexico data not available for 1998.
* Multiple SIC codes reported only in TRI.
** Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

Figure 5–3. Contribution of Top Industry Sectors to Total Reported Amounts of Releases and Transfers, NPRI and TRI, 1998



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

- Facilities in the primary metals industry (US SIC code 33) reported the largest amounts of total releases and transfers in both NPRI and TRI. These facilities reported 27 percent of NPRI and 21 percent of TRI total reported amounts of releases and transfers in 1998.
- Facilities in the chemicals manufacturing industry (US SIC code 28) reported the second-largest amount of total releases and transfers in TRI and the third-largest in NPRI.
- The fabricated metals industry (US SIC code 34) reported the second-largest amounts in NPRI.
- Electric utilities were the industry sector with the third-largest total releases and transfers in TRI.
- Hazardous waste management/solvent recovery facilities ranked fourth among industry sectors in both countries.

5.2.3 Facilities with the Largest Total Reported Amounts of Releases and Transfers, 1998

The 50 facilities in North America reporting the largest total releases and transfers reported 597.4 million kg, 18 percent of all releases and transfers in the matched data set for 1998.

- The 50 facilities with the largest total releases and transfers in 1998 reported 20 percent of total releases, 34 percent of other off-site transfers for further management and just 6 percent of off-site transfers to recycling.
- Six facilities reported more than 20 million kg each of total releases and transfers. They were all TRI facilities.
- Three of the top six were hazardous waste management/solvent recovery facilities located in the Great Lakes Region (Michigan, Indiana and Ohio). Two reported mainly off-site transfers to energy recovery, while the third reported on-site land releases.
- Three of the top six were primary metals facilities, located in the western US (Utah, Arizona and Montana). Two reported mainly on-site land releases and one reported mainly on-site air releases.

Table 5–4. The 50 North American Facilities with the Largest Total Reported Amounts of Releases and Transfers, 1998

						On- and Off-site Releases		
Rank	Facility	City, Province/State	SIC Codes Canada	SIC Codes US	Number of Forms	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)
1	Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit, MI		495/738	34	14,433	463,248	477,681
2	Pollution Control Inds. Inc.	East Chicago, IN		495/738	52	10,752	733,840	744,592
3	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	6	26,163,746	0	26,163,746
4	Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon, OH		495/738	11	22,882,149	36,459	22,918,608
5	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ		33	11	20,858,677	139	20,858,816
6	ASARCO Inc.	East Helena, MT		33	10	19,133,832	2,184,136	21,317,968
7	Armco Inc. Butler Ops. (Rte 8S)	Butler, PA		33	14	14,116,352	222,011	14,338,363
8	Southeastern Chemical & Solvent Co. Inc., TBN Holdings	Sumter, SC		495/738	41	1,997	4,367,591	4,369,588
9	Kennecott Utah Copper Smelter & Refy.	Magna, UT		33	16	15,187,654	258,691	15,446,345
10	Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View, ID		495/738	13	14,100,210	17	14,100,227
11	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	77	495/738	17	0	6,948,232	6,948,232
12	Pharmacia & Upjohn	Kalamazoo, MI		28	24	599,640	20,886	620,526
13	Systech Environmental Corp., Lafarge Corp.	Demopolis, AL		495/738	15	600	694	1,294
14	Celanese Ltd.- Clear Lake Plant, Hoechst	Pasadena, TX		28	18	374,795	23,556	398,351
15	CWM Resource Recovery Inc., Waste Management Inc.	West Carrollton, OH		495/738	8	3,724	24,945	28,669
16	Exide Corp.	Manchester, IA		36	4	1,452	680	2,132
17	North East Chemical Corp., TBN Holdings Inc.	Cleveland, OH		495/738	28	6,135	167,574	173,709
18	DuPont Victoria Plant	Victoria, TX		28	29	9,713,383	253	9,713,636
19	Air Prods. Inc., Air Prods. & Chemicals Inc.	Pasadena, TX		28	10	35,458	28,494	63,952
20	Phelps Dodge Hidalgo Inc.	Playas, NM		33	16	9,939,594	0	9,939,594
21	Solutia Inc.	Gonzalez, FL		28	18	9,868,138	1,207	9,869,345
22	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	10	9,779,338	3,086	9,782,424
23	Michigan Recovery Sys. Inc., The Environmental Quality Co.	Romulus, MI		495/738	22	25,719	256,820	282,539
24	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA		33	13	428,062	9,038,217	9,466,279
25	Marisol Inc.	Middlesex, NJ		495/738	17	5,242	0	5,242
26	PCS Nitrogen Fertilizer L.P.	Geismar, LA		28	12	9,242,050	0	9,242,050
27	Hukill Chemical Corp.	Bedford, OH		5169	18	8,969	47,623	56,592
28	Delta Faucet Co., Masco Corp. of Indiana	Greensburg, IN		34	6	229	65,417	65,646
29	Nucor Steel	Crawfordsville, IN		33	8	15,750	8,843,001	8,858,751
30	Philip Enterprises Inc., Yard 3 Facility	Hamilton, ON	77	495/738	8	0	8,576,167	8,576,167
31	Bowen Steam Electric Generating Plant, Southern Co.	Cartersville, GA		491/493	12	8,507,288	8	8,507,296
32	J & L Specialty Steel Inc.	Louisville, OH		33	6	506,740	151,927	658,667
33	American Electric Power, John E. Amos Plant	Winfield, WV		491/493	12	7,782,473	371,553	8,154,026
34	USS Gary Works, USX Corp.	Gary, IN		33	33	5,678,425	367,812	6,046,237
35	Lenzing Fibers Corp.	Lowland, TN		28	5	7,996,518	0	7,996,518
36	Exide Corp.	Bristol, TN		36	3	157	15	172
37	Waste Management of Ohio Inc.	Vickery, OH		495/738	14	7,899,321	28,583	7,927,904
38	Warner-Lambert Co., Parke-Davis Div.	Holland, MI		28	11	1,000,291	0	1,000,291
39	Cytec Inds. Inc. Fortier Plant	Westwego, LA		28	23	7,661,813	15,471	7,677,284
40	Rouge Steel Co.	Dearborn, MI		33	8	23,060	7,287,891	7,310,951
41	BASF Corp.	Freeport, TX		28	27	7,099,244	13,578	7,112,822
42	Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora, NC		491/493	12	7,307,075	0	7,307,075
43	Co-Steel Lasco	Whitby, ON	29	33	6	1,190,468	5,873,182	7,063,650
44	Elementis Chromium L.P.	Corpus Christi, TX		28	2	6,896,393	372,338	7,268,731
45	Safety-Kleen Sys. Inc.	Dolton, IL		495/738	7	4,918	0	4,918
46	Republic Engrd Steels Inc.	Canton, OH		33	9	15,070	145,341	160,411
47	Dofasco Inc.	Hamilton, ON	29	33	18	403,813	6,302,440	6,706,253
48	Dayton Power & Light Co. J.M Stuart Station	Manchester, OH		491/493	13	6,674,054	5	6,674,059
49	Parker Hannifin, Brass Prods. Div.	Otsego, MI		34	2	0	343	343
50	Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville, UT		495/738	21	6,473,315	5,811	6,479,126
	Subtotal				**730**	**259,165,201**	**63,243,128**	**322,408,329**
	% of Total				**1**	**19**	**22**	**20**
	Total				**72,795**	**1,353,877,039**	**283,026,205**	**1,636,903,244**

Note: Canada and US data only. Mexico data not available for 1998. 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 Transfers to Recycling (kg)	Off-site Transfers for Further Management: Total Other Transfers for Further Management (kg)	Total Reported Amounts of Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers) (chemicals accounting for more than 70% of total reported amounts from the facility)
1	0	60,056,477	60,534,158	Xylene, Toluene, Naphthalene, Ethylbenzene, Benzene, n-Butyl alcohol, Methyl ethyl ketone, Methanol, Methyl isobutyl ketone (transfers to energy recovery), Dichloromethane, 1,2-Dichlorobenzene (transfers to treatment)
2	0	28,355,375	29,099,967	Naphthalene, Acetaldehyde, Toluene, Methyl ethyl ketone, Methanol, n-Butyl alcohol, Benzene, Xylene (transfers to energy recovery)
3	0	0	26,163,746	Chlorine (air)
4	0	0	22,918,608	Zinc and compounds (land)
5	1,955,416	0	22,814,232	Copper/Zinc and compounds (land)
6	0	0	21,317,968	Zinc and compounds (land)
7	2,349,886	17,051	16,705,300	Nitric acid and nitrate compounds (water)
8	0	11,392,337	15,761,925	Ethylene glycol (transfers to disposal), Methyl ethyl ketone, Toluene, Methanol (transfers to energy recovery)
9	2	2	15,446,349	Copper/Zinc/Arsenic and compounds (land)
10	2	0	14,100,229	Zinc and compounds (land)
11	219,579	6,503,147	13,670,958	Xylene, Toluene (transfers to energy recovery, disposal) , Zinc and compounds (transfers of metals to disposal)
12	0	11,506,498	12,127,024	Methanol (transfers to energy recovery), Dichloromethane (transfers to treatment)
13	12,245	11,097,366	11,110,905	Xylene, Toluene, Methyl ethyl ketone (transfers to energy recovery)
14	108	10,652,677	11,051,136	Ethylene glycol (transfers to sewage), Diethyl sulfate, Acrylic acid (transfers to energy recovery)
15	0	10,527,319	10,555,988	Methanol, Methyl isobutyl ketone, Xylene (transfers to energy recovery)
16	10,527,924	0	10,530,056	Lead and compounds (transfers to recycling)
17	0	10,168,566	10,342,275	Toluene, Xylene, Methyl ethyl ketone, Trichloroethylene, Acrylonitrile (transfers to energy recovery)
18	0	370,201	10,083,837	Nitric acid and nitrate compounds (UIJ)
19	100,227	9,796,021	9,960,200	Nitric acid and nitrate compounds (transfers to sewage)
20	0	0	9,939,594	Zinc/Copper and compounds (land)
21	63,492	0	9,932,837	Nitric acid and nitrate compounds (UIJ)
22	0	0	9,782,424	Zinc and compounds (land)
23	0	9,369,640	9,652,179	Toluene, Xylene (transfers to energy recovery)
24	0	0	9,466,279	Zinc and compounds (transfers of metals to disposal)
25	0	9,349,643	9,354,885	Toluene, Methanol, Xylene, Methyl ethyl ketone (transfers to energy recovery)
26	23,129	0	9,265,179	Phosphoric acid (water)
27	0	9,068,456	9,125,048	Xylene, Methyl ethyl ketone, Toluene (transfers to energy recovery)
28	8,935,537	0	9,001,183	Copper/Zinc and compounds (transfers to recycling)
29	8,801	4,635	8,872,187	Zinc and compounds (transfers of metals to disposal)
30	0	243	8,576,410	Zinc and compounds (transfers of metals to disposal)
31	0	0	8,507,296	Hydrochloric acid (air)
32	7,755,102	0	8,413,769	Chromium/Nickel and compounds (transfers to recycling)
33	92,970	0	8,246,996	Hydrochloric acid (air)
34	2,007,291	0	8,053,528	Zinc and compounds (land, transfers to recycling)
35	0	0	7,996,518	Carbon disulfide (air)
36	7,949,658	0	7,949,830	Lead and compounds (transfers to recycling)
37	0	1,186	7,929,090	Nitric acid and nitrate compounds, Hydrogen fluoride (UIJ)
38	217,432	6,525,764	7,743,487	Methanol (transfers to energy recovery, UIJ), Toluene (transfers to energy recovery)
39	29,478	2,712	7,709,474	Acetonitrile, Acrylic acid, Acrylamide (UIJ)
40	193,199	0	7,504,150	Zinc and compounds (transfers of metals to disposal)
41	190,930	116,663	7,420,415	Nitric acid and nitrate compounds (water)
42	0	0	7,307,075	Hydrochloric acid (air)
43	231,531	0	7,295,181	Zinc and compounds (transfers of metals to disposal)
44	0	0	7,268,731	Chromium and compounds (land)
45	296,722	6,908,144	7,209,784	Toluene, Xylene, Methyl ethyl ketone (transfers to energy recovery)
46	6,979,804	0	7,140,215	Zinc and compounds (transfers to recycling)
47	0	0	6,706,253	Zinc and compounds (transfers of metals to disposal)
48	0	0	6,674,059	Hydrochloric acid (air)
49	6,535,547	0	6,535,890	Copper and compounds (transfers to recycling)
50	0	4,098	6,483,224	Zinc/Lead/Manganese/Copper and compounds (land)
	56,676,012	**211,794,221**	**597,358,031**	
	6	**34**	**18**	
	995,324,253	**622,026,834**	**3,254,254,331**	

UIJ=underground injection.

5.2.4 Total Reported Amounts of Releases and Transfers by Chemical, 1998

There are 165 chemicals in the matched data set. The 25 chemicals with the largest amounts of releases and transfers reported 2.91 billion kg, or 89 percent of all releases and transfers reported in 1998.

- Zinc (and its compounds) was the chemical with the largest total releases and transfers in 1998. There were 407.8 million kg of releases and transfers of zinc and its compounds, representing 13 percent of all releases and transfers in 1998.
- Zinc and its compounds ranked first for total releases and off-site releases. It ranked third for off-site transfers to recycling.
- Copper and its compounds had the second-largest total releases and transfers in 1998. It was the substance sent in the largest amounts for off-site transfers to recycling.
- Hydrochloric acid had the third-largest total releases and transfers in 1998 and ranked first in total releases and on-site releases. There are no releases other than air emissions for hydrochloric acid (and sulfuric acid) in the matched database because only acid aerosols of these chemicals are reportable to TRI.
- Methanol, the chemical with the fourth-largest total releases and transfers in 1998, ranked first for other transfers for further management (a category that includes transfers to energy recovery, treatment and sewage).

Table 5–5. The 25 Chemicals with the Largest Total Reported Amounts of Releases and Transfers in North America, 1998

			Releases On- and Off-site			Off-site Transfers for Further Management	
CAS Number	Chemical	Number of Forms	Total On-site Releases (kg)	Total Off-site Releases (kg)	Total Releases On- and Off-site (kg)	Total Transfers to Recycling (kg)	Total Other Transfers for Further Management** (kg)
--	Zinc (and its compounds)*	3,965	126,292,996	122,826,514	249,119,510	158,684,396	0
--	Copper (and its compounds)*	4,883	38,478,264	18,606,996	57,085,260	341,213,941	0
7647-01-0	Hydrochloric acid	1,435	278,692,433	0	278,692,433	0	0
67-56-1	Methanol	2,828	115,395,636	916,442	116,312,078	6,322,430	118,537,574
--	Lead (and its compounds)*▼	2,021	26,261,590	25,106,602	51,368,192	161,705,069	0
--	Nitric acid and nitrate compounds	3,182	119,644,549	3,232,185	122,876,734	2,630,949	52,705,318
108-88-3	Toluene	3,555	50,571,480	2,490,055	53,061,535	15,890,481	91,947,457
--	Manganese (and its compounds)*	3,616	58,123,866	38,299,276	96,423,142	59,284,943	0
1330-20-7	Xylene (mixed isomers)	3,371	37,116,608	3,955,104	41,071,712	20,447,007	82,477,734
--	Chromium (and its compounds)*▼	3,949	24,465,076	19,760,910	44,225,986	60,952,274	0
7664-93-9	Sulfuric acid	1,087	96,336,241	0	96,336,241	0	0
78-93-3	Methyl ethyl ketone	2,303	26,049,519	1,125,697	27,175,216	10,858,130	40,914,367
--	Nickel (and its compounds)*▼	3,649	11,282,141	10,240,282	21,522,523	51,159,686	0
107-21-1	Ethylene glycol	1,769	4,089,722	4,962,784	9,052,506	28,707,814	24,663,265
7664-39-3	Hydrogen fluoride	1,068	41,426,440	57,898	41,484,338	114,293	1,147,942
75-09-2	Dichloromethane▼	878	20,544,599	204,606	20,749,205	7,626,816	13,905,939
100-42-5	Styrene▼	1,714	25,637,011	927,959	26,564,970	657,908	7,603,452
7664-38-2	Phosphoric acid	3,121	23,922,851	2,944,717	26,867,568	3,007,460	3,059,160
7782-50-5	Chlorine	1,413	27,968,796	13,638	27,982,434	42,813	534,945
108-10-1	Methyl isobutyl ketone	1,089	7,411,283	312,756	7,724,039	5,736,857	14,483,077
71-36-3	n-Butyl alcohol	1,264	12,269,391	259,647	12,529,038	1,455,243	12,496,777
74-85-1	Ethylene	357	16,377,586	823	16,378,409	113	6,254,789
75-05-8	Acetonitrile	132	9,891,548	543,805	10,435,353	852,758	9,036,270
75-15-0	Carbon disulfide	104	19,727,948	2,958	19,730,906	900	227,979
100-41-4	Ethylbenzene	1,234	4,774,155	239,693	5,013,848	3,264,418	11,542,779
	Subtotal	**53,987**	**1,222,751,829**	**257,031,347**	**1,479,783,176**	**940,616,699**	**491,538,824**
	% of Total	**74**	**90**	**91**	**90**	**95**	**79**
	Total	**72,795**	**1,353,877,039**	**283,026,205**	**1,636,903,244**	**995,324,253**	**622,026,834**

Note: Canada and US data only. Mexico data not available for 1998. * Metal and its compounds. ▼ Known or suspected carcinogen.
** Includes transfers to energy recovery, treatment and sewage, except for metals, which are included in off-site releases.

Table 5–5. (*continued*)

Total Reported Amounts of Releases and Transfers (kg)	NPRI as % of North American Total	TRI as % of North American Total
407,803,906	12	88
398,299,201	6	94
278,692,433	4	96
241,172,082	9	91
213,073,261	9	91
178,213,001	5	95
160,899,473	11	89
155,708,085	16	84
143,996,453	14	86
105,178,260	12	88
96,336,241	9	91
78,947,713	12	88
72,682,209	8	92
62,423,585	5	95
42,746,573	8	92
42,281,960	7	93
34,826,330	4	96
32,934,188	7	93
28,560,192	2	98
27,943,973	7	93
26,481,058	7	93
22,633,311	11	89
20,324,381	1	99
19,959,785	0	100
19,821,045	7	93
2,911,938,699	**9**	**91**
89		
3,254,254,331	**9**	**91**

- There were six metals and their compounds among the 25 chemicals with the largest total releases and transfers in 1998, including three of the top five chemicals.
- There were five chemicals designated as known or suspected carcinogens, with one (lead and its compounds) in the top five.

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Key Findings

- In 1998, manufacturing facilities in North America released on- and off-site 1.05 billion kg of listed substances 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.
- These facilities reported a decrease in total releases on- and off-site of 4 percent from 1995 to 1998. After an increase from 1996 to 1997, releases decreased by 3 percent from 1997 to 1998.
- NPRI manufacturing facilities reported reductions in releases of 11 percent from 1995 to 1998, while TRI manufacturing facilities reported a 4 percent reduction in releases.
- Changes in the releases on- and off-site of known or suspected carcinogens were not as great. In NPRI, releases of carcinogens decreased by 8 percent from 1995 to 1998, while, in TRI, releases of carcinogens increased by 1 percent.
- As a group, metals and their compounds showed significant increases from 1995 to 1998 in North America, increasing by 29 percent. In NPRI, metals increased by 15 percent, and in TRI they increased by 33 percent.
- Transfers off-site for further management increased in North America by 11 percent from 1995 to 1998, although they did decrease in the most recent reporting period from 1997 to 1998 by 3 percent. This pattern held true in both NPRI and TRI. Transfers off-site for further management include transfers of substances that are not metals to treatment, including to sewage treatment plants.
- Total reported amounts of releases and transfers in North America were 1.26 billion kg in 1998, a decrease of 2 percent from 1.29 billion kg in 1995. They decreased by 3 percent from 1997 to 1998.
- Total releases and transfers in North America are projected to further decrease by 6 percent in 1999 and 0.5 percent in 2000. Both NPRI and TRI facilities projected an overall decrease from 1998 to 2000.

6.1 Introduction

This chapter examines changes in amounts of releases on-site and off-site and transfers for further management from 1995 to 1998. It analyzes data for industries and chemicals that reported in both the US and Canada (the matched data set) for the years 1995 through 1998. Comparable Mexican data are not available for the 1995–1998 reporting years.

The data in this chapter do not include the new TRI industries because they only began reporting in 1998. They also do not include transfers to recycling and energy recovery, since these data were required to be reported to NPRI beginning with the 1998 reporting year. Therefore, the 1998 data presented in this chapter are a subset of the 1998 data presented in Chapters 3, 4 and 5 and include only data from manufacturing sectors (US SIC codes 20–39) and on-site releases and transfers to disposal, treatment and sewage. The matched chemical list is the same as examined in previous chapters.

The data for 1998 are compared to both 1995 (the base year for the matched data set) and for 1997 (the previous year).

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

6.2 1995–1998 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, and 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.

In this chapter, data in NPRI and TRI on the TRI industries reporting for the first time for 1998 and on transfers to recycling or energy recovery are not included, since no comparable reports are available for previous years. Over 60 percent of the 1998 data, as presented in previous chapters, is not included in the 1995–1998 matched data set for 1998. Over one-third of the 1998 data is excluded because they are on transfers to recycling and energy recovery. About one-quarter is excluded because they are data from the new industry sectors.

Table 6–1. Releases On- and Off-site in North America, 1995–1998

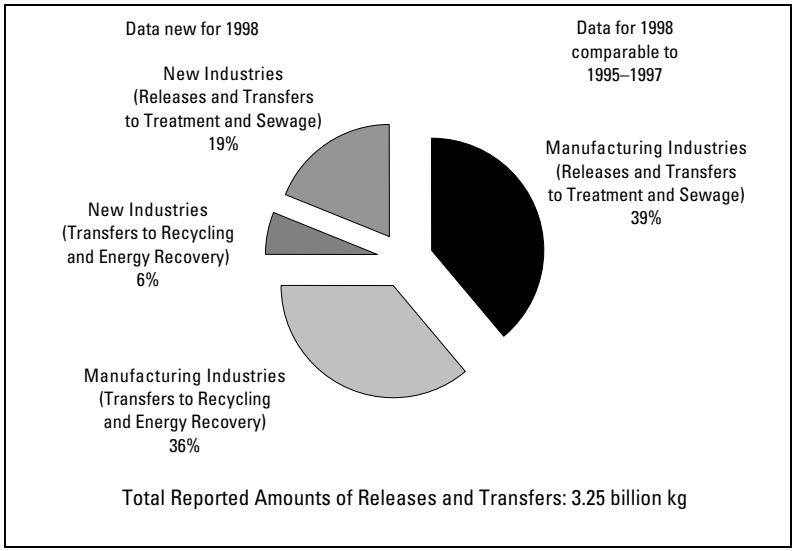
	North America					
	1995 Number	1996 Number	1997 Number	1998** Number	Change 1997-1998 (%)	Change 1995-1998 (%)
Total Facilities	21,438	21,159	20,944	20,681	-1	-4
Total Forms	65,498	64,091	64,035	63,611	-1	-3
	kg	kg	kg	kg		
On-site Releases	**934,947,862**	**884,488,077**	**852,007,622**	**826,494,317**	**-3**	**-12**
Air	608,584,820	568,400,687	513,287,807	483,383,531	-6	-21
Water	89,127,113	84,256,454	100,399,092	101,226,287	1	14
Underground Injection	88,987,387	77,512,361	81,375,591	76,604,161	-6	-14
Land	148,111,662	154,189,856	156,816,589	165,158,292	5	12
Off-site Disposal	**166,232,091**	**180,434,929**	**234,144,977**	**225,242,855**	**-4**	**35**
Transfers to Disposal (except metals)	22,865,545	17,067,402	19,969,273	23,135,638	16	1
Transfers of Metals***	143,366,546	163,367,527	214,175,704	202,107,217	-6	41
Total Releases On- and Off-site	**1,101,179,953**	**1,064,923,006**	**1,086,152,599**	**1,051,737,172**	**-3**	**-4**

Note: Canada and US data only. Mexico data not available for 1995-1998. 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.

** New TRI industry sectors not included for 1998.

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

Figure 6–1. Percentage of 1998 Data in the 1995–1998 Matched Data Set as Compared to the 1998 Matched Data Set (1998 Matched Chemicals and Industries)



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

Table 6–1. (*continued*)

NPRI*						TRI					
1995 Number	1996 Number	1997 Number	1998** Number	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 Number	1996 Number	1997 Number	1998** Number	Change 1997–1998 (%)	Change 1995–1998 (%)
1,302	1,355	1,445	1,488	3	14	20,136	19,804	19,499	19,193	-2	-5
4,164	4,324	4,632	4,797	4	15	61,334	59,767	59,403	58,814	-1	-4
kg	kg	kg	kg			kg	kg	kg	kg		
92,671,766	**83,079,927**	**79,569,219**	**76,902,892**	**-3**	**-17**	**842,276,096**	**801,408,150**	**772,438,403**	**749,591,425**	**-3**	**-11**
67,039,370	64,060,297	62,172,502	58,763,865	-5	-12	541,545,450	504,340,390	451,115,305	424,619,666	-6	-22
12,330,846	5,128,041	4,038,056	4,344,065	8	-65	76,796,267	79,128,413	96,361,036	96,882,222	1	26
3,556,927	4,812,379	4,197,660	3,701,129	-12	4	85,430,460	72,699,982	77,177,931	72,903,032	-6	-15
9,607,743	8,950,491	9,032,458	9,971,787	10	4	138,503,919	145,239,365	147,784,131	155,186,505	5	12
26,114,137	**27,478,671**	**34,309,061**	**29,264,461**	**-15**	**12**	**140,117,954**	**152,956,258**	**199,835,916**	**195,978,394**	**-2**	**40**
4,242,477	2,282,803	2,533,344	2,567,381	1	-39	18,623,068	14,784,599	17,435,929	20,568,257	18	10
21,871,660	25,195,868	31,775,717	26,697,080	-16	22	121,494,886	138,171,659	182,399,987	175,410,137	-4	44
118,785,903	**110,558,598**	**113,878,280**	**106,167,353**	**-7**	**-11**	**982,394,050**	**954,364,408**	**972,274,319**	**945,569,819**	**-3**	**-4**

* 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.

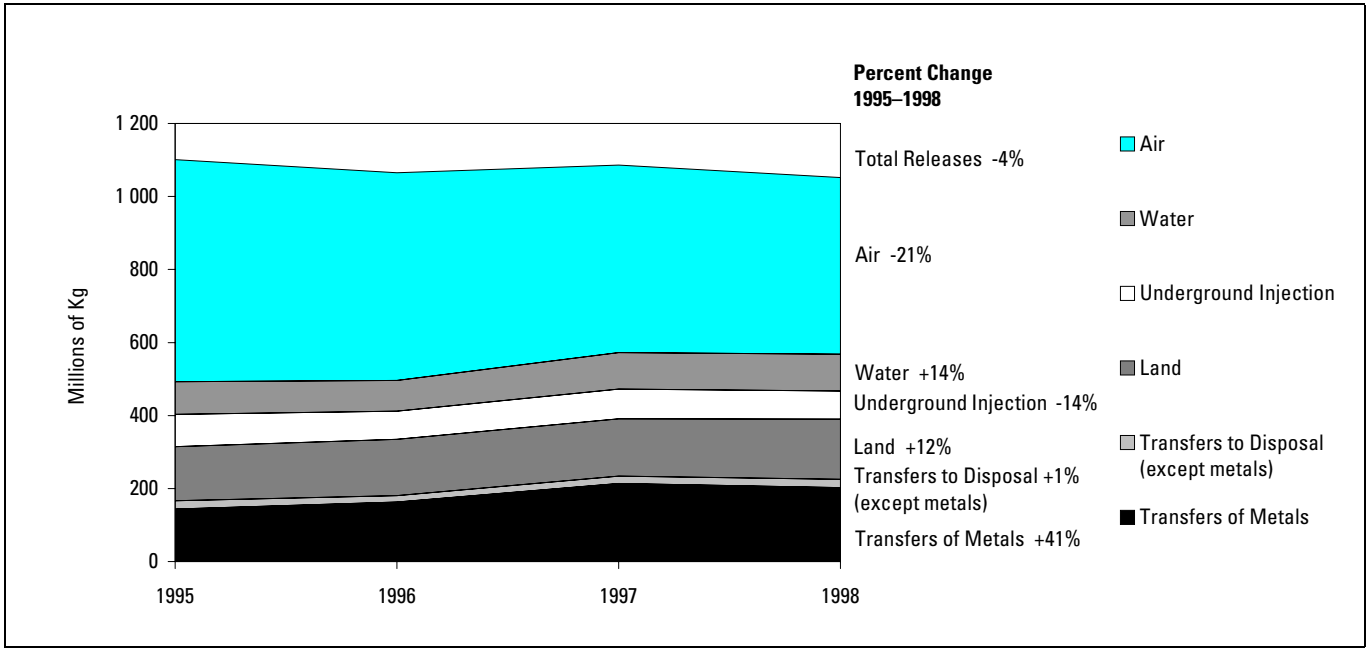
** New TRI industry sectors not included for 1998.

- Total releases on- and off-site in North America from manufacturing facilities were 1.05 billion kg in 1998, a decrease from 1.10 billion kg in 1995. In both Canada and the US, total releases increased from 1996 to 1997, but this trend was reversed with a 3 percent decrease in North America from 1997 to 1998.
- On-site releases of manufacturing facilities in North America decreased by 12 percent from 1995 to 1998, a decline that continued through 1996 and 1997. Both Canadian and US facilities had overall reductions, with Canadian facilities reporting a decrease of 17 percent and US facilities reporting a decrease of 11 percent.
- Off-site disposal, on the other hand, had substantial increases. In North America, the overall increase in off-site disposal was 35 percent from 1995–1998, with Canada reporting a 12 percent increase and the US reporting a 40 percent increase.
- However, after increases in off-site disposal from 1995 to 1996 and 1996 to 1997, both countries reported decreases in off-site disposal from 1997 to 1998. The decrease in off-site disposal from 1997 to 1998 was 4 percent for North America.

Decreases from 1995 to 1998 in total releases on- and off-site reflect substantial decreases in on-site air emissions in both countries. Only on-site underground injection also reported decreases for the same time period in North America. Increases were reported in the other types of releases, particularly on-site land disposal and off-site transfers of metals (primarily transfers to off-site land disposal).

- On-site air emissions dropped by 21 percent in North America from 1995 to 1998. In Canada the drop was 12 percent and in the US the decrease was 22 percent.
- On-site underground injection decreased by 14 percent in North America, due to decreases reported by US facilities. Canadian facilities reported increases in this category.
- Off-site transfers to disposal (except metals) decreased by 1 percent. Canadian facilities reported a 39 percent decrease in this type of transfer. On the other hand, US facilities reported a 10 percent increase.
- The largest increase came in off-site transfers of metals, a 41 percent increase in North America from 1995 to 1998. Both Canadian and US facilities reported increases, 22 percent in Canada and 44 percent in the US. However, both countries did report decreases in off-site transfers of metals during the most recent period covered in this report, from 1997 to 1998.

Figure 6–2. Releases On- and Off-site in North America, 1995–1998



Note: Canada and US data only. Mexico data not available for 1995-1998.

Figure 6–3. NPRI Releases On- and Off-site, 1995–1998

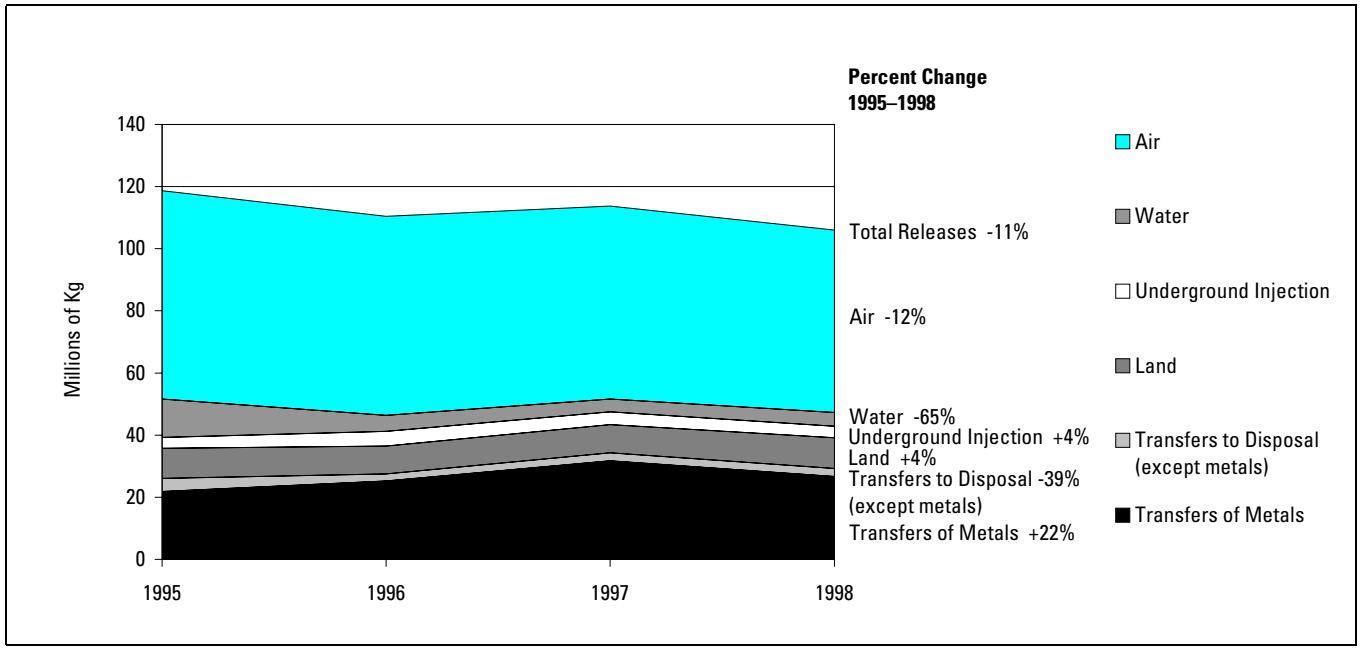
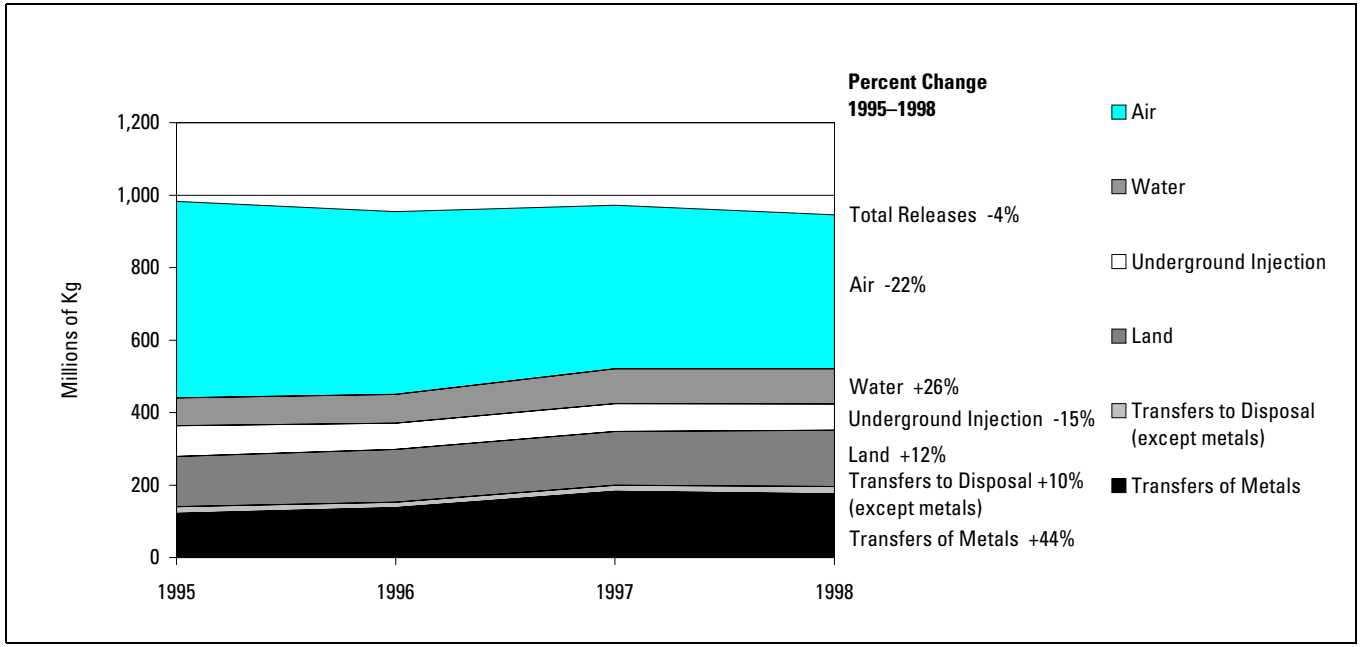


Figure 6–4. TRI Releases On- and Off-site, 1995–1998



6.2.1 1995–1998 Releases On- and Off-site by State and Province

A handful of states and provinces, including Texas, Pennsylvania, Louisiana, Ontario and Ohio reported the highest total amounts of on- and off-site releases from 1995 to 1998. However, 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.

- Texas facilities reported the largest total releases on- and off-site each year from 1995 to 1998. Texas facilities reported the largest on-site releases in both 1995 and 1998. Texas reported a 19 percent reduction in on-site releases, but a 16 percent increase in off-site releases from 1995 to 1998.
- Pennsylvania facilities reported the second-largest total releases in 1998, increasing in rank from fifth in 1995. This is due to Pennsylvania's first rank for off-site releases in both 1995 and 1998. Facilities in Pennsylvania reported increases of 27 percent from 1995 to 1998 in on-site releases.
- Louisiana facilities ranked third for total releases in both 1995 and 1998 because of their second rank for on-site releases in both of those years. Facilities in Louisiana reported decreases of 4 percent in on-site releases and 21 percent in off-site releases from 1995 to 1998.

Table 6–2. Change in Total Releases On- and Off-site in North America, 1995–1998

	Total On-site Releases					Total Off-site Releases*				
	1995		1998		Change 1995–1998	1995		1998		Change 1995–1998
State/Province	kg	Rank	kg	Rank	(%)	kg	Rank	kg	Rank	(%)
Alabama	41,321,564	5	27,889,467	9	-33	5,604,599	9	7,922,582	8	41
Alaska	1,005,984	56	186,388	60	-81	2,735	60	5,028	60	84
Alberta	15,000,884	23	10,833,102	25	-28	536,048	38	480,297	42	-10
Arizona	16,971,259	22	23,677,952	13	40	2,280,415	16	486,281	40	-79
Arkansas	10,896,768	28	9,819,835	27	-10	1,192,687	29	8,887,272	7	645
British Columbia	5,438,945	37	5,584,207	37	3	2,626,519	15	621,887	38	-76
California	9,199,503	32	8,992,989	29	-2	4,374,192	11	4,143,093	15	-5
Colorado	1,447,666	52	1,229,865	50	-15	133,344	44	640,816	37	381
Connecticut	3,671,019	43	1,976,092	46	-46	876,660	34	947,949	34	8
Delaware	1,862,513	47	1,882,608	47	1	73,141	49	42,924	53	-41
District of Columbia	0	--	0	--	--	116	62	2	63	-98
Florida	28,549,942	11	27,148,600	11	-5	1,434,854	26	1,299,186	30	-9
Georgia	19,744,480	18	18,923,175	18	-4	1,740,890	20	5,019,571	12	188
Hawaii	146,635	61	104,687	62	-29	73,933	48	8,189	58	-89
Idaho	5,669,424	36	8,458,222	31	49	38,115	51	118,051	48	210
Illinois	35,142,271	7	28,449,301	8	-19	8,051,625	6	13,730,953	6	71
Indiana	29,756,968	10	25,083,805	12	-16	13,953,160	4	22,662,744	2	62
Iowa	10,479,545	29	8,579,075	30	-18	1,011,674	31	3,706,425	16	266
Kansas	6,578,119	34	6,685,221	34	2	2,711,406	13	2,920,298	21	8
Kentucky	12,216,454	26	10,985,005	24	-10	2,691,578	14	2,748,972	22	2
Louisiana	62,224,681	2	60,024,834	2	-4	1,113,961	30	878,159	35	-21
Maine	3,732,163	42	3,113,004	42	-17	791,242	35	483,959	41	-39
Manitoba	1,530,130	50	2,812,964	43	84	83,676	47	156,914	45	88
Maryland	4,704,292	40	4,208,172	39	-11	916,242	33	264,387	44	-71
Massachusetts	3,018,629	46	1,819,201	48	-40	758,501	37	1,090,766	33	44
Michigan	26,951,643	13	17,843,690	19	-34	14,056,448	3	16,387,263	5	17
Minnesota	7,248,503	33	5,326,428	38	-27	778,053	36	1,230,639	32	58
Mississippi	21,733,402	15	22,320,689	14	3	1,312,232	27	568,563	39	-57
Missouri	21,950,439	14	20,649,721	16	-6	1,562,251	24	1,982,629	28	27
Montana	19,379,820	19	20,765,741	15	7	11,685	56	2,191,726	26	18,657
Nebraska	3,289,106	45	2,740,825	44	-17	1,726,998	21	3,001,507	20	74
Nevada	1,494,162	51	1,676,721	49	12	32,840	52	8,018	59	-76
New Brunswick	4,792,326	39	3,143,229	41	-34	147,441	43	756,068	36	413
New Hampshire	1,048,074	54	986,289	51	-6	106,543	45	137,787	47	29
New Jersey	5,345,618	38	6,115,643	36	14	1,682,177	22	1,787,561	29	6
New Mexico	18,650,847	20	10,725,716	26	-42	29,667	53	21,581	55	-27
New York	14,538,588	24	11,060,099	23	-24	2,278,085	17	2,165,758	27	-5
Newfoundland	284,203	59	249,445	58	-12	28	63	220	61	686
North Carolina	34,784,421	8	27,202,423	10	-22	1,280,685	28	2,231,687	25	74
North Dakota	652,717	57	379,250	57	-42	10,863	57	67,195	50	519
Nova Scotia	1,583,093	49	926,995	52	-41	101,656	46	99,832	49	-2
Ohio	42,664,965	4	35,571,188	6	-17	13,945,608	5	19,434,300	4	39
Oklahoma	6,458,932	35	6,603,748	35	2	1,668,025	23	1,245,780	31	-25
Ontario	45,919,429	3	37,486,944	4	-18	18,174,482	2	22,315,988	3	23
Oregon	9,318,711	31	8,355,448	32	-10	2,209,153	18	5,179,410	11	134
Pennsylvania	28,424,147	12	35,982,983	5	27	26,207,663	1	26,141,921	1	-0.3
Prince Edward Island	13,020	62	207,650	59	1,495	400	61	3	62	-99
Puerto Rico	3,542,686	44	2,710,053	45	-24	207,335	42	282,435	43	36
Quebec	17,096,072	21	15,019,704	21	-12	4,438,395	10	4,823,435	13	9
Rhode Island	1,121,027	53	555,141	55	-50	246,976	41	146,361	46	-41
Saskatchewan	1,013,664	55	638,652	54	-37	5,492	58	9,817	57	79
South Carolina	20,727,402	17	19,184,209	17	-7	1,828,294	19	4,740,338	14	159
South Dakota	1,721,125	48	892,999	53	-48	41,810	50	43,828	52	5
Tennessee	40,177,395	6	32,439,044	7	-19	3,126,512	12	3,381,244	18	8
Texas	106,260,129	1	86,381,140	1	-19	6,589,748	7	7,627,138	9	16
Utah	34,622,933	9	43,905,850	3	27	408,068	39	3,490,697	17	755
Vermont	270,745	60	122,565	61	-55	18,044	55	57,446	51	218
Virgin Islands	549,643	58	403,048	56	-27	18,587	54	22,307	54	20
Virginia	21,716,322	16	16,991,300	20	-22	1,009,901	32	3,139,204	19	211
Washington	10,463,752	30	9,068,020	28	-13	292,755	40	2,533,473	24	765
West Virginia	11,284,501	27	7,681,361	33	-32	1,544,374	25	2,706,793	23	75
Wisconsin	13,454,829	25	12,013,318	22	-11	6,058,036	8	6,005,901	10	-1
Wyoming	4,089,633	41	3,699,277	40	-10	3,468	59	10,297	56	197
Total	**934,947,862**		**826,494,317**		**-12**	**166,232,091**		**225,242,855**		**35**

Note: Canada and US data only. Mexico data not available for 1995-1998. 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.

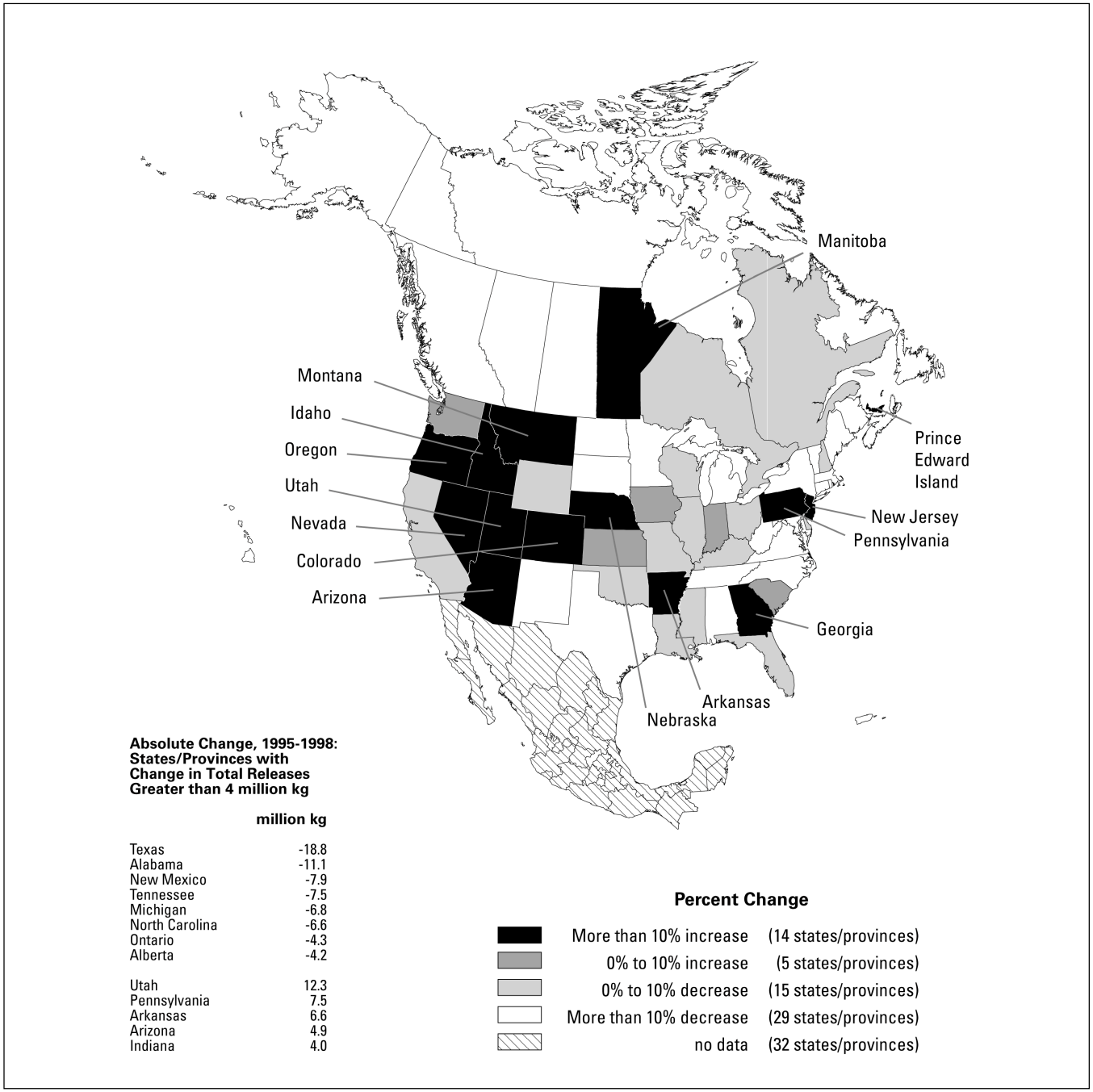
* Transfers off-site to disposal and transfers of metals from facilities located in the state/province.

Table 6–2. (*continued*)

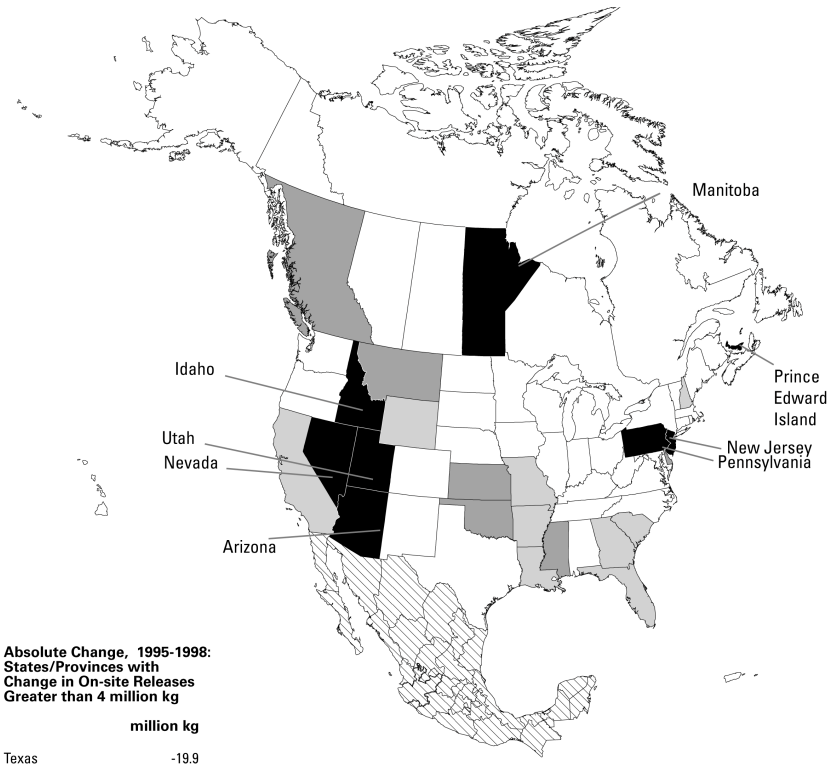
State/Province	Total Releases 1995 kg	1995 Rank	1998 kg	1998 Rank	Change 1995–1998 (%)
Alabama	46,926,163	6	35,812,049	10	-24
Alaska	1,008,719	56	191,416	60	-81
Alberta	15,536,932	25	11,313,399	30	-27
Arizona	19,251,674	22	24,164,233	14	26
Arkansas	12,089,455	29	18,707,107	22	55
British Columbia	8,065,464	35	6,206,094	38	-23
California	13,573,695	27	13,136,082	27	-3
Colorado	1,581,010	51	1,870,681	49	18
Connecticut	4,547,679	42	2,924,041	46	-36
Delaware	1,935,654	47	1,925,532	48	-1
District of Columbia	116	63	2	63	-98
Florida	29,984,796	13	28,447,786	13	-5
Georgia	21,485,370	19	23,942,746	15	11
Hawaii	220,568	61	112,876	62	-49
Idaho	5,707,539	38	8,576,273	34	50
Illinois	43,193,896	9	42,180,254	8	-2
Indiana	43,710,128	7	47,746,549	6	9
Iowa	11,491,219	31	12,285,500	28	7
Kansas	9,289,525	33	9,605,519	33	3
Kentucky	14,908,032	26	13,733,977	24	-8
Louisiana	63,338,642	3	60,902,993	3	-4
Maine	4,523,405	43	3,596,963	43	-20
Manitoba	1,613,806	50	2,969,878	45	84
Maryland	5,620,534	39	4,472,559	40	-20
Massachusetts	3,777,130	45	2,909,967	47	-23
Michigan	41,008,091	10	34,230,953	11	-17
Minnesota	8,026,556	36	6,557,067	37	-18
Mississippi	23,045,634	15	22,889,252	18	-1
Missouri	23,512,690	14	22,632,350	19	-4
Montana	19,391,505	21	22,957,467	17	18
Nebraska	5,016,104	40	5,742,332	39	14
Nevada	1,527,002	52	1,684,739	50	10
New Brunswick	4,939,767	41	3,899,297	41	-21
New Hampshire	1,154,617	54	1,124,076	51	-3
New Jersey	7,027,795	37	7,903,204	35	12
New Mexico	18,680,514	23	10,747,297	31	-42
New York	16,816,673	24	13,225,857	26	-21
Newfoundland	284,231	60	249,665	58	-12
North Carolina	36,065,106	11	29,434,110	12	-18
North Dakota	663,580	57	446,445	56	-33
Nova Scotia	1,684,749	49	1,026,827	52	-39
Ohio	56,610,573	4	55,005,488	5	-3
Oklahoma	8,126,957	34	7,849,528	36	-3
Ontario	64,093,911	2	59,802,932	4	-7
Oregon	11,527,864	30	13,534,858	25	17
Pennsylvania	54,631,810	5	62,124,904	2	14
Prince Edward Island	13,420	62	207,653	59	1,447
Puerto Rico	3,750,021	46	2,992,488	44	-20
Quebec	21,534,467	18	19,843,139	21	-8
Rhode Island	1,368,003	53	701,502	54	-49
Saskatchewan	1,019,156	55	648,469	55	-36
South Carolina	22,555,696	17	23,924,547	16	6
South Dakota	1,762,935	48	936,827	53	-47
Tennessee	43,303,907	8	35,820,288	9	-17
Texas	112,849,877	1	94,008,278	1	-17
Utah	35,031,001	12	47,396,547	7	35
Vermont	288,789	59	180,011	61	-38
Virgin Islands	568,230	58	425,355	57	-25
Virginia	22,726,223	16	20,130,504	20	-11
Washington	10,756,507	32	11,601,493	29	8
West Virginia	12,828,875	28	10,388,154	32	-19
Wisconsin	19,512,865	20	18,019,219	23	-8
Wyoming	4,093,101	44	3,709,574	42	-9
Total	**1,101,179,953**		**1,051,737,172**		**-4**

- Ontario facilities ranked fourth for total releases in 1998, down from second in 1995. This is due to decreases of 18 percent in on-site releases from 1995 to 1998. Ontario facilities reported increases of 23 percent in off-site releases from 1995 to 1998.
- Ohio facilities ranked fifth for total releases in 1998, down from fourth in 1995. This is due to decreases in on-site releases of 17 percent from 1995 to 1998. Ohio facilities reported increases of 39 percent in off-site releases from 1995 to 1998.

Map 6–1. Percent Change in Total Releases On- and Off-site in North America, 1995–1998



Map 6–2. Percent Change in On-site Releases in North America, 1995–1998



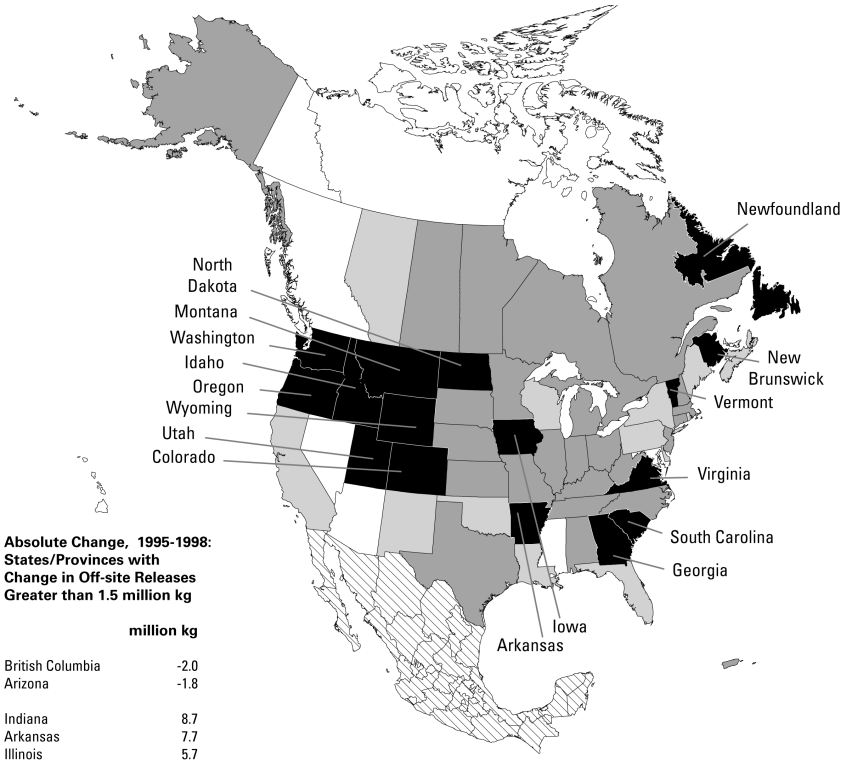
Absolute Change, 1995-1998: States/Provinces with Change in On-site Releases Greater than 4 million kg

	million kg
Texas	-19.9
Alabama	-13.4
Michigan	-9.1
Ontario	-8.4
New Mexico	-7.9
Tennessee	-7.7
North Carolina	-7.6
Ohio	-7.1
Illinois	-6.7
Virgina	-4.7
Indiana	-4.7
Alberta	-4.2
Utah	9.3
Pennsylvania	7.6
Arizona	6.7

Percent Change

More than 10% increase	(8 states/provinces)
0% to 10% increase	(6 states/provinces)
0% to 10% decrease	(9 states/provinces)
More than 10% decrease	(39 states/provinces)
no data	(32 states/provinces)

Map 6–3. Percent Change in Off-site Releases in North America, 1995–1998



Absolute Change, 1995-1998: States/Provinces with Change in Off-site Releases Greater than 1.5 million kg

	million kg
British Columbia	-2.0
Arizona	-1.8
Indiana	8.7
Arkansas	7.7
Illinois	5.7
Ohio	5.5
Ontario	4.1
Georgia	3.3
Utah	3.1
Oregon	3.0
South Carolina	2.9
Iowa	2.7
Michigan	2.3
Alabama	2.3
Washington	2.2
Montana	2.2
Virginia	2.1

Percent Change

More than 100% increase	(16 states/provinces)
0% to 100% increase	(26 states/provinces)
0% to 50% decrease	(13 states/provinces)
More than 50% decrease	(8 states/provinces)
no data	(32 states/provinces)

- Among the 10 provinces in Canada, facilities in Ontario reported the largest releases both on- and off-site from 1995 to 1998. Ontario facilities reported overall decreases in total releases of 7 percent from 1995 to 1998.
- Two provinces reported increases in total releases from 1995 to 1998, Manitoba and Prince Edward Island.
- Quebec, with the second-largest total releases, reported an 8 percent decrease from 1995 to 1998.
- Five of the 10 provinces reported decreases of over 20 percent in total releases from 1995 to 1998.
- Most of the decreases came from on-site releases. Off-site releases increased in six of the 10 provinces from 1995 to 1998.

Table 6–3. NPRI Total Releases On- and Off-site by Province, 1995, 1997–1998 (Ordered by 1998 Total Releases)

	Total On-site Releases					Total Off-site Releases*				
Province	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Ontario	45,919,429	39,274,041	37,486,944	-5	-18	18,174,482	25,464,683	22,315,988	-12	23
Quebec	17,096,072	14,579,602	15,019,704	3	-12	4,438,395	6,551,071	4,823,435	-26	9
Alberta	15,000,884	11,987,370	10,833,102	-10	-28	536,048	591,367	480,297	-19	-10
British Columbia	5,438,945	5,459,128	5,584,207	2	3	2,626,519	839,252	621,887	-26	-76
New Brunswick	4,792,326	2,357,036	3,143,229	33	-34	147,441	630,259	756,068	20	413
Manitoba	1,530,130	3,367,219	2,812,964	-16	84	83,676	49,644	156,914	216	88
Nova Scotia	1,583,093	1,063,517	926,995	-13	-41	101,656	171,819	99,832	-42	-2
Saskatchewan	1,013,664	946,849	638,652	-33	-37	5,492	10,966	9,817	-10	79
Newfoundland	284,203	314,687	249,445	-21	-12	28	0	220	--	686
Prince Edward Island	13,020	219,770	207,650	-6	1,495	400	0	3	--	-99
Total	**92,671,766**	**79,569,219**	**76,902,892**	**-3**	**-17**	**26,114,137**	**34,309,061**	**29,264,461**	**-15**	**12**

Note: The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
* Transfers off-site to disposal and transfers of metals from facilities located in the province.

Table 6–3. (*continued*)

	Total Releases				
Province	**1995 (kg)**	**1997 (kg)**	**1998 (kg)**	**Change 1997–1998 (%)**	**Change 1995–1998 (%)**
Ontario	64,093,911	64,738,724	59,802,932	-8	-7
Quebec	21,534,467	21,130,673	19,843,139	-6	-8
Alberta	15,536,932	12,578,737	11,313,399	-10	-27
British Columbia	8,065,464	6,298,380	6,206,094	-1	-23
New Brunswick	4,939,767	2,987,295	3,899,297	31	-21
Manitoba	1,613,806	3,416,863	2,969,878	-13	84
Nova Scotia	1,684,749	1,235,336	1,026,827	-17	-39
Saskatchewan	1,019,156	957,815	648,469	-32	-36
Newfoundland	284,231	314,687	249,665	-21	-12
Prince Edward Island	13,420	219,770	207,653	-6	1,447
Total	**118,785,903**	**113,878,280**	**106,167,353**	**-7**	**-11**

- Texas facilities reported the largest total releases from 1995 to 1998. This is due to large on-site releases. However, Texas reported decreases in on-site releases of 19 percent from 1995 to 1998.
- Pennsylvania facilities ranked fourth among the US states for total releases in 1995, but second in 1998, due to an increase of 27 percent in on-site releases.
- Louisiana facilities reported the third-largest total releases in 1998 and the second largest in 1995. Louisiana facilities report over 98 percent of their releases on-site, and such releases decreased by 4 percent from 1995 to 1998.
- Thirty-six of the US states and other jurisdictions reported decreases in total releases from 1995 to 1998, while 17 reported increases.

Table 6–4. TRI Total Releases On- and Off-site by State, 1995, 1997–1998 (Ordered by 1998 Total Releases)

	Total On-site Releases					Total Off-site Releases*				
State	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Texas	106,260,129	84,257,647	86,381,140	3	-19	6,589,748	9,210,849	7,627,138	-17	16
Pennsylvania	28,424,147	34,018,147	35,982,983	6	27	26,207,663	28,708,107	26,141,921	-9	0
Louisiana	62,224,681	65,748,650	60,024,834	-9	-4	1,113,961	671,026	878,159	31	-21
Ohio	42,664,965	36,863,754	35,571,188	-4	-17	13,945,608	19,657,386	19,434,300	-1	39
Indiana	29,756,968	27,695,874	25,083,805	-9	-16	13,953,160	19,963,431	22,662,744	14	62
Utah	34,622,933	41,917,773	43,905,850	5	27	408,068	4,419,044	3,490,697	-21	755
Illinois	35,142,271	30,563,308	28,449,301	-7	-19	8,051,625	14,209,415	13,730,953	-3	71
Tennessee	40,177,395	35,980,348	32,439,044	-10	-19	3,126,512	3,878,565	3,381,244	-13	8
Alabama	41,321,564	30,235,597	27,889,467	-8	-33	5,604,599	7,227,665	7,922,582	10	41
Michigan	26,951,643	20,586,493	17,843,690	-13	-34	14,056,448	14,407,458	16,387,263	14	17
North Carolina	34,784,421	29,261,716	27,202,423	-7	-22	1,280,685	3,129,660	2,231,687	-29	74
Florida	28,549,942	32,327,520	27,148,600	-16	-5	1,434,854	3,255,618	1,299,186	-60	-9
Arizona	16,971,259	13,508,792	23,677,952	75	40	2,280,415	745,913	486,281	-35	-79
Georgia	19,744,480	20,559,722	18,923,175	-8	-4	1,740,890	6,674,264	5,019,571	-25	188
South Carolina	20,727,402	18,560,218	19,184,209	3	-7	1,828,294	4,021,797	4,740,338	18	159
Montana	19,379,820	18,819,759	20,765,741	10	7	11,685	547,662	2,191,726	300	18,657
Mississippi	21,733,402	24,900,910	22,320,689	-10	3	1,312,232	630,215	568,563	-10	-57
Missouri	21,950,439	22,646,547	20,649,721	-9	-6	1,562,251	2,116,518	1,982,629	-6	27
Virginia	21,716,322	19,505,578	16,991,300	-13	-22	1,009,901	2,361,486	3,139,204	33	211
Arkansas	10,896,768	10,547,067	9,819,835	-7	-10	1,192,687	12,018,757	8,887,272	-26	645
Wisconsin	13,454,829	12,235,644	12,013,318	-2	-11	6,058,036	6,255,067	6,005,901	-4	-1
Kentucky	12,216,454	11,958,186	10,985,005	-8	-10	2,691,578	3,816,504	2,748,972	-28	2
Oregon	9,318,711	9,486,578	8,355,448	-12	-10	2,209,153	2,927,780	5,179,410	77	134
New York	14,538,588	12,059,393	11,060,099	-8	-24	2,278,085	3,320,744	2,165,758	-35	-5
California	9,199,503	9,151,164	8,992,989	-2	-2	4,374,192	3,571,081	4,143,093	16	-5
Iowa	10,479,545	7,763,144	8,579,075	11	-18	1,011,674	1,951,200	3,706,425	90	266
Washington	10,463,752	8,892,634	9,068,020	2	-13	292,755	2,805,121	2,533,473	-10	765
New Mexico	18,650,847	13,287,614	10,725,716	-19	-42	29,667	19,969	21,581	8	-27
West Virginia	11,284,501	7,993,921	7,681,361	-4	-32	1,544,374	1,604,727	2,706,793	69	75
Kansas	6,578,119	7,260,477	6,685,221	-8	2	2,711,406	1,733,821	2,920,298	68	8
Idaho	5,669,424	6,234,738	8,458,222	36	49	38,115	120,252	118,051	-2	210
New Jersey	5,345,618	5,931,806	6,115,643	3	14	1,682,177	1,939,169	1,787,561	-8	6
Oklahoma	6,458,932	6,114,846	6,603,748	8	2	1,668,025	1,649,561	1,245,780	-24	-25
Minnesota	7,248,503	5,373,365	5,326,428	-1	-27	778,053	1,108,495	1,230,639	11	58
Nebraska	3,289,106	2,238,298	2,740,825	22	-17	1,726,998	4,252,922	3,001,507	-29	74
Maryland	4,704,292	4,450,206	4,208,172	-5	-11	916,242	487,431	264,387	-46	-71
Wyoming	4,089,633	3,565,904	3,699,277	4	-10	3,468	3,523	10,297	192	197
Maine	3,732,163	2,980,004	3,113,004	4	-17	791,242	829,502	483,959	-42	-39
Puerto Rico	3,542,686	2,895,657	2,710,053	-6	-24	207,335	330,021	282,435	-14	36
Connecticut	3,671,019	2,564,019	1,976,092	-23	-46	876,660	1,586,399	947,949	-40	8
Massachusetts	3,018,629	2,125,479	1,819,201	-14	-40	758,501	750,489	1,090,766	45	44
Delaware	1,862,513	1,309,323	1,882,608	44	1	73,141	49,173	42,924	-13	-41
Colorado	1,447,666	1,320,175	1,229,865	-7	-15	133,344	304,751	640,816	110	381
Nevada	1,494,162	1,821,377	1,676,721	-8	12	32,840	9,970	8,018	-20	-76
New Hampshire	1,048,074	999,794	986,289	-1	-6	106,543	133,052	137,787	4	29
South Dakota	1,721,125	1,343,914	892,999	-34	-48	41,810	55,683	43,828	-21	5
Rhode Island	1,121,027	715,152	555,141	-22	-50	246,976	246,626	146,361	-41	-41
North Dakota	652,717	500,352	379,250	-24	-42	10,863	15,092	67,195	345	519
Virgin Islands	549,643	537,535	403,048	-25	-27	18,587	24,276	22,307	-8	20
Alaska	1,005,984	540,492	186,388	-66	-81	2,735	145	5,028	3,368	84
Vermont	270,745	157,928	122,565	-22	-55	18,044	76,100	57,446	-25	218
Hawaii	146,635	123,864	104,687	-15	-29	73,933	2,432	8,189	237	-89
District of Columbia	0	0	0	--	--	116	2	2	0	-98
Total	**842,276,096**	**772,438,403**	**749,591,425**	**-3**	**-11**	**140,117,954**	**199,835,916**	**195,978,394**	**-2**	**40**

Note: The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
* Transfers off-site to disposal and transfers of metals from facilities located in the state.

Table 6–4. (*continued*)

State	Total Releases 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Texas	112,849,877	93,468,496	94,008,278	1	-17
Pennsylvania	54,631,810	62,726,254	62,124,904	-1	14
Louisiana	63,338,642	66,419,676	60,902,993	-8	-4
Ohio	56,610,573	56,521,140	55,005,488	-3	-3
Indiana	43,710,128	47,659,305	47,746,549	0	9
Utah	35,031,001	46,336,817	47,396,547	2	35
Illinois	43,193,896	44,772,723	42,180,254	-6	-2
Tennessee	43,303,907	39,858,913	35,820,288	-10	-17
Alabama	46,926,163	37,463,262	35,812,049	-4	-24
Michigan	41,008,091	34,993,951	34,230,953	-2	-17
North Carolina	36,065,106	32,391,376	29,434,110	-9	-18
Florida	29,984,796	35,583,138	28,447,786	-20	-5
Arizona	19,251,674	14,254,705	24,164,233	70	26
Georgia	21,485,370	27,233,986	23,942,746	-12	11
South Carolina	22,555,696	22,582,015	23,924,547	6	6
Montana	19,391,505	19,367,421	22,957,467	19	18
Mississippi	23,045,634	25,531,125	22,889,252	-10	-1
Missouri	23,512,690	24,763,065	22,632,350	-9	-4
Virginia	22,726,223	21,867,064	20,130,504	-8	-11
Arkansas	12,089,455	22,565,824	18,707,107	-17	55
Wisconsin	19,512,865	18,490,711	18,019,219	-3	-8
Kentucky	14,908,032	15,774,690	13,733,977	-13	-8
Oregon	11,527,864	12,414,358	13,534,858	9	17
New York	16,816,673	15,380,137	13,225,857	-14	-21
California	13,573,695	12,722,245	13,136,082	3	-3
Iowa	11,491,219	9,714,344	12,285,500	26	7
Washington	10,756,507	11,697,755	11,601,493	-1	8
New Mexico	18,680,514	13,307,583	10,747,297	-19	-42
West Virginia	12,828,875	9,598,648	10,388,154	8	-19
Kansas	9,289,525	8,994,298	9,605,519	7	3
Idaho	5,707,539	6,354,990	8,576,273	35	50
New Jersey	7,027,795	7,870,975	7,903,204	0	12
Oklahoma	8,126,957	7,764,407	7,849,528	1	-3
Minnesota	8,026,556	6,481,860	6,557,067	1	-18
Nebraska	5,016,104	6,491,220	5,742,332	-12	14
Maryland	5,620,534	4,937,637	4,472,559	-9	-20
Wyoming	4,093,101	3,569,427	3,709,574	4	-9
Maine	4,523,405	3,809,506	3,596,963	-6	-20
Puerto Rico	3,750,021	3,225,678	2,992,488	-7	-20
Connecticut	4,547,679	4,150,418	2,924,041	-30	-36
Massachusetts	3,777,130	2,875,968	2,909,967	1	-23
Delaware	1,935,654	1,358,496	1,925,532	42	-1
Colorado	1,581,010	1,624,926	1,870,681	15	18
Nevada	1,527,002	1,831,347	1,684,739	-8	10
New Hampshire	1,154,617	1,132,846	1,124,076	-1	-3
South Dakota	1,762,935	1,399,597	936,827	-33	-47
Rhode Island	1,368,003	961,778	701,502	-27	-49
North Dakota	663,580	515,444	446,445	-13	-33
Virgin Islands	568,230	561,811	425,355	-24	-25
Alaska	1,008,719	540,637	191,416	-65	-81
Vermont	288,789	234,028	180,011	-23	-38
Hawaii	220,568	126,296	112,876	-11	-49
District of Columbia	116	2	2	0	-98
Total	**982,394,050**	**972,274,319**	**945,569,819**	**-3**	**-4**

6.2.2 1995–1998 Releases On- and Off-site by Industry Sector

Data comparing 1995 to 1998 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 Chapters 3 and 5.

Only the manufacturing sectors (US SIC codes 20–39) are included because they are the only sectors for which both TRI and NPRI data are available for the period 1995 to 1998. Therefore, the data for 1998 presented in this section and this chapter are a subset of the data presented in previous chapters.

- The primary metals industry in NPRI reported the largest total releases in 1995 and 1998. This industry sector reported an increase of 23 percent in off-site releases and a decrease of 2 percent in on-site releases from 1995 to 1998. This industry reported over 75 percent of all off-site releases reported to NPRI in 1997 and 1998.
- The NPRI chemical industry ranked second in 1998, reporting decreases of 30 percent in on-site releases and 50 percent in off-site releases from 1995 to 1998.
- While the paper products industry reported the second-largest total releases in 1995, this industry decreased on-site releases by 36 percent and ranked third for total releases in 1998.
- The other NPRI industry sectors, as a whole, reported an increase in total releases. In all, 10 industry sectors reported decreases from 1995 to 1998, and nine reported increases over the same period.

Table 6–5. Total NPRI Releases On- and Off-site by Industry, 1995, 1997–1998 (Ordered by 1998 Total Releases)

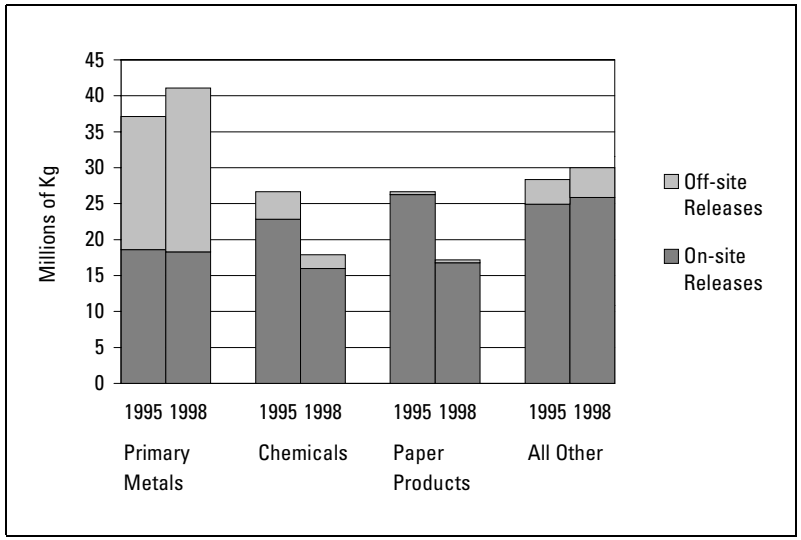
			Total On-site Releases					Total Off-site Releases*				
Rank	US SIC Code	Industry	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	33	Primary Metals	18,621,142	18,999,113	18,291,684	-4	-2	18,502,990	27,758,365	22,791,950	-18	23
2	28	Chemicals	22,852,744	18,334,710	15,969,031	-13	-30	3,792,582	1,904,157	1,912,084	0.4	-50
3	26	Paper Products	26,276,639	16,882,522	16,774,728	-1	-36	400,357	479,149	409,302	-15	2
4	30	Rubber and Plastics Products	6,325,235	6,028,342	6,144,799	2	-3	466,682	551,941	474,568	-14	2
5	37	Transportation Equipment	6,599,971	6,145,474	5,874,403	-4	-11	265,507	446,009	405,845	-9	53
6	29	Petroleum and Coal Products	4,903,716	4,573,244	3,929,771	-14	-20	363,422	544,175	802,256	47	121
7	34	Fabricated Metals Products	1,779,841	2,158,304	2,183,205	1	23	1,383,490	1,515,347	1,398,015	-8	1
8	24	Lumber and Wood Products	1,211,133	1,974,111	2,305,012	17	90	25,284	164,677	43,244	-74	71
9	27	Printing and Publishing	766,524	989,267	1,537,193	55	101	0	11,254	979	-91	--
10	25	Furniture and Fixtures	486,807	822,205	1,065,229	30	119	46	674	26,911	3,893	58,402
11	32	Stone/Clay/Glass Products	1,062,555	868,511	799,997	-8	-25	332,775	48,181	93,978	95	-72
12	20	Food Products	35,513	503,468	868,933	73	2,347	10,243	10,297	49,870	384	387
13	39	Misc. Manufacturing Industries	123,388	633,673	475,520	-25	285	105,660	177,830	173,065	-3	64
14	35	Industrial Machinery	464,116	269,113	172,690	-36	-63	90,716	418,309	383,667	-8	323
15	22	Textile Mill Products	918,196	281,192	431,481	53	-53	246	28,240	34,577	22	13,956
16	36	Electronic/Electrical Equipment	225,527	82,010	59,916	-27	-73	369,007	246,779	258,225	5	-30
17	31	Leather Products	17,858	23,680	19,300	-18	8	3,630	3,427	5,900	72	63
18	38	Measurement/Photographic Instruments	1	0	0	--	-100	1,500	250	25	-90	-98
19	23	Apparel and Other Textile Products	860	280	0	-100	-100	0	0	0	--	--
		Total	**92,671,766**	**79,569,219**	**76,902,892**	**-3**	**-17**	**26,114,137**	**34,309,061**	**29,264,461**	**-15**	**12**

* Transfers off-site to disposal and transfers of metals from facilities located in the province.

Table 6–5. (*continued*)

Rank	US SIC Code	Industry	Total Releases 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	33	Primary Metals	37,124,132	46,757,478	41,083,634	-12	11
2	28	Chemicals	26,645,326	20,238,867	17,881,115	-12	-33
3	26	Paper Products	26,676,996	17,361,671	17,184,030	-1	-36
4	30	Rubber and Plastics Products	6,791,917	6,580,283	6,619,367	1	-3
5	37	Transportation Equipment	6,865,478	6,591,483	6,280,248	-5	-9
6	29	Petroleum and Coal Products	5,267,138	5,117,419	4,732,027	-8	-10
7	34	Fabricated Metals Products	3,163,331	3,673,651	3,581,220	-3	13
8	24	Lumber and Wood Products	1,236,417	2,138,788	2,348,256	10	90
9	27	Printing and Publishing	766,524	1,000,521	1,538,172	54	101
10	25	Furniture and Fixtures	486,853	822,879	1,092,140	33	124
11	32	Stone/Clay/Glass Products	1,395,330	916,692	893,975	-2	-36
12	20	Food Products	45,756	513,765	918,803	79	1,908
13	39	Misc. Manufacturing Industries	229,048	811,503	648,585	-20	183
14	35	Industrial Machinery	554,832	687,422	556,357	-19	0.3
15	22	Textile Mill Products	918,442	309,432	466,058	51	-49
16	36	Electronic/Electrical Equipment	594,534	328,789	318,141	-3	-46
17	31	Leather Products	21,488	27,107	25,200	-7	17
18	38	Measurement/Photographic Instruments	1,501	250	25	-90	-98
19	23	Apparel and Other Textile Products	860	280	0	-100	-100
		Total	**118,785,903**	**113,878,280**	**106,167,353**	**-7**	**-11**

Figure 6–5. Change in NPRI Releases On- and Off-site by Industry, 1995–1998



Data comparing 1995 to 1998 do not include the new industry sectors because they are the only sectors for which both TRI and NPRI data are available for the period 1995 to 1998. The new industry sectors were included in data presented in Chapters 3, 4 and 5.

Only the manufacturing sectors (US SIC codes 20–39) are included because they are the only sectors that were required to report to TRI for the period 1995 to 1998. Therefore, the data for 1998 presented in this chapter are a subset of the data presented in previous chapters.

- The same three industry sectors (primary metals, chemicals, paper products) that reported the largest total releases to NPRI in 1998 also ranked in the same order for TRI.
- The primary metals sector in TRI reported an increase of 28 percent from 1995 to 1998 in total releases, with an increase of 12 percent in on-site releases and an increase of 57 percent in off-site releases. These increases continued through 1997 and 1998.
- The TRI chemicals industry ranked second for total releases in 1998 and first for on-site releases in 1998 as well as 1995. This industry sector reported decreases of on-site releases over this time period and a decrease of 16 percent in off-site releases from 1997 to 1998. However, the sector reported an overall increase from 1995 to 1998 of 19 percent in off-site releases.

Table 6–6. Total TRI Releases On- and Off-site by Industry, 1995, 1997–1998 (Ordered by 1998 Total Releases)

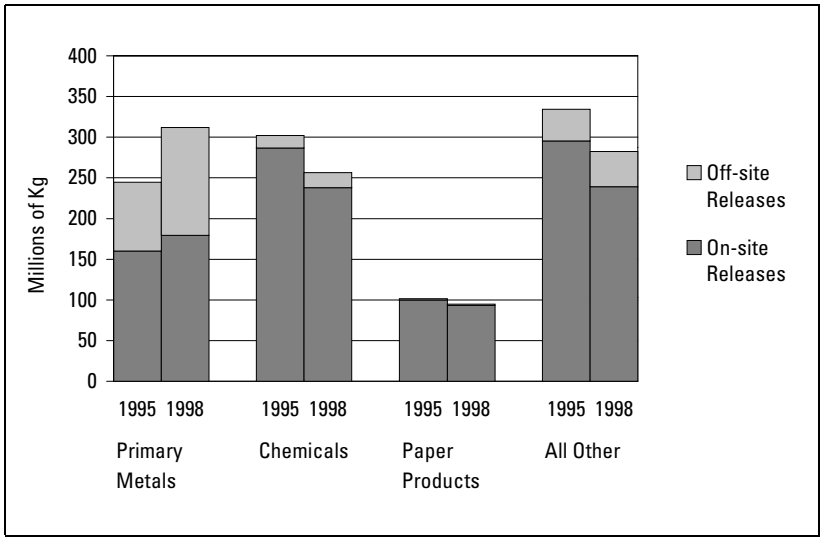
			Total On-site Releases					Total Off-site Releases*				
Rank	US SIC Code	Industry	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	33	Primary Metals	160,112,315	170,379,545	179,396,486	5	12	84,434,272	131,037,404	132,634,295	1	57
2	28	Chemicals	286,673,663	257,385,531	237,882,095	-8	-17	15,505,904	21,846,178	18,380,185	-16	19
3	26	Paper Products	100,028,421	94,968,119	93,071,716	-2	-7	1,379,446	1,833,057	1,861,145	2	35
4	--	Multiple codes 20-39	56,392,467	42,977,150	38,293,009	-11	-32	7,133,768	10,773,836	7,593,583	-30	6
5	30	Rubber and Plastics Products	44,037,968	39,505,933	39,711,131	1	-10	4,519,759	4,269,671	4,414,815	3	-2
6	37	Transportation Equipment	41,743,112	36,834,628	36,235,448	-2	-13	5,237,150	4,211,101	5,239,513	24	0.0
7	34	Fabricated Metals Products	26,652,420	21,390,790	19,028,506	-11	-29	8,946,020	10,438,200	10,796,530	3	21
8	29	Petroleum and Coal Products	21,223,559	23,647,542	25,759,946	9	21	1,456,010	1,413,825	1,582,692	12	9
9	32	Stone/Clay/Glass Products	9,444,165	11,744,778	11,743,897	0.0	24	2,604,542	3,215,678	2,734,527	-15	5
10	20	Food Products	13,584,378	11,511,797	13,560,628	18	-0.2	347,571	496,941	514,741	4	48
11	24	Lumber and Wood Products	13,710,614	11,060,959	13,732,009	24	0.2	158,486	164,167	110,284	-33	-30
12	36	Electronic/Electrical Equipment	9,797,993	6,965,808	5,817,776	-16	-41	4,127,801	6,094,283	5,752,891	-6	39
13	27	Printing and Publishing	13,450,062	10,627,800	9,531,190	-10	-29	69,868	79,606	74,144	-7	6
14	25	Furniture and Fixtures	18,019,662	10,697,434	7,244,814	-32	-60	60,385	116,618	54,087	-54	-10
15	35	Industrial Machinery	8,009,281	6,279,390	4,930,623	-21	-38	1,731,291	1,917,345	2,119,228	11	22
16	22	Textile Mill Products	6,780,336	6,417,213	4,425,077	-31	-35	361,366	273,157	300,072	10	-17
17	39	Misc. Manufacturing Industries	4,857,102	3,894,941	4,102,174	5	-16	938,301	372,718	340,890	-9	-64
18	38	Measurement/Photographic Instruments	6,066,053	4,726,120	3,874,206	-18	-36	328,085	288,457	487,405	69	49
19	31	Leather Products	776,015	505,503	487,375	-4	-37	765,025	929,753	967,060	4	26
20	21	Tobacco Products	473,270	665,112	607,780	-9	28	0	906	1,780	96	--
21	23	Apparel and Other Textile Products	443,240	252,310	155,539	-38	-65	12,904	63,015	18,527	-71	44
		Total	**842,276,096**	**772,438,403**	**749,591,425**	**-3**	**-11**	**140,117,954**	**199,835,916**	**195,978,394**	**-2**	**40**

* Transfers off-site to disposal and transfers of metals from facilities located in the state.

Table 6–6. (*continued*)

Rank	US SIC Code	Industry	Total Releases 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	33	Primary Metals	244,546,587	301,416,949	312,030,781	4	28
2	28	Chemicals	302,179,567	279,231,709	256,262,280	-8	-15
3	26	Paper Products	101,407,867	96,801,176	94,932,861	-2	-6
4	--	Multiple codes 20-39	63,526,235	53,750,986	45,886,592	-15	-28
5	30	Rubber and Plastics Products	48,557,727	43,775,604	44,125,946	1	-9
6	37	Transportation Equipment	46,980,262	41,045,729	41,474,961	1	-12
7	34	Fabricated Metals Products	35,598,440	31,828,990	29,825,036	-6	-16
8	29	Petroleum and Coal Products	22,679,569	25,061,367	27,342,638	9	21
9	32	Stone/Clay/Glass Products	12,048,707	14,960,456	14,478,424	-3	20
10	20	Food Products	13,931,949	12,008,738	14,075,369	17	1
11	24	Lumber and Wood Products	13,869,100	11,225,126	13,842,293	23	-0.2
12	36	Electronic/Electrical Equipment	13,925,794	13,060,091	11,570,667	-11	-17
13	27	Printing and Publishing	13,519,930	10,707,406	9,605,334	-10	-29
14	25	Furniture and Fixtures	18,080,047	10,814,052	7,298,901	-33	-60
15	35	Industrial Machinery	9,740,572	8,196,735	7,049,851	-14	-28
16	22	Textile Mill Products	7,141,702	6,690,370	4,725,149	-29	-34
17	39	Misc. Manufacturing Industries	5,795,403	4,267,659	4,443,064	4	-23
18	38	Measurement/Photographic Instruments	6,394,138	5,014,577	4,361,611	-13	-32
19	31	Leather Products	1,541,040	1,435,256	1,454,435	1	-6
20	21	Tobacco Products	473,270	666,018	609,560	-8	29
21	23	Apparel and Other Textile Products	456,144	315,325	174,066	-45	-62
		Total	**982,394,050**	**972,274,319**	**945,569,819**	**-3**	**-4**

Figure 6–6. Change in TRI Releases On- and Off-site by Industry, 1995–1998



- With the exception of the primary metals industry, the six industry sectors with the largest total releases in 1998 all reported decreases from 1995 to 1998; the next three industry sectors reported increases during that same period. They are petroleum and coal products, stone/clay/glass products, and food products.

6.2.3 Facilities with the Largest Changes in Total On- and Off-site Releases, 1995–1998

NPRI Facilities with Largest Changes in Total Releases, 1995–1998

Within the manufacturing sector, a few NPRI facilities accounted for large decreases in releases from 1995 to 1998. Four NPRI facilities reported more than 2 million kg of reductions in total releases, chiefly in the chemical, methanol. Methanol is primarily released to the air or water on-site.

- Among the 15 NPRI facilities with the largest reductions in total releases, five were in the chemicals industry sector (US SIC code 28) and five were in the paper products sector (US SIC code 26).
- The NPRI facility with the largest reductions from 1995 to 1998, Methanex in Medicine Hat, Alberta, installed vent gas recovery units in 1995 and 1996 and mothballed one methanol production unit in 1997.
- Irving Pulp and Paper in Saint John, New Brunswick, the NPRI facility with the second-largest reductions, substituted peroxide for methanol in its Chlorine Gas Generator unit in 1997.
- Among the 15 NPRI facilities with the largest increases in total releases from 1995 to 1998, seven were in the primary metals industry (US SIC code 33).

Table 6–7. NPRI Facilities with Largest Decrease in Total Releases On- and Off-site, 1995–1998

Rank	Facility	City, Province	US SIC Code
1	Methanex Corporation, Medicine Hat Plant	Medicine Hat, AB	28
2	Irving Pulp & Paper, Ltd/Irving Tissue Company	Saint John, NB	26
3	Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan, AB	28
4	Fort James Corporation, Fort James - Marathon, Ltd.	Marathon, ON	26
5	CXY Chemicals Limited Partnership, Canadian Occidental Petroleum	Nanaimo, BC	28
6	Cartons St-Laurent Inc.	Latuque, QC	26
7	Norampac Inc., Red Rock Div. Mill	Red Rock, ON	26
8	Algoma Steel Inc, Algoma Steel Main Works	Sault Ste. Marie, ON	33
9	Co-Steel Lasco	Whitby, ON	33
10	Bayer Inc., Sarnia Site	Sarnia, ON	28
11	NOVA Chemicals Ltd., St. Clair River Site	Corunna, ON	28
12	Les Papiers Perkins Ltée	Candiac, QC	26
13	Standard Products (Canada) Limited, Rubber Plant #1	Stratford, ON	30
14	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	33
15	General Motors of Canada Limited, Oshawa Truck Assembly Centre	Oshawa, ON	37
	Total		

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

Table 6–8. NPRI Facilities with Largest Increase in Total Releases On- and Off-site, 1995–1998

Rank	Facility	City, Province	US SIC Code
1	Dofasco Inc.	Hamilton, ON	33
2	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	33
3	Fraser Papers Inc. (Canada), Nexfor Inc.	Edmundston, NB	26
4	Ispat Sidbec Inc. Aciérie, Ispat Mexicana	Contrecœur, QC	33
5	Maple Roll Leaf, Illinois Tool Works Canada Inc.	Windsor, ON	28
6	Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan, AB	28
7	Noranda Inc., Brunswick Smelter	Belledune, NB	33
8	Petro-Canada, Burrard Products Terminal	Port Moody, BC	29
9	Papiers Domtar - Centre d'affaires Windsor	Windsor, QC	26
10	International Wallcoverings Ltd, Brampton Plant	Brampton, ON	27
11	Gerdau Courtice Steel Inc.	Cambridge, ON	33
12	Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor, ON	33
13	Gerdau MRM Steel Inc.	Selkirk, MB	33
14	ICI Canada Inc, McMasterville Complex	McMasterville, QC	28
15	Western Pulp Limited Partnership, Port Alice Cellulose Operations	Port Alice, BC	26
	Total		

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

Table 6–7. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases) (chemicals accounting for more than 70% of decrease in total releases on- and off-site from the facility)
1	4	3,353,220	3	790,700	3	365,636	-2,987,584	Methanol (air)
2	4	3,663,623	4	1,070,289	2	1,002,916	-2,660,707	Methanol (water)
3	13	2,291,434	8	225,820	4	60,110	-2,231,324	Methanol (air)
4	4	2,215,710	4	155,200	4	158,280	-2,057,430	Methanol (water)
5	2	1,988,244	2	548	3	862	-1,987,382	Asbestos (transfers to disposal)
6	4	2,408,582	8	502,404	8	491,042	-1,917,540	Methanol (water)
7	1	1,900,000	2	273,348	2	294,880	-1,605,120	Methanol (water)
8	17	1,598,360	19	210,235	15	197,362	-1,400,998	Manganese and compounds (land)
9	6	8,442,331	6	7,059,754	6	7,063,650	-1,378,681	Copper and compounds (land)
10	15	2,507,771	17	1,554,799	18	1,395,003	-1,112,768	Chloromethane, Hydrochloric acid, Benzene (air)
11	9	2,181,830	7	2,075,770	5	1,148,447	-1,033,383	Cyclohexane (air)
12	1	793,700	*	*	*	*	-793,700	Xylene (air)
13	3	963,499	3	441,200	3	198,060	-765,439	Xylene (air)
14	3	1,487,191	4	573,333	4	740,163	-747,028	Chromium and compounds (transfers of metals)
15	12	856,314	14	402,626	13	257,450	-598,864	Xylene, Toluene (air)
	98	**36,651,809**	**101**	**15,336,026**	**90**	**13,373,861**	**-23,277,948**	

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

Table 6–8. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (chemicals accounting for more than 70% of increase in total releases on- and off-site from the facility)
1	18	2,523,127	18	8,599,553	18	6,706,253	4,183,126	Zinc and compounds (transfers of metals)
2	7	3,662,640	7	4,908,786	8	4,723,052	1,060,412	Chromium and compounds (land)
3	9	313,790	9	317,510	10	1,267,036	953,246	Methanol (air), Manganese and compounds (transfers of metals)
4	5	1,510,387	5	2,349,790	5	2,435,843	925,456	Zinc and compounds (land)
5	*	*	10	750,109	9	826,291	826,291	Methyl ethyl ketone, Toluene, Methanol (air)
6	23	338,025	28	422,394	32	951,373	613,348	Ethylene (air)
7	5	18,478	6	505,648	8	577,244	558,766	Lead and compounds (transfers of metals)
8	6	5,000	8	283,029	8	482,871	477,871	Asbestos (transfers to disposal)
9	5	143,400	6	527,484	3	586,160	442,760	Methanol (air)
10	4	316,000	4	669,500	4	755,700	439,700	Methyl ethyl ketone, Toluene (air)
11	7	359,767	7	641,840	5	799,449	439,682	Zinc and compounds (transfers of metals)
12	7	850,293	8	1,105,298	8	1,279,627	429,334	Zinc/Copper and compounds (transfers of metals)
13	4	762,000	6	1,752,614	6	1,167,315	405,315	Zinc and compounds (land)
14	2	0	2	35,000	1	399,000	399,000	Nitric acid and nitrate compounds (water)
15	3	1,600	4	104,360	6	361,130	359,530	Nitric acid and nitrate compounds (water)
	105	**10,804,507**	**128**	**22,972,915**	**131**	**23,318,344**	**12,513,837**	

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

- The NPRI facility with the largest increase from 1995 to 1998 was Dofasco Inc. in Hamilton, Ontario. This integrated steel mill increased off-site transfers to disposal when it ceased sending basic oxygen furnace sludge for use in a mine reclamation project and instead sent it to an off-site landfill. It has also increased production with a new electric arc furnace. Dofasco achieved a 22 percent reduction in total releases from 1997 to 1998 through installation of pollution control equipment. Because Dofasco sent its sludge off-site for disposal, it is not on the list for largest increases in on-site releases.
- The NPRI facility with the second-largest increase in releases from 1995 to 1998 was Inco Limited, Copper Cliff Smelter Complex, Copper Cliff, Ontario. The chromium at Inco is stockpiled in an on-site landfill in the form of spent chrome-magnesite refractory brick in expectation of future processing to recover the metal.

TRI Facilities with Largest Changes in Total Releases, 1995–1998

A few TRI manufacturing facilities accounted for large changes in releases from 1995 to 1998. One TRI facility reported more than 10 million kg of reductions in total releases from 1995 to 1998 of air emissions of carbon disulfide. Two TRI facilities reported more than 10 million kg in increases in releases from 1995 to 1998, primarily as on-site releases.

- Among the 15 TRI facilities with the largest reductions in total releases, there were eight in the chemicals sector (US SIC code 28) and six in the primary metals industry (US SIC code 33).
- The TRI facility with the largest decrease in total on- and off-site releases from 1995 to 1998 was Acordis Cellulosic Fibers in Axis, Alabama. Acordis completed the installation of a new spinning machine in 1997 for the production of rayon fibers. Acordis is now able to collect carbon disulfide and recycle it instead of releasing the chemical to the air.
- The TRI facility with the second-largest apparent reductions in releases, Cyprus Miami Mining in Claypool, Arizona, expanded its reporting to include operations under the new TRI industry, metal mining. Consequently, no forms for 1998 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 how much of the 1998 amounts are from only the copper smelting and refining operations.

Table 6–9. TRI Facilities with Largest Decrease in Total Releases On- and Off-site, 1995–1998

Rank	Facility	City, State	US SIC Code
1	Acordis Cellulosic Fibers Inc., Akzo Nobel Finance US	Axis, AL	28
2	Cyprus Miami Mining Corp., Cyprus Climax Metals Co.	Claypool, AZ	33
3	Zinc Corp. of America Monaca Smelter	Monaca, PA	33
4	Celanese Ltd.- Clear Lake Plant, Hoechst	Pasadena, TX	28
5	DuPont Beaumont Plant	Beaumont, TX	28
6	Phelps Dodge Hidalgo Inc.	Playas, NM	33
7	Huntsman Corp. Port Arthur - A&O Plant	Port Arthur, TX	28
8	Cytec Inds. Inc. Fortier Plant	Westwego, LA	28
9	IMC-Agrico Co., New Wales Plant	Mulberry, FL	Mult.
10	GM Powertrain Defiance, General Motors Corp.	Defiance, OH	33
11	Chino Mines Co., Phelps Dodge Corp.	Hurley, NM	33
12	Sterling Chemicals Inc.	Texas City, TX	28
13	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT	33
14	Lenzing Fibers Corp.	Lowland, TN	28
15	Pharmacia & Upjohn	Kalamazoo, MI	28
	Total		

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

Table 6–10. TRI Facilities with Largest Increase in Total Releases On- and Off-site, 1995–1998

Rank	Facility	City, State	US SIC Code
1	Kennecott Utah Copper Smelter & Refy.	Magna, UT	33
2	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ	33
3	Armco Inc. Butler Ops. (Rte 8S)	Butler, PA	33
4	Nucor-Yamato Steel Co.	Blytheville, AR	33
5	Steel Dynamics Inc.	Butler, IN	33
6	Solutia Inc.	Gonzalez, FL	28
7	Nucor Steel	Crawfordsville, IN	33
8	ASARCO Inc.	East Helena, MT	33
9	DuPont Delisle Plant	Pass Christian, MS	28
10	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville, OR	33
11	Elementis Chromium L.P.	Corpus Christi, TX	28
12	Nucor Corp. Nucor Steel	Plymouth, UT	33
13	Nucor Steel, Nebraska	Norfolk, NE	33
14	USS Gary Works, USX Corp.	Gary, IN	33
15	Bar Tech. S. Inc. Primary Ops.	Johnstown, PA	33
	Total		

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

Table 6–9. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases) (chemicals accounting for more than 70% of decrease in total releases on- and off-site from the facility)
1	5	15,427,756	4	7,033,029	4	5,033,198	-10,394,558	Carbon disulfide (air)
2	13	7,066,233	14	8,596,691	*	*	-7,066,233	Copper/Zinc and compounds (land)
3	10	15,994,774	9	14,080,761	13	9,466,279	-6,528,495	Zinc/Lead and compounds (transfers of metals)
4	20	6,205,584	20	1,837,586	18	398,351	-5,807,233	Ethylene glycol (UIJ)
5	28	8,570,598	22	2,829,432	21	3,409,428	-5,161,170	Nitric acid and nitrate compounds, Acetonitrile (UIJ)
6	11	14,607,894	13	12,345,858	16	9,939,594	-4,668,300	Zinc and compounds (land)
7	23	4,394,508	19	911,133	19	338,509	-4,055,999	Propylene (air)
8	22	11,718,163	24	10,117,501	23	7,677,284	-4,040,879	Acetonitrile, Acrylic acid (UIJ)
9	2	3,746,031	3	1,631,746	*	*	-3,746,031	Phosphoric acid (land)
10	17	6,567,856	20	5,973,972	16	3,109,499	-3,458,357	Zinc and compounds (land)
11	3	3,233,586	*	*	*	*	-3,233,586	Copper and compounds (land)
12	36	5,408,261	34	2,879,438	35	2,277,870	-3,130,391	Nitric acid and nitrate compounds (UIJ)
13	6	29,168,743	6	28,270,233	6	26,163,746	-3,004,997	Hydrochloric acid, Chlorine (air)
14	5	10,789,279	5	7,764,811	5	7,996,518	-2,792,761	Carbon disulfide (air)
15	26	3,320,285	25	1,421,278	24	620,526	-2,699,759	Methanol (UIJ)
	227	**146,219,551**	**218**	**105,693,469**	**200**	**76,430,802**	**-69,788,749**	

* Indicates facility did not report any matched chemicals that year.
UIJ=Underground injection.

Table 6–10. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (chemicals accounting for more than 70% of increase in total releases on- and off-site from the facility)
1	14	2,885,124	14	11,214,648	16	15,446,345	12,561,221	Copper/Zinc/Arsenic and compounds (land)
2	9	9,919,427	9	935,935	11	20,858,816	10,939,389	Copper and compounds (land)
3	14	4,738,499	14	12,023,592	14	14,338,363	9,599,864	Nitric acid and nitrate compounds (water)
4	8	72,019	8	7,550,269	8	5,103,675	5,031,656	Zinc and compounds (transfers of metals)
5	1	6,117	7	6,536,202	3	4,653,338	4,647,221	Zinc and compounds (transfers of metals)
6	21	5,939,341	18	9,818,975	18	9,869,345	3,930,004	Nitric acid and nitrate compounds (UIJ)
7	9	5,236,425	9	5,641,033	8	8,858,751	3,622,326	Zinc and compounds (transfers of metals)
8	10	17,921,953	10	17,697,271	10	21,317,968	3,396,015	Zinc and compounds (land, transfers of metals), Lead/Cadmium and compounds (transfers of metals)
9	5	232,766	11	4,092,072	13	3,417,102	3,184,336	Manganese and compounds (UIJ)
10	5	1,969	5	1,063,826	5	3,023,279	3,021,310	Zinc and compounds (transfers of metals)
11	2	4,307,148	2	8,013,086	2	7,268,731	2,961,583	Chromium and compounds (land)
12	8	180,863	7	3,929,232	7	2,979,970	2,799,107	Zinc and compounds (transfers of metals)
13	7	1,272	7	309,143	8	2,588,657	2,587,385	Zinc and compounds (transfers of metals)
14	29	3,512,655	33	7,548,891	33	6,046,237	2,533,582	Zinc and compounds (land)
15	*	*	6	1,931,649	6	2,434,641	2,434,641	Zinc and compounds (transfers of metals)
	142	**54,955,578**	**160**	**98,305,824**	**162**	**128,205,218**	**73,249,640**	

* Indicates facility did not report any matched chemicals that year.
UIJ=Underground injection.

- Twelve of the 15 TRI facilities with the largest increases in total releases from 1995 to 1998 were primary metals facilities (US SIC code 33).
- The TRI facility, Kennecott Utah Copper Smelter & Refy. in Magna, Utah, reported the largest increase in total releases from 1995 to 1998. The increases were due to increased production after the installation of a new smelter in 1995. Some of the increases were a result of metal compounds that were below the reporting threshold prior to 1998, but which were reported in 1998.
- The TRI 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 and it is not possible to know how much of the 1998 amounts are due to the metal mining operations.

6.2.4 1995–1998 Total Releases On- and Off-site by Chemical

There are 165 substances in the matched data set. These are the substances reported both to NPRI and TRI. The list of substances in the matched data set remained the same for the years 1995 to 1998.

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

- The chemical with the largest reduction in total releases in North America from 1995 to 1998 was methanol, with a reported reduction of 30.6 million kg, or 21 percent. Methanol was the chemical with the largest reduction reported in NPRI and the second-largest in TRI.
- Toluene was the chemical with the second-largest reduction in North America, with a reported reduction of 22.5 million kg, or 31 percent; it was the chemical with the largest reduction in TRI.
- Three chemicals, methanol, xylene (mixed isomers), and propylene, appear on both the NPRI and TRI list of chemicals with the largest reductions in total releases.

Table 6–11. The 10 Chemicals with the Largest Decrease in Total Releases On- and Off-site in North America, 1995–1998

			Total Releases On- and Off-site				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	67-56-1	Methanol	146,519,043	118,102,930	115,873,069	-30,645,974	-21
2	108-88-3	Toluene	73,583,871	58,676,888	51,089,344	-22,494,527	-31
3	75-15-0	Carbon disulfide	38,184,592	23,402,357	19,730,475	-18,454,117	-48
4	1330-20-7	Xylene (mixed isomers)	52,292,653	40,765,912	37,463,353	-14,829,300	-28
5	78-93-3	Methyl ethyl ketone	36,924,093	29,449,513	26,365,324	-10,558,769	-29
6	75-09-2	Dichloromethane▼	28,501,881	24,083,086	20,418,041	-8,083,840	-28
7	7647-01-0	Hydrochloric acid	32,482,954	27,627,991	25,646,515	-6,836,439	-21
8	107-21-1	Ethylene glycol	10,732,176	5,658,416	4,383,985	-6,348,191	-59
9	79-01-6	Trichloroethylene▼	12,576,554	8,971,402	6,757,075	-5,819,479	-46
10	115-07-1	Propylene	13,756,730	8,448,777	8,295,560	-5,461,170	-40

Note: Canada and US data only. Mexico data not available for 1995–1998. ▼ Known or suspected carcinogen.

Table 6–12. The 10 Chemicals with the Largest Decrease in NPRI Total Releases On- and Off-site, 1995–1998

			Total Releases On- and Off-site				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	67-56-1	Methanol	30,188,726	18,585,853	18,432,241	-11,756,485	-39
2	1332-21-4	Asbestos (friable)▼	3,475,355	1,156,168	1,666,206	-1,809,149	-52
3	1330-20-7	Xylene (mixed isomers)	7,991,245	6,498,281	6,277,461	-1,713,784	-21
4	110-82-7	Cyclohexane	2,820,144	2,893,783	1,901,704	-918,440	-33
5	7782-50-5	Chlorine	1,237,753	917,963	459,705	-778,048	-63
6	--	Copper (and its compounds)*	2,395,813	1,766,002	1,646,775	-749,038	-31
7	74-87-3	Chloromethane	970,846	434,586	385,142	-585,704	-60
8	71-43-2	Benzene▼	1,809,386	1,486,072	1,281,246	-528,140	-29
9	115-07-1	Propylene	1,248,941	972,363	862,768	-386,173	-31
10	--	Manganese (and its compounds)*	5,975,690	6,773,941	5,644,579	-331,111	-6

* Metal and its compounds ▼ Known or suspected carcinogen.

Table 6–13. The 10 Chemicals with the Largest Decrease in TRI Total Releases On- and Off-site, 1995–1998

			Total Releases On- and Off-site				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	108-88-3	Toluene	67,170,443	52,466,519	45,006,417	-22,164,026	-33
2	67-56-1	Methanol	116,330,317	99,517,077	97,440,828	-18,889,489	-16
3	75-15-0	Carbon disulfide	38,171,137	23,384,622	19,714,830	-18,456,307	-48
4	1330-20-7	Xylene (mixed isomers)	44,301,408	34,267,631	31,185,892	-13,115,516	-30
5	78-93-3	Methyl ethyl ketone	31,957,530	24,291,972	21,443,265	-10,514,265	-33
6	75-09-2	Dichloromethane▼	26,323,141	21,779,863	18,251,291	-8,071,850	-31
7	7647-01-0	Hydrochloric acid	31,210,133	26,226,373	24,273,338	-6,936,795	-22
8	107-21-1	Ethylene glycol	10,127,595	5,262,570	3,957,003	-6,170,592	-61
9	79-01-6	Trichloroethylene▼	11,793,447	8,199,526	5,895,266	-5,898,181	-50
10	115-07-1	Propylene	12,507,789	7,476,414	7,432,792	-5,074,997	-41

▼ Known or suspected carcinogen.

- Metals and their compounds were among the substances with the largest increases in total releases from 1995 to 1998 in North America. Zinc and its compounds accounted for the largest increase, with 44.7million kg, or 35 percent.
- Zinc and its compounds was the substance with the largest increase from 1995 to 1998 for both NPRI and TRI. The increase was 5.1 million kg, or 30 percent, for NPRI and 39.6 million kg, or 36 percent, for TRI.
- Five chemicals, zinc and its compounds, nitric acid and nitrate compounds, styrene, chromium and its compounds, and arsenic and its compounds, appear on both the NPRI and TRI list of chemicals with the largest increases in total releases from 1995 to 1998.
- Three of the five chemicals, styrene, chromium and its compounds, and arsenic and its compounds, are known or suspected carcinogens.
- One chemical, asbestos (friable), a carcinogen, had the second-largest decrease reported to NPRI but the tenth-largest increase reported to TRI.

Table 6–14. The 10 Chemicals with the Largest Increase in Total Releases On- and Off-site in North America, 1995–1998

			Total Releases On- and Off-site				
			1995	1997	1998	Change 1995–1998	
Rank	CAS Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Zinc (and its compounds)*	128,260,265	179,470,947	172,931,035	44,670,770	35
2	--	Manganese (and its compounds)*	49,614,336	72,695,521	63,713,065	14,098,729	38
3	--	Nitric acid and nitrate compounds	100,595,939	105,913,237	115,937,155	15,341,216	15
4	--	Copper (and its compounds)*	34,135,061	36,810,331	41,965,372	7,830,311	23
5	--	Lead (and its compounds)*▼	23,325,886	30,645,197	30,306,554	6,980,668	30
6	100-42-5	Styrene▼	20,972,904	22,392,900	26,456,235	5,483,331	26
7	--	Chromium (and its compounds)*▼	26,986,765	29,161,747	31,665,188	4,678,423	17
8	--	Arsenic (and its compounds)*▼	2,252,313	4,260,439	4,510,136	2,257,823	100
9	7664-93-9	Sulfuric acid	13,386,335	14,262,355	15,551,482	2,165,147	16
10	85-44-9	Phthalic anhydride	318,747	1,528,234	1,879,249	1,560,502	490

Note: Canada and US data only. Mexico data not available for 1995–1998. * Metal and its compounds ▼ Known or suspected carcinogen.

Table 6–15. The 10 Chemicals with the Largest Increase in NPRI Total Releases On- and Off-site, 1995–1998

			Total Releases On- and Off-site				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Zinc (and its compounds)*	16,750,381	25,724,471	21,829,439	5,079,058	30
2	--	Nitric acid and nitrate compounds	2,136,297	3,238,675	3,116,126	979,829	46
3	--	Chromium (and its compounds)*▼	3,085,937	2,754,140	3,722,973	637,036	21
4	7429-90-5	Aluminum (fume or dust)*	613,535	790,035	1,011,751	398,216	65
5	1344-28-1	Aluminum oxide (fibrous forms)	51,444	316,111	399,327	347,883	676
6	100-42-5	Styrene▼	778,815	969,120	1,089,514	310,699	40
7	--	Arsenic (and its compounds)*▼	74,078	201,925	318,563	244,485	330
8	7664-39-3	Hydrogen fluoride	1,696,245	1,725,590	1,897,026	200,781	12
9	95-63-6	1,2,4-Trimethylbenzene	359,223	452,693	528,847	169,624	47
10	50-00-0	Formaldehyde▼	1,177,002	1,571,513	1,326,136	149,134	13

* Metal and its compounds ▼ Known or suspected carcinogen.

Table 6–16. The 10 Chemicals with the Largest Increase in TRI Total Releases On- and Off-site, 1995–1998

			Total Releases On- and Off-site				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Zinc (and its compounds)*	111,509,884	153,746,476	151,101,596	39,591,712	36
2	--	Manganese (and its compounds)*	43,638,646	65,921,580	63,068,486	19,429,840	45
3	--	Nitric acid and nitrate compounds	98,459,642	102,674,562	112,821,029	14,361,387	15
4	--	Copper (and its compounds)*	31,739,248	35,044,329	40,318,597	8,579,349	27
5	--	Lead (and its compounds)*▼	19,961,392	26,478,754	26,944,931	6,983,539	35
6	100-42-5	Styrene▼	20,194,089	21,423,780	25,366,721	5,172,632	26
7	--	Chromium (and its compounds)*▼	23,900,828	26,407,607	27,942,215	4,041,387	17
8	7664-93-9	Sulfuric acid	9,726,077	9,798,424	12,056,024	2,329,947	24
9	--	Arsenic (and its compounds)*▼	2,178,235	4,058,514	4,191,573	2,013,338	92
10	1332-21-4	Asbestos (friable)▼	2,266,445	1,823,667	4,068,567	1,802,122	80

* Metal and its compounds ▼ Known or suspected carcinogen.

Carcinogens

Of the 165 substances in the matched data set, 49 are known or suspected carcinogens. The substances are designated as known or suspected carcinogens by the International Agency for Research on Cancer (IARC) Monographs <http://www.iarc.fr/> or by the US National Toxicological Program (NTP) <http://ntp-server.niehs.nih.gov/>.

- Total releases on- and off-site of designated carcinogens decreased by approximately 444,000 kg or 0.3 percent, a smaller decrease than the 4 percent for all matched chemicals.
- Dichloromethane was the carcinogen with the largest decrease from 1995 to 1998 in North America. It decreased by 28 percent, including a 1 percent decrease in NPRI and a 31 percent decrease in TRI.
- Of all the designated carcinogens, lead and its compounds had the largest increase from 1995 to 1998 in North America. Lead and its compounds increased by 30 percent, including a 35 percent increase in TRI but almost no change in NPRI.
- NPRI releases on- and off-site of designated carcinogens decreased by 8 percent from 1995 to 1998. This percentage decrease was lower than that of all the matched chemicals, which decreased by 11 percent.
- The NPRI designated carcinogens with the largest decreases were asbestos, benzene, and nickel and its compounds, with decreases ranging from 29 to 52 percent.
- Chromium and its compounds had the largest increases in NPRI, and in 1998 had the largest total releases of all designated carcinogens.
- Lead (and its compounds) was the carcinogen with the second-largest total releases in NPRI in 1998. Releases of lead and its compounds increased from 1995 to 1997, but decreased to about 1995 levels from 1997 to 1998.
- Total releases of TRI designated carcinogens increased by 0.6 percent from 1995 to 1998, in contrast to NPRI carcinogens, which decreased by 8 percent, and to all TRI matched chemicals, which decreased by 4 percent.
- The three TRI carcinogens with the largest increases in total releases from 1995 to 1998 were also the three with the largest total releases in 1998: lead and its compounds, styrene, and chromium and its compounds.
- However, the TRI carcinogen with the fourth-largest total releases in 1998, dichloromethane, had the largest decrease from 1995 to 1998.

Table 6–17. Change in Total Releases On- and Off-site of Known or Suspected Carcinogens▼ in North America, 1995–1998

CAS Number	Chemical	Total Releases On- and Off-site 1995 (kg)	1997 (kg)	1998 (kg)	Change 1995–1998 kg	%
75-09-2	Dichloromethane	28,501,881	24,083,086	20,418,041	-8,083,840	-28
79-01-6	Trichloroethylene	12,576,554	8,971,402	6,757,075	-5,819,479	-46
127-18-4	Tetrachloroethylene	4,500,827	3,176,391	2,475,591	-2,025,236	-45
67-66-3	Chloroform	5,068,843	3,577,849	3,215,461	-1,853,382	-37
71-43-2	Benzene	6,228,571	5,730,294	4,942,488	-1,286,083	-21
117-81-7	Di(2-ethylhexyl) phthalate	1,705,120	697,705	601,084	-1,104,036	-65
107-13-1	Acrylonitrile	3,068,987	2,339,161	2,346,448	-722,539	-24
75-07-0	Acetaldehyde	6,815,173	6,355,655	6,202,542	-612,631	-9
108-05-4	Vinyl acetate	2,470,104	1,861,555	2,016,065	-454,039	-18
106-99-0	1,3-Butadiene	1,612,091	1,339,277	1,352,660	-259,431	-16
75-21-8	Ethylene oxide	446,145	432,013	260,240	-185,905	-42
107-06-2	1,2-Dichloroethane	616,734	492,312	434,910	-181,824	-29
56-23-5	Carbon tetrachloride	226,894	186,276	142,218	-84,676	-37
106-89-8	Epichlorohydrin	167,096	152,875	94,513	-72,583	-43
75-56-9	Propylene oxide	419,387	297,785	359,012	-60,375	-14
75-01-4	Vinyl chloride	499,294	501,396	458,198	-41,096	-8
140-88-5	Ethyl acrylate	100,114	85,557	61,512	-38,602	-39
106-46-7	1,4-Dichlorobenzene	123,683	130,151	94,022	-29,661	-24
1332-21-4	Asbestos (friable)	5,741,800	2,979,835	5,734,773	-7,027	0
96-45-7	Ethylene thiourea	9,269	2,695	3,035	-6,234	-67
79-46-9	2-Nitropropane	15,665	12,037	10,901	-4,764	-30
62-56-6	Thiourea	5,725	4,913	4,273	-1,452	-25
121-14-2	2,4-Dinitrotoluene	1,697	1,674	1,110	-587	-35
90-94-8	Michler's ketone	715	182	232	-483	-68
64-67-5	Diethyl sulfate	3,278	3,365	2,886	-392	-12
91-08-7	Toluene-2,6-diisocyanate	1,450	1,888	1,199	-251	-17
101-14-4	4,4'-Methylenebis(2-chloroaniline)	124	1,034	12	-112	-90
94-59-7	Safrole	116	229	5	-111	-96
606-20-2	2,6-Dinitrotoluene	270	210	240	-30	-11
96-09-3	Styrene oxide	106	474	347	241	227
95-80-7	2,4-Diaminotoluene	227	888	713	486	214
302-01-2	Hydrazine	16,760	18,981	17,518	758	5
584-84-9	Toluene-2,4-diisocyanate	4,166	5,964	5,067	901	22
77-78-1	Dimethyl sulfate	3,053	3,240	5,405	2,352	77
100-44-7	Benzyl chloride	10,814	16,750	14,716	3,902	36
26471-62-5	Toluenediisocyanate (mixed isomers)	35,533	42,978	41,379	5,846	16
123-91-1	1,4-Dioxane	343,816	269,744	349,693	5,877	2
139-13-9	Nitrilotriacetic acid	1,956	7,546	8,248	6,292	322
101-77-9	4,4'-Methylenedianiline	19,570	18,653	32,736	13,166	67
98-95-3	Nitrobenzene	162,246	318,784	226,451	64,205	40
79-06-1	Acrylamide	2,792,780	3,220,670	2,887,496	94,716	3
--	Cobalt (and its compounds)	648,669	979,069	758,873	110,204	17
--	Cadmium (and its compounds)	1,321,953	1,267,563	1,873,976	552,023	42
--	Nickel (and its compounds)	7,413,067	8,541,247	8,303,387	890,320	12
50-00-0	Formaldehyde	10,035,043	11,499,527	11,376,795	1,341,752	13
--	Arsenic (and its compounds)	2,252,313	4,260,439	4,510,136	2,257,823	100
--	Chromium (and its compounds)	26,986,765	29,161,747	31,665,188	4,678,423	17
100-42-5	Styrene	20,972,904	22,392,900	26,456,235	5,483,331	26
--	Lead (and its compounds)	23,325,886	30,645,197	30,306,554	6,980,668	30
	Subtotal	**177,275,234**	**176,091,163**	**176,831,659**	**-443,575**	**-0.3**
	% of Total	**16**	**16**	**17**		
	Total for Matched Chemicals	**1,101,179,953**	**1,086,152,599**	**1,051,737,172**	**-49,442,781**	**-4**

Note: A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.

▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 6–18. Change in NPRI Total Releases On- and Off-site of Known or Suspected Carcinogens,▼ 1995–1998

CAS Number	Chemical	Total Releases On- and Off-site 1995 (kg)	1997 (kg)	1998 (kg)	Change 1995–1998 kg	%
1332-21-4	Asbestos (friable)	3,475,355	1,156,168	1,666,206	-1,809,149	-52
71-43-2	Benzene	1,809,386	1,486,072	1,281,246	-528,140	-29
--	Nickel (and its compounds)	1,121,478	880,679	828,287	-293,191	-26
106-99-0	1,3-Butadiene	224,686	105,820	101,999	-122,687	-55
127-18-4	Tetrachloroethylene	148,626	52,407	46,562	-102,064	-69
75-07-0	Acetaldehyde	302,528	268,199	201,311	-101,217	-33
117-81-7	Di(2-ethylhexyl) phthalate	89,247	63,014	59,324	-29,923	-34
67-66-3	Chloroform	238,693	221,972	209,027	-29,666	-12
75-09-2	Dichloromethane	2,178,740	2,303,223	2,166,750	-11,990	-1
107-13-1	Acrylonitrile	16,322	6,469	6,205	-10,117	-62
75-21-8	Ethylene oxide	26,204	16,159	17,529	-8,675	-33
56-23-5	Carbon tetrachloride	7,769	336	464	-7,305	-94
79-06-1	Acrylamide	6,295	561	430	-5,865	-93
123-91-1	1,4-Dioxane	7,059	3,998	2,980	-4,079	-58
--	Lead (and its compounds)	3,364,494	4,166,443	3,361,623	-2,871	-0.1
106-46-7	1,4-Dichlorobenzene	10,264	8,500	9,140	-1,124	-11
140-88-5	Ethyl acrylate	1,090	161	96	-994	-91
121-14-2	2,4-Dinitrotoluene	700	816	196	-504	-72
584-84-9	Toluene-2,4-diisocyanate	350	10	10	-340	-97
106-89-8	Epichlorohydrin	133	7	5	-128	-96
79-46-9	2-Nitropropane	125	0	0	-125	-100
101-77-9	4,4'-Methylenedianiline	100	0	0	-100	-100
62-56-6	Thiourea	0	0	0	0	--
101-14-4	4,4'-Methylenebis(2-chloroaniline)	4	6	5	1	25
26471-62-5	Toluenediisocyanate (mixed isomers)	1,291	1,178	1,292	1	0.1
91-08-7	Toluene-2,6-diisocyanate	0	0	2	2	--
77-78-1	Dimethyl sulfate	8	10	13	5	63
302-01-2	Hydrazine	0	0	63	63	--
100-44-7	Benzyl chloride	10	140	138	128	1280
96-09-3	Styrene oxide	100	469	343	243	243
139-13-9	Nitrilotriacetic acid	626	3,068	1,895	1,269	203
75-56-9	Propylene oxide	10,469	13,005	14,182	3,713	35
75-01-4	Vinyl chloride	18,179	43,992	26,004	7,825	43
--	Cobalt (and its compounds)	38,005	30,986	53,518	15,513	41
107-06-2	1,2-Dichloroethane	6,168	19,603	26,360	20,192	327
108-05-4	Vinyl acetate	244,514	284,685	297,324	52,810	22
79-01-6	Trichloroethylene	783,107	771,876	861,809	78,702	10
--	Cadmium (and its compounds)	54,950	164,980	150,478	95,528	174
50-00-0	Formaldehyde	1,177,002	1,571,513	1,326,136	149,134	13
--	Arsenic (and its compounds)	74,078	201,925	318,563	244,485	330
100-42-5	Styrene	778,815	969,120	1,089,514	310,699	40
--	Chromium (and its compounds)	3,085,937	2,754,140	3,722,973	637,036	21
	Subtotal	**19,302,907**	**17,571,710**	**17,850,002**	**-1,452,905**	**-8**
	% of Total	**16**	**15**	**17**		
	Total for Matched NPRI Chemicals	**118,785,903**	**113,878,280**	**106,167,353**	**-12,618,550**	**-11**

Note: A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.
▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 6–19. Change in TRI Total Releases On- and Off-site of Known or Suspected Carcinogens,▼ 1995–1998

CAS Number	Chemical	Total Releases On- and Off-site 1995 (kg)	1997 (kg)	1998 (kg)	Change 1995–1998 kg	%
75-09-2	Dichloromethane	26,323,141	21,779,863	18,251,291	-8,071,850	-31
79-01-6	Trichloroethylene	11,793,447	8,199,526	5,895,266	-5,898,181	-50
127-18-4	Tetrachloroethylene	4,352,201	3,123,984	2,429,029	-1,923,172	-44
67-66-3	Chloroform	4,830,150	3,355,877	3,006,434	-1,823,716	-38
117-81-7	Di(2-ethylhexyl) phthalate	1,615,873	634,691	541,760	-1,074,113	-66
71-43-2	Benzene	4,419,185	4,244,222	3,661,242	-757,943	-17
107-13-1	Acrylonitrile	3,052,665	2,332,692	2,340,243	-712,422	-23
75-07-0	Acetaldehyde	6,512,645	6,087,456	6,001,231	-511,414	-8
108-05-4	Vinyl acetate	2,225,590	1,576,870	1,718,741	-506,849	-23
107-06-2	1,2-Dichloroethane	610,566	472,709	408,550	-202,016	-33
75-21-8	Ethylene oxide	419,941	415,854	242,711	-177,230	-42
106-99-0	1,3-Butadiene	1,387,405	1,233,457	1,250,661	-136,744	-10
56-23-5	Carbon tetrachloride	219,125	185,940	141,754	-77,371	-35
106-89-8	Epichlorohydrin	166,963	152,868	94,508	-72,455	-43
75-56-9	Propylene oxide	408,918	284,780	344,830	-64,088	-16
75-01-4	Vinyl chloride	481,115	457,404	432,194	-48,921	-10
140-88-5	Ethyl acrylate	99,024	85,396	61,416	-37,608	-38
106-46-7	1,4-Dichlorobenzene	113,419	121,651	84,882	-28,537	-25
96-45-7	Ethylene thiourea	9,269	2,695	3,035	-6,234	-67
79-46-9	2-Nitropropane	15,540	12,037	10,901	-4,639	-30
62-56-6	Thiourea	5,725	4,913	4,273	-1,452	-25
90-94-8	Michler's ketone	715	182	232	-483	-68
64-67-5	Diethyl sulfate	3,278	3,365	2,886	-392	-12
91-08-7	Toluene-2,6-diisocyanate	1,450	1,888	1,197	-253	-17
101-14-4	4,4'-Methylenebis(2-chloroaniline)	120	1,028	7	-113	-94
94-59-7	Safrole	116	229	5	-111	-96
121-14-2	2,4-Dinitrotoluene	997	858	914	-83	-8
606-20-2	2,6-Dinitrotoluene	270	210	240	-30	-11
96-09-3	Styrene oxide	6	5	4	-2	-33
95-80-7	2,4-Diaminotoluene	227	888	713	486	214
302-01-2	Hydrazine	16,760	18,981	17,455	695	4
584-84-9	Toluene-2,4-diisocyanate	3,816	5,954	5,057	1,241	33
77-78-1	Dimethyl sulfate	3,045	3,230	5,392	2,347	77
100-44-7	Benzyl chloride	10,804	16,610	14,578	3,774	35
139-13-9	Nitrilotriacetic acid	1,330	4,478	6,353	5,023	378
26471-62-5	Toluenediisocyanate (mixed isomers)	34,242	41,800	40,087	5,845	17
123-91-1	1,4-Dioxane	336,757	265,746	346,713	9,956	3
101-77-9	4,4'-Methylenedianiline	19,470	18,653	32,736	13,266	68
98-95-3	Nitrobenzene	162,246	318,784	226,451	64,205	40
--	Cobalt (and its compounds)	610,664	948,083	705,355	94,691	16
79-06-1	Acrylamide	2,786,485	3,220,109	2,887,066	100,581	4
--	Cadmium (and its compounds)	1,267,003	1,102,583	1,723,498	456,495	36
--	Nickel (and its compounds)	6,291,589	7,660,568	7,475,100	1,183,511	19
50-00-0	Formaldehyde	8,858,041	9,928,014	10,050,659	1,192,618	13
1332-21-4	Asbestos (friable)	2,266,445	1,823,667	4,068,567	1,802,122	80
--	Arsenic (and its compounds)	2,178,235	4,058,514	4,191,573	2,013,338	92
--	Chromium (and its compounds)	23,900,828	26,407,607	27,942,215	4,041,387	17
100-42-5	Styrene	20,194,089	21,423,780	25,366,721	5,172,632	26
--	Lead (and its compounds)	19,961,392	26,478,754	26,944,931	6,983,539	35
	Subtotal	**157,972,327**	**158,519,453**	**158,981,657**	**1,009,330**	**0.6**
	% of Total	**16**	**16**	**17**		
	Total for Matched TRI Chemicals	**982,394,050**	**972,274,319**	**945,569,819**	**-36,824,231**	**-4**

Note: A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.
▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

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

Fifteen NPRI facilities accounted for 4.9 million kg of decreases in total releases of designated carcinogens from 1995 to 1998, and 15 NPRI facilities accounted for 3.7 million kg of increases.

- The NPRI facility with the largest decrease in designated carcinogens, CXY Chemicals in Nanaimo, British Columbia, reported 2.0 million kg of off-site releases of asbestos in 1995 because of a one-time transfer of asbestos during the remediation of an inactive asbestos pit.
- The NPRI facility with the second-largest decrease in total releases, Dominion Castings in Hamilton, Ontario, began sending the chromium-containing black sand from its waste stream to a recycler in 1995 instead of to an off-site landfill.
- The NPRI facility with the largest increase in releases of designated carcinogens from 1995 to 1998 was Inco Limited, Copper Cliff Smelter Complex in Copper Cliff, Ontario. The chromium at Inco is stockpiled in an on-site landfill in the form of spent chrome-magnesite refractory brick for future processing to recover the metal.
- The NPRI facility with the second-largest increase of designated carcinogens was the Noranda Inc. Brunswick Smelter in Belledune, New Brunswick. This facility began sending waste containing metals and their compounds to an off-site landfill in 1997.

Table 6–20. NPRI Facilities with Largest Decrease in Total Releases On- and Off-site of Known or Suspected Carcinogens,▼ 1995–1998

Rank	Facility	City, Province	US SIC Code
1	CXY Chemicals Limited Partnership, Canadian Occidental Petroleum	Nanaimo, BC	28
2	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	33
3	Bayer Inc., Sarnia Site	Sarnia, ON	28
4	Co-Steel Lasco	Whitby, ON	33
5	Slater Steels, Hamilton Specialty Bar Division	Hamilton, ON	33
6	Noranda Inc, Fonderie Horne	Rouyn-Noranda, QC	33
7	Western Co-Operative Fertilizers Ltd. - Calgary Site	Calgary, AB	28
8	Novopharm Limited	Toronto, ON	28
9	Doorhandle Systems, Hudson Bay Technologies	Brampton, ON	34
10	Abitibi Consolidated Inc, Division Belgo	Shawinigan, QC	26
11	Inco Limited Nickel Refinery	Copper Cliff, ON	33
12	Abitibi-Consolidated Inc., Division Port-Alfred	La Baie, QC	26
13	Advanced Monobloc, C.C.L. Industries Inc.	Penetanguishene, ON	34
14	Cooper Automotive Products Wagner Div., Cooper Industries Inc.	Stratford, ON	37
15	Imperial Oil, Sarnia Chemical Plant	Sarnia, ON	28
	Total		

Note: The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.
▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 6–21. NPRI Facilities with Largest Increase in Total Releases On- and Off-site of Known or Suspected Carcinogens,▼ 1995–1998

Rank	Facility	City, Province	US SIC Code
1	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	33
2	Noranda Inc., Brunswick Smelter	Belledune, NB	33
3	Petro-Canada, Burrard Products Terminal	Port Moody, BC	29
4	Stelco Inc., Hilton Works	Hamilton, ON	33
5	Carpenter Canada Limited	Woodbridge, ON	30
6	Dominion Colour Corporation, Kikuchi Color & Chemical	Ajax, ON	28
7	Kuntz Electroplating Inc.	Kitchener, ON	34
8	MAAX Inc., Fibre de verre moderne - usine 5	Tring-Jonction, QC	30
9	Safety-Kleen, Lambton Facility	Corunna, ON	28
10	Aciers Atlas Inc., Aciers Inoxydables Atlas	Tracy, QC	33
11	Hudson Bay Mining and Smelting, Metallurgical Complex	Flin Flon, MB	33
12	Novopharm Limited	Markham, ON	28
13	Falconbridge Ltd-Kidd Metallurgical Div.	District of Cochrane, ON	33
14	Uniboard Canada Inc., Division Val-d'Or, Unikunz Canada Inc.	Val-d'Or, QC	24
15	René Matériaux Composites Ltée, Usine St-Éphrem	St-Éphrem-de-Beauce, QC	37
	Total		

Note: The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.
▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 6–20. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases) (chemicals accounting for more than 70% of decrease in total releases on- and off-site of carcinogens from the facility)
1	1	1,988,000	1	272	2	742	-1,987,258	Asbestos (transfers to disposal)
2	1	1,401,905	2	547,186	2	727,323	-674,582	Chromium and compounds (transfers of metals)
3	5	529,475	5	215,673	5	176,839	-352,636	Benzene, 1,3-Butadiene (air)
4	3	998,809	3	588,851	3	660,598	-338,211	Lead and compounds (land, transfers of metals)
5	3	358,037	5	318,805	5	58,443	-299,594	Lead and compounds (transfers of metals)
6	6	398,980	5	281,030	5	240,090	-158,890	Lead and compounds (air)
7	1	154,000	1	0	*	*	-154,000	Asbestos (transfers to disposal)
8	1	418,410	1	313,250	1	274,196	-144,214	Dichloromethane (air)
9	2	140,810	2	74,750	*	*	-140,810	Chromium/Nickel and compounds (transfers of metals)
10	1	147,397	*	*	1	6,898	-140,499	Formaldehyde (water)
11	5	126,800	*	*	*	*	-126,800	Nickel and compounds (air)
12	1	129,500	2	26,330	1	14,400	-115,100	Formaldehyde (water)
13	1	109,380	*	*	*	*	-109,380	Tetrachloroethylene (air)
14	1	106,287	*	*	*	*	-106,287	Asbestos (transfers to disposal)
15	5	116,188	4	72,551	5	14,625	-101,563	Benzene (air), Asbestos (transfers to disposal)
	37	**7,123,978**	**31**	**2,438,698**	**30**	**2,174,154**	**-4,949,824**	

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

Table 6–21. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (chemicals accounting for more than 70% of increase in total releases on- and off-site of carcinogens from the facility)
1	4	498,950	4	897,650	5	1,815,626	1,316,676	Chromium and compounds (land)
2	3	18,200	3	482,987	3	538,612	520,412	Lead and compounds (transfers of metals)
3	1	1,200	2	272,319	2	474,715	473,515	Asbestos (transfers to disposal)
4	6	319,970	6	472,790	6	540,070	220,100	Asbestos (transfers to disposal)
5	2	196,585	2	296,925	2	374,612	178,027	Dichloromethane (air)
6	2	185,000	2	223,000	2	304,000	119,000	Lead and compounds (transfers of metals)
7	2	56,776	2	54,441	2	174,650	117,874	Nickel and compounds (transfers of metals)
8	*	*	1	73,260	1	115,740	115,740	Styrene (air)
9	*	*	*	*	6	110,867	110,867	Lead/Arsenic and compounds (land)
10	3	279,360	3	425,160	3	380,630	101,270	Chromium and compounds (transfers of metals)
11	3	41,177	3	234,454	3	136,714	95,537	Lead/Cadmium and compounds (air)
12	1	72,981	1	226,993	1	168,505	95,524	Dichloromethane (air)
13	*	*	4	69,999	4	78,308	78,308	Lead and compounds (air)
14	*	*	1	82,340	1	72,051	72,051	Formaldehyde (air)
15	*	*	2	71,000	2	72,000	72,000	Styrene (air)
	27	**1,670,199**	**36**	**3,883,318**	**43**	**5,357,100**	**3,686,901**	

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

Fifteen TRI facilities accounted for 11.8 million kg of decreases in designated carcinogens from 1995 to 1998, and 15 accounted for 21.7 million kg of increases in designated carcinogens.

- Zinc Corp. of America Monaca Smelter in Monaca, Pennsylvania, reported the largest decrease of carcinogens from 1995 to 1998, a decrease of 1.9 million kg. Prior to 1998, a major clean-up operation to remove old slag from the facility grounds was completed. The reported amounts for 1998 represent only the waste from slag generated during that year.
- Three other TRI facilities reported more than 1 million kg of decreases. Two were primary metals facilities (US SIC code 33), ASARCO Inc. in Hayden, Arizona, and Electralloy in Oil City, Pennsylvania. One was a chemicals manufacturer (US SIC code 28), BP Chemicals Inc. in Lima, Ohio.
- The TRI facility with the largest increase in designated carcinogens was Kennecott Utah Copper Smelter & Refy. in Magna, Utah. It reported an increase of 5.7 million kg, primarily of arsenic and lead and their compounds. The increase was due to increased production after the installation of a new smelter in 1995.

Table 6–22. TRI Facilities with Largest Decrease in Total Releases On- and Off-site of Known or Suspected Carcinogens,▼ 1995–1998

Rank	Facility	City, State	US SIC Code
1	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA	33
2	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ	33
3	Electralloy, G.O. Carlson Inc.	Oil City, PA	33
4	BP Chemicals Inc., BP America Inc.	Lima, OH	28
5	Cyprus Miami Mining Corp., Cyprus Climax Metals Co.	Claypool, AZ	33
6	Avesta Sheffield Plate Inc.	New Castle, IN	33
7	Monsanto - Chocolate Bayou	Alvin, TX	28
8	Birmingham Southeast L.L.C. Jackson MS Steel Div., Birmingham Steel	Flowood, MS	33
9	Armstrong World Inds. Lancaster Plant	Lancaster, PA	39
10	Slater Steels, Ft. Wayne Specialty Alloys Div.	Fort Wayne, IN	33
11	Eastman Kodak Co. Kodak Park	Rochester, NY	38
12	General Electric Plastics Co.	Mount Vernon, IN	28
13	ASARCO Inc., Omaha Plant	Omaha, NE	33
14	Heatcraft Inc., Lennox Intl. Inc.	Grenada, MS	Mult.
15	Celanese Ltd.- Clear Lake Plant, Hoechst	Pasadena, TX	28
	Total		

Note: The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.
▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 6–23. TRI Facilities with Largest Increase in Total Releases On- and Off-site of Known or Suspected Carcinogens,▼ 1995–1998

Rank	Facility	City, State	US SIC Code
1	Kennecott Utah Copper Smelter & Refy.	Magna, UT	33
2	Elementis Chromium L.P.	Corpus Christi, TX	28
3	ASARCO Inc.	East Helena, MT	33
4	American Steel Foundries, Alliance Plant, Amsted Inds. Inc.	Alliance, OH	33
5	Zinc Corp. of America, Horsehead Ind. Inc.	Palmerton, PA	33
6	Monsanto - Luling	Luling, LA	28
7	Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne, NC	28
8	Aguaglass Corp., Masco Corp.	Adamsville, TN	30
9	LTV Steel Co. Inc. Pittsburgh Works	Pittsburgh, PA	33
10	Quemetco Inc., RSR Corp.	City of Industry, CA	33
11	Solutia - Chocolate Bayou	Alvin, TX	28
12	C & D Techs. Inc.	Conyers, GA	36
13	Carpenter Co.	Russellville, KY	Mult.
14	Nucor-Yamato Steel Co.	Blytheville, AR	33
15	Federal Mogul Friction Prods.	Manila, AR	37
	Total		

Note: The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
A chemical (and its compound) is included if the chemical or any of its compounds is a designated carcinogen.
▼ Carcinogenic substances are those chemicals or chemical compounds listed in either the International Agency for Research on Cancer (IARC) Monographs or the US National Toxicological Program (NTP) Annual Report to Congress.

Table 6–22. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases) (chemicals accounting for more than 70% of decrease in total releases on- and off-site of carcinogens from the facility)
1	4	2,525,364	4	1,066,481	4	660,183	-1,865,181	Lead and compounds (transfers of metals)
2	4	2,635,015	4	534,481	5	1,316,661	-1,318,354	Lead/Arsenic and compounds (transfers of metals)
3	2	1,315,953	2	67,259	2	76,966	-1,238,987	Chromium and compounds (transfers of metals)
4	10	1,821,611	10	992,845	10	814,593	-1,007,018	Acrylonitrile (UIJ)
5	7	891,992	7	680,183	*	*	-891,992	Lead/Chromium and compounds (land)
6	2	849,182	2	49,344	2	35,914	-813,268	Chromium and compounds (transfers of metals)
7	4	801,396	1	43,284	1	63,501	-737,895	Acrylonitrile (UIJ)
8	3	604,672	3	131	2	3,512	-601,160	Lead and compounds (transfers of metals)
9	2	579,256	1	13,742	1	2,856	-576,400	Di-(2-ethylhexyl) phthalate (transfers to disposal)
10	2	573,016	2	35,073	2	27,139	-545,877	Chromium and compounds (transfers of metals)
11	10	1,330,379	10	1,014,075	8	813,893	-516,486	Dichloromethane (air)
12	4	704,631	4	398,436	4	243,308	-461,323	Dichloromethane (air)
13	2	453,285	2	896,507	*	*	-453,285	Lead and compounds (transfers of metals)
14	1	447,951	1	48,202	2	228	-447,723	Trichloroethylene (air)
15	6	417,915	6	61,385	6	50,319	-367,596	Vinyl acetate, Ethylene oxide (UIJ)
	63	**15,951,618**	**59**	**5,901,428**	**49**	**4,109,073**	**-11,842,545**	

* Indicates facility did not report any matched carcinogens that year.
UIJ=Underground injection.

Table 6–23. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (chemicals accounting for more than 70% of increase in total releases on- and off-site of carcinogens from the facility)
1	5	830,679	5	4,170,733	6	6,514,154	5,683,475	Arsenic/Lead and compounds (land)
2	1	4,306,445	1	8,012,383	1	7,267,938	2,961,493	Chromium and compounds (land)
3	4	1,931,484	4	2,043,545	4	3,697,473	1,765,989	Lead/Cadmium and compounds (transfers of metals)
4	3	1,161,760	3	492,213	1	2,634,195	1,472,435	Chromium and compounds (transfers of metals)
5	*	*	1	0	3	1,433,806	1,433,806	Lead and compounds (transfers of metals)
6	2	1,823,991	2	3,236,644	2	3,057,143	1,233,152	Formaldehyde (UIJ)
7	1	3,315,097	1	4,136,190	1	4,543,951	1,228,854	Chromium and compounds (land)
8	1	665,652	1	1,057,867	1	1,705,013	1,039,361	Styrene (air)
9	2	16,866	2	12,255	3	1,011,156	994,290	Asbestos (transfers to disposal)
10	3	702,388	3	935,692	3	1,483,818	781,430	Lead and compounds (transfers of metals)
11	0	0	3	1,039,050	3	766,226	766,226	Acrylonitrile (UIJ)
12	1	573	1	811,312	1	745,228	744,655	Lead and compounds (transfers of metals)
13	3	353,610	5	571,776	5	905,682	552,072	Dichloromethane (air)
14	4	19,454	4	736,243	4	566,939	547,485	Lead and compounds (transfers of metals)
15	1	345,079	1	32	1	875,215	530,136	Asbestos (transfers to disposal)
	31	**15,473,078**	**37**	**27,255,935**	**39**	**37,207,937**	**21,734,859**	

* Indicates facility did not report any matched carcinogens that year.
UIJ=Underground injection.

Metals and Their Compounds

Total releases of the 15 metals and metal compounds in the matched data set increased in both NPRI and TRI from 1995 to 1998. 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.

- Total releases of metals and their compounds increased 31 percent from 1995 to 1998 in North America. The increase in NPRI was 15 percent and the increase in TRI was 33 percent.
- The increase is opposite to the trend for all matching chemicals, which decreased by 4 percent in North America, 11 percent in NPRI and 4 percent in TRI.
- The metal with the largest increase in North America was zinc and its compounds, with 44.7 million kg, or 35 percent. Zinc and its compounds was also the metal with the largest increase in both NPRI and TRI.
- The metal with the largest decrease in North America was antimony and its compounds, with a 203,000 kg decrease, or 7 percent. Antimony (and its compounds) was the metal with the largest decrease in TRI, while copper (and its compounds) was the metal with the largest decrease in NPRI.
- Eleven of the 15 metals in TRI reported increases from 1995 to 1998. Only antimony and its compounds, aluminum, mercury and its compounds, and vanadium showed decreases. The decrease for mercury and its compounds was 77 percent.

Table 6–24. Change in Total Releases On- and Off-site of Metals and Their Compounds in North America, 1995–1998

CAS Number	Chemical	Total Releases On- and Off-site 1995 (kg)	1997 (kg)	1998 (kg)	Change 1995–1998 kg	%
--	Antimony (and its compounds)	2,773,646	2,766,710	2,570,730	-202,916	-7
--	Mercury (and its compounds)	129,948	34,602	31,199	-98,749	-76
7440-62-2	Vanadium (fume or dust)	258,457	198,060	173,055	-85,402	-33
--	Selenium (and its compounds)	225,725	256,971	327,496	101,771	45
--	Cobalt (and its compounds)	648,669	979,069	758,873	110,204	17
--	Silver (and its compounds)	50,525	76,788	171,586	121,061	240
7429-90-5	Aluminum (fume or dust)	5,385,884	6,325,634	5,629,425	243,541	5
--	Cadmium (and its compounds)	1,321,953	1,267,563	1,873,976	552,023	42
--	Nickel (and its compounds)	7,413,067	8,541,247	8,303,496	890,429	12
--	Arsenic (and its compounds)	2,252,313	4,260,439	4,510,136	2,257,823	100
--	Chromium (and its compounds)	26,986,765	29,161,747	31,665,188	4,678,423	17
--	Lead (and its compounds)	23,325,886	30,645,197	30,306,554	6,980,668	30
--	Copper (and its compounds)	34,135,061	36,810,331	41,965,372	7,830,311	23
--	Manganese (and its compounds)	49,614,336	72,695,521	68,713,065	19,098,729	38
--	Zinc (and its compounds)	128,260,265	179,470,947	172,931,035	44,670,770	35
	Subtotal	**282,782,500**	**373,490,826**	**369,931,186**	**87,148,686**	**31**
	% of Total	**26**	**34**	**35**		
	Total for All Matched Chemicals	**1,101,179,953**	**1,086,152,599**	**1,051,737,172**	**-49,442,781**	**-4**

Note: Canada and US data only. Mexico data not available for 1995–1998.

Table 6–25. Change in NPRI Total Releases On- and Off-site of Metals and Their Compounds, 1995–1998

CAS Number	Chemical	Total Releases On- and Off-site 1995 (kg)	1997 (kg)	1998 (kg)	Change 1995–1998 kg	%
--	Copper (and its compounds)	2,395,813	1,766,002	1,646,775	-749,038	-31
--	Manganese (and its compounds)	5,975,690	6,773,941	5,644,579	-331,111	-6
--	Nickel (and its compounds)	1,121,478	880,679	828,396	-293,082	-26
7440-62-2	Vanadium (fume or dust)	173,414	119,082	103,671	-69,743	-40
--	Mercury (and its compounds)	19,305	3,730	5,418	-13,887	-72
--	Lead (and its compounds)	3,364,494	4,166,443	3,361,623	-2,871	-0.1
--	Silver (and its compounds)	1,029	1,848	2,723	1,694	165
--	Selenium (and its compounds)	33,611	39,649	44,836	11,225	33
--	Cobalt (and its compounds)	38,005	30,986	53,518	15,513	41
--	Antimony (and its compounds)	13,103	20,234	37,807	24,704	189
--	Cadmium (and its compounds)	54,950	164,980	150,478	95,528	174
--	Arsenic (and its compounds)	74,078	201,925	318,563	244,485	330
7429-90-5	Aluminum (fume or dust)	613,535	790,035	1,011,751	398,216	65
--	Chromium (and its compounds)	3,085,937	2,754,140	3,722,973	637,036	21
--	Zinc (and its compounds)	16,750,381	25,724,471	21,829,439	5,079,058	30
	Subtotal	**33,714,823**	**43,438,145**	**38,762,550**	**5,047,727**	**15**
	% of Total	**28**	**38**	**37**		
	Total for Matched NPRI Chemicals	**118,785,903**	**113,878,280**	**106,167,353**	**-12,618,550**	**-11**

Table 6–26. Change in TRI Total Releases On- and Off-site of Metals and Their Compounds, 1995–1998

CAS Number	Chemical	Total Releases On- and Off-site 1995 (kg)	1997 (kg)	1998 (kg)	Change 1995–1998 kg	%
--	Antimony (and its compounds)	2,760,543	2,746,476	2,532,923	-227,620	-8
7429-90-5	Aluminum (fume or dust)	4,772,349	5,535,599	4,617,674	-154,675	-3
--	Mercury (and its compounds)	110,643	30,872	25,781	-84,862	-77
7440-62-2	Vanadium (fume or dust)	85,043	78,978	69,384	-15,659	-18
--	Selenium (and its compounds)	192,114	217,322	282,660	90,546	47
--	Cobalt (and its compounds)	610,664	948,083	705,355	94,691	16
--	Silver (and its compounds)	49,496	74,940	168,863	119,367	241
--	Cadmium (and its compounds)	1,267,003	1,102,583	1,723,498	456,495	36
--	Nickel (and its compounds)	6,291,589	7,660,568	7,475,100	1,183,511	19
--	Arsenic (and its compounds)	2,178,235	4,058,514	4,191,573	2,013,338	92
--	Chromium (and its compounds)	23,900,828	26,407,607	27,942,215	4,041,387	17
--	Lead (and its compounds)	19,961,392	26,478,754	26,944,931	6,983,539	35
--	Copper (and its compounds)	31,739,248	35,044,329	40,318,597	8,579,349	27
--	Manganese (and its compounds)	43,638,646	65,921,580	63,068,486	19,429,840	45
--	Zinc (and its compounds)	111,509,884	153,746,476	151,101,596	39,591,712	36
	Subtotal	**249,067,677**	**330,052,681**	**331,168,636**	**82,100,959**	**33**
	% of Total	**25**	**34**	**35**		
	Total for Matched TRI Chemicals	**982,394,050**	**972,274,319**	**945,569,819**	**-36,824,231**	**-4**

Facilities with Largest Changes in Total Releases On- and Off-site of Metals and Their Compounds

Fifteen NPRI facilities accounted for 5.9 million kg of decreases in total releases of metals and metal compounds from 1995 to 1998, and 15 NPRI facilities accounted for 10.0 million kg of increases.

- Two NPRI facilities reported more than 1.3 million kg of decreases in total releases of metals and their compounds from 1995 to 1998.
- The facility with the largest reported decrease in total releases of metals was Algoma Steel in Sault Ste. Marie, Ontario. Metals in slurry from the steelmaking process were reported as released to land prior to 1996 by the facility. The facility changed its reporting to reflect the fact that the slurry is stored on the property until the metals are recovered in the sintering process. It no longer reports them as on-site land releases.
- The facility with the second-largest reported decrease in total releases of metals was Co-Steel Lasco in Whitby, Ontario. This mini-mill steel manufacturer that recycles cars and other steel scrap sends electric arc furnace dust off site to a waste management company in Ontario. In 1995, the waste management company changed its practices from recycling the metals in the dust to disposal in a landfill. Co-Steel is implementing plans to send the dust to a recycler in Pennsylvania. Other year-to-year differences reflect changes in the raw materials used.

Table 6–27. NPRI Facilities with Largest Decrease in Total Releases On- and Off-site of Metals and Their Compounds, 1995–1998

Rank	Facility	City, Province	US SIC Code
1	Algoma Steel Inc, Algoma Steel Main Works	Sault Ste. Marie, ON	33
2	Co-Steel Lasco	Whitby, ON	33
3	Dominion Castings Ltd., NACO Inc.	Hamilton, ON	33
4	Titan Steel & Wire Co. Ltd., Mitsui & Co. Ltd.	Surrey, BC	33
5	Lake Erie Steel Company Ltd., Stelco Inc.	Nanticoke, ON	33
6	QIT-Fer et Titane Inc., RTZ Fer et Titane Inc.	Tracy, QC	33
7	Noranda Inc, Fonderie Horne	Rouyn-Noranda, QC	33
8	Doorhandle Systems, Hudson Bay Technologies	Brampton, ON	34
9	Slater Steels, Hamilton Specialty Bar Division	Hamilton, ON	33
10	Inco Limited Nickel Refinery	Copper Cliff, ON	33
11	Versatech Industries, Apex Metals Inc.	Kitchener, ON	34
12	Owens-Corning Canada Inc., Guelph Glass Plant	Guelph, ON	32
13	AltaSteel Ltd., Stelco Inc.	Edmonton, AB	33
14	North Atlantic Refining Ltd.	Come By Chance, NF	29
15	Abitibi-Consolidated Inc., Division Port-Alfred	La Baie, QC	26
	Total		

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

Table 6–28. NPRI Facilities with Largest Increase in Total Releases On- and Off-site of Metals and Their Compounds, 1995–1998

Rank	Facility	City, Province	US SIC Code
1	Dofasco Inc.	Hamilton, ON	33
2	Inco Limited, Copper Cliff Smelter Complex	Copper Cliff, ON	33
3	Ispat Sidbec Inc. Aciérie, Ispat Mexicana	Contrecœur, QC	33
4	Noranda Inc., Brunswick Smelter	Belledune, NB	33
5	Gerdau Courtice Steel Inc.	Cambridge, ON	33
6	Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor, ON	33
7	Gerdau MRM Steel Inc.	Selkirk, MB	33
8	Ivaco Rolling Mills	L'Orignal, ON	33
9	Recyclage d'aluminium, Philip Services Corp.	Bécancour, QC	33
10	Hudson Bay Mining and Smelting, Metallurgical Complex	Flin Flon, MB	33
11	Cominco Ltd., Trail Operations	Trail, BC	33
12	Falconbridge Ltd-Kidd Metallurgical Div.	District of Cochrane, ON	33
13	Fraser Papers Inc. (Canada), Nexfor Inc.	Edmundston, NB	26
14	Safety-Kleen, Lambton Facility	Corunna, ON	28
15	New Flyer Industries Limited	Winnipeg, MB	37
	Total		

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

Table 6–27. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases) (chemicals accounting for more than 70% of decrease in total releases on- and off-site of metals and their compounds from the facility)
1	6	1,401,740	7	7,628	6	12,223	-1,389,517	Manganese and compounds (land)
2	6	8,442,331	6	7,059,754	6	7,063,650	-1,378,681	Copper and compounds (land)
3	2	1,487,191	3	573,333	3	740,163	-747,028	Chromium and compounds (transfers of metals)
4	2	398,235	2	6,650	2	6,212	-392,023	Zinc and compounds (transfers of metals)
5	6	446,525	6	1,942,724	6	104,922	-341,603	Manganese and compounds (land)
6	6	326,478	2	6,660	2	34,800	-291,678	Zinc and compounds (transfers of metals)
7	11	648,045	11	498,120	11	393,690	-254,355	Lead and compounds (air)
8	4	209,780	3	91,920	*	*	-209,780	Chromium/Nickel/Zinc and compounds (transfers of metals)
9	5	1,455,519	8	1,491,409	8	1,276,342	-179,177	Lead and compounds (transfers of metals)
10	7	153,630	*	*	*	*	-153,630	Nickel and compounds (air), Lead and compounds (air, water)
11	3	136,000	3	0	3	0	-136,000	Zinc and compounds (transfers of metals)
12	1	125,048	*	*	*	*	-125,048	Zinc and compounds (transfers of metals)
13	5	797,452	6	971,493	6	678,263	-119,189	Zinc/Manganese and compounds (transfers of metals)
14	4	122,723	3	35,003	3	22,769	-99,954	Vanadium (air)
15	1	99,700	1	34,000	1	0	-99,700	Manganese and compounds (transfers of metals)
	69	**16,250,397**	**61**	**12,718,694**	**57**	**10,333,034**	**-5,917,363**	

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

Table 6–28. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (chemicals accounting for more than 70% of increase in total releases on- and off-site of metals and their compounds from the facility)
1	6	1,947,875	6	8,191,371	6	6,323,711	4,375,836	Zinc and compounds (transfers of metals)
2	6	621,640	6	1,014,986	7	1,927,052	1,305,412	Chromium and compounds (land)
3	5	1,510,387	5	2,349,790	5	2,435,843	925,456	Zinc and compounds (land)
4	5	18,478	5	485,648	7	552,244	533,766	Lead and compounds (transfers of metals)
5	5	354,078	5	632,146	5	799,449	445,371	Zinc and compounds (transfers of metals)
6	7	850,293	8	1,105,298	8	1,279,627	429,334	Zinc/Copper and compounds (transfers of metals)
7	3	762,000	5	1,752,614	5	1,167,315	405,315	Zinc and compounds (land)
8	5	1,548,866	7	1,657,147	7	1,850,638	301,772	Zinc/Manganese and compounds (transfers of metals)
9	1	265,000	1	275,000	1	500,000	235,000	Aluminum (land)
10	5	161,217	5	710,354	5	391,520	230,303	Zinc/Lead and compounds (air)
11	*	*	*	*	9	220,612	220,612	Zinc and compounds (air)
12	*	*	9	169,168	9	183,079	183,079	Lead/Copper and compounds (air)
13	*	*	*	*	2	176,604	176,604	Manganese and compounds (transfers of metals)
14	*	*	*	*	8	133,681	133,681	Lead/Arsenic and compounds (land)
15	*	*	*	*	1	129,100	129,100	Zinc and compounds (transfers of metals)
	48	**8,039,834**	**62**	**18,343,522**	**85**	**18,070,475**	**10,030,641**	

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

- Two NPRI facilities reported increases in total releases of metals of more than 1 million kg. These two facilities also had the largest increases in total releases for all matched chemicals (see Table 6–8).
- The NPRI facility with the largest increase from 1995 to 1998 was Dofasco Inc. in Hamilton, Ontario. However, it achieved a 23 percent reduction in total releases of metals from 1997 to 1998 through installation of pollution control equipment. The increase from 1995 to 1998 was due to production increases.

Fifteen TRI facilities accounted for 35.3 million kg of decreases in total releases of metals and metal compounds from 1995 to 1998, and 15 TRI facilities accounted for 64.3 million kg of increases.

- Two TRI facilities had decreases in total releases of more than 5 million kg in metals and their compounds from 1995 to 1998.
- The apparent decrease of 7.0 million kg from the Cyprus Miami Mining Corp. in Claypool, Arizona, was due to a change in reporting. The facility reported as a copper smelter (US SIC code 33, primary metals industry) prior to 1998. The TRI industries added to reporting for 1998 included metal mining, and Cyprus Miami Mining now reports under the new metal mining industry sector. Such reports are not included in the matched data set for 1995 to 1998.
- Zinc Corp. of America Monaca Smelter in Monaca, Pennsylvania, reported the second-largest decrease of metals from 1995 to 1998. (This facility also reported a large decrease in carcinogens (see Table 6–22). Amounts prior to 1998 reflect a major clean-up operation to remove old slag from the facility grounds.
- Two TRI facilities had increases in total releases of more than 10 million kg from 1995 to 1998.

Table 6–29. TRI Facilities with Largest Decrease in Total Releases On- and Off-site of Metals and Their Compounds, 1995–1998

Rank	Facility	City, State	US SIC Code
1	Cyprus Miami Mining Corp., Cyprus Climax Metals Co.	Claypool, AZ	33
2	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA	33
3	Phelps Dodge Hidalgo Inc.	Playas, NM	33
4	GM Powertrain Defiance, General Motors Corp.	Defiance, OH	33
5	Chino Mines Co., Phelps Dodge Corp.	Hurley, NM	33
6	Northwestern Steel & Wire Co.	Sterling, IL	33
7	ASARCO Inc., Omaha Plant	Omaha, NE	33
8	Electralloy, G.O. Carlson Inc.	Oil City, PA	33
9	Natl. Steel Corp., Great Lakes Div.	Ecorse, MI	33
10	Chemetal Inc., Comilog	New Johnsonville, TN	28
11	Newport Steel Corp., NS Group Inc.	Wilder, KY	33
12	Birmingham Southeast L.L.C. Jackson MS Steel Div., Birmingham Steel	Flowood, MS	33
13	Avesta Sheffield Plate Inc.	New Castle, IN	33
14	Inspec USA Inc., Unit 2, Inspec Group PLC	Galena, KS	28
15	Franklin Bronze & Alloy Co., Inc.	Franklin, PA	33
	Total		

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

Table 6–30. TRI Facilities with Largest Increase in Total Releases On- and Off-site of Metals and Their Compounds, 1995–1998

Rank	Facility	City, State	US SIC Code
1	Kennecott Utah Copper Smelter & Refy.	Magna, UT	33
2	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ	33
3	Nucor-Yamato Steel Co.	Blytheville, AR	33
4	Steel Dynamics Inc.	Butler, IN	33
5	Nucor Steel	Crawfordsville, IN	33
6	ASARCO Inc.	East Helena, MT	33
7	DuPont Delisle Plant	Pass Christian, MS	28
8	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville, OR	33
9	Elementis Chromium L.P.	Corpus Christi, TX	28
10	Nucor Corp. Nucor Steel	Plymouth, UT	33
11	Nucor Steel, Nebraska	Norfolk, NE	33
12	USS Gary Works, USX Corp.	Gary, IN	33
13	Bar Tech. S. Inc. Primary Ops.	Johnstown, PA	33
14	Nucor Steel	Huger, SC	33
15	Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais, IL	33
	Total		

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

Table 6–29. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases (chemicals accounting for more than 70% of decrease in total releases on- and off-site of metals and their compounds from the facility)
1	11	7,015,825	14	8,596,691	*	*	-7,015,825	Copper/Zinc and compounds (land)
2	10	15,994,774	9	14,080,761	9	9,237,026	-6,757,748	Zinc/Lead and compounds (transfers of metals)
3	10	14,457,961	13	12,345,858	11	9,856,664	-4,601,297	Zinc and compounds (land)
4	6	6,229,568	20	5,973,972	6	2,851,338	-3,378,230	Zinc and compounds (land)
5	2	3,169,958	*	*	*	*	-3,169,958	Copper and compounds (land)
6	4	7,437,795	6	6,815,353	4	5,874,579	-1,563,216	Zinc/Manganese and compounds (land)
7	5	1,403,295	6	1,749,708	*	*	-1,403,295	Zinc/Lead and compounds (transfers of metals)
8	4	1,336,940	5	131,414	4	108,701	-1,228,239	Chromium and compounds (transfers of metals)
9	3	6,154,942	18	3,599,189	5	4,961,497	-1,193,445	Zinc and compounds (transfers of metals)
10	2	2,108,027	2	1,540,532	1	994,761	-1,113,266	Manganese and compounds (land)
11	8	1,389,208	7	1,027,962	7	511,996	-877,212	Zinc and compounds (transfers of metals)
12	5	841,427	5	1,886	4	6,796	-834,631	Lead and compounds, Manganese and compounds (transfers of metals)
13	3	851,384	5	234,027	3	37,542	-813,842	Chromium and compounds (transfers of metals)
14	1	740,703	14	871,865	*	*	-740,703	Manganese and compounds (transfers of metals)
15	3	636,961	2	332,198	*	*	-636,961	Nickel/Copper/Zinc and compounds (transfers of metals)
	77	**69,768,768**	**126**	**57,301,416**	**54**	**34,440,900**	**-35,327,868**	

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

- The TRI facility, Kennecott Utah Copper Smelter & Refy. in Magna, Utah, reported the largest increase in total releases of metals from 1995 to 1998. The increases were due to increased production after the installation of a new smelter in 1995.
- The TRI facility with the second-largest apparent increase in total releases of metals, 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 and it is not possible to know how much of the 1998 amounts are due to the metal mining operations.

Table 6–30. (*continued*)

Rank	1995 Number of Forms	1995 Total Releases On- and Off-site (kg)	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	Change in Total Releases 1995–1998 (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases) (chemicals accounting for more than 70% of increase in total releases on- and off-site of metals and their compounds from the facility)
1	8	2,844,556	8	11,168,635	12	15,396,980	12,552,424	Copper/Zinc/Arsenic and compounds (land)
2	8	9,864,880	8	879,354	10	20,836,631	10,971,751	Copper and compounds (land)
3	6	57,587	7	7,550,269	7	5,103,675	5,046,088	Zinc and compounds (transfers of metals)
4	1	6,117	6	6,536,172	3	4,653,338	4,647,221	Zinc and compounds (transfers of metals)
5	6	5,213,871	6	5,611,437	6	8,844,081	3,630,210	Zinc and compounds (transfers of metals)
6	9	17,914,618	9	17,690,263	9	21,309,880	3,395,262	Zinc and compounds (land, transfers of metals), Lead/Cadmium and compounds (transfers of metals)
7	*	*	6	3,809,614	7	3,107,143	3,107,143	Manganese and compounds (UIJ)
8	5	1,969	5	1,063,826	5	3,023,279	3,021,310	Zinc and compounds (transfers of metals)
9	1	4,306,445	1	8,012,383	1	7,267,938	2,961,493	Chromium and compounds (land)
10	6	180,815	5	3,929,159	6	2,979,970	2,799,155	Zinc and compounds (transfers of metals)
11	6	1,272	6	309,143	7	2,588,657	2,587,385	Zinc and compounds (transfers of metals)
12	9	3,004,720	11	6,892,996	12	5,544,812	2,540,092	Zinc and compounds (land)
13	*	*	5	1,930,760	5	2,433,548	2,433,548	Zinc and compounds (transfers of metals)
14	*	*	4	758,438	6	2,350,354	2,350,354	Zinc and compounds (transfers of metals)
15	5	2,252	5	2,388,551	5	2,291,419	2,289,167	Zinc and compounds (transfers of metals)
	70	**43,399,102**	**92**	**78,531,000**	**101**	**107,731,705**	**64,332,603**	

* Indicates facility did not report any matched metals that year.
UIJ=Underground injection.

6.3 1995–1998 Transfers Off-site for Further Management

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

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

These transfers also do not include transfers of metals. Such transfers 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 and locations where waste 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-

Table 6–31. Transfers Off-site for Further Management in North America, 1995–1998

	North America					
	1995 Number	1996 Number	1997 Number	1998* Number	Change 1997-1998 (%)	Change 1995-1998 (%)
Total Facilities	21,438	21,159	20,944	20,681	-1	-4
Total Forms	65,498	64,091	64,035	63,611	-1	-3
	kg	kg	kg	kg	%	%
Transfers to Treatment (except metals)**	88,638,661	85,368,536	103,403,299	99,368,671	-4	12
Transfers to Sewage/POTWs (except metals)**	97,480,049	95,419,143	108,819,072	107,028,733	-2	10
Total Transfers Off-site for Further Management	**186,118,710**	**180,787,679**	**212,222,371**	**206,397,404**	**-3**	**11**

Note: Canada and US data only. Mexico data not available for 1995–1998. 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.

* New TRI industry sectors not included for 1998.

** Does not Include transfers of metals and metal compounds to treatment or sewage.

Table 6–31. (*continued*)

	NPRI						TRI					
	1995 Number	1996 Number	1997 Number	1998* Number	Change 1997-1998 (%)	Change 1995-1998 (%)	1995 Number	1996 Number	1997 Number	1998* Number	Change 1997-1998 (%)	Change 1995-1998 (%)
Total Facilities	1,302	1,355	1,445	1,488	3	14	20,136	19,804	19,499	19,193	-2	-5
Total Forms	4,164	4,324	4,632	4,797	4	15	61,334	59,767	59,403	58,814	-1	-4
	kg	kg	kg	kg	%	%	kg	kg	kg	kg	%	%
Transfers to Treatment (except metals)**	7,456,946	9,135,194	9,927,697	8,135,931	-18	9	81,181,715	76,233,342	93,475,602	91,232,740	-2	12
Transfers to Sewage/POTWs (except metals)**	4,177,909	4,893,811	5,260,842	5,413,397	3	30	93,302,140	90,525,332	103,558,230	101,615,336	-2	9
Total Transfers Off-site for Further Management	**11,634,855**	**14,029,005**	**15,188,539**	**13,549,328**	**-11**	**16**	**174,483,855**	**166,758,674**	**197,033,832**	**192,848,076**	**-2**	**11**

Note: Canada and US data only. Mexico data not available for 1995–1998. 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.

* New TRI industry sectors not included for 1998.

** Does not Include transfers of metals and metal compounds to treatment or sewage.

and off-site releases because it is not known how much of the off-site transfers are released at off-site locations after treatment.

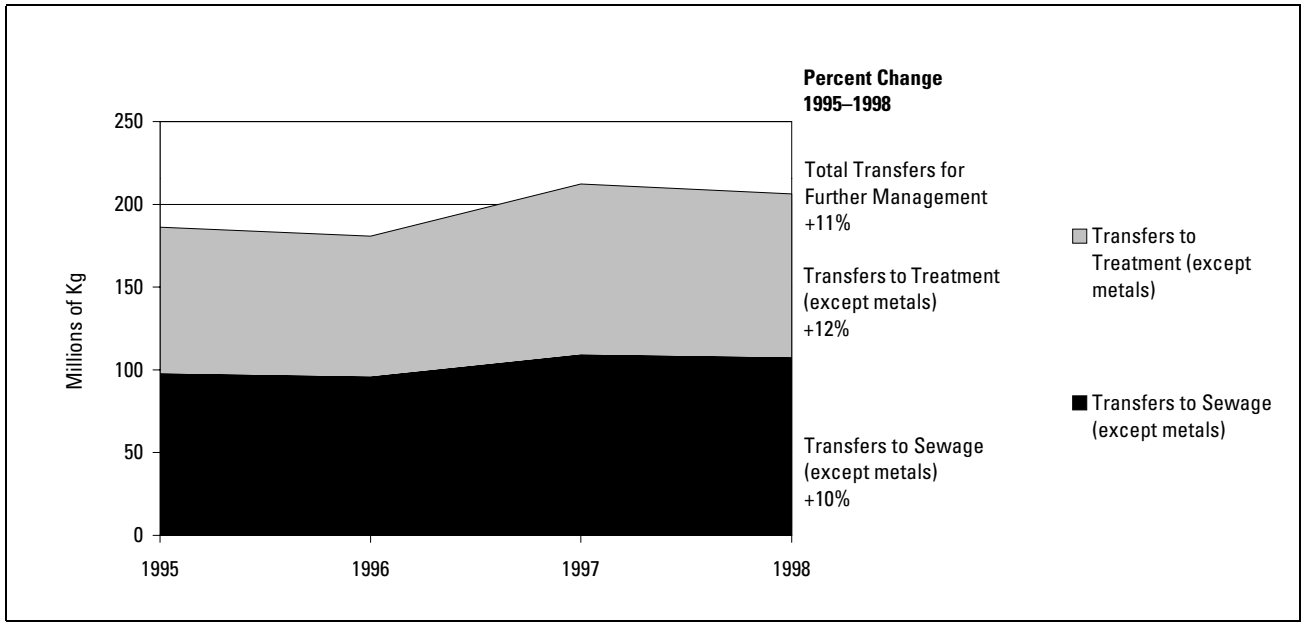
This section presents information on amounts of chemicals sent off-site to treatment and sewage, with the focus on the amounts reported by the sending facilities. The information in Chapter 7, which addresses cross-border transfers, focuses on the sites receiving the transfers.

- North American transfers to treatment and sewage (not including metals) decreased from 1997 to 1998 by 3 percent; however, the overall change from 1995 to 1998 was an increase of 11 percent.
- The increase from 1995 to 1998 for NPRI was 16 percent; for TRI it was 11 percent.
- NPRI facilities report more of their transfers to treatment, and TRI facilities report more of their transfers to sewage overall.

Increases in transfers for further management from 1995 to 1998 reflect increases in both transfers to treatment and transfers to sewage. These two types of transfers were reported in approximately the same amounts and percentage increases in North America.

- The same pattern of change occurred in transfers to treatment for both NPRI and TRI and for transfers to sewage for TRI. Decreases from 1997 to 1998, but increases overall from 1995 to 1998.
- Only NPRI transfers to sewage increased from 1997 to 1998, by 3 percent. Such transfers increased each year from 1995 to 1998, increasing by 30 percent over this period.

Figure 6–7. Transfers Off-site for Further Management in North America, 1995–1998



Note: Canada and US data only. Mexico data not available for 1995–1998.

Figure 6–8. NPRI Transfers Off-site for Further Management, 1995–1998

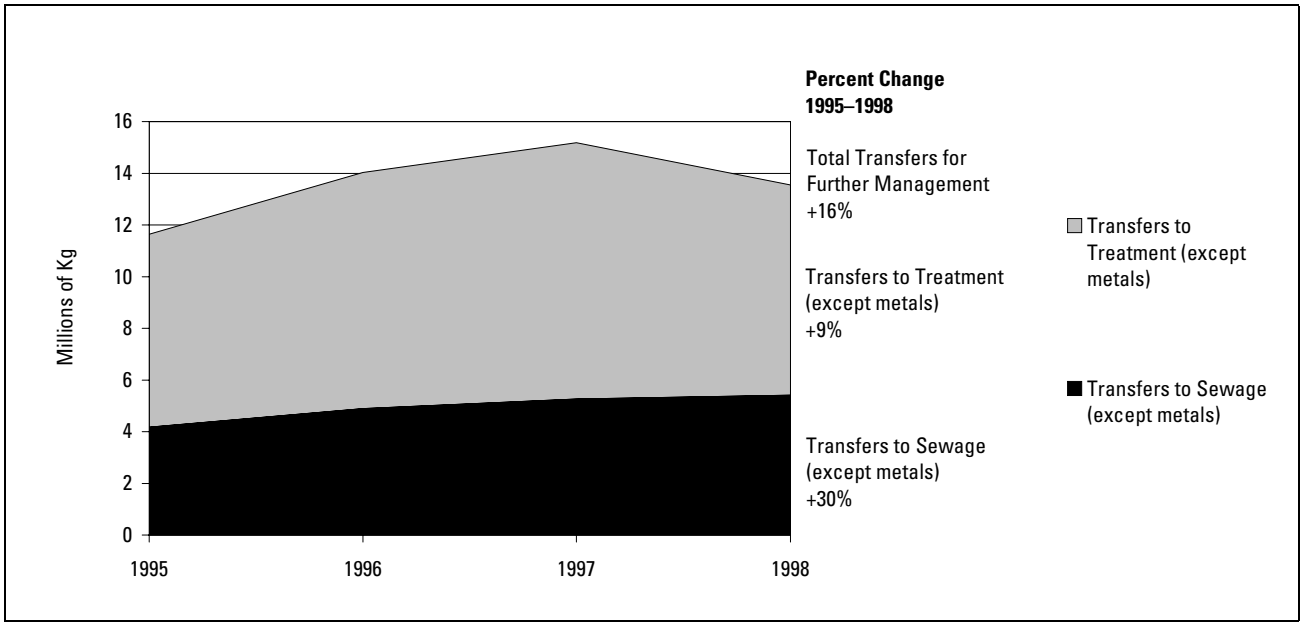
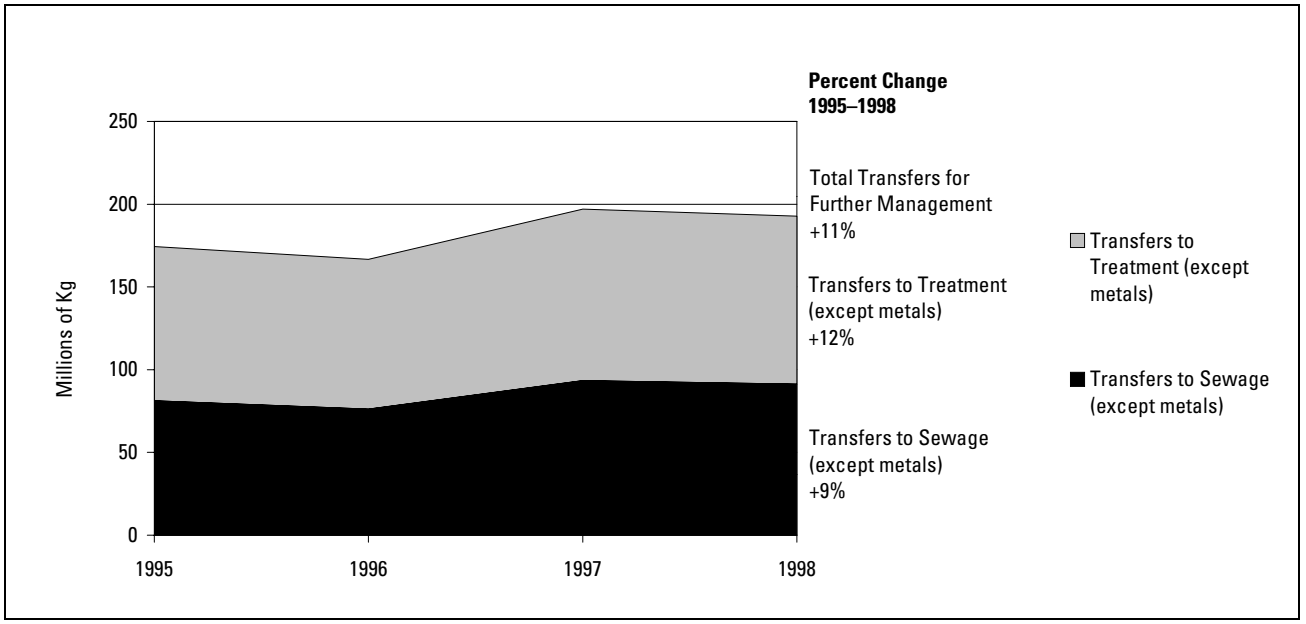


Figure 6–9. TRI Transfers Off-site for Further Management, 1995–1998



6.3.1 1995–1998 Transfers Off-site for Further Management by State and Province

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

While the vast majority of transfers to sewage can be expected to be to sites within the same state or province, some transfers to treatment may not. This section examines transfers from the perspective of where they originate, while Chapter 7 examines cross-border transfers and where such transfers end up.

- Facilities in Ontario and Quebec reported the largest transfers for further management in each of the years 1995 to 1998.
- Ontario and Quebec facilities reported increases of 38 and 13 percent respectively from 1995 to 1998.

Table 6–32. NPRI Transfers for Further Management by Province, 1995, 1997–1998 (Ordered by 1998 Total Transfers)

	Transfers to Treatment (except metals)					Transfers to Sewage (except metals)				
Province	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Ontario	3,329,329	5,182,915	4,971,305	-4	49	3,725,978	4,777,146	4,758,656	0	28
Quebec	1,823,429	2,070,270	2,189,974	6	20	403,396	458,013	334,982	-27	-17
Alberta	662,560	570,301	542,388	-5	-18	33,220	5,274	317,632	5,923	856
Manitoba	205,419	266,510	275,233	3	34	50	40	4	-90	-92
Prince Edward Island	0	34,694	71,041	105	--	0	0	0	--	--
New Brunswick	1,411,120	1,467,887	56,269	-96	-96	0	0	0	--	--
British Columbia	18,328	32,833	15,472	-53	-16	15,000	18,324	2,068	-89	-86
Nova Scotia	6,261	300,787	11,749	-96	88	0	0	0	--	--
Saskatchewan	500	1,500	2,500	67	400	265	2,045	55	-97	-79
Newfoundland	0	0	0	--	--	0	0	0	--	--
Total	**7,456,946**	**9,927,697**	**8,135,931**	**-18**	**9**	**4,177,909**	**5,260,842**	**5,413,397**	**3**	**30**

Note: The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
Transfers to treatment and to sewage (except metals) from facilities located in the province.

Table 6–32. (*continued*)

Province	Total Transfers for Further Management 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Ontario	7,055,307	9,960,061	9,729,961	-2	38
Quebec	2,226,825	2,528,283	2,524,956	0	13
Alberta	695,780	575,575	860,020	49	24
Manitoba	205,469	266,550	275,237	3	34
Prince Edward Island	0	34,694	71,041	105	--
New Brunswick	1,411,120	1,467,887	56,269	-96	-96
British Columbia	33,328	51,157	17,540	-66	-47
Nova Scotia	6,261	300,787	11,749	-96	88
Saskatchewan	765	3,545	2,555	-28	234
Newfoundland	0	0	0	--	--
Total	**11,634,855**	**15,188,539**	**13,549,328**	**-11**	**16**

- The largest decreases were reported by facilities in New Brunswick, which had reductions of 96 percent. The rank of New Brunswick dropped from third in 1995 to sixth in 1998.
- Only facilities in British Columbia also reported decreases from 1995 to 1998.
- Five provinces had decreases from 1997 to 1998, including top-ranked Ontario.

- Texas facilities reported the largest transfers for further management, both to treatment and to sewage, in 1995 and 1998. They reported an increase of 17 percent from 1997 to 1998 and an overall increase of 11 percent from 1995 to 1998.
- The four states with the largest transfers for further management, Texas, Michigan, Ohio and New Jersey, were top ranked in 1995 and 1998. In addition, Pennsylvania was ranked second in 1997.
- Among these four top-ranked states, only New Jersey reported a decrease from 1995 to 1998, of 20 percent.
- About 60 percent of the states and other US jurisdictions reported increases from 1995 to 1998, and 40 percent reported decreases.

Table 6–33. TRI Transfers for Further Management by State, 1995, 1997–1998 (Ordered by 1998 Total Transfers)

	Transfers to Treatment (except metals)					Transfers to Sewage (except metals)				
State	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Texas	12,838,062	8,766,843	10,816,503	23	-16	18,067,681	20,529,038	23,498,480	14	30
Michigan	6,125,643	6,014,006	9,876,168	64	61	4,226,124	5,601,483	6,707,359	20	59
Ohio	5,469,808	6,505,387	6,122,536	-6	12	6,025,775	6,511,594	6,471,108	-1	7
New Jersey	2,240,076	2,261,225	1,709,538	-24	-24	9,617,607	8,779,002	7,737,035	-12	-20
California	1,281,142	1,531,639	1,671,985	9	31	5,665,329	7,346,679	6,311,863	-14	11
Pennsylvania	5,536,148	14,794,882	4,346,043	-71	-21	2,919,364	3,034,670	2,618,824	-14	-10
Virginia	380,746	692,819	804,073	16	111	5,636,081	7,642,871	5,811,171	-24	3
Louisiana	2,199,253	3,563,922	6,273,504	76	185	10,550	29,765	109,139	267	934
South Carolina	1,959,126	3,298,436	4,194,229	27	114	1,406,552	1,899,534	2,023,958	7	44
Wisconsin	3,918,627	4,195,813	4,223,681	1	8	2,091,215	2,009,014	1,891,935	-6	-10
Indiana	2,001,926	2,417,417	3,543,681	47	77	579,620	1,204,176	2,323,618	93	301
Oregon	135,468	147,305	242,703	65	79	4,477,311	4,862,679	5,287,325	9	18
Illinois	3,116,188	2,374,588	2,974,163	25	-5	3,006,674	2,394,924	2,501,566	4	-17
Puerto Rico	2,458,699	2,288,045	3,848,983	68	57	1,073,984	994,459	955,234	-4	-11
Massachusetts	2,178,030	2,125,259	1,894,235	-11	-13	2,604,770	2,201,596	2,781,305	26	7
Missouri	3,797,350	3,647,025	3,602,207	-1	-5	907,372	835,877	750,970	-10	-17
Minnesota	259,901	310,878	496,076	60	91	3,304,218	4,017,817	3,425,748	-15	4
Alabama	2,358,391	3,864,169	3,460,027	-10	47	252,585	376,420	392,374	4	55
Maryland	713,960	2,377,352	2,597,055	9	264	1,299,847	1,069,421	1,199,341	12	-8
Iowa	669,894	625,936	1,440,629	130	115	3,371,423	3,183,521	2,247,339	-29	-33
Florida	920,468	1,652,401	905,701	-45	-2	2,687,066	3,338,473	2,767,026	-17	3
Tennessee	1,981,016	2,504,479	1,417,877	-43	-28	1,935,334	2,203,285	2,231,779	1	15
Connecticut	2,671,810	4,165,005	3,102,884	-26	16	273,622	411,056	412,870	0	51
New York	1,859,954	2,316,962	1,595,003	-31	-14	3,038,181	2,190,769	1,713,009	-22	-44
Kentucky	2,217,767	2,481,124	2,366,693	-5	7	369,004	556,953	474,292	-15	29
Georgia	854,752	893,272	1,564,146	75	83	1,126,713	1,227,692	1,081,418	-12	-4
West Virginia	1,718,330	1,023,100	942,819	-8	-45	1,340,867	1,644,063	1,440,046	-12	7
North Carolina	5,295,389	1,377,149	1,246,509	-9	-76	804,718	535,979	490,545	-8	-39
Washington	150,959	243,515	417,505	71	177	1,163,673	1,215,576	1,183,411	-3	2
Delaware	297,111	185,108	168,991	-9	-43	1,128,396	1,291,465	1,164,709	-10	3
Colorado	474,027	443,580	780,034	76	65	163,489	328,806	304,116	-8	86
Arizona	89,467	276,071	200,737	-27	124	694,310	880,370	738,250	-16	6
Arkansas	450,727	491,258	627,449	28	39	66,176	43,513	42,405	-3	-36
South Dakota	52,450	49,224	108,881	121	108	172,073	1,084,486	507,894	-53	195
Mississippi	738,061	488,787	385,900	-21	-48	305,641	202,934	230,638	14	-25
Kansas	960,373	1,622,232	321,879	-80	-66	170,645	524,967	204,581	-61	20
Oklahoma	98,609	668,668	135,069	-80	37	52,441	197,867	216,370	9	313
Idaho	2,463	6,060	12,234	102	397	170,100	226,383	326,360	44	92
Utah	17,081	42,091	202,200	380	1,084	198,620	121,325	106,400	-12	-46
New Hampshire	110,651	154,860	135,699	-12	23	99,067	122,176	131,311	7	33
North Dakota	8,073	11,103	1,321	-88	-84	250,716	58,771	228,525	289	-9
Rhode Island	176,330	122,495	136,334	11	-23	147,579	128,951	86,528	-33	-41
New Mexico	16,657	59,113	65,053	10	291	121,121	152,396	125,306	-18	3
Virgin Islands	68,096	135,332	154,972	15	128	0	0	0	--	--
Vermont	125,705	59,167	42,035	-29	-67	80,963	105,111	109,636	4	35
Nebraska	40,262	32,809	15,200	-54	-62	138,410	154,291	127,264	-18	-8
Maine	128,984	19,449	32,660	68	-75	55,707	81,639	103,140	26	85
Nevada	648	3,654	4,384	20	577	3,416	4,270	20,413	378	498
Montana	12,950	118,236	2,928	-98	-77	10	10	1,289	12,790	12,790
Hawaii	3,331	826	1,340	62	-60	0	0	0	--	--
Wyoming	764	24,538	195	-99	-74	0	113	113	0	--
Alaska	12	988	89	-91	642	0	0	0	--	--
District of Columbia	0	0	0	--	--	0	0	0	--	--
Total	**81,181,715**	**93,475,602**	**91,232,740**	**-2**	**12**	**93,302,140**	**103,558,230**	**101,615,336**	**-2**	**9**

Note: The data are estimates of releases and transfers of chemicals as reported by facilities, and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.
Transfers to treatment and to sewage (except metals) from facilities located in the state.

Table 6–33. (*continued*)

State	Total Transfers for Further Management				
	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Texas	30,905,743	29,295,881	34,314,983	17	11
Michigan	10,351,767	11,615,489	16,583,527	43	60
Ohio	11,495,583	13,016,981	12,593,644	-3	10
New Jersey	11,857,683	11,040,227	9,446,573	-14	-20
California	6,946,471	8,878,318	7,983,848	-10	15
Pennsylvania	8,455,512	17,829,552	6,964,867	-61	-18
Virginia	6,016,827	8,335,690	6,615,244	-21	10
Louisiana	2,209,803	3,593,687	6,382,643	78	189
South Carolina	3,365,678	5,197,970	6,218,187	20	85
Wisconsin	6,009,842	6,204,827	6,115,616	-1	2
Indiana	2,581,546	3,621,593	5,867,299	62	127
Oregon	4,612,779	5,009,984	5,530,028	10	20
Illinois	6,122,862	4,769,512	5,475,729	15	-11
Puerto Rico	3,532,683	3,282,504	4,804,217	46	36
Massachusetts	4,782,800	4,326,855	4,675,540	8	-2
Missouri	4,704,722	4,482,902	4,353,177	-3	-7
Minnesota	3,564,119	4,328,695	3,921,824	-9	10
Alabama	2,610,976	4,240,589	3,852,401	-9	48
Maryland	2,013,807	3,446,773	3,796,396	10	89
Iowa	4,041,317	3,809,457	3,687,968	-3	-9
Florida	3,607,534	4,990,874	3,672,727	-26	2
Tennessee	3,916,350	4,707,764	3,649,656	-22	-7
Connecticut	2,945,432	4,576,061	3,515,754	-23	19
New York	4,898,135	4,507,731	3,308,012	-27	-32
Kentucky	2,586,771	3,038,077	2,840,985	-6	10
Georgia	1,981,465	2,120,964	2,645,564	25	34
West Virginia	3,059,197	2,667,163	2,382,865	-11	-22
North Carolina	6,100,107	1,913,128	1,737,054	-9	-72
Washington	1,314,632	1,459,091	1,600,916	10	22
Delaware	1,425,507	1,476,573	1,333,700	-10	-6
Colorado	637,516	772,386	1,084,150	40	70
Arizona	783,777	1,156,441	938,987	-19	20
Arkansas	516,903	534,771	669,854	25	30
South Dakota	224,523	1,133,710	616,775	-46	175
Mississippi	1,043,702	691,721	616,538	-11	-41
Kansas	1,131,018	2,147,199	526,460	-75	-53
Oklahoma	151,050	866,535	351,439	-59	133
Idaho	172,563	232,443	338,594	46	96
Utah	215,701	163,416	308,600	89	43
New Hampshire	209,718	277,036	267,010	-4	27
North Dakota	258,789	69,874	229,846	229	-11
Rhode Island	323,909	251,446	222,862	-11	-31
New Mexico	137,778	211,509	190,359	-10	38
Virgin Islands	68,096	135,332	154,972	15	128
Vermont	206,668	164,278	151,671	-8	-27
Nebraska	178,672	187,100	142,464	-24	-20
Maine	184,691	101,088	135,800	34	-26
Nevada	4,064	7,924	24,797	213	510
Montana	12,960	118,246	4,217	-96	-67
Hawaii	3,331	826	1,340	62	-60
Wyoming	764	24,651	308	-99	-60
Alaska	12	988	89	-91	642
District of Columbia	0	0	0	--	--
Total	**174,483,855**	**197,033,832**	**192,848,076**	**-2**	**11**

6.3.2 1995–1998 Transfers Off-site for Further Management by Industry Sector

Data comparing 1995 to 1998 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 4 and 5. Only the manufacturing sectors (US SIC codes 20–39) are included. Also, transfers to recycling or energy recovery are not included because they were not required reporting under NPRI until 1998. Therefore, the data for 1998 presented in this section and this chapter are a subset of the data presented in previous chapters.

- The chemicals manufacturing industry (US SIC code 28) in NPRI reported the largest amounts of transfers to treatment and sewage for each of the years 1995 to 1998. This industry sector reported 10.8 million kg, almost 80 percent of NPRI total transfers for further management in 1998.
- Only one other NPRI industry sector reported over 1.0 million kg—the paper products industry (US SIC code 26), in 1995 and 1997. Since then, the paper products industry has decreased transfers for further management by 97 percent.
- The NPRI food industry (US SIC code 20) reported the second-largest transfers for further management in 1998, all as transfers to sewage. This sector increased such transfers by 74 percent from 1995 to 1998. In 1995, this sector ranked fifth.
- Eight NPRI industry sectors did not report any transfers to sewage, while three did not report any transfers to treatment.

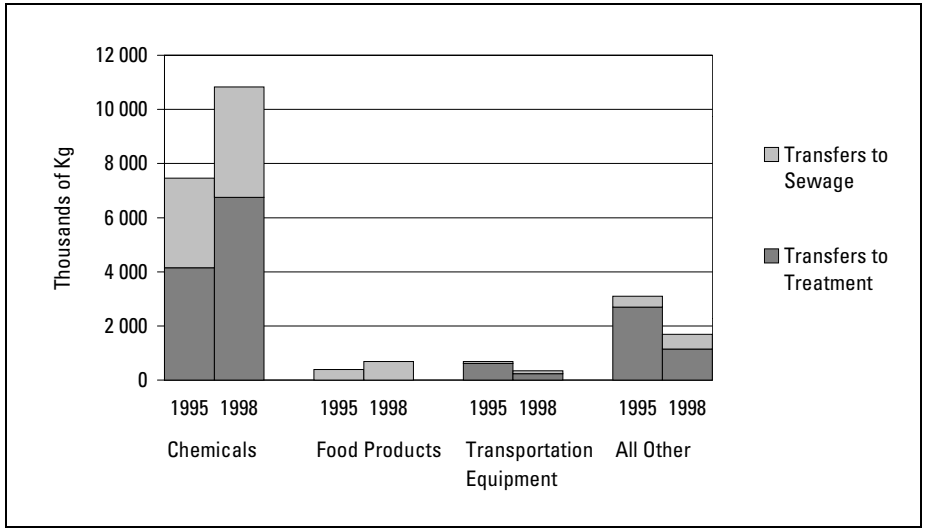
Table 6–34. NPRI Transfers Off-site for Further Management by Industry, 1995, 1997–1998 (Ordered by 1998 Total Transfers)

			Transfers to Treatment (except metals)					Transfers to Sewage (except metals)				
Rank	US SIC Code	Industry	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	28	Chemicals	4,147,437	6,650,935	6,749,561	1	63	3,312,444	3,904,071	4,080,083	5	23
2	20	Food Products	0	0	0	--	--	393,381	742,466	685,690	-8	74
3	37	Transportation Equipment	612,583	353,452	234,372	-34	-62	75,159	80,345	110,582	38	47
4	30	Rubber and Plastics Products	501,492	397,158	323,806	-18	-35	155,399	105	248	136	-100
5	29	Petroleum and Coal Products	13,388	327,606	43,734	-87	227	22,337	249,849	251,582	1	1026
6	33	Primary Metals	167,176	55,311	53,870	-3	-68	91,586	106,091	176,125	66	92
7	25	Furniture and Fixtures	7,747	138,206	200,101	45	2483	0	0	0	--	--
8	27	Printing and Publishing	101,053	141,702	194,257	37	92	0	0	0	--	--
9	34	Fabricated Metals Products	172,892	173,355	189,408	9	10	9,835	68,059	1,831	-97	-81
10	39	Misc. Manufacturing Industries	23,340	35,819	6,920	-81	-70	83,165	87,193	87,003	0	5
11	32	Stone/Clay/Glass Products	49,146	44,850	56,322	26	15	3,036	21	598	2748	-80
12	26	Paper Products	1,559,703	1,567,966	39,213	-97	-97	7,986	1,332	278	-79	-97
13	36	Electronic/Electrical Equipment	15,980	6,140	9,189	50	-42	23,581	21,310	19,377	-9	-18
14	35	Industrial Machinery	34,965	30,234	26,987	-11	-23	0	0	0	--	--
15	31	Leather Products	2,400	3,600	4,430	23	85	0	0	0	--	--
16	24	Lumber and Wood Products	39,886	843	2,822	235	-93	0	0	0	--	--
17	22	Textile Mill Products	7,758	520	939	81	-88	0	0	0	--	--
--	23	Apparel and Other Textile Products	0	0	0	--	--	0	0	0	--	--
--	38	Measurement/Photographic Instruments	0	0	0	--	--	0	0	0	--	--
		Total	**7,456,946**	**9,927,697**	**8,135,931**	**-18**	**9**	**4,177,909**	**5,260,842**	**5,413,397**	**3**	**30**

Table 6–34. (*continued*)

Rank	US SIC Code	Industry	Total Transfers for Further Management 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	28	Chemicals	7,459,881	10,555,006	10,829,644	3	45
2	20	Food Products	393,381	742,466	685,690	-8	74
3	37	Transportation Equipment	687,742	433,797	344,954	-20	-50
4	30	Rubber and Plastics Products	656,891	397,263	324,054	-18	-51
5	29	Petroleum and Coal Products	35,725	577,455	295,316	-49	727
6	33	Primary Metals	258,762	161,402	229,995	42	-11
7	25	Furniture and Fixtures	7,747	138,206	200,101	45	2483
8	27	Printing and Publishing	101,053	141,702	194,257	37	92
9	34	Fabricated Metals Products	182,727	241,414	191,239	-21	5
10	39	Misc. Manufacturing Industries	106,505	123,012	93,923	-24	-12
11	32	Stone/Clay/Glass Products	52,182	44,871	56,920	27	9
12	26	Paper Products	1,567,689	1,569,298	39,491	-97	-97
13	36	Electronic/Electrical Equipment	39,561	27,450	28,566	4	-28
14	35	Industrial Machinery	34,965	30,234	26,987	-11	-23
15	31	Leather Products	2,400	3,600	4,430	23	85
16	24	Lumber and Wood Products	39,886	843	2,822	235	-93
17	22	Textile Mill Products	7,758	520	939	81	-88
--	23	Apparel and Other Textile Products	0	0	0	--	--
--	38	Measurement/Photographic Instruments	0	0	0	--	--
		Total	**11,634,855**	**15,188,539**	**13,549,328**	**-11**	**16**

Figure 6–10. Change in NPRI Transfers Off-site for Further Management by Industry, 1995–1998



Only data for the manufacturing sectors (US SIC codes 20–39) are included because they are the only sectors for which both TRI and NPRI data are available from 1995 to 1998. Transfers from the new industry sectors were included in data presented in Chapters 4 and 5. Also, transfers to recycling or energy recovery are not included because they were not required reporting under NPRI until 1998. Therefore, the data for 1998 presented in this section and this chapter are a subset of the data presented in previous chapters.

- As in NPRI, the TRI chemical manufacturing sector (US SIC code 28) reported the largest transfers for further management in each year from 1995 to 1998. The increase reported by this sector over this period was 12 percent, and from 1997 to 1998, it was 5 percent.
- The TRI paper products industry (US SIC code 26) reported the second-largest transfers for further management in 1998. This sector reported a decrease from 1995 to 1998 of 5 percent, and from 1997 to 1998, of 7 percent.
- Thirteen of the 21 industry sectors reported increases in transfers for further management from 1995 to 1998.
- The industry sectors reporting decreases in transfers for further management from 1995 to 1998 included the second-ranked paper products industry and the fifth-ranked primary metals industry (US SIC code 33).

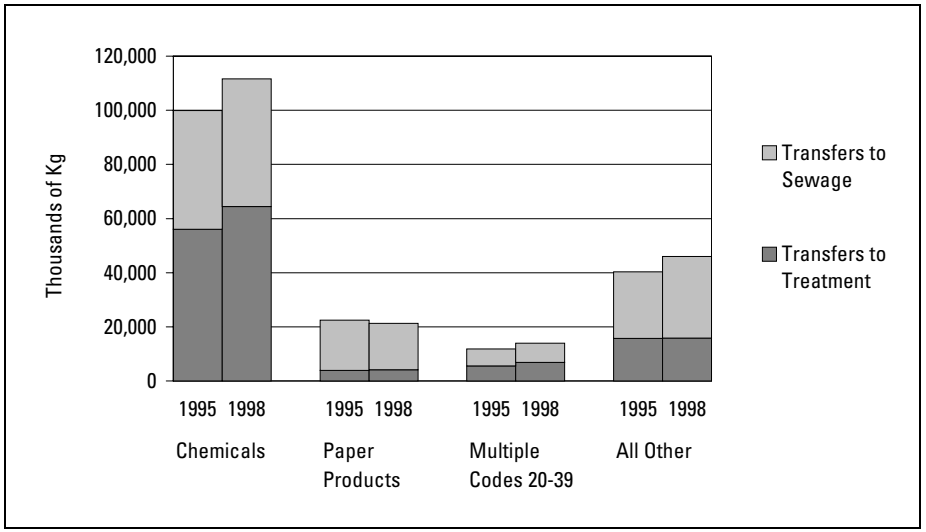
Table 6–35. TRI Transfers Off-site for Further Management by Industry, 1995, 1997–1998 (Ordered by 1998 Total Transfers)

			Transfers to Treatment (except metals)					Transfers to Sewage (except metals)				
Rank	US SIC Code	Industry	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	28	Chemicals	56,079,347	59,950,631	64,438,190	7	15	43,873,327	46,365,656	47,162,537	2	7
2	26	Paper Products	3,888,225	3,992,851	4,120,029	3	6	18,558,379	19,024,540	17,208,014	-10	-7
3	--	Multiple codes 20-39	5,532,151	5,262,072	6,809,791	29	23	6,289,575	5,951,268	7,138,515	20	13
4	20	Food Products	293,117	372,388	397,036	7	35	9,165,776	11,990,559	10,448,613	-13	14
5	33	Primary Metals	4,915,712	13,399,306	3,282,277	-76	-33	3,088,672	4,419,639	3,926,292	-11	27
6	36	Electronic/Electrical Equipment	1,720,898	1,138,487	1,276,313	12	-26	4,034,543	5,402,222	5,094,289	-6	26
7	29	Petroleum and Coal Products	346,067	646,158	1,936,745	200	460	1,762,211	2,360,875	2,652,330	12	51
8	37	Transportation Equipment	1,684,551	1,893,802	2,279,989	20	35	1,180,628	1,689,810	2,174,894	29	84
9	34	Fabricated Metals Products	2,009,909	2,308,904	1,702,291	-26	-15	1,675,593	1,967,498	2,332,295	19	39
10	30	Rubber and Plastics Products	1,173,991	1,564,497	1,647,942	5	40	808,881	1,077,335	1,312,743	22	62
11	38	Measurement/Photographic Instruments	1,537,737	1,059,361	1,495,315	41	-3	329,448	257,681	263,750	2	-20
12	32	Stone/Clay/Glass Products	564,664	696,458	603,776	-13	7	306,178	366,620	305,702	-17	0
13	35	Industrial Machinery	399,937	349,654	264,030	-24	-34	1,018,402	1,240,804	596,360	-52	-41
14	39	Misc. Manufacturing Industries	194,985	232,972	259,461	11	33	294,772	210,916	455,967	116	55
15	22	Textile Mill Products	232,338	129,119	160,334	24	-31	776,841	1,031,018	467,898	-55	-40
16	27	Printing and Publishing	145,545	154,207	242,596	57	67	75,163	103,562	42,642	-59	-43
17	25	Furniture and Fixtures	342,263	234,301	223,149	-5	-35	36,642	72,708	15,437	-79	-58
18	24	Lumber and Wood Products	90,248	84,529	88,285	4	-2	1,357	2,349	4,616	97	240
19	31	Leather Products	3,067	5,656	4,351	-23	42	25,639	18,249	12,298	-33	-52
20	21	Tobacco Products	72	0	727	--	910	0	36	95	164	--
21	23	Apparel and Other Textile Products	26,891	249	113	-55	-100	113	4,885	49	-99	-57
		Total	**81,181,715**	**93,475,602**	**91,232,740**	**-2**	**12**	**93,302,140**	**103,558,230**	**101,615,336**	**-2**	**9**

Table 6–35. (*continued*)

Rank	US SIC Code	Industry	Total Transfers for Further Management 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	28	Chemicals	99,952,674	106,316,287	111,600,727	5	12
2	26	Paper Products	22,446,604	23,017,391	21,328,043	-7	-5
3	--	Multiple codes 20-39	11,821,726	11,213,340	13,948,306	24	18
4	20	Food Products	9,458,893	12,362,947	10,845,649	-12	15
5	33	Primary Metals	8,004,384	17,818,945	7,208,569	-60	-10
6	36	Electronic/Electrical Equipment	5,755,441	6,540,709	6,370,602	-3	11
7	29	Petroleum and Coal Products	2,108,278	3,007,033	4,589,075	53	118
8	37	Transportation Equipment	2,865,179	3,583,612	4,454,883	24	55
9	34	Fabricated Metals Products	3,685,502	4,276,402	4,034,586	-6	9
10	30	Rubber and Plastics Products	1,982,872	2,641,832	2,960,685	12	49
11	38	Measurement/Photographic Instruments	1,867,185	1,317,042	1,759,065	34	-6
12	32	Stone/Clay/Glass Products	870,842	1,063,078	909,478	-14	4
13	35	Industrial Machinery	1,418,339	1,590,458	860,390	-46	-39
14	39	Misc. Manufacturing Industries	489,757	443,888	715,428	61	46
15	22	Textile Mill Products	1,009,179	1,160,137	628,232	-46	-38
16	27	Printing and Publishing	220,708	257,769	285,238	11	29
17	25	Furniture and Fixtures	378,905	307,009	238,586	-22	-37
18	24	Lumber and Wood Products	91,605	86,878	92,901	7	1
19	31	Leather Products	28,706	23,905	16,649	-30	-42
20	21	Tobacco Products	72	36	822	2,183	1,042
21	23	Apparel and Other Textile Products	27,004	5,134	162	-97	-99
		Total	**174,483,855**	**197,033,832**	**192,848,076**	**-2**	**11**

Figure 6–11. Change in TRI Transfers Off-site for Further Management by Industry, 1995–1998



6.3.3 1995–1998 Transfers Off-site for Further Management by Chemical

There are 165 substances in the matched data set. These are the substances reported both to NPRI and TRI. The list of substances in the matched data set remained the same for the years 1995 to 1998.

Appendix D presents information on potential health effects of substances with the largest releases and transfers as reported to the North American PRTRs, from the US Agency for Toxic Substances and Disease Registry, 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 decrease in transfers for further management in North America from 1995 to 1998 was vinyl acetate, a designated carcinogen. The reported decrease was 3.9 million kg, or 82 percent. Vinyl acetate was the chemical with the largest decrease for both NPRI and TRI.
- For NPRI, the chemical with the second-largest decrease from 1995 to 1998 was methanol, with a decrease of 18 percent.
- For TRI, ethylene glycol was the chemical with the second-largest decrease in transfers for further management, with a 16 percent decrease from 1995 to 1998.

Table 6–36. The 10 Chemicals with the Largest Decrease in Transfers Off-site for Further Management in North America, 1995–1998

			Transfers for Further Management				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	108-05-4	Vinyl acetate▼	4,737,577	1,105,368	868,584	-3,868,993	-82
2	107-21-1	Ethylene glycol	16,225,372	15,177,379	13,743,656	-2,481,716	-15
3	95-50-1	1,2-Dichlorobenzene	1,216,677	1,028,986	450,877	-765,800	-63
4	127-18-4	Tetrachloroethylene▼	1,043,798	514,504	444,418	-599,380	-57
5	74-85-1	Ethylene	963,354	9,885,983	369,040	-594,314	-62
6	108-95-2	Phenol	3,394,207	3,156,191	2,802,147	-592,060	-17
7	79-00-5	1,1,2-Trichloroethane	1,478,666	1,159,769	914,505	-564,161	-38
8	106-44-5	p-Cresol	449,257	43,572	25,946	-423,311	-94
9	109-86-4	2-Methoxyethanol	579,406	335,107	217,481	-361,925	-62
10	1319-77-3	Cresol (mixed isomers)	530,719	176,460	286,870	-243,849	-46

▼ Known or suspected carcinogen.

Table 6–37. The 10 Chemicals with the Largest Decrease in NPRI Transfers Off-site for Further Management, 1995–1998

			Transfers for Further Management				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	108-05-4	Vinyl acetate▼	593,400	2,527	698	-592,702	-99.9
2	67-56-1	Methanol	1,942,256	2,733,829	1,596,186	-346,070	-18
3	50-00-0	Formaldehyde▼	210,304	127,366	82,620	-127,684	-61
4	71-43-2	Benzene▼	129,138	21,018	57,096	-72,042	-56
5	106-99-0	1,3-Butadiene▼	58,342	12,620	4,442	-53,900	-92
6	7664-38-2	Phosphoric acid	121,295	45,967	72,449	-48,846	-40
7	127-18-4	Tetrachloroethylene▼	70,001	24,659	26,113	-43,888	-63
8	95-63-6	1,2,4-Trimethylbenzene	115,208	48,885	74,645	-40,563	-35
9	107-13-1	Acrylonitrile▼	34,599	0	0	-34,599	-100
10	109-86-4	2-Methoxyethanol	33,900	0	0	-33,900	-100

▼ Known or suspected carcinogen.

Table 6–38. The 10 Chemicals with the Largest Decrease in TRI Transfers Off-site for Further Management, 1995–1998

			Transfers for Further Management				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	108-05-4	Vinyl acetate▼	4,144,177	1,102,841	867,886	-3,276,291	-79
2	107-21-1	Ethylene glycol	15,943,177	14,652,513	13,467,779	-2,475,398	-16
3	95-50-1	1,2-Dichlorobenzene	1,208,677	1,018,986	440,877	-767,800	-64
4	108-95-2	Phenol	3,174,327	2,882,650	2,428,783	-745,544	-23
5	74-85-1	Ethylene	959,872	9,885,923	368,740	-591,132	-62
6	79-00-5	1,1,2-Trichloroethane	1,478,666	1,159,584	914,505	-564,161	-38
7	127-18-4	Tetrachloroethylene▼	973,797	489,845	418,305	-555,492	-57
8	106-44-5	p-Cresol	449,257	43,572	25,928	-423,329	-94
9	1319-77-3	Cresol (mixed isomers)	526,751	142,227	145,817	-380,934	-72
10	109-86-4	2-Methoxyethanol	545,506	335,107	217,481	-328,025	-60

▼ Known or suspected carcinogen.

- Of the 10 NPRI chemicals with the largest decreases, six are designated known or suspected carcinogens.
- Of the 10 TRI chemicals with the largest decreases, two are designated known or suspected carcinogens.

- Nitric acid and nitrate compounds had the largest increase in transfers for further management from 1995 to 1998 in North America and in both NPRI and TRI. Nitric acid and nitrate compounds increased by 10.8 million kg, or 26 percent, in North America, and by 18 percent in NPRI and 27 percent in TRI.
- Methanol had the second-largest TRI increases, while, in NPRI, methanol had the second-largest decreases.
- One designated carcinogen, dichloromethane, was on both the NPRI and the TRI list of the 10 chemicals with the largest increases in transfers for further management from 1995 to 1998.

Table 6–39. The 10 Chemicals with the Largest Increase in Transfers Off-site for Further Management in North America, 1995–1998

			Transfers for Further Management				
			1995	1997	1998	Change 1995–1998	
Rank	CAS Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Nitric acid and nitrate compounds	41,104,673	50,326,882	51,891,129	10,786,456	26
2	110-82-7	Cyclohexane	600,196	2,075,234	2,662,684	2,062,488	344
3	1330-20-7	Xylene (mixed isomers)	5,764,285	6,587,253	7,551,918	1,787,633	31
4	106-99-0	1,3-Butadiene▼	102,207	154,677	1,781,719	1,679,512	1643
5	67-56-1	Methanol	57,176,734	63,374,165	58,770,007	1,593,273	3
6	75-05-8	Acetonitrile	2,312,856	2,394,293	3,728,082	1,415,226	61
7	108-90-7	Chlorobenzene	783,978	1,557,440	2,179,730	1,395,752	178
8	115-07-1	Propylene	36,391	56,990	1,261,753	1,225,362	3367
9	75-09-2	Dichloromethane▼	5,300,980	6,243,106	6,517,147	1,216,167	23
10	62-53-3	Aniline	550,532	1,040,334	1,607,379	1,056,847	192

▼ Known or suspected carcinogen.

Table 6–40. The 10 Chemicals with the Largest Increase in NPRI Transfers Off-site for Further Management, 1995–1998

			Transfers for Further Management				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Nitric acid and nitrate compounds	3,923,093	4,913,814	4,647,152	724,059	18
2	108-88-3	Toluene	1,317,160	2,226,515	2,034,939	717,779	54
3	110-82-7	Cyclohexane	117,789	330,692	674,976	557,187	473
4	71-36-3	n-Butyl alcohol	203,557	387,029	536,657	333,100	164
5	78-93-3	Methyl ethyl ketone	412,909	778,686	662,188	249,279	60
6	75-05-8	Acetonitrile	0	130,000	241,000	241,000	--
7	108-95-2	Phenol	219,880	273,541	373,364	153,484	70
8	1319-77-3	Cresol (mixed isomers)	3,968	34,233	141,053	137,085	3,455
9	75-09-2	Dichloromethane▼	67,341	260,108	137,216	69,875	104
10	100-41-4	Ethylbenzene	29,132	27,192	72,176	43,044	148

▼ Known or suspected carcinogen.

Table 6–41. The 10 Chemicals with the Largest Increase in TRI Transfers Off-site for Further Management, 1995–1998

			Transfers for Further Management				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Nitric acid and nitrate compounds	37,181,580	45,413,068	47,243,977	10,062,397	27
2	67-56-1	Methanol	55,234,478	60,640,336	57,173,821	1,939,343	4
3	1330-20-7	Xylene (mixed isomers)	4,496,173	4,912,373	6,307,049	1,810,876	40
4	106-99-0	1,3-Butadiene▼	43,865	142,057	1,777,277	1,733,412	3,952
5	110-82-7	Cyclohexane	482,407	1,744,542	1,987,708	1,505,301	312
6	108-90-7	Chlorobenzene	783,978	1,557,440	2,176,530	1,392,552	178
7	115-07-1	Propylene	36,391	56,990	1,261,753	1,225,362	3,367
8	75-05-8	Acetonitrile	2,312,856	2,264,293	3,487,082	1,174,226	51
9	75-09-2	Dichloromethane▼	5,233,639	5,982,998	6,379,931	1,146,292	22
10	62-53-3	Aniline	547,582	1,039,881	1,606,688	1,059,106	193

▼ Known or suspected carcinogen.

6.4 1995–1998 Total Reported Amounts of Releases and Transfers

The total amounts reported to the PRTR systems in Canada and the US include releases both on- and off-site and 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 TRI industries reporting for the first time in 1998 are not included, since no comparable reports are available for years prior to 1998.

- From 1995 to 1998, the number of facilities reporting in North America declined by 4 percent and the number of forms by 3 percent. However, while the number of TRI facilities reporting declined by 5 percent, the number of NPRI facilities reporting increased by 14 percent.
- The same was true for the period from 1997 to 1998. Overall, the number of North American facilities reporting declined, while the number of NPRI facilities increased and the number of TRI facilities decreased.

Table 6–42. Total Releases and Transfers in North America, 1995–1998

	North America					
	1995 Number	1996 Number	1997 Number	1998* Number	Change 1997-1998 (%)	Change 1995-1998 (%)
Total Facilities	21,438	21,159	20,944	20,681	-1	-4
Total Forms	65,498	64,091	64,035	63,611	-1	-3
	kg	kg	kg	kg		
On-site Releases	934,947,862	884,488,077	852,007,622	826,494,317	-3	-12
Off-site Disposal	166,232,091	180,434,929	234,144,977	225,199,893	-4	35
Total Releases On- and Off-site	**1,101,179,953**	**1,064,923,006**	**1,086,152,599**	**1,051,737,172**	**-3**	**-4**
Total Transfers Off-site for Further Management	**186,118,710**	**180,787,679**	**212,222,371**	**206,397,404**	**-3**	**11**
Total Releases and Transfers	**1,287,298,663**	**1,245,710,685**	**1,298,374,970**	**1,258,134,576**	**-3**	**-2**

Note: Canada and US data only. Mexico data not available for 1995–1998. 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.
* New TRI industry sectors not included for 1998.

Table 6–42. (*continued*)

NPRI*						TRI					
1995 Number	1996 Number	1997 Number	1998** Number	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 Number	1996 Number	1997 Number	1998** Number	Change 1997–1998 (%)	Change 1995–1998 (%)
1,302	1,355	1,445	1,488	3	14	20,136	19,804	19,499	19,193	-2	-5
4,164	4,324	4,632	4,797	4	15	61,334	59,767	59,403	58,814	-1	-4
kg	kg	kg	kg			kg	kg	kg	kg		
92,671,766	83,079,927	79,569,219	76,902,892	-3	-17	842,276,096	801,408,150	772,438,403	749,591,425	-3	-11
26,114,137	27,478,671	34,309,061	29,264,461	-15	12	140,117,954	152,956,258	199,835,916	195,978,394	-2	40
118,785,903	**110,558,598**	**113,878,280**	**106,167,353**	**-7**	**-11**	**982,394,050**	**954,364,408**	**972,274,319**	**945,569,819**	**-3**	**-4**
11,634,855	**14,029,005**	**15,188,539**	**13,549,328**	**-11**	**16**	**174,483,855**	**166,758,674**	**197,033,832**	**192,848,076**	**-2**	**11**
130,420,758	**124,587,603**	**129,066,819**	**119,716,681**	**-7**	**-8**	**1,156,877,905**	**1,121,123,082**	**1,169,308,151**	**1,138,417,895**	**-3**	**-2**

Note: Canada and US data only. Mexico data not available for 1995–1998. 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.

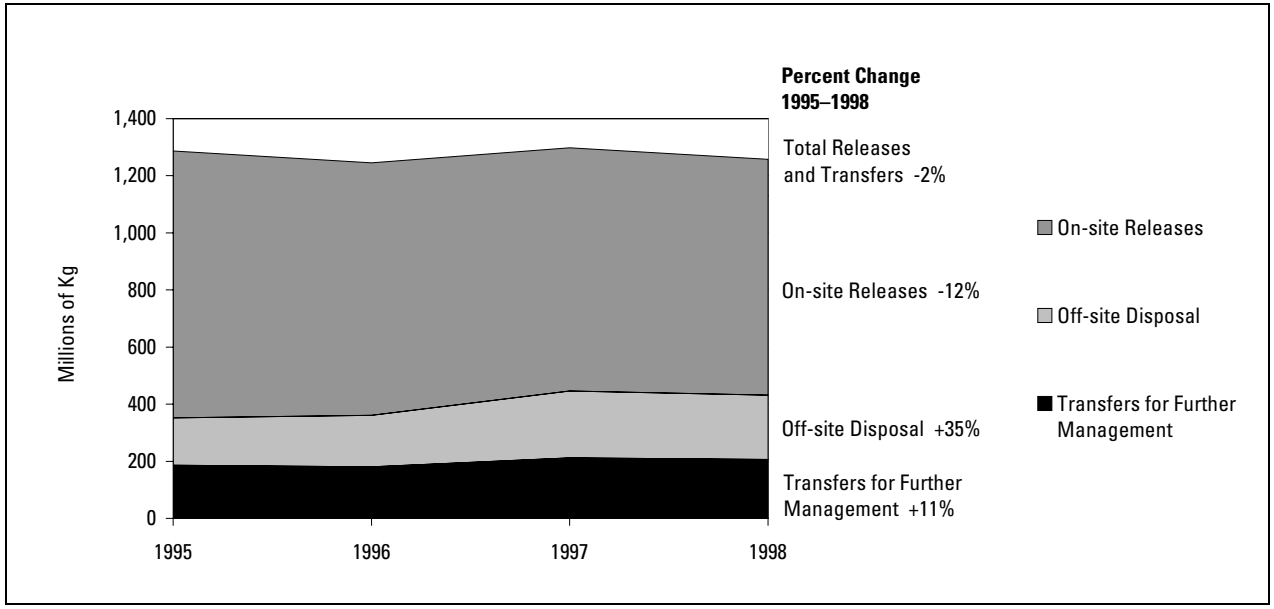
** New TRI industry sectors not included for 1998.

- Total reported amounts of releases and transfers in North America were 1.3 billion kg in 1998, a decrease of 3 percent from 1997 and 2 percent from 1995. Both releases and transfers increased from 1996 to 1997.
- Both off-site transfers to disposal and off-site transfers for further management increased from 1995 to 1998, although both types of transfers decreased from 1997 to 1998 in North America.
- NPRI total releases and transfers decreased from 1997 to 1998, after an increase from 1996 to 1997 and despite an increase in the number of facilities reporting.
- The overall decrease in NPRI totals reflected decreases in on-site releases of 3 percent from 1997 to 1998 and 17 percent from 1995 to 1998. Both off-site releases (off-site transfers to disposal) and off-site transfers for further management increased from 1995 to 1998, although they did decrease during the most recent period from 1997 to 1998.
- Similarly for TRI, the overall decrease in TRI totals reflected an 11 percent decrease in on-site releases from 1995 to 1998, with a 3 percent decrease from 1997 to 1998. This trend coincides with a decreasing number of TRI facilities reporting each year.
- TRI off-site releases and off-site transfers for further management both increased from 1995 to 1998, although decreases were reported from 1997 to 1998.

Decreases from 1995 to 1998 in total reported amounts of releases and transfers reflect decreases in on-site releases. On-site releases were the majority of reported amounts in all years despite the increases in off-site disposal and off-site transfers for further management.

- On-site releases in North America dropped by 12 percent from 1995 to 1998. On-site releases include releases at the reporting facility site to air, surface water, underground injection wells and land.
- Off-site disposal in North America increased by 35 percent from 1995 to 1998. Off-site disposal refers to off-site transfers to disposal of chemicals that are not metals and all off-site transfers of metals and their compounds.
- Off-site transfers for further management in North America increased by 11 percent from 1995 to 1998. Off-site transfers for further management include transfers of chemicals that are not metals that are sent for treatment, including to sewage treatment plants.
- Both NPRI and TRI showed trends in all categories of releases and transfers similar to those in North America as a whole.

Figure 6–12. Releases and Transfers in North America, 1995–1998



Note: Canada and US data only. Mexico data not available for 1995–1998.

Figure 6–13. NPRI Releases and Transfers, 1995–1998

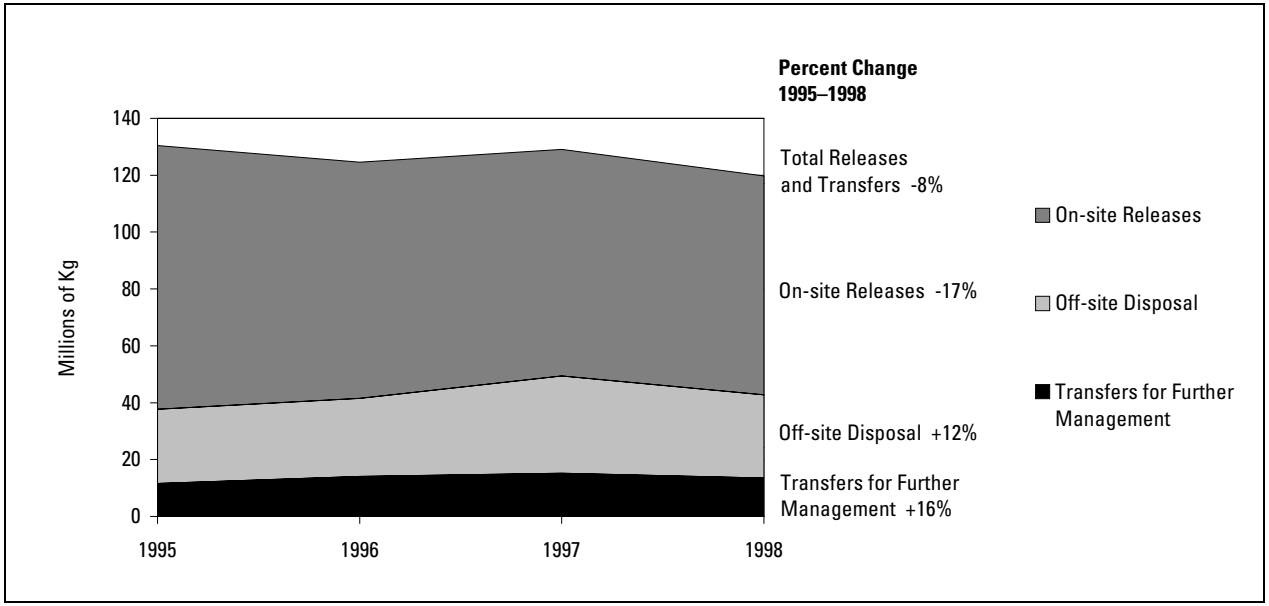
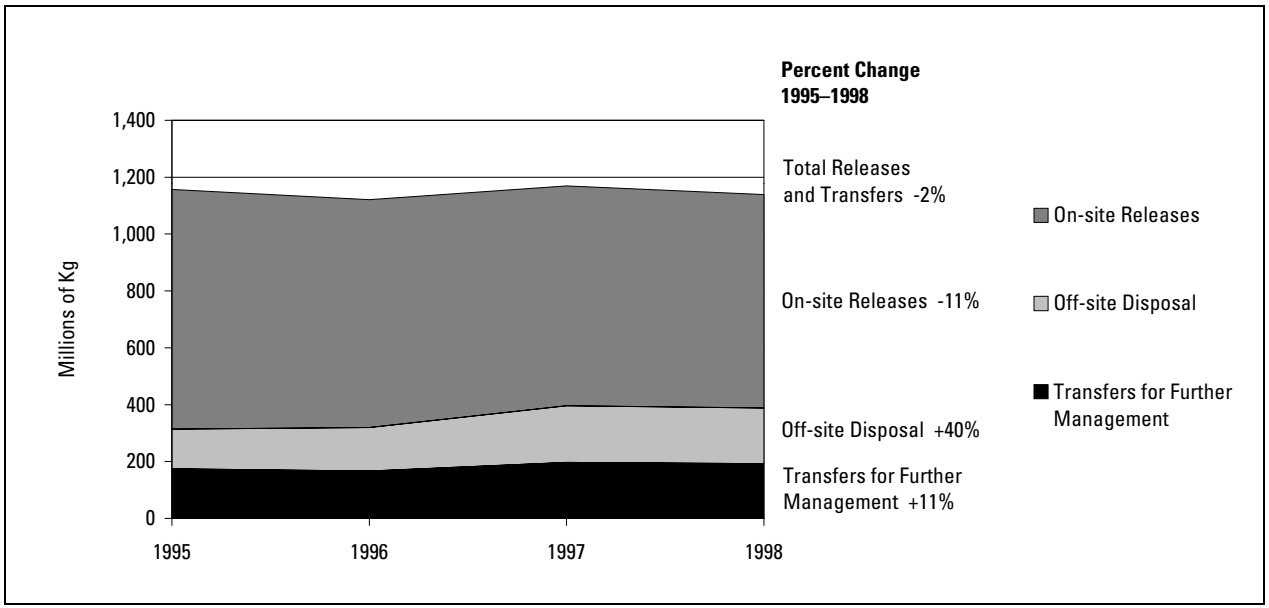


Figure 6–14. TRI Releases and Transfers, 1995–1998



6.4.1 1995–1998 and 1999–2000 Projections of Total Reported Amounts of Releases and Transfers

Both NPRI and TRI facilities report projections of total releases and transfers for the two years following the reporting year.

TRI facilities enter their projections in a different section of their reporting form (in Section 8 of the TRI Form R) from where they report the specific releases and transfers (Sections 5 and 6 of the TRI Form R). Therefore, total amounts for TRI releases and transfers when compared to projected amounts differ somewhat from total releases and transfers analyzed throughout the rest of the report.

NPRI facilities report their projections in a manner similar to their actual releases and transfers so the NPRI total reported amounts for 1995 to 1998 do not differ from those in the rest of the report.

- North American facilities projected a decrease in total reported amounts of releases and transfers from 1998 to 1999 and to 2000. The projected decrease from 1998 to 1999 is 6 percent, with an additional slight decrease of 0.5 percent to 2000.
- NPRI facilities, however, did not project a decrease. The NPRI projection is for a 3 percent increase from 1998 to 1999 and a 2 percent decrease from 1999 to 2000. This would translate into an overall increase from 1998, but would still fall below amounts reported for 1997.
- TRI facilities projected a 7 percent decrease from 1998 to 1999 and a slight additional decrease to 2000 of 0.3 percent.

Table 6–43. Total Releases and Transfers in North America, Actual and Projected, 1995–1998

	North America			NPRI			TRI		
	Total Releases and Transfers (kg)	Change from Prior Year (kg)	% Change from Prior Year	Total Releases and Transfers (kg)	Change from Prior Year (kg)	% Change from Prior Year	Total Releases and Transfers (kg)	Change from Prior Year (kg)	Change from Prior Year (%)
1995 (Actual)	1,273,170,629			130,420,758			1,142,749,871		
1996 (Actual)	1,230,520,127	-42,650,502	-3	124,587,603	-5,833,155	-4	1,105,932,524	-36,817,347	-3
1997 (Actual)	1,258,921,549	28,401,422	2	129,066,819	4,479,216	4	1,129,854,730	23,922,206	2
1998 (Actual)	1,250,882,976	-8,038,573	-1	119,716,681	-9,350,138	-7	1,131,166,295	1,311,565	0.1
1999 (Projection)	1,177,764,983	-73,117,993	-6	122,714,985	2,998,304	3	1,055,049,998	-76,116,297	-7
2000 (Projection)	1,172,294,045	-5,470,938	-0.5	120,234,547	-2,480,438	-2	1,052,059,498	-2,990,500	-0.3

Note: Canada and US data only. Mexico data not available for 1995–1998.
TRI data from Section 8.1 plus 8.7 on TRI Form R.
NPRI and TRI 1995, 1996, 1997 and 1998 data from form of year indicated; 1999 and 2000 data from 1998 reporting form.
One NPRI facility incorrectly reported 20,849 tonnes for 1999 (projection). The correct number, 20,849 kg, has been used in this table.

Table 6–44. Average Releases and Transfers per Facility, NPRI and TRI, 1995–1998

	NPRI		TRI		Ratio of Average per Facility (NPRI/TRI)	
	1995 (kg/facility)	1998* (kg/facility)	1995 (kg/facility)	1998* (kg/facility)	1995	1998*
On-site Releases	71,176	51,682	41,829	39,055	1.7	1.3
Off-site Disposal	20,057	19,667	6,959	10,211	2.9	1.9
Total Releases On- and Off-site	**91,233**	**71,349**	**48,788**	**49,266**	**1.9**	**1.4**
Total Transfers Off-site for Further Management	**8,936**	**9,106**	**8,665**	**10,048**	**1.0**	**0.9**
Total Releases and Transfers	**100,170**	**80,455**	**57,453**	**59,314**	**1.7**	**1.4**

* New TRI industry sectors not included for 1998.

6.4.2 1995–1998 Average Total Reported Amounts of Releases and Transfers per Facility

- From 1995 to 1998, the average total releases and transfers per facility decreased in NPRI and increased in TRI, narrowing the difference between them.
- In 1995, NPRI average total releases and transfers per facility were 1.7 times those of TRI. By 1998, NPRI averages were 1.4 times those of TRI.
- The average for NPRI on-site releases was 1.7 times TRI averages in 1995 and 1.3 times TRI in 1998.
- Overall, the ratio of the average off-site disposal amounts per facility in NPRI to that in TRI was the largest of the different types of releases and transfers. NPRI was almost three times TRI (2.9 times) in 1995. This had dropped to about twice (1.9 times) that of TRI in 1998.
- For off-site transfers for further management, NPRI facilities reported lower averages per facility in 1998, down from about the same (1.0) in 1995 to 0.9 in 1998.

6.4.3 1995–1998 Total Reported Amounts of Releases and Transfers by State and Province

NPRI facilities in the manufacturing industries, included in the matched data set since 1995, reported a decrease in total releases and transfers of 8 percent from 1995 to 1998.

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 based on the originating states and provinces. Analysis based on the destination states and provinces is presented in Chapter 7.

- Ontario, Quebec and Alberta reported the largest total releases and transfers every year from 1995 to 1998.
- Ontario facilities reported increases from 1995 to 1997, but overall had reductions of 2 percent from 1995 to 1998. The reductions in Ontario were due to decreases in amounts released. Off-site transfers for further management in Ontario increased by 38 percent from 1995 to 1998.

Table 6–45. NPRI Total Releases and Transfers by Province, 1995, 1997–1998 (Ordered by 1998 Total)

	Total Releases On- and Off-site					Total Transfers for Further Management				
Province	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Ontario	64,093,911	64,738,724	59,802,932	-8	-7	7,055,307	9,960,061	9,729,961	-2	38
Quebec	21,534,467	21,130,673	19,843,139	-6	-8	2,226,825	2,528,283	2,524,956	-0.1	13
Alberta	15,536,932	12,578,737	11,313,399	-10	-27	695,780	575,575	860,020	49	24
British Columbia	8,065,464	6,298,380	6,206,094	-1	-23	33,328	51,157	17,540	-66	-47
New Brunswick	4,939,767	2,987,295	3,899,297	31	-21	1,411,120	1,467,887	56,269	-96	-96
Manitoba	1,613,806	3,416,863	2,969,878	-13	84	205,469	266,550	275,237	3	34
Nova Scotia	1,684,749	1,235,336	1,026,827	-17	-39	6,261	300,787	11,749	-96	88
Saskatchewan	1,019,156	957,815	648,469	-32	-36	765	3,545	2,555	-28	234
Prince Edward Island	13,420	219,770	207,653	-6	1,447	0	34,694	71,041	105	--
Newfoundland	284,231	314,687	249,665	-21	-12	0	0	0	--	--
Total	**118,785,903**	**113,878,280**	**106,167,353**	**-7**	**-11**	**11,634,855**	**15,188,539**	**13,549,328**	**-11**	**16**

Table 6–45. (*continued*)

Province	Total Releases and Transfers 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Ontario	71,149,218	74,698,785	69,532,893	-7	-2
Quebec	23,761,292	23,658,956	22,368,095	-5	-6
Alberta	16,232,712	13,154,312	12,173,419	-7	-25
British Columbia	8,098,792	6,349,537	6,223,634	-2	-23
New Brunswick	6,350,887	4,455,182	3,955,566	-11	-38
Manitoba	1,819,275	3,683,413	3,245,115	-12	78
Nova Scotia	1,691,010	1,536,123	1,038,576	-32	-39
Saskatchewan	1,019,921	961,360	651,024	-32	-36
Prince Edward Island	13,420	254,464	278,694	10	--
Newfoundland	284,231	314,687	249,665	--	--
Total	**130,420,758**	**129,066,819**	**119,716,681**	**-7**	**-8**

- Quebec facilities reported decreases from 1995 to 1998 of 6 percent, including a 5 percent reduction from 1997 to 1998. Quebec reached the reductions through decreases in releases of 8 percent; off-site transfers for further management in Quebec increased by 13 percent from 1995 to 1998.
- Alberta facilities reported reductions of 25 percent from 1995 to 1998, despite increases of 24 percent in off-site transfers for further management.
- Only facilities in Manitoba reported an overall increase in releases and transfers from 1995 to 1998, of 78 percent. However, Manitoba reported a decrease from 1997 to 1998 of 12 percent.

TRI facilities in the manufacturing industries, included in the matched data set since 1995, reported a decrease in releases and transfers of 2 percent from 1995 to 1998.

Releases are on-site releases to air, water, underground injection and land of the facility, 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 based on the originating states and provinces. Analysis based on the destination states and provinces is presented in Chapter 7.

- Texas reported the largest total releases and transfers each year from 1995 to 1998. Facilities in Texas reported an increase of 5 percent from 1997 to 1998, although they reported an overall reduction of 11 percent from 1995 to 1998.
- Pennsylvania reported the second-largest releases and transfers in 1998, an increase of 10 percent from 1995 to 1998. Facilities in Pennsylvania ranked fourth in 1995. The increase was the result of total releases, which increased 14 percent from 1995 to 1998. However, Pennsylvania did report reductions of 14 percent in total releases and transfers from 1997 to 1998.

Table 6–46. TRI Total Releases and Transfers by State, 1995, 1997–1998 (Ordered by 1998 Total)

	Total Releases On- and Off-site					Total Transfers for Further Management				
State	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Texas	112,849,877	93,468,496	94,008,278	1	-17	30,905,743	29,295,881	34,314,983	17	11
Pennsylvania	54,631,810	62,726,254	62,124,904	-1	14	8,455,512	17,829,552	6,964,867	-61	-18
Ohio	56,610,573	56,521,140	55,005,488	-3	-3	11,495,583	13,016,981	12,593,644	-3	10
Louisiana	63,338,642	66,419,676	60,902,993	-8	-4	2,209,803	3,593,687	6,382,643	78	189
Indiana	43,710,128	47,659,305	47,746,549	0	9	2,581,546	3,621,593	5,867,299	62	127
Michigan	41,008,091	34,993,951	34,230,953	-2	-17	10,351,767	11,615,489	16,583,527	43	60
Utah	35,031,001	46,336,817	47,396,547	2	35	215,701	163,416	308,600	89	43
Illinois	43,193,896	44,772,723	42,180,254	-6	-2	6,122,862	4,769,512	5,475,729	15	-11
Alabama	46,926,163	37,463,262	35,812,049	-4	-24	2,610,976	4,240,589	3,852,401	-9	48
Tennessee	43,303,907	39,858,913	35,820,288	-10	-17	3,916,350	4,707,764	3,649,656	-22	-7
Florida	29,984,796	35,583,138	28,447,786	-20	-5	3,607,534	4,990,874	3,672,727	-26	2
North Carolina	36,065,106	32,391,376	29,434,110	-9	-18	6,100,107	1,913,128	1,737,054	-9	-72
South Carolina	22,555,696	22,582,015	23,924,547	6	6	3,365,678	5,197,970	6,218,187	20	85
Missouri	23,512,690	24,763,065	22,632,350	-9	-4	4,704,722	4,482,902	4,353,177	-3	-7
Virginia	22,726,223	21,867,064	20,130,504	-8	-11	6,016,827	8,335,690	6,615,244	-21	10
Georgia	21,485,370	27,233,986	23,942,746	-12	11	1,981,465	2,120,964	2,645,564	25	34
Arizona	19,251,674	14,254,705	24,164,233	70	26	783,777	1,156,441	938,987	-19	20
Wisconsin	19,512,865	18,490,711	18,019,219	-3	-8	6,009,842	6,204,827	6,115,616	-1	2
Mississippi	23,045,634	25,531,125	22,889,252	-10	-1	1,043,702	691,721	616,538	-11	-41
Montana	19,391,505	19,367,421	22,957,467	19	18	12,960	118,246	4,217	-96	-67
California	13,573,695	12,722,245	13,136,082	3	-3	6,946,471	8,878,318	7,983,848	-10	15
Arkansas	12,089,455	22,565,824	18,707,107	-17	55	516,903	534,771	669,854	25	30
Oregon	11,527,864	12,414,358	13,534,858	9	17	4,612,779	5,009,984	5,530,028	10	20
New Jersey	7,027,795	7,870,975	7,903,204	0	12	11,857,683	11,040,227	9,446,573	-14	-20
Kentucky	14,908,032	15,774,690	13,733,977	-13	-8	2,586,771	3,038,077	2,840,985	-6	10
New York	16,816,673	15,380,137	13,225,857	-14	-21	4,898,135	4,507,731	3,308,012	-27	-32
Iowa	11,491,219	9,714,344	12,285,500	26	7	4,041,317	3,809,457	3,687,968	-3	-9
Washington	10,756,507	11,697,755	11,601,493	-1	8	1,314,632	1,459,091	1,600,916	10	22
West Virginia	12,828,875	9,598,648	10,388,154	8	-19	3,059,197	2,667,163	2,382,865	-11	-22
New Mexico	18,680,514	13,307,583	10,747,297	-19	-42	137,778	211,509	190,359	-10	38
Minnesota	8,026,556	6,481,860	6,557,067	1	-18	3,564,119	4,328,695	3,921,824	-9	10
Kansas	9,289,525	8,994,298	9,605,519	7	3	1,131,018	2,147,199	526,460	-75	-53
Idaho	5,707,539	6,354,990	8,576,273	35	50	172,563	232,443	338,594	46	96
Maryland	5,620,534	4,937,637	4,472,559	-9	-20	2,013,807	3,446,773	3,796,396	10	89
Oklahoma	8,126,957	7,764,407	7,849,528	1	-3	151,050	866,535	351,439	-59	133
Puerto Rico	3,750,021	3,225,678	2,992,488	-7	-20	3,532,683	3,282,504	4,804,217	46	36
Massachusetts	3,777,130	2,875,968	2,909,967	1	-23	4,782,800	4,326,855	4,675,540	8	-2
Connecticut	4,547,679	4,150,418	2,924,041	-30	-36	2,945,432	4,576,061	3,515,754	-23	19
Nebraska	5,016,104	6,491,220	5,742,332	-12	14	178,672	187,100	142,464	-24	-20
Maine	4,523,405	3,809,506	3,596,963	-6	-20	184,691	101,088	135,800	34	-26
Wyoming	4,093,101	3,569,427	3,709,574	4	-9	764	24,651	308	-99	-60
Delaware	1,935,654	1,358,496	1,925,532	42	-1	1,425,507	1,476,573	1,333,700	-10	-6
Colorado	1,581,010	1,624,926	1,870,681	15	18	637,516	772,386	1,084,150	40	70
Nevada	1,527,002	1,831,347	1,684,739	-8	10	4,064	7,924	24,797	213	510
South Dakota	1,762,935	1,399,597	936,827	-33	-47	224,523	1,133,710	616,775	-46	175
New Hampshire	1,154,617	1,132,846	1,124,076	-1	-3	209,718	277,036	267,010	-4	27
Rhode Island	1,368,003	961,778	701,502	-27	-49	323,909	251,446	222,862	-11	-31
North Dakota	663,580	515,444	446,445	-13	-33	258,789	69,874	229,846	229	-11
Virgin Islands	568,230	561,811	425,355	-24	-25	68,096	135,332	154,972	15	128
Vermont	288,789	234,028	180,011	-23	-38	206,668	164,278	151,671	-8	-27
Alaska	1,008,719	540,637	191,416	-65	-81	12	988	89	-91	642
Hawaii	220,568	126,296	112,876	-11	-49	3,331	826	1,340	62	-60
District of Columbia	116	2	2	0	-98	0	0	0	--	--
Total	**982,394,050**	**972,274,319**	**945,569,819**	**-3**	**-4**	**174,483,855**	**197,033,832**	**192,848,076**	**-2**	**11**

Table 6–46. (*continued*)

State	Total Releases and Transfers 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
Texas	143,755,620	122,764,377	128,323,261	5	-11
Pennsylvania	63,087,322	80,555,806	69,089,771	-14	10
Ohio	68,106,156	69,538,121	67,599,132	-3	-1
Louisiana	65,548,445	70,013,363	67,285,636	-4	3
Indiana	46,291,674	51,280,898	53,613,848	5	16
Michigan	51,359,858	46,609,440	50,814,480	9	-1
Utah	35,246,702	46,500,233	47,705,147	3	35
Illinois	49,316,758	49,542,235	47,655,983	-4	-3
Alabama	49,537,139	41,703,851	39,664,450	-5	-20
Tennessee	47,220,257	44,566,677	39,469,944	-11	-16
Florida	33,592,330	40,574,012	32,120,513	-21	-4
North Carolina	42,165,213	34,304,504	31,171,164	-9	-26
South Carolina	25,921,374	27,779,985	30,142,734	9	16
Missouri	28,217,412	29,245,967	26,985,527	-8	-4
Virginia	28,743,050	30,202,754	26,745,748	-11	-7
Georgia	23,466,835	29,354,950	26,588,310	-9	13
Arizona	20,035,451	15,411,146	25,103,220	63	25
Wisconsin	25,522,707	24,695,538	24,134,835	-2	-5
Mississippi	24,089,336	26,222,846	23,505,790	-10	-2
Montana	19,404,465	19,485,667	22,961,684	18	18
California	20,520,166	21,600,563	21,119,930	-2	3
Arkansas	12,606,358	23,100,595	19,376,961	-16	54
Oregon	16,140,643	17,424,342	19,064,886	9	18
New Jersey	18,885,478	18,911,202	17,349,777	-8	-8
Kentucky	17,494,803	18,812,767	16,574,962	-12	-5
New York	21,714,808	19,887,868	16,533,869	-17	-24
Iowa	15,532,536	13,523,801	15,973,468	18	3
Washington	12,071,139	13,156,846	13,202,409	0	9
West Virginia	15,888,072	12,265,811	12,771,019	4	-20
New Mexico	18,818,292	13,519,092	10,937,656	-19	-42
Minnesota	11,590,675	10,810,555	10,478,891	-3	-10
Kansas	10,420,543	11,141,497	10,131,979	-9	-3
Idaho	5,880,102	6,587,433	8,914,867	35	52
Maryland	7,634,341	8,384,410	8,268,955	-1	8
Oklahoma	8,278,007	8,630,942	8,200,967	-5	-1
Puerto Rico	7,282,704	6,508,182	7,796,705	20	7
Massachusetts	8,559,930	7,202,823	7,585,507	5	-11
Connecticut	7,493,111	8,726,479	6,439,795	-26	-14
Nebraska	5,194,776	6,678,320	5,884,796	-12	13
Maine	4,708,096	3,910,594	3,732,763	-5	-21
Wyoming	4,093,865	3,594,078	3,709,882	3	-9
Delaware	3,361,161	2,835,069	3,259,232	15	-3
Colorado	2,218,526	2,397,312	2,954,831	23	33
Nevada	1,531,066	1,839,271	1,709,536	-7	12
South Dakota	1,987,458	2,533,307	1,553,602	-39	-22
New Hampshire	1,364,335	1,409,882	1,391,086	-1	2
Rhode Island	1,691,912	1,213,224	924,364	-24	-45
North Dakota	922,369	585,318	676,291	16	-27
Virgin Islands	636,326	697,143	580,327	-17	-9
Vermont	495,457	398,306	331,682	-17	-33
Alaska	1,008,731	541,625	191,505	-65	-81
Hawaii	223,899	127,122	114,216	-10	-49
District of Columbia	116	2	2	0	-98
Total	**1,156,877,905**	**1,169,308,151**	**1,138,417,895**	**-3**	**-2**

- Ohio had the third-largest total releases and transfers in 1998, down from the second-largest in 1995. Facilities in Ohio reported decreases of 1 percent from 1995 to 1998, although their transfers for further management rose 10 percent during that period.
- Twenty states reported increases in total releases and transfers from 1995 to 1998. Two states, Arkansas and Idaho, reported increases of more than 50 percent in both releases and total releases and transfers.

6.4.4 1995–1998 Total Reported Amounts of Releases and Transfers by Industry

Data comparing 1995 to 1998 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 Chapter 5. Therefore, the data for 1998 presented in this section and this chapter are a subset of the data presented in previous chapters.

- The NPRI primary metals industry reported the largest total amounts of releases and transfers in each year from 1995 to 1998. This industry sector reported an increase of 11 percent from 1995 to 1998, primarily as releases. From 1997 to 1998, however, primary metals facilities in NPRI reported a reduction of 12 percent.
- The NPRI chemicals manufacturing industry reported the second-largest total releases and transfers. It reported an overall decrease of 16 percent from 1995 to 1998. This industry reported the largest transfers off-site for further management, with an increase of 45 percent in these transfers from 1995 to 1998.
- The NPRI paper products industry reported a 39 percent reduction in releases and transfers from 1995 to 1998. This industry had the third-largest total releases and transfers in NPRI in 1998.

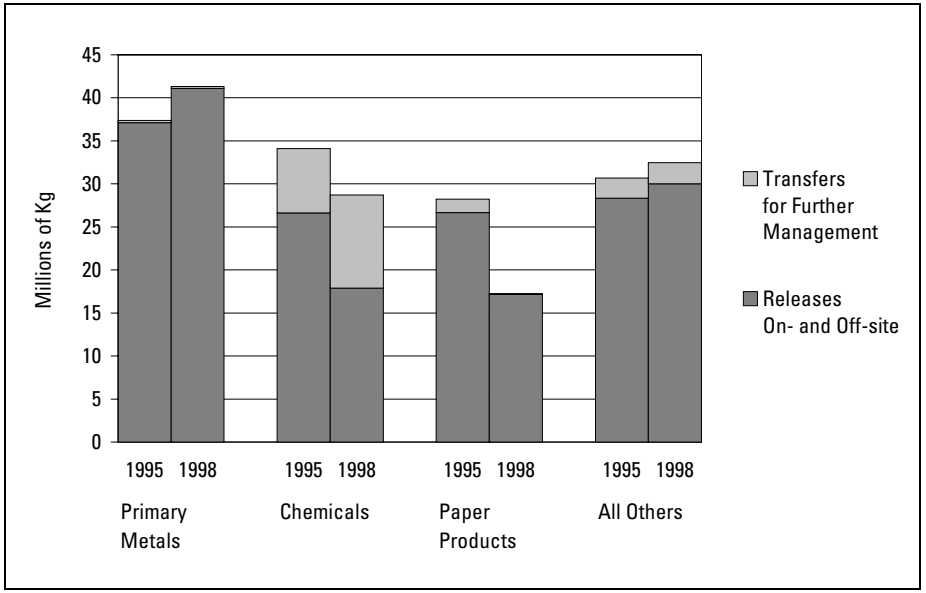
Table 6–47. NPRI Total Releases and Transfers by Industry, 1995, 1997–1998 (Ordered by 1998 Total)

			Total Releases On- and Off-site					Total Transfers for Further Management				
Rank	US SIC Code	Industry	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	33	Primary Metals	37,124,132	46,757,478	41,083,634	-12	11	258,762	161,402	229,995	42	-11
2	28	Chemicals	26,645,326	20,238,867	17,881,115	-12	-33	7,459,881	10,555,006	10,829,644	3	45
3	26	Paper Products	26,676,996	17,361,671	17,184,030	-1	-36	1,567,689	1,569,298	39,491	-97	-97
4	30	Rubber and Plastics Products	6,791,917	6,580,283	6,619,367	1	-3	656,891	397,263	324,054	-18	-51
5	37	Transportation Equipment	6,865,478	6,591,483	6,280,248	-5	-9	687,742	433,797	344,954	-20	-50
6	29	Petroleum and Coal Products	5,267,138	5,117,419	4,732,027	-8	-10	35,725	577,455	295,316	-49	727
7	34	Fabricated Metals Products	3,163,331	3,673,651	3,581,220	-3	13	182,727	241,414	191,239	-21	5
8	24	Lumber and Wood Products	1,236,417	2,138,788	2,348,256	10	90	39,886	843	2,822	235	-93
9	27	Printing and Publishing	766,524	1,000,521	1,538,172	54	101	101,053	141,702	194,257	37	92
10	20	Food Products	45,756	513,765	918,803	79	1,908	393,381	742,466	685,690	-8	74
11	25	Furniture and Fixtures	486,853	822,879	1,092,140	33	124	7,747	138,206	200,101	45	2,483
12	32	Stone/Clay/Glass Products	1,395,330	916,692	893,975	-2	-36	52,182	44,871	56,920	27	9
13	39	Misc. Manufacturing Industries	229,048	811,503	648,585	-20	183	106,505	123,012	93,923	-24	-12
14	35	Industrial Machinery	554,832	687,422	556,357	-19	0	34,965	30,234	26,987	-11	-23
15	22	Textile Mill Products	918,442	309,432	466,058	51	-49	7,758	520	939	81	-88
16	36	Electronic/Electrical Equipment	594,534	328,789	318,141	-3	-46	39,561	27,450	28,566	4	-28
17	31	Leather Products	21,488	27,107	25,200	-7	17	2,400	3,600	4,430	23	85
18	38	Measurement/Photographic Instruments	1,501	250	25	-90	-98	0	0	0	--	--
19	23	Apparel and Other Textile Products	860	280	0	-100	-100	0	0	0	--	--
		Total	**118,785,903**	**113,878,280**	**106,167,353**	**-7**	**-11**	**11,634,855**	**15,188,539**	**13,549,328**	**-11**	**16**

Table 6–47. (*continued*)

Rank	US SIC Code	Industry	Total Releases and Transfers 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	33	Primary Metals	37,382,894	46,918,880	41,313,629	-12	11
2	28	Chemicals	34,105,207	30,793,873	28,710,759	-7	-16
3	26	Paper Products	28,244,685	18,930,969	17,223,521	-9	-39
4	30	Rubber and Plastics Products	7,448,808	6,977,546	6,943,421	0	-7
5	37	Transportation Equipment	7,553,220	7,025,280	6,625,202	-6	-12
6	29	Petroleum and Coal Products	5,302,863	5,694,874	5,027,343	-12	-5
7	34	Fabricated Metals Products	3,346,058	3,915,065	3,772,459	-4	13
8	24	Lumber and Wood Products	1,276,303	2,139,631	2,351,078	10	84
9	27	Printing and Publishing	867,577	1,142,223	1,732,429	52	100
10	20	Food Products	439,137	1,256,231	1,604,493	28	265
11	25	Furniture and Fixtures	494,600	961,085	1,292,241	34	161
12	32	Stone/Clay/Glass Products	1,447,512	961,563	950,895	-1	-34
13	39	Misc. Manufacturing Industries	335,553	934,515	742,508	-21	121
14	35	Industrial Machinery	589,797	717,656	583,344	-19	-1
15	22	Textile Mill Products	926,200	309,952	466,997	51	-50
16	36	Electronic/Electrical Equipment	634,095	356,239	346,707	-3	-45
17	31	Leather Products	23,888	30,707	29,630	-4	24
18	38	Measurement/Photographic Instruments	1,501	250	25	-90	-98
19	23	Apparel and Other Textile Products	860	280	0	-100	-100
		Total	**130,420,758**	**129,066,819**	**119,716,681**	**-7**	**-8**

Figure 6–15. Change in NPRI Total Reported Amounts of Releases and Transfers by Industry, 1995–1998



- As a whole, the other NPRI industries reported an overall increase from 1995 to 1998. Eight of the NPRI manufacturing industry sectors reported increases, while 11 industry sectors reported reductions from 1995 to 1998.

Data comparing 1995 to 1998 do not include data in NPRI or TRI from the industry sectors reporting for the first time to TRI for 1998. Information on releases and transfers from the new industry sectors was included in data presented in Chapter 5.

Only the manufacturing sectors (US SIC codes 20–39) are included because they are the only sectors for which both NPRI and TRI data are available for the period from 1995 to 1998. Therefore, the data for 1998 presented in this section and this chapter are a subset of the data presented in previous chapters.

- The TRI chemicals manufacturing industry reported the largest total amounts of releases and transfers in 1998. It realized reductions of 9 percent from 1995 to 1998, including a 5 percent reduction from 1997 to 1998.
- The TRI primary metals industry reported increasing releases during the period from 1995 to 1998, with an overall increase in total releases and transfers of 26 percent. Releases reported by the primary metals industry increased by 4 percent from 1997 to 1998. These increases were offset by reductions in off-site transfers for further management, so that the total reported releases and transfers for this industry were about the same in 1997 and 1998.

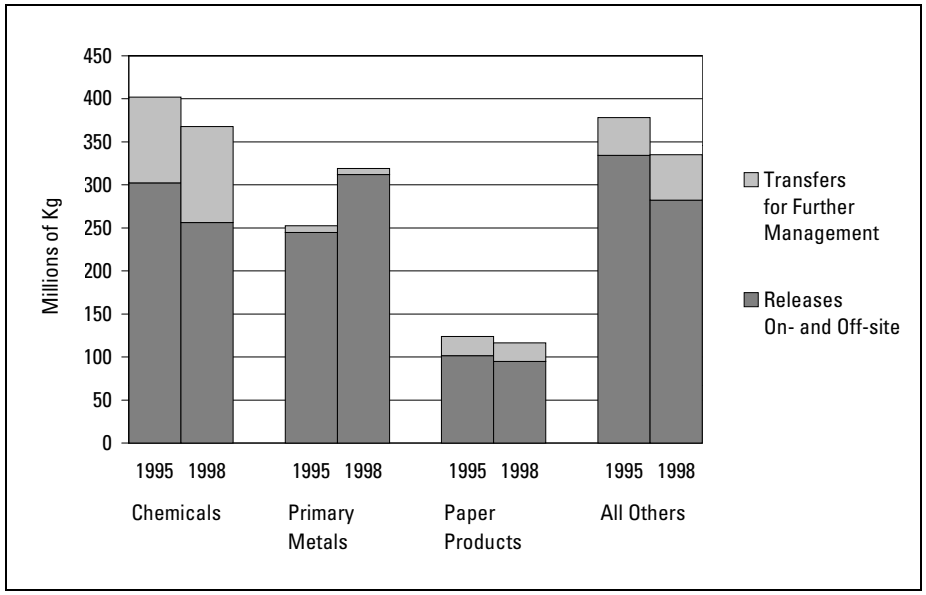
Table 6–48. TRI Total Releases and Transfers by Industry, 1995, 1997–1998 (Ordered by 1998 Total)

			Total Releases On- and Off-site					Total Transfers for Further Management				
Rank	US SIC Code	Industry	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)	1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	28	Chemicals	302,179,567	279,231,709	256,262,280	-8	-15	99,952,674	106,316,287	111,600,727	5	12
2	33	Primary Metals	244,546,587	301,416,949	312,030,781	4	28	8,004,384	17,818,945	7,208,569	-60	-10
3	26	Paper Products	101,407,867	96,801,176	94,932,861	-2	-6	22,446,604	23,017,391	21,328,043	-7	-5
4	--	Multiple codes 20-39	63,526,235	53,750,986	45,886,592	-15	-28	11,821,726	11,213,340	13,948,306	24	18
5	30	Rubber and Plastics Products	48,557,727	43,775,604	44,125,946	1	-9	1,982,872	2,641,832	2,960,685	12	49
6	37	Transportation Equipment	46,980,262	41,045,729	41,474,961	1	-12	2,865,179	3,583,612	4,454,883	24	55
7	34	Fabricated Metals Products	35,598,440	31,828,990	29,825,036	-6	-16	3,685,502	4,276,402	4,034,586	-6	9
8	29	Petroleum and Coal Products	22,679,569	25,061,367	27,342,638	9	21	2,108,278	3,007,033	4,589,075	53	118
9	20	Food Products	13,931,949	12,008,738	14,075,369	17	1	9,458,893	12,362,947	10,845,649	-12	15
10	36	Electronic/Electrical Equipment	13,925,794	13,060,091	11,570,667	-11	-17	5,755,441	6,540,709	6,370,602	-3	11
11	32	Stone/Clay/Glass Products	12,048,707	14,960,456	14,478,424	-3	20	870,842	1,063,078	909,478	-14	4
12	24	Lumber and Wood Products	13,869,100	11,225,126	13,842,293	23	0	91,605	86,878	92,901	7	1
13	27	Printing and Publishing	13,519,930	10,707,406	9,605,334	-10	-29	220,708	257,769	285,238	11	29
14	35	Industrial Machinery	9,740,572	8,196,735	7,049,851	-14	-28	1,418,339	1,590,458	860,390	-46	-39
15	25	Furniture and Fixtures	18,080,047	10,814,052	7,298,901	-33	-60	378,905	307,009	238,586	-22	-37
16	38	Measurement/Photographic Instruments	6,394,138	5,014,577	4,361,611	-13	-32	1,867,185	1,317,042	1,759,065	34	-6
17	22	Textile Mill Products	7,141,702	6,690,370	4,725,149	-29	-34	1,009,179	1,160,137	628,232	-46	-38
18	39	Misc. Manufacturing Industries	5,795,403	4,267,659	4,443,064	4	-23	489,757	443,888	715,428	61	46
19	31	Leather Products	1,541,040	1,435,256	1,454,435	1	-6	28,706	23,905	16,649	-30	-42
20	21	Tobacco Products	473,270	666,018	609,560	-8	29	72	36	822	2,183	1,042
21	23	Apparel and Other Textile Products	456,144	315,325	174,066	-45	-62	27,004	5,134	162	-97	-99
		Total	**982,394,050**	**972,274,319**	**945,569,819**	**-3**	**-4**	**174,483,855**	**197,033,832**	**192,848,076**	**-2**	**11**

Table 6–48. (*continued*)

Rank	US SIC Code	Industry	Total Releases and Transfers 1995 (kg)	1997 (kg)	1998 (kg)	Change 1997–1998 (%)	Change 1995–1998 (%)
1	28	Chemicals	402,132,241	385,547,996	367,863,007	-5	-9
2	33	Primary Metals	252,550,971	319,235,894	319,239,350	0	26
3	26	Paper Products	123,854,471	119,818,567	116,260,904	-3	-6
4	--	Multiple codes 20-39	75,347,961	64,964,326	59,834,898	-8	-21
5	30	Rubber and Plastics Products	50,540,599	46,417,436	47,086,631	1	-7
6	37	Transportation Equipment	49,845,441	44,629,341	45,929,844	3	-8
7	34	Fabricated Metals Products	39,283,942	36,105,392	33,859,622	-6	-14
8	29	Petroleum and Coal Products	24,787,847	28,068,400	31,931,713	14	29
9	20	Food Products	23,390,842	24,371,685	24,921,018	2	7
10	36	Electronic/Electrical Equipment	19,681,235	19,600,800	17,941,269	-8	-9
11	32	Stone/Clay/Glass Products	12,919,549	16,023,534	15,387,902	-4	19
12	24	Lumber and Wood Products	13,960,705	11,312,004	13,935,194	23	-0.2
13	27	Printing and Publishing	13,740,638	10,965,175	9,890,572	-10	-28
14	35	Industrial Machinery	11,158,911	9,787,193	7,910,241	-19	-29
15	25	Furniture and Fixtures	18,458,952	11,121,061	7,537,487	-32	-59
16	38	Measurement/Photographic Instruments	8,261,323	6,331,619	6,120,676	-3	-26
17	22	Textile Mill Products	8,150,881	7,850,507	5,353,381	-32	-34
18	39	Misc. Manufacturing Industries	6,285,160	4,711,547	5,158,492	9	-18
19	31	Leather Products	1,569,746	1,459,161	1,471,084	1	-6
20	21	Tobacco Products	473,342	666,054	610,382	-8	29
21	23	Apparel and Other Textile Products	483,148	320,459	174,228	-46	-64
		Total	**1,156,877,905**	**1,169,308,151**	**1,138,417,895**	**-3**	**-2**

Figure 6–16. Change in TRI Total Reported Amounts of Releases and Transfers by Industry, 1995–1998



- The TRI paper products industry reported reductions in releases and in total releases and transfers from 1995 to 1998. It reported a decrease of 6 percent from 1995 to 1998, with a 3 percent decrease from 1997 to 1998.
- Sixteen of the TRI manufacturing industry sectors reported decreases, while five industry sectors reported increases from 1995 to 1998.

6.4.5 Facilities with the Largest Decreases and Increases in Total Reported Amounts of Releases and Transfers, 1995–1998

A few facilities in North America accounted for large decreases in total releases and transfers from 1995 to 1998.

- Three TRI facilities reported reductions of more than 5 million kg. The facility with the largest decrease in total releases and transfers from 1995 to 1998 was Acordis Cellulosic Fibers in Axis, Alabama. Acordis completed the installation of a new spinning machine in 1997 for the production of rayon fibers. The project allows Acordis to collect carbon disulfide and recycle it instead of releasing the chemical to the air.
- The facility with the second-largest apparent reductions in releases and transfers, Cyprus Miami Mining in Claypool, Arizona, expanded its reporting to include operations under the new TRI industry, metal mining. Consequently, no forms for 1998 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.
- Of the 50 facilities in North America with the largest decreases in total releases and transfers, 27 were chemical manufacturers (US SIC code 28) and 14 were primary metals facilities (US SIC code 33).

Table 6–49. The 50 Facilities with Largest Decrease in Total Releases and Transfers in North America, 1995–1998

					1995			
			SIC Code					
Rank	Facility	City, State/Province	Canada	US	Number of Forms	Total Releases On- and Off-site (kg)	Total Transfers for Further Management (kg)	Total Releases and Transfers (kg)
1	Acordis Cellulosic Fibers Inc., Akzo Nobel Finance US	Axis, AL		28	5	15,427,756	0	15,427,756
2	Cyprus Miami Mining Corp., Cyprus Climax Metals Co.	Claypool, AZ		33	13	7,066,233	0	7,066,233
3	Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca, PA		33	10	15,994,774	0	15,994,774
4	Millennium Petrochemicals Inc., Millennium Chemicals Inc.	La Porte, TX		28	22	1,648,477	3,500,429	5,148,906
5	Phelps Dodge Hidalgo Inc.	Playas, NM		33	11	14,607,894	0	14,607,894
6	DuPont Beaumont Plant	Beaumont, TX		28	28	8,570,598	278,640	8,849,238
7	Huntsman Corp. Port Arthur - A&O Plant	Port Arthur, TX		28	23	4,394,508	67,692	4,462,200
8	DuPont Cape Fear	Leland, NC		28	21	1,693,772	3,539,703	5,233,475
9	Cytec Inds. Inc. Fortier Plant	Westwego, LA		28	22	11,718,163	114	11,718,277
10	IMC-Agrico Co., New Wales Plant	Mulberry, FL		Mult.	2	3,746,031	0	3,746,031
11	GM Powertrain Defiance, General Motors Corp.	Defiance, OH		33	17	6,567,856	3,480	6,571,336
12	Chino Mines Co., Phelps Dodge Corp.	Hurley, NM		33	3	3,233,586	0	3,233,586
13	Sterling Chemicals Inc.	Texas City, TX		28	36	5,408,261	18,986	5,427,247
14	Methanex Corporation, Medicine Hat Plant	Medicine Hat, AB	37	28	4	3,353,220	31,950	3,385,170
15	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	6	29,168,743	0	29,168,743
16	Lenzing Fibers Corp.	Lowland, TN		28	5	10,789,279	0	10,789,279
17	Irving Pulp & Paper, Ltd/Irving Tissue Company	Saint John, NB	27	26	4	3,663,623	0	3,663,623
18	Celanese Ltd.- Clear Lake Plant, Hoechst	Pasadena, TX		28	20	6,205,584	1,287,304	7,492,888
19	Bayer Corp.	New Martinsville, WV		28	30	3,839,419	515	3,839,934
20	Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan, AB	37	28	13	2,291,434	0	2,291,434
21	Fort James Corporation, Fort James - Marathon, Ltd.	Marathon, ON	27	26	4	2,215,710	0	2,215,710
22	CXY Chemicals Limited Partnership, Canadian Occidental Petroleum	Nanaimo, BC	37	28	2	1,988,244	0	1,988,244
23	Cartons St-Laurent Inc.	Latuque, QC	27	26	4	2,408,582	0	2,408,582
24	Cabot Corp. Canal Plant	Franklin, LA		28	3	1,905,154	0	1,905,154
25	Norampac Inc., Red Rock Div. Mill	Red Rock, ON	27	26	1	1,900,000	0	1,900,000
26	Northwestern Steel & Wire Co.	Sterling, IL		33	8	7,458,528	0	7,458,528
27	Cabot Corp. Ville Platte Plant	Ville Platte, LA		28	3	1,614,127	0	1,614,127
28	IMC-Agrico Co., South Pierce Plant	Mulberry, FL		28	2	1,431,746	0	1,431,746
29	Monsanto - Chocolate Bayou	Alvin, TX		28	19	1,856,700	0	1,856,700
30	ASARCO Inc., Omaha Plant	Omaha, NE		33	6	1,407,644	0	1,407,644
31	Algoma Steel Inc, Algoma Steel Main Works	Sault Ste. Marie, ON	29	33	17	1,598,360	0	1,598,360
32	PD Glycol, Equistar Chemicals L.P.	Beaumont, TX		28	6	34,815	1,748,908	1,783,723
33	North American Rayon Corp., North American Corp.	Elizabethton, TN		28	3	1,389,668	0	1,389,668
34	Co-Steel Lasco	Whitby, ON	29	33	6	8,442,331	0	8,442,331
35	Electralloy, G.O. Carlson Inc.	Oil City, PA		33	4	1,336,940	0	1,336,940
36	Natl. Steel Corp., Great Lakes Div.	Ecorse, MI		33	15	6,190,780	25,042	6,215,822
37	Reynolds Metals Co. - Sheffield Plant	Sheffield, AL		34	12	1,292,523	1,419	1,293,942
38	Osram Sylvania Prods. Inc.	Versailles, KY		36	6	1,237,879	0	1,237,879
39	Chemetal Inc., Comilog	New Johnsonville, TN		28	3	2,108,049	0	2,108,049
40	Inspec USA Inc.	Galena, KS		28	4	1,231,753	694,355	1,926,108
41	Weyerhaeuser Co.	Longview, WA		Mult.	17	2,529,048	0	2,529,048
42	Cabot Corp., Cab-o-Sil Div.	Tuscola, IL		28	6	1,121,425	0	1,121,425
43	Simpson Pasadena Paper Co., Simpson Investment Co.	Pasadena, TX		26	8	576,481	3,783,492	4,359,973
44	Avesta Sheffield Plate Inc.	New Castle, IN		33	5	1,076,446	3,521	1,079,967
45	PCS Phosphate Co. Inc., Potash Corp. of Saskatchewan Inc.	Aurora, NC		28	6	4,559,331	0	4,559,331
46	Degussa Corp. - Ivanhoe	Louisa, LA		28	2	929,705	0	929,705
47	Exxon Chemical Baton Rouge Chemical Plant, Exxon Corp.	Baton Rouge, LA		28	34	1,194,395	157,077	1,351,472
48	Pfizer Pharmaceuticals Inc.	Barceloneta, PR		28	6	59,821	1,248,708	1,308,529
49	DuPont Louisville Works	Louisville, KY		28	10	38,695	872,167	910,862
50	Newport Steel Corp., NS Group Inc.	Wilder, KY		33	8	1,389,208	0	1,389,208
	Total				**525**	**221,913,299**	**17,263,502**	**239,176,801**

Note: Canada and US data only. Mexico data not availble 1995-1998. 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 6–49. (*continued*)

Rank	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1997 Total Transfers for Further Management (kg)	1997 Total Releases and Transfers (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	1998 Total Transfers for Further Management (kg)	1998 Total Releases and Transfers (kg)	Change in Total Releases and Transfers 1995–1998 (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)
1	4	7,033,029	0	7,033,029	4	5,033,198	0	5,033,198	-10,394,558	Carbon disulfide (air)
2	14	8,596,691	0	8,596,691	*	*	*	*	-7,066,233	Copper/Zinc and compounds (land)
3	9	14,080,761	0	14,080,761	13	9,466,279	0	9,466,279	-6,528,495	Zinc/Lead and compounds (transfers of metals)
4	21	1,526,810	0	1,526,810	12	373,251	0	373,251	-4,775,655	Vinyl acetate (transfers to treatment)
5	13	12,345,858	0	12,345,858	16	9,939,594	0	9,939,594	-4,668,300	Zinc and compounds (land)
6	22	2,829,432	262,188	3,091,620	21	3,409,428	1,199,945	4,609,373	-4,239,865	Nitric acid and nitrate compounds, Acetonitrile (UIJ)
7	19	911,133	25,699	936,832	19	338,509	2,426	340,935	-4,121,265	Propylene (air)
8	19	1,186,920	71,755	1,258,675	21	1,066,338	72,528	1,138,866	-4,094,609	Ethylene glycol (transfers to treatment)
9	24	10,117,501	2,944	10,120,445	23	7,677,284	1,848	7,679,132	-4,039,145	Acetonitrile, Acrylic acid (UIJ)
10	3	1,631,746	0	1,631,746	*	*	*	*	-3,746,031	Phosphoric acid (land)
11	20	5,973,972	5,294	5,979,266	16	3,109,499	1,847	3,111,346	-3,459,990	Zinc and compounds (land)
12	*	*	*	*	*	*	*	*	-3,233,586	Copper and compounds (land)
13	34	2,879,438	10,070	2,889,508	35	2,277,870	29,604	2,307,474	-3,119,773	Nitric acid and nitrate compounds (UIJ)
14	3	790,700	5,150	795,850	3	365,636	550	366,186	-3,018,984	Methanol (air)
15	6	28,270,233	0	28,270,233	6	26,163,746	0	26,163,746	-3,004,997	Hydrochloric acid, Chlorine (air)
16	5	7,764,811	0	7,764,811	5	7,996,518	0	7,996,518	-2,792,761	Carbon disulfide (air)
17	4	1,070,289	0	1,070,289	2	1,002,916	0	1,002,916	-2,660,707	Methanol (water)
18	20	1,837,586	4,112,762	5,950,348	18	398,351	4,588,642	4,986,993	-2,505,895	Ethylene glycol (UIJ)
19	29	1,571,712	5,235	1,576,947	27	1,435,424	6,281	1,441,705	-2,398,229	Nitric acid and nitrate compounds (water)
20	8	225,820	0	225,820	4	60,110	0	60,110	-2,231,324	Methanol (air)
21	4	155,200	0	155,200	4	158,280	0	158,280	-2,057,430	Methanol (water)
22	2	548	0	548	3	862	0	862	-1,987,382	Asbestos (transfers to disposal)
23	8	502,404	0	502,404	8	491,042	0	491,042	-1,917,540	Methanol (water)
24	3	622,199	0	622,199	3	73,266	0	73,266	-1,831,888	Carbon disulfide, Ethylene (air)
25	2	273,348	0	273,348	2	294,880	0	294,880	-1,605,120	Methanol (water)
26	6	6,815,353	0	6,815,353	6	5,887,549	0	5,887,549	-1,570,979	Zinc/Manganese and compounds (land)
27	3	78,028	0	78,028	3	57,256	0	57,256	-1,556,871	Carbon disulfide (air)
28	2	1,473,469	0	1,473,469	*	*	*	*	-1,431,746	Phosphoric acid (land)
29	4	471,070	0	471,070	4	428,467	0	428,467	-1,428,233	Acrylonitrile, Acetonitrile, Hydrogen cyanide, Phenol (UIJ)
30	6	1,749,708	0	1,749,708	*	*	*	*	-1,407,644	Zinc/Lead and compounds (transfers of metals)
31	19	210,235	0	210,235	15	197,362	0	197,362	-1,400,998	Manganese and compounds (land)
32	6	61,987	158,086	220,073	6	42,760	346,014	388,774	-1,394,949	Ethylene glycol (transfers to treatment)
33	2	571,610	0	571,610	*	*	*	*	-1,389,668	Carbon disulfide (air)
34	6	7,059,754	0	7,059,754	6	7,063,650	0	7,063,650	-1,378,681	Copper and compounds (land)
35	5	131,414	0	131,414	5	125,403	0	125,403	-1,211,537	Chromium and compounds (transfers of metals)
36	18	3,599,189	10,970	3,610,159	18	5,013,678	14,332	5,028,010	-1,187,812	Zinc and compounds (transfers of metals)
37	12	252,047	1,044	253,091	12	155,792	877	156,669	-1,137,273	Methyl ethyl ketone, Toluene (air)
38	6	131,472	129	131,601	7	110,869	28	110,897	-1,126,982	Xylene (air)
39	2	1,540,532	0	1,540,532	2	995,004	0	995,004	-1,113,045	Manganese and compounds (land)
40	4	292,906	1,415,918	1,708,824	14	825,162	0	825,162	-1,100,946	Nitric acid and nitrate compounds (transfers to disposal, treatment)
41	18	2,094,108	0	2,094,108	18	1,457,038	0	1,457,038	-1,072,010	Methanol (air)
42	6	123,465	0	123,465	6	121,725	0	121,725	-999,700	Chlorine (air)
43	8	211,227	3,361,224	3,572,451	8	245,862	3,149,842	3,395,704	-964,269	Methanol (transfers to sewage)
44	5	234,027	50,540	284,567	5	65,125	67,302	132,427	-947,540	Chromium and compounds (transfers of metals)
45	6	3,969,324	0	3,969,324	5	3,640,016	0	3,640,016	-919,315	Phosphoric acid (land)
46	2	30,385	0	30,385	2	28,572	0	28,572	-901,133	Carbon disulfide (air)
47	35	435,080	47,468	482,548	37	403,979	61,024	465,003	-886,469	Nitric acid and nitrate compounds (water), Methanol (transfers to disposal, treatment)
48	5	43,902	540,726	584,628	6	31,749	393,152	424,901	-883,628	Methanol, Toluene (transfers to treatment)
49	6	30,630	1,158	31,788	9	26,586	1,112	27,698	-883,164	Toluene (transfers to treatment)
50	7	1,027,962	0	1,027,962	7	511,996	0	511,996	-877,212	Zinc and compounds (transfers of metals)
	495	**144,837,025**	**10,088,360**	**154,925,385**	**466**	**108,567,881**	**9,937,354**	**118,505,235**	**-120,671,566**	

* Indicates facility did not report any matched chemicals that year.
UIJ=Underground injection.

A few facilities in North America accounted for large increases in total releases and transfers from 1995 to 1998.

- Three TRI facilities reported increases of more than 9 million kg in total releases and transfers from 1995 to 1998.
- The TRI facility, Kennecott Utah Copper Smelter & Refy. in Magna, Utah, reported the largest increase in total releases and transfers from 1995 to 1998. The increases were due to increased production after the installation of a new smelter in 1995. Some of the increases were the result of metal compounds that were below the reporting threshold prior to 1998, but which were reported in 1998.
- The TRI 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 and it is not possible to know how much of the 1998 amounts are due to the metal mining operations.
- Of the 50 facilities in North America with the largest increases in total releases and transfers, 31 were primary metals facilities (US SIC code 33) and 14 were chemical manufacturers (US SIC code 28).

Table 6–50. The 50 Facilities with Largest Increase in Total Releases and Transfers in North America, 1995–1998

					1995			
			SIC Code					
Rank	Facility	City, State/Province	Canada	US	Number of Forms	Total Releases On- and Off-site (kg)	Total Transfers for Further Management (kg)	Total Releases and Transfers (kg)
1	Kennecott Utah Copper Smelter & Refy.	Magna, UT		33	14	2,885,124	0	2,885,124
2	ASARCO Inc. Ray Complex/Hayden Smelter & Concentrator	Hayden, AZ		33	9	9,919,427	0	9,919,427
3	Armco Inc. Butler Ops. (Rte 8S)	Butler, PA		33	14	4,738,499	5,907	4,744,406
4	Nucor-Yamato Steel Co.	Blytheville, AR		33	8	72,019	0	72,019
5	Steel Dynamics Inc.	Butler, IN		33	1	6,117	0	6,117
6	Dofasco Inc.	Hamilton, ON	29	33	18	2,523,127	2	2,523,129
7	Solutia Inc.	Gonzalez, FL		28	21	5,939,341	0	5,939,341
8	Nucor Steel	Crawfordsville, IN		33	9	5,236,425	0	5,236,425
9	ASARCO Inc.	East Helena, MT		33	10	17,921,953	0	17,921,953
10	DuPont Delisle Plant	Pass Christian, MS		28	5	232,766	9,070	241,836
11	Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville, OR		33	5	1,969	0	1,969
12	Elementis Chromium L.P.	Corpus Christi, TX		28	2	4,307,148	0	4,307,148
13	Norco Chemical Plant - East Site, Shell Oil Co.	Norco, LA		28	*	*	*	*
14	Nucor Corp. Nucor Steel	Plymouth, UT		33	8	180,863	0	180,863
15	Nucor Steel, Nebraska	Norfolk, NE		33	7	1,272	0	1,272
16	USS Gary Works, USX Corp.	Gary, IN		33	29	3,512,655	0	3,512,655
17	Bar Tech. S. Inc. Primary Ops.	Johnstown, PA		33	*	*	*	*
18	Nucor Steel	Huger, SC		33	*	*	*	*
19	Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais, IL		33	5	2,252	0	2,252
20	PCS Nitrogen Fertilizer L.P.	Geismar, LA		28	11	6,955,699	0	6,955,699
21	J. R. Simpolot Co., Heyburn Food Group	Heyburn, ID		Mult.	1	0	0	0
22	FMC Corp.	Baltimore, MD		28	14	36,928	244,431	281,359
23	Rouge Steel Co.	Dearborn, MI		33	12	5,157,848	0	5,157,848
24	Ipsco Steel Inc.	Muscatine, IA		33	*	*	*	*
25	Angus Chemical Co.	Sterlington, LA		28	11	2,530,971	321	2,531,292
26	Birmingham Steel Corp. Seattle WA Steel Div.	Seattle, WA		33	5	1,806	0	1,806
27	Timken Co. - Faircrest Steel Plant	Canton, OH		33	7	28,324	0	28,324
28	Nucor Steel, Arkansas Plant	Blytheville, AR		33	9	12,006	0	12,006
29	Zinc Corp. of America, Horsehead Ind. Inc.	Palmerton, PA		33	3	9,653	0	9,653
30	Koppers Inds. Inc.	Cicero, IL		28	9	80,597	13,204	93,801
31	Birmingham Southeast LLC, Birmingham Steel Corp.	Cartersville, GA		33	6	11,462	0	11,462
32	Dow Chemical Co. - Midland Ops.	Midland, MI		28	49	582,446	0	582,446
33	USS Mon Valley Works - Edgar Thomson Plant, USX Corp.	Braddock, PA		33	6	1,068,496	0	1,068,496
34	Wheeling-Pittsburgh Steel Corp. Mingo Junction	Mingo Junction, OH		33	5	336,082	0	336,082
35	BHP Copper N. A. San Manuel Smelting & Refining	San Manuel, AZ		33	11	213,586	0	213,586
36	A. E. Staley Mfg. Co. Sagamore Ops.	Lafayette, IN		20	5	16,679	46,329	63,008
37	HNA Holdings Inc., Hoechst Corp.	Spartanburg, SC		Mult.	13	339,506	0	339,506
38	Roanoke Electric Steel Corp.	Roanoke, VA		33	7	1,865	0	1,865
39	J & L Specialty Steel Inc.	Midland, PA		33	9	489,450	113,786	603,236
40	Solutia - Chocolate Bayou	Alvin, TX		28	*	*	*	*
41	FMC Corp. Phosphorus Chemicals Div.	Lawrence, KS		28	3	114,411	9,551	123,962
42	American Steel Foundries, Alliance Plant, Amsted Inds. Inc.	Alliance, OH		33	7	1,271,796	248	1,272,044
43	CSC Ltd., SBQ Ltd.	Warren, OH		33	6	32,964	0	32,964
44	Doe Run Co. Glover Smelter, Renco Group Inc.	Annapolis, MO		33	6	2,959,545	0	2,959,545
45	Monsanto - Luling	Luling, LA		28	13	1,978,881	8,530	1,987,411
46	Occidental Chemical Corp., Occidental Petroleum Corp.	Castle Hayne, NC		28	2	3,315,098	0	3,315,098
47	U.S. Sugar Corp. Clewiston Mill	Clewiston, FL		20	*	*	*	*
48	Amoco Petroleum Prods. Refining Business Group, BP Amoco Corp.	Texas City, TX		29	32	662,707	7,877	670,584
49	Weirton Steel Corp.	Weirton, WV		33	12	693,457	2	693,459
50	Equistar Chemicals L.P. La Porte Plant	La Porte, TX		28	*	*	*	*
	Total				**439**	**86,383,220**	**459,258**	**86,842,478**

Note: Canada and US data only. Mexico data not availble 1995-1998. 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.
* Indicates facility did not report any matched chemicals that year.

Table 6–50. (*continued*)

Rank	1997 Number of Forms	1997 Total Releases On- and Off-site (kg)	1997 Total Transfers for Further Management (kg)	1997 Total Releases and Transfers (kg)	1998 Number of Forms	1998 Total Releases On- and Off-site (kg)	1998 Total Transfers for Further Management (kg)	1998 Total Releases and Transfers (kg)	Change in Total Releases and Transfers 1995–1998 (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)
1	14	11,214,648	0	11,214,648	16	15,446,345	2	15,446,347	12,561,223	Copper/Zinc/Arsenic and compounds (land)
2	9	935,935	0	935,935	11	20,858,816	0	20,858,816	10,939,389	Copper and compounds (land)
3	14	12,023,592	22,976	12,046,568	14	14,338,363	17,051	14,355,414	9,611,008	Nitric acid and nitrate compounds (water)
4	8	7,550,269	0	7,550,269	8	5,103,675	0	5,103,675	5,031,656	Zinc and compounds (transfers of metals)
5	7	6,536,202	0	6,536,202	3	4,653,338	0	4,653,338	4,647,221	Zinc and compounds (transfers of metals)
6	18	8,599,553	988	8,600,541	18	6,706,253	0	6,706,253	4,183,124	Zinc and compounds (transfers of metals)
7	18	9,818,975	0	9,818,975	18	9,869,345	0	9,869,345	3,930,004	Nitric acid and nitrate compounds (UIJ)
8	9	5,641,033	14,957	5,655,990	8	8,858,751	4,635	8,863,386	3,626,961	Zinc and compounds (transfers of metals)
9	10	17,697,271	0	17,697,271	10	21,317,968	0	21,317,968	3,396,015	Zinc and compounds (land, transfers of metals), Lead/Cadmium and compounds (transfers of metals)
10	11	4,092,072	8,163	4,100,235	13	3,417,102	8,163	3,425,265	3,183,429	Manganese and compounds (UIJ)
11	5	1,063,826	0	1,063,826	5	3,023,279	0	3,023,279	3,021,310	Zinc and compounds (transfers of metals)
12	2	8,013,086	0	8,013,086	2	7,268,731	0	7,268,731	2,961,583	Chromium and compounds (land)
13	*	*	*	*	24	522,373	2,291,065	2,813,438	2,813,438	Propylene, 1,3-Butadiene (transfers to treatment), Ethylene (transfers to treatment, air)
14	7	3,929,232	0	3,929,232	7	2,979,970	0	2,979,970	2,799,107	Zinc and compounds (transfers of metals)
15	7	309,143	0	309,143	8	2,588,657	0	2,588,657	2,587,385	Zinc and compounds (transfers of metals)
16	33	7,548,891	0	7,548,891	33	6,046,237	0	6,046,237	2,533,582	Zinc and compounds (land)
17	6	1,931,649	0	1,931,649	6	2,434,641	0	2,434,641	2,434,641	Zinc and compounds (transfers of metals)
18	4	758,438	0	758,438	6	2,350,354	0	2,350,354	2,350,354	Zinc and compounds (transfers of metals)
19	6	2,388,551	0	2,388,551	6	2,291,419	0	2,291,419	2,289,167	Zinc and compounds (transfers of metals)
20	12	13,827,714	0	13,827,714	12	9,242,050	0	9,242,050	2,286,351	Phosphoric acid (water)
21	1	275,619	0	275,619	1	2,276,290	0	2,276,290	2,276,290	Nitric acid and nitrate compounds (water)
22	18	22,086	2,283,196	2,305,282	18	14,189	2,427,784	2,441,973	2,160,614	Toluene, Methanol (transfers to treatment)
23	12	6,434,115	0	6,434,115	8	7,310,951	0	7,310,951	2,153,103	Zinc/Manganese and compounds (transfers of metals)
24	6	712,356	0	712,356	6	2,084,833	0	2,084,833	2,084,833	Zinc and compounds (transfers of metals)
25	11	2,957,702	51,229	3,008,931	11	4,398,679	112,141	4,510,820	1,979,528	Nitric acid and nitrate compounds (UIJ)
26	5	1,769,438	0	1,769,438	6	1,961,814	0	1,961,814	1,960,008	Zinc and compounds (transfers of metals)
27	7	2,495,328	0	2,495,328	7	1,867,675	0	1,867,675	1,839,351	Zinc/Manganese and compounds (transfers of metals)
28	10	2,968,525	0	2,968,525	10	1,795,862	0	1,795,862	1,783,856	Zinc and compounds (transfers of metals)
29	4	2,057	0	2,057	6	1,781,921	0	1,781,921	1,772,268	Lead and compounds (transfers of metals)
30	9	1,360,603	9,884	1,370,487	10	1,819,268	9,819	1,829,087	1,735,286	Phthalic anhydride (transfers to disposal)
31	5	2,401,220	0	2,401,220	7	1,737,858	0	1,737,858	1,726,396	Zinc and compounds (transfers of metals)
32	55	676,546	148,709	825,255	56	392,248	1,796,665	2,188,913	1,606,467	Acetonitrile, Methanol, Methyl isobutyl ketone (transfers to treatment)
33	7	3,092,472	0	3,092,472	7	2,658,358	0	2,658,358	1,589,862	Zinc and compounds (transfers of metals)
34	5	51,099	0	51,099	9	1,925,129	0	1,925,129	1,589,047	Zinc and compounds (transfers of metals)
35	13	2,889,170	0	2,889,170	11	1,787,189	0	1,787,189	1,573,603	Copper and compounds (air)
36	5	79,377	420,254	499,631	6	73,588	1,506,725	1,580,313	1,517,305	Nitric acid and nitrate compounds (transfers to sewage)
37	13	77,236	303,855	381,091	13	84,346	1,768,707	1,853,053	1,513,547	Methanol (transfers to treatment)
38	7	1,236,328	0	1,236,328	7	1,500,950	0	1,500,950	1,499,085	Zinc and compounds (transfers of metals)
39	9	874,464	91,003	965,467	9	2,004,072	75,284	2,079,356	1,476,120	Nitric acid and nitrate compounds (water)
40	16	1,803,515	0	1,803,515	16	1,438,474	0	1,438,474	1,438,474	Acrylonitrile, Hydrogen cyanide, Phenol (UIJ)
41	3	145,280	6,531	151,811	2	1,552,326	7,401	1,559,727	1,435,765	Phosphoric acid (transfers to disposal)
42	6	511,949	258	512,207	3	2,677,506	0	2,677,506	1,405,462	Chromium and compounds (transfers of metals)
43	7	507,776	0	507,776	7	1,390,815	0	1,390,815	1,357,851	Zinc and compounds (transfers of metals)
44	7	4,921,195	0	4,921,195	7	4,240,587	0	4,240,587	1,281,042	Zinc/Lead and compounds (land)
45	14	3,413,846	9,574	3,423,420	13	3,246,796	8,617	3,255,413	1,268,002	Formaldehyde (UIJ)
46	1	4,136,190	0	4,136,190	1	4,543,951	0	4,543,951	1,228,853	Chromium and compounds (land)
47	*	*	*	*	3	1,228,300	0	1,228,300	1,228,300	Naphthalene, Methanol (air, land)
48	33	1,763,846	0	1,763,846	32	1,870,381	959	1,871,340	1,200,756	Methanol (air)
49	14	739,180	19,447	758,627	14	1,855,543	25,406	1,880,949	1,187,490	Manganese and compounds (transfers of metals)
50	*	*	*	*	16	1,157,277	0	1,157,277	1,157,277	Ethylene (air), Zinc and compounds (transfers of metals)
	503	**172,198,598**	**3,391,024**	**175,589,622**	**550**	**211,994,843**	**10,060,424**	**222,055,267**	**135,212,789**	

UIJ=Underground injection.

6.4.6 1995–1998 Total Reported Amounts of Releases and Transfers by Chemical

There are 165 substances in the matched data set. These are the substances reported both to NPRI and TRI and, therefore, in the matched data set. The list of substances in the matched data set is the same for the 1995–1998 period as for 1998.

Appendix D presents information on potential health effects of substances with the largest releases and transfers as reported to the North American PRTRs, from the US Agency for Toxic Substances and Disease Registry, 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 decrease in total releases and transfers in North America from 1995 to 1998 was methanol, with a decrease of 14 percent. Methanol had the largest such decrease in NPRI, with a 38 percent decrease, and the third largest such decrease in TRI, with a 10 percent decrease.
- The chemical with the second-largest decrease in total releases and transfers in North America from 1995 to 1998 was toluene, with a decrease of 25 percent. Toluene was the chemical with the largest such decrease reported in TRI, with a decrease of 28 percent.

Table 6–51. The 10 Chemicals with the Largest Decrease in Total Releases and Transfers in North America, 1995–1998

			Total Releases and Transfers				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	67-56-1	Methanol	203,695,777	181,477,095	174,643,076	-29,052,701	-14
2	108-88-3	Toluene	84,672,979	70,180,638	63,150,828	-21,522,151	-25
3	75-15-0	Carbon disulfide	38,399,290	23,526,352	19,841,939	-18,557,351	-48
4	1330-20-7	Xylene (mixed isomers)	58,056,938	47,353,165	45,015,271	-13,041,667	-22
5	78-93-3	Methyl ethyl ketone	40,347,771	33,332,981	30,786,988	-9,560,783	-24
6	107-21-1	Ethylene glycol	26,957,548	20,835,795	18,127,641	-8,829,907	-33
7	75-09-2	Dichloromethane▼	33,802,861	30,326,192	26,935,188	-6,867,673	-20
8	7647-01-0	Hydrochloric acid	32,482,954	27,627,991	25,646,515	-6,836,439	-21
9	79-01-6	Trichloroethylene▼	13,080,630	9,601,843	7,291,773	-5,788,857	-44
10	108-05-4	Vinyl acetate▼	7,207,681	2,966,923	2,884,649	-4,323,032	-60

▼ Known or suspected carcinogen.

Table 6–52. The 10 Chemicals with the Largest Decrease in NPRI Total Releases and Transfers, 1995–1998

Rank	CAS Number	Chemical	Total Releases and Transfers 1995 (kg)	1997 (kg)	1998 (kg)	Change 1995–1998 kg	%
1	67-56-1	Methanol	32,130,982	21,319,682	20,028,427	-12,102,555	-38
2	1332-21-4	Asbestos (friable) ▼	3,475,355	1,156,168	1,666,206	-1,809,149	-52
3	1330-20-7	Xylene (mixed isomers)	9,259,357	8,173,161	7,522,330	-1,737,027	-19
4	7782-50-5	Chlorine	1,237,753	918,193	459,805	-777,948	-63
5	--	Copper (and its compounds)*	2,395,813	1,766,002	1,645,980	-749,833	-31
6	71-43-2	Benzene▼	1,938,524	1,507,090	1,338,342	-600,182	-31
7	74-87-3	Chloromethane	970,846	434,586	385,142	-585,704	-60
8	108-05-4	Vinyl acetate▼	837,914	287,212	298,022	-539,892	-64
9	115-07-1	Propylene	1,248,941	972,363	862,768	-386,173	-31
10	110-82-7	Cyclohexane	2,937,933	3,224,475	2,576,680	-361,253	-12

* Metal and its compounds. ▼ Known or suspected carcinogen.

Table 6–53. The 10 Chemicals with the Largest Decrease in TRI Total Releases and Transfers, 1995–1998

Rank	CAS Number	Chemical	Total Releases and Transfers 1995 (kg)	1997 (kg)	1998 (kg)	Change 1995–1998 kg	%
1	108-88-3	Toluene	76,942,391	61,743,754	55,032,962	-21,909,429	-28
2	75-15-0	Carbon disulfide	38,377,685	23,508,617	19,826,294	-18,551,391	-48
3	67-56-1	Methanol	171,564,795	160,157,413	154,614,649	-16,950,146	-10
4	1330-20-7	Xylene (mixed isomers)	48,797,581	39,180,004	37,492,941	-11,304,640	-23
5	78-93-3	Methyl ethyl ketone	34,968,299	27,396,754	25,202,741	-9,765,558	-28
6	107-21-1	Ethylene glycol	26,070,772	19,915,083	17,424,782	-8,645,990	-33
7	7647-01-0	Hydrochloric acid	31,210,133	26,226,373	24,273,338	-6,936,795	-22
8	75-09-2	Dichloromethane▼	31,556,780	27,762,861	24,631,222	-6,925,558	-22
9	79-01-6	Trichloroethylene▼	12,269,302	8,792,685	6,377,484	-5,891,818	-48
10	115-07-1	Propylene	12,544,180	7,533,404	8,694,545	-3,849,635	-31

▼ Known or suspected carcinogen.

- For NPRI, the chemical with the second-largest decrease was asbestos, with a decrease of 52 percent.
- For TRI, the chemical with the second-largest decrease was carbon disulfide, with a decrease of 48 percent.
- Of the 10 chemicals with the largest decreases in total releases and transfers in North America, three were designated known or suspected carcinogens, —dichloromethane, trichloroethylene and vinyl acetate.

- Zinc and its compounds had the largest reported increase in total releases and transfers from 1995 to 1998 in North America, and in both NPRI and TRI. Zinc and its compounds increased 44.7 million kg, or 35 percent.
- Nitric acid and nitrate compounds, with the second-largest increase in North America, and in both NPRI and TRI, increased by 16.1 million kg, or 18 percent.
- Of the 10 chemicals with the largest increases in total releases and transfers in North America, three were designated known or suspected carcinogens: lead and its compounds, arsenic and its compounds and formaldehyde; and six were metals: zinc, manganese, copper, lead, chromium, and arsenic and their compounds.

Table 6–54. The 10 Chemicals with the Largest Increase in Total Releases and Transfers in North America, 1995–1998

			Total Releases and Transfers				
			1995	1997	1998	Change 1995–1998	
Rank	CAS Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Zinc (and its compounds)*	128,260,265	179,470,947	172,930,199	44,669,934	35
2	--	Nitric acid and nitrate compounds	141,700,612	156,240,119	167,828,284	26,127,672	18
3	--	Manganese (and its compounds)*	49,614,336	72,695,521	68,710,485	19,096,149	38
4	--	Copper (and its compounds)*	34,135,061	36,810,331	41,964,577	7,829,516	23
5	--	Lead (and its compounds)*▼	23,325,886	30,645,197	30,306,554	6,980,668	30
6	100-42-5	Styrene▼	23,035,595	25,086,446	28,778,262	5,742,667	25
7	--	Chromium (and its compounds)*	26,986,765	29,161,747	31,665,187	4,678,422	17
8	--	Arsenic (and its compounds)*▼	2,252,313	4,260,439	4,510,136	2,257,823	100
9	7664-93-9	Sulfuric acid	13,386,335	14,262,355	15,551,482	2,165,147	16
10	50-00-0	Formaldehyde▼	11,618,750	13,058,180	13,255,934	1,637,184	14

* Metal and its compounds. ▼ Known or suspected carcinogen.

Table 6–55. The 10 Chemicals with the Largest Increase in NPRI Total Releases and Transfers, 1995–1998

			Total Releases and Transfers				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Zinc (and its compounds)*	16,750,381	25,724,471	21,828,603	5,078,222	30
2	--	Nitric acid and nitrate compounds	6,059,390	8,152,489	7,763,278	1,703,888	28
3	--	Chromium (and its compounds)*▼	3,085,937	2,754,140	3,722,972	637,035	21
4	7429-90-5	Aluminum (fume or dust)*	613,535	790,035	1,011,751	398,216	65
5	108-88-3	Toluene	7,730,588	8,436,884	8,117,866	387,278	5
6	1344-28-1	Aluminum oxide (fibrous forms)	58,404	316,111	399,327	340,923	584
7	100-42-5	Styrene▼	976,254	1,222,544	1,264,217	287,963	29
8	--	Arsenic (and its compounds)*▼	74,078	201,925	318,563	244,485	330
9	78-93-3	Methyl ethyl ketone	5,379,472	5,936,227	5,584,247	204,775	4
10	7664-39-3	Hydrogen fluoride	1,702,145	1,725,619	1,897,153	195,008	11

* Metal and its compounds. ▼ Known or suspected carcinogen.

Table 6–56. The 10 Chemicals with the Largest Increase in TRI Total Releases and Transfers, 1995–1998

			Total Releases and Transfers				
	CAS		1995	1997	1998	Change 1995–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	kg	%
1	--	Zinc (and its compounds)*	111,509,884	153,746,476	151,101,596	39,591,712	36
2	--	Nitric acid and nitrate compounds	135,641,222	148,087,630	160,065,006	24,423,784	18
3	--	Manganese (and its compounds)*	43,638,646	65,921,580	63,068,486	19,429,840	45
4	--	Copper (and its compounds)*	31,739,248	35,044,329	40,318,597	8,579,349	27
5	--	Lead (and its compounds)*▼	19,961,392	26,478,754	26,944,931	6,983,539	35
6	100-42-5	Styrene▼	22,059,341	23,863,902	27,514,045	5,454,704	25
7	--	Chromium (and its compounds)*▼	23,900,828	26,407,607	27,942,215	4,041,387	17
8	7664-93-9	Sulfuric acid	9,726,077	9,798,424	12,056,024	2,329,947	24
9	--	Arsenic (and its compounds)*▼	2,178,235	4,058,514	4,191,573	2,013,338	92
10	1332-21-4	Asbestos (friable)▼	2,266,788	1,823,668	4,068,908	1,802,120	80

* Metal and its compounds. ▼ Known or suspected carcinogen.

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Key Findings

- Most transfers sent outside the country of the originating facility were transfers of metals to recycling in 1998—68 percent for NPRI facilities and 85 percent for TRI facilities.
- For both US and Canada, transfers outside the country were more likely to be transfers to recycling and less likely to be transfers to treatment or disposal than were transfers sent within the country.
- NPRI facilities sent 32.2 million kg of matched chemicals to US locations in 1998.
- TRI facilities sent 39.2 million kg of matched chemicals to Canadian locations and 26.5 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.
- A relatively small number of facilities in each country sent transfers across the US-Canada border—305 TRI facilities and 129 NPRI facilities. A total of 15 facilities in each country accounted for 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 New York in the United States.
- Cross-border transfers to treatment and disposal to Canada from the US increased from 1.5 million kg to 3.5 million kg from 1996 to 1998. The increase was primarily due to a facility in Pennsylvania reporting for the first time in 1998 transfers of lead and zinc and their compounds sent to a facility in Ontario for disposal in a landfill.
- Cross-border transfers to treatment and disposal to the US from Canada decreased from 4.3 million kg to 1.7 million kg from 1996 to 1998. One facility in Ontario reported a decrease of 1.3 million kg of zinc and manganese and their compounds sent to landfills through development of alternative uses for the metals.

7.1 Introduction

NPRI and TRI facilities report the amounts of chemicals they transferred to off-site locations, along with the address of the off-site location. Most transfers occurred 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. The off-site transfers examined are transfers to recycling, energy recovery, treatment and disposal. Off-site transfers to sewage are not included because they are sent to local sewage treatment plants.

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

This chapter presents:

- 1998 data for transfers to disposal, recycling, energy recovery and treatment; and
- data for the time period 1996–1998 for transfers to disposal and treatment.

The 1996–1998 data include only transfers to disposal and treatment, since only for those transfers was reporting mandatory under NPRI for the years 1996–1998. Also, no data for 1995 are included because NPRI reporting did not include specific amounts for each transfer site until the 1996 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 1998 reporting year and before. Also, transfers of metals, except those to recycling, are included in one treatment/disposal 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.

7.2 1998 Transfers Outside the Country

Chemicals can be transferred off-site to another facility for recycling, for further management (energy recovery or treatment) or for disposal. All transfers of metals that are not sent for recycling are presented in one 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 were transfers of metals to recycling in 1998—68 percent for NPRI facilities and 85 percent for US TRI facilities.
- NPRI facilities reported sending 32.2 million kg outside the country, 18 percent of all NPRI transfers for 1998.
- TRI facilities reported sending 67.2 million kg outside the country, 4 percent of all TRI transfers for 1998.
- For both US and Canadian facilities, transfers outside the country were more likely to be to recycling and less likely to be transfers to treatment or disposal than were transfers sent within the country. In NPRI for transfers within Canada, 45 percent were to recycling and 27 percent were of metals to treatment or disposal. In TRI for transfers within the US, 46 percent were transfers to recycling; 24 percent were transfers to energy recovery; and 13 percent were transfers of metals to treatment or disposal.

Table 7–1. Transfers from NPRI Facilities within Canada and to Other Countries, 1998

	Outside Canada		Within Canada		Total Off-site Transfers
	kg	%	kg	%	kg
Transfers to Recycling of Metals	22,041,539	68	67,002,336	45	89,043,875
Transfers to Recycling (except metals)	3,558,057	11	14,191,206	10	17,749,263
Transfers to Energy Recovery (except metals)	3,261,930	10	8,760,889	6	12,022,819
Transfers to Treatment (except metals)	299,182	1	10,436,859	7	10,736,041
Transfers to Disposal (except metals)	1,172,353	4	8,392,246	6	9,564,599
Transfers of Metals to Treatment/ Disposal	1,861,676	6	39,686,231	27	41,547,907
Total Off-site Transfers	**32,194,737**	**100**	**148,469,767**	**100**	**180,664,504**

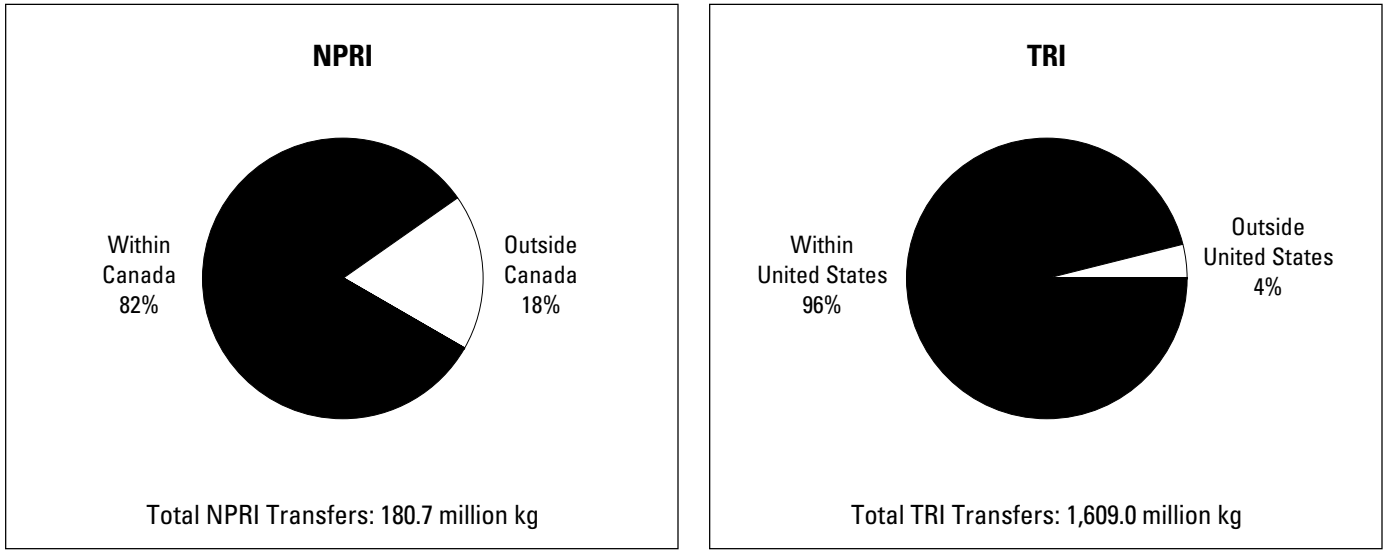
Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (less than 0.01% of total).

Table 7–2. Transfers from TRI facilities within United States and to Other Countries, 1998

	Outside United States		Within United States		Total Off-site Transfers
	kg	%	kg	%	kg
Transfers to Recycling of Metals	57,408,567	85	706,603,331	46	764,011,898
Transfers to Recycling (except metals)	1,012,003	2	122,021,694	8	123,033,697
Transfers to Energy Recovery (except metals)	1,847,940	3	374,171,222	24	376,019,162
Transfers to Treatment (except metals)	3,525,759	5	112,095,311	7	115,621,070
Transfers to Disposal (except metals)	361,785	1	27,657,606	2	28,019,391
Transfers of Metals to Treatment/ Disposal	3,006,071	4	199,304,743	13	202,310,814
Total Off-site Transfers	**67,162,125**	**100**	**1,541,853,907**	**100**	**1,609,016,032**

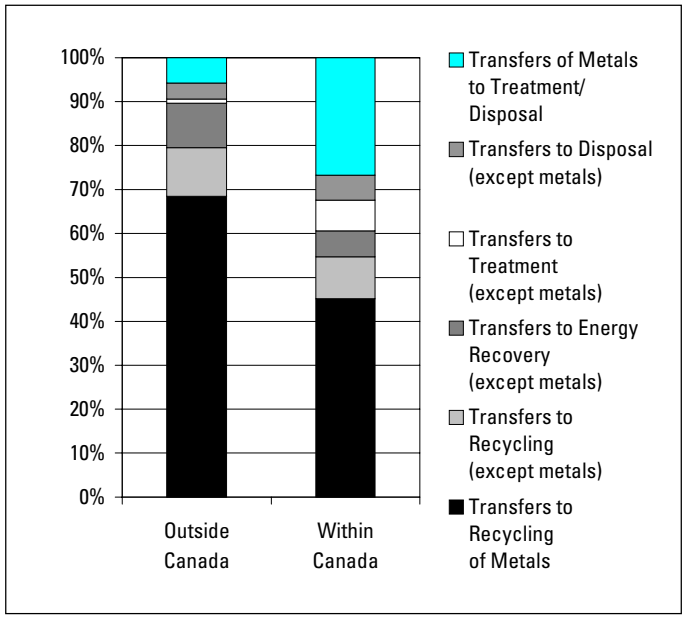
Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.10% of total).

Figure 7–1. Percentage of Transfers Sent Within and Outside Country, NPRI and TRI, 1998



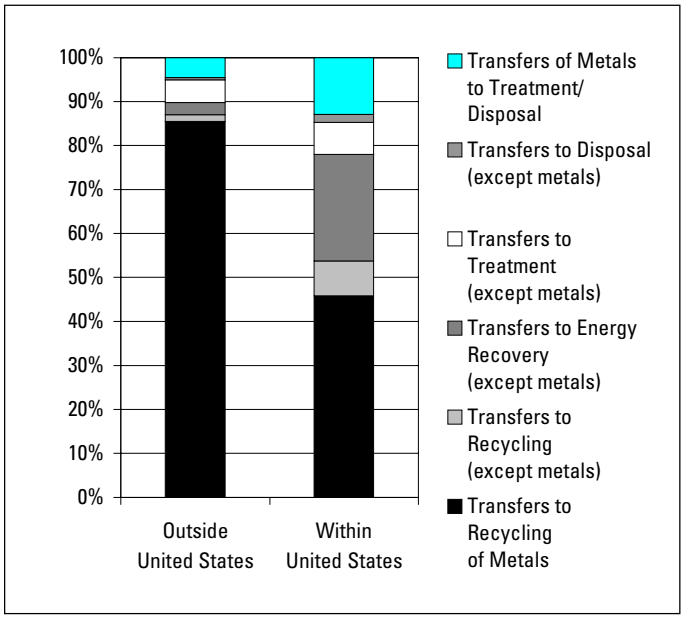
Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (less than 0.01% of total).

Figure 7–2. Transfers from NPRI Facilities within Canada and to Other Countries, by Type of Transfer, 1998



Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.10% of total).

Figure 7–3. Transfers from TRI Facilities within United States and to Other Countries, by Type of Transfer, 1998



Note: Does not include transfers to sewage. Does not include transfers to unknown destinations (0.10% of total).

7.2.1 Transfers Across North American Borders, 1998

Both NPRI and TRI facilities send transfers across the border to their neighbor, as well as to other countries outside North America. TRI facilities also send transfers to Mexico.

- Virtually all of Canada's transfers outside its borders went to locations in the United States. NPRI facilities sent 32.2 million kg of matched chemicals in 1998 to US locations.
- US TRI facilities sent 39.2 million kg to Canadian locations and 26.5 million kg to Mexican locations.
- Mexico has not begun to collect mandatory data on transfers, so it is not known how much was transferred to the US or Canada from Mexico.
- The largest amount of transfers to the US from Canada went to the state of Michigan (9.4 million kg, representing 29 percent of all such transfers). Another 16 percent went to the state of New York (5.0 million kg).
- The largest amount of transfers to Canada from the US was sent to Ontario (25.1 million kg, or 37 percent of all US transfers to other countries). Another 21 percent went to the province of Quebec (13.8 million kg).

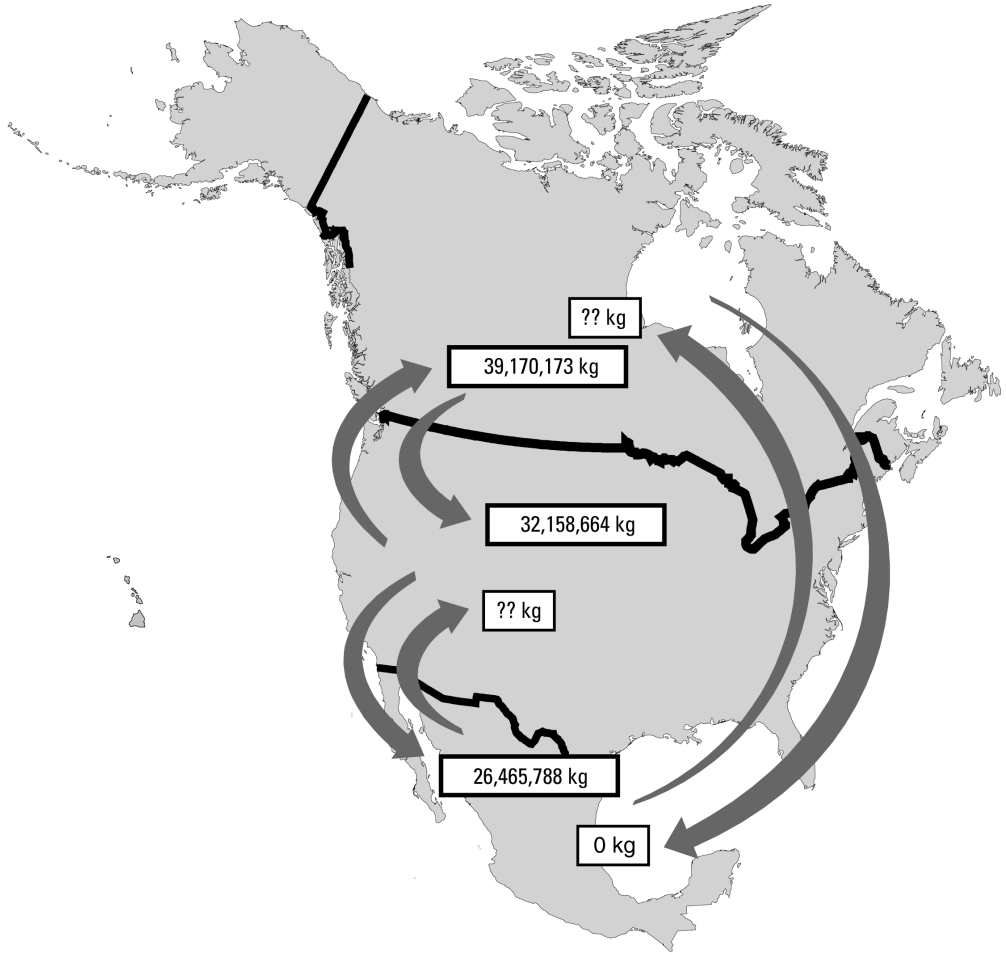
Table 7–3. NPRI Off-site Transfers to Other Countries from Canada, 1998

	Type of Transfer							
Receiving Country	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers Received (kg)	Transfers Outside Canada (%)
United States	**22,005,488**	**3,558,057**	**3,261,930**	**299,182**	**1,172,331**	**1,861,676**	**32,158,664**	**100**
Alaska	540	0	0	0	0	0	540	0.0
Arizona	2,020	0	0	0	0	0	2,020	0.0
California	259,640	0	0	0	0	0	259,640	0.8
Connecticut	2,441,000	0	0	0	0	0	2,441,000	7.6
Florida	16,000	0	0	0	0	0	16,000	0.0
Georgia	533	0	0	0	0	0	533	0.0
Idaho	1,666	0	0	0	0	0	1,666	0.0
Illinois	747,329	13,356	0	0	0	0	760,685	2.4
Indiana	91,510	148,312	375,720	0	0	0	615,542	1.9
Iowa	737,000	0	0	0	0	0	737,000	2.3
Kansas	0	0	97,772	0	0	0	97,772	0.3
Louisiana	9,732	31,629	0	0	0	0	41,361	0.1
Maryland	0	5,797	0	0	0	0	5,797	0.0
Massachusetts	0	0	0	25,300	0	0	25,300	0.1
Michigan	4,130,299	1,432,474	1,696,787	105,722	565,139	1,440,444	9,370,865	29.1
Mississippi	1,800	0	0	0	0	0	1,800	0.0
Missouri	500,000	0	0	0	0	0	500,000	1.6
New Jersey	522,810	0	0	0	0	19,375	542,185	1.7
New York	4,957,832	0	894	10,829	0	12,100	4,981,655	15.5
North Carolina	51,340	0	0	0	0	0	51,340	0.2
North Dakota	0	0	0	0	0	2,928	2,928	0.0
Ohio	2,400,650	51	66,171	118,540	606,750	366,810	3,558,972	11.1
Oregon	0	0	226	0	0	8	234	0.0
Pennsylvania	3,020,716	0	0	26,000	400	4,500	3,051,616	9.5
South Carolina	83	0	972,000	0	0	0	972,083	3.0
Texas	1,873,756	1,320,833	0	0	42	0	3,194,631	9.9
Utah	0	123,770	0	0	0	0	123,770	0.4
Washington	149,888	61,735	52,360	12,791	0	15,511	292,285	0.9
West Virginia	89,338	420,100	0	0	0	0	509,438	1.6
Wisconsin	6	0	0	0	0	0	6	0.0
Other Countries	**36,051**	**0**	**0**	**0**	**22**	**0**	**36,073**	**0.1**
England	34,899	0	0	0	0	0	34,899	0.1
Germany	1,152	0	0	0	22	0	1,174	0.0
Total Transferred Outside Canada	**22,041,539**	**3,558,057**	**3,261,930**	**299,182**	**1,172,353**	**1,861,676**	**32,194,737**	**100**

Table 7–4. TRI Off-site Transfers to Other Countries from the United States, 1998

	Type of Transfer							
Receiving Country	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers Received (kg)	Transfers Outside US (%)
Canada	**29,451,957**	**1,011,990**	**1,847,940**	**3,525,759**	**361,785**	**2,970,742**	**39,170,173**	**58**
Alberta	0	0	0	0	0	200	200	0.0
British Columbia	81,290	0	1,562	227	23	669	83,771	0.1
Manitoba	177,780	0	0	0	0	0	177,780	0.3
Ontario	17,240,542	275,383	1,793,316	3,287,759	232,196	2,245,289	25,074,485	37.3
Quebec	11,952,345	736,607	53,062	237,773	129,566	724,584	13,833,937	20.6
Mexico	**26,465,775**	**13**	**0**	**0**	**0**	**0**	**26,465,788**	**39**
Monterrey	25,939,088	13	0	0	0	0	25,939,101	38.6
Other Cities	526,687	0	0	0	0	0	526,687	0.8
Other Countries	**1,490,835**	**0**	**0**	**0**	**0**	**35,329**	**1,526,164**	**2**
Belgium	13,059	0	0	0	0	0	13,059	0.0
China	11,791	0	0	0	0	0	11,791	0.0
France	29,804	0	0	0	0	0	29,804	0.0
Germany	851,379	0	0	0	0	0	851,379	1.3
Italy	7,618	0	0	0	0	0	7,618	0.0
Japan	316,399	0	0	0	0	0	316,399	0.5
Singapore	2,789	0	0	0	0	35,329	38,118	0.1
United Arab Emirates	211,051	0	0	0	0	0	211,051	0.3
United Kingdom	46,945	0	0	0	0	0	46,945	0.1
Total Transferred Outside US	**57,408,567**	**1,012,003**	**1,847,940**	**3,525,759**	**361,785**	**3,006,071**	**67,162,125**	**100**

Map 7–1. Off-site Transfers across North America, 1998



States/Provinces with Largest Transfers Received

	To (kg)	From (kg)
Ontario	25,074,485	24,252,558
Quebec	13,833,937	3,965,461
Michigan	9,370,865	6,016,808
New York	4,981,655	3,872,396

Table 7–5. Off-site Transfers across National Boundaries between United States and Canada, 1998

	To/From Canadian Province													Total Cross-Boundary Transfers	
To/From US State	To Alberta (kg)	From Alberta (kg)	To British Columbia (kg)	From British Columbia (kg)	To Manitoba (kg)	From Manitoba (kg)	From New Brunswick (kg)	From Nova Scotia (kg)	To Ontario (kg)	From Ontario (kg)	To Quebec (kg)	From Quebec (kg)	From Saskatch-ewan (kg)	To Canada (kg)	From Canada (kg)
Alabama	0	0	0	0	0	0	0	0	39,178	0	0	0	0	39,178	0
Alaska	0	540	0	0	0	0	0	0	0	0	0	0	0	0	540
Arizona	0	2,020	5,467	0	0	0	0	0	754,113	0	0	0	0	759,580	2,020
Arkansas	0	0	0	0	0	0	0	0	0	0	970,522	0	0	970,522	0
California	0	209,230	9,349	50,410	177,780	0	0	0	525,323	0	6,996	0	0	719,448	259,640
Connecticut	0	0	0	0	0	0	0	0	41,713	2,441,000	317,722	0	0	359,435	2,441,000
Delaware	0	0	0	0	0	0	0	0	2,449	0	2,903,235	0	0	2,905,684	0
Florida	0	0	0	0	0	0	0	16,000	2,208	0	339	0	0	2,547	16,000
Georgia	0	0	0	0	0	0	0	0	29,461	533	263,088	0	0	292,549	533
Idaho	0	0	0	1,666	0	0	0	0	0	0	0	0	0	0	1,666
Illinois	0	0	0	0	0	0	0	0	778,309	45,500	780,756	715,185	0	1,559,065	760,685
Indiana	0	167,890	0	207,830	0	0	0	0	65,898	239,822	0	0	0	65,898	615,542
Iowa	0	0	0	0	0	737,000	0	0	0	0	0	0	0	0	737,000
Kansas	0	0	0	0	0	0	0	0	4,761	0	104,498	97,772	0	109,259	97,772
Kentucky	0	0	0	0	0	0	0	0	1,865,785	0	1,908,626	0	0	3,774,411	0
Louisiana	0	41,361	0	0	0	0	0	0	103,404	0	256	0	0	103,660	41,361
Maine	0	0	0	0	0	0	0	0	0	0	11,850	0	0	11,850	0
Maryland	0	0	0	0	0	0	0	0	0	5,797	0	0	0	0	5,797
Massachusetts	0	0	0	0	0	0	0	0	189,782	0	504,839	25,300	0	694,621	25,300
Michigan	0	0	0	0	0	0	0	0	6,003,120	9,226,612	13,688	144,253	0	6,016,808	9,370,865
Minnesota	0	0	0	0	0	0	0	0	7,029	0	15,650	0	0	22,679	0
Mississippi	0	0	0	0	0	0	0	0	0	0	0	1,800	0	0	1,800
Missouri	0	0	0	0	0	500,000	0	0	0	0	0	0	0	0	500,000
Nebraska	0	0	0	0	0	0	0	0	4,502,769	0	0	0	0	4,502,769	0
New Hampshire	0	0	0	0	0	0	0	0	622,471	0	35,785	0	0	658,256	0
New Jersey	0	0	0	0	0	0	104,922	0	66,000	120,531	314,603	316,732	0	380,603	542,185
New York	0	0	0	0	0	0	0	0	1,632,279	4,843,655	2,240,117	138,000	0	3,872,396	4,981,655
North Carolina	0	0	0	0	0	0	0	0	30,869	20,000	161	31,340	0	31,030	51,340
North Dakota	0	0	0	0	0	0	0	0	0	0	0	0	2,928	0	2,928
Ohio	0	29,033	0	96,410	0	0	0	0	3,396,876	3,315,399	784,678	118,130	0	4,181,554	3,558,972
Oklahoma	0	0	0	0	0	0	0	0	30,385	0	0	0	0	30,385	0
Oregon	0	226	29,646	8	0	0	0	0	0	0	0	0	0	29,646	234
Pennsylvania	0	0	0	0	0	0	0	0	2,045,992	3,044,097	2,275,001	7,519	0	4,320,993	3,051,616
Puerto Rico	0	0	0	0	0	0	0	0	165	0	0	0	0	165	0
Rhode Island	0	0	0	0	0	0	0	0	0	0	106,867	0	0	106,867	0
South Carolina	0	0	0	0	0	0	0	80	299,460	3	1,389	972,000	0	300,849	972,083
Tennessee	0	0	0	0	0	0	0	0	7,027	0	0	0	0	7,027	0
Texas	0	620,400	0	36,281	0	16,000	0	0	1,906,873	949,603	48,116	1,298,300	274,047	1,954,989	3,194,631
Utah	0	0	0	123,770	0	0	0	0	0	0	0	0	0	0	123,770
Vermont	0	0	0	0	0	0	0	0	0	0	6,234	0	0	6,234	0
Virginia	0	0	0	0	0	0	0	0	22,630	0	218,497	0	0	241,127	0
Washington	200	1,570	38,640	152,585	0	39,000	0	0	0	0	424	99,130	0	39,264	292,285
West Virginia	0	509,438	0	0	0	0	0	0	96,755	0	0	0	0	96,755	509,438
Wisconsin	0	0	669	0	0	0	0	0	1,401	6	0	0	0	2,070	6
Total	**200**	**1,581,708**	**83,771**	**668,960**	**177,780**	**1,292,000**	**104,922**	**16,080**	**25,074,485**	**24,252,558**	**13,833,937**	**3,965,461**	**276,975**	**39,170,173**	**32,158,664**

Note: Does not include transfers to sewage.

7.2.2 Transfers between US States and Canadian Provinces, 1998

A relatively small number of facilities transfer listed substances in the matched data base across the US-Canada border, and 15 facilities in each country account for the majority of such transfers.

- For 1998, 305 TRI facilities and 129 NPRI facilities reported transfers across the US-Canada border.
- Ten TRI facilities and eight NPRI facilities reported more than 1.0 million kg of cross-border transfers. Only 15 facilities in each country reported two-thirds of the total cross-border transfers.
- The majority of the transfers of these facilities with the largest cross-border transfers were metals and their compounds destined for recycling.

Table 7–6. TRI Facilities with Largest Transfers to Canada from the US, 1998

Rank	Facility	City, State	US SIC Code	Number of Facilities Reporting Transfers to Canada
1	Lucent Techs. Inc.	Omaha, NE	Mult.	1
2	Delphi Packard Electric Sys., General Motors Corp.	Warren, OH	37	1
3	Johnson Controls Inc., Battery Group	Middletown, DE	36	1
4	GNB Techs. Inc., Pacific Dunlop GNB Corp.	Dunmore, PA	Mult.	1
5	Petro-Chem Processing Group/Solvent Distillers Group, Nortru Inc.	Detroit, MI	495/738	1
6	Michigan Recovery Sys. Inc., The Environmental Quality Co.	Romulus, MI	495/738	1
7	Zinc Corp. of America, Horsehead Ind. Inc.	Palmerton, PA	33	1
8	General Cable Corp.	Lawrenceburg, KY	33	1
9	General Cable Corp.	Bonham, TX	33	1
10	Gibbs Die Casting Aluminum, Corp.	Henderson, KY	33	1
11	GNB Techs. Inc.	Fort Smith, AR	36	1
12	GE Co., Silicone Prods.	Waterford, NY	28	1
13	Dow Corning Corp.	Carrollton, KY	28	1
14	General Cable Corp.	Kingman, AZ	Mult.	1
15	Brush Wellman Inc. Elmore Plant	Elmore, OH	33	1
	Subtotal			**15**
	% of Total			**5**
	Total			**305**

Note: Canada and US data only. Mexico data not available for 1998. The data are estimates of 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 7–7. NPRI Facilities with Largest Transfers to the US from Canada, 1998

Rank	Facility	City, Province	US SIC Code	Number of Facilities Reporting Transfers to US
1	Raw Materials Corporation	Port Colborne, ON	36	1
2	Alcatel Canada Wire, Simcoe Plant	Simcoe, ON	33	1
3	Fisher Gauge Limited, Otonabee Plant	Peterborough, ON	33	1
4	Ford Motor Company of Canada Limited, Windsor Aluminum Plant	Windsor, ON	33	1
5	Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor, ON	33	1
6	DNN Galvanizing, Dofasco	Windsor, ON	33	1
7	Union Carbide Canada Inc., Prentiss Chemical	Lacombe County, AB	28	1
8	Ball Packaging Products Canada, Inc.	Burlington, ON	34	1
9	Safety-Kleen Canada Inc., Centre de recyclage de St-Constant	St-Constant, QC	73	1
10	Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton, ON	73	1
11	L&M Screw Machine Products Limited	North York, ON	34	1
12	Philip Enterprises Inc., Fort Erie Facility	Fort Erie, ON	73	1
13	Noma Cable Tech, Stouffville Plant	Stouffville, ON	33	1
14	Aimco Solrec Ltd., Morobel Dr.	Milton, ON	28	1
15	Superior Cable Corporation, Superior Telecommunication Inc.	Winnipeg, MB	33	1
	Subtotal			**15**
	% of Total			**12**
	Total			**129**

Note: Canada and US data only. Mexico data not available for 1998. The data are estimates of 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 7–6. (*continued*)

	Type of Transfer							
Rank	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers (kg)	Chemicals Transferred in Largest Amounts
1	4,490,766	12,003	0	0	0	0	4,502,769	Copper and its compounds
2	3,026,199	0	0	0	0	0	3,026,199	Copper and its compounds
3	2,903,235	0	0	0	0	0	2,903,235	Lead and its compounds
4	2,248,979	0	0	0	0	0	2,248,979	Lead and its compounds
5	0	0	1,793,316	434,856	0	11,624	2,239,796	Xylene, Toluene
6	0	0	0	1,922,729	0	5,498	1,928,227	Xylene, Toluene
7	0	0	0	0	0	1,754,612	1,754,612	Lead and its compounds
8	1,677,460	0	0	0	0	0	1,677,460	Copper and its compounds
9	1,461,256	0	0	0	0	0	1,461,256	Copper and its compounds
10	1,147,392	0	0	0	0	0	1,147,392	Copper/Nickel and its compounds
11	970,522	0	0	0	0	0	970,522	Lead and its compounds
12	770,975	75	0	0	0	90,703	861,753	Copper and its compounds
13	761,234	0	0	0	0	0	761,234	Copper and its compounds
14	753,366	0	0	0	0	747	754,113	Copper and its compounds
15	731,816	0	0	0	0	0	731,816	Copper and its compounds
	20,943,200	**12,078**	**1,793,316**	**2,357,585**	**0**	**1,863,184**	**26,969,363**	
	71	**1**	**97**	**67**	**0**	**63**	**69**	
	29,451,957	**1,011,990**	**1,847,940**	**3,525,759**	**361,785**	**2,970,742**	**39,170,173**	

Table 7–7. (*continued*)

	Type of Transfer							
Rank	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers (kg)	Chemicals Transferred in Largest Amounts
1	5,304,500	0	0	0	0	0	5,304,500	Lead and its compounds
2	2,558,000	0	0	0	0	0	2,558,000	Copper and its compounds
3	1,324,800	0	0	0	0	0	1,324,800	Zinc and its compounds
4	1,283,000	0	0	0	0	0	1,283,000	Aluminum
5	0	0	0	0	0	1,279,157	1,279,157	Zinc/Copper and its compounds
6	1,152,000	0	0	0	0	0	1,152,000	Zinc and its compounds
7	89,338	1,040,500	0	0	0	0	1,129,838	Ethylene glycol
8	1,059,817	0	0	0	0	0	1,059,817	Copper and its compounds
9	0	0	972,000	0	0	0	972,000	Toluene, Xylene
10	0	0	773,481	0	185,102	12,700	971,283	Xylene, Toluene
11	918,459	0	0	0	0	0	918,459	Copper/Zinc and its compounds
12	0	0	0	410	543,750	343,910	888,070	Nitric acid and nitrate compounds
13	886,300	0	0	0	0	0	886,300	Copper and its compounds
14	0	0	792,570	0	0	0	792,570	Xylene, Toluene
15	737,000	0	0	0	0	0	737,000	Copper and its compounds
	15,313,214	**1,040,500**	**2,538,051**	**410**	**728,852**	**1,635,767**	**21,256,794**	
	70	**29**	**78**	**0**	**62**	**88**	**66**	
	22,005,488	**3,558,057**	**3,261,930**	**299,182**	**1,172,331**	**1,861,676**	**32,158,664**	

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

- One site in Ontario (Philip Environmental Services in Hamilton) received 11.8 million kg from TRI facilities. This site also received 2.1 million kg from NPRI facilities. US transfers represented 85 percent of the total transfers received in 1998. Most of the transfers were metals sent for recycling.
- A second site in Ontario (Safety-Kleen in Corunna) received 4.9 million kg from the US and 20.9 million kg from sites within Canada. US transfers represented 19 percent of the total transfers received in 1998. Most of the transfers to this site were of metals destined for treatment/disposal.
- One site in Quebec (Nova Lead in Ste. Catherine) received 7.3 million kg from US facilities, representing 97 percent of all transfers to this site reported for 1998. Most of the transfers were of metals for recycling.
- A second site in Quebec (Noranda Metallurgy Inc. (Horne Smelter) in Rouyn-Noranda) received 3.2 million kg from US facilities and 2.4 million kg from Canadian facilities. Most of the transfers were of metals for recycling.

Table 7–8. Sites in Ontario that Received Largest Transfers from US, 1998

Rank	Transfer Site Name	Location	City/Province
1	Philip Environmental Services	Centennial Pkwy. N.	Hamilton, ON
2	Safety-Kleen/Laidlaw	Telfer Road	Corunna, ON
3	Philip Enterprises Inc. (Firestone)	Burlington Street East	Hamilton, ON
4	Chem-King (Philip Environmental)	Snow Valley Road	Barrie, ON
5	Philip Services Corp. (Parkdale)	Parkdale	Hamilton, ON
1	Philip Environmental Services	Centennial Pkwy. N.	Hamilton, ON
2	Safety-Kleen/Laidlaw	Telfer Road	Corunna, ON
3	Philip Enterprises Inc. (Firestone)	Burlington Street East	Hamilton, ON
4	Chem-King (Philip Environmental)	Snow Valley Road	Barrie, ON
5	Philip Services Corp. (Parkdale)	Parkdale	Hamilton, ON

Table 7–9. Sites in Quebec that Received Largest Transfers from US, 1998

Rank	Transfer Site Name	Location	City/Province
1	Nova Lead	Garnier St.	Ste. Catherine, QC
2	Noranda Metallurgy Inc. (Horne Smelter)	Portelance Avenue	Rouyn-Noranda, QC
3	Norsk Hydro Canada Inc.	Boul. Raoul-Duchesne	Bécancour, QC
4	Stablex Canada Inc.	Industrial Blvd.	Blainville, QC
5	Chemrec Inc.	Brosseau	Cowansville, QC
1	Nova Lead	Garnier St.	Ste. Catherine, QC
2	Noranda Metallurgy Inc. (Horne Smelter)	Portelance Avenue	Rouyn-Noranda, QC
3	Norsk Hydro Canada Inc.	Boul. Raoul-Duchesne	Bécancour, QC
4	Stablex Canada Inc.	Industrial Blvd.	Blainville, QC
5	Chemrec Inc.	Brosseau	Cowansville, QC

Table 7–8. (*continued*)

Rank	Number of Facilities	Number of Forms	Type of Transfer: Recycling* (kg)	Energy Recovery ** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Energy Recovery/ Treatment/ Disposal* (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From US (%)
From US TRI Facilities										
1	15	35	11,803,517	0	0	0	747	11,804,264	13,863,096	85
2	45	337	0	37,255	2,649,924	163,801	2,050,983	4,901,963	25,765,158	19
3	8	18	2,301,097	0	0	0	2,459	2,303,556	2,321,942	99
4	1	34	0	1,187,617	287,337	0	7,679	1,482,633	1,789,792	83
5	10	59	99,575	460,532	112,410	250	18,238	691,005	2,238,221	31
From Canadian NPRI Facilities										
1	7	10	2,058,832	0	0	0	0	2,058,832		
2	62	266	3,625	185,888	3,767,201	3,439,246	13,467,235	20,863,195		
3	1	3	9,859	0	0	0	8,527	18,386		
4	9	46	2,817	15,197	1,799	284,612	2,734	307,159		
5	18	68	0	230,868	22,495	1,243,309	50,544	1,547,216		

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

Table 7–9. (*continued*)

Rank	Number of Facilities	Number of Forms	Type of Transfer: Recycling* (kg)	Energy Recovery ** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Energy Recovery/ Treatment/ Disposal* (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From US (%)
From US TRI Facilities										
1	13	25	7,264,172	0	0	0	48,809	7,312,981	7,569,034	97
2	27	67	3,088,722	0	0	0	90,798	3,179,520	5,604,100	57
3	1	3	1,147,392	0	0	0	0	1,147,392	1,147,392	100
4	63	167	0	0	108,274	129,453	575,571	813,298	4,482,342	18
5	9	13	633,795	0	106,258	0	0	740,053	1,819,794	41
From Canadian NPRI Facilities										
1	3	3	235,053	0	0	0	21,000	256,053		
2	5	14	2,424,580	0	0	0	0	2,424,580		
3	0	0	0	0	0	0	0	0		
4	62	136	0	42,305	104,984	322,038	3,199,717	3,669,044		
5	15	44	1,073,272	0	5,822	647	0	1,079,741		

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

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

- One site in Michigan (Systech Environmental Corp. in Alpena) received 1.9 million kg from Canadian facilities, which represented 12 percent of the total 15.8 million kg reported transferred to this site from both Canada and the US in 1998. Most of the transfers were for energy recovery.
- A second site in Michigan (Arco Alloys Corp. in Detroit) received 1.6 million kg from Canadian facilities, which represented 94 percent of all transfers to this site reported for 1998. All of these transfers were of metals for recycling.
- One site in New York (Revere Smelting & Refining Corp. in Middletown) received 2.7 million kg from Canadian facilities (representing 20 percent of all transfers to this site) and 10.4 million kg from US facilities (representing 80 percent of the total transfers received by this site). All of these transfers were of metals for recycling.

Table 7–10. Sites in Michigan that Received Largest Transfers from Canada, 1998

Rank	Transfer Site Name	Location	City/State
1	Systech Environmental Corp.	Ford Avenue	Alpena, MI
2	Arco Alloys Corp.	Trombly	Detroit, MI
3	Browning Ferris, Arbor Hills Landfill	West Six-Mile Rd.	Northville, MI
4	Gage Products Company	Wanda Avenue	Ferndale, MI
5	Alchem Aluminum Inc.	West Garfield	Coldwater, MI
1	Systech Environmental Corp.	Ford Avenue	Alpena, MI
2	Arco Alloys Corp.	Trombly	Detroit, MI
3	Browning Ferris, Arbor Hills Landfill	West Six-Mile Rd.	Northville, MI
4	Gage Products Company	Wanda Avenue	Ferndale, MI
5	Alchem Aluminum Inc.	West Garfield	Coldwater, MI

Table 7–11. Sites in New York that Received Largest Transfers from Canada, 1998

Rank	Transfer Site Name	Location	City/State
1	Revere Smelting & Refining Corp.	Ballard Road	Middletown, NY
2	Eastern alloys	Henry Henning Drive	Maybrook, NY
3	Upstate Metals Corporation	RR5, Canastota Industrial Park	Canastota, NY
4	Alcan Aluminum	P.O. Box 28	Oswego, NY
5	Steelbro International Co. Inc.	Park Avenue	Williston Park, NY
1	Revere Smelting & Refining Corp.	Ballard Road	Middletown, NY
2	Eastern alloys	Henry Henning Drive	Maybrook, NY
3	Upstate Metals Corporation	RR5, Canastota Industrial Park	Canastota, NY
4	Alcan Aluminum	P.O. Box 28	Oswego, NY
5	Steelbro International Co. Inc.	Park Avenue	Williston Park, NY

Table 7–10. (*continued*)

Rank	Number of Facilities	Number of Forms	Type of Transfer: Recycling* (kg)	Energy Recovery ** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Energy Recovery/ Treatment/ Disposal* (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From Canada (%)
From Canadian NPRI Facilities										
1	6	46	144,390	1,696,787	40,000	0	20,090	1,901,267	15,761,835	**12**
2	4	4	1,622,100	0	0	0	0	1,622,100	1,721,300	**94**
3	7	24	172,000	0	0	896	1,407,436	1,580,332	1,660,353	**95**
4	4	27	1,393,870	0	0	0	1	1,393,871	8,620,280	**16**
5	4	6	1,293,654	0	0	0	0	1,293,654	2,005,229	**65**
From US TRI Facilities										
1	7	96	0	12,135,364	1,528,598	0	196,606	13,860,568		
2	3	3	99,200	0	0	0	0	99,200		
3	21	43	0	0	0	8,322	71,699	80,021		
4	36	218	6,953,519	63	271,213	0	1,614	7,226,409		
5	22	41	710,039	0	0	0	1,536	711,575		

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

Table 7–11. (*continued*)

Rank	Number of Facilities	Number of Forms	Type of Transfer: Recycling* (kg)	Energy Recovery ** (kg)	Treatment** (kg)	Disposal** (kg)	Metals to Energy Recovery/ Treatment/ Disposal* (kg)	Total Transfers (kg)	Total North American Transfers (kg)	From Canada (%)
From Canadian NPRI Facilities										
1	1	1	2,651,000	0	0	0	0	2,651,000	13,042,867	**20**
2	3	3	990,400	0	0	0	0	990,400	2,312,924	**43**
3	1	1	886,300	0	0	0	0	886,300	2,326,668	**38**
4	2	4	169,720	0	0	0	0	169,720	169,720	**100**
5	1	1	101,000	0	0	0	0	101,000	133,394	**76**
From US TRI Facilities										
1	7	11	10,391,867	0	0	0	0	10,391,867		
2	7	7	1,322,522	0	0	0	2	1,322,524		
3	3	9	1,428,577	0	0	0	11,791	1,440,368		
4	0	0	0	0	0	0	0	0		
5	1	3	32,394	0	0	0	0	32,394		

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

Most cross-border transfers were transfers of metals to recycling. The primary metals industry sector (US SIC code 33) in both Canada and the US sent the largest amounts of these transfers.

- Canadian primary metals (US SIC code 33) facilities sent 32 percent of all transfers to the US. These transfers were mostly metals to recycling. This sector also reported the largest amounts of transfers of metals to treatment/disposal.
- Canadian electronic/electrical equipment manufacturers (US SIC code 36) sent 18 percent of all transfers to the US, all as metals to recycling.
- Canadian hazardous waste management and solvent recovery facilities sent the largest amounts of transfers to energy recovery and transfers of substances other than metals for disposal to the US.

Table 7–12. Industries Reporting Transfers to US from Canada, 1998

		Type of Transfer							
US SIC Code	Industry	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers (kg)	Total (%)
33	Primary Metals	8,944,546	38,600	0	0	0	1,390,457	10,373,603	32.3
36	Electronic/Electrical Equipment	5,867,798	13,356	0	0	0	0	5,881,154	18.3
34	Fabricated Metals Products	5,058,215	0	0	0	0	2,928	5,061,143	15.7
495/738	Hazardous Waste Mgt./Solvent Recovery	12,100	185,505	2,112,244	79,201	1,105,542	412,432	3,907,024	12.1
28	Chemicals	256,142	1,072,129	1,148,792	219,952	65,851	129	2,762,995	8.6
37	Transportation Equipment	62,368	1,393,874	0	0	0	3,580	1,459,822	4.5
29	Petroleum and Coal Products	260,366	848,745	0	0	42	0	1,109,153	3.4
39	Misc. Manufacturing Industries	837,971	0	0	29	0	0	838,000	2.6
491/493	Electric Utilities	268,032	0	0	0	0	0	268,032	0.8
20	Food Products	152,823	0	0	0	0	38,750	191,573	0.6
35	Industrial Machinery	161,094	0	0	0	0	13,400	174,494	0.5
32	Stone/Clay/Glass Products	120,200	0	894	0	35	0	121,129	0.4
27	Printing and Publishing	0	5,797	0	0	0	0	5,797	0.0
30	Rubber and Plastics Products	3,833	51	0	0	0	0	3,884	0.0
26	Paper Products	0	0	0	0	861	0	861	0.0
	Total	**22,005,488**	**3,558,057**	**3,261,930**	**299,182**	**1,172,331**	**1,861,676**	**32,158,664**	**100**

Table 7–13. Industries Reporting Transfers to Canada from US, 1998

US SIC Code	Industry	Type of Transfer: Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers (kg)	Total (%)
33	Primary Metals	9,763,412	166,609	0	0	34,707	1,841,300	11,806,028	30.1
--	Multiple codes 20-39	8,362,784	12,116	0	33,234	34	78,031	8,486,199	21.7
495/738	Hazardous Waste Mgt./Solvent Recovery	305,070	0	1,797,920	2,779,100	198,026	380,854	5,460,970	13.9
36	Electronic/Electrical Equipment	5,257,640	234	0	23	0	27,570	5,285,467	13.5
37	Transportation Equipment	3,506,488	6,376	1,562	0	4	106,184	3,620,614	9.2
28	Chemicals	1,690,529	541,404	0	708,279	73,339	122,833	3,136,384	8.0
34	Fabricated Metals Products	293,783	180	0	4,825	6,871	402,559	708,218	1.8
26	Paper Products	2,148	279,219	0	227	0	2,702	284,296	0.7
38	Measurement/Photographic Instruments	199,320	0	0	0	0	0	199,320	0.5
30	Rubber and Plastics Products	19,320	1,045	48,345	0	0	395	69,105	0.2
32	Stone/Clay/Glass Products	0	0	0	0	34,495	1,088	35,583	0.1
39	Misc. Manufacturing Industries	20,890	4,807	0	0	0	3,513	29,210	0.1
35	Industrial Machinery	24,680	0	0	0	0	2,349	27,029	0.1
29	Petroleum and Coal Products	5,893	0	0	71	14,309	1,364	21,637	0.1
23	Apparel and Other Textile Products	0	0	113	0	0	0	113	0.0
	Total	**29,451,957**	**1,011,990**	**1,847,940**	**3,525,759**	**361,785**	**2,970,742**	**39,170,173**	**100**

- The US primary metals (US SIC code 33) facilities sent 30 percent of all transfers to Canada. These transfers were mostly metals to recycling. This sector also reported the largest amounts of transfers of metals to treatment/disposal.
- US manufacturing facilities reporting multiple SIC codes sent 22 percent of all transfers to Canada, primarily as metals to recycling.
- US hazardous waste management and solvent recovery facilities sent the largest amounts of transfers to energy recovery and transfers of substances other than metals for disposal to the US.

NPRI and TRI facilities both transferred more copper and its compounds across the US-Canada border than any other substance in the matched data set in 1998. Most of it was destined for recycling.

- Three metals (copper, lead and zinc and their compounds) were the substances with the largest transfers from Canada to the US. The three represented almost two-thirds of all such transfers in 1998.
- Amounts of 25 chemicals represented 99.5 percent of all transfers from Canada to the US. Nine of the 25 were metals, including the three with the largest transfers, and six were known or suspected carcinogens.
- Ethylene glycol was the chemical with the largest transfers to recycling of substances other than metals, and toluene was the chemical with the largest transfers to energy recovery.

Table 7–14. Chemicals Transferred to United States from Canadian NPRI Facilities, 1998

		Type of Transfer							
CAS Number	Chemical	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers Received (kg)	Total (%)
--	Copper (and its compounds)*	7,310,005	0	0	0	0	449,909	7,759,914	24.1
--	Lead (and its compounds)*▼	6,166,904	0	0	0	0	109,996	6,276,900	19.5
--	Zinc (and its compounds)*	5,412,321	0	0	0	0	776,450	6,188,771	19.2
1330-20-7	Xylene (mixed isomers)	0	735,777	967,029	38,022	243,787	0	1,984,615	6.2
7429-90-5	Aluminum (fume or dust)*	1,620,290	0	0	0	0	0	1,620,290	5.0
107-21-1	Ethylene glycol	0	1,328,002	20,326	23,275	6,400	0	1,378,003	4.3
108-88-3	Toluene	0	26,410	1,109,231	76,449	164,613	0	1,376,703	4.3
108-95-2	Phenol	0	687,000	447	60,900	0	0	748,347	2.3
--	Manganese (and its compounds)*	563,504	0	0	0	0	160,764	724,268	2.3
--	Nitric acid and nitrate compounds	0	0	0	429	606,750	0	607,179	1.9
78-93-3	Methyl ethyl ketone	0	18,587	401,078	26,282	103,385	0	549,332	1.7
--	Nickel (and its compounds)*▼	403,080	0	0	0	0	78,592	481,672	1.5
--	Chromium (and its compounds)*▼	190,397	0	0	0	0	273,480	463,877	1.4
108-10-1	Methyl isobutyl ketone	0	313,000	70,145	160	27,870	0	411,175	1.3
100-41-4	Ethylbenzene	0	155,431	74,717	297	8,765	0	239,210	0.7
67-56-1	Methanol	0	56,079	114,399	26,010	1,060	0	197,548	0.6
7440-62-2	Vanadium (fume or dust)*	186,391	0	0	0	0	0	186,391	0.6
106-42-3	p-Xylene	0	0	171,000	0	0	0	171,000	0.5
--	Silver (and its compounds)*	133,122	0	0	0	0	0	133,122	0.4
75-09-2	Dichloromethane▼	0	46,959	63,549	15,248	0	0	125,756	0.4
95-47-6	o-Xylene	0	0	120,000	0	0	0	120,000	0.4
71-36-3	n-Butyl alcohol	0	37,100	40,859	0	0	0	77,959	0.2
95-63-6	1,2,4-Trimethylbenzene	0	67,543	0	0	0	0	67,543	0.2
127-18-4	Tetrachloroethylene▼	0	0	54,423	1,997	0	0	56,420	0.2
79-01-6	Trichloroethylene▼	0	0	26,787	13,407	0	0	40,194	0.1
	Subtotal	**21,986,014**	**3,471,888**	**3,233,990**	**282,476**	**1,162,630**	**1,849,191**	**31,986,189**	**99**
	% of Total	**100**	**98**	**99**	**94**	**99**	**99**	**99**	
	Total	**22,005,488**	**3,558,057**	**3,261,930**	**299,182**	**1,172,331**	**1,861,676**	**32,158,664**	**100**

* Metal and its compounds. ▼Known or suspected carcinogen.

Table 7–15. Chemicals Transferred in Largest Amounts to Canada from US TRI Facilities, 1998

			Type of Transfer							
Rank	CAS Number	Chemical	Recycling of Metals (kg)	Recycling (except metals) (kg)	Energy Recovery (except metals) (kg)	Treatment (except metals) (kg)	Disposal (except metals) (kg)	Metals to Energy Recovery/ Treatment/ Disposal (kg)	Total Transfers Received (kg)	Total (%)
1	--	Copper (and its compounds)*	19,211,403	0	0	0	0	147,420	19,358,823	49.4
2	--	Lead (and its compounds)*▼	7,517,693	0	0	0	0	1,630,139	9,147,832	23.4
3	1330-20-7	Xylene (mixed isomers)	0	1,785	597,493	1,057,978	9,746	0	1,667,002	4.3
4	108-88-3	Toluene	0	327,085	239,208	1,006,916	12,222	0	1,585,431	4.0
5	--	Zinc (and its compounds)*	691,897	0	0	0	0	699,691	1,391,588	3.6
6	--	Nickel (and its compounds)*▼	1,063,575	0	0	0	0	158,086	1,221,661	3.1
7	75-09-2	Dichloromethane▼	0	413,075	0	107,060	1,493	0	521,628	1.3
8	67-56-1	Methanol	0	21,481	68,102	384,840	5,638	0	480,061	1.2
9	--	Chromium (and its compounds)*▼	254,777	0	0	0	0	207,402	462,179	1.2
10	--	Manganese (and its compounds)*	420,172	0	0	0	0	34,519	454,691	1.2
11	78-93-3	Methyl ethyl ketone	0	39,983	110,981	149,757	2,601	0	303,322	0.8
12	91-20-3	Naphthalene	0	0	150,303	9,274	92,177	0	251,754	0.6
13	--	Nitric acid and nitrate compounds	0	226	0	66,304	130,727	0	197,257	0.5
14	100-41-4	Ethylbenzene	0	40	118,540	63,869	1,839	0	184,288	0.5
15	75-01-4	Vinyl chloride▼	0	166,601	0	1,125	2	0	167,728	0.4
16	71-43-2	Benzene▼	0	0	91,863	53,274	2,958	0	148,095	0.4
17	108-10-1	Methyl isobutyl ketone	0	3,769	64,837	56,456	1,079	0	126,141	0.3
18	--	Antimony (and its compounds)*	112,421	0	0	0	0	6,645	119,066	0.3
19	71-36-3	n-Butyl alcohol	0	4,620	66,474	26,837	113	0	98,044	0.3
20	--	Silver (and its compounds)*	92,660	0	0	0	0	1,340	94,000	0.2
21	--	Cadmium (and its compounds)*▼	19,900	0	0	0	0	60,540	80,440	0.2
22	95-50-1	1,2-Dichlorobenzene	0	0	0	71,373	340	0	71,713	0.2
23	108-95-2	Phenol	0	0	58,614	1,141	4,425	0	64,180	0.2
24	127-18-4	Tetrachloroethylene▼	0	0	0	62,915	223	0	63,138	0.2
25	--	Cobalt (and its compounds)*▼	54,162	0	0	0	0	7,816	61,978	0.2
		Subtotal	**29,438,660**	**978,665**	**1,566,415**	**3,119,119**	**265,583**	**2,953,598**	**38,322,040**	**98**
		% of Total	**100**	**97**	**85**	**88**	**73**	**99**	**98**	
		Total	**29,451,957**	**1,011,990**	**1,847,940**	**3,525,759**	**361,785**	**2,970,742**	**39,170,173**	**100**

* Metal and its compounds. ▼ Known or suspected carcinogen.

- Two metals (copper and lead and their compounds) were the substances with the largest transfers from the US to Canada. These two metals represented almost three-quarters of all such transfers in 1998.
- Amounts of 25 chemicals represented 98 percent of all transfers from the US to Canada in 1998. Ten of the 25 were metals, including the two with the largest transfers, and nine were known or suspected carcinogens.
- Xylene and toluene were the chemicals with the largest transfers to treatment of substances other than metals and the third-and fourth-largest amounts overall.

7.3 1996–1998 Cross-Border Transfers

Transfers to treatment and disposal have been reported to both NPRI and TRI since 1996. NPRI had reports of transfers to treatment and disposal for 1995 but only required facilities to report the entire amount transferred and not how much went to individual transfer sites. Transfers to recycling and energy recovery became mandatory for NPRI for the 1998 reporting year. Therefore, comparisons of transfers can be made for the years 1996 to 1998 and can only compare transfers to treatment and disposal.

- Transfers to treatment and disposal to Canada from the US increased from 1.5 million kg to 3.5 million kg from 1996 to 1998. The increase occurred primarily in transfers of metals.
- Transfers to treatment and disposal to the US from Canada decreased from 4.3 million kg to 1.7 million kg from 1996 to 1998. The decrease occurred primarily in transfers of substances other than metals to treatment.
- TRI facilities transferred metals to treatment/disposal to Mexico sites in 1996 and 1997, but did not make such transfers to Mexico in 1998. No data are available for transfers from Mexico to the US.
- Only a few facilities account for the majority of the transfers between the US and Canada.

Table 7–16. Off-site Transfers to Treatment/Disposal to/from Canada, US and Mexico, 1996–1998

	Transfers to Treatment/Disposal						
	1996	1997	1998	Change 1997–1998		Change 1996–1998	
	kg	kg	kg	kg	%	kg	%
To Canada from US	**1,519,903**	**1,718,640**	**3,500,306**	**1,781,666**	**104**	**1,980,403**	**130**
Transfers to Treatment (except metals)	943,186	525,876	746,659	220,783	42	-196,527	-21
Transfers to Disposal (except metals)	87,789	125,710	163,759	38,049	30	75,970	87
Transfers of Metals to Treatment/Disposal	488,928	1,067,054	2,589,888	1,522,834	143	2,100,960	430
To US from Canada	**4,292,785**	**3,708,472**	**1,736,014**	**-1,972,458**	**-53**	**-2,556,771**	**-60**
Transfers to Treatment (except metals)	1,604,072	1,441,289	219,981	-1,221,308	-85	-1,384,091	-86
Transfers to Disposal (except metals)	345,770	182,127	66,789	-115,338	-63	-278,981	-81
Transfers of Metals to Treatment/Disposal	2,342,943	2,085,056	1,449,244	-635,812	-30	-893,699	-38
To Mexico from US	**245,774**	**222,995**	**0**	**-222,995**	**-100**	**-245,774**	**-100**
Transfers to Treatment (except metals)	0	0	0	0	--	0	--
Transfers to Disposal (except metals)	0	0	0	0	--	0	--
Transfers of Metals to Treatment/Disposal	245,774	222,995	0	-222,995	-100	-245,774	-100
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 1996–1998.

Figure 7–4. Change in Transfers to Treatment/Disposal sent to/from Canada, US and Mexico, 1996–1998

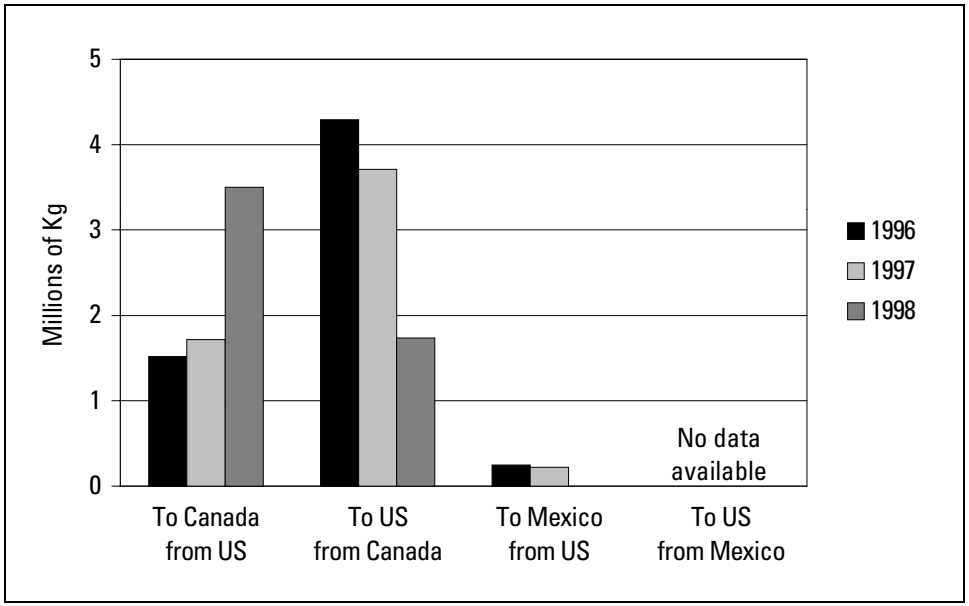


Table 7–17. Largest North American Transfers across Canada-US Border, 1996–1998

Year	Sending Facility/ Receiving Facility	Chemical	Amount Transferred (kg)	Type of Treatment or Disposal	Comments
TO CANADA FROM US					
Zinc Corp. of America, Palmerton, PA (US SIC code 33 Primary Metals)					
1996	No reports		0		
1997	No reports		0		
1998	Safety-Kleen, Corunna, ON	Lead and its compounds	1,360,544	Landfill	
1998	Safety-Kleen, Corunna, ON	Zinc and its compounds	321,995	Landfill	
Dow Corning Corp., Midland, MI (US SIC Code 28 Chemicals)					
1996	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Methanol	161,223	Incineration	
1997	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Methanol	69,559	Incineration	
1998	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Methanol	131,676	Incineration	Decrease of 18% from 1996 to 1998
1996	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Toluene	152,582	Incineration	
1997	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Toluene	0	Incineration	Sent 458,621 kg to Dow Chemical, Midland, MI
1998	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Toluene	175,464	Incineration	Increase of 15% from 1996 to 1998
1996	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Xylene (mixed isomers)	131,428	Incineration	
1997	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Xylene (mixed isomers)	78,248	Incineration	
1998	Safety-Kleen (Sarnia) Ltd., Corunna, ON	Xylene (mixed isomers)	217,029	Incineration	Increase of 65% from 1996 to 1998
TO US FROM CANADA					
Lake Erie Steel Company Ltd., Stelco Inc., Nanticoke, Ontario (US SIC code 33 Primary Metals)					
1996	Santarosa Group, Niagara Falls, NY	Manganese (and its compounds)	174,788	Landfill	
1997	Santarosa Group, Niagara Falls, NY	Manganese (and its compounds)	0		
1998	Santarosa Group, Niagara Falls, NY	Manganese (and its compounds)	0		Sold as a product
1996	Pine Tree Landfill, Lennox, MI	Zinc (and its compounds)	1,166,400	Landfill	
1997	Pine Tree Landfill, Lennox, MI	Zinc (and its compounds)	0		Sent 1,480,000 kg to Philip Environmental Services Corp., Stoney Creek , ON
1998	Pine Tree Landfill, Lennox, MI	Zinc (and its compounds)	0		Stored on-site for future recycling
Aimco Solrec Ltd., Milton, Ontario (US SIC code 28 Chemicals)					
1996	Systech Corp., Alpena, MI	Five chemicals	1,076,255	Incineration	n-Butyl alcohol, methyl ethyl ketone,
1996	Systech Corp., Paulding, OH	Five chemicals	137,095	Incineration	Methyl isobutyl ketone, toluene, xylene (mixed isomers)
1997	Systech Corp., Alpena, MI	Five chemicals	888,252	Incineration	
1997	Systech Corp., Paulding, OH	Five chemicals	32,187	Incineration	
1998	Systech Corp., Alpena, MI	Five chemicals	0		Reported 743,510 kg transferred to energy recovery
Zalev Brothers Co., Windsor, Ontario (US SIC code 33 Primary Metals)					
1996	Browning-Ferris Industries - Arbor Hills Landfill, Northville, MI	Zinc and its compounds	368,621	Landfill	
1996	Wayne Disposal - Canton, Inc., Sauk Hills, Canton, MI	Zinc and its compounds	54,692	Landfill	
1997	Browning-Ferris Industries - Arbor Hills Landfill, Northville, MI	Zinc and its compounds	529,508	Landfill	
1998	Browning-Ferris Industries - Arbor Hills Landfill, Northville, MI	Zinc and its compounds	613,061	Landfill	Increase of 45% from 1996 to 1998
1996	Browning-Ferris Industries - Arbor Hills Landfill, Northville, MI	Copper and its compounds	260,740	Landfill	
1996	Wayne Disposal - Canton, Inc., Sauk Hills, Canton, MI	Copper and its compounds	38,686	Landfill	
1997	Browning-Ferris Industries - Arbor Hills Landfill, Northville, MI	Copper and its compounds	374,544	Landfill	
1998	Browning-Ferris Industries - Arbor Hills Landfill, Northville, MI	Copper and its compounds	433,644	Landfill	Increase of 45% from 1996 to 1998

- The increase of 1.8 million kg of transfers from the US to Canada from 1997 to 1998 includes 1.7 million kg of lead and zinc and their compounds transfers from the Zinc Corp. of America in Palmerton, Pennsylvania, to Safety-Kleen in Corunna, Ontario.
- The decrease of 2.6 million kg of transfers from Canada to the US from 1996 to 1998 includes 1.3 million kg of zinc and manganese and their compounds transfers from Lake Erie Steel Company in Nanticoke, Ontario, to Pine Tree Landfill in Lennox, Michigan, and Santarosa Group in Niagara Falls, New York; it also includes 1.2 million kg transfers of five chemicals from Aimco Solrec in Milton, Ontario, to Systech Corp. facilities in Alpena, Michigan, and Paulding, Ohio.

7.3.1 1996 to 1998 Transfers to Treatment and Disposal by Industry

In TRI, 14 industry sectors reported transfers to Canadian sites in 1996 and, in NPRI, 12 industry sectors reported transfers to US sites. By 1998 two industry sectors in each country no longer reported cross-border transfers to treatment and disposal.

- The primary metals industry (US SIC code 33) reported the largest transfers across borders in 1998. This sector has increased transfers to Canada from the US and decreased transfers to the US from Canada.
- The increase in transfers to Canada are largely the result of reporting by one facility, Zinc Corp. of America in Palmerton, Pennsylvania, which reported transfers for the first time in 1998 of 1.7 million kg of lead and zinc and their compounds to Safety-Kleen in Corunna, Ontario.
- The US chemicals industry (US SIC code 28) reported the largest transfers to Canada to treatment and disposal in 1996 and the second largest in 1998. Transfers of three chemicals from one facility, Dow Corning Corp. in Midland, Michigan, also to Safety-Kleen in Corunna, Ontario, accounted for 46 percent of these transfers in 1996 and 58 percent in 1998.
- The decrease in transfers to the US from Canada is also largely the result of reporting by a few facilities.

Table 7–18. TRI Off-site Transfers to Canada from United States, by Industry, 1996–1998 (Ordered by Industry with Largest Transfers in 1998)

		Total Transfers to Treatment/Disposal						
US SIC		1996	1997	1998	Change 1997–1998		Change 1996–1998	
Code	Industry	(kg)	(kg)	(kg)	(kg)	(%)	(kg)	(%)
33	Primary Metals	39,978	339,192	1,876,007	1,536,815	453	1,836,029	4593
28	Chemicals	968,185	428,627	904,451	475,824	111	-63,734	-7
34	Fabricated Metals Products	142,908	425,760	414,255	-11,505	-3	271,347	190
--	Multiple codes 20-39	151,479	209,823	111,299	-98,524	-47	-40,180	-27
37	Transportation Equipment	6,280	10,523	106,188	95,665	909	99,908	1591
32	Stone/Clay/Glass Products	20,871	10,931	35,583	24,652	226	14,712	70
36	Electronic/Electrical Equipment	30,764	23,167	27,593	4,426	19	-3,171	-10
29	Petroleum and Coal Products	48,755	83,272	15,744	-67,528	-81	-33,011	-68
39	Misc. Manufacturing Industries	14,980	6,471	3,513	-2,958	-46	-11,467	-77
26	Paper Products	86,304	180,478	2,929	-177,549	-98	-83,375	-97
35	Industrial Machinery	4,679	4	2,349	2,345	58,625	-2,330	-50
30	Rubber and Plastics Products	4,535	203	395	192	95	-4,140	-91
38	Measurement/Photographic Instruments	70	76	0	-76	-100	-70	-100
23	Apparel and Other Textile Products	115	113	0	-113	-100	-115	-100
	Total	**1,519,903**	**1,718,640**	**3,500,306**	**1,781,666**	**104**	**1,980,403**	**130**

Table 7–19. NPRI Off-site Transfers to United States from Canada, by Industry, 1996–1998 (Ordered by Industry with Largest Transfers in 1998)

		Total Transfers to Treatment/Disposal						
US SIC		1996	1997	1998	Change 1997–1998		Change 1996–1998	
Code	Industry	(kg)	(kg)	(kg)	(kg)	(%)	(kg)	(%)
33	Primary Metals	2,551,559	1,992,564	1,390,457	-602,107	-30	-1,161,102	-46
28	Chemicals	1,704,675	1,520,273	285,932	-1,234,341	-81	-1,418,743	-83
20	Food Products	0	35,000	38,750	3,750	11	38,750	--
35	Industrial Machinery	0	0	13,400	13,400	--	13,400	--
37	Transportation Equipment	5,393	36,411	3,580	-32,831	-90	-1,813	-34
34	Fabricated Metals Products	5,381	4,321	2,928	-1,393	-32	-2,453	-46
26	Paper Products	5,645	0	861	861	--	-4,784	-85
29	Petroleum and Coal Products	0	0	42	42	--	42	--
32	Stone/Clay/Glass Products	84	361	35	-326	-90	-49	-58
39	Misc. Manufacturing Industries	348	132	29	-103	-78	-319	-92
24	Lumber and Wood Products	0	102,650	0	-102,650	-100	0	--
30	Rubber and Plastics Products	19,700	16,760	0	-16,760	-100	-19,700	-100
	Total	**4,292,785**	**3,708,472**	**1,736,014**	**-1,972,458**	**-53**	**-2,556,771**	**-60**

- One primary metals facility, Lake Erie Steel Company in Nanticoke, Ontario, reported sending 1.3 million kg of zinc and manganese and their compounds to landfills in Lennox, Michigan, and Niagara Falls, New York, in 1996. The facility reported no such transfers in 1998, having developed a product for the manganese and plans for future recycling of the zinc.
- The decrease in transfers from Canada to the US seen in the chemicals manufacturing industry are also largely due to reporting by one facility, Aimco Solrec in Milton, Ontario, to Systech Corp. incineration facilities in Michigan and Ohio. This facility has decreased the amount of transfers to treatment of five chemicals from 1.2 million kg to less than 750,000 kg. However, it also changed from reporting the transfers as sent for treatment (incineration) to reporting the transfers as sent for energy recovery to the same Systech Corp. facility in Alpena, Michigan. Transfers to energy recovery reported for 1998 are not included in the comparison between 1996 and 1998, since they were not required to be reported under NPRI in 1996.

7.3.2 1996 to 1998 Transfers to Treatment and Disposal by Chemical

A few chemicals account for most of the transfers to treatment and disposal from 1996 to 1998.

- Transfers of 25 chemicals account for more than 90 percent of all transfers to treatment and disposal from 1996 to 1998.
- Lead and its compounds were transferred in the largest amounts to Canada from the US in 1998, having increased by 1.5 million kg since 1996. This was largely the result of reporting by one facility, Zinc Corp. of America in Palmerton, Pennsylvania, which reported transfers of lead and its compounds to a landfill at Safety-Kleen in Corunna, Ontario, for the first time in 1998.
- Zinc and its compounds were transferred in the largest amounts to the US from Canada in all three years from 1996 to 1998. In 1996, one facility, Lake Erie Steel in Nanticoke, Ontario, accounted for 1.2 million kg of zinc and its compounds sent to the Pine Tree Landfill in Lennox, Michigan. However, this facility did not transfer zinc and its compounds in 1998. Instead, the facility Zalev Brothers in Windsor, Ontario, increased by 45 percent its transfers of zinc and its compounds to the Browning-Ferris Industries landfill in Northville, Michigan.

Table 7–20. TRI Off-site Transfers to Treatment/Disposal to Canada from the United States, Chemicals with Largest Transfers in 1998, 1996–1998

			Total Transfers to Treatment/Disposal						
	CAS		1996	1997	1998	Change 1997–1998		Change 1996–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	(kg)	(%)	(kg)	(%)
1	--	Lead (and its compounds)*▼	52,595	22,268	1,538,601	1,516,333	6,809	1,486,006	2,825
2	--	Zinc (and its compounds)*	198,258	410,894	620,999	210,105	51	422,741	213
3	67-56-1	Methanol	277,717	173,617	249,341	75,724	44	-28,376	-10
4	1330-20-7	Xylene (mixed isomers)	149,834	83,902	230,108	146,206	174	80,274	54
5	108-88-3	Toluene	309,222	110,771	191,544	80,773	73	-117,678	-38
6	--	Nickel (and its compounds)*▼	79,611	150,176	128,090	-22,086	-15	48,479	61
7	--	Copper (and its compounds)*	79,953	386,832	127,632	-259,200	-67	47,679	60
8	91-20-3	Naphthalene	23,332	33,556	92,092	58,536	174	68,760	295
9	--	Chromium (and its compounds)*▼	52,492	57,702	91,180	33,478	58	38,688	74
10	100-41-4	Ethylbenzene	37,023	6,320	60,185	53,865	852	23,162	63
11	--	Cadmium (and its compounds)*▼	548	690	57,813	57,123	8,279	57,265	10,450
12	--	Manganese (and its compounds)*	5,282	27,615	19,086	-8,529	-31	13,804	261
13	--	Nitric acid and nitrate compounds	25,118	50,244	17,087	-33,157	-66	-8,031	-32
14	7664-39-3	Hydrogen fluoride	17,776	38,065	12,082	-25,983	-68	-5,694	-32
15	--	Cyanides	3,850	4,635	11,288	6,653	144	7,438	193
16	75-05-8	Acetonitrile	38,476	32,405	8,129	-24,276	-75	-30,347	-79
17	120-12-7	Anthracene	1,882	602	6,108	5,506	915	4,226	225
18	108-95-2	Phenol	1,712	1,526	5,527	4,001	262	3,815	223
19	71-43-2	Benzene▼	2,239	1,917	3,146	1,229	64	907	41
20	7782-50-5	Chlorine	0	3,287	2,664	-623	-19	2,664	--
21	62-53-3	Aniline	2,415	0	2,573	2,573	--	158	7
22	78-93-3	Methyl ethyl ketone	7,587	329	1,996	1,667	507	-5,591	-74
23	--	Mercury (and its compounds)*	2,646	3,537	1,861	-1,676	-47	-785	-30
24	75-00-3	Chloroethane	4,648	2,439	1,780	-659	-27	-2,868	-62
25	--	Arsenic (and its compounds)*▼	16,616	4,100	1,705	-2,395	-58	-14,911	-90
		Subtotal	**1,390,832**	**1,607,429**	**3,482,617**	**1,875,188**	**117**	**2,091,785**	**150**
		% of Total	**92**	**94**	**99**				
		Total	**1,519,903**	**1,718,640**	**3,500,306**	**1,781,666**	**104**	**1,980,403**	**130**

* Metal and its compounds. ▼ Known or suspected carcinogen.

Table 7–21. NPRI Off-site Transfers to Treatment/Disposal to the United States from Canada, Chemicals with Largest Transfers in 1998, 1996–1998

			Total Transfers to Treatment/Disposal						
	CAS		1996	1997	1998	Change 1997–1998		Change 1996–1998	
Rank	Number	Chemical	(kg)	(kg)	(kg)	(kg)	(%)	(kg)	(%)
1	--	Zinc (and its compounds)*	1,661,967	1,437,167	688,890	-748,277	-52	-973,077	-59
2	--	Copper (and its compounds)*	305,374	397,554	449,108	51,554	13	143,734	47
3	--	Manganese (and its compounds)*	274,721	117,050	150,621	33,571	29	-124,100	-45
4	--	Lead (and its compounds)*▼	58,248	67,583	84,431	16,848	25	26,183	45
5	108-88-3	Toluene	253,097	404,697	66,096	-338,601	-84	-187,001	-74
6	--	Nitric acid and nitrate compounds	100,000	72,032	63,019	-9,013	-13	-36,981	-37
7	108-95-2	Phenol	93,972	66,101	60,900	-5,201	-8	-33,072	-35
8	--	Nickel (and its compounds)*▼	13,531	51,871	59,994	8,123	16	46,463	343
9	1330-20-7	Xylene (mixed isomers)	845,784	409,385	29,807	-379,578	-93	-815,977	-96
10	78-93-3	Methyl ethyl ketone	212,159	210,306	26,030	-184,276	-88	-186,129	-88
11	75-09-2	Dichloromethane▼	31,500	73,800	12,900	-60,900	-83	-18,600	-59
12	79-01-6	Trichloroethylene▼	5,400	22,000	12,400	-9,600	-44	7,000	130
13	107-21-1	Ethylene glycol	0	0	10,800	10,800	--	10,800	--
14	--	Chromium (and its compounds)*▼	1,048	7,366	8,715	1,349	18	7,667	732
15	--	Cobalt (and its compounds)*▼	3,346	4,185	4,845	660	16	1,499	45
16	62-53-3	Aniline	3,210	3,734	2,882	-852	-23	-328	-10
17	--	Cadmium (and its compounds)*▼	1,828	2,280	2,640	360	16	812	44
18	50-00-0	Formaldehyde▼	63	105,831	1,911	-103,920	-98	1,848	2,933
19	71-43-2	Benzene▼	0	0	14	14	--	14	--
20	67-56-1	Methanol	104,877	180,693	10	-180,683	-100	-104,867	-100
21	100-41-4	Ethylbenzene	498	125	1	-124	-99	-497	-100
22	100-42-5	Styrene▼	338	125	0	-125	-100	-338	-100
23	117-81-7	Di(2-ethylhexyl) phthalate▼	0	0	0	0	--	0	--
24	127-18-4	Tetrachloroethylene▼	19,000	9,700	0	-9,700	-100	-19,000	-100
25	1332-21-4	Asbestos (friable)▼	238,000	0	0	0	--	-238,000	-100
		Subtotal	**4,227,961**	**3,643,585**	**1,736,014**	**-1,907,571**	**-52**	**-2,491,947**	**-59**
		% of Total	**98**	**98**	**100**				
		Total	**4,292,785**	**3,708,472**	**1,736,014**	**-1,972,458**	**-53**	**-2,556,771**	**-60**

* Metal and its compounds. ▼ Known or suspected carcinogen.

- Zinc and its compounds were also transferred in the second-largest amounts in the reverse direction, to Canada from the US in 1998. Half of the amount for 1998 was sent to Safety-Kleen in Corunna, Ontario, by one facility, Zinc Corp. of America in Palmerton, Pennsylvania, which did not report any transfers in 1996.

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Key Findings

- Facilities that report pollution prevention activities also report reductions in releases and transfers of chemicals. Facilities active in pollution prevention reported a reduction of 22 percent in releases and transfers in NPRI and an 11 percent reduction in TRI. Those that do not report pollution prevention are registering increases in releases and transfers or only small decreases.
- In 1998, NPRI facilities that reported pollution prevention activities most often cited undertaking spill and leak prevention from the matched list of pollution prevention activities.
- In 1998, TRI facilities that reported pollution prevention activities most often cited equipment or process modification from the matched list of pollution prevention activities.
- The definition of pollution prevention and PRTR reporting of pollution prevention measures differs among the three countries.
- Case studies of pollution prevention activities in the three countries illustrate the importance of motivated employees, environmental management systems and company environmental policies in driving reductions in pollution. While PRTR programs help to identify opportunities for pollution prevention, many companies still experience difficulty in identifying successful alternatives for existing chemicals or processes.

8.1 Introduction

This chapter takes a closer look at pollution prevention activities in Canada, Mexico and the US. First, an analysis of common types of pollution prevention reporting is presented, followed by case studies of facilities making progress in pollution prevention.

Pollution prevention seeks to eliminate the causes of pollution rather than managing it after it has been created. Pollution control, by contrast, refers to measures to reduce environmental damage—often through "end of pipe' measures or other methods implemented after the pollution has been generated.

8.1.1 Definitions of Pollution Prevention in North America

While all three countries have government policies to encourage pollution prevention, its exact definition varies among the three countries.

In Canada, the definition of pollution prevention is "the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce the overall risk to human health or the environment."

The federal environmental law of Mexico, the General Law on Ecological Equilibrium and Environmental Protection, defines pollution prevention as "the set of norms and measures set to prevent degradation of the environment" (Article 3/XXV of Chapter 1).

In the US, the definition of pollution prevention used by the EPA is "source reduction—preventing or reducing waste where it originates, at the source, including practices that conserve natural resources by reducing or eliminating pollutants through increased efficiency in the use of raw materials, energy, water, and land."

These three definitions differ in their focus and scope. The Mexican definition is broad and makes no distinction between avoiding the generation of pollution and controlling it after it is generated. The Canadian definition is more limited to activities that avoid or minimize the creation of pollution and does not include pollution control measures. The US definition is the most restrictive: focusing on activities that prevent the generation of waste at the source. The US definition does not include on-site recycling of chemicals in their definition of pollution prevention, while Canada's does.

8.1.2 Pollution Prevention Reporting in North America, 1998

Mandatory reporting on pollution prevention activities began with the 1997 reporting year for NPRI and 1991 for TRI. Reporting for pollution prevention is voluntary in Mexico.

Pollution prevention reporting in TRI and NPRI are quite similar. Both countries require facilities to choose which pollution prevention activities apply for each chemical. These activities include product design, good operating practices, process modifications, and spill and leak control. Neither country asks a facility to report on the actual amount of the chemical that was reduced from the pollution prevention activities.

TRI and NPRI differ in two important respects. First, NPRI considers on-site reuse, recycling or recovery a pollution prevention activity, while TRI does not. Secondly, while both systems list certain activities that are considered pollution prevention, the TRI list is much more

specific, with 43 specific source reduction activities, while NPRI has seven general categories. For example, the NPRI category of spill and leak prevention is broken into six separate activities in TRI.

For the purposes of this analysis, TRI activities can be arranged into five of the NPRI categories. One NPRI category, on-site reuse, recycling or recovery, however, is not included in the TRI list of pollution prevention activities. In addition, the NPRI category of good operating practices or training is not included because, although TRI activities include good operating practices, they do not include training. This category is reported by a large number of NPRI facilities. Therefore, these two categories, on-site reuse, recycling or recovery and good operating practices or training, are not included in the analyses in this chapter.

There may also be other differences in pollution prevention activity reporting in Canada and the US. In both countries, facilities report activities undertaken during the calendar year. Some facilities, however, may be reporting ongoing activities that began in earlier years. The TRI form specifies that facilities are to report activities engaged in during the reporting year, while the NPRI form does not (Appendices F and G). In both cases, though, separate instructions indicate the reporting should cover activities done during the calendar year.

Also, entries supplied by NPRI facilities in the optional Comments section of their form indicate some facilities are reporting pollution control activities (for example, installation of

Table 8–1. Categories of Pollution Prevention Activities as Reported to the National PRTRs

	NPRI Categories	Corresponding NPRI Category	RETC Categories
A	Materials or feedstock substitution	G	Changes in operating practices
B	Product design or reformulation	--	In situ treatment
C	Equipment or process modifications	F	Inventory control
D	Spill and leak prevention	D	Spill and leakage prevention
E	On-site reuse, recycling or recovery	A	Changes to inputs
F	Improved inventory management or purchasing techniques	B	Product changes
G	Good operating practices or training	C	Changes in processes
		A, C, D	Changes in cleaning practices
		--	Other

Corresponding NPRI Category		TRI Categories	Corresponding NPRI Category		TRI Categories
		Good Operating Practices			**Process Modifications**
	W13	Improved maintenance scheduling, record keeping, or procedures	C	W51	Instituted recirculation within a process
	W14	Changed production schedule to minimize equipment and feedstock changeovers	C	W52	Modified equipment, layout, or piping
	W19	Other changes in operating practices	C	W53	Use of a different process catalyst
			C	W54	Instituted better controls on operating bulk containers to minimize discarding of empty containers
			C	W55	Changed from small volume containers to bulk containers to minimize discarding of empty containers
		Inventory Control			
F	W21	Instituted procedures to ensure that materials do not stay in inventory beyond shelf-life	C	W58	Other process modifications
F	W22	Began to test outdated material — continue to use if still effective			**Cleaning and Degreasing**
F	W23	Eliminated shelf-life requirements for stable materials	C	W59	Modified stripping/cleaning equipment
F	W24	Instituted better labeling procedures	C	W60	Changed to mechanical stripping/cleaning devices (from solvents or other materials)
F	W25	Instituted clearinghouse to exchange materials that would otherwise be discarded		W61	Changed to aqueous cleaners (from solvents or other materials)
F	W29	Other changes in inventory control	D	W63	Modified containment procedures for cleaning units
			D	W64	Improved draining procedures
				W65	Redesigned parts racks to reduce drag out
		Spill and Leak Prevention	C	W66	Modified or installed rinse systems
D	W31	Improved storage or stacking procedures	C	W67	Improved rinse equipment design
D	W32	Improved procedures for loading, unloading, and transfer operations	C	W68	Improved rinse equipment operation
D	W33	Installed overflow alarms or automatic shut-off valves	C	W71	Other cleaning and degreasing modifications
D	W35	Installed vapor recovery systems			**Surface Preparation and Finishing**
D	W36	Implemented inspection or monitoring program of potential spill or leak sources	C	W72	Modified spray systems or equipment
D	W39	Other spill and leak prevention		W73	Substituted coating materials used
			C	W74	Improved application techniques
			C	W75	Changed from spray to other system
		Raw Material Modifications	C	W78	Other surface preparation and finishing modifications
A	W41	Increased purity of raw materials			
A	W42	Substituted raw materials			**Product Modifications**
A	W49	Other raw material modifications	B	W81	Changed product specifications
			B	W82	Modified design or composition
			B	W83	Modified packaging
			B	W89	Other product modifications

Note: On-site reuse, recycling or recovery not a source reduction activity in TRI.
Good operating practices or training in NPRI does not match source reduction activities in TRI.
Reporting under RETC was voluntary for 1998.

Table 8–2. NPRI Reporting of Pollution Prevention Activity, by Category, 1998

Pollution Prevention Activity	Facilities Reporting Pollution Prevention Activity: Number	Facilities Reporting Pollution Prevention Activity: As % of All NPRI Facilities	Forms with Pollution Prevention Activity Reported: Number	Forms with Pollution Prevention Activity Reported: As % of All NPRI Forms
Materials or feedstock substitutions	162	10	296	6
Product redesign or reformulation	172	11	338	6
Equipment or process modifications	402	26	971	19
Spill and leak prevention	469	30	1,364	26
Improved inventory management or purchasing techniques	224	14	583	11
Total Reporting Pollution Prevention Activity*	**836**	**54**	**2,337**	**45**

* The numerical totals do not equal the sum of the above categories because facilities may report more than one type of pollution prevention activity category, and they may report more than one type of activity per form.

Table 8–3. TRI Reporting of Pollution Prevention Activity, by Category, 1998

Pollution Prevention Activity	Facilities Reporting Pollution Prevention Activity: Number	Facilities Reporting Pollution Prevention Activity: As % of All TRI Facilities	Forms with Pollution Prevention Activity Reported: Number	Forms with Pollution Prevention Activity Reported: As % of All TRI Forms
Materials or feedstock substitutions	1,350	7	2,295	4
Product redesign or reformulation	445	2	794	1
Equipment or process modifications	2,099	10	4,219	7
Spill and leak prevention	956	5	2,489	4
Improved inventory management or purchasing techniques	528	3	1,164	2
Total Reporting Pollution Prevention Activity*	**3,818**	**19**	**8,406**	**15**

Note: Only TRI Form R was used in this analysis because TRI Form A does not include the section on pollution prevention activity. Form As provide only the name of the chemical and can be used when reportable amounts are less than 100 pounds and use is less than 1 million pounds annually. There were 20,422 facilities submitting at least one TRI Form R in the matched data set, with a total of 57,646 TRI Form Rs.
* The numerical totals do not equal the sum of the above categories because facilities may report more than one type of pollution prevention activity category, and they may report more than one type of activity per form.

treatment systems) in this section. This is not likely to occur in TRI, since facilities must check one or more of the specific activities, and these activities do not include pollution control projects. The TRI database does not have comments from facilities (nor does the reporting form allow for general comments).

8.2 Analysis of Pollution Prevention Activities Reported, 1998

The following analysis of pollution prevention is based on the matched data set using a common set of pollution prevention categories. The NPRI category of on-site recycling, reuse and recycling and categories of good operating practices or training are not included, as mentioned above.

In 1998, 54 percent of the NPRI facilities reported pollution prevention activity, while 19 percent of TRI facilities did.

- For NPRI, the most frequently cited activity was spill and leak prevention, with equipment or process modifications second.
- For TRI, the most frequently cited activity was equipment or process modifications, with materials or feedstock modifications second.

In 1998 in Mexico, approximately 3 percent of the facilities reporting to COA filled out Section V, which includes voluntary reporting of pollution prevention activities. Of these 31 reporting facilities, 19 were chemical facilities, four were paint and dye facilities, three were metallurgical industries, three were automotive and two were oil and petroleum facilities. The most frequently reported pollution prevention practice was spill prevention.

8.2.1 The Relationship between Pollution Prevention Reporting and Trends in Releases and Transfers, 1998

Pollution prevention activities are intended to reduce the amount of releases and transfers. The amounts of the reductions due to the activities are not reported to TRI and NPRI, just the types of pollution prevention activities undertaken. However, the data can be analyzed to see if facilities reporting pollution prevention activities are also showing reductions in releases and transfers over the years. Submissions for the same chemical by the same facility for all four years, 1995 through 1998, are compared. (A facility fills out one form per chemical.)

There are many reasons in addition to pollution prevention why a facility may show a reduction from one year to another. For example, reductions in reported amounts of releases and transfers can occur due to a decrease in production at the facility, installation of pollution control equipment, or a change in the method used to estimate releases and transfers. Facilities may also show an increase even when practicing pollution prevention, for example, if production-level increases more than make up for the pollution prevention gains.

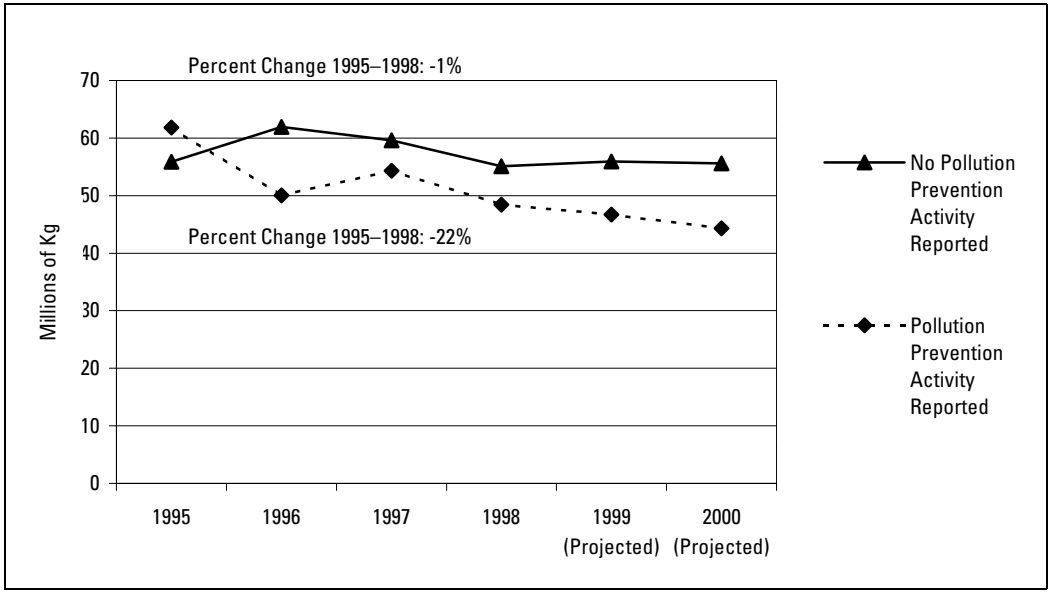
For both NPRI and TRI, facilities that reported pollution prevention activities in 1998 showed a reduction in releases and transfers from 1995 to 1998. Facilities that did not report pollution prevention activities showed increases in releases and transfers.

Table 8–4. NPRI Total Reported Amounts of Releases and Transfers for Forms with and without Pollution Prevention Activity Reporting, 1995–2000

	Chemicals Reported All Four Years, 1995–1998*		
	All Forms Number	Forms with Pollution Prevention Activity Reported Number	Forms with No Pollution Prevention Activity Reported Number
Forms	3,234	1,550	1,684
Total Releases and Transfers	**kg**	**kg**	**kg**
1995	117,711,036	61,851,082	55,859,954
1996	111,982,006	50,044,896	61,937,110
1997	113,970,593	54,344,000	59,626,593
1998	103,530,151	48,454,436	55,075,715
1999 (Projected)	102,631,334	46,715,967	55,915,367
2000 (Projected)	99,896,370	44,297,455	55,598,915
	% Change	**% Change**	**% Change**
1995–1998 Actual	-12	-22	-1
1998–2000 Projected	-4	-9	1

* Data for forms submitted by the same facility for the same substance in all four years 1995–1998.

Figure 8–1. Change in NPRI Total Reported Amounts of Releases and Transfers for Forms with and without Pollution Prevention Activity Reporting, 1995–2000



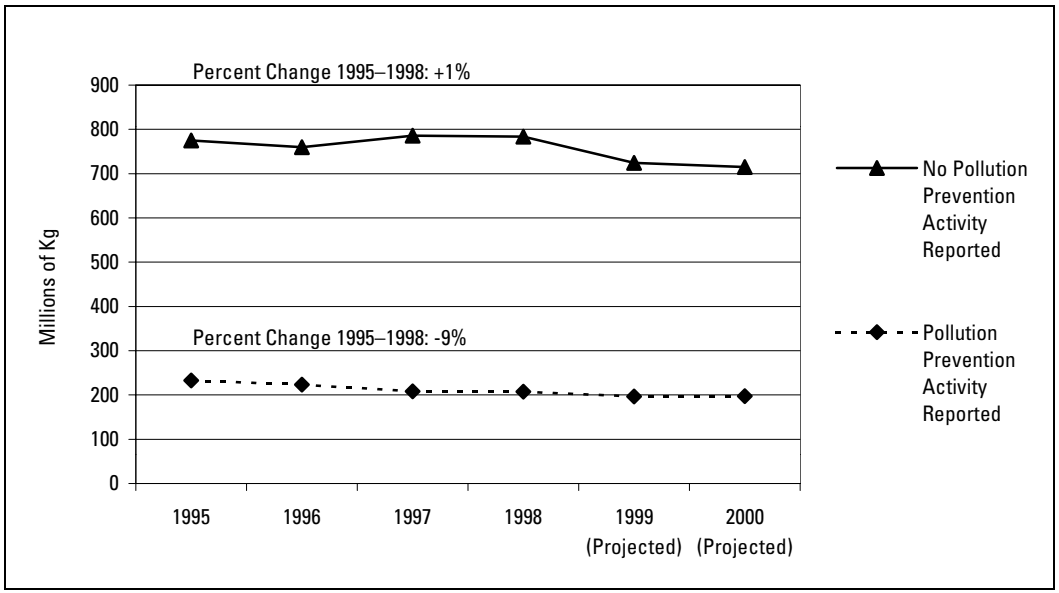
Note: For chemicals reported in all four years (1995–1998) only.

Table 8–5. TRI Total Reported Amounts of Releases and Transfers for Forms with and without Pollution Prevention Activity Reporting, 1995–2000

	Chemicals Reported All Four Years, 1995–1998*		
	All Forms	Forms with Pollution Prevention Activity Reported	Forms with No Pollution Prevention Activity Reported
	Number	Number	Number
Forms	37,007	6,322	30,685
Total Releases and Transfers	**kg**	**kg**	**kg**
1995	1,007,459,970	232,621,573	774,838,397
1996	982,938,154	223,197,534	759,740,620
1997	993,630,466	208,165,461	785,465,005
1998	991,627,505	207,759,638	783,867,867
1999 (Projected)	920,469,408	196,353,636	724,115,772
2000 (Projected)	912,154,118	197,324,881	714,829,237
	% Change	**% Change**	**% Change**
1995–1998 Actual	-2	-11	1
1998–2000 Projected	-8	-5	-9

Note: Data taken from TRI Form R, Section 8.
* Data for forms submitted by the same facility for the same substance in all four years 1995–1998.

Figure 8–2. Change in TRI Total Reported Amounts of Releases and Transfers for Forms with and without Pollution Prevention Activity Reporting, 1995–2000



Note: For chemicals reported in all four years (1995-1998) only.

- NPRI forms with reporting on pollution prevention activity showed a 22 percent reduction in total releases and transfers from 1995 to 1998. NPRI forms with no reporting on pollution prevention activities indicated had a 1 percent decrease over the same period.
- TRI forms with reporting on pollution prevention activity also showed reductions: an 11 percent decrease in total releases and transfers from 1995 to 1998. On the other hand, those TRI forms with no reporting on pollution prevention activity showed a 1 percent increase over the same period.
- This trend also holds true if projections from NPRI are analyzed. NPRI forms with pollution prevention activity in 1998 projected a further decrease of 9 percent from 1998 to 2000, while forms with no pollution prevention activity projected a 1 percent increase.
- The opposite trend was observed with TRI projections. TRI forms citing pollution prevention activity reported in 1998 projected a further decrease of 5 percent from 1998 to 2000, while forms with no pollution prevention activity reported projected a 9 percent decrease.

8.3 Examples of Pollution Prevention

8.3.1 Overview of Interviews

When obtaining input on the development of this report, a number of stakeholders expressed an interest in taking a closer look at pollution prevention activities as reported to national PRTRs. This section explores some of the stories behind the pollution prevention reporting and profiles examples of pollution prevention.

Thirty facilities in Canada, Mexico and the US were interviewed. Facilities were selected to provide a mix of different types of pollution prevention reporting, industry sectors, geographic areas, and large and small amounts of reported releases and transfers. Facilities were asked a series of questions about their pollution prevention activities. Six areas of pollution prevention were probed: corporate-level responsibility for pollution prevention, the existence of environmental policy, the motivation for pollution prevention, examples of projects with approximate costs and time periods, how information of pollution prevention was received and transferred, and future plans.

Twelve facilities were interviewed in Canada, 10 in Mexico and eight in the US. In Canada and the US, the NPRI and TRI databases were used to identify facilities releasing or transferring two chemicals, trichloroethylene and nickel and its compounds. These two substances were chosen because trichloroethylene (TCE) and some members of the nickel group are carcinogens, considered toxic under the Canadian CEPA, and are released in large volumes, are reported by multiple industry sectors, and are on the ARET and EPA 33/50 program lists. Facilities were interviewed about pollution prevention activities for all chemicals at their site.

In Mexico, because of the small number of facilities reporting pollution prevention, a modified selection approach was used. About 100 companies under federal jurisdiction from the INE database were sent a letter and questionnaire from INE, inviting them to participate. Of the 10 companies that agreed, none had filled out Section V of the COA, but all had implemented pollution prevention activities.

The information gained from these interviews is thus illustrative, not definitive, of pollution prevention activities in the three countries.

8.3.2 Types of Pollution Prevention Activities Reported

In general, the types of pollution prevention activities implemented most frequently in the interviewed facilities were activities related to equipment or process modifications, followed by activities involving preventive maintenance and materials substitution. The activities least implemented were the ones focused on product changes.

8.3.3 Motivations for Implementing Pollution Prevention

Diverse reasons motivated the facilities interviewed to implement pollution prevention programs. Environmental consciousness, to avoid environmental impacts, implementation of some type of process control plan, whether quality assurance or ISO 14000, and company environmental policies were the main ones. Perhaps because pollution prevention often requires asking questions on a fundamental level, such as why a facility is using a particular chemical, facilities with tools that promote this fundamental questioning—corporate environmental policies and environmental management approaches, for example—tended to implement pollution prevention activities.

Customers were a powerful force in pollution prevention, both for driving changes and limiting them. Several facilities in Canada noted that their customers were demanding products cleaned without trichloroethylene (TCE), and this had led to a reappraisal of their use of the chemical. Others noted that customers demanded a product cleaned with TCE, and this was a critical specification to continue with their business. Often this specification was laid down by an authority, such as Underwriters Laboratories, and changing this specification was a laborious process. This requirement had slowed progress towards a TCE alternative in some companies, or forced a company to have two parallel processes, one for TCE and one for TCE alternatives.

The reason for implementing pollution prevention can be specific to the chemical. For example, TCE smells even at relatively low concentrations, prompting sufficient employee pressure over health concerns and working conditions to drive reductions at several facilities. Nickel, on the other hand, does not smell, and so does not generate the same degree of employee pressure for reduction. TCE is also expensive to purchase and often requires specialized and expensive disposal techniques, creating another incentive to reduce use. Nickel is often a trace impurity in steel, and so does not cost anything to buy, creating no incentive for pollution prevention.

8.3.4 Sources of Information on Pollution Prevention

Traditionally the barriers to pollution prevention have included the lack of information and dissemination of information about possible pollution prevention opportunities. Many facilities noted that PRTR programs had helped identify opportunities for pollution prevention. Nine of the 10 Mexican facilities, seven of the 12 Canadian facilities, and one of the eight US facilities had used PRTR data or programs to identify pollution prevention opportunities.

Facilities interviewed across North America had multiple sources of environmental information, but many did not know where to go for new ideas on pollution prevention for a particular process. Many facilities had been frustrated by trying processes that did not work and that created new, unexpected problems. Trial and error, often within a vacuum of information, seemed to be the main method of identifying effective pollution prevention activities. Comments heard were “you’re alone,” “competitors won’t tell you what they’re doing” and “associations don’t know your process.”

Some of the most useful assistance had come from facilities in different industrial sectors comparing notes. These facilities were not competitors, so could share information easily, and often used the substance in similar applications. Four of the 10 Mexican facilities, seven of the 12 Canadian facilities, and two of the eight US facilities had been assisted by other facilities in pollution prevention.

Table 8–6. Types of Facilities Interviewed about Pollution Prevention Activities

Industry Sectors	Number of Facilities
Metallurgical/Primary Metal/Fabricated Metal/Mining	9
Chemical/ Petroleum and Coal Products	8
Automotive/Transportation Equipment	3
Electrical and Electronic Products	2
Other Manufacturing/Instruments	2
Glass/Plastic Products	2
Furniture	1
Industrial Machinery	1
Printing and Publishing	1
Rubber and Miscellaneous Products	1
Number of Facilities Interviewed	**30**

Table 8–7. Pollution Prevention Activities Reported by Interviewed Facilities

Pollution Prevention Activities Reported	Number of Facilities
Equipment or process modifications	18
Spill and leak prevention	12
Materials or feedstock substitutions	12
Improved inventory management or purchasing techniques	10
Product redesign or reformulation	3
Number of Facilities Interviewed	**30**

Note: A facility can report more than one activity.

Table 8–8. Reasons for Implementing Pollution Prevention Activities at Interviewed Facilities

Reason	Number of Facilities
As a result of the company environmental policy	16
As a result of the environmental conscience of the company personnel/To avoid environmental impacts	15
Implementation of an environmental management plan/quality assurance/ISO 14000 requirements	15
As a result of governmental regulations or audits	9
Pressure of social groups/consumers/ suppliers	8
High cost of chemical purchase or disposal	4
As a result of company expansion	1
Number of Facilities Interviewed	**30**

Note: A facility may report more than one reason.

Table 8–9. Sources of Information for Pollution Prevention Activities

Sources of Information about Pollution Prevention	Number of Facilities
Used PRTR data or programs to identify pollution prevention opportunities	20
Used information from others within company	17
Used information from other companies	14
Used information from government programs	12
Used information from consultants	9
Used information from trade shows, trade journals, suppliers	8
Number of Facilities Interviewed	**30**

Note: A facility may report more than one source.

For example, one facility used the NPRI list to identify other facilities releasing TCE, contacted them and learned of alternative chemicals and processes to TCE. Some government programs have been set up with this in mind, such as the Canadian federal-provincial (Ontario) Metal Finishing Industry Pollution Prevention Project.

Companies that had multiple facilities often shared information within the company on a particular chemical or process. For many, this was a vital source of information, helping to shape their priorities and design their solutions. One company had a best practices exchange to help share innovative ideas.

Trade shows, trade journals and suppliers were frequently cited sources of information on pollution prevention. Consultants were seen as a limited source of information. Only four of the 10 facilities in Mexico used a consultant, only three of the 12 Canadian facilities, and none of the five US facilities.

A few companies knew about government programs or information on pollution prevention, but these were not frequently used or found to be particularly helpful. Eight of the ten facilities interviewed in Mexico knew about government programs offering pollution prevention assistance, and five knew about financial support for these programs. Two facilities in Canada and none in the US identified governmental programs on pollution prevention.

8.3.5 Mechanisms

Some of the largest reductions in releases were at facilities with a dedicated individual with the authority to make changes, backed up by a company environmental policy. At companies where the environmental responsibility rested with a person carrying many other responsibilities, often less progress was made. The time, resources and enthusiasm of the individual were often driving forces in reducing chemicals.

Many of the pollution prevention activities had been under way for many years. Projects were often phased in and revised over time. This is important, as NPRI and TRI require reporting for only those pollution prevention activities implemented during the current year. The 1998 data often catch only part of a process that extends over time.

Most small facilities did not have a written environmental policy or a designated person responsible for environmental affairs. However, some small facilities were asking fundamental questions about their continued use of a chemical and had quickly moved to substitute one chemical for another. Some larger companies had tended to change their processes, often moving from cleaning with TCE to aqueous cleaning systems.

8.4 Pollution Prevention Case Studies

A selection of case studies from the three countries is presented to illustrate the diverse pollution prevention projects and mechanisms.

8.4.1 Blount Canada Limited develops innovative process to eliminate trichloroethylene

Blount Canada, located in Guelph, Ontario, completely eliminated trichloroethylene (TCE) in 1999. Its 800 employees use stamping, laser cutting, degreasing, chrome plating and other processes to convert raw steel into finished products such as parts for chainsaws. Solvents such as TCE had been used for decades to remove oils from metal parts. This created a number of undesirable wastestreams: air emissions inside and outside the plant, and used solvent and leftover sludge requiring hazardous waste disposal.

As a result of reporting to NPRI, TCE was identified as the largest release from the Blount facility, and Blount was identified as the third-highest TCE emitter in Canada in 1998. The NPRI reporting and a high priority given to environmental practices at the company caused Blount staff to question their use of TCE.

A TCE phase-out project was started in 1998. Finding a replacement for TCE was not an easy task. TCE remains a legal product, an excellent solvent, and federal legislation to limit TCE use has not yet been brought into force. Additionally, replacement techniques for solvent degreasing generally involve replacing solvents with aqueous washing systems. Blount staff felt that aqueous washing systems could present troublesome drawbacks. Oil would contaminate the water system, resulting in a new, large and continuous wastestream of oily water requiring disposal. In addition, some of the wash chemicals are proprietary and expensive to purchase. There was also a risk that parts could be recontaminated by oily water on the surface when pulled from the tank.

Instead of choosing the common alternative, Blount pioneered a new process: heating and spinning the parts to remove oil. Different speeds and heating temperatures were tried. Then the new centrifugal process was phased in over five months in 1999. The last steel part to be cleaned with TCE rolled through production in November 1999. Now, TCE has been completely eliminated from Blount's manufacturing facilities.

The environmental, financial and production benefits of the new degreasing process have been numerous: the spun-off oil is recycled, TCE has been eliminated for use and there are no TCE emissions to the air; within the plant, water use has been reduced by 28 percent, hazardous wastestreams have been eliminated, and production efficiency has been increased through the removal of the solvent degreasing bottleneck. The project payback was less than five years at cost of approximately C$750,000. Blount officials are very proud of this accomplishment, and the company recently won an environmental award for this and other work.

Another company that reported TCE to NPRI used the NPRI list to identify other facilities practicing pollution prevention and has contacted Blount to learn about this new centrifugal degreasing process.

Blount Canada also reports nickel, manganese and copper and their compounds to NPRI. These metals are bound up in the steel that they purchase and all scrap steel is recycled.

Blount Canada reported three pollution prevention activities to NPRI in 1998: equipment or process modifications, on-site recycling, and good operating practices and training.

For more information, contact Jim Gilles at Blount Canada at (519) 822-6870 or <www.blount.com>.

8.4.2 Bristol Aerospace Limited Reduces Trichloroethylene through Training and Alternative Processes

At Bristol Aerospace's plant in Winnipeg, Manitoba, TCE is also used to clean metal parts. As a result of a written company environmental policy, ISO 14001 certification, and employee concerns, the company has moved to reduce TCE use. However, some customers specified that their parts be cleaned using TCE, which limited the phase-out of TCE. TCE use was reviewed, and only those parts required to be washed in TCE now use this process. All other parts are now cleaned, using an aqueous wash system. However, because the aqueous wash system takes longer to clean a part—approximately two hours compared to 15 minutes for TCE washing—often operators would use the TCE process when it was not required. Training on the two systems has further reduced the use of the TCE process.

Bristol Aerospace's other environmental priority is the elimination of cadmium plating. Alternatives to it are being researched company-wide for use in all facilities. This provides a larger pool of ideas and resources than is available at the facility level. Again, customers are a powerful force in designing changes, as some customers specify cadmium plating for their parts. Bristol Aerospace is also participating in a federal-provincial pollution prevention project, which they are finding to be a good source of ideas.

Bristol Aerospace reported four pollution prevention activities in 1998: materials or feedstock substitution, equipment or process modifications, spill and leak prevention and other pollution prevention activities.

For more information, contact Kevin Smith at Bristol Aerospace at (204) 775-8331 or <www.bristol.ca>.

8.4.3 Small furniture company, Calstone Incorporated, uses practical methods to reduce trichloroethylene use

Calstone Incorporated, in Toronto, Ontario, employs approximately 40 people to make furniture. Like many smaller companies, the company does not have a written environmental policy, and responsibility for environmental decisions rests with the general manager. TCE is used to degrease metal in furniture parts. The company tried to reduce use of TCE through practical methods, such as limiting the time TCE is used and having a good ventilation system. While the company considers TCE one of the best solvents for degreasing metal, they will probably switch to an alternative in the next two years, because of environmental and health concerns with TCE and the increasing cost of purchasing TCE. The company learned through reporting to NPRI of the carcinogenicity of TCE, and this increased the pressure to switch from TCE.

When asked to identify the most useful sources of information on reducing TCE use, the staff at Calstone noted suppliers and trade shows. Government sites, programs or competitors' actions were not seen as useful sources of information.

Calstone reported good operating practices or training as its pollution prevention methods in 1998. TCE use is limited to half a day, and new workers are trained by existing workers on the job.

For more information, contact Kurt Shultz at (416) 298-9187.

8.4.4 Schneider Electric Canada part of trilateral effort to minimize environmental effects

Schneider Electric Canada, in Bramalea, Ontario, makes electrical switches for power control equipment in its Toronto area plants. Nickel and its compounds, as well as other metals, are trace impurities in the steel used to make boxes to house the electrical switches and control equipment. The specifications for products used for electrical applications is governed by international and national standards and codes, such as the Canadian Standards Association or Underwriters Laboratories' requirements. These codes are often difficult to change, which limits opportunities to reduce uses of certain materials. However, all scrap metal is recycled off-site.

The parent company, Schneider Electric North American Division, owns 26 manufacturing facilities in Canada, Mexico, and the US. Schneider Electric strives to integrate both safety and environmental concerns into corporate decision making. Several of its North American facilities have obtained ISO 14001 certification. A formal, corporate-wide, written environmental policy is in place, which establishes minimum standards. The corporate environmental policy has mandatory waste reduction and minimization goals, which are implemented by specific committees. Each facility can then customize its own policy.

Schneider Electric has worldwide corporate bans on the use and/or otherwise processing of several chemicals, including TCE, arsenic, cadmium, cyanide, mercury, asbestos, lead, hexavalent chromium, CFCs, xylene, toluene and methylene chloride.

The Bramalea Schneider Electric facility reported good operating practices or training as pollution prevention measures in 1998.

For more information, contact Rickesh Patel at (416) 752-8020 or patelr@squared.com.

8.4.5 Sandvik Steel switches to ultrasonic cleaning to reduce trichloroethylene use

Sandvik Steel Canada, in Arnprior, Ontario, uses TCE to degrease metal tubes in its Ottawa area plant. Employee concern, rising cost of purchasing TCE and corporate pressure resulted in a goal to eliminate the use of TCE by 2002. The formal

environmental goal was linked to employee bonuses and employee performance, providing a strong incentive to eliminate TCE.

A "TRIC eliminators" ("TRIC" is a common name for trichloroethylene) team led the effort to find alternatives to TCE use, but the difficulty of cleaning the inside of a tube ruled out many alternatives. Ideas were gathered from visits to other Sandvik facilities in Sweden and England. Consultants had few ideas for this specific problem. The team decided on ultrasonic cleaning and perfected the method over one year.

Sandvik Steel reported 289,986 kg of total releases and transfers of TCE in 1998, the highest amount of any facility in Canada. They reported one pollution prevention activity in 1998: equipment or process modifications.

For more information, call Peter Kwandt at (613) 623-6501.

8.4.6 Relocation of Household Products changes environmental plans

The Household Products facility, in Asheboro, North Carolina, manufactured appliances (principally hair dryers). It previously operated as a subsidiary of the Black and Decker Company, and was subsequently acquired by Windmere Durable Holdings, Inc. The facility ceased operations in 1999.

The reductions seen in TRI total waste between 1995 and 1998 for this facility were the initial phases of a major pollution prevention effort that was terminated when the facility was closed and all of the equipment was relocated to Mexico. Currently, remediation of contamination at the facility site is the only ongoing activity.

Improved monitoring of degreaser operations was the first of three phases of a larger plan. Working with the local environmental protection authorities, facility staff installed an extended cooling jacket at the end of 1998, which should have increased efficiency of the unit significantly. Unfortunately, the plant did not operate for long enough in 1999, prior to relocation, to assess the effects of this improvement.

The final, and most important, phase was to be the installation of a new degreaser, at a capital cost of US$1.1 million. It was anticipated that this equipment change would have radically reduced TCE emissions in 2000 and subsequent reporting years. The relocation of the facility, however, terminated this project. It is believed by facility staff that the existing vapor degreaser is being operated in Mexico.

This facility reported one pollution prevention activity for TCE in 1998: improved maintenance scheduling, record keeping, or procedures.

8.4.7 Plant Expansion at Plymouth Tube creates environmental opportunities

The Plymouth Tube plant, in Salisbury, Maryland, is one of approximately ten facilities operated by Plymouth Tube in the US. It employs 130 people and produces 200,000 linear feet of stainless steel tube per week. TCE is used in a vapor degreaser to clean metal tubing. While there are engineering staff available for technical support at corporate headquarters, most pollution control and source reduction activities are handled by plant staff. Operational staff are directly involved in environmental responsibilities.

A significant portion of the recent reductions in TCE reflected a temporary slowdown in plant operations. A large quantity of TCE waste was reported in 1997. This reflects a few "acid events" late in 1997, where TCE in a vapor degreaser "goes sour," and must be replaced.

The implementation of the pollution prevention projects at the facility were tied to the expansion of the plant. This entailed the following actions:

- The existing vapor degreaser was supplemented with a second tank of newer design.
- Accommodating the new tank necessitated relocation of the original tank.
- Relocation of the existing tank facilitated better control of tank operations.
- An accordion-type cover was added to the original tank, further controlling emissions.

This facility reported one pollution prevention activity for TCE in 1998: modified equipment, layout or piping.

For more information, contact George Papp at (410) 749-1666.

8.4.8 *Nueva Fábrica Nacional de Vidrio, S.A. de C.V.* (FANAL) invests in environmental improvements to Achieve National Clean Industry Certificate

Nueva Fábrica Nacional de Vidrio (FANAL), located in the state of Mexico, employs nearly 2,500 people making glass bottles and jars.

Since 1994, the company has invested more than US$2.8 million in environmental protection measures. Pollution prevention activities were developed as a result of the implementation of an environmental management system, and other programs, such as the national Clean Industry Certificate (1996). An industry obtains a Clean Industry Certificate after completing an audit, developing goals, a work program and a timetable to achieve these goals. The environmental audits are performed by the Office of the Federal Attorney for Environmental Protection. Over 1300 audits have been completed since the program started in 1992.

FANAL implemented a range of pollution prevention activities. The company experienced the most problems finding substitutes that would provide the same performance as materials being eliminated. Opportunities for pollution prevention occurred when existing systems were replaced at the end of their useful life.

By changing to more efficient combustion equipment, FANAL has reduced NO_x emissions by about 20 metric tons per year and improved fuel consumption per unit of production. The use of lead-based ceramic paints was also reduced by about 80 percent. Additionally, FANAL has eliminated the use of asbestos/chrome-based refractories and

its TCE-based degreaser. Biodegradable oils are now used to reduce wastewater pollution charges.

The environmental benefits include the reduction of waste, especially through the recycling of waste glass, the savings of more than 50 percent in water use, the reduction of risks for the employees, zero discharges of wastewater and meeting air pollution limits. The company, though, did not fill out Section V of the COA format in 1998.

The company considers that participation in the Clean Industry program and the implementation of an environmental management system have helped identify pollution prevention opportunities. Nevertheless, the company was not aware of the governmental pollution prevention programs, or of financial and technical support for pollution prevention existing in Mexico. They did not receive technical support from any Mexican environmental association. Most of the information obtained was from a US company that is a leader in the glass business.

For more information, contact Ing. Hugo Vargas Garnelo at (525) 864-0500 or hvargas@difa.com.mx.

8.4.9 White-Rodgers Division of Emerson Electric switches to water-based degreasing

The White-Rogers Division facility, located in Batesville, Arkansas, is one of several manufacturing plants within this division of Emerson Electric. It employs 1,000 people and operates continuously, producing electronic natural gas valves for residential furnaces and hot water heaters. Aluminum is cast, machined, cleaned, and assembled into valves. A series of chlorinated solvents (previously 1,1,1-trichloroethane and freon, most recently TCE) have been used in vapor degreasing equipment to remove machining lubricants prior to assembly.

The 1998 data capture the initial phases of a changeover from vapor degreasing to aqueous degreasing that began to affect TRI reports in 1995 and was completed in 1998. A subsequent phase of this program, not reflected in these data, addresses spent washwater from degreasing operations.

The facility decided to convert to water-based degreasing methods to avoid the adverse environmental impacts of chlorinated solvents (both air emissions and hazardous waste generation). The first of five water washers was put in service in 1995. All water washers were operational in 1998. This eliminated annual consumption of 144,000 kg of TCE, as well as the releases of this hazardous air pollutant and generation of solvent-contaminated hazardous waste. This conversion involved a capital cost of US$1.2 million. It is expected that the facility will report no TCE releases to TRI in 2000.

After approximately one week of operation, the water in the degreasing units becomes sufficiently contaminated with machining oils and metal shavings that it must be replaced. Originally, the facility used an on-site wastewater treatment plant to adjust the pH of the wastewater, followed by discharge to the sewer system. Plant operations generated 6.8 million liters of wastewater per year, contaminated with 1,000 mg/l of machining oils. In late 1998, as the final aqueous degreasing unit was being installed, the facility began a research program for recycling the wastewater. While not affecting TCE emissions, this would decrease the overall environmental burden associated with parts degreasing.

A reverse osmosis (ultrafiltration) system was ultimately selected, because it captured both water and reusable detergent. Construction of the system, with a dedicated building, will cost US$700,000 and was expected to be online by late 2000. It is anticipated that this system will decrease the volume of wastewater (and use of potable water) by 90 percent, and the concentration of oil in the remaining wastewater by 95 percent. The system also reduces the energy consumption needed to heat water for the degreasers.

This facility reported one pollution prevention activity for TCE in 1998: change to aqueous cleaners (from solvents or other materials).

For more information, contact Mark Carroll at (870) 793-1892.

8.4.10 Arcade Marketing, Inc. improves handling of solvents

The Arcade Marketing, Inc. facility, in Chattanooga, Tennessee, employs approximately 350 people and specializes in the production of fragrance samples, such as are bound into publications. Using technology that the firm developed and patented to ensure that the fragrance is released only when the sample packet is opened by the consumer, the firm has come to have complete dominance in this niche market.

The fragrance samples are contained within printed inserts for the publications. Trichloroethylene is used as part of the process of lithographic printing of these sample containers, where it is used in blanket washing and to clean metering rollers. Previously, products containing dichloromethane (also a TRI chemical and carcinogen) had been used for these purposes; suppliers had switched to TCE when the regulatory standards affecting dichloromethane became more stringent.

The reduction in TCE releases was a result of a change in materials handling at the facility. In this initiative, proper labeling of all materials was maintained, and staff members were instructed on the proper uses of various solvent materials. Previously, staff had come to use different solvent materials interchangeably for miscellaneous purposes, without adequate attention to distinctions in the proper handling of different materials.

The program reflects the interaction of historical conditions, regulatory imperatives, new staff, and technical support from local government. The urban area around Chattanooga, where the facility is located, had experienced significant air pollution problems, such that it was a non-attainment area for VOCs under the Clean Air Act. In response to this situation, the county government had created an Air Bureau, both to enforce local standards on emissions, and to work with industry in meeting those

standards. In consequence, the Chattanooga area was able to attain compliance with the Clean Air Act within eight years.

When new technical staff were brought into the facility, a number of the materials in use were presenting difficulties for compliance with the facility's air emission permits. For example, the use of acetone in letterpress operations was causing compliance issues. The new staff insisted on addressing all pollution and compliance issues facility-wide. A consultant was employed to review facility operations, and the active involvement of both the state government and county Air Bureau were sought. With the technical support of the consultant and local officials, new staff were able to institute a comprehensive manifesting system addressing use of solvents within the facility.

This facility reported two pollution prevention activities for TCE in 1998: instituted better labeling procedures and other cleaning and degreasing modifications.

For more information, contact Ray Mitchell at (423) 624-3301.

8.4.11 Customers drive chemical switch at Jesco Resources, Inc.

Jesco Resources Inc., in North Kansas City, Missouri, is an independent lubricant manufacturing company, specializing in the production of manufacturing greases and gear oils. The facility employs approximately 20 people. Trichloroethylene was used as a formulation component in one of Jesco's finished products.

The reduction in TCE emissions and waste reflects the replacement of this product with another not containing TCE (product reformulation). Data from 1995–1998 reflect a process of replacement begun in 1990. The TCE-containing product was phased out between 1995 and 1999, with no actual or anticipated TCE use in 2000.

The program began with the listing of TCE as a Hazardous Air Pollutant under the 1990 Clean Air Act Amendments. Jesco's efforts to eliminate TCE from its product reflect customer requests for the replacement. The key issue was to maintain product performance, while eliminating TCE. Because of customer demand for the replacement product, Jesco was able to make the substitution without incurring costs. (Federal and state regulations driving this change did hinder product sales for the original product.) No substantial change in plant operations occurred during the changeover.

In addition to this specific program, Jesco tracks all materials use and loss. The hazardous waste is profiled, and operations that generate such waste are identified under the responsibility of the general manager for operations. No technical assistance has been obtained. The facility's ultimate goal is the complete elimination of hazardous waste.

This facility reported two pollution prevention activities for TCE in 1998: substitution of raw materials and other changes in operating practices.

For more information, contact Ross Longwell at (816) 471-4590.

8.4.12 Mexican Center for Cleaner Production assists *Nicro, S.A. de C.V.* with environmental improvements

Nicro, S.A de C.V. is an electroplating company with 170 employees located in Mexico City. It operates various production lines, including copper-nickel-chromium processes.

During 1996, the company participated in a demonstration project with the Mexican Center for Cleaner Production. Created in 1995, the Mexican Center for Cleaner Production has developed and published guidelines for cleaner production for several industrial sectors, including electroplating, chemical manufacturing and metal plating.

Nicro's main environmental pollution problems were the use of the polishing paste perchlorethylene, the loss of process solutions from one bath to the other and low energy efficiency. As a result of the first evaluations done by the experts of the Mexican Center for Cleaner Production during 1997–1998, the polishing paste was replaced with a water soluble paste and the operations in the copper-nickel-chromium production line were improved by introducing a blower agitator in the rinsing baths and returning the rinse water from the first bath back to the process tank.

The company was assisted by the Mexican Center for Cleaner Production during the project development and implementation. An investment of approximately US$8,000 in the plating process accomplished a 90 percent recovery of losses from the nickel and chromium baths and a reduction in raw materials use and water treatment requirements. The project payback was less than half a year.

The company has now developed a plan for water-saving and energy-saving measures. Technological modernization will also reduce air emissions, wastewater discharges and hazardous waste.

Nicro considers that the RETC has helped in identifying opportunities for pollution prevention, even though they did not report under Section V of the COA format during 1998.

For more information, contact Ing. Pablo Pages López at 5-3611188 Ext. 29 or 5-3977213 or <nicro@infosel.net.mx>.

Also contact the Mexican Center for Cleaner Production at <www.cmpl.ipn.mx>.

8.4.13 Chromium Corporation/Cybershield reduces nickel emissions from plating process

Chromium Corporation, located in Lufkin, Texas, split into two companies in 1998: Cybershield and Chromium Corporation. Cybershield used nickel as a finish plating on telecommunications equipment. In 1998 they installed a countercurrent flow system in rinse tanks to increase efficiency in water usage and plating

Chromium Corporation had, and Cybershield continues to have, an official, written pollution prevention policy as part of their overall environmental management plan. This includes a five-year source reduction/waste minimization plan, environmental and human health risk considerations, individual project development, and future reduction goals. The corporate environmental manager, who supervises pollution prevention and

waste management at the facility, states that pollution prevention is a top priority of their environmental management plan.

Cybershield has also installed equipment costing US$1.5 million that reduced volatile organic compounds emissions from a painting process by over 95 percent. They have also installed wet scrubbers in an electrodeless plating process that have reduced air emissions of copper, nickel, formaldehyde and ammonia by 50 percent. At Chromium Corporation, there are plans to implement a chromic acid recovery and purification system to achieve zero discharge for chromium. Future plans include a nitric acid recovery system, chemical precipitation treatment systems for copper and nickel recovery, and a plan to reduce hazardous waste generation more than 90 percent by the year 2001.

This facility reported three pollution prevention activities for TCE in 1998: institution of recirculation within a process, other process modifications, and other changes in operating practices.

For more information, contact Ty Thornton at (936) 633-6395.

8.4.14 Drive to reduce emissions at *Ejes Tractivos, S.A. de C.V.*

Ejes Tractivos in the state of Mexico employs approximately 900 people in the manufacture of automotive parts using cutting, machining, welding, assembling and painting.

The company is already certified under a quality system and has started to implement the ISO 14001 system. A further plan is to obtain a Mexican National Clean Industry Certificate by the year 2002. The main problem was generation of air pollution, wastewater and hazardous waste.

The wastewater discharges were reduced to zero by the installation of a wastewater treatment plant, which includes UV treatment. This water can be reused now in certain processes and for services. *Ejes Tractivos* is considering the installation of a reverse osmosis wastewater treatment system to produce a higher-quality water for reuse in certain production processes.

While the company was below the established Mexican emission standards, they still decided to install internal control equipment to further reduce emissions to the environment.

Nonhazardous waste had been separated from hazardous waste and is reused or recycled. Cartons and paper are recycled for worker notebooks, sludge is generally sent to a landfill and used oil is incinerated. Only paint slugs and wastewater sludge are sent to a hazardous waste landfill.

The investments cost approximately US$600,000. The economic and environmental benefits were not quantified. The company considers that the RETC could provide valuable information on pollution prevention opportunities; however, they did not report any information under Section V of the COA for 1998.

For more information, contact Ing. Rodolfo Valencia Pedraza at (525) 726-8000.

Appendix A – A Comparison of Chemicals Listed under 1998 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-Dinitrophénol	2,4-Dinitrofenol	X		
51-75-2	Nitrogen mustard	Moutarde azotée	Mostaza de nitrógeno	X		
51-79-6	Urethane	Uréthane	Uretano	X		
52-68-6	Trichlorfon	Trichlorfon	Triclorfón	X		
52-85-7	Famphur	Famphur	Famfur	X		
53-96-3	2-Acetylaminofluorene	2-Acétylaminofluorène	2-Acetilaminofluoreno	X		
55-18-5	N-Nitrosodiethylamine	N-Nitrosodiéthylamine	N-Nitrosodietilamina	X		
55-21-0	Benzamide	Benzamide	Benzamida	X		
55-38-9	Fenthion	Fenthion	Fentión	X		
55-63-0	Nitroglycerin	Nitroglycérine	Nitroglicerina	X	X	
56-23-5	Carbon tetrachloride	Tétrachlorure de carbone	Tetracloruro de carbono	X	X	X
56-35-9	Bis(tributyltin) oxide	Oxyde de bis(tributylétain)	Óxido de tributilestaño	X		
56-38-2	Parathion	Parathion	Paratión	X		
57-14-7	1,1-Dimethylhydrazine	1,1-Diméthylhydrazine	1,1-Dimetilhidracina	X		
57-33-0	Pentobarbital sodium	Pentobarbital sodique	Pentobarbital sódico	X		
57-41-0	Phenytoin	Phénytoine	Fenitoina	X		
57-57-8	beta-Propiolactone	bêta-Propiolactone	beta-Propiolactona	X		
57-74-9	Chlordane	Chlordane	Clordano	X		X
58-89-9	Lindane	Lindane	Lindano	X		X
58-90-2	2,3,4,6-Tetrachlorophenol	2,3,4,6-Tétrachlorophénol	2,3,4,6-Tetraclorofenol			X
59-89-2	N-Nitrosomorpholine	n-Nitrosomorpholine	N-Nitrosomorfolina	X		
60-09-3	4-Aminoazobenzene	4-Aminoazobenzène	4-Aminoazobenceno	X		
60-11-7	4-Dimethylaminoazobenzene	4-Diméthylaminoazobenzène	4-Dimetilaminoazobenceno	X		
60-34-4	Methylhydrazine	Méthylhydrazine	Metilhidracina	X		
60-35-5	Acetamide	Acétamide	Acetamida	X		
60-51-5	Dimethoate	Diméthoate	Dimetoato	X		
60-57-1	Dieldrin	Dieldrine	Dieldrín			X
61-82-5	Amitrole	Amitrole	Amitrol	X		
62-53-3	Aniline	Aniline	Anilina	X	X	X
62-55-5	Thioacetamide	Thioacétamide	Tioacetamida	X		
62-56-6	Thiourea	Thio-urée	Tiourea	X	X	
62-73-7	Dichlorvos	Dichlorvos	Diclorvos	X		
62-74-8	Sodium fluoroacetate	Fluoroacétate de sodium	Fluoroacetato de sodio	X		
62-75-9	N-Nitrosodimethylamine	N-Nitrosodiméthylamine	N-Nitrosodimetilamina	X		X
63-25-2	Carbaryl	Carbaryl	Carbaril	X		
64-18-6	Formic acid	Acide formique	Ácido fórmico	X		
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		
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 1998 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	Hexacloroetano	X	X	X
68-12-2	N,N-Dimethylformamide	N,N-Diméthyl formamide	N.N-Dimetilformamida	X		
68-76-8	Triaziquone	Triaziquone	Triaziquone	X		
70-30-4	Hexachlorophene	Hexachlorophène	Hexaclorofeno	X		
71-36-3	n-Butyl alcohol	Butan-1-ol	Alcohol n-butílico	X	X	
71-43-2	Benzene	Benzène	Benceno	X	X	X
71-55-6	1,1,1-Trichloroethane	1,1,1-Trichloroéthane	1,1,1-Tricloroetano	X		X
72-20-8	Endrin	Endrine	Endrín			X
72-43-5	Methoxychlor	Méthoxychlore	Metoxicloro	X		X
72-57-1	Trypan blue	Bleu trypan	Azultripán	X		
74-82-8	Methane	Méthane	Metano			X
74-83-9	Bromomethane	Bromométhane	Bromometano	X	X	X
74-85-1	Ethylene	Éthylène	Etileno	X	X	
74-87-3	Chloromethane	Chlorométhane	Clorometano	X	X	X
74-88-4	Methyl iodide	Iodométhane	Yoduro de metilo	X	X	
74-90-8	Hydrogen cyanide	Cyanure d'hydrogène	Ácido cianhídrico	X	X	
74-95-3	Methylene bromide	Bromure de méthyle	Bromuro de metilo	X		
75-00-3	Chloroethane	Chloroéthane	Cloroetano	X	X	
75-01-4	Vinyl chloride	Chlorure de vinyle	Cloruro de vinilo	X	X	X
75-05-8	Acetonitrile	Acétonitrile	Acetonitrilo	X	X	
75-07-0	Acetaldehyde	Acétaldéhyde	Acetaldehído	X	X	X
75-09-2	Dichloromethane	Dichlorométhane	Diclorometano	X	X	X
75-15-0	Carbon disulfide	Disulfure de carbone	Disulfuro de carbono	X	X	
75-21-8	Ethylene oxide	Oxyde d'éthylène	Óxido de etileno	X	X	
75-25-2	Bromoform	Bromoforme	Bromoformo	X		X
75-27-4	Dichlorobromomethane	Dichlorobromométhane	Diclorobromometano	X		
75-34-3	1,1-Dichloroéthane	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
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
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
75-69-4	Trichlorofluoromethane (CFC-11)	Trichlorofluorométhane (CFC-11)	Triclorofluorometano (CFC-11)	X		X
75-71-8	Dichlorodifluoromethane (CFC-12)	Dichlorodifluorométhane (CFC-12)	Diclorodifluorometano (CFC-12)	X		X
75-72-9	Chlorotrifluoromethane (CFC-13)	Chlorotrifluorométhane (CFC-13)	Clorotrifluorometano (CFC-13)	X		X
75-86-5	2-Methyllactonitrile	Acétonecyanhydrine	2-Metillactonitrilo	X		
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	Chloro-1,1,1-trifluoroéthane (HCFC-133a)	2-Cloro-1,1,1-trifluoroetano (HCFC-133a)	X		
76-01-7	Pentachloroethane	Pentachloroéthane	Pentacloroetano	X		
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 1998 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
76-15-3	Monochloropentafluoroethane (CFC-115)	Chloropentafluoroéthane (CFC-115)	Cloropentafluoroetano (CFC-115)	X		X
76-44-8	Heptachlor	Heptachlore	Heptacloro	X		X
76-87-9	Triphenyltin hydroxide	Hydroxyde de triphénylétain	Hidróxido de trifenilestaño	X		
77-47-4	Hexachlorocyclopentadiene	Hexachlorocyclopentadiène	Hexaclorciclopentadieno	X	X	X
77-73-6	Dicyclopentadiene	Dicyclopentadiène	Dicloropentadieno	X		
77-78-1	Dimethyl sulfate	Sulfate de diméthyle	Sulfato de dimetilo	X	X	
78-48-8	S,S,S-Tributyltrithiophosphate	Trithiophosphate de S,S,S-tributyle	S,S,S-Tributiltritiofosfato	X		
78-84-2	Isobutyraldehyde	Isobutyraldéhyde	Isobutiraldehído	X	X	
78-83-1	i-Butyl alcohol	2-Méthylpropan-1-ol	Alcohol i-butílico		X	
78-87-5	1,2-Dichloropropane	1,2-Dichloropropane	1,2-Dicloropropano	X	X	
78-88-6	2,3-Dichloropropene	2,3-Dichloropropène	2,3-Dicloropropeno	X		
78-92-2	sec-Butyl alcohol	Butan-2-ol	Alcohol sec-butílico	X	X	
78-93-3	Methyl ethyl ketone	Méthyléthylcétone	Metil etil cetona	X	X	
79-00-5	1,1,2-Trichloroethane	1,1,2-Trichloroéthane	1,1,2-Tricloroetano	X	X	X
79-01-6	Trichloroethylene	Trichloroéthylène	Tricloroetileno	X	X	X
79-06-1	Acrylamide	Acrylamide	Acrilamida	X	X	X
79-10-7	Acrylic acid	Acide acrylique	Ácido acrílico	X	X	
79-11-8	Chloroacetic acid	Acide chloroacétique	Ácido cloroacético	X	X	
79-19-6	Thiosemicarbazide	Thiosemicarbazide	Tiosemicarbacida	X		
79-21-0	Peracetic acid	Acide peracétique	Ácido peracético	X	X	
79-22-1	Methyl chlorocarbonate	Chlorocarbonate de méthyle	Clorocarbonato de metilo	X		
79-34-5	1,1,2,2-Tetrachloroethane	1,1,2,2-Tétrachloroéthane	1,1,2,2-Tetracloroetano	X	X	X
79-44-7	Dimethylcarbamyl chloride	Chlorure de diméthylcarbamyle	Cloruro de dimetilcarbamil	X		
79-46-9	2-Nitropropane	2-Nitropropane	2-Nitropropano	X	X	X
80-05-7	4,4'-Isopropylidenediphenol	p,p'-Isopropylidènediphénol	4,4'-Isopropilidenodifenol	X	X	
80-15-9	Cumene hydroperoxide	Hydroperoxyde de cumène	Cumeno hidroperóxido	X	X	
80-62-6	Methyl methacrylate	Méthacrylate de méthyle	Metacrilato de metilo	X	X	
81-07-2	Saccharin	Saccharine	Sacarina	X		
81-88-9	C.I. Food Red 15	Indice de couleur Rouge alimentaire 15	Rojo 15 alimenticio	X	X	
82-28-0	1-Amino-2-methylanthraquinone	1-Amino-2-méthylanthraquinone	1-Amino-2-metilantraquinona	X		
82-68-8	Quintozene	Quintozène	Quintoceno	X		
84-66-2	Diethyl phthalate	Phtalate de diéthyle	Dietil ftalato		X	
84-74-2	Dibutyl phthalate	Phtalate de dibutyle	Dibutil ftalato	X	X	X
85-01-8	Phenanthrene	Phénanthrène	Fenantreno	X		
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
88-75-5	2-Nitrophenol	2-Nitrophénol	2-Nitrofenol	X		
88-85-7	Dinitrobutyl phenol	Dinosébé	Dinitrobutilfenol	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
88-89-1	Picric acid	Acide picrique	Ácido pícrico	X		
90-04-0	o-Anisidine	o-Anisidine	o-Anisidina	X		
90-43-7	2-Phenylphenol	o-Phénylphénol	2-Fenilfenol	X	X	
90-94-8	Michler's ketone	Cétone de Michler	Cetona Michler	X	X	
91-08-7	Toluene-2,6-diisocyanate	Toluène-2,6-diisocyanate	Toluen-2,6-diisocianato	X	X	
91-20-3	Naphthalene	Naphtalène	Naftaleno	X	X	
91-22-5	Quinoline	Quinoléine	Quinoleína	X	X	
91-59-8	beta-Naphthylamine	bêta-Naphtylamine	beta-Naftilamina	X		X
91-94-1	3,3'-Dichlorobenzidine	3,3'-Dichlorobenzidine	3,3'-Diclorobencidina	X		
92-52-4	Biphenyl	Biphényle	Bifenilo	X	X	X
92-67-1	4-Aminobiphenyl	4-Aminobiphényle	4-Aminobifenilo	X		X
92-87-5	Benzidine	Benzidine	Bencidina	X		X
92-93-3	4-Nitrobiphenyl	4-Nitrobiphényle	4-Nitrobifenilo	X		X
93-65-2	Mecoprop	Mécoprop	Mecoprop	X		
94-11-1	2,4-D Isopropyl ester	2,4-Dichlorophénoxyacétate d'isopropyle	2,4-D isopropilester	X		
94-36-0	Benzoyl peroxide	Peroxyde de benzoyle	Peróxido de benzoilo	X	X	
94-58-6	Dihydrosafrole	Dihydrosafrole	Dihidrosafrol	X		
94-59-7	Safrole	Safrole	Safrol	X	X	
94-74-6	Methoxone	Méthoxone	Metoxona	X		
94-75-7	2,4-D (Acetic acid)	Acide dichloro-2,4-phénoxyacétique	Ácido 2,4-diclorofenoxiacético	X		X
94-80-4	2,4-D Butyl ester	2,4-Dichlorophénoxyacétate de butyle	2,4-D butilester	X		
94-82-6	2,4-DB	Acide 4-(2,4-dichlorophénoxy)butyrique	2,4-DB	X		
95-47-6	o-Xylene	o-Xylène	o-Xileno	X	X	
95-48-7	o-Cresol	o-Crésol	o-Cresol	X	X	
95-50-1	1,2-Dichlorobenzene	o-Dichlorobenzène	1,2-Diclorobenceno	X	X	X
95-53-4	o-Toluidine	o-Toluidine	o-Toluidina	X		
95-54-5	1,2-Phenylenediamine	o-Phénylènediamine	1,2-Fenilendiamina	X		
95-63-6	1,2,4-Trimethylbenzene	1,2,4-Triméthylbenzène	1,2,4-Trimetilbenceno	X	X	
95-69-2	p-Chloro-o-toluidine	4-Chloro-o-toluidine	p-Cloro-o-toluidina	X		
95-80-7	2,4-Diaminotoluene	2,4-Diaminotoluène	2,4-Diaminotolueno	X	X	
95-95-4	2,4,5-Trichlorophenol	Trichloro-2,4,5-phénol	2,4,5-Triclorofenol	X		X
96-09-3	Styrene oxide	Oxyde de styrène	Óxido de estireno	X	X	
96-12-8	1,2-Dibromo-3-chloropropane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-3-cloropropano	X		
96-18-4	1,2,3-Trichloropropane	1,2,3-Trichloropropane	1,2,3-Tricloropropano	X		
96-33-3	Methyl acrylate	Acrylate de méthyle	Acrilato de metilo	X	X	
96-45-7	Ethylene thiourea	Imidazolidine-2-thione	Etilén tiourea	X	X	
97-23-4	Dichlorophene	Dichlorophène	Diclorofeno	X		
97-56-3	C.I. Solvent Yellow 3	Indice de couleur Jaune de solvant 3	Solvente de amarillo 3	X		
98-07-7	Benzoic trichloride	Trichlorure de benzylidyne	Benzotricloruro	X		
98-82-8	Cumene	Cumène	Cumeno	X	X	
98-86-2	Acetophenone	Acétophénone	Acetofenona	X		
98-87-3	Benzal chloride	Chlorure de benzale	Cloruro de benzal	X		
98-88-4	Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo	X	X	
98-95-3	Nitrobenzene	Nitrobenzène	Nitrobenceno	X	X	
99-30-9	Dichloran	Chlorure de dichlorobenzalkonium	Cloruro de diclorobenzalconio	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
99-55-8	5-Nitro-o-toluidine	5-Nitro-o-toluidine	5-Nitro-o-toluidina	X		
99-59-2	5-Nitro-o-anisidine	5-Nitro-o-anisidine	5-Nitro-o-anisidina	X		
99-65-0	m-Dinitrobenzene	m-Dinitrobenzène	m-Dinitrobenceno	X		
100-01-6	p-Nitroaniline	p-Nitroaniline	p-Nitroanilina	X		
100-02-7	4-Nitrophenol	p-Nitrophénol	4-Nitrofenol	X	X	
100-25-4	p-Dinitrobenzene	p-Dinitrobenzène	p-Dinitrobenceno	X		
100-41-4	Ethylbenzene	Éthylbenzène	Etilbenceno	X	X	
100-42-5	Styrene	Styrène	Estireno	X	X	X
100-44-7	Benzyl chloride	Chlorure de benzyle	Cloruro de bencilo	X	X	
100-75-4	N-Nitrosopiperidine	N-Nitrosopipéridine	N-Nitrosopiperidina	X		
101-05-3	Anilazine	Anilazine	Anilacina	X		
101-14-4	4,4'-Methylenebis(2-chloroaniline)	p,p'-Méthylènebis(2-chloroaniline)	4,4'-Metilenobis(2-cloroanilina)	X	X	
101-61-1	4,4'-Methylenebis(N,N-dimethyl)benzeneamine	4,4'-Méthylènebis(N,N-diméthyl)benzèneamine	4,4'-Metilenobis(N,N-dimetil)bencenamina	X		
101-68-8	Methylenebis(phenylisocyanate)	Méthylènebis(phénylisocyanate)	Metilenobis(fenilisocianato)		X	
101-77-9	4,4'-Methylenedianiline	p,p'-Méthylènedianiline	4,4'-Metilenodianilina	X	X	
101-80-4	4,4'-Diaminodiphenyl ether	Éther 4,4'-diaminodiphényle	Éter 4,4'-diaminodifenílico	X		
101-90-6	Diglycidyl resorcinol ether	Éther de résorcinol et de diglycydile	Diglicidil resorcinol éter	X		
103-23-1	Bis(2-ethylhexyl) adipate	Adipate de bis(2-éthylhexyle)	Bis(2-etilhexil) adipato		X	
104-12-1	p-Chlorophenyl isocyanate	Isocyanate de 4-chlorophényle	p-Clorofenil isocianato	X		
104-94-9	p-Anisidine	p-Anisidine	p-Anisidina	X		
105-67-9	2,4-Dimethylphenol	2,4-Diméthylphénol	2,4-Dimetilfenol	X		
106-42-3	p-Xylene	p-Xylène	p-Xileno	X	X	
106-44-5	p-Cresol	p-Crésol	p-Cresol	X	X	
106-46-7	1,4-Dichlorobenzene	p-Dichlorobenzène	1,4-Diclorobenceno	X	X	X
106-47-8	p-Chloroaniline	p-Chloroaniline	p-Cloroanilina	X		
106-50-3	p-Phenylenediamine	p-Phénylènediamine	p-Fenilenodiamina	X	X	
106-51-4	Quinone	p-Quinone	Quinona	X	X	
106-88-7	1,2-Butylene oxide	1,2-Époxybutane	Óxido de 1,2-butileno	X	X	
106-89-8	Epichlorohydrin	Épichlorohydrine	Epiclorohidrina	X	X	X
106-93-4	1,2-Dibromoethane	1,2-Dibromoéthane	1,2-Dibromoetano	X		
106-99-0	1,3-Butadiene	Buta-1,3-diène	1,3-Butadieno	X	X	X
107-02-8	Acrolein	Acroléine	Acroleína	X		X
107-05-1	Allyl chloride	Chlorure d'allyle	Cloruro de alilo	X	X	
107-06-2	1,2-Dichloroethane	1,2-Dichloroéthane	1,2-Dicloroetano	X	X	X
107-11-9	Allylamine	Allylamine	Alil amina	X		
107-13-1	Acrylonitrile	Acrylonitrile	Acrilonitrilo	X	X	X
107-18-6	Allyl alcohol	Alcool allylique	Alcohol alílico	X	X	
107-19-7	Propargyl alcohol	Alcool propargylique	Alcohol propargílico	X		
107-21-1	Ethylene glycol	Éthylèneglycol	Etilén glicol	X	X	
107-30-2	Chloromethyl methyl ether	Éther de méthyle et de chlorométhyle	Éter clorometil metílico	X		
108-05-4	Vinyl acetate	Acétate de vinyle	Acetato de vinilo	X	X	
108-10-1	Methyl isobutyl ketone	Méthylisobutylcétone	Metil isobutil cetona	X	X	
108-31-6	Maleic anhydride	Anhydride maléique	Anhídrido maleico	X	X	
108-38-3	m-Xylene	m-Xylène	m-Xileno	X	X	
108-39-4	m-Cresol	m-Crésol	m-Cresol	X	X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
108-45-2	1,3-Phenylenediamine	m-Phénylènediamine	1,3-Fenilendiamina	X		
108-60-1	Bis(2-chloro-1-methylethyl) ether	Éther di(2-chloro-1-méthyléthyle)	Éter bis(2-cloro-1-metil etil)	X		
108-88-3	Toluene	Toluène	Tolueno	X	X	
108-90-7	Chlorobenzene	Chlorobenzène	Clorobenceno	X	X	X
108-93-0	Cyclohexanol	Cyclohexanol	Ciclohexanol	X		
108-95-2	Phenol	Phénol	Fenol	X	X	X
109-06-8	2-Methylpyridine	2-Méthylpyridine	2-Metilpiridina	X		
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		
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		
111-91-1	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		
115-29-7	Endosulfan	Endosulfan	Endosulfán			X
115-32-2	Dicofol	Dicofol	Dicofol	X		
116-06-3	Aldicarb	Aldicarbe	Aldicarb	X		
117-79-3	2-Aminoanthraquinone	2-Aminoanthraquinone	2-Aminoantraquinona	X		
117-81-7	Di(2-ethylhexyl) phthalate	Phtalate de bis(2-éthylhexyle)	Di(2-etilhexil) ftalato	X	X	
117-84-0	Di-n-octyl phthalate	Phtalate de di-n-octyle	Di-n-octil ftalato		X	
118-74-1	Hexachlorobenzene	Hexachlorobenzène	Hexaclorobenceno	X		X
119-90-4	3,3'-Dimethoxybenzidine	3,3'-Diméthoxybenzidine	3,3'-Dimetoxibencidina	X		
119-93-7	3,3'-Dimethylbenzidine	3,3'-Diméthylbenzidine	3,3'-Dimetilbencidina	X		
120-12-7	Anthracene	Anthracène	Antraceno	X	X	
120-36-5	2,4-DP	Dichlorprop	2,4-DP	X		
120-58-1	Isosafrole	Isosafrole	Isosafrol	X	X	
120-71-8	p-Cresidine	p-Crésidine	p-Cresidina	X		
120-80-9	Catechol	Catéchol	Catecol	X	X	
120-82-1	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzène	1,2,4-Triclorobenceno	X	X	X
120-83-2	2,4-Dichlorophenol	2,4-Dichlorophénol	2,4-Diclorofenol	X	X	
121-14-2	2,4-Dinitrotoluene	2,4-Dinitrotoluène	2,4-Dinitrotolueno	X	X	X
121-44-8	Triethylamine	Triéthylamine	Trietilamina	X		
121-69-7	N,N-Dimethylaniline	N,N-Diméthylaniline	N,N-Dimetilanilina	X	X	
121-75-5	Malathion	Malathion	Malatión	X		
122-34-9	Simazine	Simazine	Simacina	X		
122-39-4	Diphenylamine	Dianiline	Difenilamina	X		
122-66-7	1,2-Diphenylhydrazine	1,2-Diphénylhydrazine	1,2-Difenilhidracina	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
123-31-9	Hydroquinone	Hydroquinone	Hidroquinona	X	X	
123-38-6	Propionaldehyde	Propionaldéhyde	Propionaldehído	X	X	
123-63-7	Paraldehyde	Paraldéhyde	Paraldehído	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		
124-73-2	Dibromotetrafluoroethane (halon 2402)	Dibromotétrafluoroéthane (halon 2402)	Dibromotetrafluoroetano (halon 2402)	X		
126-72-7	Tris(2,3-dibromopropyl) phosphate	Phosphate de tris(2,3-dibromopropyle)	Tris(2,3-dibromopropil) fosfato	X		
126-98-7	Methacrylonitrile	Méthacrylonitrile	Metacrilonitrilo	X		
126-99-8	Chloroprene	Chloroprène	Cloropreno	X		
127-18-4	Tetrachloroethylene	Tétrachloroéthylène	Tetracloroetileno	X	X	
128-03-0	Potassium dimethyldithiocarbamate	Diméthyldithiocarbamate de potassium	Dimetilditiocarbamato de potasio	X		
128-04-1	Sodium dimethyldithiocarbamate	Diméthyldithiocarbamate de sodium	Dimetilditiocarbamato de sodio	X		
128-66-5	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 hidrocloruro	X		
134-32-7	alpha-Naphthylamine	alpha-Naphtylamine	alfa-Naftilamina	X		
135-20-6	Cupferron	Cupferron	Cupferron	X		
136-45-8	Dipropyl isocinchomeronate	Pyridine-2,5-dicarboxylate de dipropyle	Dipropilisocincomeronato	X		
137-26-8	Thiram	Thirame	Tiram	X		
137-41-7	Potassium N-methyldithiocarbamate	Méthyldithiocarbamate de potassium	N-metilditiocarbamato de potasio	X		
137-42-8	Metham sodium	Métam-sodium	N-Metilditiocarbamato de sodio	X		
138-93-2	Disodium cyanodithioimidocarbonate	Cyanodithiocarbamate de disodium	Cianoditiocarbamato de disodio	X		
139-13-9	Nitrilotriacetic acid	Acide nitrilotriacétique	Ácido nitrilotriacético	X	X	
139-65-1	4,4'-Thiodianiline	4,4'-Thiodianiline	4,4'-Tiodianilina	X		
140-88-5	Ethyl acrylate	Acrylate d'éthyle	Acrilato de etilo	X	X	
141-32-2	Butyl acrylate	Acrylate de butyle	Acrilato de butilo	X	X	
142-59-6	Nabam	Nabame	Nabam	X		
148-79-8	Thiabendazole	Thiabendazole	Tiabendazol	X		
149-30-4	2-Mercaptobenzothiazole	Benzothiazole-2-thiol	2-Mercaptobenzotiazol	X		
150-50-5	Merphos	Trithiophosphate de tributyle	Merfos	X		
150-68-5	Monuron	Monuron	3-(4-cloro fenil)–1,1-dimetilurea	X		
151-56-4	Ethyleneimine	Éthylène imine	Etilenimina	X		
156-10-5	p-Nitrosodiphenylamine	p-Nitrosodiphénylamine	p-Nitrosodifeniamina	X		
156-62-7	Calcium cyanamide	Cyanamide calcique	Cianamida de calcio	X	X	
298-00-0	Methyl parathion	Parathion-méthyl	Metilparatión	X		X
300-76-5	Naled	Naled	Naled	X		
301-12-2	Oxydemeton methyl	Oxydéméton-méthyl	Metiloximetón	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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
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-Dinitrobenceno	X		
532-27-4	2-Chloroacetophenone	2-Chloroacétophénone	2-Cloroacetofenona	X		
533-74-4	Dazomet	Dazomet	Dazomet	X		
534-52-1	4,6-Dinitro-o-cresol	4,6-Dinitro-o-crésol	4,6-Dinitro-o-cresol	X	X	X
540-59-0	1,2-Dichloroethylene	1,2-Dichloroéthylène	1,2-Dicloroetileno	X		
541-41-3	Ethyl chloroformate	Chloroformiate d'éthyle	Cloroformiato de etilo	X	X	
541-53-7	2,4-Dithiobiuret	2,4-Dithiobiuret	2,4-Ditiobiuret	X		
541-73-1	1,3-Dichlorobenzene	1,3-Dichlorobenzène	1,3-Diclorobenceno	X		
542-75-6	1,3-Dichloropropylene	1,3-Dichloropropylène	1,3-Dicloropropileno	X		
542-76-7	3-Chloropropionitrile	3-Chloropropionitrile	3-Cloropropionitrilo	X		
542-88-1	Bis(chloromethyl) ether	Éther di(chlorométhylique)	Bis(clorometil) éter	X		X
554-13-2	Lithium carbonate	Carbonate de lithium	Carbonato de litio	X		
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		
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	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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		
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		
636-21-5	o-Toluidine hydrochloride	Chlorydrate de o-toluidine	o-Toluidina hidrocloruro	X		
639-58-7	Triphenyltin chloride	Chlorure de triphénylétain	Cloruro de trifenilestaño	X		
680-31-9	Hexamethylphosphoramide	Hexaméthylphosphoramide	Hexametilfosforamida	X		
684-93-5	N-Nitroso-N-methylurea	N-Nitroso-N-méthylurée	N-Nitroso-N-metilurea	X		
709-98-8	Propanil	Propanil	Propanilo	X		
759-73-9	N-Nitroso-N-ethylurea	N-Nitroso-N-éthylurée	N-Nitroso-N-etilurea	X		
759-94-4	Ethyl dipropylthiocarbamate	EPTC	Dipropiltiocarbamato de etilo	X		
764-41-0	1,4-Dichloro-2-butene	1,4-Dichloro-2-butène	1,4-Dicloro-2-buteno	X		
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	1,1-Dichloro-1,2,2-trifluoroéthane (HCFC-123b)	1,1,-Dicloro-1,2,2-trifluoroetano (HCFC-123b)	X		
834-12-8	Ametryn	Amétryne	Ametrín	X		
842-07-9	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvente	X	X	
872-50-4	N-Methyl-2-pyrrolidone	N-Méhyl-2-pyrrolidone	N-Metil2-pirrolidona	X		
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		
957-51-7	Diphenamid	Difénamide	Difenamida	X		
961-11-5	Tetrachlorvinphos	Tétrachlorvinphos	Tetraclorvinfos	X		
989-38-8	C.I. Basic Red 1	Indice de couleur Rouge de base 1	Rojo 1 básico	X	X	
1114-71-2	Pebulate	Pébulate	Pebulato	X		
1120-71-4	Propane sultone	Propanesultone	Propane sultone	X		
1134-23-2	Cycloate	Cycloate	Ciclolato	X		
1163-19-5	Decabromodiphenyl oxide	Oxyde de décabromodiphényle	Óxido de decabromodifenilo	X	X	
1313-27-5	Molybdenum trioxide	Trioxyde de molybdène	Trióxido de molibdeno	X	X	
1314-20-1	Thorium dioxide	Dioxyde de thorium	Dióxido de torio	X	X	
1319-77-3	Cresol (mixed isomers)	Crésol (mélange d'isomères)	Cresol (mezcla de isómeros)	X	X	
1320-18-9	2,4-D Propylene glycol butyl ether ester	(2,4-Dichlorophénoxy)acétate de 2-butoxyméthyléthyle	Ester de 2,4-D propilen glicolbutileter	X		
1330-20-7	Xylene (mixed isomers)	Xylène (mélange d'isomères)	Xileno (mezcla de isómeros)	X	X	
1332-21-4	Asbestos (friable form)	Amiante (forme friable)	Asbestos (friables)	X	X	X
1335-87-1	Hexachloronaphthalene	Hexachloronaphtalène	Hexacloronaftaleno	X		
1336-36-3	Polychlorinated biphenyls (PCBs)	Biphényles polychlorés (BPC)	Bifenilos policlorados (BPC)	X		X
1344-28-1	Aluminum oxide (fibrous forms)	Oxyde d'aluminium (formes fibreuses)	Óxido de aluminio (formas fibrosas)	X	X	
1464-53-5	Diepoxybutane	Diépoxybutane	Diepoxibutano	X		
1563-66-2	Carbofuran	Carbofuran	Carbofurano	X		
1582-09-8	Trifluralin	Trifuraline	Trifluralín	X		
1634-04-4	Methyl tert-butyl ether	Oxyde de tert-butyle et de méthyle	Éter metil terbutílico	X	X	
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1,2-Dichloro-1,1-difluoroéthane (HCFC-132b)	1,2-Dicloro-1,1-difluoroetano (HCFC-132b)	X		
1689-84-5	Bromoxynil	Bromoxynil	Bromoxinilo	X		
1689-99-2	Bromoxynil octanoate	Octanoate de 2,6-dibromo-4-cyanophényle	Bromoxinil octanoato	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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
1836-75-5	Nitrofen	Nitrofène	Nitrofén	X		
1861-40-1	Benfluralin	Benfluralin	Benfluralín	X		
1897-45-6	Chlorothalonil	Chlorothalonil	Clorotalonil	X		
1910-42-5	Paraquat dichloride	Paraquat-dichlorure	Dicloruro de Paracuat	X		
1912-24-9	Atrazine	Atrazine	Atracina	X		
1918-00-9	Dicamba	Dicamba	Dicamba	X		
1918-02-1	Picloram	Piclorame	Picloram	X		
1918-16-7	Propachlor	Propachlore	Propaclor	X		
1928-43-4	2,4-D 2-Ethylhexyl ester	2,4-Dichlorophénoxyacétate de 2-éthylhexyle	2,4-D 2-Etilexil ester	X		
1929-73-3	2,4-D Butoxyethyl ester	2,4-Dichlorophénoxyacétate de 2-butoxyéthyle	2,4-D Butoxyetilester	X		
1929-82-4	Nitrapyrin	Nitrapyrine	Nitrapirina	X		
1937-37-7	C.I. Direct Black 38	Indice de couleur Noir direct 38	Negro 38	X		
1982-69-0	Sodium dicamba	3,6-Dichloro-o-anisate de sodium	Dicamba de sodio	X		
1983-10-4	Tributyltin fluoride	Fluorure de tributylétain	Fluoruro de tributilestaño	X		
2032-65-7	Methiocarb	Méthiocarbe	Metiocarb	X		
2155-70-6	Tributyltin methacrylate	Méthacrylate de tributylétain	Metacrilato de tributilestaño	X		
2164-07-0	Dipotassium endothall	Endothal-potassium	Endotal dipotásico	X		
2164-17-2	Fluometuron	Fluométuron	Fluometurón	X		
2212-67-1	Molinate	Molinate	Molinato	X		
2234-13-1	Octochloronaphthalene	Octochloronaphtalène	Octacloronaftaleno	X		
2300-66-5	Dimethylamine dicamba	Acide 3,6-dichloro-o-anisique, composé avec diméthylamine	Dicamba dimetilamina	X		
2303-16-4	Diallate	Diallate	Diallate	X		
2303-17-5	Triallate	Triallate	Trialato	X		
2312-35-8	Propargite	Propargite	Propargita	X		
2385-85-5	Mirex	Mirex	Mirex			X
2439-01-2	Chinomethionat	Chinométionate	Quinometionato	X		
2439-10-3	Dodine	Dodine	Dodina	X		
2524-03-0	Dimethyl chlorothiophosphate	Thiophosphorochloridate de O,O-diméthyle	Clorotiofosfato de dimetilo	X		
2551-62-4	Sulfur hexachoride	Hexachlorure de soufre	Hexacloruro de azufre			X
2602-46-2	C.I. Direct Blue 6	Indice de couleur Bleu direct 6	Azul 6	X		
2655-15-4	2,3,5-Trimethylphenyl methylcarbamate	Méthylcarbamate de 2,3,5-triméthylphényle	Metilcarbamato de 2,3,5-trimetilfenilo	X		
2699-79-8	Sulfuryl fluoride	Fluorure de sulfuryle	Fluoruro de sulfurilo	X		
2702-72-9	2,4-D Sodium salt	2,4-Dichlorophénoxyacetate de sodium	Sal sódica del 2,4-D	X		
2832-40-8	C.I. Disperse Yellow 3	Indice de couleur Jaune de dispersion 3	Amarillo 3 disperso	X	X	
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	2-Chloro-1,1,1,2-tétrafluoroéthane (HCFC-124)	2-Cloro-1,1,1,2-tetrafluoroetano (HCFC-124)	X		X
2971-38-2	2,4-D Chlorocrotyl ester	(2,4-Dichlorophénoxy)acétate de 4-chlorobutén-2-yle	Ester clorocrotílico del 2,4-D	X		
3118-97-6	C.I. Solvent Orange 7	Indice de couleur Orange de solvant 7	Naranja 7 solvente	X	X	
3383-96-8	Temephos	Téméphos	Temefos	X		
3653-48-3	Methoxone, sodium salt	Acide (4-chloro-2-méthylphenoxy)acétique, sel de sodium	Sal sódica de metoxona	X		
3761-53-3	C.I. Food Red 5	Indice de couleur Rouge alimentaire 5	Rojo 5 alimenticio	X		
4080-31-3	1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	3-Chloroallylochlorure de méthénamine	Cloruro de 1-(3-Cloroalil)-3,5,7-triasa-1-azoniaadamantano	X		
4170-30-3	Crotonaldehyde	Crotonaldéhyde	Crotonaldehído	X		
4549-40-0	N-Nitrosomethylvinylamine	N-Nitrosométhylvinylamine	N-Nitrosometilvinilamina	X		
4680-78-8	C.I. Acid Green 3	Indice de couleur Vert acide 3	Verde 3 ácido	X	X	

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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		
7429-90-5	Aluminum (fume or dust)	Aluminium (fumée ou poussière)	Aluminio (humo o polvo)	X	X	
7439-92-1	Lead	Plomb	Plomo	X		
7439-96-5	Manganese	Manganèse	Manganeso	X		
7439-97-6	Mercury	Mercure	Mercurio	X		
7440-02-0	Nickel	Nickel	Níquel	X		
7440-22-4	Silver	Argent	Plata	X		
7440-28-0	Thallium	Thallium	Talio	X		
7440-36-0	Antimony	Antimoine	Antimonio	X		
7440-38-2	Arsenic	Arsenic	Arsénico	X		
7440-39-3	Barium	Baryum	Bario	X		
7440-41-7	Beryllium	Béryllium	Berilio	X		
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		
7637-07-2	Boron trifluoride	Trifluorure de bore	Trifluoruro de boro	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	Amoniaco	X	X	
7664-93-9	Sulfuric acid	Acide sulfurique	Ácido sulfúrico	X	X	
7696-12-0	Tetramethrin	Tétraméthrine	Tetrametrina	X		
7697-37-2	Nitric acid	Acide nitrique	Ácido nítrico	X	X	
7723-14-0	Phosphorus (yellow or white)	Phosphore (jaune ou blanc)	Fósforo (amarillo o blanco)	X	X	
7726-95-6	Bromine	Brome	Bromo	X		
7758-01-2	Potassium bromate	Bromate de potassium	Bromato de potasio	X		
7782-41-4	Fluorine	Fluor	Fluor	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
7786-34-7	Mevinphos	Mevinphos	Mevinfos	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		
10028-15-6	Ozone	Ozone	Ozono	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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		
13474-88-9	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1,1-Dicloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	X		
13684-56-5	Desmedipham	Desmédiphame	Desmedifam	X		
14484-64-1	Ferbam	Ferbame	Ferban	X		
15972-60-8	Alachlor	Alachlore	Alaclor	X		
16071-86-6	C.I. Direct Brown 95	Indice de couleur Brun direct 95	Café 95	X		
16543-55-8	N-Nitrosonornicotine	N-Nitrosonornicotine	N-Nitrosonornicotina	X		
17804-35-2	Benomyl	Bénomyl	Benomil	X		
19044-88-3	Oryzalin	Oryzalin	Orizalina	X		
19666-30-9	Oxydiazon	Oxydiazon	Oxidiazono	X		
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride	Dichlorure de 3,3'-diméthoxybiphényl-4,4'-ylènediammonium	Dicloruro de 3,3'-dimetoxibencidina	X		
20354-26-1	Methazole	Méthazole	Metazol	X		
20816-12-0	Osmium tetroxide	Tétroxyde d'osmium	Tetróxido de osmio	X		
20859-73-8	Aluminum phosphide	Phospure d'aluminium	Fosfuro de aluminio	X		
21087-64-9	Metribuzin	Métribuzine	Metribucina	X		
21725-46-2	Cyanazine	Cyanazine	Cianacina	X		
22781-23-3	Bendiocarb	Bendiocarbe	Bendiocarb	X		
23564-05-8	Thiophanate-methyl	Thiophanate-méthyl	Metiltiofanato	X		
23564-06-9	Thiophanate ethyl	Thiophanate	Etiltiofanato	X		
23950-58-5	Pronamide	Pronamide	Pronamida	X		
25311-71-1	Isofenphos	Isophenphos	Isofenfos	X		
25321-14-6	Dinitrotoluene (mixed isomers)	Dinitrotoluène (mélange d'isomères)	Dinitrotolueno (mezcla de isómeros)	X	X	
25321-22-6	Dichlorobenzene (mixed isomers)	Dichlorobenzène (mélange d'isomères)	Diclorobenceno (mezcla de isómeros)	X		
25376-45-8	Diaminotoluene (mixed isomers)	Diaminotoluène (mélange d'isomères)	Diaminotolueno (mezcla de isómeros)	X		
26002-80-2	Phenothrin	Phénothrine	Fenotrina	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		
27314-13-2	Norflurazon	Norflurazon	Norfurazona	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		
29232-93-7	Pirimiphos methyl	Pirimiphos-méthyl	Metilpirimifos	X		
30560-19-1	Acephate	Acéphate	Acefato	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
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	Dichlorotrifluoroéthane	Diclorotrifluoroetano	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	Diethatyl ethyl	N-(chloroacetyl)-N-(2,6-diethylphenyl) glycinate d'éthyle	Etildietatil	X		
39156-41-7	2,4-Diaminoanisole sulfate	Sulfate de 2,4-diaminoanisole	Sulfato de 2,4-diaminoanisol	X		
39300-45-3	Dinocap	Dinocap	Dinocap	X		
39515-41-8	Fenpropathrin	Fenpropathrine	Fenpropatrina	X		
40487-42-1	Pendimethalin	Pendiméthaline	Pendimetalina	X		
41198-08-7	Profenofos	Profénofos	Profenofos	X		
41766-75-0	3,3'-Dimethylbenzidine dihydrofluoride	Dihydrofluorure de 3,3'-diméthylbenzidine	Difluoruro de 3,3´-dimetilbencidina	X		
42874-03-3	Oxyfluorfen	Oxyfluorfène	Oxifluorfeno	X		
43121-43-3	Triadimefon	Triadiméfon	Triadimefón	X		
50471-44-8	Vinclozolin	Vinclozoline	Vinclosolín	X		
51235-04-2	Hexazinone	Hexazinone	Hexacinona	X		
51338-27-3	Diclofop methyl	Diclofop-méthyl	Metildiclofop	X		
51630-58-1	Fenvalerate	Fenvalérate	Fenvalerato	X		
52645-53-1	Permethrin	Perméthrine	Permitrina	X		
53404-19-6	Bromacil, lithium salt	Bromacil, sel de lithium	Sal de litio bromacílica	X		
53404-37-8	2,4-D 2-Ethyl-4-methylpentyl ester	(2,4-Dichlorophénoxy)acétate de 2-éthyl-4-méthylpentyle	2,4-D 2-Etil-4-metilpentil éster	X		
53404-60-7	Dazomet, sodium salt	Dazomet, sel de sodium	Sal de sodio diazomética	X		
55290-64-7	Dimethipin	Diméthipin	Dimetipina	X		
55406-53-6	3-Iodo-2-propynyl butylcarbamate	Butylcarbamate de 3-iodo-2-propynyle	3-yodo-2-propinil butilcarbamato	X		
57213-69-1	Triclopyr triethylammonium salt	Acide [(3,5,6-trichloro-2-pyridyl)oxy]acétique,	Sal de triclopir trietilamonio	X		
59669-26-0	Thiodicarb	Thiodicarbe	Tiodicarb	X		
60168-88-9	Fenarimol	Fénarimol	Fenarimol	X		
60207-90-1	Propiconazole	Propiconazole	Propiconazol	X		
62476-59-9	Acifluorfen, sodium salt	Acifluorfen, sel de sodium	Sal de sodio de acifluorfeno	X		
63938-10-3	Chlorotetrafluoroethane	Chlorotétrafluoroéthane	Clorotetrafluoroetano	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		
69409-94-5	Fluvalinate	Fluvalinate	Fluvalinato	X		
69806-50-4	Fluazifop butyl	Fluazifop-butyl	Butil flucifop	X		
71751-41-2	Abamectin	Abamectine	Abamectina	X		
72178-02-0	Fomesafen	Fomésafène	Fomesafén	X		
72490-01-8	Fenoxycarb	Fénoxycarbe	Fenoxicarb	X		
74051-80-2	Sethoxydim	Séthoxydime	Setoxidime	X		

* RETC list of chemicals for voluntary reporting in Section V of COA.

Appendix A – A Comparison of Chemicals Listed under 1998 TRI, NPRI and RETC* (*continued*)

CAS Number	Chemical Name	Substance	Sustancia	TRI	NPRI	RETC
76578-14-8	Quizalofop-ethyl	Quizalofop	Etilquizalofop	X		
77501-63-4	Lactofen	Lactofène	Lactofén	X		
82657-04-3	Bifenthrin	Bifenthrine	Bifentrina	X		
88671-89-0	Myclobutanil	Myclobutanil	Miclobutanilo	X		
90454-18-5	Dichloro-1,1,2-trifluoroethane	Dichloro-1,1,2-trifluoroéthane	Dicloro-1,1,2-trifluoroetano	X		
90982-32-4	Chlorimuron ethyl	Chlorimuron	Etil clorimurón	X		
101200-48-0	Tribenuron methyl	Tribénuron	Metiltribenurón	X		
111512-56-2	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1,1-Dicloro-1,2,3,3,3-pentafluoropropano (HCFC-225eb)	X		
111984-09-9	3,3'-Dimethoxybenzidine hydrochloride	Hydrochlorure de 3,3'-diméthoxybenzidine	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)	Bario 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
	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
	Hydrobromocarbons	Hydrobromocarbures	Hidrobromocarbonos			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	Alcanes polychlorés	Alcanos policlorinados	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.

** Elemental compounds are reported separately from their respective elements in TRI and RETC and aggregated with them in NPRI.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1998

CAS Number	Chemical Name	Substance	Sustancia
50-00-0	Formaldehyde▼	Formaldéhyde	Formaldehído
55-63-0	Nitroglycerin	Nitroglycérine	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
64-67-5	Diethyl sulfate▼	Sulfate de diéthyle	Sulfato de dietilo
67-56-1	Methanol	Méthanol	Metanol
67-66-3	Chloroform▼	Chloroforme	Cloroformo
67-72-1	Hexachloroethane	Hexachloroéthane	Hexacloroetano
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
75-56-9	Propylene oxide▼	Oxyde de propylène	Óxido de propileno
75-65-0	tert-Butyl alcohol	2-Méthylpropan-2-ol	Alcohol terbutílico
77-47-4	Hexachlorocyclopentadiene	Hexachlorocyclopentadiène	Hexaclorciclopentadieno
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
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'-Isopropylidènediphénol	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

▼ Known or suspected carcinogen.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1998 (*continued*)

CAS Number	Chemical Name	Substance	Sustancia
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
98-88-4	Benzoyl chloride	Chlorure de benzoyle	Cloruro de benzoilo
98-95-3	Nitrobenzene▼	Nitrobenzène	Nitrobenceno
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'-Méthylènedianiline	4,4'-Metilenodianilina
106-42-3	p-Xylene	p-Xylène	p-Xileno
106-44-5	p-Cresol	p-Crésol	p-Cresol
106-46-7	1,4-Dichlorobenzene▼	p-Dichlorobenzène	1,4-Diclorobenceno
106-50-3	p-Phenylenediamine	p-Phénylènediamine	p-Fenilenodiamina
106-51-4	Quinone	p-Quinone	Quinona
106-88-7	1,2-Butylene oxide	1,2-Époxybutane	Óxido de 1,2-butileno
106-89-8	Epichlorohydrin▼	Épichlorohydrine	Epiclorohidrina
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	Acrilonitrilo
107-18-6	Allyl alcohol	Alcool allylique	Alcohol alílico
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

▼ Known or suspected carcinogen.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1998 (*continued*)

CAS Number	Chemical Name	Substance	Sustancia
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
109-86-4	2-Methoxyethanol	2-Méthoxyéthanol	2-Metoxietanol
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
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
121-69-7	N,N-Dimethylaniline	N,N-Diméthylaniline	N,N-Dimetilanilina
123-31-9	Hydroquinone	Hydroquinone	Hidroquinona
123-38-6	Propionaldehyde	Propionaldéhyde	Propionaldehído
123-72-8	Butyraldehyde	Butyraldéhyde	Butiraldehído
123-91-1	1,4-Dioxane▼	1,4-Dioxane	1,4-Dioxano
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
156-62-7	Calcium cyanamide	Cyanamide calcique	Cianamida de calcio
302-01-2	Hydrazine▼	Hydrazine	Hidracina
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
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
842-07-9	C.I. Solvent Yellow 14	Indice de couleur Jaune de solvant 14	Amarillo 14 solvente
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
2832-40-8	C.I. Disperse Yellow 3	Indice de couleur Jaune de dispersion 3	Amarillo 3 disperso

▼ Known or suspected carcinogen.

Appendix B – Matched Chemicals - Listed in both TRI and NPRI, 1998 (*continued*)

CAS Number	Chemical Name	Substance	Sustancia
3118-97-6	C.I. Solvent Orange 7	Indice de couleur Orange de solvant 7	Naranja 7 solvente
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
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
7697-37-2	Nitric acid**	Acide nitrique	Ácido nítrico
7723-14-0	Phosphorus (yellow or white)	Phosphore (jaune ou blanc)	Fósforo (amarillo o blanco)
7782-50-5	Chlorine	Chlore	Cloro
10049-04-4	Chlorine dioxide	Dioxyde de chlore	Dióxido de cloro
25321-14-6	Dinitrotoluene (mixed isomers)	Dinitrotoluène (mélange d'isomères)	Dinitrotolueno (mezcla de isómeros)
26471-62-5	Toluenediisocyanate (mixed isomers)▼	Toluènediisocyanate (mélange d'isomères)	Toluendiisocianatos (mezcla de isómeros)
	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*	Mercure (et ses composés)	Mercurio y compuestos
	Nickel compounds*▼	Nickel (et ses composés)	Níquel y compuestos
	Nitrate compounds or nitrate ion**	Composés de nitrate ou ion nitrate	Nitratos o ion nitratos
	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.

** Nitric acid, nitrate ion and nitrate compounds are aggregated into one category called nitric acid and nitrate compounds in the matched data set.

*** Elemental compounds are reported separately from their respective elements in TRI and aggregated with them in NPRI and in the matched data set.

Appendix C – List of Facilities that Appear in Tables

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
3M Nevada Plant	Nevada	MO	64772MNVDPHIGHW	4-10
3M Springfield MO	Springfield	MO	65802M 3211E	4-10
A. E. Staley Mfg. Co., Sagamore Ops.	Lafayette	IN	47902STLYM2245N	4-11 6-50
Abbott Health Prods. Inc.	Barceloneta	PR	00617BBTTCROADN	4-9
Abbott Labs., North Chicago Plant	North Chicago	IL	60064BBTTL1400N	4-9
Abitibi Consolidated Inc., Division Belgo	Shawinigan	QC	0000002752	6-20
Abitibi-Consolidated Inc., Division Port-Alfred	La Baie	QC	0000002636	6-20 6-27
Aciers Atlas Inc., Aciers Inoxydables Atlas	Tracy	QC	0000003953	3-23 3-31 3-33 6-21
Acme Steel Co., Riverdale Plant	Riverdale	IL	60627CMSTL13500	3-32
Acordis Cellulosic Fibers Inc., Akzo Nobel Finance US	Axis	AL	36505CRTLDUSHIG	3-4 3-7 3-9 3-26 3-30 6-9 6-49
Advanced Monobloc, C.C.L. Industries Inc.	Penetanguishene	ON	0000000092	6-20
Agrium Products Inc., Redwater Fertilizer Operations	Redwater	AB	0000002134	3-25 3-29
Aguaglass Corp.	Adamsville	TN	38310QGLSSINDUS	3-13 3-34 6-23
Aimco Solrec Ltd., Morobel Dr.	Milton	ON	0000004893	4-10 7-7 7-17
Air Prods. Inc., Air Prods. & Chemicals Inc.	Pasadena	TX	77506RPRDC1423H	4-11 5-4
Alberta Power Limited, Battle River Generating Station	Forestburg	AB	0000001033	3-21 3-31
Alberta Power Limited, H.R. Milner Generating Station	Grande Cache	AB	0000001039	3-31
Albright & Wilson Americas	Charleston	SC	29415LBRGH2151K	4-11
Alcan Smelters and Chemicals Ltd., Kitimat Works	Kitimat	BC	0000002788	3-23 3-29
Alcatel Canada Wire, Simcoe Plant	Simcoe	ON	0000000953	7-7
Algoma Steel Inc., Algoma Steel Main Works	Sault Ste. Marie	ON	0000001070	6-7 6-27 6-49
AlliedSignal Canada Inc., Amherstburg Plant	Amherstburg	ON	0000005655	3-31
AltaSteel Ltd., Stelco Inc.	Edmonton	AB	0000001106	3-23 3-29 6-27
American Electric Power, John E. Amos Plant	Winfield	WV	25213JHNMS1530W	3-4 3-5 3-9 3-22 3-30 5-4
American Electric Power, Mitchell Plant	Moundsville	WV	26041MTCHLSTATE	3-4 3-5 3-9 3-22 3-30
American Electric Power, Mountaineer Plant	New Haven	WV	25265MNTNRRTE33	3-30
American Steel Foundries, Alliance Plant, Amsted Inds. Inc.	Alliance	OH	44601MRCNS1001E	3-10 3-13 3-15 3-32 3-34 6-23 6-50
Amoco Petroleum Prods. Refining Business Group, BP Amoco Corp.	Texas City	TX	77590MCLCM24015	6-50
Angus Chemical Co.	Sterlington	LA	71280NGSCHLAHWY	3-7 3-9 3-13 3-26 3-30 6-50
Archimica Inc.	Rock Hill	SC	29731TRYBR2550V	4-10
Armco Inc., Butler Ops. (Rte 8S)	Butler	PA	16003RMCDVROUTE	3-4 3-6 3-9 3-24 3-30 5-4 6-10 6-50
Armco Inc., Zanesville Ops.	Zanesville	OH	43701RMCDV1724L	4-10
Armstrong World Inds., Lancaster Plant	Lancaster	PA	17604RMSTRLIBER	6-22
ASARCO Inc.	East Helena	MT	59635SRCNCSMELT	3-4 3-6 3-9 3-10 3-13 3-15 3-24 3-30 3-32 3-34 3-36 5-4 6-10 6-23 6-30 6-50
ASARCO Inc., El Paso	El Paso	TX	79999SRCNCPOBOX	4-4
ASARCO Inc., Ray Complex/Hayden Smelter & Concentrator	Hayden	AZ	85235SRCNC64ASA	3-4 3-6 3-9 3-13 3-15 3-24 3-30 3-36 5-4 6-10 6-22 6-30 6-50
ASARCO Inc., Omaha Plant	Omaha	NE	68102SRCNC500DO	6-22 6-29 6-49
AT Plastics Inc., Edmonton Site	Edmonton	AB	0000000126	3-25
Atlas Steels Inc., Atlas Specialty Steels	Welland	ON	0000003158	3-31
Avesta Sheffield Plate Inc.	New Castle	IN	47362VSTNCSTRD3	6-22 6-29 6-49
Baker Petrolite Corp., Baker Hughes Inc.	Sand Springs	OK	74063CHMLN9100W	4-9
Baldwin Power Station, Illinova Corp.	Baldwin	IL	62217LLNSP1901B	3-9 3-30
Ball Packaging Products Canada, Inc.	Burlington	ON	0000003117	7-7
Bar Tech. S. Inc., Primary Ops.	Johnstown	PA	15907FRNKL119WA	3-10 3-15 3-32 6-10 6-30 6-50
BASF Corp.	Freeport	TX	77541BSFCR602CO	3-4 3-7 3-9 3-26 3-30 5-4

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
BASF Corp.	Huntington	WV	25722BSFCR24THS	4-11
Bayer Corp.	New Martinsville	WV	26155MBYCRSTATE	6-49
Bayer Inc., Sarnia Site	Sarnia	ON	0000001944	3-25 3-29 3-31 4-10 6-7 6-20
BHP Copper N. A. San Manuel Smelting & Refining	San Manuel	AZ	85631MGMCPHIGHW	6-50
Birmingham Southeast L.L.C., Jackson MS Steel Div., Birmingham	Flowood	MS	39208BSCSTFOURT	6-22 6-29
Birmingham Southeast L.L.C., Birmingham Steel Corp.	Cartersville	GA	30120TLNTCPEEPL	3-10 3-32 6-50
Birmingham Steel Corp., Seattle WA Steel Div.	Seattle	WA	98106SLMNB2424S	3-10 3-32 6-50
Birmingham Steel Corp., Kankakee Illinois Steel Div.	Bourbonnais	IL	60914BRMNGRR1BO	3-10 3-15 3-32 6-30 6-50
Boeing Co. - Wichita Div.	Wichita	KS	67277BNGML3801S	4-4
Boise Cascade Corp.	Saint Helens	OR	97051BSCSC1300K	4-11
Bowater Pulp & Paper Canada Inc., Thunder Bay Operations	Thunder Bay	ON	0000000930	3-29
Bowen Steam Electric Generating Plant, Southern Co.	Cartersville	GA	30120BWNST317CO	3-4 3-5 3-9 3-22 3-30 5-4
BP Chemicals Inc. Green Lake Facility, BP America	Port Lavaca	TX	77979BPCHMTEXAS	3-7 3-13 3-26
BP Chemicals Inc., BP America Inc.	Lima	OH	45805BPCHMFORTA	3-4 3-7 3-9 3-13 3-26 3-30 6-22
Brandon Shores & Wagner Complex, Baltimore Gas Electric Co.	Baltimore	MD	21226BRNDN1000B	3-4 3-5 3-9 3-22 3-30
Browning Ferris Industries, BFI Calgary Landfill District #2	Calgary	AB	0000005200	3-8 3-13 3-27 3-29 3-33
Brush Wellman Inc., Elmore Plant	Elmore	OH	43416BRSHWSOUTH	7-6
C & D Techs. Inc.	Conyers	GA	30207CDCHR1835I	3-13 6-23
Cabot Corp., Canal Plant	Franklin	LA	70583CBTCRSTATE	6-49
Cabot Corp., Ville Platte Plant	Ville Platte	LA	70586CBTCR412MI	6-49
Cabot Corp., Cab-o-Sil Div.	Tuscola	IL	61953CBTCRROUTE	6-49
Canadian Fertilizers Limited	Medicine Hat	AB	0000003821	3-25 3-29
Canadian General - Tower Ltd.	Cambridge	ON	0000003475	3-29
Canfor, Prince George Pulp & Paper Mills	Prince George	BC	0000004063	3-29
Cardell Corp., Molex Corp.	Auburn Hills	MI	48326CRDLL2025T	4-4
Cardinal Plant, Cardinal Operating Co.	Brilliant	OH	43913CRDNL306CO	3-4 3-5 3-9 3-22 3-30
Carpenter Canada Limited	Woodbridge	ON	0000002567	3-33 6-21
Carpenter Co.	Russellville	KY	42276RCRPNFORRE	3-13 6-23
Carpenter Co., Tupelo Div.	Verona	MS	38879RCRPNLEEIN	3-13
Cartons St-Laurent Inc.	Latuque	QC	0000003140	3-29 6-7 6-49
Cascade Steel Rolling Mills, Schnitzer Steel Inds.	McMinnville	OR	97128CSCDS3200N	3-10 3-15 3-32 6-10 6-30 6-50
Celanese Canada Inc., Edmonton Facility	Edmonton	AB	0000001162	3-7 3-25 3-29 3-31 3-33
Celanese Ltd.- Clear Lake Plant, Hoechst	Pasadena	TX	77507HCHST9502B	4-9 4-11 5-4 6-9 6-22 6-49
Cerro Wire & Cable Co. Inc.	Hartselle	AL	35640CRRWR201TH	3-10 3-15 3-32
Chaparral Steel Midlothian L.P., Texas Inds. Inc.	Midlothian	TX	76065CHPRR300WA	4-4
Chemdesign Corp., Bayer Corp.	Fitchburg	MA	01420CHMDS99DEV	4-10
Chemetal Inc., Comilog	New Johnsonville	TN	37134CHMTLFOOTE	6-29 6-49
Chemical Solvents - Denison Avenue Facility	Cleveland	OH	44109CHMCL1010D	4-9
Chemical Waste Management	Emelle	AL	35459CHMCLHWY17	3-4 3-8 3-9 3-13 3-15 3-28 3-30 3-34
Chemical Waste Management Inc.	Kettleman City	CA	93239CHMCL35251	3-4 3-8 3-9 3-13 3-15 3-28 3-30 3-34
Chemical Waste Management of the Northwest Inc.	Arlington	OR	97812CHMCL17629	3-4 3-8 3-9 3-13 3-15 3-28 3-30 3-34
Chemtron Corp.	Avon	OH	44011CHMTR35850	4-10
Chevron Chemical Co.	Port Arthur	TX	77640CHVRN2001S	4-10
Chino Mines Co., Phelps Dodge Corp.	Hurley	NM	88043CHNMN210CO	6-9 6-29 6-49
Ciba Specialty Chemicals Corp.	McIntosh	AL	36653CBGGYGEIGY	4-9 4-10

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
Ciba Specialty Chemicals Corp.	Newport	DE	19804CBGGYJAMES	4-11
Cincinnati Specialties Inc.	Cincinnati	OH	45217PMCSP501MU	4-11
Coatings 85 Ltd.,	Mississauga	ON	0000002545	3-31
Cominco Ltd., Trail Operations	Trail	BC	0000003802	6-28
Consolidated Recycling Co. Inc.	Troy	IN	47588CNSLDEIGHT	4-9
Cooper Automotive Products Wagner Div., Cooper Industries Inc.	Stratford	ON	0000004489	6-20
Co-Steel Lasco	Whitby	ON	0000003824	3-4 3-6 3-10 3-15 3-23 3-29 3-31 3-33 3-35 5-4 6-7 6-20 6-27 6-49
Co-Steel Raritan	Perth Amboy	NJ	08862RRTNR225EL	4-4
CPI - Kraft Div., Consolidated Papers Inc.	Wisconsin Rapids	WI	54494CNSLD950FO	4-10
Creanova Inc., Veba Corp.	Theodore	AL	36582KYFRSRANGE	4-9
Crystal Clean Services L.L.C.	Indianapolis	IN	46222CRYST3970W	3-10 3-13 3-15 3-28 3-32
CSC Ltd., SBQ Ltd.	Warren	OH	44482CPPRW4000M	3-10 3-32 6-50
CWM Chemical Services L.L.C	Model City	NY	14107CWMCH1550B	3-13 3-28
CWM Resource Recovery Inc., Waste Management Inc.	West Carrollton	OH	45449CWMRS4301I	4-9 4-10 5-4
CXY Chemicals Limited Partnership, Canadian Occidental Petroleum	Nanaimo	BC	0000003526	6-7 6-20 6-49
Cyprus Miami Mining Corp., Cyprus Climax Metals Co.	Claypool	AZ	85532NSPRTPOBOX	6-9 6-22 6-29 6-49
Cytec Inds. Inc., Fortier Plant	Westwego	LA	70094MRCNC10800	3-4 3-7 3-9 3-13 3-26 3-30 5-4 6-9 6-49
Daishowa-Marubeni Int'l, Peace River Pulp Division	Peace River	AB	0000000223	3-29
Davisco Lake Norden Food Ingredient Co.	Lake Norden	SD	57248LKNRD408DA	4-11
Dayton Power & Light Co., J.M Stuart Station	Manchester	OH	45144DYTNP745US	3-4 3-5 3-9 3-22 3-30 5-4
DDE Louisville, DuPont Dow Elastomers	Louisville	KY	40216DDLSV4242C	4-10
Degussa Corp. - Ivanhoe	Louisa	LA	70562SHLND2MILE	6-49
Degussa Corp. Metal Group	South Plainfield	NJ	07080MTZMT3900S	4-11
Delphi Automotive Sys. L.L.C., General Motors Corp.	New Brunswick	NJ	08903DLCRM760JE	4-4
Delphi Energy & Engine Mgmt. Sys., General Motors Corp.	Fitzgerald	GA	31750DLCRMPERRY	4-4
Delphi Packard Electric Sys., General Motors Corp.	Warren	OH	44483GMCPCNORTH	4-4 7-6
Delta Faucet Co., Masco Corp. of Indiana	Greensburg	IN	47240DLTFCHIGHW	4-4 5-4
Demenno / Kerdoon, World Oil Corp.	Compton	CA	90222DMNNK2000N	4-11
Detroit Edison Monroe Power Plant, DTE Energy	Monroe	MI	48161DTRTD3500E	3-5 3-9 3-22 3-30
DNN Galvanizing, Dofasco	Windsor	ON	0000000276	7-7
Doe Run Co. Glover Smelter, Renco Group Inc.	Annapolis	MO	63646SRCNCHIGHW	3-9 3-13 3-15 3-30 6-50
Doe Run Co. Herculaneum Smelter, Renco Group Inc.	Herculaneum	MO	63048HRCLN881MA	3-9 3-13 3-15 3-30
Dofasco Inc.	Hamilton	ON	0000003713	3-4 3-6 3-10 3-15 3-23 3-31 3-33 3-35 5-4 6-8 6-28 6-50
Dominion Castings Ltd., NACO Inc.	Hamilton	ON	0000004739	3-13 3-23 3-31 3-33 3-35 6-7 6-20 6-27
Dominion Colour Corporation, Kikuchi Color & Chemical	Ajax	ON	0000001495	3-31 4-11 6-21
Domtar Papers, Cornwall Business Unit	Cornwall	ON	0000001197	3-29
Doorhandle Systems, Hudson Bay Technologies	Brampton	ON	0000001433	6-20 6-27
Douglas Battery Mfg. Co.	Winston-Salem	NC	27107DGLSB500BA	4-4
Dow Chemical Canada Inc., Sarnia	Sarnia	ON	0000003146	3-25
Dow Chemical Canada Incorporated, Western Canada Operations	Fort Saskatchewan	AB	0000000280	3-25 3-29 6-8
Dow Chemical Co. - Midland Ops.	Midland	MI	48667THDWCMICHI	4-10 6-50
Dow Corning Corp.	Carrollton	KY	41008DWCRNUSHIG	7-6
Dow Corning Corp.	Midland	MI	48686DWCRN3901S	4-9 4-10 7-17
DuPont Beaumont Plant	Beaumont	TX	77704DPNTBSTATE	4-10 6-9 6-49
DuPont Cape Fear	Leland	NC	28451DPNT STATE	4-9 6-49

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
DuPont Cedar Creek Site	Fayetteville	NC	28302CMRCSPOBOX	4-10
DuPont Chambers Works	Deepwater	NJ	08023DPNTCRT130	4-10
DuPont Delisle Plant	Pass Christian	MS	39571DPNTD7685K	3-15 3-26 6-10 6-30 6-50
DuPont La Porte Plant	La Porte	TX	77571DPNTL12501	4-10
DuPont Mobile Plant	Axis	AL	36505DPNTMHIGHW	4-10
DuPont Victoria Plant	Victoria	TX	77902DPNTVOLDBL	3-4 3-7 3-9 3-26 3-30 5-4
Dupont Agricultural Caribe Inds. Ltd.	Manati	PR	00701DPNTGHIGHW	4-10
Dupont Louisville Works	Louisville	KY	40216DPNTL4200C	6-49
Eastman Kodak Co., Kodak Park	Rochester	NY	14652STMNK1669L	3-13 6-22
Edmonton Power Inc., Genesee Thermal Generating Station	Warburg	AB	0000000267	3-21 3-31
Electralloy, G.O. Carlson Inc.	Oil City	PA	16301LCTRL175MA	6-22 6-29 6-49
Elementis Chromium L.P.	Corpus Christi	TX	78407MRCNC3800B	3-4 3-7 3-9 3-13 3-15 3-26 3-30 3-34 3-36 5-4 6-10 6-23 6-30 6-50
Elkem Metals Co.	Marietta	OH	45750LKMMTROUTE	3-4 3-9 3-15 3-24 3-30
EME Homer City Generation L.P.	Homer City	PA	15748MHMRC1750P	3-9 3-30
Encycle Texas Inc., ASARCO Inc.	Corpus Christi	TX	78407NCYCL5500R	3-10 3-32
Engineered Controls Int'l. Inc.	Whitsett	NC	27377NGNRD1239R	4-4
Envirite of Illinois Inc.	Harvey	IL	60426NVRTF16435	3-32
Envirite of Ohio Inc.	Canton	OH	44707NVRTF2050C	3-8 3-10 3-13 3-15 3-28 3-32 3-34
Envirite of Pennsylvania Inc.	York	PA	17404NVRTF730VO	3-32
Envirosafe Services of Idaho Inc., ETDS Inc.	Grand View	ID	83624NVRSF1012M	3-4 3-8 3-9 3-13 3-15 3-28 3-30 3-34 3-36 5-4
Envirosafe Services of Ohio Inc., ETDS Inc.	Oregon	OH	43616NVRSF876OT	3-4 3-8 3-9 3-13 3-15 3-28 3-30 3-34 3-36 5-4
Equistar Chemicals - Bayport Chemicals Plant	Pasadena	TX	77507QSTRC5761U	4-11
Equistar Chemicals L.P., La Porte Plant	La Porte	TX	77571QNTMC1515M	4-9 6-50
Equistar Chemicals L.P., Victoria Facility	Victoria	TX	77902CCDNTOLDBL	4-9
Esco Co. Ltd. Ptnr.	Muskegon	MI	49443STSHR1221B	4-9
Essex Group Inc., Superior Telecom Inc.	Columbia City	IN	46725SSXWRPOBOX	4-4
Ethyl Canada Inc.	Corunna	ON	0000002734	3-31
Eveready Battery Co. Inc., Ralston Purina Co.	Marietta	OH	45750VRDYBCOUNT	3-10 3-32
Excel TSD Inc.	Memphis	TN	38109XCLTS552RI	4-9
Exide Corp.	Manchester	IA	52057XDCRPSOUTH	4-4 5-4
Exide Corp.	Salina	KS	67401XDBTT413EB	4-4
Exide Corp.	Bristol	TN	37620XDCRP364EX	4-4 5-4
Exide Corp., General Battery	Muncie	IN	46302XDCRP2601W	4-4
Exxon Chemical Baton Rouge Chemical Plant, Exxon Corp.	Baton Rouge	LA	70805XXNCH4999S	4-9 6-49
Fairmount Chemical Co. Inc.	Newark	NJ	07105FRMNT117BL	4-11
Falconbridge Ltd-Kidd Metallurgical Div.	District of Cochrane	ON	0000002815	6-21 6-28
Federal Mogul Friction Prods.	Manila	AR	72442SBRKPONESI	3-13 3-32 6-23
Firestone Synthetic Rubber & Latex Co., Bridgestone/Firestone	Sulphur	LA	70602FRSTNLA108	4-4
Firstenergy, W.H. Sammis Plant	Stratton	OH	43961FRSTNSTATE	3-4 3-5 3-9 3-22 3-30
Fisher Gauge Limited, Otonabee Plant	Peterborough	ON	0000002744	7-7
Fletcher Challenge Canada, Elk Falls Mill	Campbell River	BC	0000000333	3-29
Flexsys America L.P. Krummrich	Sauget	IL	62206FLXSY500MO	4-11
FMC Corp.	Baltimore	MD	21226FMCCR1701E	4-10 6-50
FMC Corp. Phosphorus Chemicals Div.	Lawrence	KS	66044FMCCR9THMA	3-10 3-32 6-50
Foamex L.P.	Corry	PA	16407FMXPR466SH	3-13

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
Fonderies canadiennes d'acier Ltée, Atchison Casting Corp.	Montréal	QC	0000004371	3-31
Ford Motor Co., Livonia Transmission Plant	Livonia	MI	48150FRDMT36200	4-11
Ford Motor Company of Canada Limited, Windsor Aluminum Plant	Windsor	ON	0000004416	7-7
Ford Motor Company, Oakville Assembly Plant	Oakville	ON	0000003419	3-29
Ford Motor Company, St. Thomas Assembly Plant	St. Thomas	ON	0000003883	3-29
Ford Motor Company, Windsor Casting Plant	Windsor	ON	0000003416	3-31
Formosa Plastics Corp. Louisiana	Baton Rouge	LA	70805FRMSPGULFS	4-4
Formosa Plastics Corp. Texas	Point Comfort	TX	77978FRMSPPOBOX	4-4
Fort James Corporation, Fort James - Marathon, Ltd.	Marathon	ON	0000000462	6-7 6-49
Franklin Bronze & Alloy Co., Inc.	Franklin	PA	16323FRNKLBOX87	6-29
Fraser Papers Inc. (Canada), Nexfor Inc.	Edmundston	NB	0000001221	3-29 3-31 6-8 6-28
Fuji Photo Film Inc.	Greenwood	SC	29648FJPHT211PU	4-11
Gage Prods. Co.	Ferndale	MI	48220GGPRD625WA	4-9
GE Co., Silicone Prods.	Waterford	NY	12188GNRLL260HU	7-6
General Cable Corp.	Kingman	AZ	86401GNRLC4900I	7-6
General Cable Corp.	Watkinsville	GA	30677LLDTBBARNE	4-4
General Cable Corp.	Lawrenceburg	KY	40342GNRLC1381B	7-6
General Cable Corp.	Bonham	TX	75418GNRLC800E2	7-6
General Electric Plastics Co.	Mount Vernon	IN	47620GPLSTLEXAN	6-22
General Motors of Canada Limited, Oshawa Car Assembly Plant	Oshawa	ON	0000003893	3-29
General Motors of Canada Limited, Oshawa Truck Assembly Center	Oshawa	ON	0000003870	6-7
Gerdau Courtice Steel Inc.	Cambridge	ON	0000004169	3-23 3-31 3-35 6-8 6-28
Gerdau MRM Steel Inc.	Selkirk	MB	0000001651	3-23 3-29 3-35 6-8 6-28
Gibbs Die Casting Aluminum, Corp.	Henderson	KY	42420GBBSDUS60W	7-6
Glenbrook Nickel Co.	Riddle	OR	97469GLNBR5093R	3-13
GM Powertrain Defiance, General Motors Corp.	Defiance	OH	43512GMC STATE	3-15 6-9 6-29 6-49
GNB Tech. Inc., Pacific Dunlop GNB Corp.	Leavenworth	KS	66048GNBNC1901S	4-4
GNB Techs. Inc.	Fort Smith	AR	72901GNBNC4115S	7-6
GNB Techs. Inc., Pacific Dunlop GNB Corp.	Shreveport	LA	71129GNBNC6901W	4-4
GNB Techs. Inc., Pacific Dunlop GNB Corp.	Dunmore	PA	18512GNBNCONEDU	7-6
Granite City Steel, Nat'l. Steel Corp.	Granite City	IL	62040GRNTC20THS	3-15
Great Lakes Chemical Corp.	Newport	TN	37821GRTLKROUTE	4-11
Grede Foundries Inc., Milwaukee Steel Div.	Milwaukee	WI	53204GRDFN1320S	3-10 3-32
Gulf Power Co. - Plant Crist, Southern Co.	Pensacola	FL	32514GLFPW11999	3-5 3-9 3-22 3-30
Heat Energy Advanced Technology Inc.	Dallas	TX	75212HTNRG4460S	4-9
Heatcraft Inc., Lennox Int'l. Inc.	Grenada	MS	38901HTCRFHIGHW	6-22
Henkel Corp. Chemicals Group Cincinnati	Cincinnati	OH	45232HNKLC4900E	4-11
Hercules Inc.	Hopewell	VA	23860QLNCM1111H	4-11
Hercules Inc., Aqualon Div.	Parlin	NJ	08859HRCLSSOUTH	4-11
Heritage Environmental Services L.L.C.	Indianapolis	IN	46231HRTGN7901W	3-8 3-10 3-13 3-15 3-28 3-32
HMT Technology Corp.	Eugene	OR	97402HMTTC3590W	4-11
HNA Holdings Inc. - Shelby Plant	Shelby	NC	28150HCHSTHWY19	4-4
HNA Holdings Inc., Hoechst Corp.	Spartanburg	SC	29304HCHSTI85AT	4-10 6-50
Hoffmann-La Roche Inc., Roche Holdings Inc.	Nutley	NJ	07110HFFMN340KI	4-11
Holnam Inc., Holly Hill SC Plant	Holly Hill	SC	29059SNTCMSCHWY	4-9

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
Hudson Bay Mining and Smelting, Metallurgical Complex	Flin Flon	MB	0000003414	3-29 6-21 6-28
Hukill Chemical Corp.	Bedford	OH	44146HKLLC7013K	4-9 4-10 5-4
Huntsman Corp. Port Arthur - A&O Plant	Port Arthur	TX	77641TXCCHGATE2	6-9 6-49
Huntsman Petrochemical Corp.	Cantonment	FL	32533HNTSM3000O	4-10
Hydrite Chemical Co.	Cottage Grove	WI	53527HYDRT150WD	4-9
ICI Canada Inc., McMasterville Complex	McMasterville	QC	0000000420	3-25 6-8
Ifastgroupe Inc., Infasco Div.	Marieville	QC	0000000449	3-31
IMC-Agrico Co., New Wales Plant	Mulberry	FL	33860MCFRTHIGHW	6-9 6-49
IMC-Agrico Co., South Pierce Plant	Mulberry	FL	33860GRCCHSTATE	6-49
Imperial Home Decor Group (Canada) ULC	Brampton	ON	0000002263	3-29
Imperial Oil, IOL Sarnia Refinery	Sarnia	ON	0000003704	3-29
Imperial Oil, Sarnia Chemical Plant	Sarnia	ON	0000001464	3-25 3-31 6-20
Inco Alloys Int'l. Inc., Special Metals Corp.	Huntington	WV	25720NCLLYRIVER	4-11
Inco Limited, Nickel Refinery	Copper Cliff	ON	0000001467	6-20 6-27
Inco Limited, Copper Cliff Smelter Complex	Copper Cliff	ON	0000000444	3-4 3-9 3-13 3-23 3-29 3-33 3-35 6-8 6-21 6-28
Indian River Power Plant	Titusville	FL	32780NDNRV7800S	3-13
Inspec USA Inc.	Galena	KS	66739LLCCH22MIS	3-32 6-49
Inspec USA Inc., Unit 2, Inspec Group PLC	Galena	KS	66762KCHCH22MIL	6-29
International Paper Erie Mill	Erie	PA	16533HMMRM1540E	4-11
International Wallcoverings Ltd., Brampton Plant	Brampton	ON	0000003759	3-29 6-8
Ipsco Steel Inc.	Muscatine	IA	52761PSCST1770B	3-10 3-15 3-32 6-50
Irving Pulp & Paper, Ltd/Irving Tissue Company	Saint John	NB	0000002604	3-29 6-7 6-49
Ispat Sidbec Inc. Aciérie, Ispat Mexicana	Contrecoeur	QC	0000003649	3-15 3-23 3-29 3-35 6-8 6-28
Ivaco Rolling Mills	L'Orignal	ON	0000001520	3-10 3-23 3-31 3-35 6-28
J & L Specialty Steel Inc.	Louisville	OH	44641JLSPC1500W	4-4 5-4
J & L Specialty Steel Inc.	Midland	PA	15059JLSPC12THS	6-50
J. R. Simpolot Co., Heyburn Food Group	Heyburn	ID	83336JRSMPHIGHW	6-50
Jessop Steel Co., Allegheny Teledyne Inc.	Washington	PA	15301JSSPS500GR	4-4
Johnson Controls Inc., Battery Group	Saint Joseph	MO	64502JHNSN4722P	4-4
Johnson Controls Inc., Battery Group	Kernersville	NC	27102JHNSN2701W	4-4
Johnson Controls Inc., Battery Group	Holland	OH	43528JHNSN10300	4-4
Johnson Controls Inc., Battery Group	Middletown	DE	19709JHNSNRD170	7-6
Johnson Controls Inc., Battery Group	Tampa	FL	33612JHNSN10215	4-4
Kennecott Utah Copper Smelter & Refy.	Magna	UT	84006KNNCT8362W	3-4 3-6 3-9 3-13 3-15 3-24 3-30 3-34 3-36 5-4 6-10 6-23 6-30 6-50
Kentucky Utilities Co. - Ghentstation, LG&E Energy Corp.	Ghent	KY	41045KNTCKUS42P	3-4 3-5 3-9 3-22 3-30
Keystone Station	Shelocta	PA	15774KYSTNRTE21	3-9 3-30
Keystone Steel & Wire Co., Keystone Consolidated Inds. Inc.	Peoria	IL	61641KYSTN7000S	3-10 3-15 3-32
Koppel Steel Corp., NS Group Inc.	Koppel	PA	16136BBCCKMOUNT	3-32
Koppers Inds. Inc.	Cicero	IL	60650KPPRS3900S	3-10 3-32 6-50
Kronos Canada, Inc., N.L. Industries, Inc.	Varennes	QC	0000001561	3-25 3-31 3-35
Kuntz Electroplating Inc.	Kitchener	ON	0000003111	3-31 6-21
Kwikset Corp., Black & Decker Corp.	Denison	TX	75020KWKST2600N	4-4
L&M Screw Machine Products Limited	North York	ON	0000000715	7-7
Laclede Steel Co., Ivaco	Alton	IL	62002LCLDSCUTST	3-32
Lake Erie Steel Company Ltd., Stelco Inc.	Nanticoke	ON	0000003855	6-27 7-17

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
Lenzing Fibers Corp.	Lowland	TN	37778LNZNGTENNE	3-4 3-7 3-9 3-26 3-30 5-4 6-9 6-49
Les Forges de Sorel Inc., Slater Industries Inc.	St-Joseph-de-Sorel	QC	0000004797	3-31
Les Papiers Perkins Ltée	Candiac	QC	0000002524	6-7
Les Produits chimiques Delmar Inc.	Lasalle	QC	0000004321	4-10
Les Services Safety-Kleen (Mercier) Ltée	Mercier	QC	0000005449	3-27 3-31
Les Services Safety-Kleen (Québec) Ltée, Ville Ste-Catherine	Ste-Catherine	QC	0000005454	3-27 3-31
Lilly Tech. Center, Eli Lilly & Co.	Indianapolis	IN	46285LLLLY1555K	4-10
Lomac Inc., PCL Group Inc.	Muskegon	MI	49442LMCNC5025E	4-11
LTV Steel Co. Inc., Pittsburghworks	Pittsburgh	PA	15207PTTSB4650S	3-32 6-23 3-13
Lucent Techs. Inc.	Omaha	NE	68137TTNTW120TH	4-4 7-6
Lukens Steel Co., Bethlehem Steel Corp.	Coatesville	PA	19320LKNSSMODEN	4-4
Lyondell Chemical Worldwide Inc.	Westlake	LA	70669RCCHM900AI	4-9
Lyondell Chemical Worldwide Inc., Bayport Plant	Pasadena	TX	77507RCCHM10801	4-9 4-11
Lyondell-Citgo Refining Co. Ltd.	Houston	TX	77017LYNDL12000	4-11
M & M Chemical & Equipment Co., Giant Cement Holding Inc.	Attalla	AL	35954MMCHMRT3BO	4-9
MAAX Inc., Fibre de verre moderne - usine 5	Tring-Jonction	QC	0000004916	6-21
Magnesium Corp. of America, Renco Group Inc.	Rowley	UT	84074MXMGNROWLE	3-4 3-6 3-9 3-24 3-30 5-4 6-9 6-49
Mallinckrodt Inc.	Saint Louis	MO	63147MLLNC3600N	4-10
Manitoba Hydro, Selkirk Generating Station	St. Clements	MB	0000000823	3-21
Maple Roll Leaf, Illinois Tool Works Canada Inc.	Windsor	ON	0000005627	3-25 3-29 6-8
Marisol Inc.	Middlesex	NJ	08846MRSLN125FA	4-9 5-4
Merck & Co. Inc.	Albany	GA	31708MRCKC3517R	4-9
Merck & Co. Inc.	Rahway	NJ	07065MRCKC126EL	4-9
Merck & Co. Inc., Cherokee Site	Riverside	PA	17868MRCKC100AV	4-9
Metal Koting, Continuous Colour Coat Ltd.	Rexdale	ON	0000004527	3-31
Métallurgie Noranda, Affinerie CCR	Montréal-Est	QC	0000003916	3-31 4-4
Methanex Corporation, Medicine Hat Plant	Medicine Hat	AB	0000001782	3-25 6-7 6-49
Michigan Recovery Sys. Inc., The Environmental Quality Co.	Romulus	MI	48174MCHGN36345	4-9 4-10 5-4 7-6
Millennium Petrochemicals Inc., Millennium Chemicals Inc.	La Porte	TX	77571QNTMC11603	6-49
Mitsubishi Polyester Film L.L.C.	Greer	SC	29651HCHSTHOODR	4-4
Monsanto - Chocolate Bayou	Alvin	TX	77511MNSNTFM291	6-22 6-49
Monsanto - Luling	Luling	LA	70070MNSNTRIVER	3-13 3-34 6-23 6-50
Morbern Incorporated	Cornwall	ON	0000000741	3-29
Motiva Norco Refy. Co., Motiva Ents. L.L.C.	Norco	LA	70079SHLLL1205R	4-10
Mueller Brass Co., Mueller Inds. Inc.	Port Huron	MI	48060MLLRB1925L	4-4
Nat'l. Steel Corp., Greatlakes Div.	Ecorse	MI	48229GRTLKNO1QU	3-4 3-6 3-10 3-15 3-24 3-32 6-29 6-49
New Brunswick Power, Belledune Thermal Generating Station	Belledune	NB	0000001698	3-21 3-31
New Brunswick Power, Coleson Cove Generating Station	Saint John	NB	0000001696	3-21 3-29
New Brunswick Power, Dalhousie Generating Station	Dalhousie	NB	0000001712	3-21 3-29
New Brunswick Power, Grand Lake Generation Station	Minto	NB	0000001708	3-21
New Flyer Industries Limited	Winnipeg	MB	0000005244	3-31 6-28
Newport Steel Corp., NS Group Inc.	Wilder	KY	41071NWPRTLICKI	6-29 6-49
Noltex L.L.C., Mitsubishi Chemical America Inc.	La Porte	TX	77571NLTXL12220	4-9
Noma Cable Tech, Stouffville Plant	Stouffville	ON	0000002700	7-7
Norampac Inc., Red Rock Div. Mill	Red Rock	ON	0000003013	6-7 6-49

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
Noranda Inc, Fonderie Horne	Rouyn-Noranda	QC	0000003623	3-29 6-20 6-27
Noranda Inc. CEZinc, Usine d'extraction de zinc	Salaberry-de-Valleyfield	QC	0000002938	4-4
Noranda Inc., Brunswick Smelter	Belledune	NB	0000004024	3-31 3-33 6-8 6-21 6-28
Norco Chemical Plant - East Site, Shell Oil Co.	Norco	LA	70079NRCCH15536	4-10 6-50
North American Rayon Corp., North American Corp.	Elizabethton	TN	37643NRTHMWESTE	6-49
North Atlantic Refining Ltd.	Come By Chance	NF	0000004316	6-27
North East Chemical Corp., TBN Holdings Inc.	Cleveland	OH	44113NRTHS3301M	4-9 5-4
North Star BHP Steel L.L.C., NSS Ventures Inc.	Delta	OH	43515NRTHS6767C	4-4
Northwestern Steel & Wire Co.	Sterling	IL	61081NRTHW121WA	3-4 3-6 3-9 3-15 3-24 3-30 3-36 6-29 6-49
Nova Chemicals Ltd., St. Clair River Site	Corunna	ON	0000004700	3-25 3-29 6-7
Nova Scotia Power Inc., Lingan Generating Station	New Waterford	NS	0000003992	3-21 3-29
Nova Scotia Power Inc., Point Aconi Generating Station	Point Aconi	NS	0000004000	3-21 3-29
Novopharm Limited	Markham	ON	0000002472	6-21
Novopharm Limited	Toronto	ON	0000002469	6-20
Nucor Corp. Nucor Steel	Plymouth	UT	84330NCRST7285W	3-10 3-15 3-32 6-10 6-30 6-50
Nucor Steel	Crawfordsville	IN	47933NCRST400SO	3-4 3-6 3-10 3-15 3-24 3-32 3-36 5-4 6-10 6-30 6-50
Nucor Steel	Huger	SC	29450NCRST1455H	3-10 3-15 3-32 6-30 6-50
Nucor Steel - Texas	Jewett	TX	75846NCRSTHWY79	4-4
Nucor Steel, Arkansas Plant	Blytheville	AR	72315NCRST7301E	3-10 3-32 4-4 6-50
Nucor Steel, Nebraska	Norfolk	NE	68701NCRSTRURAL	3-10 3-15 3-32 6-10 6-30 6-50
Nucor-Yamato Steel Co.	Blytheville	AR	72316NCRYM5929E	3-4 3-6 3-10 3-15 3-24 3-32 3-36 6-10 6-23 6-30 6-50
Occidental Chemical Corp.	Castle Hayne	NC	28429CCDNTOFFST	3-4 3-7 3-9 3-13 3-15 3-26 3-30 3-34 6-23 6-50
Ontario Power Generation Inc, Lakeview GS	Mississauga	ON	0000002844	3-21 3-29
Ontario Power Generation Inc., Lambton Generating Station	Courtright	ON	0000001809	3-21 3-29
Ontario Power Generation Inc., Nanticoke Generating Station	Nanticoke	ON	0000001861	3-4 3-5 3-9 3-21 3-29
Onyx Environmental Services L.L.C.	Azusa	CA	91702LSLVN1704W	4-9
Oregon Steel Mills Inc.	Portland	OR	97203RGNST14400	3-10 3-32
Osram Sylvania Prods. Inc.	Versailles	KY	40383GTPRD900TY	6-49
Owens-Corning Canada Inc., Guelph Glass Plant	Guelph	ON	0000003287	6-27
Pacifica Papers Inc., Powell River Division	Powell River	BC	0000000723	3-29
Paintplas Inc.	Ajax	ON	0000000733	3-29
Papiers Domtar - Centre d'affaires Windsor	Windsor	QC	0000001195	3-29 6-8
Parker Hannifin, Brass Prods. Div.	Otsego	MI	49078PRKRH300PA	4-4 5-4
PCS Nitrogen Fertilizer L.P.	Geismar	LA	70734RCDNCHIGHW	3-4 3-7 3-9 3-26 3-30 5-4 6-50
PCS Phosphate Co. Inc., Auroradiv.	Aurora	NC	27806TXSGLHIGHW	3-7 3-26 6-49
PD Glycol, Equistar Chemicals L.P.	Beaumont	TX	77704PDGLYGULFS	6-49
Penford Prods. Co.	Cedar Rapids	IA	52406PNFRD1001F	4-11
Penick Corp., Penick Pharmaceuticals	Newark	NJ	07114PNCKC158MT	4-11
Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria	IL	61615PRDSP4349W	3-4 3-8 3-9 3-13 3-15 3-28 3-30 3-36 5-4
Petro-Canada, Burrard Products Terminal	Port Moody	BC	0000003905	3-31 3-33 6-8 6-21
Petro-Canada, Edmonton Refinery	Edmonton	AB	0000003903	3-31
Petro-Chem Processing Group/Solvent Distillers Group, Nortru	Detroit	MI	48214PTRCH421LY	4-10 4-9 5-4 7-6
Pétromont, société en commandite	Varennes	QC	0000003634	3-25 3-29
Pfister Chemical Inc.	Ridgefield	NJ	07657PFSTRLINDE	4-11
Pfizer Inc. - Groton Site	Groton	CT	06340PFZRNEASTE	4-10

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
Pfizer Pharmaceuticals Inc.	Barceloneta	PR	00617PFZRPHIGHW	6-49
Pharmacia & Upjohn	Kalamazoo	MI	49001THPJH7171P	4-9 4-10 4-11 5-4 6-9
Pharmacia & Upjohn Caribe Inc.	Arecibo	PR	00617THPJHHIGHW	4-11
Phelps Dodge Hidalgo Inc.	Playas	NM	88009PHLPSHIDAL	3-4 3-6 3-9 3-15 3-24 3-30 3-36 5-4 6-9 6-29 6-49
Philip Enterprises Inc., Barrie Facility	Barrie	ON	0000005647	3-27 3-31 4-9
Philip Enterprises Inc., Fort Erie Facility	Fort Erie	ON	0000005646	3-10 3-27 3-31 3-33 7-7
Philip Enterprises Inc., Parkdale Avenue Facility	Hamilton	ON	0000005645	3-4 3-8 3-10 3-15 3-27 3-31 3-33 3-35 4-9 5-4 7-7
Philip Enterprises Inc., Rexdale Facility	Etobicoke	ON	0000005648	3-10 3-27 3-31
Philip Enterprises Inc., Yard 3 Facility	Hamilton	ON	0000001928	3-4 3-8 3-10 3-13 3-15 3-27 3-31 3-33 3-35 5-4
Philip Enterprises, Delta Facility	Delta	BC	0000005111	3-27
Philip Services Corp., Windsor Facility	Windsor	ON	0000004627	3-27 3-31
PMX Inds. Inc.	Euclid	OH	44132NRTHC1121E	4-4
Pollution Control Inds. Inc.	East Chicago	IN	46312PLLTN4343K	3-13 4-9 4-10 5-4
Potlatch Corp., MN P&P Div.	Cloquet	MN	55720PTLTCNORTH	4-11
Procter & Gamble Mfg. Co.	Sacramento	CA	95826PRCTR8201F	4-11
PSI Gibson Generating Station, Cinergy Corp.	Princeton	IN	47670PSNRGHWY64	3-4 3-5 3-9 3-22 3-30
QIT-Fer et Titane Inc., RTZ Fer et Titane Inc.	Tracy	QC	0000004806	6-27
Quality Chemicals Inc., Chemfirst Corp.	Tyrone	PA	16686QLTYCINDUS	4-10
Quanex Macsteel	Fort Smith	AR	72902QNXMC4700P	4-4
Quemetco Inc., RSR Corp.	City of Industry	CA	91745QMTCN720SO	3-13 3-10 3-32 6-23
Quemetco Inc., RSR Corp.	Indianapolis	IN	46231QMTCN7870W	3-10 3-13 3-32
Raw Materials Corporation	Port Colborne	ON	0000005758	4-4 7-7
Rea Magnet Wire Co.	Lafayette	IN	47905RMGNT2800C	4-4
Recyclage d'aluminium, Philip Services Corp.	Bécancour	QC	0000002799	3-29 6-28
René Matériaux Composites Ltée, Usine St-Éphrem	St-Éphrem-de-Beauce	QC	0000004981	6-21
Republic Engrd Steels Inc.	Canton	OH	44704LTVST26338	4-4 5-4
Reynolds Metals Co. – Sheffield Plant	Sheffield	AL	35660RYNLD501W2	6-49
Rineco	Benton	AR	72015RNC001007V	4-9
Roanoke Electric Steel Corp.	Roanoke	VA	24017RNKLC102WE	3-10 3-32 6-50
Roche Colorado Corp., Syntex (USA) Inc.	Boulder	CO	80301SYNTX2075N	4-9
Rome Cable Corp., Rome Group Inc.	Rome	NY	13440RMCBL421RI	4-4
Rouge Steel Co.	Dearborn	MI	48121RGSTL3001M	3-4 3-6 3-10 3-15 3-24 3-32 3-36 5-4 6-50
Roxboro Steam Electric Plant, Carolina Power & Light Co.	Semora	NC	27343RXBRS1700D	3-4 3-5 3-9 3-22 3-30 5-4
Ruetgers Organics Corp.	State College	PA	16801RTGRS201ST	4-10
S&W Waste Inc.	South Kearny	NJ	07032SWWST115JA	3-13 3-32
S. D. Warren Co., Sappi Ltd.	Muskegon	MI	49443SDWRR2400L	4-11
Safety Kleen (Lone & Grassy) Inc. GMF	Grantsville	UT	84074PPMNCI80	3-4 3-8 3-9 3-13 3-15 3-28 3-30 3-34 3-36 5-4
Safety-Kleen (Atlantic) Limited, Safety-Kleen Debert	Debert	NS	0000005011	3-27
Safety-Kleen (Buttonwillow) Inc.	Buttonwillow	CA	93206SFTYK2500W	3-13
Safety-Kleen (Pinewood)	Pinewood	SC	29125SFTYKRTE1	3-13
Safety-Kleen (Ryley) Ltd., Ryley Facility	Ryley	AB	0000004871	3-27
Safety-Kleen (Westmorland) Inc.	Westmorland	CA	92281SFTYK5295S	3-13
Safety-Kleen Canada Inc., Centre de recyclage de St-Constant	St-Constant	QC	0000005421	7-7
Safety-Kleen Corp.	Denton	TX	76208SFTYK1722C	4-9
Safety-Kleen Corp.	San Antonio	TX	78219SFTYK4303P	4-9

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
Safety-Kleen Envirosystem Co. of Puerto Rico Inc.	Manati	PR	00674SFTYKKM510	4-9 4-10
Safety-Kleen Lone & Grassy Mtn. Inc.	Waynoka	OK	73860SFTYK5MILE	3-8 3-13 3-15 3-28 3-34
Safety-Kleen Ltd. (Niagara)	Thorold	ON	0000005625	3-27 3-31 3-33 3-35 4-10
Safety-Kleen Ltd., Mississauga Service Centre	Mississauga	ON	0000004948	3-27 3-31
Safety-Kleen Oil Recovery Co.	East Chicago	IN	46312SFTYK601RI	4-4
Safety-Kleen Sys. Inc.	Dolton	IL	60419SFTYK633E1	4-9 4-10 5-4
Safety-Kleen Sys. Inc.	Smithfield	KY	40068SFTYK3700L	4-9 4-10
Safety-Kleen, Lambton Facility	Corunna	ON	0000002537	6-21 6-28
Saft America Inc.	Valdosta	GA	31601SFTMR711IN	4-11
Scherer Steam Electric Generating Plant	Juliette	GA	31046SCHRR10986	3-4 3-5 3-9 3-22 3-30
Seagate Recording Media, Seagate Tech. Inc.	Anaheim	CA	92807SGTSB3845E	4-11
Seh-America Inc.	Vancouver	WA	98682SHMRC4111N	4-11
Seminole Generating Station	Palatka	FL	32177SMNLGUSHWY	3-9 3-22 3-30
Shell Chemical Co.	Belpre	OH	45714SHLLC2982W	4-10
Shepherd Chemical Co.	Cincinnati	OH	45212THSHP4900B	4-11
Sherritt International Corporation, Fort Saskatchewan	Fort Saskatchewan	AB	0000002132	6-7 6-49
Siemens Power Corp.	Richland	WA	99352DVNCD2101H	4-11
Sikeston Power Station	Sikeston	MO	63801SKSTN1551W	3-15
Simpson Pasadena Paper Co., Simpson Investment Co.	Pasadena	TX	77506SMPSNNORTH	4-11 6-49
Sivaco Québec	Marieville	QC	0000003812	3-31
Slater Steels, Ft. Wayne Specialty Alloys Div.	Fort Wayne	IN	46801SLTRS2400T	6-22
Slater Steels, Hamilton Specialty Bar Division	Hamilton	ON	0000002161	3-10 3-23 3-31 3-35 6-20 6-27
Solutia - Chocolate Bayou	Alvin	TX	77511SLTNCFM291	3-13 6-23 6-50
Solutia Canada Inc., Produits chimiques	Lasalle	QC	0000001648	4-10
Solutia Inc.	Gonzalez	FL	32533MNSNT3000O	3-4 3-7 3-9 3-26 3-30 5-4 6-10 6-50
Solutia Inc.	Springfield	MA	01151MNSNT730WO	4-11
Southeastern Chemical & Solvent Co. Inc., TBN Holdings	Sumter	SC	29151STHST755IN	3-8 3-10 3-28 3-32 4-9 5-4
Southwire Co.	Carrollton	GA	30119CPPRDCENTR	3-10 3-32
Specialtychem Prods. Corp., Bayer Corp.	Marinette	WI	54143SPCLT2STAN	4-9
Squibb Mfg. Inc., Bristol Myers Squibb Co.	Humacao	PR	00661SQBBMSTATE	4-10
Standard Products (Canada) Limited, Rubber Plant #1	Stratford	ON	0000002176	6-7
Steel Dynamics Inc.	Butler	IN	46721STLDY4500C	3-4 3-10 3-15 3-24 3-32 6-10 6-30 6-50
Stelco Inc., Hilton Works	Hamilton	ON	0000002984	3-23 3-31 3-33 6-21
Stelco McMaster Ltée	Contrecoeur	QC	0000002986	3-10 3-23 3-31 3-35
Stelfil Ltée, Stelco Inc.	Lachine	QC	0000003568	3-31
Stelwire Ltd., Parkdale Works	Hamilton	ON	0000004045	3-31
Sterling Chemicals Inc.	Texas City	TX	77592STRLN201BA	6-9 6-49
Stone Container Corp.	Panama City	FL	32401STNCN1EVER	4-11
Stone Container Corp.	Hopewell	VA	23860STNHP910IN	4-11
Sun Chemical Corp., DIC Americas Inc.	Newark	NJ	07105SNCHM185FO	4-11
Sunoco Inc., Frankford Plant	Philadelphia	PA	19137LLDSGMARGA	4-11
Superior Cable Corporation, Superior Telecommunication Inc.	Winnipeg	MB	0000000968	7-7
Sydney Steel Corporation	Sydney	NS	0000004204	3-29
Systech Environmental Corp., Lafarge Corp.	Demopolis	AL	36732SYSTCARCOL	4-9 5-4
Tennessee Eastman Div., Eastman Chemical Co.	Kingsport	TN	37662TNNSSEASTM	4-10

Appendix C – List of Facilities that Appear in Tables (*continued*)

Facility Name	City	Province/ State	PRTR ID Number	Tables Facility Appears in
Teva Pharmaceuticals USA	Mexico	MO	65265BCRFT5000C	4-9
Thomas & Betts Corp.	Horseheads	NY	14845LRCLC224NM	4-4
Timken Co. - Faircrest Steel Plant	Canton	OH	44706THTMK4511F	3-10 3-32 6-50
Timken Co. Harrison Steel Plant	Canton	OH	44706HRRSNHARRI	3-32
Tippecanoe Labs., Eli Lilly & Co.	Lafayette	IN	47905LLLLYLILLY	4-10
Titan Steel & Wire Co. Ltd., Mitsui & Co. Ltd.	Surrey	BC	0000004307	6-27
Tonolli Canada Limited	Mississauga	ON	0000002256	3-31
Toray Plastics (America) Inc.	North Kingstown	RI	02852TRYPL21CRI	4-4
TransAlta Utilities Corporation, Keephills Thermal Generating	Duffield	AB	0000002286	3-21 3-29
TransAlta Utilities Corporation, Sundance Thermal Generating	Duffield	AB	0000002284	3-21 3-29
TransAlta Utilities Corporation, Wabamun Thermal Generating	Wabamun	AB	0000002282	3-21 3-29
Tremco Inc., RPM Inc.	Ashland	OH	44805TRMCN1451J	4-11
U.S. Mint, U.S. Department of the Treasury	Denver	CO	80204NTDST320WE	4-4
U.S. Sugar Corp., Clewiston Mill	Clewiston	FL	33440SSGRC1731A	6-50
U.S. TVA Kingston Fossil Plant	Harriman	TN	37763STVKNSWANP	3-30
U.S. TVA Paradise Fossil Plant	Drakesboro	KY	42337STVPR13246	3-5 3-9 3-22 3-30
Uniboard Canada Inc., Division Val-d'Or, Unikunz Canada Inc.	Val-d'Or	QC	0000004060	6-21
Union Carbide Canada Inc., Prentiss Chemical Manufacturing Plant	Lacombe County	AB	0000002316	3-25 3-29 7-7
Union Carbide Corp., Texas City Plant	Texas City	TX	77592NNCRB33015	4-11
Union Carbide Corp., Cypress Catalyst Plant	Norco	LA	70079CYPRS16122	4-10
USS Fairfield Works, USX Corp.	Fairfield	AL	35064SSFRFVALLE	3-15
USS Gary Works, USX Corp.	Gary	IN	46402SSGRYONENO	3-4 3-6 3-9 3-15 3-24 3-30 3-36 5-4 6-10 6-30 6-50
USS Mon Valley Works - Edgar Thomson Plant, USX Corp.	Braddock	PA	15104SSDGRBRADD	3-15 3-10 3-32 6-50
Versatech Industries, Apex Metals Inc.	Kitchener	ON	0000004703	6-27
Viasystems Canada Inc.	Pointe-Claire	QC	0000003123	3-31
Vicksburg Chemical Co.	Vicksburg	MS	39180CDRCHPOBOX	3-7 3-26
Warner-Lambert Co., Parke-Davis Div.	Holland	MI	49424PRKDV188HO	4-9 4-10 5-4
Waste Control Specialist L.L.C.	Andrews	TX	79714WSTCN9998H	3-13
Waste Management of Ohio Inc.	Vickery	OH	43464WSTMN3956S	3-4 3-8 3-9 3-28 3-30 5-4
Wasteco Environmental Services Ltd., Ceda-Reactor Ltd.	Edmonton	AB	0000005273	3-27
Wayne Disposal Inc., The Environmental Quality Co.	Belleville	MI	48111WYNDS49350	3-13 3-15 3-28
Weirton Steel Corp.	Weirton	WV	26062WRTNS400TH	3-10 3-32 6-50
Western Co-Operative Fertilizers Ltd. - Calgary Site	Calgary	AB	0000002376	6-20
Western Pulp Limited Partnership, Port Alice Cellulose Operations	Port Alice	BC	0000002377	6-8
Westvaco Corp. Fine Papers Div.	Luke	MD	21540WSTVC300PR	4-11
Weyerhaeuser Co.	Longview	WA	98632WYRHS3401I	6-49
Wheeling-Pittsburgh Steel Corp. Mingo Junction	Mingo Junction	OH	43952WHLNGMCLIS	3-10 3-32 6-50
Witco Canada Inc., West Hill Plant	Scarborough	ON	0000003553	3-29
Witco Corp.	Friendly	WV	26175NNCRBSTATE	4-10
WRR Environmental Services Co. Inc., Caribou Corp.	Washington	WI	54701WRRNV5200S	4-10
Wyckoff Chemical Co. Inc.	South Haven	MI	49090WYCKF1421K	4-9
Zalev Brothers Co., Ferrous Processing & Trading Co.	Windsor	ON	0000004980	3-23 3-10 3-31 3-35 6-8 6-28 7-7 7-17
Zinc Corp. of America Monaca Smelter, Horsehead Inds.	Monaca	PA	15061ZNCCR300FR	3-4 3-6 3-10 3-15 3-24 3-32 3-36 5-4 6-9 6-22 6-29 6-49
Zinc Corp. of America, Horsehead Ind. Inc.	Palmerton	PA	18071ZNCCRFOURT	3-10 3-13 3-32 6-23 6-50 7-6 7-17

Appendix D – Human Health Effects of Chemicals on the "Top 25" Lists for Releases and for Total Reported Amounts of Releases and Transfers

Note 1: Chemicals can have a variety of health and environmental effects, and the fact that a chemical is reported to NPRI or TRI does not mean that the chemical is considered to pose toxic risks to humans. In some cases, chemicals may be of greater concern for effects on ecosystems. For example, a relatively non-toxic chemical may serve as an excess nutrient in aquatic systems, leading to a buildup of algae that can deplete oxygen and kill fish and other aquatic life (eutrophication). Other chemicals may be of concern because they contribute to acid precipitation, or lead to the formation of tropospheric ozone (photochemical smog). Further, all effects are dose-dependent and may not occur at levels found in the environment or associated with PRTR releases. Effects shown in workers are likely to reflect exposures significantly higher than those occurring in the environment. PRTRs do not collect data on exposure or risk associated with the releases they report.

Note 2: The data in this table reflect three sources:

- *ToxFAQs* distributed by the US Agency for Toxic Substances and Disease Registry
- *Chemical Fact Sheets* distributed by the Office of Pollution Prevention and Toxics of the US Environmental Protection Agency
- *Hazardous Substance Fact Sheets* distributed by the New Jersey Department of Health and Senior Services

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.
--	Arsenic (and its compounds)	ATSDR	Levels above 60 parts per million in food or water can be fatal. Inhalation can irritate respiratory system.	Long-term exposure can lead to darkening of skin and "corns" or "warts" on palms, soles and torso. Inorganic arsenic is a ***known carcinogen***.
1332-21-4	Asbestos (friable)	ATSDR	Inhalation leads to asbestosis (scar tissue buildup in lungs and surrounding tissue).	A known carcinogen by inhalation: lung cancer and mesothelioma (cancer of the tissues lining the chest cavity). Some evidence for ***cancer*** of stomach, intestines, esophagus, pancreas and kidneys. Risks from ingestion unclear.
71-36-3	n-Butyl alcohol	EPA	Inhalation leads to headaches. Contact with liquid or vapor irritates eyes, nose, throat. Contact with liquid irritates skin.	Adverse eye effects and hearing loss in exposed workers. Adverse effects on thyroid, blood, lungs, intestine, liver, kidneys and nervous system in laboratory studies.
75-15-0	Carbon disulfide	ATSDR	Inhalation effects include headaches, fatigue, sleep disturbance, breathing changes, and chest pains. Skin burns from dermal contact.	Nerve changes in workers. Effects on brain, liver, and heart, as well as fetal toxicity in laboratory studies.
7782-50-5	Chlorine	EPA	Effects range from coughing and chest pain to water retention in the lungs; irritation to skin, eyes, and respiratory system.	Adverse effects on immune system, blood, heart and respiratory system in laboratory studies.

Appendix D – Human Health Effects of Chemicals on the "Top 25" Lists for Releases and for Total Reported Amounts of Releases and Transfers (*continued*)

CAS Number	Name	Source	High Exposure Effects	Longer and Lower Exposure Effects
--	Chromium (and its compounds)	ATSDR	Hexavalent forms (Cr VI) are more toxic than trivalent (Cr III). Inhalation effects include irritation/damage to nose, lungs, stomach and intestines. Some persons are allergic, and high exposure may trigger asthma. Ingestion effects include stomach upset and ulcers, convulsions, damage to kidneys and liver, and death.	Some chromium VI compounds are ***known human carcinogens***, based on both exposed workers and laboratory studies. Animal studies indicate reproductive effects and fetal toxicity.
--	Copper (and its compounds)	NJDOH	Exposure to dust and fume can irritate eyes, nose and throat. May also cause "metal fume fever," with symptoms similar to flu. Onset may be delayed for hours or days following exposure.	May decrease fertility in both males and females. Repeated exposure can cause chronic irritation of nose and even perforation of septum. May also lead to thickening and greenish coloration of skin, coloration of teeth and hair. Repeated high exposure can affect liver.
75-09-2	Dichloromethane	ATSDR	Inhalation effects include slower reaction time, loss of fine motor control, dizziness, nausea, tingling or numbness in fingers and toes, increasing up to unconsciousness or death. Dermal contact causes burning sensation and skin reddening; contact with eyes can burn cornea.	Impairment of hearing and vision. Causes ***cancer*** in laboratory studies.
100-41-4	Ethylbenzene	NJDOH	Irritates eyes, nose, throat. Contact can irritate skin. Inhalation can cause dizziness, unconsciousness, difficulty breathing and death.	Limited evidence that damages developing fetus. Prolonged high exposure may damage liver. May be mutagenic, but not known whether carcinogenic. Nervous system damage is unknown, but is caused by many solvents.
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	NJDOH*	Inhalation irritates nose, mouth and throat. Higher concentrations can lead to fluid buildup (pulmonary edema), or spasm of windpipe, which can cause death. Contact with liquid can cause severe eye burns, irritation or burning of skin.	Causes ***cancer*** of the nasal passages in laboratory studies. Repeated exposure can cause bronchitis and asthma-like allergy. May cause skin allergy with heightened sensitivity to future low-level exposures.

* Formaldehyde fact sheet issued in 1989 is being revised.

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 ***cancer*** in exposed workers.
7664-39-3	Hydrogen fluoride	ATSDR	Inhalation effects include damage to lungs and heart, death. Dermal contact will burn skin and eyes.	Irritation of eyes, skin and lungs.
--	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)	NJDOH*	Exposure to heated fumes can cause "metal fume fever," with symptoms similar to flu, as well as congestion and coughing (manganese "pneumonia").	Repeated exposure may cause brain damage, with ultimate effects resembling Parkinson's disease. May damage liver, kidney, lungs.
67-56-1	Methanol	EPA	Ingestion effects range from headaches 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	ATSDR	Inhalation effects include irritation of nose, throat, skin and eyes. Laboratory studies have shown birth defects, unconsciousness and death; neural impairment at lower levels.	Studies not reported.
108-10-1	Methyl isobutyl ketone	EPA	Range from headaches, dizziness, nausea and numbness in fingers and toes to unconsciousness and death. Vapor irritates eyes, nose and throat. Liquid irritates eyes and skin.	Nausea, headaches, weakness and adverse liver effects in workers. Kidney and liver effects, as well as fetal toxicity, in laboratory studies.
--	Nickel (and its compounds)	ATSDR	Inhalation effects include bronchitis and reduced lung function. Ingestion leads to stomach problems, blood and kidney effects, as well as liver, immune system and reproductive effects in laboratory studies.	Small amounts are essential for animal nutrition, may be for humans. Allergic skin rashes. ***Cancer*** of lung and nasal sinus seen in nickel workers, inhalation of insoluble nickel compounds caused cancer in laboratory studies.

* Manganese fact sheet issued in 1989 is being revised.

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.
7664-38-2	Phosphoric acid	NJDOH	Contact can severely damage skin and eyes, causing permanent damage. Breathing vapor can irritate nose, throat and lungs.	Repeated exposure to vapor can cause bronchitis. Long-term exposure to skin can cause drying and cracking.
100-42-5	Styrene	ATSDR	Inhalation effects include depression, trouble concentrating, muscle weakness, fatigue, and nausea; possibly irritation of eye, nose and throat. Laboratory studies show damage to nose and liver, reproductive and fetal toxicity. Ingestion led to damage of liver, kidney, brain and lungs in laboratory studies.	Studies not reported.
7664-93-9	Sulfuric acid	NJDOH	Inhalation can irritate the lungs; higher exposures can lead to fluid buildup (pulmonary edema), a medical injury. Contact with skin and eyes can cause third-degree burns and blindness.	Repeated inhalation can lead to bronchitis, and may lead to emphysema. Exposure to vapor may cause chronic runny nose, tearing of the eyes, nosebleeds and stomach upset, as well as erosion and pitting of teeth. Some evidence of increased lung ***cancer*** in exposed workers.
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.
1330-20-7	Xylene (mixed isomers)	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 can lead to stomach cramps, nausea and vomiting. Inhalation can cause "metal fume fever," probably an immune reaction of lungs and body temperature. Dermal exposure causes skin irritation in laboratory studies.	An essential element in the human diet. Prolonged ingestion of excessive levels can cause anemia, damage to pancreas, and reduction of beneficial cholesterol. Laboratory studies indicate effects on fertility and fetal size.

Appendix E – Uses of Chemicals on the "Top 25" Lists for Releases and 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 1998 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 by-products of production processes. A prime example is methanol, generated as a by-product 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/toxfaq.html>
- *OPPT Chemical Fact Sheets*, EPA Office of Pollution Prevention and Toxics <www.epa.gov/chemfact/>
- *Chemical Backgrounders*, Environment Writer, National Safety Council's Environmental Health Center <www.nsc.org/EHC/ew/chemical.htm>
- *Kirk-Othmer Concise Encyclopedia of Chemical Technology* (New York and Toronto: John Wiley & Sons, 1985)

CAS Number	Name	Uses
75-05-8	Acetonitrile	Primarily used by chemicals industry to extract inorganic and organic chemicals, especially butadiene. Also used in the manufacture of pesticides.
--	Arsenic (and its compounds)	Produced as a by-product of the operation of copper and lead smelters. Inorganic arsenic compounds are mainly used to preserve wood. Also used to make agricultural insecticides and weed killers.
1332-21-4	Asbestos (friable)	Principal use is in asbestos cement products. Resistant to heat and most chemicals, asbestos fibers are also used in roofing shingles, paper products and friction products (automobile clutch, brake and transmission parts).
71-36-3	n-Butyl alcohol	Main use (more than half) is in production of butyl acrylate and methacrylate esters, used in making latex (water-based) paints. Added to plastics, hydraulic fluids and detergent formulations. Also used by pharmaceutical industry as an extractant and as an additive in certain medicines.
75-15-0	Carbon disulfide	Primarily used (more than half) in production of rayon. Also in production of chemicals for agriculture (fumigants), for production of rubber and cellophane. Some uses as an industrial solvent, including metal cleaning. Formerly, a principal use was as a feedstock for production of carbon tetrachloride, an ozone-depleting chemical.
7782-50-5	Chlorine	Used to make ethylene dichloride/vinyl chloride, polyurethanes and other organic chemicals. Used as a bleach in pulp and paper production. Also used in water and wastewater treatment.
--	Chromium (and its compounds)	Used in steel and other alloys, in making refractories (bricks used in industrial furnaces), dyes and pigments, and in plating chrome, tanning leather and preserving wood. Chromium and its compounds are also used as cleaning agents in electroplating, as mordants in textile manufacture and in other processes.
--	Copper (and its compounds)	Used in electrical and electronic products, building construction, and industrial machinery and equipment. Copper and its compounds appear in electroplated coatings, cooking utensils, piping, dyes and dye processes, wood preservatives and pesticides. Also used in mildew preventives, corrosion inhibitors, fuel additives, printing and photocopying, pigments for glass and ceramic production. Copper compounds are also used as catalysts, as a purifying agent in the petroleum industry and in alloys and metal refining.

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
75-09-2	Dichloromethane	Widely used as a solvent in paint strippers, including furniture strippers, home paint removers and aircraft maintenance products. Used as a solvent and degreasing agent in metal cleaning and a process solvent in pharmaceutical production. Also used in production of plastics (polycarbonate and triacetate fiber) and polyurethane foam. Other uses include electronics manufacture, film processing, food processing and production of pesticides, synthetic fibers, paints and coatings. No longer widely used as an aerosol propellant.
100-41-4	Ethylbenzene	Used in the production of styrene (99 percent of production) and synthetic polymers, and as a solvent. A significant component of gasoline.
74-85-1	Ethylene	Principally used (more than half) in producing low-density and high-density polyethylenes. Also serves as an intermediate in production of vinyl chloride, ethylene oxide, ethylbenzene and others. Used as a solvent, a refrigerant, a raw material for anesthetics and a medication. Also used to regulate plant growth and, as a compressed gas, to ripen various fruits.
107-21-1	Ethylene glycol	Primary use (about one-third) in antifreeze and de-icing solutions (for cars, airplanes, boats). Also used in manufacturing polyester fiber and PET resins (for bottles and film). Also used as a solvent by the paint and plastics industries, and as a constituent of photographic developing solutions, hydraulic brake fluids and inks.
50-00-0	Formaldehyde	Largest use is in production of resins, including urea-formaldehyde (UF) and phenolic resins (used in particleboard and plywood, respectively) and acetal resins. Also in production of acetylenic chemicals (butanediol, methylene diisocyanate (MDI) and other industrial chemical products. Also serves as a preservative in medical laboratories and as an embalming fluid and sterilizer.
7647-01-0	Hydrochloric acid	Uses include brine treatment for chloralkali, steel pickling, food processing (including production of corn syrup) and production of calcium chloride. Also used in oil well acidulation (to stimulate oil and gas production), in 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). Also used in oil well acidulation (to stimulate oil and gas production) and in froth flotation (to separate metals from ores). Used as a chemical intermediary for fluorocarbons, aluminum fluoride, cryolite, uranium hexafluoride, and fluoride salts. Used in fluorination processes (especially in the aluminum industry, in dye chemistry and in fluoride manufacture), as a catalyst (especially in the petroleum industry) and in alkylation, isomerization, condensation, dehydration, and polymerization reactions. Used as a cleaning agent (for cast iron, copper, brass, brick and stone) and in etching and polishing.
--	Lead (and its compounds)	Most important use is in producing batteries. Also used in ammunition, metal products (solder and pipes), roofing and devices to shield X-rays. Uses in gasoline, paints and ceramic products, caulking and pipe solder have been dramatically reduced. Lead compounds appear in dyes, explosives, asbestos brake linings, insecticides and rodenticides, ointments and other products. Also used as catalysts, cathode material, flame retardant, metal and wire coating, agent or constituent in glass manufacture and agent for recovering precious metals, notably gold.
--	Manganese (and its compounds)	Manganese is used in steel production to improve hardness, stiffness and strength. Manganese compounds are used in production of dry-cell batteries, in glazes, ceramics and fertilizers, as fungicides, as oxidizing agents and disinfectants and in other uses.

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
67-56-1	Methanol	Largest use of methanol in the US 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 US). Also used in production of formaldehyde, acetic acid, chloromethanes and methyl methacrylate. Also used as a solvent in paint strippers, aerosol spray paints, wall paints, carburetor cleaners and windshield-washing products. Methanol is used in coating wood and paper, in producing synthetic fibers (acetate and triacetate) and in manufacturing pharmaceuticals.
78-93-3	Methyl ethyl ketone	The largest use (two-thirds) is as a solvent in protective surface coatings, although this use is decreasing. Also added to adhesives, used in lube-oil dewaxing and added to printing inks. Used in manufacture of organic chemicals, including drugs and cosmetics.
108-10-1	Methyl isobutyl ketone	The largest use (two-thirds) is as a solvent in protective surface coatings, although this use is decreasing. Also added to adhesives. Also used in production of other chemicals, including rubber antioxidants and acetylenic surfactants (for inks, paints and pesticides) and in solvent extraction.
--	Nickel (and its compounds)	In alloys, used in making metal coins and jewelry and metal parts for industrial uses. Nickel compounds are also used for nickel plating (electroplating), in nickel-cadmium battery manufacture, to color ceramics and as catalysts.
--	Nitric acid and nitrate compounds	The chief use of nitric acid is in producing ammonium nitrate fertilizer. Also used in the manufacture of cyclohexanone and as a raw material for adipic acid and caprolactam, both used in making nylon. Nitrates are used in producing explosives, including gunpowder.
7664-38-2	Phosphoric acid	Used in production of sodium phosphates, as well as calcium, ammonium and potassium phosphates. (Phosphates are used in salts, soaps and detergents.) Also used in fertilizers, yeasts, fire control agents, waxes and polishes, gelatin and soft drinks. Used in chemical production (of ethylbenzene, propylene and cumene) and as an antioxidant, acidulant and flavor agent in food products.
100-42-5	Styrene	Mainly used (two-thirds) in producing polystyrene. Also used in production of acrylonitrile-butadiene-styrene (ABS) resins and acrylonitrile-sytrene resins; these are used in automobile parts, appliances (including refrigerators and freezers), pipe, business machines and luggage and recreational goods. Also used to produce styrene-butadiene latex and rubber, unsaturated polyester resins, thermoplatics elastomers and various styrene copolymers.
7664-93-9	Sulfuric acid	Principal use (almost three-quarters) is in fertilizer production, generally produced by fertilizer manufacturers themselves. Sulfuric acid generated during smelting is sold for numerous chemical and industrial uses, but is also used in leaching copper. Industrial uses include production of explosives, other acids, dyestuffs, glue, wood preservatives and lead-acid vehicle batteries. Also used in purifying petroleum, pickling metal, electroplating and nonferrous metallurgy.
108-88-3	Toluene	By far, the largest use is in gasoline; most toluene is never separated from petroleum crude oil (its largest source), but is pumped from refineries to other locations where it is added directly to gasoline. Toluene "recovered" from crude oil is principally used to make benzene. Toluene is also a by-product 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.
1330-20-7	Xylene (mixed isomers)	Used as a solvent in the printing, rubber and leather industries. Also used as a cleaning agent, a thinner for paint and in paints and varnishes.
--	Zinc (and its compounds)	The most common use of zinc is in galvanizing metals (including steel). Zinc is also used in dry-cell batteries and in alloys such as brass and bronze. Zinc compounds are used in production of paint, rubber, dye, wood preservatives and ointments. Zinc sulfate, as one example, is used principally in fertilizers, but also in animal feed, water treatment, chemical manufacture and froth flotation (to extract metals from ore).

Page 1 of 5

EPA United States Environmental Protection Agency

FORM R

TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

WHERE TO SEND COMPLETED FORMS: 1. EPCRA Reporting Center, P.O. Box 3348, Merrifield, VA 22116-3348, ATTN: TOXIC CHEMICAL RELEASE INVENTORY

Enter "X" here if this is a revision

For EPA use only

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR 19 ____

SECTION 2. TRADE SECRET INFORMATION

2.1	Are you claiming the toxic chemical identified on page 2 trade secret? ☐ Yes (Answer question 2.2; Attach substantiation forms) ☐ No (Do not answer 2.2; go to Section 3)	2.2	Is this copy ☐ Sanitized ☐ Unsanitized (Answer only if "YES" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official	Signature	Date signed

SECTION 4. FACILITY IDENTIFICATION

		TRI Facility ID Number
4.1	Facility or Establishment Name	Facility or Establishment Name or Mailing Address (if different from street address)
	Street	Mailing Address
	City/County/State/Zip Code	City/County/State/Zip Code
4.2	This report contains information for: (Important: check only one) a. ☐ An entire facility b. ☐ Part of a facility c. ☐ A federal facility	
4.3	Technical Contact Name	Telephone Number (include area code)
4.4	Public Contact Name	Telephone Number (include area code)
4.5	SIC Code(s) (4 digits)	a / b / c / d / e / f
4.6	Latitude: Degrees / Minutes / Seconds	Longitude: Degrees / Minutes / Seconds

4.7 Dun & Bradstreet Number(s) (9 digits)	4.8 EPA Identification Number(s) (RCRA I.D. No.) (12 characters)	4.9 Facility NPDES Permit Number(s) (9 characters)	4.10 Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)
a.	a.	a.	a.
b.	b.	b.	b.

SECTION 5. PARENT COMPANY INFORMATION

5.1	Name of Parent Company	☐ NA	
5.2	Parent Company's Dun & Bradstreet Number	☐ NA	(9 digits)

EPA Form 9350-1 (Rev. 4/97) – Previous editions are obsolete.

Page 2 of 5

EPA FORM R PART II. CHEMICAL - SPECIFIC INFORMATION	TRI FACILITY ID NUMBER
	Toxic Chemical, Category or Generic Name

SECTION 1. TOXIC CHEMICAL IDENTITY (Important: DO NOT complete this section if you completed Section 2 below.)

1.1	CAS Number [illegible]
1.2	Toxic Chemical or Chemical Category Name [illegible]
1.3	Generic Chemical Name [illegible]

SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you complete Section 1 above.)

2.1	Generic Chemical Name Provided by Supplier [illegible]

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY (Important: Check all that apply.)

3.1 Manufacture the toxic chemical:	3.2 Process the toxic chemical:	3.3 Otherwise use the toxic chemical:
a. ☐ Produce b. ☐ Import		
If produce or import:		
c. ☐ For on-site use/processing	a. ☐ As a reactant	a. ☐ As a chemical processing aid
d. ☐ For sale/distribution	b. ☐ As a formulation component	b. ☐ As a manufacturing aid
e. ☐ As a byproduct	c. ☐ As an article component	c. ☐ Ancillary or other use
f. ☐ As an impurity	d. ☐ Repackaging	

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1	☐ (Enter two-digit code from instruction package.)

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

			A. Total Release (pounds/year) [illegible]	B. Basis of estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	NA ☐			
5.2	Stack or point air emissions	NA ☐			
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
	Stream or Water Body Name				
5.3.1					
5.3.2					
5.3.3					
5.4.1	Underground Injection on-site to Class I Wells	NA ☐			
5.4.2	Underground Injection on-site to Class II-V Wells	NA ☐			

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
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

		NA	A. Total Release (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)
5.5	Disposal to land on-site			
5.5.1A	RCRA Subtitle C landfills	☐		
5.5.1B	Other landfills	☐		
5.5.2	Land treatment/application farming	☐		
5.5.3	Surface impoundment	☐		
5.5.4	Other disposal	☐		

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)

6.1.A. Total Quantity Transferred to POTWs and Basis of Estimate

6.1.A.1. Total Transfers (pounds/year) (enter range code or estimate)	6.1.A.2 Basis of Estimate (enter code)

6.1.B. POTW Name

POTW Address

City	State	County	Zip

6.1.B POTW Name

POTW Address

City	State	County	Zip

If additional pages of Part II, Section 6.1 are attached, indicate the total number of pages in this box ☐ and indicate which Part II, Section 6.1 page this is here ☐ (example: 1,2,3, etc.)

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2 OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)

Off-Site Location Name

Off-Site Address

City	State	County	Zip

Is location under control of reporting facility or parent company? ☐ Yes ☐ No

Range Codes: A = 1 to 10 pounds; B = 11 to 99 pounds; C = 100 to 499 pounds

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (continued)

A. Total Transfers (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1.M
2.	2.	2.M
3.	3.	3.M
4.	4.	4.M

6.2 ___ OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)

Off-Site Location Name

Off-Site Address

City | State | County | Zip

Is location under control of reporting facility or parent company? ___ Yes ___ No

A. Total Transfers (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1.M
2.	2.	2.M
3.	3.	3.M
4.	4.	4.M

SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.

a. General Waste Stream (enter code)	b. Waste Treatment Methods Sequence (enter up to 6 digit codes)	c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data?
7A.1a	7A.1b 1 2 3 4 5 6	7A.1c	7A.1d %	7A.1e Yes ☐ No ☐
7A.2a	7A.2b 1 2 3 4 5 6	7A.2c	7A.2d %	7A.2e Yes ☐ No ☐
7A.3a	7A.3b 1 2 3 4 5 6	7A.3c	7A.3d %	7A.3e Yes ☐ No ☐
7A.4a	7A.4b 1 2 3 4 5 6	7A.4c	7A.4d %	7A.4e Yes ☐ No ☐
7A.5a	7A.5b 1 2 3 4 5 6	7A.5c	7A.5d %	7A.5e Yes ☐ No ☐

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.)

Range Codes: A - 1-10 pounds, B - 11-49 pounds, C - 50-99 pounds

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

FACILITY ID NUMBER

Toxic Chemical, Category or Generic Name

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☐ Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

Energy Recovery Methods (enter 2-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 2-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)		
8.10.1		a.	b.	c.
8.10.2		a.	b.	c.
8.10.3		a.	b.	c.
8.10.4		a.	b.	c.

8.11 Is additional optional information on source reduction, recycling, or pollution control activities included with this report? (Check one box) ☐ YES ☐ NO

* Report releases pursuant to EPCRA Section 329(8) including "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment." Do not include any quantity treated 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 :	1998
A1.1	**NPRI ID :**	
A1.4	**Web Site Address**	http://

A2.0	FACILITY IDENTIFICATION & SITE ADDRESS	
A2.1	**Company Name :**	
A2.2	**Facility Name :**	
A2.3	**Street Address :**	
A2.4	**Street Address :**	
A2.5	**City / District :**	
A2.6	**Province / Territory :**	
A2.7	**Postal Code :**	

A3.0	PARENT COMPANY INFORMATION		
A3.1	**Is the facility controlled by another company or companies ?**	( ) Y/N	If Yes, please use Appendix A.

A4.0	FACILITY PUBLIC CONTACT (Optional)			
A4.1	**Title :**	Dr ( ) Mr ( ) Mrs ( ) Miss ( ) Ms ( )		
A4.2	**First Name :**			
A4.3	**Last Name :**			
A4.4	**Position :**			
A4.5	**Telephone No :**	( ) -	**Ext. :**	
A4.7	**Facsimile No :**	( ) -		
A4.8	**E-mail Address :**			

A5.0	FACILITY PUBLIC CONTACT ADDRESS (Optional)			
Is the mailing address for the public contact in A4.0 different from the facility's site address in A2.0 ?		( ) Y/N If Yes, please provide the address below.		
A5.1	**Company Name :**			
A5.2	**Facility Name :**			
A5.3	**Mailing Address :**			
A5.4	**Mailing Address :**			
A5.5	**City / District :**			
A5.6	**Province / Territory :**		**Postal Code :**	
A5.8	**State :**		**Zip Code/Other :**	
A5.10	**Country :**			

NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

A6.0	FACILITY TECHNICAL CONTACT			
A6.1	Title :	Dr ( ) Mr ( ) Mrs ( ) Miss ( ) Ms ( )		
A6.2	First Name :			
A6.3	Last Name :			
A6.4	Position :			
A6.5	Telephone No :	( ) -	Ext :	
A6.7	Facsimile No :	( ) -		
A6.8	E-mail Address :			

A7.0	FACILITY TECHNICAL CONTACT ADDRESS			
Is the mailing address for the technical contact in A6.0 different from the facility's site address in A2.0 ?		( ) Y/N	If Yes, please provide the address below.	
A7.1	Company Name :			
A7.2	Facility Name :			
A7.3	Mailing Address :			
A7.4	Mailing Address :			
A7.5	City / District :			
A7.6	Province / Territory		Postal Code :	
A7.8	State :		Zip Code/Other :	
A7.10	Country :			

A8.0	COMPANY COORDINATOR (Optional)			
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 :			

A9.0	COMPANY COORDINATOR ADDRESS (Optional)			
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 :		Postal Code :	
A9.8	State :		Zip Code/Other :	
A9.10	Country :			

NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

A10.0	STANDARD INDUSTRIAL CLASSIFICATION CODE (SIC) AND THE NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM CODE (NAICS)	
A10.2	4-Digit Canadian SIC Code :	__ __ __ __
A10.3	4-Digit American SIC Code :	__ __ __ __
A10.6	6-Digit NAICS Code :	__ __ __ __ __ __

A11.0	NUMBER OF FULL-TIME EMPLOYEES OR EQUIVALENT	
A11.1	Number of Employees :	

A12.0	REGULATIONS AND PERMITS (Optional)		
A12.1	Do you report under other environmental regulations or permits ?	( ) Y/N	If Yes, please use Appendix B.

A15.1	COMMENTS ON THE FACILITY (Optional)
A15.2	COMMENTS ON POLLUTION PREVENTION ACTIVITIES (Optional)

NPRI - The National Pollutant Release Inventory

PART A - FACILITY IDENTIFICATION

A16.0	COMPANY OFFICIAL CERTIFYING SUBMISSION	
A16.1	Title :	Dr ( ) Mr ( ) Mrs ( ) Miss ( ) Ms ( )
A16.2	First Name :	
A16.3	Last Name :	
A16.4	Position :	

A17.0	COMPANY OFFICIAL ADDRESS			
Is the mailing address for the company official in A16.0 different from the facility's site address in A2.0 ?		( ) Y/N If Yes, please provide the address below.		
A17.1	Company Name :			
A17.2	Facility Name :			
A17.3	Mailing Address :			
A17.4	Mailing Address :			
A17.5	City / District :			
A17.6	Province/Territory :		Postal Code :	
A17.8	State :		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.

B1.0	SUBSTANCE IDENTITY	
B1.1	CAS Registry Number :	
B1.2	Substance Name :	

B2.0	NATURE OF ACTIVITIES (Select at least one activity)	
B2.1	MANUFACTURE THE SUBSTANCE	
	( )	For On-Site Use / Processing
	( )	For Sale / Distribution
	( )	As a By-product
	( )	As an Impurity
B2.2	PROCESS THE SUBSTANCE	
	( )	As a Reactant
	( )	As a Formulation Component
	( )	As an Article Component
	( )	Repackaging Only
	( )	As a By-product
B2.3	OTHERWISE USE THE SUBSTANCE	
	( )	As a Chemical Processing Aid
	( )	As a Manufacturing Aid
	( )	Ancillary / Other Use
	( )	As a By-product

B10.0	ON-SITE RELEASES		
B10.1	Do you release this substance on site ?	( ) Y / N	If No, go directly to section B14.0

B11.0	REPORTING RELEASES LESS THAN ONE TONNE		
B11.1	If the total releases are less than one (1) tonne, are you reporting this amount as a sum for all media ?	( ) Y/N	If Yes, go directly to section B12.5

B12.0	ON-SITE RELEASES OF THE SUBSTANCE TO THE ENVIRONMENT		
B12.1	AIR RELEASES	BASIS OF ESTIMATE (Select one method)	RELEASES (Tonnes / Year)
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 %)			
	(Jan.-March)	(April-June)	(July-Sept.)	(Oct.-Dec.)
B13.1	%	%	%	%

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)		
	1999	2000	2001
	2002 (Optional)	2003 (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)	OFF-SITE CODES (See Appendix C)
a	Physical Treatment	C / E / M / O		
b	Chemical Treatment	C / E / M / O		
c	Biological Treatment	C / E / M / O		
d	Incineration / Thermal	C / E / M / O		
e i	Containment: Landfill	C / E / M / O		
e ii	Containment: Other Storage	C / E / M / O		
f	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			

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 subtance)

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	1999	2000	2001
	2002 (Optional)	2003 (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)	OFF-SITE CODES (see Appendix C)
a	Energy Recovery	C / E / M / O		
b	Recovery of Solvents	C / E / M / O		
c	Recovery of Organic Substances (Not Solvents)	C / E / M / O		
d	Recovery of Metals and Metal Compounds	C / E / M / O		
e	Recovery of Inorganic Materials (Not Metals)	C / E / M / O		
f	Recovery of Acids and Bases	C / E / M / O		
g	Recovery of Catalysts	C / E / M / O		
h	Recovery of Pollution Abatement Residues	C / E / M / O		
i	Refining or Re-use of Used Oil	C / E / M / O		
j	Other	C / E / M / O		
B25.2	TOTAL			

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)

B26.2	COMMENTS ON TRANSFERS OFF SITE FOR RECYCLING (Optional)

B27.0	ANTICIPATED TRANSFERS OFF SITE FOR RECYCLING (Tonnes / Year)		
B27.1	1999	2000	2001
	2002 (Optional)	2003 (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

P1.0	PARENT COMPANY			
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 :			

P1.0	PARENT COMPANY			
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 :			

P1.0	PARENT COMPANY			
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 :			

Environment Canada Environnement Canada

NPRI - The National Pollutant Release Inventory

APPENDIX B
REGULATIONS & PERMITS AND SURFACE WATER BODIES

NPRI ID :

	REGULATIONS & PERMITS (Section A12.0) (Optional)	
	ID Number	Government Department, Agency or Program Name

	SURFACE WATER BODIES (Codes to be used in section B12.3)	
	Alphabetical Code	Name of water body, stream, creek, river, etc.
	A	
	B	
	C	
	D	
	E	
	F	
	G	
	H	
	I	
	J	
	K	

NPRI - The National Pollutant Release Inventory

APPENDIX C
OFF-SITE FACILITIES

NPRI ID :

S1.0	OFF-SITE FACILITY				
S1.1	Off-Site Code :	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 :		Postal Code :		
S1.8	State :		Zip Code / Other :		
S1.10	Country :				

S1.0	OFF-SITE FACILITY				
S1.1	Off-Site Code :		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 :		Postal Code :		
S1.8	State :		Zip Code / Other :		
S1.10	Country :				

S1.0	OFF-SITE FACILITY				
S1.1	Off-Site Code :		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 :		Postal Code :		
S1.8	State :		Zip Code / Other :		
S1.10	Country :				

COA Form

ANNUAL CERTIFICATE FOR THE OPERATION OF INDUSTRIAL FACILITIES UNDER FEDERAL JURISDICTION FOR THE YEAR 1998

To be completed by SEMARNAP	
1) APPLICATION NUMBER:	**2) ENVIRONMENTAL REGISTRATION NUMBER:**
3) RECEIVED BY: _____ Name and signature	(Signature with date received)
4) License Number:	

In compliance with Articles 1, 4, 5, 11, 109 (BIS and BISm1), 111, 111BIS, 112, 113, 122, 139, 151, 157 y 159 (BIS, BIS 1, BIS 3, BIS 4 y BIS 6), of the General Law of Ecological Equilibrium and Environmental Protection (LGEEPA); Articles 3, 4, 9, 15, 29, 52, 85, 86, 87, 89 y 92 of the Law on National Waters; and pursuant to the Public Agreements of dates April 11, 1997 and April 9, 1998 through which the Secretariat of Environment, Natural Resources and Fisheries (SEMARNAP) shall establish the mechanisms and procedures to obtain the Single Environmental License through one single procedure, as well as the updating of the information about pollutant releases through an Annual Operation Certificate, the company I represent hereby provides the following information to the Institution regarding the annual facility operations.

TO BE COMPLETED BY THE INDUSTRIAL FACILITY	
5) TRADE NAME OF THE FACILITY: _____ I declare that the information contained in this request and the appendices thereto is true. In case of any omissions or false declarations, SEMARNAP may cancel this application or apply appropriate administrative sanctions. **PLACE AND DATE:** _____	_____ Name and signature of the legal representative _____ Name and signature of the technical officer

REGISTRATION DATA

This data should be submitted when this information form is being used for the first time or any of the data has changed during the year of the report.

1) NAME OR FACILITY NAME: | **RFC:**

2) SIEM REGISTRATION NUMBER: | **3) COMMERCE CHAMBER AND NUMBER:**

4) PRIMARY INDUSTRIAL ACTIVITY OF THE FACILITY[2]: | **CMAP CODE[3]:** | **ENVIRONMENTAL CODE[3]:**

5) ADDRESS (Append map according to General Instructions)

Industrial Port ( ) Specify: _____
Town ( ) Street: _____
Outer/inner number: _____ Colonia: _____
State: _____ Postal code: _____
Municipality: _____ Federal entity: _____
Telephone _____ Fax: _____ E-mail: _____

6) Address to hear or receive notifications (in case it is different from the one above):

Street: _____ Outer/inner number: _____
Colonia: _____ State (or town): _____
Postal code: _____ Municipality or delegation: _____
Federal entity: _____ Telephone: _____
Fax: _____ E-mail: _____

7) DATE OF START OF OPERATIONS: Day ☐☐ Month ☐☐ Year ☐☐☐☐

8) EQUIVALENT NUMBER of EMPLOYEES[4]

Employees: _____ Workers: _____ Total: _____

9) WORKING SHIFTS (indicate worked hours)

Monday to Friday _____ h/d Saturday _____ h/d
Sunday _____ h/d Total _____ h/wk.

10) AVERAGE NUMBER of WORKERS, by DAY and WORKED SHIFT (Consider a shift for every different schedule. DO NOT Leave blanks. If there is not information, write NA/ not applicable)

Shifts		Average number of workers						
Nr.	Schedule	M	T	W	T	F	S	S

11) Is it a Maquiladora of temporary importation regime? Yes ( ) No ( )

12) Is it part of a corporation?[5] Yes ( ) No ( ) **Specify:**

13) CAPITAL PARTICIPATION: Only national ( ) Mostly national ( ) Mostly foreign ( ) Only foreign ( )

14) NAME OF AGENT OR LEGAL PROMOTER (present document): | **RFC:**

1. Mexican Managerial Information System
2. Present copy of proving document in which the main industrial activity is indicated, for example: state or municipal license, tax document, and land use license. This section is to be completed by SEMARNAP.
3. The Mexican Classification of Activities and Products Code (CMAP) is obtained along with the Environmental Code (CA). This section is to be completed by SEMARNAP.
4. To calculate the equivalent number of working people, divide the total number of worker-hours (the addition of worked hours in a year by all the employees at the facility) by 2000 hours. That is, if 19 employees work at a facility and each one works 48 hours a week during 50 weeks a year, then 45600 hours a year are worked (19x48x50) and you have 22.8 equivalent employee hours (45600/2000). To calculate the number of workers, you should proceed in the same way.
5. Indicate if the facility belongs to a national or international corporation.

SECTION I. GENERAL TECHNICAL INFORMATION

As set forth in Articles 19 and 21 of the regulations of the LGEEPA under prevention and control of atmospheric pollution, the reporting of information contained in this section is obligatory.

1.1 CHANGE of NAME or TRADE NAME

Day ☐☐ Month ☐☐ Year ☐☐☐☐

If this is the case, enter the date of the change of name or trade name of the facility. Changes in process and reductions and increases in production should be reported in the Operating License or Single Environmental License (LAU), giving prompt notification at the INE procession window or at the state delegations of Semarnap. In cases of change of domicile or industrial transfer, the facility must process a new License.

1.2 RISK and CONTINGENCIES

If applicable, write down the date on which the Environmental Impact Assessment was issued and/or the Accident Prevention Program or the Contingency Program was approved.

1.2.1 Date of submission of the last Risk Assessment: Day ☐☐ Month ☐☐ Year ☐☐☐☐

1.2.2 Date of the last update of the Accident Prevention Program or Contingency Program: Day ☐☐ Month ☐☐ Year ☐☐☐☐

1.3 OPERATIONS AND PROCESS DESCRIPTION

If necessary due to changes in the facility or if using this form for the first time, prepare the *General Operating Diagram* and *The Table of Consumption, generation and/or release points* following the example included in the General Instructions Catalogue, section VI.3, that comes with this form. The diagram (annex 1.3b) and the Summary Table (annex 1.3.c) shall include all areas (production, wastewater treatment, waste management, services, etc.) where there are points of raw materials, water or energy use, or where pollutants are generated, stored or released, for example, when:

- there is an input, as direct or indirect consumption, of some of the substances listed in table number 12 in the code catalogue,
- caloric energy is used or produced,
- water is used, or
- any of the substances contained in the list is generated, stored, or emitted to the environment.

In case there are different production processes, the facility should report and present them. Their identification should follow a consecutive increasing numeric order, as shown in the instruction section. The emission points (machinery, processes, services, control equipments, etc.) identified in these diagrams will be used throughout the whole form, so they should be clearly defined following the criteria cited before.

1.4 DIRECT and INDIRECT RAW MATERIALS including raw materials that contain any of the substances listed in Table 12 of the General Code Catalogue.

Name[1]			Consumption Point[2]	Physical state[3]	Type of storage[4]	Annual consumption	
Commercial	Chemical	CAS Number				Amount[5]	Unit[6]

1 Indicate the commercial and chemical names of the raw materials consumed. When applicable, provide the information of the pure raw materials as well as the Chemical Abstracts Service identification number CAS.
2 Indicate the number appearing in the General Operating Diagram and on the summary table corresponding to the equipment or process in which the raw material is consumed.
3 Physical State Codes may be found in Table 1 of the General Code Catalogue.
4 According to Table 2 of the General Code Catalogue.
5 Indicate the amount consumed during the year reported.
6 Units of mass (kgs), tons (metric tons), pounds or volume liters, gallons, barrels, square meters or square feet can be reported. If the units are unknown, the term pieces can be used.

1.5 PRODUCTS

Product Name	Physical State[1]	Type storage[2]	Annual production	
			Amount	Unit[3]

1 The physical state codes can be found in Table 1 of the General Code Catalogue.
2 According to Table 2 of the General Code Catalogue.
3 Units of mass (kgs), tons (metric tons), pounds or volume liters, gallons, barrels, square meters or square feet can be reported. If the units are unknown, the term pieces can be used.

1.6 ENERGY CONSUMPTION

1.6.1 Annual consumption of fossil fuel

Fuel type[1]	Annual consumption	
	Amount	Unit[2]

1 Indicate whether the employed fuels natural gas (NG), LP gas, fuel oil (FO), gasoil (GO), diafano (DF), diesel (DI), gasoline (GA), coal (CA), burned wastes (BW) or others. Low caloric power fuels such as: sugar cane pulp, cellulose, wood or fuels coming from wastes where released heat is used in production processes, steam or electricity generation shall be considered as burned wastes and, therefore, be reported in this Table. Whenever the facility counts on service gasoline stations, diesel or LP gas for the use in vehicles or service lifts, such amount of consumption shall not be considered.
2 Units of mass (kgs), tons (metric tons), pounds or volume liters, gallons, barrels, square meters or square feet can be reported. If the units are unknown, the term pieces can be used.

1.6.2 Annual consumption of electric energy

Type of supply[1]	Annual consumption	
	Amount	Unit[2]

1. Indicate whether the consumed electric energy comes from external supplier (EE) or is generated at the facility site by burning fossil fuels (CF), burninng cane sugar pulp, cellulose, wood, other wastes (CDR) or other alternative energy sources (OM).
2. Units suchs as: J/s (joules/second), MJ/hr (megajoules/hour), W (watts), KW (kilowatts) or MW (megawatts) can be used.

SECTION II. ATMOSPHERIC POLLUTION

Pursuant to Article 19 and 21 of the LGEEPA Regulations on Atmospheric Pollution Prevention and Control, the following data shall be provided the first time this reporting form is used or when the facility data are different from those reported in the Single Environmental License, the Release Inventory or the last Operating Certificate.

2.1 GENERATION of POLLUTANTS (odors, gases and/or liquid or solid particles)

2.1.1 Characteristics of the machinery, equipment or activity that generates pollutants

Name of machinery, equipment or activity[1]	Release point[2]	Length of Operation[3]	Type of emission[4]	Only for combustion equipment				
				Capacity of equipment[6]		Annual fuel consumption(s)[7]		
				Amount	Unit[6]	Type[7]	Amount	Unit[7]

1 Indicate the name of the equipment (process, machinery or activity) for pollutant release points.
2 Indicate the identification number of the machinery, equipment or activity for pollutant release points according to the General Operating Diagram and summary table of section 1.3.
3 Indicate length of equipment performance or how long the activity took place during a year's time (hours per year).
4 Indicate whether the emission is point source (C) or fugitive (F).
5 This section shall be reported whenever dealing with external-combustion equipment (boilers, furnaces, etc.) or internal-combustion (energy generation plants with diesels, gas turbines, compressors, etc.).
6 Indicate the nominal thermal capacity of the combustion as defined by the manufacturer in: cc (boiler power), MJ/hr (megajoules/hour), kcal/hr (kilocalories/hour), BTU/hr (British Thermal hour/Unit) or lb/hr (pounds of steam/hour).
7 Indicate whether the employed fuel is natural gas (NG), LP gas, fuel oil (FO), gasoil (GO), diafano (DF), diesel (DI), gasoline (GA), coal (CA), burned wastes (BW) or others and the annual consumption in mass: ton (metric tons), kg (kilograms) or lb (pounds); or units of volume: gal (gallons), brl (barrels), lt (liters), m^3 (cubic meters) or ft^3 (cubic feet).

2.1.2 Characteristics of chimneys and release ducts

Duct or chimney[1]	Release point[2]	Related release points [3]	Height (m)[4]	Inner diameter (m)	Gas flow speed (m/seg)[5]	Output temperature (ºC)

1 Indicate name or identification number used at the facility to identify the chimney or duct that is being reported. If it does not apply, indicate by NA (not applicable).
2 According to the General Operating Diagram and Summary Table No. 1.3 indicate the identification number of the duct or chimney at which releases are generated.
3 Indicate each generation point (refer to the equipment table, machinery or activity, see Table 2.1.1) for each reported release point.
4 Height in meters of the release chimney or duct, starting from the ground level.
5 Indicate in m/seg (the average speed of output gas flow under normal performance circumstances). The data shall correspond to the gas and particle sampling at chimneys whenever the parameters of NOM-085-ECOL-1994 are applied. In the cases in which this norm is not applicable and the gas output speed is unknown as well as when dealing with vent ducts, it shall be indicated by NA (not applicable).

2.2 POLLUTANTS AND PARAMETERS UNDER REGULATION

Emission Point[1]	Equipment or Process subject to norm[2]	Norm to Apply[2]	Parameters[2]	Maximum permissible value		Emission[3]		Estimation method[4]
				Amount	Unit[2]	Amount	Unit	

1 Indicate the identification number of duct or chimney at which releases are generated, according to the General Operating Diagram and summary table requested in section 1.3.

2 Make a list of operations and equipment for each release point, according to table 2.1.2, and indicate the pollutant or normed parameter and the number of the corresponding norm, according to the following list:

Equipment or operation	Norm	Normed parameter	Units	Observations
Combustion	NOM-085-ECOL-1994	Particles	mg/m^3 ó $kg/10^6Kcal$	Corrected at 5% O_2 when referenced in concentrations
Combustion	NOM-085-ECOL-1994	SO_2	ppm ó $kg/10^6Kcal$	Corrected at 5% O_2 when referenced in concentrations
Combustion	NOM-085-ECOL-1994	NOx	ppm ó $kg/10^6Kcal$	Corrected at 5% O_2 when referenced in concentrations
Combustion	NOM-085-ECOL-1994	Excess of air	%	Equipment less than 5,200 Mj/h
Combustion	NOM-085-ECOL-1994	Smog density	Unites	Equipment less than 5,200 Mj/h
Particle releases	NOM-043-ECOL-1993	Particles	mg/m^3	In relation to gas flow
Cement	NOM-040-ECOL-1993	Particles	kg/m^3	Calcination furnace
Clinker furnace	NOM-040-ECOL-1993	Particles	mg/m	Crushing, grinding and cooling
Glass production	NOM-097-ECOL-1994	Particles, NOx	kg/ton	kg/ton of melted glass
Sulfuric acid	NOM-039-ECOL-1993	Mists of SO_2, H_2SO_4/SO_3	kg/ton	kg/ton of H_2SO_4 at 100%
Dodecylbenzene sulfonic acid	NOM-046-ECOL-1993	Mists SO_2, H_2SO_4/SO_3	g/kg	g/kg of dodecilbencen sulfuric acid at 100%
Cellulose production	NOM-105-ECOL-1996	Particles, totally reduced S (as H_2S)	mg/m^3	Corrected at 8% O_2 in recovering furnace and 10% O_2 in lime furnace
Automobile industry	NOM-121-ECOL-1998	VOC's	g/m^2	m^2 of covering area

3 Indicate the value obtained during the last smapling of the reporting year. The sampling register must be kept as well as the technical papers related to show in case it is required by INE or PROFEPA. Report the average value of the last month, in case of every day or weekly measurements of excess of air are taken to fulfill the NOM-085-ECOL-1994 requirements.

4 Indicate the method used to perform the reported measurement, according to the respective technical norm.

2.3 ANNUAL EMISSIONS

The requested data in the following tables correspond to the release points reported in Table 2.1.1 and can be estimated either from the results of measurements or through the application of estimation methods, mass balances or mathematical models of emissions. The corresponding calculation report should be kept and made available in case INE or PROFEPA requests it. In cases in which methods or emission control equipment are not applied, indicate NA (not applicable) in the corresponding columns. This is not a subject of sanctions at all. The information requested in Tables 2.3.4, 2.3.5 and 2.3.6 is not compulsory until the corresponding Official Mexican Norms are issued. The information that is requested in the table 2.3.7 should be submitted by those facilities that submitted *el programa de obras y acciones* to reduce the emissions of Volatile Organic Compounds, as requested in the Operating License or the Single Environmental License.

2.3.1 Sulfur dioxide

Release point[1]	Annual emission			Control equipment or method		
	Amount[2]	Unit[3]	Estimation method[4]	Code[5]	Efficiency (%)[6]	Estimation method[7]

1 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
2 Indicate the annual amount of the released pollutant.
3 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
4 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
5 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
6 Report the last measured efficiency value or estimate through an indirect method.
7 Indicate the method used to estimate efficiency, according to Table 4 of the General Code Catalogue.

2.3.2 Nitrogen 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, HC[1]

Release points[2]	Annual emission			Control equipment or method		
	Amount[3]	Unit[4]	Estimation method[5]	Code[6]	Efficiency (%)[7]	Estimation method[8]

1 Report the total hydrocarbons (methanic and non-methanic) released to the atmosphere by combustion equipment. The release of hydrocarbons in processes that do not include combustion equipment are reported in Table 2.3.7 (volatile organic compounds).
2 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
3 Indicate the annual amount of the released pollutant.
4 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
5 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
6 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
7 Report the last measured efficiency value or estimate through an indirect method.
8 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

2.3.5 Carbon monoxide

Release points[1]	Annual emission			Control equipment or method		
	Amount[2]	Unit[3]	Estimation method[4]	Code[5]	Efficiency (%)[6]	Estimation method[7]

1 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
2 Indicate the annual amount of the released pollutant.
3 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
4 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
5 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
6 Report the last measured efficiency value or estimate through an indirect method.
7 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

2.3.6 Carbon dioxide

Release points[1]	Annual emission			Control equipment or method		
	Amount[2]	Unit[3]	Estimation method[4]	Code[5]	Efficiency (%)[6]	Estimation method[7]

1 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
2 Indicate the annual amount of the released pollutant.
3 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
4 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
5 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
6 Report the last measured efficiency value or estimate through an indirect method.
7 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

2.3.7 Volatile organic compounds[1]

Release points[2]	Annual emission			Control equipment or method		
	Amount[3]	Unit[4]	Estimation method[5]	Code[6]	Efficiency (%)[7]	Estimation method[8]

1 If this is the case, the data in this table shall correspond to the conditioning factors related to the Action and Building Plan to reduce Volatile Organic Compound releases requested in the Operating License or the Single Environmental License. If the facility uses measurements or estimations of specific volatile organic compounds, they shall report them in Section V of this License (Annual Releases and Transfers of listed pollutants).
2 Number corresponding to the General Operating Diagram and summary table requested in Section 1.3.
3 Indicate the annual amount of the released pollutant.
4 Mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds) can be used as measurement units.
5 Indicate the method used to estimate the total annual released amount, according to Table 4 of the General Code Catalogue.
6 Indicate the control method(s) of air releases, according to Table 7 of the General Code Catalogue.
7 Report the last measured efficiency value or estimate through an indirect method.
8 Indicate the used method to estimate efficiency, according to Table 4 of the General Code Catalogue.

SECTION III. WATER USE and DISCHARGE of WASTEWATERS

To report the information contained in this section is optional and will be used for statistical purposes. The omission of this section shall bring about no consequences at all.

3.1 WATER USE

Water extraction source[1]	Concession or assignment license number[2]	Concession entity[3]	Annual water used	
			Amount[4]	Unit[5]

1 Indicate the origin of every extracting or supplying source upon which the facility relies. Indicate also: network of potable water (PW), superficial (FS), underground (UG), salty (SO), treated or reused (TR) or of any other kind (OK) of source.
2 Indicate the corresponding number to the title or assignation, according to jurisdictional area of source used.
3 Indicate the name of administrative entity that granted concession or assignation.
4 Indicate the annual total amount of water used from each extracting source.
5 Volume units such as: lt. (liters), m^3 (cubic meters), ft^3 (cubic feet) or gal (gallons) shall be used.

3.2 DISCHARGE of WASTEWATERS

3.2.1 General Discharge Data

Discharge type[1]	Release point[2]	Discharge number[3]	Hydrological region[4]	Modifications[5]		Discharge frequency[7]	Crop irrigation[8]	Annual *in situ* treatment		
				Permits and records	REPDA[6]			Code[9]	Amount[10]	Unit[11]

1 According to Table 5 of the General Code Catalogue.
2 Number corresponding to the Operating Diagrams and Summary Table, as requested in section 1.3.
3 When applicable, establish the relationship between the release points identified on the Operating Diagrams and Summary Table and the numbers of discharge that appear in the application done at the National Water Commission. When it is not the case, indicate NA (not applicable).
4 According to Table 11 of the General Code Catalogue and the map of Hydrologic Regions.
5 When applicable, indicate the modifications to the permits or registers of the authorized discharges.
6 When applicable, indicate the certificate number of modification from the Public Registry of Water Rights (PRWR).
7 Indicate if it is continuous (C), intermittent (I) or occasional (O).
8 When it is used for watering crops, indicate if it is of restrictive (R) or non-restrictive type (N).
9 According to Table 6 of the General Code catalogue.
10 Report the annual total volume of treated water at the facility.
11 Volume units such as: lt. (liters), m^3 (cubic meters), ft^3 (cubic feet) or gal (gallons) shall be used.

3.2.2 Wastewater discharge quality description[1]

Parameter[3]	Release point[2]							
Annual volume [cubic meters]								
Hydrogen potential (pH)								
Temperature [ºC]								
Fats and oils [mg/l]								
Floating matter (present or absent)								
Sedimentable solids [ml/l]								
Total suspended solids [mg/l]								
Biochemical oxygen demand (DBO_5) [mg/l]								
Total arsenic [mg/l]								
Total cadmium [mg/l]								
Total cyanide [mg/l]								
Total copper [mg/l]								
Hexavalent chromium [mg/l]								
Total phosphorus [mg/l]								
Total mercury [mg/l]								
Total nickel [mg/l]								
Total nitrogen [mg/l]								
Total lead [mg/l]								
Total zinc [mg/l]								
Fecal coliform bacteria [NMP/100 ml]								
Helminth eggs [organisms/l]								

1 Some discharge parameters, such as: heavy metals and cyanide compounds, are included in the list of substances subject to be reported (Table 12 of the General Code Catalogue) and shall be reported again in section V. However in this section, at this time, the concentration value shall not be reported, but the corresponding total annual release.
2 Indicate the discharge point corresponding to the Operating Diagrams and Summary Table, as requested in section 1.3 and which also appears in the previous table (3.2.1).
3 Annual average according to volume. Estimated value departing from the data presented to the authorities throughout the reporting year (for CNA, use the values contained in the declarations for water discharge rights, presented every three months).

SECTION IV. HAZARDOUS WASTE GENERATION, TREATMENT and TRANSFER

Reporting the information contained in this section is optional for facilities that generate hazardous wastes, as well as for the ones responsible for providing hazardous waste treatment services. If the information is provided, it will be considered as fulfilling, for the time span in which the Operation Certificate is valid, the current legal requirement to present periodic information related to the generation or transfer of these wastes. Otherwise, the facilities should present the corresponding manifests in the time requested.

4.1 HAZARDOUS WASTE GENERATION[1]

Generation point[2]	Waste identification		Annual generation		*In situ* treatment[7]		
	NOM-052-ECOL-93[3]	Code[4]	Amount[5]	Unit[6]	Code[8]	Annual treated amount	Unit[6]

1 Hazardous waste treatment companies who, as a consequence of their operations, generate additional hazardous wastes, shall also provide the information requested in this table, reporting the hazardous wastes *generated* by the facility that is reporting.
2 Number corresponding to the Operating Diagrams and Summary Table as requested in section 1.3.
3 Identification number of wastes according to NOM-052-ECOL-93.
4 Code of the hazardous waste according to Table 9 in the General Code Catalogue.
5 Annually generated amount, at the generating (process or activity) point, which is being reported.
6 Use volume units, such as: lt. (litres), m^3 (cubic meters), ft^3 (cubic feet) or gal (gallons) or mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds). If treating with containers impregnated with hazardous wastes, report as units the characteristics of these containers; i. e.: metallic drum of 200 lt., plastic bucket for 1 gal. etc.
7 Indicate the treatment code and volume of treated wastes at the facility that is reporting. This information corresponds only to the wastes generated by the facility itself; the treatment(s) provided by a hazardous waste treatment company shall be reported in Table 4.4. Whenever more than one treatment is provided, every treatment shall be indicated on a line; the generation point for each one of them shall be repeated.
8 According to Table 8 of the General Code Catalogue.

4.2 HAZARDOUS WASTE STORAGE AT THE FACILITY SITE

Generation point[1]	Waste identification		Storage							
	NOM-052-ECOL-93[2]	Code[3]	Form[4]	Annual amount[5]	Unit[6]	Time[7] (days)	Storage characteristics[8]			
							Local	Material	Ventilation	Lighting

1 Number corresponding to the Operating Diagrams and Summary Table as requested in section 1.3.
2 Waste identification number according to NOM-052-ECOL-93.
3 Code of the hazardous waste according to Table 9 of the General Code Catalogue.
4 According to Table 2 of the General Code Catalogue.
5 Annual amount of waste that is stored. For example; if 22 kilograms of a waste are stored once for 3 days, 15 kilograms of the same waste are stored for two months and 32 kilograms remain there for 8 days on another time, then the amount to report will be: 22+15+32= 69 kilograms of the waste.
6 Use volume units, such as: lt. (litres), m^3 (cubic meters), ft^3 (cubic feet) or gal (gallons) or mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds). If treating with containers impregnated with hazardous wastes, report as units the characteristics of these containers; i. e.: metallic drum of 200 lt., plastic bucket for 1 gal. etc.
7 Maximum storage time of the waste, indicated in days.
8 According to Table 3 of the General Code Catalogue.

4.3 HAZARDOUS WASTE TRANSFER[1]

Generation point[2]	Waste identification		Handling company[5]	Total annually transfered	
	NOM-052-ECOL-93[3]	Code[4]		Amount[6]	Unit[7]

1 The hazardous waste generator shall contract only the services of companies, authorized by INE, to handle such wastes. (Articles 151 BIS LGEEPA and 10 from the Hazardous Waste Regulation).
2 Number corresponding to the Operating Diagrams and Summary Table as requested in section 1.3.
3 Waste identification number according to NOM-052-ECOL-93.
4 Code of the hazardous waste according to Table 9 of the General Code Catalogue.
5 Indicate the authorization number for the handling of hazardous wastes given by INE. If this datum is unknown, indicate name of the hazardous waste handling company.
6 Indicate the total amount of the hazardous waste transferred during the year of report.
7 Use volume units, such as: lt. (litres), m^3 (cubic meters), ft^3 (cubic feet) or gal (gallons) or mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds). If treating with containers impregnated with hazardous wastes, report as units the characteristics of these containers; i. e.: metallic drum of 200 lt., plastic bucket for 1 gal. etc.

4.4 HAZARDOUS WASTE TREATMENT. This section is to be completed only by companies providing hazardous waste treatment services.

Waste identification		Treatment or disposal method[3]	Annual total handled	
NOM-052-ECOL-93[1]	Code[2]		Amount[4]	Unit[5]

1 Waste identification number according to NOM-052-ECOL-93.
2 Code of the hazardous waste according to Table 9 of the General Code Catalogue.
3 According to table 8 of the General Code Catalogue.
4 The hazardous waste handling company operating under this license shall indicate here the total amount of wastes annually received.
5 Use volume units, such as: lt. (litres), m^3 (cubic meters), ft^3 (cubic feet) or gal (gallons) or mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds). If treating with containers impregnated with hazardous wastes, report as units the characteristics of these containers; i. e.: metallic drum of 200 lt., plastic bucket for 1 gal. etc.

SECTION V. ANNUAL RELEASE and TRANSFER of LISTED POLLUTANTS

It is optional to report the information contained in this section until the corresponding Mexican Official Norm (NOM) is issued. The referenced substances are the ones listed in Table 12, in the General Code Catalogue.

5.1 USE OF LISTED POLLUTANTS

5.1.1 Use of listed pollutants at the facility site

Identification of listed pollutants		Use[2]	Annual amount[3]	Unit[4]
Name[1]	Code[1]			

1 Chemical name and code of the pollutant according to Table 12 of the General Code Catalogue.
2 Indicate whether it was used as direct raw material (ID), indirect one (II), remained in storage (IA) or was produced at the facility site (EG).
3 Total amount annually consumed (as direct or indirect raw material), stored or produced.
4 Use only units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).

5.1.2 Listed pollutants received in hazardous wastes and/or wastewaters[1]

Identification of listed substance		Generator identification[3]	Annual received amount	
Name[2]	Code[2]		Amount[4]	Unit[5]

1 Information only requested for companies handling hazardous waste and wastewaters.
2 Chemical name and code of the pollutant according to Table 12 of the General Code Catalogue.
3 Indicate the Register Number issued by INE for the Hazardous Waste Generator whose waste is being reported. If more than one generator submits the same substance, it shall be reported on as many lines as there are different generators. The name of the substance shall be repeated on each line. If this datum is unknown, indicate the name of the facility that generated the submitted waste.
4 Total annual amount received for treatment. If the pollutant which is being reported is received in different deliveries and comes from one single generator you shall add all the deliveries and report the annual total. It shall be kept in mind that for each generator a different reporting line shall be used.
5 Only use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).

5.2 LISTED POLLUTANT RELEASES

5.2.1 Air releases of listed pollutants

Identification of listed substances		Annual release			
Name[1]	Code[1]	Release point[2]	Amount[3]	Unit[4]	Estimation method[5]

1 Chemical name and code of the pollutant according to Table 12 of the General Code Catalogue.
2 Number corresponding to the Operating Diagram and Summary Table as requested in section 1.3.
3 Total annual release of pollutant that is reported.
4 Only use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).
5 According to Table 4 of the General Code Catalogue.

5.2.2 Listed pollutant releases to water bodies

Identification of listed substance		Annual discharge[2]			
Name[1]	Code[1]	Release point[3]	Amount[4]	Unit[5]	Estimation method[6]

1 Chemical name and code of the pollutant, according to Table 12 of the General Code Catalogue.
2 Indicate the requested data for the wastewater discharge to water bodies (do not include discharges to sewer systems).
3 Number corresponding to the Operating Diagram and Summary Table as requested in section 1.3.
4 Total annual release of pollutant that is reported.
5 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lbs (pounds). If concentration units are used (milligrams/liter or grams/cubic meter), the total release shall be estimated from the annual volume reported in section III (table 3.2.2).
6 According to Table 4 of the General Code Catalogue.

5.2.3 Listed pollutant releases to soil, including infiltration and injection of wastewaters

Identification of listed substance		Annual discharge[2]			
Name[1]	Code[1]	Release point[2]	Amount[3]	Unit[4]	Estimation method[5]

1 Chemical name and code of pollutant, according to Table 12 of the General Code Catalogue.
2 Indicate the place, at the facility, in which the pollutant is stored, treated or disposed of. It shall be clearly indicated in the Operating Diagram and Summary Table in the case of wastewater injections, the existence of the well(s) of the corresponding injection.
3 Total annual release of pollutant that is reported.
4 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lbs (pounds).
5 According to Table 4 of the General Code Catalogue.

5.2.4 Listed pollutant releases to any media derived from accidents, contingencies or uncontrolled releases

Identification of listed substances		Pollutant code[2]	Amount[3]	Unit[4]	Estimation method[5]
Name[1]	Code[1]				

1 Chemical name and code of pollutant, according to Table 12 of the General Code Catalogue.
2 Indicate the Code for the event, according to Table 10 of the General Code Catalogue. A single line shall be used for each event occurring during the reporting year.
3 Total annual release of pollutant that is reported.
4 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lbs (pounds).
5 According to Table 4 of the General Code Catalogue.

5.3. LISTED POLLUTANT TRANSFERS

5.3.1 Transfers to hazardous waste treatment facilities or to wastewater treatment facilities

Identification of listed substances		Physical state[2]	Handling company[3]	Treatment or disposal method code[4]	Annual amount[5]	Unit[6]	Estimation method[7]
Name[1]	Code[1]						

1 Chemical name and code of pollutant, according to Table 12 of the General Code Catalogue.
2 See Table 1 of the General Code Catalogue.
3 Enter the Hazardous Waste Treatment Permit issued by the INE. If this datum is unknown, indicate the name of the hazardous waste handling company.
4 According to 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			
Name[1]	Code[1]	Amount[2]	Unit[3]	Amount[2]	Unit[3]	Amount[2]	Unit[3]	Previous year	Reporting year

1 Code of the pollutant, according to Table 12 of the General Code Catalogue.
2 Total annual release of the listed substance that is being reported (Tables 5.2.1, 5.2.2, 5.2.3 and 5.2.4).
3 Use units of mass: mg (milligrams), g (grams), kg (kilograms), ton (metric tons) or lb (pounds).
4 The reported activity index may be calculated based on the referenced raw material; indicate the number for the current reporting year and the one before. For example: 1997 information is being reported and the facility had 25,000 m^3 toluene consumption in this year, 37,000 cubic meters in 1996 and 35,000 in 1995; the activity index for the current reporting year is 0.67 (25,000/37,000), whereas for the previous year (1996) the index was 1.06 (37,000/35,000).

5.4.2 Pollution prevention and control activities

Identification of listed substances		Physical state[2]	Control activities[3]	In situ treatment			
Name[1]	Code[1]			Method´s code(s)[4]	Estimated efficiency (%)[5]	Amount[6]	Unit[7]

1 Code of the pollutant, according to Table 12 of the General Code Catalogue.
2 See Table 1 of the General Code Catalogue.
3 Indicate if there have been changes in: operating practices (CPO), *in situ* treatment (TS), inventory control (IC), spill and leak prevention (PDF), changes to inputs (CMP), product changes (PC), changes in the production process (CPP), changes in housekeeping practices (CCP), others (O).
4 According to 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).