TAKING STOCK

North American Pollutant Releases and Transfers 1995

COMMISSION FOR ENVIRONMENTAL COOPERATION
1998

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 April 1997 and the NPRI data set of June 1997 were used. The CEC is aware that changes have occurred to both data sets for the reporting year 1995 since this time that are not reflected in this report. These changes will be reflected in the next report, which will summarize the 1996 data and make year-to-year comparisons with previous years' data.

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Chapter TAKING STOCK

This second annual *Taking Stock* report provides a continental picture of pollutant release and transfer (PRTR) data, based on information provided by the three governments from their domestic PRTR inventories.

The report provides a unique tool for governments, companies and communities, allowing them to assess progress and trends in pollutant releases and transfers at a North American scale. *Taking Stock* creates an informational basis for trinational cooperation to further reduce North American pollution.

The annual report is continuously evolving, based on comments from industry, community groups and governmental officials. In response to comments on the first *Taking Stock*, important revisions were made in this year's report, including the addition of new analyses and the inclusion of more explanation and context in the presentation of the analytical results.

The CEC would like to thank officials from the three national PRTR programs whose support and cooperation have been vital to the development of this report: Steve McCauley and François Lavallée, Environment Canada; Luis Sánchez and Arturo Morales, *Secretaría de Medio Ambiente, Recursos Naturales y Pesca*; and Susan Hazen and John Harman, US Environmental Protection Agency.

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Janine Ferretti
Interim Executive Director

Acronym	Meaning
AOX	Adsorbable organic halides
ARET	Accelerated Reduction/Elimination of Toxics
CEC	Commission for Environmental Cooperation
CMAP	*Classificación Mexicana de Actividades y Producto*s (Mexican Activities and Products Classification)
COA	*Cédula de Operación Anual* (Annual Certificate of Operation: the name by which the *Cédula de Operación para Establecimientos Industriales de Juridicción Federal* is usually known)
CPPA	Canadian Pulp and Paper Association
ECF	Elemental chlorine-free (bleaching process)
EPA	US Environmental Protection Agency
GNC	*Grupo Nacional Coordinador* (Mexican National Coordinating Group)
IARC	International Agency for Research on Cancer
IJC	International Joint Commission
INE	*Instituto Nacional de Ecología* (Mexican National Institute of Ecology)
kg	kilograms
LAU	*Licencia Ambiental Única* (Single Environment License)
LGEEPA	*Ley General del Equilibrio Ecológico y la Protección al Ambiente* (General Law of Ecological Equilibrium and Environmental Protection)
NAAEC	North American Agreement on Environmental Cooperation
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
NCASI	US National Council of the Paper Industry for Air and Stream Improvement
NGO	Nongovernmental organization
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
PBT	Persistent bioaccumulative toxicant
POTWs	US publicly-owned treatment works
PRTR	Pollutant release and transfer register
PVG	*Programa Voluntario de Gestión Ambiental* (Voluntary Environmental Management Program)
RETC	*Registro de Emisiones y Transferencia de Contaminantes* (PRTR for Mexico)

Acronym	Meaning
Semarnap	*Secretaría de Medio Ambiente, Recursos Naturales y Pesca* (Mexican Secretariat of the Environment, Natural Resources and Fisheries)
SIC	Standard Industrial Classification
SIRG	*Sistema Integrado de Regulación Ambiental*
THC	Total hydrocarbons
TRI	Toxics Release Inventory (PRTR for US)
TSP	Total suspended particulates
UNEP	United Nations Environment Programme
UNITAR	United Nations Institut for Training and Research

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.

Destruction

A variety of processes that change the chemical in waste into another substance. Destruction also includes physical or mechanical processes that reduce the environmental impact of the waste. This is the term used in the NPRI report of 1993 data to summarize chemical, physical and biological treatment and incineration. (See "treatment" as the term used to cover these activities in the TRI summary reports.)

Energy recovery

The combustion or burning of a wastestream to produce heat or energy.

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 (pollution prevention at the source), followed by recycling, energy recovery, treatment, and disposal as the least desirable option.

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. NPRI covers all industrial sectors and 176 chemicals and chemical categories. TRI covers manufacturing sectors and over 600 chemicals and chemical categories (for 1995 and later years). The "matched" data set selects NPRI and TRI data from only manufacturing facilities and for the 169 chemicals that appear on both lists. Further, deletions and modifications to the reporting definition of certain chemicals, among the 169 common to both PRTRs, occurred between the years 1994 and 1995. Ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, and sulfuric chemicals are no longer reported as separate chemicals in either NPRI or TRI. Therefore, the "multi-year matched" data set includes the same manufacturing sectors, but excludes reports on these chemicals.

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.

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.

Otherwise used

Any use of a chemical that is not manufacturing or processing, for instance as a chemical processing aid, as a manufacturing aid or in 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.

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 in the product or in product quality, or change in raw materials. This does not include spills resulting from large-scale accidents or waste from actions to clean up contamination. As used by 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.

Releases

Quantities of a chemical in waste released on-site to air, water, underground injection or land.

Source reduction

A strategy for reducing pollution that involves preventing the generation of waste in the first place, rather than cleaning it up, treating it, or recycling it after it has been produced.

Source reduction activity

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

Tonne

A metric tonne, equaling 1,000 kilograms, 1.1023 short tons or 0.9842 long tons.

Transfers

Transfers in both Canada and the United States include chemicals in waste that are sent from the reporting facility to another facility off-site that treats or disposes of the chemical. Under the TRI definition, transfers also include chemicals sent off-site for recycling and energy recovery, but reporting of such transfers is optional under NPRI. (Transfers of chemicals in products are currently not included in either country's PRTR.)

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 and biological treatment and incineration. (See "destruction" as the term used to cover these activities in NPRI.)

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 material destined for recycling, reuse or energy recovery is included in their definition of waste.

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LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

North Americans are concerned about the effect of chemicals on their health and environment. Many companies have responded with programs to prevent or reduce chemical releases and transfers, often in response to government programs mandating their identification and reduction. One such program, the pollutant release and transfer register (PRTR), is a cornerstone of these efforts. PRTRs are designed to track the quantities of substances of concern that are released into the air, water or land. Results are fed into a national database, allowing information on these substances to be made available quickly to the public.

The Commission for Environmental Cooperation (CEC) recognizes the importance of these 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) now being implemented in Mexico—for their potential to enhance the quality of the North American environment. The 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.

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

> This past year, the NAFTA partners began to examine their common need for an inventory of polluting emissions. We have decided to create a North American Pollutant Release Inventory which will bring together, for the first time, existing national public information about emissions and long-range transportation of pollutants. This vital tool for improving the quality of the environment will be the result of harmonized methods of reporting on pollutant emissions of mutual concern.

At the Third Annual Regular Session in Toronto, Canada (August 1996), the Ministers noted in the Communique:

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

At the Fourth Annual Regular Session in Pittsburgh, Pennsylvania, USA (June 1997), the Ministers passed 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.

1.1 What Are Pollutant Release and Transfer Registers?

Pollutant release and transfer registers like TRI and NPRI provide detailed data on types, locations and amounts of substances of concern released on-site and transferred off-site by industrial facilities. The federal governments then provide annual reports that are released to the public; the database is also made publicly accessible. Many corporations also use the data to report to the public on their environmental performance. PRTRs are a new and innovative tool that can be used for a variety of purposes.

Tracking environmental substances of concern through pollutant release and transfer registers is essential to:

- enhance environmental quality;
- increase public and industry understanding of the types and quantities of substances of concern released into the environment and transferred off-site as waste;
- encourage industry to prevent pollution, reduce waste generation, decrease releases and transfers, and assume responsibility for chemical use;
- track environmental progress; and
- assist governments in identifying priorities.

While there are many different environmental reporting databases, characteristics that all PRTRs share are:

- providing an overview of pollutant releases and transfers,
- reporting on individual chemicals,
- reporting by individual facilities,
- covering all environmental media,
- periodic reporting,
- defined and structured reporting,
- using computerized data management,
- limiting trade secrecy,
- indicating what is being held as a trade secret, and
- resulting in information actively disseminated to the public.

PRTRs are based on the reporting of individual pollutants because this is the only meaningful way to compare information on releases to air with those to water and land and with various off-site transfers. Such chemical-specific data may be supplemented with additional parameters that are relevant to only one environmental medium (e.g., biological oxygen demand in water, total particulates in air, amount of spent solvent waste transferred for treatment).

Reporting by facility is key to identifying where releases occur and who or what generated them. This allows interested persons and groups to identify local industrial sources for releases of substances of concern. 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 releases (the Netherlands' PRTR, discussed below, supplies an example).

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 water releases, for example, may vaporize into the air. Therefore, the reporting of releases and transfers to all environmental media is important.

To determine the status and trends of releases and transfers, reports must be made periodically and cover the same period of time for all facilities reporting.

The ability to compile, sort, rank and otherwise analyze the data depends upon their structure. A clearly defined and highly structured database allows for a much wider range of analyses.

Similarly, 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.

Much of the power of a PRTR stems from public disclosure of its contents. Active dissemination is important. For a PRTR to be effective, impediments to public availability of the facility-specific information must be limited. In addition, users of a PRTR must know what types of data are withheld from disclosure (for instance, if a facility substituted a generic name for a substance emitted to air, obfuscating its chemical identity).

1.2 PRTRs Evolve to Serve Many Purposes

Many of the defining characteristics described above reflect a primary purpose of PRTRs: serving the public's right to know. Providing information to the public has been a central reason for development of pollutant registers in North America. (See **Chapter 2** for a discussion of their comparative features.) Most PRTRs in place or under development in other countries, however, serve different purposes from their North American counterparts, and these differences have influenced their design.

For example, the PRTR for England and Wales, the UK Chemical Release Inventory, was created as part of an effort to integrate separate air, water and hazardous waste permitting systems. This PRTR requires data from facilities on all releases covered by such permits. It thus contains many reports of non-chemical-specific parameters (e.g., volatile organic chemicals in air emissions or the pH of water discharges). Moreover, given its origins, there is no common list of chemicals across facilities nor is there reporting across environmental media at a single facility, until permits are fully integrated. A powerful tool for tracking compliance with regulatory permits, the PRTR for England and Wales is evolving to provide a more consistent perspective on the status and trends of pollutant releases there.

On the other hand, the PRTR for the Netherlands, its Emissions Inventory System, originated in efforts to compile a complete overview of sources of conventional and toxic air pollutants. It includes not only detailed estimates of major industrial point source releases, but also estimates of smaller and more diffused sources (e.g., dry cleaning shops, households and automobiles), as well as of any natural sources. More recently, the inventory has been expanded to include releases to water, and there are plans to add wastes being released and transferred to land. While the system in the Netherlands does not yet address all environmental media, nor many types of transfers, it provides a much broader overview of sources of pollutant releases than most other PRTRs.

A number of countries have conducted pilot studies for national PRTRs. While not the focus of their PRTR data collection, Sweden and the Czech Republic have collected data in their PRTR pilot studies relating to use and materials accounting, respectively—issues being debated in North America, particularly the United States.

Thus, while there are defining characteristics for PRTRs, the design of individual systems reflects their origins and history. Moreover, PRTRs tend to evolve to serve ever broader purposes within each country. Canada, Mexico and the United States have committed themselves to making their evolving PRTRs ever more comparable with one another.

1.3 Impacts of the North American PRTRs

Many companies have responded to PRTR results by conducting an internal environmental review and setting goals for waste reduction. For example, after reviewing some of its first TRI results, Monsanto committed itself to, and achieved, a five-year, 90 percent reduction in emissions to the air. PRTR data are also a useful aid in tracking overall environmental progress. US TRI data have shown a 46 percent reduction from 1988 to 1995 in releases reported. Canada's paper products industry accomplished significant reductions from 1994 to 1995 (a 10 percent decrease in releases and a 40 percent decrease in transfers, resulting in a 13 percent decrease in total releases and transfers, despite a 14 percent increase in the number of facilities reporting). Paper and paper products manufacturers led all industries in NPRI for total releases and transfers in 1994, but ranked only third in 1995. Many factors have influenced these changes, as explored in **Chapter 8**.

Government priorities can shift, based on PRTR data. New programs or enforcement measures can be tailored to accomplish specific goals, such as reducing specific substances or targeting releases in a particular region. TRI data are being used to set enforcement priorities and to target industries for technical assistance. Both the United States and Canada offer examples of voluntary reduction programs targeted on specific substances. In 1991, EPA launched the 33/50 Program seeking voluntary reductions in the releases and transfers of 17 chemicals on the TRI list. The result is that industry surpassed the national goal of a 33 percent reduction by 1992 (from 1988 levels) and achieved the 50 percent reduction goal for 1995 by 1994 (one year early). The Program accomplished a 56 percent reduction by 1995. Under the Canadian Accelerated Reduction/Elimination of Toxics (ARET) program, many industries have voluntarily reduced their releases of NPRI substances of

concern. The ARET program was initiated in 1990; fulfilling its mandate, it first identified criteria for persistence, bioaccumulation and toxicity and targeted 117 chemicals meeting one or more of the criteria. The "ARET Challenge," issued in March 1994, calls for voluntary reductions in on-site releases to air, water and soil of 90 percent of the target substances that meet all three criteria and 50 percent for the other target substances by the year 2000 (measured against the 1993 base year). Of the 117 ARET chemicals, 49 are listed on NPRI. From 1994 to 1995, NPRI facilities reported reductions of 14 percent in total on-site releases, and 19 percent in emissions to air, for the 49 chemicals.

1.4 Integrating North American PRTR Data

The CEC wishes to assist citizens in understanding and using the existing data from North American PRTRs. Helpful information can be found in pollutant release and transfer reports from Canada and the United States. But these systems have important differences between them, so superficial comparisons can be very deceptive. (**Chapter 2** describes these differences and how this report takes them into account.) *Taking Stock 1995* attempts to increase the value of the national inventories by presenting an analysis of the types and amounts of releases and transfers of substances of concern across North America.

Taking Stock 1995 summarizes PRTR data based on reports that industrial facilities filed for the 1995 operating year, the latest data available at the time this report was written. These PRTR reports were due to be submitted by the facilities during the summer of 1996. The US EPA released the TRI data to the public in a report dated April 1997, and Environment Canada released the NPRI data in November 1997.

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LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

All three North American countries have established the type of data to be collected under their PRTRs. The Canadian and US data are publicly available in the form of reports, but the entire database is also available electronically. There are plans to make the data collected in Mexico electronically available as well. By consulting one of these databases, a user can quickly gather information on a facility's releases and transfers. Assisting citizens in understanding what the information means, achieving accurate comparisons and making full use of the available possibilities are among the CEC's goals in producing this report. This chapter provides an overview of the existing PRTRs in North America, including recent developments in all three countries; discusses the context of the data and this report; and supplies contacts for additional information.

2.1 Description of the Three North American PRTRs

The three inventories 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. However, each inventory also has its unique aspects, which result from its historical development and special industrial characteristics of the country.

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), is ongoing.

2.1.1 Expansion of the US TRI

Implementation of a three-phase expansion of the US TRI began in the 1995 reporting year with the addition of more than 250 chemicals to the reporting list. [For a detailed comparison of the chemical lists in all three countries, see **Appendix A,** "A Comparison of Chemicals Listed under the 1995 TRI, NPRI and RETC."] In Phase II, seven industry groups not previously covered by TRI will begin reporting for 1998. The proposed Phase III would add information on chemical use to TRI reporting.

In Phase I, the TRI list of substances was expanded to 606 chemicals, including 28 chemical categories. Among the added substances were more than 150 pesticides, along with priority chemicals identified under the US Clean Air Act, Clean Water Act, and Safe Drinking Water Act. Many are carcinogens, reproductive toxicants, or developmental toxicants.

Only one of these newly added substances is also on the NPRI list: the nitrate compounds category. Two changes in the list of substances were the same as those, mentioned above, that were implemented on the Canadian NPRI: (1) the new category of nitrate compounds, and (2) the change in definition for reporting ammonia and the deletion of ammonium sulfate and ammonium nitrate. Two other changes that result in differences between NPRI and TRI reporting are (1) the change in definition of hydrochloric acid and sulfuric acid (only aerosol forms are now reported) and (2) the deletion of acetone and methylene bis(phenylisocyanate) from the list. The latter chemical was included in the new category of diisocyanates and deleted as a separate listing.

To reduce the reporting burden in the face of the expanded chemical list, TRI now has a different form for chemicals generated as waste in quantities less than 500 pounds, or manufactured, processed, or otherwise used in amounts of less than 1 million pounds for the year. This form (Form A) consists of the facility and chemical identification sections from the complete TRI reporting form (Form R). Thus, it supplies the identity of the chemical substance, but not any amounts of waste generated, releases or transfers. [Form R appears in **Appendix B**.] EPA is weighing potential revisions to the TRI reporting forms.

Phase II will be implemented with the 1998 reporting year. The added industrial sectors are metal mining, coal mining, electric utilities, commercial hazardous waste treatment, wholesale chemical products, petroleum bulk stations, and solvent recovery services. In undertaking this expansion, the Agency focused on industries that provide energy or raw material to manufacturers (for example, mining) and those that receive or take away materials from the manufacturing sector (for example, petroleum bulk terminals). EPA conducted regional training sessions for facilities in these industries in the fall of 1997 and continues its training assistance in 1998. Because these industries already report to NPRI, the expansion will increase the amount of the data that is comparable between the two countries. EPA expects this will increase the number of facilities reporting to TRI by 30 percent.

With the endorsement of President Clinton, EPA proposes in Phase III to collect data on chemical use, also referred to as materials accounting. These data would track the amounts of a listed chemical substance entering a facility, transformed into products and waste, and leaving the facility in products and waste. Similar data, already collected by the states of New Jersey and Massachusetts, would provide additional information on:

- the amount of chemicals passing through communities, for emergency planning, risk screening, and other local responsibilities,
- the overall quantities of substances of concern going into products,
- potential worker safety and health issues, and
- the pollution prevention performance of reporting facilities.

EPA began reviewing this issue in 1993 and held public meetings on the topic in 1994 and 1995. During this period, EPA also produced three "Issues Papers" to provide background, summarize comments received, and describe its preliminary findings. In October 1996, the agency issued a notice of proposed rulemaking, soliciting public comments on "all aspects of chemical use data and its collection." EPA again convened public meetings. An extended comment period on the proposal ended 28 February 1997. EPA continues to review the 41,000 comments received to lay the groundwork for Phase III rulemaking.

Other developments under consideration include lower reporting thresholds for mercury, dioxin, and other persistent bioaccumulative toxicants (PBTs). Other PBTs not presently covered may also be proposed for addition to the TRI list at the same time.

2.1.2 Developments in Canada's NPRI

The 1995 data are the third set reported to NPRI. For the 1995 reporting year, Environment Canada made changes to the substance list, to the reporting criteria and to the reporting directives. In the list of substances to be reported, two major changes occurred: the nitrate ion in solution at pH 6.5 or higher was required to be reported, and total ammonia was added, replacing ammonia and its salts—ammonium sulfate and ammonium nitrate. Other minor changes involved adding the qualifier "friable" to asbestos, adding "and its salts" to weak acids and bases, and deleting one category of zinc since it was included in another category.

The year 1995 also saw an important change to the reporting criteria, requiring the weight of a by-product released to the environment or transferred off-site for disposal to be used in the calculation of reporting thresholds regardless of the concentration of the by-product. Previously, such by-products with concentrations of less than 1 percent were not included in the calculation of the reporting threshold. This change was designed to capture large sources of some pollutants, which normally generate pollutants in concentrations below 1 percent, such as aluminum smelters, utilities and pulp and paper mills. Many facilities have commented that this change in reporting criteria resulted in significant increases in their 1995 NPRI reported releases and transfers. Many of the reported increases may not reflect actual increases of releases to the environment, but newly required reporting of what is really a continuation of the same level of environmental releases. Without contacting all facilities and asking each one to determine the effect of this reporting change on its data, it is not possible to quantify the overall effect on the entire NPRI database. Nevertheless, readers are urged to keep the probable importance of this reporting change in mind when reviewing the 1995 NPRI data.

In Environment Canada's summary report, several chemicals, sectors and provinces are noted to have been affected by the by-product rule, including methanol from pulp and paper mills, particularly in Alberta and Ontario; carbon disulfide, particularly in Alberta; hydrogen fluoride from aluminum smelters, particularly in Quebec and British Columbia; and hydrochloric acid and sulfuric acid from utilities, particularly in Alberta and Ontario. In the *Taking Stock* report, one of these sectors, pulp and paper (often referred to in this report by its database designator—paper products), is examined in detail in **Chapter 8**. The other two—utilities and aluminum smelters—are not part of the matched chemical/industry or multi-year matched chemical/industry data sets, so this will reduce the effect of the by-product change on analysis using these data sets. Two of the chemicals, hydrochloric acid and sulfuric acid, are also not part of the matched or multi-year matched data sets.

Changes to directives for 1995 included:

- All releases to sanitary sewers are reported as a transfer to a sewage treatment plant, regardless of the level of treatment at that plant. In 1993 and 1994, releases to sanitary sewers that fed a treatment plant with only primary treatment were considered a release to water. (Primary treatment typically removes solid materials by allowing them to settle out of a wastestream. Secondary treatment typically uses microorganisms in an effort to further degrade pollutants in a wastestream.)
- Rounding of releases less than 0.5 tonnes to zero was permitted in 1993 and 1994, but is no longer allowed. Codes are used to reflect the amount released, with reporting of zero allowed only if releases are zero.
- Facilities that transfer NPRI substances from one container into another type are required to report in 1995 if releases occur during the transfer or repackaging of materials.
- The 1995 NPRI reporting software also made changes to minimize common errors such as incorrect reporting of geographical location and SIC codes. [A printed version of the reporting form appears in **Appendix C**.]

Further changes will affect the 1996 reporting year and be reflected in the 1996 report:

- the threshold pH for the nitrate ion in solution was changed from 6.5 to 6.0;
- the portion of the pollutant released to each lake, river, or stream must be reported (previously only the total quantity to all water bodies and the name of each body was required); and
- the quantity of pollutants transferred to each off-site facility must be reported, rather than just the total for several facilities.

These changes will allow greater tracking of pollutants in the environment and, for the first time, yield data on the quantity of pollutants transferred off-site to receiving locations, for example, in other provinces or other countries. Such changes for the 1996 reporting year will be reflected in the next *Taking Stock* report.

In the fall of 1997, Environment Canada proposed a series of changes to NPRI, including a new process for adding and deleting substances, a change in reporting data, and a method to measure pollution prevention. After a stakeholder workshop and written comments, Environment Canada's proposed direction is to create a working group to develop protocols for adding and deleting substances, to retain the June 1 reporting date and to further review the pollution prevention issue. More information can be found at Environment Canada's Web site at <http://www.ec.gc.ca>.

2.1.3 Current Status of RETC Implementation in Mexico

The *Grupo Nacional Coordinador* (National Coordinating Group—GNC), consisting of 38 governmental, industrial, education and non-governmental organizations, completed, in March 1997, the development of the National Executive Proposal for RETC implementation in Mexico. The proposal includes the report format, the list of substances and legal instruments in accordance with the latest revisions to the *Ley General del Equilibrio Ecológico y la Protección al Ambiente* (General Law of Ecological Equilibrium and Environmental Protection —LGEEPA) of 13 December 1996.

In April 1997 the Mexican environmental authorities presented "The New Environmental Policy for Mexican Industry" to industry representatives, environmental consultants and non governmental organisations (NGOs). This policy seeks to integrate the different applicable environmental regulatory policies and procedures into a single system that is compatible not only with private sector productivity and competitiveness, but also with the public interest in a safe and clean environment.

The heart of the environmental policy is the *Sistema Integrado de Regulación Ambiental* (Integrated System of Environmental Regulation—SIRG), based upon Articles 109 bis and 109 bis-1 of the LGEEPA. These Articles establish the obligation of *Secretaría de Medio Ambiente, Recursos Naturales y Pesca* (Mexican Secretariat of the Environment, Natural Resources and Fisheries—Semarnap) to integrate its inventory of atmospheric emissions, wastewater discharges, hazardous materials and wastes, to create a consolidated information system and to establish mechanisms for those industries that need permits or authorizations from Semarnap to handle everything in one procedure.

SIRG is composed of three principal components: The *Licencia Ambiental Única* (Single Environmental License), the *Cédula de Operación Anual* (Annual Operation Certificate—see discussion below) and the *Programa Voluntario de Gestión Ambiental* (Voluntary Environmental Management Program). These components are often referred to by their respective acronyms: LAU, COA, and PVG.

On 11 April 1997 the Agreement that establishes the mechanisms and procedures for obtaining the *Licencia Ambiental Única* and the *Cédula de Operación Anual* was published in the *Diario Oficial de la Federación* (Official Diary of the Federation). This Agreement went into effect on 16 June 1997, even though the instructions and corresponding forms were not published until 18 August 1997.

In accordance with the LGEEPA and the instructions published by Semarnap, the industrial sectors under federal jurisdiction that must comply with the *Licencia Ambiental Única* and the *Cédula de Operación Anual* are the following:

1. Petroleum
2. Petrochemical
3. Chemical
4. Paints and dyes
5. Iron and steel
6. Metal
7. Automotive
8. Cellulose
9. Paper
10. Cement
11. Lime
12. Asbestos
13. Glass
14. Electrical energy generation
15. Hazardous waste treatment

Other industries that must comply with the requirements are the following:

- industrial or commercial facilities, works or activities of the Federal Public Administration;
- industries located in industrial parks under federal jurisdiction; and
- sources located in a state that affects, or is able to affect, the ecological balance of a neighboring state or country.

Licencia Ambiental Única

The *Licencia Ambiental Única* brings together industry's obligations in a single document, in accordance with environmental regulations, including:

- environmental impact evaluation,
- risk evaluation,
- air emissions,
- water use and wastewater discharge, and
- generation, management and transfer of hazardous waste.

The *Licencia Ambiental Única* applies to new facilities, although facilities wishing to submit information voluntarily may do so; the *Licencia* is awarded once and must be renewed only when the facility moves or changes industrial type.

The Agreement setting forth the procedures for obtaining the *Licencia Ambiental Única* (and the *Cédula de Operación Anual*) establishes that the responsibility for awarding the *Licencia Ambiental Única* in the Metropolitan Zone of Mexico City, which includes the Federal District and 18 municipalities of the State of Mexico, will be exercised by Semarnap through *Instituto Nacional de Ecología* (Mexican National Institute of Ecology—INE). In the rest of the country the *Licencia Ambiental Única* will be provided by Semarnap federal delegations.

Cédula de Operación Anual

The *Cédula de Operación Anual* is the term by which the *Cédula de Operación para Establecimientos Industriales de Juridicción Federal* (see **Appendix D**) is usually referred. It is an annual report of emissions and transfers of pollutants to air, water and land that occurred during the previous calendar year, and is an updated version of the *Cédula de Operación*, previously used. During the first four months of the year following the receipt of and operation under a *Licencia Ambiental Única*, the *Cédula de Operación Anual* must be prepared by the industrial facility to update information on performance and the basis on which it received the *Licencia*. In a one-time arrangement, during the first year the new format *Cédula de Operación Anual* is used, which takes effect in 1998 for 1997 data, the period for submitting the information has been extended to 31 July 1998.

Semarnap is currently developing an agreement to define the scope and terms of the *Licencia Ambiental Única* and the *Cédula de Operación Anual*. The draft agreement, which may still be modified, requires that the *Cédula de Operación Anual* contain the following elements:

a) The information requested in Section I, "General Technical Information," and in Section II, "Atmospheric Pollution," is mandatory according to current regulations. Facilities must report information on a subset of released pollutants to air for which they already have permits (i.e., SO_2, NO_x, CO, TSP, and THC).
b) The information that is requested in Section III, "Water Use and Discharge of Wastewaters," is optional and will be used for statistical purposes only. Therefore, if this information is not submitted, no penalty will be assessed.
c) The information requested in Section IV, "Hazardous Waste Generation, Treatment and Transfer," must be submitted by facilities that generate and treat hazardous waste and may be presented in *Cédula* format. The report submitted must then be used as the basis for any other periodic reports of movements or transfers required by regulations. If the information is not prepared in the *Cédula* format, the facility may prepare each of the periodic reports, for the requested time period.
d) The information requested in Section V, "Annual Emissions and Transfer of Listed Pollutants," is voluntary until the *Norma Oficial Mexicana* (Mexican Official Regulation) determining the list of substances to be reported has been published.

Therefore, the initial implementation of the Mexican RETC will apply only to industrial facilities under federal jurisdiction. Despite the fact that the report format allows for multi-media substance reporting, only air releases are subject to mandatory reporting at this time. INE has estimated that in all about 30 pollutants are named on air emission permits.

Programa Voluntario de Gestión Ambiental

The *Programa Voluntario de Gestión Ambiental* (Voluntary Environmental Management Program) is a mechanism for self-regulation, directed toward facilities that already possess the *Licencia Ambiental Única*. This program seeks to develop environmental administrative capacity within each industrial facility to achieve environmental protection through prevention and the sustainable use of natural resources.

To participate in the *Programa Voluntario de Gestión Ambiental*, the facility signs a *Convenio de Proactividad* (Proactive Convention) with the environmental authority, in which the facility develops an Environmental Program and incorporates into its administrative procedures an Environmental Administration System that takes into account the needs or interests of the facility and its unique characteristics.

The *Programa Voluntario de Gestión Ambiental* must include a calendar for completing the proposed actions and must strive for a stricter level of environmental protection than that demanded by regulation.

The RETC

The *Cédula de Operación Anual* is the basis of the RETC. In the first four sections of the *Cédula*—in addition to general information on the facility, the processes used and the products generated—information is requested on emission sources and air pollution control equipment; water use and wastewater discharge; and the generation, treatment, and transfer of hazardous wastes. However, due to the integration of the regulatory system by the authorities, this information is required only when the data differ from those reported in the *Licencia Ambiental Única* or the latest *Cédula de Operación Anual*.

In its fifth section, the *Cédula de Operación Anual* requests information on the identification and use of listed substances as well as their release to different media, including releases from accidents and/or contingencies, off-site transfers and information on pollution prevention and control activities taken by the facility.

Facilities that possess a *Licencia Ambiental Única* or a valid, previous operating license, must obtain a *Cédula de Operación Anual*. There are no thresholds or exemptions based upon the quantity of each substance managed.

The list of substances that must be reported during the first year that the *Cédula de Operación Anual* is in effect includes 161 specific chemicals and 17 chemical categories, for a total of 178 substances subject to reporting. This list includes 34 substances in addition to the 149 that were used in the Querétaro case study, but deletes five others. The emission values of particulates and combustion gases (NO_x, SO_x, CO and total hydrocarbons) are required to be included in the inventory by Section II of the *Cédula de Operación Anual*. Carbon dioxide, which represented more than 97 percent of the total reported emissions in the case study, remains on the list. Combustion gases are not included on either the TRI or NPRI lists (see **Appendix A** for a complete compilation of listed substances).

The substances considered in the Mexican environmental regulations and in the requirements for compliance with international obligations are fully included in the final list, whereas additional substances listed by other countries were evaluated for inclusion, based on criteria of environmental persistence, bioaccumulation and toxicity. All evaluations were performed using the system utilized by the Province of Ontario for the evaluation of environmental contaminants (see **Figure 2–1**). Mexican environmental authorities intend to incorporate the selection protocol and evaluation criteria in a regulation that is currently under development.

Confidentiality of information was considered during the most recent amendments to the LGEEPA, which has a chapter on Environmental Right-to-Know. This chapter notes, in Article 159 bis 3, the public's right to request, and receive access to, environmental information from the authorities. However, Article 159 bis 4 stipulates that the authorities may deny access when the information requested:

- is considered confidential for legal reasons or its distribution may affect national security,
- involves judicial proceedings that are awaiting resolution,
- is information provided by third parties that are not legally obligated to grant access, and
- contains proprietary details on inventories and new materials and process technologies, including their description.

The environmental authorities are currently developing legal instruments to permit implementation of the *Licencia Ambiental Única* and the *Cédula de Operación Anual* in conformance with the regulations of the LGEEPA in the area of atmospheric emissions and hazardous waste, as well as the *Ley Nacional de Aquas* (National Waters Law) and its regulations.

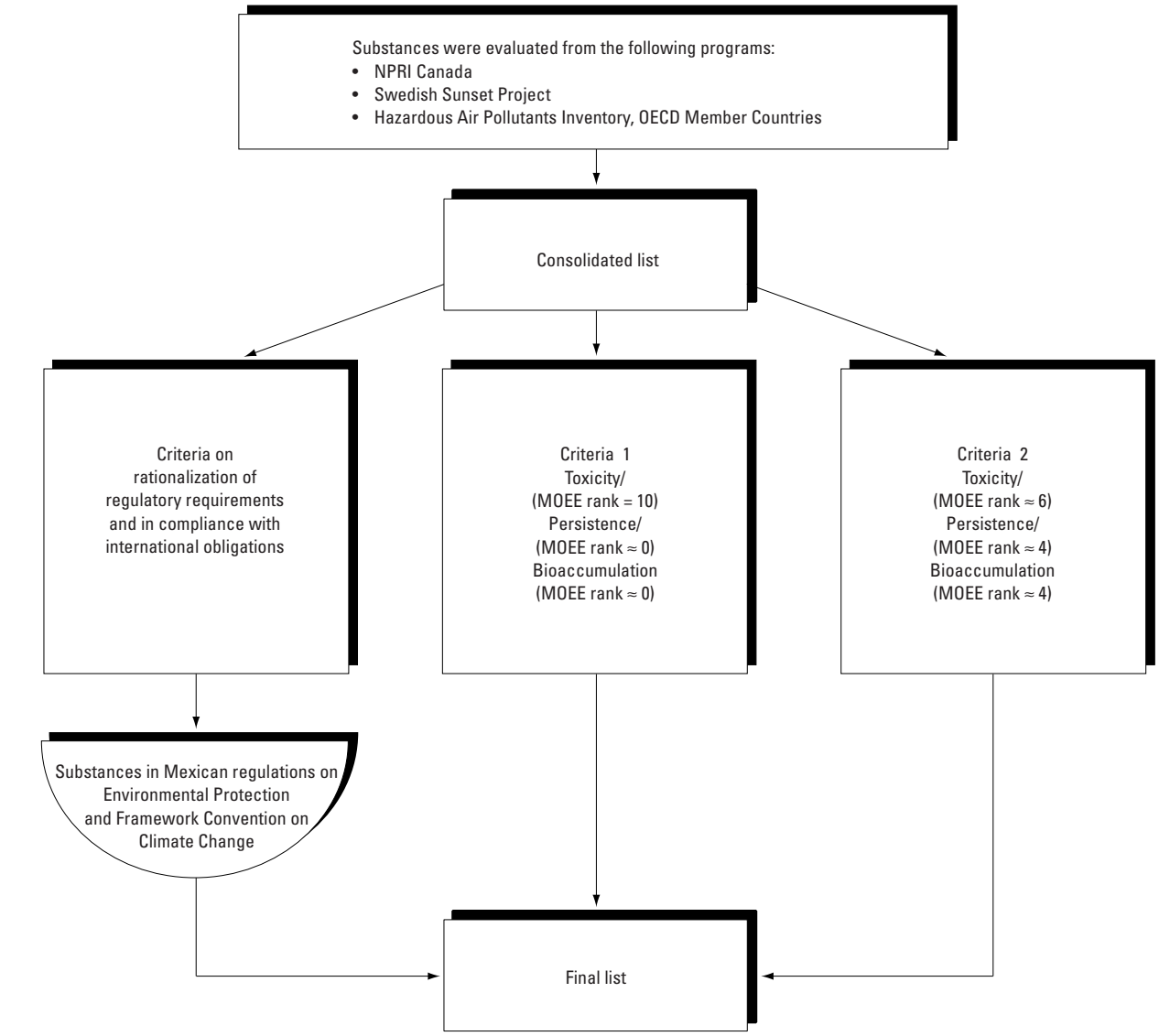
Activities of the *Grupo Nacional Coordinador*

The *Grupo Nacional Coordinador* (National Coordinating Group—GNC) was formed as a consultative forum to achieve consensus between the interested parties in the decisions defining the elements necessary for the Mexican RETC. A meeting in June 1997 focused on the components of the *Sistema Integrado de Regulación Ambiental*, and on the development of the computer system that will handle the data generated by RETC as well as incorporate geographic information systems into the database.

The GNC continues to meet periodically and act as an advisory group, following RETC activities and suggesting updates to various RETC components—such as the list of substances and the reporting form.

Figure 2–1
1995

RETC Protocol for Selection of Substances



MOEE rank: ranking on Ministry of Environment and Energy (Ontario) Scoring System

PRTR Workshop for Latin American Countries

Due to the interest in establishing pollutant release and transfer registers in other countries, an international PRTR workshop was held 29–31 July 1997 for Latin American countries in Querétaro, Mexico. This event was organized and sponsored by CEC, INE, UNITAR, OECD, UNEP, EPA and the government of the State of Querétaro. Approximately 80 representatives of governmental organizations, industry and NGOs from 31 countries attended (including the Americas, Japan, Australia, and the Netherlands). Topics related to the development of PRTRs were discussed during sessions that included expert panels and work groups.

The workshop focused on the principal problems encountered in the design and implementation of a PRTR, the presentation of specific case studies, discussion of opportunities and challenges for PRTRs as a tool for environmental management and the need to develop comparable registers in the region. A copy of the workshop summary is available upon request from the CEC.

2.2 Basic Similarities of PRTRs

As indicated in **Chapter 1**, the three North American PRTRs have the following basic similarities. They all:

- provide an overview of releases and transfers of listed pollutants,
- report on individual chemicals,
- report by individual facilities,
- cover all environmental media,
- require periodic reporting,
- depend on defined and structured reporting,
- use computerized data management,
- limit trade secrecy,
- indicate what is being held as a trade secret, and
- result in information actively disseminated to the public.

2.2.1 Individual Chemicals

Each country in North America has developed its own list of substances, reflecting local conditions, scientific assessments and chemicals commonly in commerce. The TRI list for 1995 reporting consists of 606 chemicals, including 28 chemical categories, compared to 176 chemicals with 16 categories on the NPRI list. A total of 169 substances, including16 categories, are common to both lists. There are 178 chemicals, including 17 chemical categories, on the RETC list. A total of 78 substances, including 11 categories, are common to all three lists. For a detailed comparison of the chemical lists in the three countries, see **Appendix A**, "A Comparison of Chemicals Listed under the 1995 TRI, NPRI and RETC."

TRI facilities report separately for certain chemicals and their compounds, while in NPRI, a chemical and its compounds count as one category. Generally, RETC follows the NPRI approach. 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 1995* add the TRI amount reported for the given substance to the amount reported for its compounds, to correspond with NPRI practice.

2.2.2 Individual Facilities

Each country has different requirements that make a facility eligible for reporting. In the United States, all manufacturing and federal facilities which meet or exceed the threshold must report; some additional industries will begin reporting in 1998 under the Phase II expansion. In Canada, any facility that meets the threshold (see discussion below) must report. Canada exempts certain facilities, such as 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. Mexico requires any facility under federal jurisdiction to report.

2.2.3 Releases and Transfers

In their reports, facilities provide estimates of their releases of the listed substances to the air, land and water and also by underground injection (except in Mexico where injection is not practiced as a method of disposal). Facilities also estimate the amounts of the listed substance in waste that they transfer off-site. A transfer is the shipment of the substance in waste to a municipal sewage treatment plant or to another site for treatment or disposal or (in the case of the US TRI and the Mexican RETC) for recycling/recovery. Tracking both releases and transfers is necessary to provide a full picture of the movements of chemicals. Each country has slightly different categories for releases and transfers, outlined in **Table 2–1**.

2.2.4 Trade Secrecy

The purpose of the databases is to provide the public with data about chemicals in the environment, so in general, all three databases limit the type of information that facilities can claim as secret and withhold from public information. 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 13 TRI forms, out of 73,311 submitted for 1995, contained such claims. In Canada, all information in a report may be held confidential if it conforms to the criteria under the Federal Access to Information Act. Like TRI, claims for trade secrecy are a small percentage of the NPRI information filed. Mexico has established in the LGEEPA criteria for trade secrecy (see **Section 2.1.3**) and would omit the report from the public database, in the same manner as Canada.

2.2.5 Public Dissemination

As one of the purposes of the databases is to provide this information to the public, both TRI and NPRI are available in a variety of formats: annual summary reports, detailed data in hard copy and electronic form, and over the Internet. The level and detail of the information to be made public under the Mexican RETC will increase after the first two years. In the first two years, summary data on releases and transfers by industry and geographic sector at national, state, and municipal levels will be published. After that, INE intends to make public all data at the facility level.

EPA established a new Center for Environmental Information and Statistics on 1 January 1998 that will provide the public with analyses of TRI and other environmental databases.

2.3 Differences in the PRTR Databases

The three PRTR systems also have important differences. They differ in:

- substances reported,
- types of facilities covered,
- release and transfer categories,
- reporting thresholds,
- industrial classification system,
- classification of small releases, and
- requirements for reporting on source reduction.

Appendix A lists the chemicals in each PRTR, and **Table 2–1** indicates the major differences in the types of facilities required to report and in the categories of releases and transfers. These differences also affect the way the data are presented. When data from the PRTRs are compiled for comparison, these differences are addressed by selecting subsets of data that are comparable across the PRTRs, as explained below. Other differences cannot readily be resolved in this manner, and further details about them are provided here, as they must be kept in mind when interpreting the data presented in this report.

2.3.1 Matching Data across PRTRs

To compare data from PRTRs with different requirements, this report relies on selecting the comparable elements. The data are from Canada and the United States; the Mexican system is being implemented and data are not yet available. **Chapter 3** presents a North American summary of the comparable data from NPRI and TRI, based on those chemicals and industrial sectors for which reporting is required in both countries (a matched data set). This supplies an overview of current North American PRTR reporting, as represented by common reporting elements. **Chapter 4** then draws comparisons from the matched NPRI/TRI data set. These chapters examine only 1995 data.

In practice, a matched data set limits the analysis to the manufacturing sector, because non-manufacturing facilities were not required to report to TRI. Chemicals may also be reportable in both systems, but are defined differently. For sulfuric acid and hydrochloric acid, for example, the TRI definition has changed so that only aerosol forms are reported. All forms of these acids are still reportable to NPRI. For comparing TRI and NPRI data, the matched data set excludes these two chemicals as well as any on one list but not the other.

Chapter 5 looks at both 1994 and 1995 data, which further limits the matched data set to address only the industries and chemicals that were covered by both PRTRs in both years. A chemical added to or deleted from either PRTR in either 1994 or 1995 is not included in this analysis.

To help clarify the differences in data sets, **Chapter 3** begins with summary tables from the 1995 matched data set, the 1995 complete databases, and the 1994–1995 matched data set. Throughout *Taking Stock 1995*, letters (M=matched chemicals/industries, MY=multi-year chemicals/industries or A=all chemicals/industries) on the left sides of the tables and figures state which data set is in use. Only tables and figures based on the same data set can be meaningfully compared with one another.

2.3.2 Thresholds

One of the major differences among the databases is the reporting threshold: the amount of a given substance that can be manufactured or used in the facility before reporting is required. If the threshold is met or exceeded, then all releases and transfers must be reported. In the United States, if more than 25,000 lbs (11.34 tonnes) of a chemical is manufactured or processed or if more than 10,000 lbs (4.54 tonnes) is "otherwise used," then releases and transfers must be reported. In Canada, if 10 tonnes (22,050 lbs) or more of the substance is manufactured, processed or "otherwise used," then releases and transfers must be reported. Both systems require reporting for facilities that employ the equivalent of 10 or more full-time employees.

The other major difference in threshold requirements between TRI and NPRI is the amount of chemical in a mixture. Both countries require reporting if this amount equals or exceeds 1 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. In addition, as described above, Canada requires the inclusion of the weight of by-products released to the environment or transferred off-site for disposal, regardless of concentration levels, in the threshold calculation.

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

The Mexican RETC does not have reporting thresholds by amount of substance, number of employees or any other kind.

2.3.3 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. The United States and Canada each use a "Standard Industrial Classification" system, such that industries are identified by their "SIC code." The two national systems, however, are not the same. Mexico uses the *Clasificación Mexicana de Actividades y Productos* (Mexican Activities and Products Classification——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 characterize the majority of its operations. This is essential to comparing the NPRI and TRI data, because otherwise 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. Information is available from Statistics Canada on the Internet at: <http://www.statcan.ca/english/Subjects/Standard/ind_e.htm>. For information on NAICS in English, see the INEGI web site at <http://www.inegi.gob.mx/homeing/conteo/scian.html>. [The Spanish site is <http://www.inegi.gob.mx/homepara/conteo/scian.html>.]

Table 2–1
1995

Comparison of Mandatory 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. (Additional sectors, beginning 1998.)	Any facility manufacturing or using a listed chemical, except research, repair and retail sales. Also, except agriculture, mining, well drilling, but not if process or otherwise use the substance.	Any facility 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.	CMAP code per facility.
List of chemicals	Chemicals used in manufacturing (606 substances includes 28 chemical categories).	Chemicals used or manufactured (176 substances includes 16 categories).	Chemicals meeting toxicity, bio-accumulation, and persistence criteria and chemicals considered in the *Norma Oficial Mexicana* (178 substances includes 17 categories). However, only chemicals for which a facility already has a permit for air emissions must be reported.
Reporting Threshold			
Number of employees	10 or more	10 or more	No threshold.
Activity/use of chemicals	Manufacture/process more than 25,000 pounds (11,338 kg) or use more than 10,000 pounds (4,535 kg)	Manufacture, process or use 10 tonnes (10,000 kg) or more	No threshold. However, only chemicals for which a facility already has a permit for air emissions must be reported.
Concentration of chemicals in mixtures	Concentrations equal to or greater than 1 percent (0.1 percent for carcinogens) count toward activity/use threshold.	Concentrations equal to or greater than 1 percent plus total weight of by-products count toward activity/use threshold.	No threshold.
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 (453 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 pounds (502 tonnes).	Total releases less than 1 tonne (1,000 kg) reported as total releases only. Releases to each medium less than 1 tonne (1,000 kg) reported by range code.	No different provisions for small-quantity reporting.
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. Amount from spills not included. Only air emissions permit substances must be reported.

Major Data Elements	US Toxics Release Inventory (TRI)	Canadian National Pollutant Release Inventory (NPRI)	Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC)
Releases, cont.			
Surface water discharges	Amount to each water body includes spills and leaks. Percentage due to stormwater reported.	Total discharges, total spills and total leaks to all water bodies as three separate amounts. (Beginning 1996, amounts reported separately for each water body.)	Not mandatory.
On-site land releases	Amount to landfills, land treatment/ application, surface impoundments reported separately. Spills and leaks included. (Beginning 1996, two categories for landfills— hazardous waste and other.)	Amount to landfills, land treatment/ application, spills, leaks, other reported separately.	Not mandatory.
Underground injection	Amount to on-site wells. Amount from spills included. (Beginning 1996, amount to Class I wells reported separately from amount to all other wells.)	Amount to on-site wells. Amount from spills included.	Underground injection not practiced in Mexico.
Accidental spills	Reported as single number for all releases and transfers; also included in release and transfer amounts.	Reported separately under air, water and on-site land releases. Included in under-ground injection and transfer amounts.	Not mandatory.
Transfers			
Transfers to municipal sewage	Total amount reported. List name/address of each municipal sewage treatment plant.	Total amount reported. List name/address of each municipal sewage treatment plant. (Beginning 1996, separate amount discharged to each municipal treatment plant reported.)	Not mandatory.
Other off-site transfers	Amount reported by method of treatment/ disposal; amount reported for each transfer location with name/address.	Total amount reported by method of treatment/disposal; list name/address of each transfer location. (Beginning 1996, amount to each transfer location reported for each treatment/disposal method).	Not mandatory.
Chemicals in Waste			
Management by treatment, disposal	Amount managed on-site and off-site by type of management.	Off-site transfers only.	Not mandatory.
Recycling/reuse/recovery	Amount managed on-site and off-site by type of management.	Not mandatory.	Not mandatory.
Other Data Elements			
Type of on-site waste treatment	Type for each method used by type of wastestream.	Not reported.	Not mandatory.
Projections	Two years following, amounts for on-site and off-site waste management.	Three years following, additional two years optional, for total releases and total transfers.	Not mandatory.
Source reduction	Type of source reduction activities (21 categories).	Not reported.	Not mandatory.

2.3.4 Reporting of Small Releases

For releases of a substance that total less than one tonne, NPRI allows a facility 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. The amounts of the individual releases by medium are reported under TRI, and the amounts of the individual types of transfers are reported for both NPRI and TRI.

As described above, beginning in 1995, EPA added a reduced reporting option for facilities that meet the reporting thresholds (described above), but whose total "reportable amount" for the year does not exceed 500 lbs (227 kg) in production-related waste. This amount includes releases and transfers, plus waste that is managed on site. A further restriction is that the facility may not manufacture, process or otherwise use one million lbs or more of the substance during the year. These facilities may submit a "certification" form (called Form A) that identifies the chemical reported, but contains no information on amounts. These forms are included in the database with releases and transfers set to zero.

Finally, both NPRI and TRI offer the option to report a range for the smallest releases. In this report, the midpoint of the range is used as the estimate for the amount of release in these cases.

2.3.5 Source Reduction

The United States requires facilities to identify the types of source reduction activities they have undertaken during the reporting year. The Canadian NPRI does not have this requirement. The Mexican RETC does not currently require this information.

2.4 Context of Report and Limitations OF Data

Taking Stock 1995 analyzes publicly available 1995 data submitted by specific US and Canadian facilities on their use of listed chemicals or substances in amounts that meet or exceed certain thresholds. Effective use of PRTR data—and therefore of this report—requires attention to context and limitations. PRTR data have many limitations, all of which influence this report. For one thing, important information often lies beyond the bounds of existing PRTR data. Chemicals of concern may move into the environment from uses not addressed by PRTR reporting requirements, and no PRTR chemical list includes all the substances that may cause harm. PRTRs also offer no direct perspective on the ultimate environmental fate of chemical substances that reporting facilities release or ship off-site for disposal or other disposition. Most PRTRs now in existence or in development do not cover:

- the full range of facilities that may manufacture, process or use listed chemicals,
- small sources (e.g., gasoline service stations, dry cleaners), mobile sources (motor vehicles), area sources (farms, parking lots) or natural sources,
- all releases and transfers from a facility, or
- all substances of concern.

Most PRTRs also do not collect all the kinds of information that would improve the interpretation of facilities' reports. These include:

- factors responsible for changes in releases and transfers from year to year,
- a reliable basis for normalizing data from year to year,
- information on the health or environmental significance of the chemicals, and
- exposure to or risk from substances of concern.

While much can be learned directly from NPRI, TRI and the forthcoming RETC, each exhibits some or all of these limits. None supplies a complete view of any listed chemical within a country's borders. Similarly, a North American compilation of data reflects the limits of its constituent databases. This report therefore reflects these limitations, which are described in more detail in the following sections.

2.4.1 Accounting for Sources of Releases and Transfers

The North American PRTRs differ in the facilities they require to report. With few exceptions, Canada's NPRI covers all facilities that manufacture, process or use a listed pollutant above threshold limits. As established in 1987, the US TRI covered only manufacturing facilities. Federal facilities were added in 1994, and beginning in 1998, TRI coverage will expand to include mining, electrical utilities and other industries, as discussed above. The matched data set that forms a large part of this report includes only those industries that are common to both reporting systems.

PRTR data do not account for all sources of releases and transfers, an important limitation in considering information in this report. Threshold limits exempt small sources from reporting. Dry cleaning establishments and automotive service stations are typical examples. In a particular locale, one or more of these small sources may represent a large source of a listed chemical. Taken as a whole, they may also constitute a large source for particular substances. Also, non-point sources are not fully estimated in North American PRTRs. Among these, agricultural sources are important; pesticides from such sources, for example, may raise concerns both locally and globally. Mobile sources (such as automobiles, trucks, aircraft, and boats) are also particularly significant. Published NPRI reports supply an estimate of releases from mobile sources, as part of the context for NPRI data. Mexico plans to provide estimates of non-point sources. Depending on the pollutant, natural sources may sometimes be the dominant sources of releases. Transfers of listed pollutants as (or in) products are not presently addressed by any of the North American PRTRs.

Individual PRTRs also may not require reporting of all types of releases and transfers. In Canada, for example, reporting of transfers off-site for recycling or energy recovery is optional. US facilities report not only the off-site transfers, but also the amounts treated on-site and used on-site for recycling and energy recovery. Because of the voluntary reporting of the recycling, reuse, recovery amounts in Canada, transfers to recycling, reuse, recovery are not included in the matched and multi-year matched chemical/industries data sets, and this may exclude large amounts of pollutants.

2.4.2 Tracking Reductions in Releases and Transfers

Because North American PRTRs are structured around annual reporting, their data reveal year-to-year changes and can be used to track long-term trends. Current PRTR reporting, however, does not explain these changes. Reductions in releases and transfers may result from source reduction (pollution prevention) activities, implementation of pollution control, changes in production level, and changes in estimation methods. A particular reduction may arise from a combination of these events, but PRTR data do not tell how much of the change was due to which factor. The benefits of reductions in releases are also difficult to quantify.

Several methods can be used to investigate changes, depending on the information a PRTR collects. TRI, for example, requires facilities to indicate whether they undertook source reduction activities during the year and, if so, what activities. Although no reduction amount can be attributed to a particular cause, TRI forms that indicate source reduction activities can be compared to those that do not, to suggest the extent to which facilities' pollution prevention actions may be helping to reduce releases. In another example, meteorological records for a local area subject to flooding might be used with NPRI data to explore correlations between rainfall and surface water discharges. In TRI, facilities indicate this as the percentage of surface water discharges attributable to stormwater run-off.

Some reductions in releases reported to PRTRs do not, in fact, represent smaller quantities of pollutants released to the environment. Generally, facilities estimate rather than measure their releases. PRTRs do not require precise measurement, as a way to reduce the cost to industry of preparing their PRTR reports. A facility may choose one of several reasonable methods for estimating its releases, basing them on monitoring data, materials balance calculations, or best engineering judgment. Changing from one estimation method to another may cause variation in the amounts reported without any change in actual releases. Facilities in a particular industry may rely on estimation methods (typically, "emission factors") supplied by a trade association or by manufacturers of equipment widely used in that industry. When these emission factors are revised, reported releases for an entire industry may change. [**Section 8.5** discusses an example of this in the pulp and paper industry.]

A recent study of TRI facilities that had reported large reductions in production-related waste found that just one type of "paper" change—that is, a reporting change that does not reflect any actual difference in amounts released, transferred or managed in waste—accounted for half of the apparent reductions. Facility decisions to redefine certain activities, especially on-site recycling, meant that the amounts associated with those activities were no longer reportable to TRI. (In other research, such as *Toxics Watch 1995* [INFORM Inc., 1995], such redefinitions have also explained some of the large increases in TRI reporting.) However, when this study focused on TRI's release/disposal category, rather than total production-related waste, reductions proved much more likely to be real. Facilities cited actual changes, including source reduction (pollution prevention) actions, as the reason for more than 90 percent of the reported decreases in release/disposal amounts (see T.E. Natan, Jr. and C.G. Miller, Are toxics release inventory reductions real? Is source reduction the cause? *Environmental Science & Technology* in press, 1998).

NPRI does require facilities to report reasons for changes, using general categories: changes in production levels, changes in estimation methods, other (including accidents or spills), or no significant change. NPRI facilities indicate the appropriate category for change in total releases and again for change in total transfers; they can also provide a comment on the reason for year-to-year differences. TRI does not require facilities to identify reasons for changes, although facilities report the kind of estimation method used for each individual release and transfer amount; these can be compared from year to year. NPRI facilities also report the kind of estimation method used for each individual release and transfer amount. TRI also requires facilities to calculate an index indicating changes in production. The Mexican RETC follows the US TRI pattern. This information, required in TRI but voluntary for the RETC, can indicate relative production changes from year to year, but not the amount of reduction (or increase) in PRTR releases and transfers associated with changes in production.

2.4.3 Normalization

Some approaches have been suggested for normalizing PRTR data to account for conditions that vary among reporting facilities. Proposed normalizing measures include total amounts of chemicals per unit of production, per unit of energy consumption, or per job. Every normalization method has an underlying set of assumptions and limitations. For example, normalizing the release data on the basis of employees assumes that there is a relationship between the amount of releases and the number of employees such that a facility that has more employees will have more releases and a facility that has fewer employees will have fewer releases. Many facilities do not find such a direct relationship. Releases may be smaller because of production processes used, different raw materials used or installation of pollution control devices, than at another facility in the same industrial sector with the same number of employees. In addition, factors that influence the number of employees at a facility from year to year are numerous, and therefore year-to-year comparisons based on normalizing by employees may not provide an accurate picture of releases. Other facilities note the difficulty in obtaining accurate employment figures on a facility basis. If a facility has its head office and production staff at the same location, what is the appropriate number of employees to correspond to the release data? NPRI facilities report the number of employees, but TRI facilities do not. Other information sources can give an estimate of employees per TRI company, but this may not be accurate at the facility level. Because of these difficulties and the likelihood of introducing errors, this report has not normalized NPRI and TRI data on the basis of employee size.

Other methods of normalization include normalizing releases on the basis of production level. The underlying assumption here is that as production increases, releases increase proportionately, and as production decreases, releases decrease.

Again, production may increase without a corresponding increase in releases due to a host of reasons such as raw material substitution, changes in production processes, improved spill management and pollution prevention activities. Some industrial sectors, such as the chemical industry, have reported reductions in releases with increases in production. Another challenge is trying to define a measure of production that is appropriate to vastly different industrial sectors and applicable over time. Some observers argue that normalizing by production would provide a more accurate basis to compare facilities and jurisdictions, noting that if a facility is "bigger" than another, then it stands to reason that its releases and transfers would also be larger. Only TRI contains any production-related information and that is an index of relative production from one year to the next. Such a measure, at best, is suited only to interpreting changes in PRTR data for a single facility from year to year. It cannot be used to compare across facilities. Normalization could also be undertaken from the point of view of potential exposure. What is the population surrounding a facility? What are the uses of water bodies into which pollutants are discharged?

Normalizing data can provide additional perspectives on the environmental performance of reporting facilities through which to view the same data. However, every normalization method has its own underlying sets of assumptions and limitations. Moreover the TRI, NPRI and proposed RETC do not collect any common data for use in normalizing. This report adds only limited data on population and geographic area to the release-and-transfer data provided by the PRTRs.

For all the reasons above, this report does not provide analyses using normalizing techniques. The CEC welcomes suggestions on practical methods to normalize the data sets and expects to present analyses using several different normalizing approaches, as part of a special feature on environmental performance measurement in its North American PRTR report of 1996 data. [Note: An accompanying discussion of the philosophy underlying the system of facility rankings used in this report is presented in the text box in **Section 3.3**.]

2.4.4 Data on Exposure and Risk

Substances listed in PRTRs differ in their toxicity, their persistence and their ability to accumulate in organisms such as fish and humans. Some chemicals reported to NPRI and TRI are known carcinogens; others break down rapidly in water. Chemicals can have different impacts in water or air or in mixtures.

There are notable differences of opinion on some of the health and environmental characteristics of chemicals on the NPRI and TRI lists. There is also a broad range of health endpoints (potentially measurable effects on human health) and an even broader range of factors that determine health and environmental impacts. For these reasons, this report does not directly address the health and environmental characteristics of the releases and transfers analyzed here. A table of reported effects for the listed substances would be oversimplified and potentially misleading. To provide a full overview of their effects would be too voluminous for the report. As a first step, however, this report does present data on releases and transfers of carcinogens (see **Chapter 3**).

Readers wishing to learn more about the health and environmental characteristics of the chemicals reported to NPRI, TRI, and RETC can get information from these sources:

- Canadian Centre for Occupational Health and Safety—<http://www.ccohs.ca/oshanswers>; e-mail: inquiries@ccohs.ca
- U.S. National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances, available from the National Library of Medicine—<http://www.nlm.gov/pubs/factsheets/rtecsfs.htm>
- National Library of Medicine's Hazardous Substances Data Bank (HSDB)—<http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.htm>
- State of New Jersey, Department of Health, Right-to-Know Hazardous Substances Fact Sheets—<http://www.stat.nj.us/health/eoh/rtkweb/rtkhsfs.htm>
- National Safety Council, *Crossroads* on Chemical Databases and MSDSs—<http://www.nsc.org/xroads/chem.htm>
- Sistema Internacional de Monitoreo Ambiental, which also supplies hourly information on Mexico City's air quality under the General Direction for Pollution Prevention and Control—<http://www.calidad-del-aire.gob.mx>
- Sistema Nacional de Información Ambiental—<http://www.ine.gob.mx/indicadores/espanol/i_ca6.htm>
- Contaminación Industrial con Solventes Orgánicos como Causa de Teratogénesis (*Salud Pública Mex* 1996), Instituto Nacional de Salud Pública—<http://www.insp.mx/salud/38/381-12s.html>

PRTRs do not collect data on exposure or risk associated with the releases they report. Exposure and risk assessment depend on site-specific geographic and population characteristics, and the data they require can range from prevailing wind patterns to inhalation rates of children playing in schoolyards. Toxicity indices, sometimes recommended for evaluating PRTR data, do not reflect these local details. On the other hand, PRTR data can contribute to estimates of local exposure or risk. Public health authorities, for example, can use release data from local facilities as one element needed to compile a profile of local exposure.

Taking Stock 1995 adds together information on chemicals that differ in their toxicity, persistence, and ability to bioaccumulate. The total amount of substances released or transferred from a facility may not necessarily represent the environmental and health risks from this facility. Any evaluation of the relative health and environmental impacts of a facility's releases and transfers must take into account a wide range of factors, including the toxicity of the chemicals released, local climatic and environmental conditions, the proximity of people and the ecological sensitivity of the area.

2.5 PRTR Contacts for Further Information

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

Public Access to NPRI Data and Information

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

Headquarters: 819-953-1656 819-994-3266 (fax)

Environment Canada on the Internet:
<http://www.ec.gc.ca>
NPRI data on the Internet:
<http://www.ec.gc.ca/pdb/npri>

Public Access to TRI Data and Information

TRI Telephone Support

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

EPA on the Internet:
<http://www.epa.gov>

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

On-line Data Access

1) **RTK NET:** <http://www.rtk.net> for Internet access,
202-234-8570 for free on-line access to TRI data, or
202-234-8494 for information.

2) **National Library of Medicine's Toxnet** computer system:
301-496-6531 to register.

Additional Information on Mexican RETC

Luis Sánchez Cataño
Director de Gestión Ambiental Metropolitana
Instituto Nacional de Ecología
Avenida Revolución 1425-9
Col. Tlacopac
Delegación Alvaro Obregón
01040 México, D.F.
525-624-3570 525-624-3584 (fax)
lsanchez@chajul.ine.gob.mx

Semarnap on the Internet:
<http://www.semarnap.gob.mx>

INE's web page site for RETC on the Internet:
<http://www.ine.gob.mx/retc/retc.html>

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

Key Findings

- Facilities in the United States dominated releases and transfers of listed pollutants in 1995, as reported to North American Pollutant Release and Transfer Registers (PRTRs). This is true both generally and for all types of releases and transfers. However, based on the relative size of the two reporting systems (by the number of facilities that report and the number of forms they submit), Canadian releases and transfers represent a larger share of all release/transfer types, except for transfers to municipal sewage treatment plants.
- Environmental releases (to air, surface water, underground injection and land disposal at the facility) accounted for nearly three-quarters of the total amount of releases and transfers reported.
- Ten states and provinces reported total releases and transfers of more than 45 million kg each in 1995. Releases and transfers were concentrated in the southeastern United States and on both the Canadian and US sides of the Great Lakes.
- The 50 largest facilities (far less than 1 percent of all reporting facilities) generated 26 percent of total releases and transfers. In particular, they dominated injection of listed substances to underground wells, releases on-site to land and discharges to surface waters. The large facilities' waste management methods tended to concentrate on one release medium or transfer type. In most cases, one release/transfer type received more than 70 percent of the facility's reported chemicals in waste.
- The chemical industry (US SIC code 28) dominated releases, transfers and total releases and transfers. Further, 29 of the 50 facilities with the largest total releases and transfers were chemical industry facilities.
- Fifteen percent of total releases and transfers were of 45 chemicals designated as known or suspected carcinogens. Releases of these chemicals totaled 128 million kg and transfers 67 million kg.

3.1 Introduction

This chapter provides an overall summary of PRTR data for North America, using publicly available data collected by Canada and the United States for 1995. It analyzes the data for industries and chemicals that must be reported in both countries (a matched data set). **Chapter 4** compares the data from the two PRTRs, again using the 1995 matched data set of common chemicals and industries. In **Chapter 5,** data for 1994 and 1995 are compared for both countries, for common chemicals and industries (a multi-year matched data set).

The data for Canada are based on the NPRI data as compiled in the NPRI document *Summary Report 1995: National Pollutant Release Inventory,* Environment Canada, Hull, Quebec, November 1997. The data for the United States are based on TRI data as released to the public in *1995 Toxics Release Inventory: Public Data Release*, US Environmental Protection Agency, Washington, DC, April 1997.

To clarify the differences among data sets, this chapter begins with summary tables for the matched data set for 1995, the complete NPRI and TRI data for 1995, and the multi-year matched data set for 1994–1995 (**Tables 3–1**, **3–2** and **3–3**). Letters on the left sides of all tables and figures throughout the report state which data set is in use, as explained in **Chapter 2**.

While similar, the two current North American PRTRs exhibit significant differences in the chemicals and industries they cover: The 1995 TRI required reporting list numbered 606 chemicals and chemical categories, while that for NPRI covered 176. In 1995, TRI applied only to manufacturing and

Table 3–1
M 1995

North American Releases and Transfers, NPRI and TRI

Data Analyzed in this Chapter and Chapter 4	North America Number		Canadian NPRI Number		US TRI Number		NPRI as % of North American Total	TRI as % of North American Total
	kg	%	kg	%	kg	%		
Total Facilities	21,095		1,309		19,786		6.2	93.8
Total Forms	64,092		4,328		59,764		6.8	93.2
Total Air Emissions	639,954,996	48.9	79,547,053	51.3	560,407,943	48.5	12.4	87.6
Surface Water Discharges	75,990,103	5.8	15,419,582	9.9	60,570,521	5.2	20.3	79.7
Underground Injection	102,720,500	7.8	9,937,227	6.4	92,783,273	8.0	9.7	90.3
On-Site Land Releases	134,910,378	10.3	11,690,712	7.5	123,219,666	10.7	8.7	91.3
Matched Releases	**953,725,730**	**72.8**	**116,744,327**	**75.3**	**836,981,403**	**72.4**	**12.2**	**87.8**
Treatment/Destruction	117,107,768	8.9	13,148,001	8.5	103,959,767	9.0	11.2	88.8
Sewage/POTWs	100,254,236	7.7	4,457,382	2.9	95,796,854	8.3	4.4	95.6
Disposal/Containment	138,582,168	10.6	20,654,350	13.3	117,927,818	10.2	14.9	85.1
Matched Transfers	**355,944,172**	**27.2**	**38,259,733**	**24.7**	**317,684,439**	**27.5**	**10.7**	**89.3**
Total Releases and Transfers	**1,309,669,902**	**100.0**	**155,004,060**	**100.0**	**1,154,665,842**	**100.0**	**11.8**	**88.2**

➤ Canada and US data only, Mexico data not collected for 1995.

federal facilities, while, with a few exceptions, NPRI encompassed facilities in any industry. Data in this chapter are limited to the chemicals and industries common to both PRTRs. Industries are defined by their US Standard Industrial Classification (SIC) code, which both countries collect.

As shown in **Chapter 4**, the matched data set—that is, data from industries and chemicals covered by both PRTRs—represents 68 percent of NPRI total releases and transfers and 84 percent of the TRI releases and transfers (not including off-site transfers to recycling, reuse, and energy recovery). Averaged over the two countries, the matched data represent 82 percent of the North American total. When all reported amounts for transfers to recycling/reuse/recovery are included, the matched data set represents 44 percent of the North American total.

Currently, almost 25 percent of NPRI total releases and transfers must be excluded from the matched data set in this report, because they are reported by non-manufacturing industries (see **Figure 4–1**, in **Chapter 4**). As described in **Chapter 2**, TRI has expanded to cover certain additional industries, beginning with the 1998 reporting year. Had these expansion industries reported to TRI in 1995, only 14 percent of the NPRI totals would have been excluded, a substantial increase in comparability between the two databases.

3.2 North American Releases and Transfers: The Data

The data covered in this chapter reflect the submission of 64,092 forms by 21,095 industrial facilities. (Facilities report one chemical per form; therefore a facility that reports releases and/or transfers of 10 chemicals submits 10 forms.) These facilities reported releases and transfers of 1.3 billion kg of listed chemicals in North America in 1995 (see **Table 3–1**). In this common database, the Canadian NPRI represents 12 percent and the US TRI 88 percent of total releases and transfers. Canadian facilities, however, account for a greater proportion of all releases and transfers than would be expected from the number of facilities and forms involved (6 percent of reporting facilities and 7 percent of submitted forms, but 12 percent of releases and 11 percent of transfers).

These results were taken from the larger pool of data that includes all industries and all chemicals that are reported to either PRTR. In the complete databases, a total of 23,709 facilities

Table 3–2
A 1995

North American Releases and Transfers, NPRI and TRI

	North America Number		Canadian NPRI Number		US TRI Number		NPRI as % of North American Total	TRI as % of North American Total
Total Facilities	23,709		1,758		21,951		7.4	92.6
Total Forms	79,605		6,294		73,311		7.9	92.1
	kg	**%***	**kg**	**%***	**kg**	**%***	**%**	**%**
Total Air Emissions	811,073,607	50.8	102,537,501	44.7	708,536,106	51.8	12.6	87.4
Surface Water Discharges	96,230,607	6.0	34,409,462	15.0	61,821,145	4.5	35.8	64.2
Underground Injection	122,652,243	7.7	16,085,482	7.0	106,566,761	7.8	13.1	86.9
On-Site Land Releases	140,598,536	8.8	15,822,135	6.9	124,776,401	9.1	11.3	88.7
Total Releases	**1,170,770,356**	**73.3**	**169,069,943**	**73.7**	**1,001,700,413**	**73.2**	**14.4**	**85.6**
Treatment/Destruction	146,968,533	9.2	16,548,187	7.2	130,420,346	9.5	11.3	88.7
Sewage/ POTWs	114,894,506	7.2	6,125,111	2.7	108,769,395	7.9	5.3	94.7
Disposal/Containment	165,482,360	10.4	37,748,366	16.4	127,733,994	9.3	22.8	77.2
Total Transfers	**427,345,399**	**26.7**	**60,421,664**	**26.3**	**366,923,735**	**26.8**	**14.1**	**85.9**
Subtotal Releases and Transfers	**1,598,115,755**	**100.0**	**229,491,607**	**100.0**	**1,368,624,148**	**100.0**	**14.4**	**85.6**
Recycling/Reuse/Recovery**	1,166,315,115		162,355,301		1,003,959,814		13.9	86.1
Energy Recovery**	234,957,812		2,744,784		232,213,028		1.2	98.8
Total Releases and Transfers	**2,999,388,682**		**394,591,692**		**2,604,796,990**		**13.2**	**86.8**

* Percentage of subtotal releases and transfers, excluding recycling/reuse/recovery and energy recovery, presented for consistency with Tables 3–1 and 3–3.
** Optional reporting for NPRI, required for TRI.
➤ Canada and US data only, Mexico data not collected for 1995.

reported, submitting 79,605 forms. In this compilation of all PRTR reports, total releases and transfers amounted to just under 3.0 billion kg for 1995 (see **Table 3–2**). The most significant difference between the complete databases and the matched data set of common industries and chemicals is the reporting on transfers to recycling, reuse or recovery and transfers to energy recovery. Submission of data on these transfers is mandatory for TRI, but remains optional for NPRI until the 1998 reporting year. These types of transfers accounted for 1.6 billion kg of listed chemicals, more than half of the North American total of 3.0 billion.

Chapter 4 returns to the matched data set summarized in **Table 3–1**, to compare NPRI and TRI reporting for the common set of chemicals and industries. **Chapter 4** also discusses in more detail the effects of excluding chemicals and industries from each PRTR's data.

North American PRTR data for 1994 and 1995 are summarized in **Table 3–3**. For this analysis, any chemical or industry that was not covered by both NPRI and TRI in both years must be further excluded from the matched data. Although the industrial coverage did not change from 1994 to 1995, some changes in the lists of chemical substances to be reported did occur. Thus, the 1995 releases and transfers in **Table 3–3** total nearly 1.1 billion kg. **Chapter 5** analyzes the matched two-year North American data.

In future years, reporting for the two PRTRs will become more similar, increasing the proportion of data held in common. EPA is implementing an expansion of industrial coverage for TRI, effective with the 1998 reporting year. Also for 1998, reporting of transfers to recycling/reuse/recovery or to energy recovery will become mandatory for NPRI facilities.

Because facilities may at any time submit revisions to their previous reports, the NPRI and TRI databases are never static. *Taking Stock* uses the two databases as they existed at the time that

Table 3–3
MY 94-95

North American Releases and Transfers, NPRI and TRI

Data Analyzed in Chapter 5	North America				NPRI				TRI			
	1994	1995	Change 1994-1995		1994	1995	Change 1994-1995		1994	1995	Change 1994-1995	
	Number	Number	Number	%	Number	Number	Number	%	Number	Number	Number	%
Facilities	20,482	20,041	-441	-2.2	1,281	1,298	17	1.3	19,201	18,743	-458	-2.4
Forms	59,491	58,561	-930	-1.6	3,860	4,031	171	4.4	55,631	54,530	-1,101	-2.0
	kg	kg	kg	%	kg	kg	kg	%	kg	kg	kg	%
Releases												
Total Air Emissions	583,531,740	551,473,170	-32,058,570	-5.5	66,862,674	63,201,922	-3,660,752	-5.5	516,669,066	488,271,248	-28,397,818	-5.5
Surface Water Discharges	30,742,636	26,918,213	-3,824,423	-12.4	12,962,199	10,919,996	-2,042,203	-15.8	17,780,437	15,998,217	-1,782,220	-10.0
Underground Injection	43,721,458	55,992,452	12,270,994	28.1	872,126	3,236,927	2,364,801	271.2	42,849,332	52,755,525	9,906,193	23.1
On-Site Land Releases	136,008,323	131,360,857	-4,647,466	-3.4	10,390,568	11,573,758	1,183,190	11.4	125,617,755	119,787,099	-5,830,656	-4.6
Matched Releases	**794,168,793**	**765,885,868**	**-28,282,925**	**-3.6**	**91,252,202**	**89,073,779**	**-2,178,423**	**-2.4**	**702,916,591**	**676,812,089**	**-26,104,502**	**-3.7**
Transfers												
Treatment/Destruction	102,191,808	109,004,789	6,812,981	6.7	14,494,719	12,645,014	-1,849,705	-12.8	87,697,089	96,359,775	8,662,686	9.9
Sewage/POTWs	65,474,711	63,670,962	-1,803,749	-2.8	464,174	394,752	-69,422	-15.0	65,010,537	63,276,210	-1,734,327	-2.7
Disposal/Containment	126,068,931	133,215,054	7,146,123	5.7	11,808,310	20,486,822	8,678,512	73.5	114,260,621	112,728,232	-1,532,389	-1.3
Matched Transfers	**293,735,451**	**305,890,805**	**12,155,354**	**4.1**	**26,767,203**	**33,526,588**	**6,759,385**	**25.3**	**266,968,248**	**272,364,217**	**5,395,970**	**2.0**
Matched Releases and Transfers	**1,087,904,244**	**1,071,776,673**	**-16,127,571**	**-1.5**	**118,019,405**	**122,600,367**	**4,580,962**	**3.9**	**969,884,839**	**949,176,307**	**-20,708,532**	**-2.1**

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to both NPRI and TRI. Canada and US data only, Mexico data not collected for 1994 and 1995.

Table 3–4
A 1994

Update of North American Total Release and Transfer Data, NPRI and TRI

	1994 Data, Reported in *Taking Stock 1994*			1994 Data, with Revisions Submitted since 1994 Report		
	North America	Canadian NPRI	US TRI	North America	Canadian NPRI	US TRI
Number	**Number**	**Number**	**Number**	**Number**	**Number**	
Total Facilities	24,451	1,707	22,744	24,816	1,740	23,076
Total Forms	81,260	5,928	75,332	82,224	6,004	76,220
	kg	**kg**	**kg**	**kg**	**kg**	**kg**
Releases						
Total Air Emissions	801,835,911	96,163,310	705,672,601	809,182,329	97,506,936	711,675,393
Surface Water Discharges	85,439,465	55,469,720	29,969,745	84,683,838	55,385,747	29,298,091
Underground Injection	172,527,104	14,264,870	158,262,234	173,837,729	13,364,870	160,472,859
On-Site Land Releases	145,221,958	14,087,660	131,134,298	151,528,567	14,096,225	137,432,342
Total Releases	**1,205,280,853**	**180,241,975**	**1,025,038,878**	**1,219,489,854**	**180,611,169**	**1,038,878,685**
Transfers						
Treatment, Destruction	168,978,727	24,393,542	144,585,185	158,014,954	24,972,538	133,042,416
Sewage/POTWs	117,521,363	2,016,222	115,505,141	116,719,343	2,082,300	114,637,043
Disposal/Containment	174,469,897	37,869,948	136,599,949	158,088,757	23,100,584	134,988,173
Total Transfers	**460,969,987**	**64,279,712**	**396,690,275**	**432,823,054**	**50,155,422**	**382,667,632**
Total Releases and Transfers	**1,666,250,840**	**244,521,687**	**1,421,729,153**	**1,652,312,908**	**230,766,591**	**1,421,546,317**

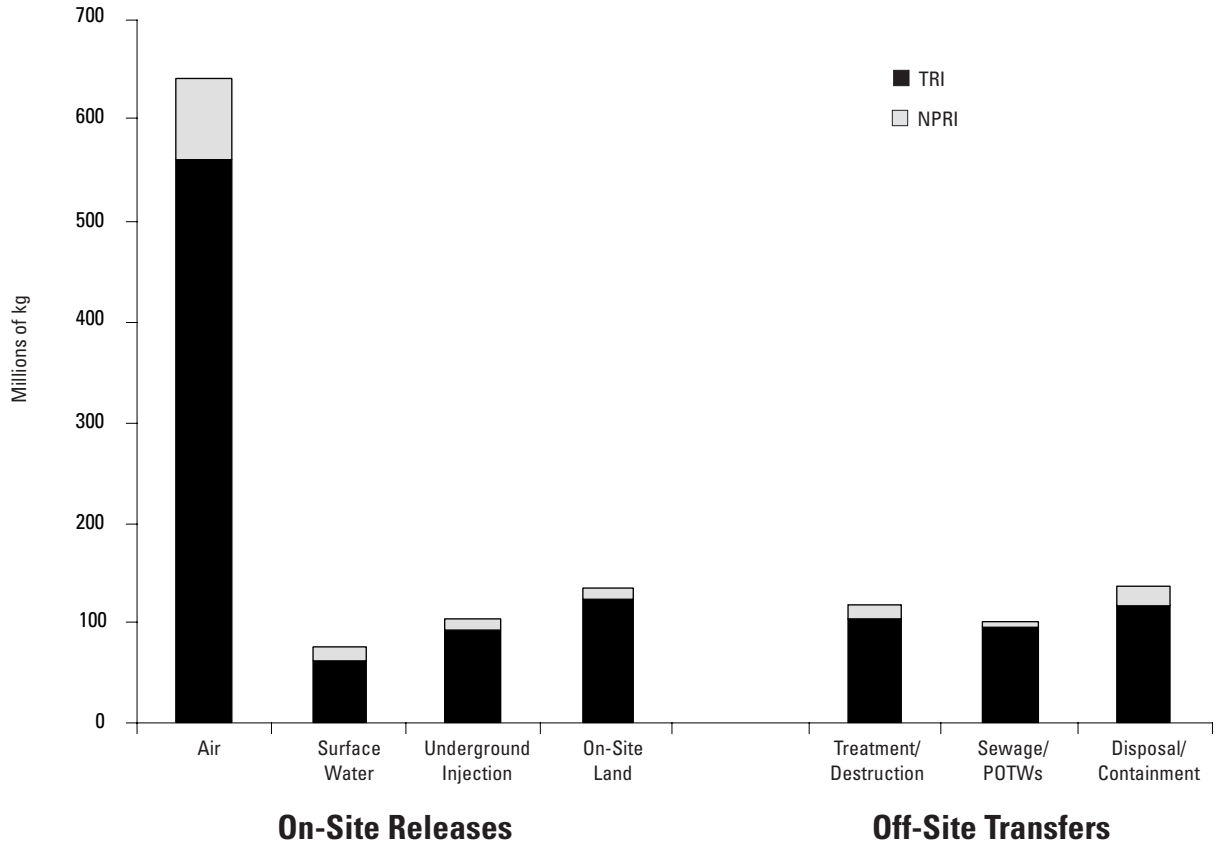
➤ Canada and US data only, Mexico data not collected for 1994.

Canada and the United States "locked" their data for their own annual published summaries (June 1997 for NPRI and April 1997 for TRI). Last year's report, *Taking Stock 1994*, analyzed NPRI and TRI data as of June 1996. **Table 3–4** compares 1994 data analyzed in *Taking Stock 1994* with the current 1994 data (June 1997 update) that reflects revisions submitted since that report.

Although more facilities filed 1994 reports, the North American total for releases and transfers for that reporting year decreased by 14 million kg as a result of all revisions received. Most of the additional facilities reported to TRI, where increased releases were offset by decreases in transfers, leaving little net change. In NPRI, the revised data brought a small increase in releases but a larger decrease in transfers, reflected in the net decrease overall for North America.

Figure 3–1
M 1995

North American Releases and Transfers



3.3 North American Releases and Transfers

For the common North American data set (see **Table 3–1**, above), releases (to air, surface waters, on-site land and underground injection) represented 73 percent of total releases and transfers reported in 1995. Emissions to the air accounted for two-thirds of all releases and nearly one-half of total releases and transfers. On-site land releases was the next largest type of release (10 percent of total releases and transfers), followed by underground injection (8 percent) and discharges into surface waters (6 percent). US facilities report larger releases to all media, dominating the North American data, but surface waters receive approximately twice the proportion of Canadian releases and transfers (10 percent) than is the case for the United States (5 percent). **Figure 3–1** graphically presents the distribution of releases and transfers, illustrating data from **Table 3–1**.

Facilities reported greater off-site transfers to disposal (11 percent of North American total releases and transfers) than to treatment (9 percent) or to sewage/POTWs (8 percent). Off-site transfers differed markedly, however, in the two countries: for Canada, transfers to municipal sewage treatment plants were small—3 percent of the NPRI total—and the amounts transferred to disposal (13 percent) were significantly greater than those sent to treatment (approximately 9 percent). Transfers to sewage was the only category in which the NPRI contribution to total releases and transfers was smaller than the NPRI percentage of facilities. In contrast, in the US TRI, transfers to sewage treatment plants—although still the smallest reported transfer type—represented 8 percent of the total, and transfers to disposal (10 percent) were only somewhat greater than transfers to treatment (9 percent; see **Figure 3–1**).

RANKING FACILITIES, PROVINCES AND STATES

Two issues raised in comments on this series of reports relate to the ranking of facilities and provinces/states and the lack of some form of production normalization of PRTR data. Underlying these two interrelated topics is the value-laden subject of how to measure environmental performance.

The CEC received comments on last year's report relating concerns that the rankings in the report were simplistic and/or misleading. Other comments received, however, supported the rankings used, and pointed out that they were consistent with practices employed by the existing national PRTR programs, such as the Toxics Release Inventory. The CEC has attempted to respond to both views by providing different presentations of ranking as a way of balancing differing approaches.

This report includes rankings of facilities based upon their total on-site releases collectively for all listed pollutants. This approach aggregates releases to different environmental media, which may have different impacts. It also aggregates chemicals with differing chemical and toxicological properties. Finally, it does not take into account any differences in the proximity of people and sensitive environments to the releases. On the other hand, it lumps only chemicals of concern—and these are just one percent of chemicals in commerce in the United States and Canada.

These rankings are done exclusively on the basis of reported quantities and are not risk-based. They present the largest sources of releases to the environment of the reported chemical from the covered facilities and provinces/states. While crude, rankings of the largest polluters in PRTR databases provide some perspective and have served to stimulate actions by industry and government to reduce pollution of substances of concern. Thus, the CEC has continued to include such rankings in this report.

None of the rankings is meant to imply that any facility is not living up to its environmental obligations under the law, nor that any province's or state's environmental program is inadequate. Such rankings instead document some of the largest sources of the listed pollutants to the environment.

Some tables include both releases and off-site transfers and rank reporting facilities and states/provinces based upon their totals. Some transfers are sent for treatment, others for disposal. Some transfers are largely destroyed in treatment or managed at disposal sites. Other transfers result in large amounts of the substances of concern entering the environment at off-site locations (at varying distances from the facility). As a result, such rankings are not based upon what enters the environment, particularly at the site of the facility. The combination of releases and transfers instead sums the amounts of the listed pollutants being released to the environment on-site and sent off-site in wastes.

The CEC has received many suggestions of alternative measures of environmental performance for facility and state/province rankings of PRTR data. Some approaches suggested for environmental performance measurement include compilations of releases and transfers that are "normalized" to account for differences in sizes and trends in production. Issues in normalization are discussed in **Chapter 2**.

Among the many approaches to measuring environmental performance that were suggested by commenters to supplement, or substitute for, the simple summaries provided herein are:

- toxicity weighted releases,
- chemical class-based releases,
- health risks,
- health and environmental risks,
- feasibility of release reductions,
- efficiency,
- releases per unit of monetary value,
- releases per unit of production,
- changes in releases per changes in production,
- geographical area (see **Tables 3–5** and **3–6**), and
- population (see **Tables 3–5** and **3–6**).

These suggestions, along with other possible measures to rank the environmental performance of industrial facilities and governmental jurisdictions will be discussed for possible inclusion as a special feature in the next CEC North American PRTR report.

Table 3–5
M 1995

North American Releases, by State and Province

State/Province	1995 Population	Land Area (km²)	Total Releases (kg)	Rank	Total Releases Per Capita (kg)	Rank	Total Releases Per km sq (kg)	Rank
Texas	18,801,380	691,031	112,793,420	1	6.0	10	163.2	21
Louisiana	4,338,072	123,675	70,770,304	2	16.3	2	572.2	2
Ontario	11,097,450	1,068,586	48,987,455	3	4.4	18	45.8	37
Ohio	11,134,032	107,045	45,870,951	4	4.1	21	428.5	3
Alabama	4,246,205	133,916	41,530,464	5	9.8	6	310.1	8
Tennessee	5,246,723	109,153	40,403,210	6	7.7	8	370.2	5
Illinois	11,790,379	145,934	35,130,323	7	3.0	26	240.7	14
North Carolina	7,202,335	136,413	33,735,003	8	4.7	17	247.3	12
Utah	1,958,313	219,889	30,718,386	9	15.7	3	139.7	23
Florida	14,184,155	151,940	30,592,848	10	2.2	37	201.3	15
Alberta	2,752,058	661,194	30,208,648	11	11.0	4	45.7	38
Indiana	5,796,948	93,719	30,201,225	12	5.2	14	322.3	7
Michigan	9,537,948	151,585	23,529,621	13	2.5	33	155.2	22
Mississippi	2,696,183	123,515	22,344,953	14	8.3	7	180.9	17
Pennsylvania	12,060,312	117,348	21,132,521	15	1.8	41	180.1	18
Georgia	7,208,676	152,577	21,047,672	16	2.9	28	137.9	25
South Carolina	3,667,000	80,583	21,007,927	17	5.7	12	260.7	9
Quebec	7,343,240	1,540,689	20,358,536	18	2.8	32	13.2	50
Montana	870,351	380,850	19,634,638	19	22.6	1	51.6	36
Virginia	6,615,234	105,587	19,254,062	20	2.9	30	182.4	16
Missouri	5,319,335	180,515	18,963,517	21	3.6	22	105.1	27
Arizona	4,305,016	295,260	15,236,624	22	3.5	23	51.6	35
New York	18,190,562	127,190	13,176,768	23	0.7	54	103.6	28
Arkansas	2,484,761	137,754	12,772,193	24	5.1	15	92.7	29
Iowa	2,843,074	145,752	12,346,541	25	4.3	19	84.7	30
California	31,565,480	411,049	12,305,985	26	0.4	59	29.9	44
Kentucky	3,856,877	104,659	11,907,988	27	3.1	25	113.8	26
Wisconsin	5,122,100	145,436	10,930,967	28	2.1	38	75.2	31
West Virginia	1,825,256	62,758	10,555,283	29	5.8	11	168.2	19
Washington	5,447,720	176,478	9,886,090	30	1.8	39	56.0	33
Oklahoma	3,274,870	181,186	9,608,628	31	2.9	27	53.0	34
Oregon	3,148,855	251,419	9,003,747	32	2.9	31	35.8	42
Kansas	2,563,618	213,098	8,348,243	33	3.3	24	39.2	39
New Mexico	1,689,849	314,926	8,097,135	34	4.8	16	25.7	46
Minnesota	4,614,613	218,601	7,925,993	35	1.7	43	36.3	41
British Columbia	3,762,859	947,806	6,110,485	36	1.6	44	6.4	54
New Jersey	7,949,506	20,168	5,208,802	37	0.7	55	258.3	10
New Brunswick	760,187	73,440	5,077,910	38	6.7	9	69.1	32
Wyoming	479,192	253,326	4,717,495	39	9.8	5	18.6	48
Maryland	5,038,912	27,091	4,544,015	40	0.9	52	167.7	20
Nebraska	1,639,213	200,350	3,895,184	41	2.4	35	19.4	47
Puerto Rico	3,755,127	9,104	3,589,767	42	1.0	51	394.3	4
Idaho	1,166,112	216,431	3,403,718	43	2.9	29	15.7	49
Connecticut	3,270,740	12,997	3,260,594	44	1.0	50	250.9	11
Maine	1,238,572	86,156	3,036,522	45	2.5	34	35.2	43
Massachusetts	6,071,078	21,456	2,995,778	46	0.5	56	139.6	24
Alaska	602,545	1,530,702	2,610,801	47	4.3	20	1.7	62
Manitoba	1,136,796	649,953	2,605,811	48	2.3	36	4.0	58
Saskatchewan	1,016,600	652,334	1,645,493	49	1.6	45	2.5	60
Nova Scotia	937,777	55,491	1,634,705	50	1.7	42	29.5	45
Nevada	1,533,478	286,353	1,548,687	51	1.0	49	5.4	56
Colorado	3,747,560	269,596	1,509,326	52	0.4	57	5.6	55
Delaware	717,041	5,294	1,277,780	53	1.8	40	241.4	13
Rhode Island	991,701	3,139	1,142,993	54	1.2	47	364.1	6
New Hampshire	1,148,244	24,033	902,927	55	0.8	53	37.6	40
North Dakota	641,506	183,121	828,404	56	1.3	46	4.5	57
South Dakota	729,500	199,731	797,729	57	1.1	48	4.0	59
Virgin Islands	101,809	342	557,783	58	5.5	13	1,631.5	1
Vermont	584,776	24,900	231,810	59	0.4	58	9.3	52
Hawaii	1,179,198	16,760	155,654	60	0.1	61	9.3	53
Newfoundland	576,637	405,721	102,264	61	0.2	60	0.3	63
Prince Edward Island	135,606	5,659	13,020	62	0.1	62	2.3	61
American Samoa	46,773	199	2,404	63	0.1	63	12.1	51
District of Columbia	554,528	163	0	64	0.0	64	0.0	64
Total	**296,312,553**	**15,443,126**	**953,725,730**		**3.2**		**61.8**	

➤ Canada and US data only, Mexico data not collected for 1995.

3.4 Geography of North American Releases and Transfers

3.4.1 State and Provincial Data

Among US states and Canadian provinces, only Texas reported more than 100 million kg of total releases in 1995, (113 million kg, as shown in **Table 3–5**). Louisiana followed with 71 million kg, and Ontario ranked third with 49 million kg. Together, their facilities accounted for nearly one quarter of total releases reported in 1995. In 26 other provinces and states, releases totaled more than 10 million kg.

Similar results appear in **Table 3–6**, which ranks US states and Canadian provinces according to the total releases and transfers reported by facilities located within their borders. The 1,073 TRI facilities in Texas reported 151 million kg of total releases and transfers, more than any other state or province. Texas contains more reporting facilities and reported greater total releases and transfers than Louisiana and Ontario, ranked second and third, combined. In each of the top 10 states and provinces, total releases and transfers exceeded 45 million kg. Twenty-five other states and provinces reported total releases and transfers of more 10 million kg each.

Map 3–1 illustrates the concentration of releases and transfers around the Great Lakes area in the United States and Canada and in parts of the southern United States. (**Tables 3–5** and **3–6** also provide total population and land area for each of the states and provinces.)

Table 3–6
M 1995

North American Releases and Transfers, by State and Province

State/Province	1995 Population	Land Area (km^2)	Number of Facilities	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Rank	Total Releases and Transfers Per Capita (kg)	Rank	Total Releases and Transfers Per km^2 (kg)	Rank
Texas	18,801,380	691,031	1,073	112,793,420	38,288,906	151,082,326	1	8.0	10	218.6	22
Louisiana	4,338,072	123,675	275	70,770,304	3,725,456	74,495,761	2	17.2	2	602.3	5
Ontario	11,097,450	1,068,586	718	48,987,455	25,291,348	74,278,803	3	6.7	14	69.5	33
Ohio	11,134,032	107,045	1,491	45,870,951	25,684,992	71,555,943	4	6.4	15	668.5	4
Pennsylvania	12,060,312	117,348	1,126	21,132,521	35,228,537	56,361,058	5	4.7	25	480.3	10
Alabama	4,246,205	133,916	472	41,530,464	8,331,449	49,861,913	6	11.7	4	372.3	13
Illinois	11,790,379	145,934	1,204	35,130,323	14,573,702	49,704,025	7	4.2	29	340.6	14
Tennessee	5,246,723	109,153	588	40,403,210	7,845,953	48,249,163	8	9.2	8	442.0	11
Michigan	9,537,948	151,585	806	23,529,621	24,115,735	47,645,356	9	5.0	20	314.3	16
Indiana	5,796,948	93,719	924	30,201,225	16,198,405	46,399,630	10	8.0	12	495.1	9
North Carolina	7,202,335	136,413	786	33,735,003	7,755,651	41,490,654	11	5.8	18	304.2	17
Florida	14,184,155	151,940	465	30,592,848	5,094,049	35,686,897	12	2.5	41	234.9	20
Alberta	2,752,058	661,194	88	30,208,648	1,318,330	31,526,978	13	11.5	5	47.7	42
Utah	1,958,313	219,889	132	30,718,386	627,044	31,345,431	14	16.0	3	142.6	29
Quebec	7,343,240	1,540,689	328	20,358,536	6,978,005	27,336,541	15	3.7	33	17.7	49
Virginia	6,615,234	105,587	409	19,254,062	7,883,453	27,137,515	16	4.1	31	257.0	19
South Carolina	3,667,000	80,583	460	21,007,927	5,379,419	26,387,346	17	7.2	13	327.5	15
Missouri	5,319,335	180,515	517	18,963,517	7,056,535	26,020,052	18	4.9	23	144.1	28
California	31,565,480	411,049	1,233	12,305,985	13,310,459	25,616,444	19	0.8	57	62.3	37
Mississippi	2,696,183	123,515	286	22,344,953	2,476,750	24,821,703	20	9.2	7	201.0	23
Georgia	7,208,676	152,577	637	21,047,672	3,243,470	24,291,142	21	3.4	36	159.2	25
Wisconsin	5,122,100	145,436	795	10,930,967	10,112,376	21,043,342	22	4.1	30	144.7	27
New York	18,190,562	127,190	641	13,176,768	6,904,505	20,081,273	23	1.1	54	157.9	26
Montana	870,351	380,850	25	19,634,638	24,717	19,659,355	24	22.6	1	51.6	41
Arizona	4,305,016	295,260	158	15,236,624	3,210,162	18,446,786	25	4.3	28	62.5	36
New Jersey	7,949,506	20,168	544	5,208,802	12,819,942	18,028,744	26	2.3	43	893.9	2
Iowa	2,843,074	145,752	373	12,346,541	5,372,582	17,719,124	27	6.2	17	121.6	30
Kentucky	3,856,877	104,659	381	11,907,988	5,397,554	17,305,542	28	4.5	26	165.4	24
Oregon	3,148,855	251,419	230	9,003,747	6,560,180	15,563,927	29	4.9	21	61.9	38
West Virginia	1,825,256	62,758	131	10,555,283	4,062,537	14,617,820	30	8.0	11	232.9	21
Arkansas	2,484,761	137,754	351	12,772,193	1,428,056	14,200,249	31	5.7	19	103.1	31
Kansas	2,563,618	213,098	255	8,348,243	3,988,354	12,336,596	32	4.8	24	57.9	39
Minnesota	4,614,613	218,601	461	7,925,993	3,931,715	11,857,707	33	2.6	40	54.2	40
Washington	5,447,720	176,478	255	9,886,090	1,660,589	11,546,679	34	2.1	45	65.4	34
Oklahoma	3,274,870	181,186	253	9,608,628	1,814,528	11,423,156	35	3.5	35	63.0	35
British Columbia	3,762,859	947,806	75	6,110,485	2,675,862	8,786,347	36	2.3	42	9.3	54
Massachusetts	6,071,078	21,456	457	2,995,778	5,556,172	8,551,950	37	1.4	53	398.6	12
New Mexico	1,689,849	314,926	32	8,097,135	183,312	8,280,447	38	4.9	22	26.3	47
Maryland	5,038,912	27,091	168	4,544,015	2,981,184	7,525,198	39	1.5	52	277.8	18
Puerto Rico	3,755,127	9,104	142	3,589,767	3,798,424	7,388,191	40	2.0	46	811.5	3
Connecticut	3,270,740	12,997	294	3,260,594	4,007,733	7,268,327	41	2.2	44	559.2	6
New Brunswick	760,187	73,440	21	5,077,910	1,558,783	6,636,693	42	8.7	9	90.4	32
Nebraska	1,639,213	200,350	150	3,895,184	1,984,346	5,879,531	43	3.6	34	29.3	46
Wyoming	479,192	253,326	24	4,717,495	4,237	4,721,732	44	9.9	6	18.6	48
Maine	1,238,572	86,156	83	3,036,522	810,707	3,847,229	45	3.1	37	44.7	44
Idaho	1,166,112	216,431	56	3,403,718	173,083	3,576,801	46	3.1	38	16.5	50
Manitoba	1,136,796	649,953	38	2,605,811	301,215	2,907,026	47	2.6	39	4.5	59
Delaware	717,041	5,294	69	1,277,780	1,487,622	2,765,402	48	3.9	32	522.4	8
Alaska	602,545	1,530,702	8	2,610,801	2,748	2,613,550	49	4.3	27	1.7	62
Colorado	3,747,560	269,596	159	1,509,326	856,165	2,365,491	50	0.6	58	8.8	55
Nova Scotia	937,777	55,491	22	1,634,705	107,917	1,742,622	51	1.9	47	31.4	45
Rhode Island	991,701	3,139	134	1,142,993	599,216	1,742,209	52	1.8	48	555.0	7
Saskatchewan	1,016,600	652,334	14	1,645,493	27,845	1,673,338	53	1.6	50	2.6	60
Nevada	1,533,478	286,353	32	1,548,687	28,305	1,576,992	54	1.0	55	5.5	57
New Hampshire	1,148,244	24,033	91	902,927	235,657	1,138,585	55	1.0	56	47.4	43
North Dakota	641,506	183,121	32	828,404	271,401	1,099,805	56	1.7	49	6.0	56
South Dakota	729,500	199,731	68	797,729	295,633	1,093,362	57	1.5	51	5.5	58
Virgin Islands	101,809	342	2	557,783	87,136	644,918	58	6.3	16	1,886.4	1
Vermont	584,776	24,900	32	231,810	136,335	368,145	59	0.6	59	14.8	51
Hawaii	1,179,198	16,760	14	155,654	77,259	232,913	60	0.2	60	13.9	52
Newfoundland	576,637	405,721	3	102,264	28	102,292	61	0.2	61	0.3	63
Prince Edward Island	135,606	5,659	2	13,020	400	13,420	62	0.1	62	2.4	61
American Samoa	46,773	199	1	2,404	0	2,404	63	0.1	63	12.1	53
District of Columbia	554,528	163	1	0	2	2	64	0.0	64	0.0	64
Total	**296,312,553**	**15,443,126**	**21,095**	**953,725,730**	**355,944,172**	**1,309,669,902**		**4.4**		**84.8**	

➤ Canada and US data only, Mexico data not collected for 1995.

3.4.2 Facilities with the Largest Total Releases and Transfers

Some of the geographical pattern of releases and transfers can be attributed to a few facilities, as appears in **Map 3–2**, which locates facilities (two in NPRI and 35 in TRI) that reported more than 4 million kg of total releases and transfers in 1995.

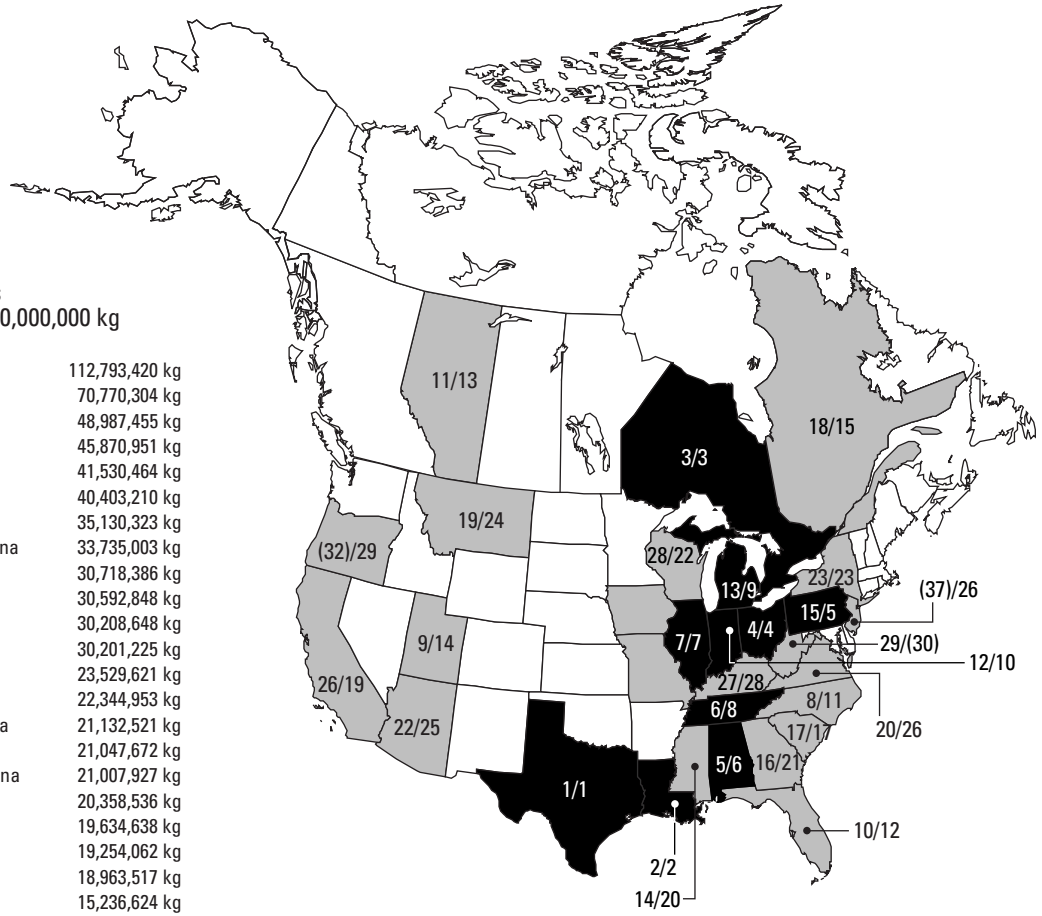
Table 3–7 lists the 50 facilities with the largest total releases. (Any evaluation of the relative health and environmental impacts of releases and transfers from these facilities must also take into account the toxicity of the chemicals released, local climatic conditions and the proximity of people and/or ecologically sensitive areas to the released waste streams.) Their reported releases amounted to 31 percent of the North American total. Seven of the 50 reported to NPRI and the remainder to TRI. For 30 of these facilities, release of one chemical to one environmental medium constituted more than 70 percent of total releases.

As illustrated in **Figure 3–2**, underground injection and on-site land releases played a much larger role for these facilities than for the rest of the reporting facilities. Together, these two media accounted for 59 percent of the top 50 facilities' releases, compared to 10 percent for all facilities. Correspondingly, air emissions were a much smaller proportion for the top 50 facilities (31 percent) than for others (83 percent).

The 50 facilities with the largest total releases and transfers reported in the combined North American data for 1995 appear in **Table 3–8**. These 50 facilities, which constitute far less than 1 percent of the total number of reporting facilities and which submitted 1 percent of all forms, nonetheless reported 26 percent of total releases and transfers. Seven are Canadian facilities, while 43 are in the United States.

Map 3–1
M 1995

Largest Sources of North American Releases and Transfers: States and Provinces (Total Releases of more than 10 million kg; Total Releases and Transfers of more than 15 million kg)



Total Releases
Greater than 10,000,000 kg

1	Texas	112,793,420 kg
2	Louisiana	70,770,304 kg
3	Ontario	48,987,455 kg
4	Ohio	45,870,951 kg
5	Alabama	41,530,464 kg
6	Tennessee	40,403,210 kg
7	Illinois	35,130,323 kg
8	North Carolina	33,735,003 kg
9	Utah	30,718,386 kg
10	Florida	30,592,848 kg
11	Alberta	30,208,648 kg
12	Indiana	30,201,225 kg
13	Michigan	23,529,621 kg
14	Mississippi	22,344,953 kg
15	Pennsylvania	21,132,521 kg
16	Georgia	21,047,672 kg
17	South Carolina	21,007,927 kg
18	Quebec	20,358,536 kg
19	Montana	19,634,638 kg
20	Virginia	19,254,062 kg
21	Missouri	18,963,517 kg
22	Arizona	15,236,624 kg
23	New York	13,176,768 kg
24	Arkansas	12,772,193 kg
25	Iowa	12,346,541 kg
26	California	12,305,985 kg
27	Kentucky	11,907,988 kg
28	Wisconsin	10,930,967 kg
29	West Virginia	10,555,283 kg

Total Releases and Transfers
Greater than 15,000,000 kg

1	Texas	151,082,326 kg
2	Louisiana	74,495,761 kg
3	Ontario	74,278,803 kg
4	Ohio	71,555,943 kg
5	Pennsylvania	56,361,058 kg
6	Alabama	49,861,913 kg
7	Illinois	49,704,025 kg
8	Tennessee	48,249,163 kg
9	Michigan	47,645,356 kg
10	Indiana	46,399,630 kg
11	North Carolina	41,490,654 kg
12	Florida	35,686,897 kg
13	Alberta	31,526,978 kg
14	Utah	31,345,431 kg
15	Quebec	27,336,541 kg
16	Virginia	27,137,515 kg
17	South Carolina	26,387,346 kg
18	Missouri	26,020,052 kg
19	California	25,616,444 kg
20	Mississippi	24,821,703 kg
21	Georgia	24,291,142 kg
22	Wisconsin	21,043,342 kg
23	New York	20,081,273 kg
24	Montana	19,659,355 kg
25	Arizona	18,446,786 kg
26	New Jersey	18,028,744 kg
27	Iowa	17,719,124 kg
28	Kentucky	17,305,542 kg
29	Oregon	15,563,927 kg

Rankings

5/6 Rank for Total Releases/
Rank for Total Releases and Transfers

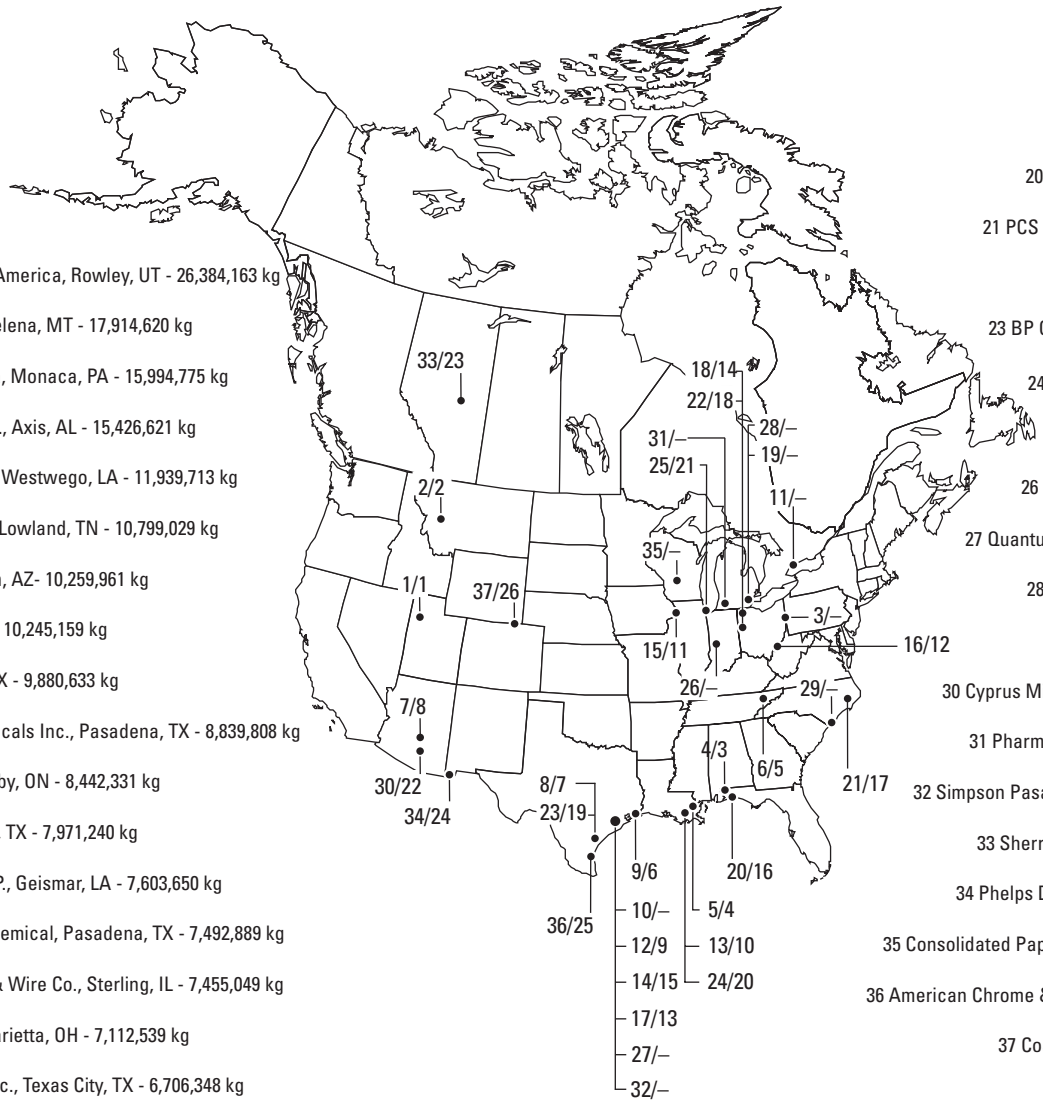
Rankings over 29 shown in parentheses

Total Releases and Transfers

- ■ 45,000,000 to 155,000,000 kg
- ▩ 15,000,000 to 45,000,000 kg
- □ Less than 15,000,000 kg

Map 3–2
M 1995

Largest Sources of North American Releases and Transfers: Facilities (Total Releases and Transfers of more than 4 million kg; Total Releases of more than 4 million kg)



1 Magnesium Corp. of America, Rowley, UT - 26,384,163 kg
1 - 26,384,163 kg
2 ASARCO Inc., East Helena, MT - 17,914,620 kg
2 - 17,914,440 kg
3 Zinc Corp. of America, Monaca, PA - 15,994,775 kg
— - 265,390 kg
4 Courtaulds Fibers Inc., Axis, AL - 15,426,621 kg
3 - 15,426,621 kg
5 Cytec Industries Inc., Westwego, LA - 11,939,713 kg
4 - 11,927,468 kg
6 Lenzing Fibers Corp., Lowland, TN - 10,799,029 kg
5 - 10,535,991 kg
7 ASARCO Inc., Hayden, AZ- 10,259,961 kg
8 - 8,249,523 kg
8 DuPont, Victoria, TX - 10,245,159 kg
7 - 9,507,453 kg
9 DuPont, Beaumont, TX - 9,880,633 kg
6 - 9,590,740 kg
10 Air Products & Chemicals Inc., Pasadena, TX - 8,839,808 kg
— - 24,118 kg
11 Co-Steel Lasco, Whitby, ON - 8,442,331 kg
— - 2,411,507 kg
12 BASF Corp., Freeport, TX - 7,971,240 kg
9 - 7,879,003 kg
13 Arcadian Fertilizer L.P., Geismar, LA - 7,603,650 kg
10 - 7,587,285 kg
14 Hoechst Celanese Chemical, Pasadena, TX - 7,492,889 kg
15 - 6,171,388 kg
15 Northwestern Steel & Wire Co., Sterling, IL - 7,455,049 kg
11 - 7,143,484 kg
16 Elkem Metals Co., Marietta, OH - 7,112,539 kg
12 - 7,089,410 kg
17 Sterling Chemicals Inc., Texas City, TX - 6,706,348 kg
13 - 6,650,935 kg
18 General Motors Corp., Defiance, OH - 6,622,830 kg
14 - 6,618,292 kg
19 National Steel Corp., Ecorse, MI - 6,275,515 kg
— - 145,397 kg

20 Monsanto Co., Cantonment, FL - 6,042,606 kg
16 - 6,039,612 kg
21 PCS Phosphate Co. Inc., Aurora, NC - 6,025,431 kg
17 - 6,025,431 kg
22 BP Chemicals Inc., Lima, OH - 5,918,045 kg
18 - 5,910,608 kg
23 BP Chemicals Inc., Port Lavaca, TX - 5,757,533 kg
19 - 5,729,566 kg
24 IMC-Agrico Co., St. James, LA - 5,282,193 kg
20 - 5,282,193 kg
25 U.S. Steel, Gary, IN - 5,280,950 kg
21 - 5,230,864 kg
26 Nucor Steel, Crawfordsville, IN - 5,214,733 kg
— - 10,193 kg
27 Quantum Chemical Corp., La Porte, TX - 5,151,741 kg
— - 1,009,119 kg
28 Rouge Steel Co., Dearborn, MI - 5,098,011 kg
— - 26,224 kg
29 DuPont, Leland, NC - 4,979,273 kg
— - 1,390,539 kg
30 Cyprus Miami Mining Corp., Claypool, AZ - 4,873,576 kg
22 - 4,873,576 kg
31 Pharmacia & Upjohn Co., Portage, MI - 4,860,311 kg
— - 3,305,683 kg
32 Simpson Pasadena Paper Co., Pasadena, TX - 4,612,172 kg
— - 572,444 kg
33 Sherritt Inc., Fort Saskatchewan, AB - 4,600,109 kg
23 - 4,583,739 kg
34 Phelps Dodge Hidalgo Inc., Playas, NM - 4,542,226 kg
24 - 4,542,226 kg
35 Consolidated Papers Inc., Wisconsin Rapids, WI - 4,489,506 kg
— - 1,180,751 kg
36 American Chrome & Chemicals, Corpus Christi, TX - 4,346,825 kg
25 - 4,305,964 kg
37 Coastal Chem Inc., Cheyenne, WY - 4,197,077 kg
26 - 4,197,029 kg

4/3 Rank for Total Releases and Transfers/Rank for Total Releases (if reported more than 4 million kilograms in total releases)
Facility List: Rank for Total Releases and Transfers/Facility, City, State/Province – Amount of Total Releases and Transfers
Rank for Total Releases (if more than 4 million kilograms) – Amount of Total Releases

Table 3–7
M 1995

The 50 North American Facilities with Largest Total Releases

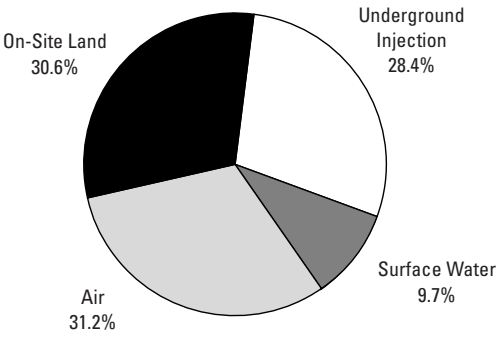
Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	Magnesium Corp. of America	Rowley, UT		33	5	26,384,163	0	0	0	26,384,163
2	ASARCO Inc.	East Helena, MT		33	9	43,652	233	0	17,870,556	17,914,440
3	Courtaulds Fibers Inc.	Axis, AL		28	4	15,163,039	23,492	0	240,091	15,426,621
4	Cytec Industries Inc.	Westwego, LA		28	22	270,745	22,935	11,633,788	0	11,927,468
5	Lenzing Fibers Corp.	Lowland, TN		28	6	10,521,887	14,104	0	0	10,535,991
6	DuPont	Beaumont, TX		28	24	316,524	2,022	9,272,194	0	9,590,740
7	DuPont	Victoria, TX		28	29	164,471	708	9,338,080	4,194	9,507,453
8	ASARCO Inc.	Hayden, AZ		33	8	454,888	0	0	7,794,636	8,249,523
9	BASF Corp.	Freeport, TX		28	26	152,088	7,714,761	12,154	0	7,879,003
10	Arcadian Fertilizer L.P.	Geismar, LA		28	10	696,290	6,691,922	2	199,071	7,587,285
11	Northwestern Steel & Wire Co.	Sterling, IL		33	6	67,947	707	0	7,074,830	7,143,484
12	Elkem Metals Co.	Marietta, OH		33	6	1,956,983	273,469	0	4,858,957	7,089,410
13	Sterling Chemicals Inc.	Texas City, TX		28	36	479,409	558	6,170,968	0	6,650,935
14	General Motors Corp.	Defiance, OH		33	18	347,699	11,961	0	6,258,631	6,618,292
15	Hoechst Celanese Chemical	Pasadena, TX		28	20	456,104	0	5,715,283	0	6,171,388
16	Monsanto Co.	Cantonment, FL		28	22	84,873	486	5,954,254	0	6,039,612
17	PCS Phosphate Co. Inc.	Aurora, NC		28	6	1,610,757	2	0	4,414,671	6,025,431
18	BP Chemicals Inc.	Lima, OH		28	28	183,288	0	5,727,320	0	5,910,608
19	BP Chemicals Inc.	Port Lavaca, TX		28	17	90,938	327	5,634,195	4,106	5,729,566
20	IMC-Agrico Co.	St. James, LA		28	7	2,990,289	2,113,388	0	178,516	5,282,193
21	U.S. Steel	Gary, IN		33	29	3,177,896	14,576	0	2,038,392	5,230,864
22	Cyprus Miami Mining Corp.	Claypool, AZ		33	5	15,360	126	0	4,858,091	4,873,576
23	Sherritt Inc.	Fort Saskatchewan, AB	37	28	14	4,277,316	302,517	0	3,646	4,583,739
24	Phelps Dodge Hidalgo Inc.	Playas, NM		33	1	73,161	0	0	4,469,064	4,542,226
25	American Chrome & Chemicals	Corpus Christi, TX		28	3	41,088	1,837	0	4,263,039	4,305,964
26	Coastal Chem Inc.	Cheyenne, WY		28	13	492,449	0	3,704,308	272	4,197,029
27	Sherritt Inc.	Redwater, AB	37	28	11	2,085,465	79,883	1,655,240	111,063	3,931,751
28	IMC-Agrico Co.	Mulberry, FL		Mult.	2	249,161	0	0	3,673,469	3,922,630
29	Monsanto Co.	Alvin, TX		28	20	61,108	0	3,818,617	19,048	3,898,772
30	Bayer Corp.	New Martinsville, WV		28	29	243,410	3,589,628	0	261	3,833,298
31	Doe Run Co.	Herculaneum, MO		33	9	107,398	485	0	3,568,587	3,676,471
32	Irving Pulp and Paper	Saint John, NB	27	26	3	275,185	3,387,916	0	0	3,663,101
33	Rubicon Inc.	Geismar, LA		28	22	295,409	97	3,271,519	0	3,567,025
34	Celanese Canada Inc.	Edmonton, AB	37	28	10	339,568	0	3,156,460	1,143	3,497,171
35	Methanex Corporation	Medicine Hat, AB	37	28	6	3,351,900	0	0	1,320	3,353,220
36	Vicksburg Chemical Co.	Vicksburg, MS		28	4	53,140	3,276,172	0	0	3,329,312
37	Occidental Chemical Corp.	Castle Hayne, NC		28	2	2,653	16	0	3,310,707	3,313,376
38	Pharmacia & Upjohn Co.	Portage, MI		28	26	498,449	58,299	2,748,934	0	3,305,683
39	PCS Phosphate	White Springs, FL		28	4	235,832	304	0	2,993,197	3,229,333
40	Chino Mines Co.	Hurley, NM		33	1	16,503	0	0	3,137,437	3,153,940
41	ASARCO Inc.	Annapolis, MO		33	6	177,505	20	0	2,782,020	2,959,545
42	Kennecott Utah Copper	Magna, UT		33	13	76,488	1,839	0	2,606,259	2,684,585
43	Canadian Fertilizers Limited	Medicine Hat, AB	37	28	4	2,618,992	25,663	0	0	2,644,759
44	Eastman Kodak Co.	Rochester, NY		38	50	2,504,829	131,463	0	259	2,636,551
45	Shell Scotford Refinery	Fort Saskatchewan, AB	36	29	11	53,925	112	2,515,001	662	2,569,700
46	CF Industries, Inc.	Donaldsonville, LA		28	10	2,248,567	276,916	0	0	2,525,483
47	Weyerhaeuser Co.	Longview, WA		Mult.	16	2,283,871	219,354	0	0	2,503,225
48	Terra Nitrogen	Catoosa, OK		28	8	2,390,748	81,194	0	794	2,472,736
49	Angus Chemical Co.	Sterlington, LA		28	12	34,082	27,305	2,387,407	0	2,448,794
50	Granite City Steel	Granite City, IL		33	22	91,816	8,405	0	2,334,810	2,435,032
	Subtotal				**675**	**90,809,308**	**28,355,202**	**82,715,725**	**89,071,798**	**290,952,497**
	% of Total				**1.1**	**14.2**	**37.3**	**80.5**	**66.0**	**30.5**
	Total				**64092**	**639,954,996**	**75,990,103**	**102,720,500**	**134,910,378**	**953,725,730**

* Chemicals accounting for more than 70% of total releases from the facility. Data on all chemicals can be found on the Internet at <http://www.rtk.net> for TRI facilities and <http://www.ec.gc.ca> for NPRI facilities.
➤ Canada and US data only, Mexico data not collected for 1995. UIJ=underground injection.

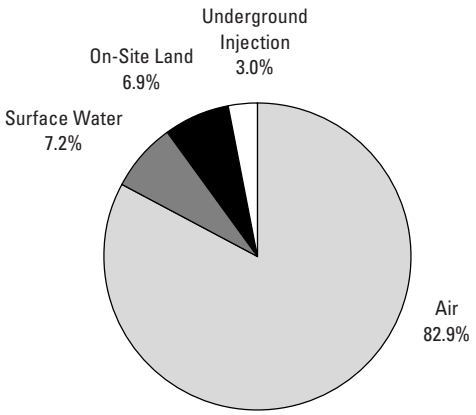
Rank	Major Chemicals Reported (Primary Media)*
1	Chlorine (air)
2	Zinc and compounds (land)
3	Carbon disulfide (air)
4	Acetonitrile, acrylic acid, ammonia (UIJ)
5	Carbon disulfide (air)
6	Nitric acid and nitrate compounds, acetonitrile (UIJ)
7	Nitric acid and nitrate compounds (UIJ)
8	Copper/zinc and compounds (land)
9	Nitric acid and nitrate compounds (water)
10	Phosphoric acid (water)
11	Zinc/manganese and compounds (land)
12	Manganese and compounds, ammonia (land, air)
13	Nitric acid and nitrate compounds, ammonia, methanol (UIJ)
14	Zinc and compounds (land)
15	Ethylene glycol (UIJ)
16	Nitric acid and nitrate compounds (UIJ)
17	Phosphoric acid (land)
18	Acetonitrile, acrylonitrile, ammonia, acrylamide (UIJ)
19	Acetonitrile, ammonia, acrylamide (UIJ)
20	Ammonia, phosphoric acid (air, water)
21	Ammonia, zinc/manganese and compounds (air, land)
22	Copper and compounds (land)
23	Ammonia, methanol (air)
24	Copper and compounds (land)
25	Chromium and compounds (land)
26	Nitric acid and nitrate compounds (UIJ)
27	Ammonia (air, UIJ)
28	Phosphoric acid (land)
29	Ammonia, acrylonitrile, methanol (UIJ)
30	Nitric acid and nitrate compounds (water)
31	Zinc and compounds (land)
32	Methanol (water)
33	Nitric acid and nitrate compounds, ammonia (UIJ, air)
34	Methanol, methyl ethyl ketone (UIJ)
35	Methanol (air)
36	Nitric acid and nitrate compounds (water)
37	Chromium and compounds (land)
38	Methanol (UIJ)
39	Phosphoric acid (land)
40	Copper and compounds (land)
41	Zinc/lead and compounds (land)
42	Copper/zinc/lead and compounds (land)
43	Ammonia (air)
44	Dichloromethane, methanol (air)
45	Ammonia (UIJ)
46	Ammonia (air)
47	Methanol, acetaldehyde (air)
48	Ammonia (air)
49	Nitric acid and nitrate compounds, formaldehyde (UIJ)
50	Zinc and compounds (land)

Figure 3–2
M 1995

North American Releases, Top 50 Facilities and All Other Facilities



Top 50 Facilities
Total 290,352,497 kg



All Other Facilities (21,045)
Total 662,773,233 kg

Table 3–8
M 1995

The 50 North American Facilities with Largest Total Releases and Transfers

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	Magnesium Corp. of America	Rowley, UT		33	5	26,384,163	0	0	0	26,384,163
2	ASARCO Inc.	East Helena, MT		33	9	43,652	233	0	17,870,556	17,914,440
3	Zinc Corp. of America	Monaca, PA		33	10	265,247	143	0	0	265,390
4	Courtaulds Fibers Inc.	Axis, AL		28	4	15,163,039	23,492	0	240,091	15,426,621
5	Cytec Industries Inc.	Westwego, LA		28	22	270,745	22,935	11,633,788	0	11,927,468
6	Lenzing Fibers Corp.	Lowland, TN		28	6	10,521,887	14,104	0	0	10,535,991
7	ASARCO Inc.	Hayden, AZ		33	8	454,888	0	0	7,794,636	8,249,523
8	DuPont	Victoria, TX		28	29	164,471	708	9,338,080	4,194	9,507,453
9	DuPont	Beaumont, TX		28	24	316,524	2,022	9,272,194	0	9,590,740
10	Air Products & Chemicals Inc.	Pasadena, TX		28	11	24,118	0	0	0	24,118
11	Co-Steel Lasco	Whitby, ON	29	33	6	13,986	221	0	2,397,300	2,411,507
12	BASF Corp.	Freeport, TX		28	26	152,088	7,714,761	12,154	0	7,879,003
13	Arcadian Fertilizer L.P.	Geismar, LA		28	10	696,290	6,691,922	2	199,071	7,587,285
14	Hoechst Celanese Chemical	Pasadena, TX		28	20	456,104	0	5,715,283	0	6,171,388
15	Northwestern Steel & Wire Co.	Sterling, IL		33	6	67,947	707	0	7,074,830	7,143,484
16	Elkem Metals Co.	Marietta, OH		33	6	1,956,983	273,469	0	4,858,957	7,089,410
17	Sterling Chemicals Inc.	Texas City, TX		28	36	479,409	558	6,170,968	0	6,650,935
18	General Motors Corp.	Defiance, OH		33	18	347,699	11,961	0	6,258,631	6,618,292
19	National Steel Corp.	Ecorse, MI		33	15	137,793	7,604	0	0	145,397
20	Monsanto Co.	Cantonment, FL		28	22	84,873	486	5,954,254	0	6,039,612
21	PCS Phosphate Co. Inc.	Aurora, NC		28	6	1,610,757	2	0	4,414,671	6,025,431
22	BP Chemicals Inc.	Lima, OH		28	28	183,288	0	5,727,320	0	5,910,608
23	BP Chemicals Inc.	Port Lavaca, TX		28	17	90,938	327	5,634,195	4,106	5,729,566
24	IMC-Agrico Co.	St. James, LA		28	7	2,990,289	2,113,388	0	178,516	5,282,193
25	U.S. Steel	Gary, IN		33	29	3,177,896	14,576	0	2,038,392	5,230,864
26	Nucor Steel	Crawfordsville, IN		33	7	10,173	9	0	11	10,193
27	Quantum Chemical Corp.	La Porte, TX		28	23	1,006,231	2,880	0	8	1,009,119
28	Rouge Steel Co.	Dearborn, MI		33	8	20,755	5,469	0	0	26,224
29	DuPont	Leland, NC		28	21	1,016,099	203,813	0	170,628	1,390,539
30	Cyprus Miami Mining Corp.	Claypool, AZ		33	5	15,360	126	0	4,858,091	4,873,576
31	Pharmacia & Upjohn Co.	Portage, MI		28	26	498,449	58,299	2,748,934	0	3,305,683
32	Simpson Pasadena Paper Co.	Pasadena, TX		26	8	572,444	0	0	0	572,444
33	Sherritt Inc.	Fort Saskatchewan, AB	37	28	14	4,277,316	302,517	0	3,646	4,583,739
34	Phelps Dodge Hidalgo Inc.	Playas, NM		33	1	73,161	0	0	4,469,064	4,542,226
35	Consolidated Papers Inc.	Wisconsin Rapids, WI		26	13	1,180,410	340	0	0	1,180,751
36	American Chrome & Chemicals	Corpus Christi, TX		28	3	41,088	1,837	0	4,263,039	4,305,964
37	Coastal Chem Inc.	Cheyenne, WY		28	13	492,449	0	3,704,308	272	4,197,029
38	Sherritt Inc.	Redwater, AB	37	28	11	2,085,465	79,883	1,655,240	111,063	3,931,751
39	IMC-Agrico Co.	Mulberry, FL		Mult.	2	249,161	0	0	3,673,469	3,922,630
40	Monsanto Co.	Alvin, TX		28	20	61,108	0	3,818,617	19,048	3,898,772
41	Boise Cascade Corp.	Saint Helens, OR		26	8	266,397	0	0	0	266,397
42	Bayer Corp.	New Martinsville, WV		28	29	243,410	3,589,628	0	261	3,833,298
43	Rubicon Inc.	Geismar, LA		28	22	295,409	97	3,271,519	0	3,567,025
44	Doe Run Co.	Herculaneum, MO		33	9	107,398	485	0	3,568,587	3,676,471
45	Irving Pulp and Paper	Saint John, NB	27	26	3	275,185	3,387,916	0	0	3,663,101
46	Celanese Canada Inc.	Edmonton, AB	37	28	10	339,568	0	3,156,460	1,143	3,497,171
47	Methanex Corporation	Medicine Hat, AB	37	28	6	3,351,900	0	0	1,320	3,353,220
48	Cerro Wire & Cable Co. Inc.	Hartselle, AL		33	3	14	7	0	0	20
49	Dominion Colour Corp.	Ajax, ON	37	28	6	0	0	0	0	100
50	Hercules Inc.	Hopewell, VA		28	12	358,380	0	0	0	358,380
	Subtotal				**663**	**82,892,405**	**24,526,924**	**77,813,317**	**74,473,600**	**259,706,707**
	% of Total				**1**	**13.0**	**32.3**	**75.8**	**55.2**	**27.2**
	Total				**64,092**	**639,954,996**	**75,990,103**	**102,720,500**	**134,910,378**	**953,725,730**

* Chemicals accounting for more than 70% of total releases and transfers from the facility. Data on all chemicals can be found on the Internet at <http://www.rtk.net> for TRI facilities and at <http://www.ec.gc.ca> for NPRI facilities.

➤ Canada and US data only, Mexico data not collected for 1995. UIJ=underground injection.

Rank	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
1	0	0	0	0	26,384,163	Chlorine (air)
2	0	180	0	180	17,914,620	Zinc and compounds (land)
3	12,172	0	15,717,212	15,729,385	15,994,775	Zinc/lead and compounds (transfers to disposal)
4	0	0	0	0	15,426,621	Carbon disulfide (air)
5	133	0	12,111	12,244	11,939,713	Acetonitrile, acrylic acid, ammonia (UIJ)
6	0	0	263,039	263,039	10,799,029	Carbon disulfide (air)
7	2,010,308	129	0	2,010,437	10,259,961	Copper/zinc and compounds (land)
8	737,706	0	0	737,706	10,245,159	Nitric acid and nitrate compounds (UIJ)
9	278,793	0	11,099	289,893	9,880,633	Nitric acid and nitrate compounds, acetonitrile (UIJ)
10	267,078	8,548,399	213	8,815,690	8,839,808	Nitric acid and nitrate compounds (transfers to sewage)
11	0	24	6,030,800	6,030,824	8,442,331	Zinc and compounds (transfers to disposal)
12	81,888	0	10,349	92,238	7,971,240	Nitric acid and nitrate compounds (water)
13	0	0	16,365	16,365	7,603,650	Phosphoric acid (water)
14	3,293	1,284,014	34,195	1,321,501	7,492,889	Ethylene glycol (UIJ)
15	311,565	0	0	311,565	7,455,049	Zinc/manganese and compounds (land)
16	0	0	23,129	23,129	7,112,539	Manganese and compounds, ammonia (land, air)
17	24,920	8,691	21,803	55,414	6,706,348	Nitric acid and nitrate compounds, ammonia, methanol (UIJ)
18	1,746	2,792	0	4,538	6,622,830	Zinc and compounds (land)
19	76,685	14,264	6,039,169	6,130,118	6,275,515	Zinc and compounds (transfers to disposal)
20	0	0	2,994	2,994	6,042,606	Nitric acid and nitrate compounds (UIJ)
21	0	0	0	0	6,025,431	Phosphoric acid (land)
22	6,807	0	630	7,438	5,918,045	Acetonitrile, acrylonitrile, ammonia, acrylamide (UIJ)
23	27,967	0	0	27,967	5,757,533	Acetonitrile, ammonia, acrylamide (UIJ)
24	0	0	0	0	5,282,193	Ammonia, phosphoric acid (air, water)
25	4,245	0	45,840	50,086	5,280,950	Ammonia, zinc/manganese and compounds (air, land)
26	1,478	0	5,203,062	5,204,540	5,214,733	Zinc and compounds (transfers to disposal)
27	4,142,622	0	0	4,142,622	5,151,741	Vinyl acetate (transfers to treatment)
28	0	0	5,071,787	5,071,787	5,098,011	Zinc and compounds (transfers to disposal)
29	3,557,400	0	31,333	3,588,733	4,979,273	Ethylene glycol (transfers to treatment)
30	0	0	0	0	4,873,576	Copper and compounds (land)
31	1,090,299	456,417	7,912	1,554,628	4,860,311	Methanol, dichloromethane (UIJ, transfers to treatment)
32	0	4,039,728	0	4,039,728	4,612,172	Methanol (transfers to sewage)
33	0	0	16,370	16,370	4,600,109	Ammonia, methanol (air)
34	0	0	0	0	4,542,226	Copper and compounds (land)
35	3,308,755	0	0	3,308,755	4,489,506	Methanol (transfers to treatment)
36	36,735	0	4,127	40,862	4,346,825	Chromium and compounds (land)
37	0	0	48	48	4,197,077	Nitric acid and nitrate compounds (UIJ)
38	0	0	0	0	3,931,751	Ammonia (air)
39	0	0	0	0	3,922,630	Phosphoric acid (land)
40	0	0	0	0	3,898,772	Ammonia, acrylonitrile, methanol (UIJ)
41	0	3,600,884	1,459	3,602,343	3,868,740	Methanol (transfers to sewage)
42	514	0	28,388	28,902	3,862,201	Nitric acid and nitrate compounds (water)
43	218,672	0	922	219,594	3,786,619	Nitric acid and nitrate compounds, ammonia (UIJ, air)
44	0	454	0	454	3,676,925	Zinc and compounds (land)
45	0	0	0	0	3,663,101	Methanol (water)
46	0	0	35,658	35,658	3,532,829	Methanol, methyl ethyl ketone (UIJ)
47	0	74,900	30	74,930	3,428,150	Methanol (air)
48	0	0	3,415,766	3,415,766	3,415,786	Copper and compounds (transfers to disposal)
49	0	3,150,000	186,100	3,336,100	3,336,200	Nitric acid and nitrate compounds (transfers to sewage)
50	0	2,974,425	0	2,974,425	3,332,805	Nitric acid and nitrate compounds, ethylene glycol (transfers to sewage)
	16,201,784	**24,155,302**	**42,231,909**	**82,588,995**	**342,295,702**	
	13.8	**24.1**	**30.5**	**23.2**	**26.1**	
	117,107,768	**100,254,236**	**138,582,168**	**355,944,172**	**1,309,669,902**	

While these 50 facilities reported one-quarter of total releases and transfers, they—mainly the US facilities—accounted for three-quarters of all underground injection. The top 50 facilities also reported more than one-half of on-site land releases and nearly one-third of surface water discharges. These patterns suggest that releases to these media—underground, on-site land and surface water—are more concentrated in North America than air emissions. (Overall, air emissions accounted for nearly one-half of all releases and transfers in the two countries.)

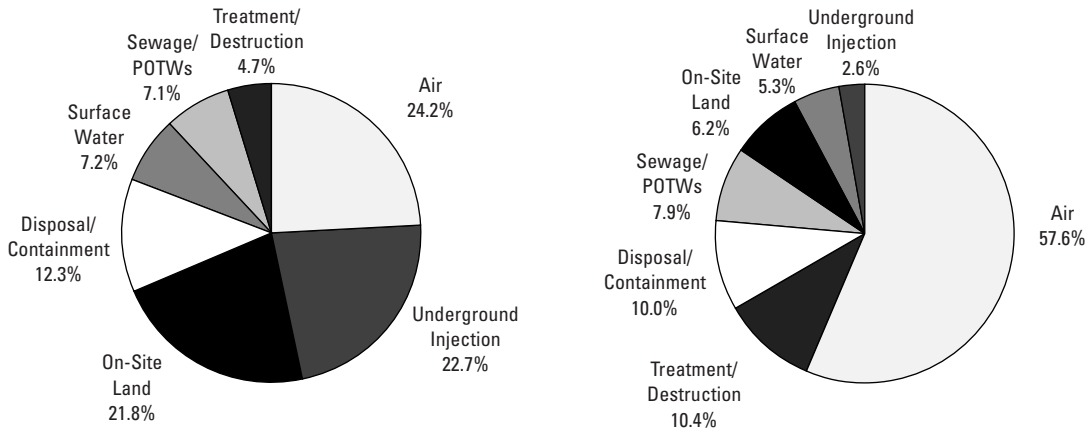
In contrast to their heavy contribution to other media, these facilities originated only 13 percent of reported releases to air. While this is still disproportionate to the number of facilities involved, these emissions represent a smaller fraction of total releases and transfers for these facilities than was found in the data for the full set of facilities. These 50 facilities also generated 23 percent of all off-site transfers, ranging from nearly 31 percent of transfers to disposal to 14 percent of transfers sent to treatment (see **Table 3–8**).

Figure 3–3 compares the distribution of releases and transfers of the top 50 facilities with those of all other facilities that reported to NPRI and TRI. Again, although individual facilities reported large emissions to air, the 50 facilities together report a much smaller proportion of releases as air emissions than all other facilities.

Among the 50 facilities were the largest single sources of each distinct type of release and transfer. Magnesium Corp. of America, in Rowley, Utah, for example, reported only air emissions, but led all facilities for total releases and transfers. In some cases, a few facilities account for a sizable portion of the North American total for a particular

Figure 3–3 M 1995

North American Releases and Transfers, Top 50 Facilities and All Other Facilities

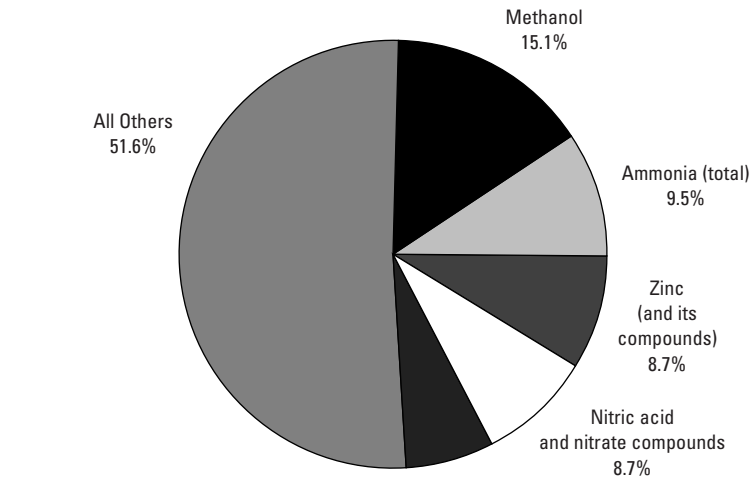


Top 50 Facilities
Total 342,295,705 kg

All Other Facilities (21,045)
Total 967,374,200 kg

Figure 3–4 M 1995

North American Top Five Chemicals for Total Releases and Transfers



Total 1,309,669,902 kg

release or transfer type. Two facilities, for example—BASF in Freeport, Texas, and Arcadian Fertilizer in Geismar, Louisiana—together account for 19 percent of all reported discharges to surface water. Similarly, three facilities reported 29 percent of the underground injection; these were Cytec Industries in Westwego, Louisiana, and DuPont facilities in Victoria and Beaumont, Texas.

Moreover, releases and transfers from these facilities were to a striking extent limited to one release medium or transfer type, as in the case of Magnesium Corp. of America. For 45 of the top 50 facilities, releases to a single medium or transfers to a single management type represented more than 70 percent of the total release-and-transfer amount. As **Table 3–8** shows, most of these facilities reported large amounts for just one or a few chemicals. For six of the top 10 facilities listed, just one chemical and one method of release or transfer accounted for more than 70 percent of the facility's totals.

3.5 Principal Chemicals Reported

The top five chemicals for total releases and transfers represented nearly half of all releases and transfers reported in North America, as illustrated in **Figure 3–4**. **Table 3–9** shows the 25 chemicals with the largest total releases and transfers. All but one of these chemicals (phenol) also ranked in the top 25 for releases. Nineteen were among the top 25 for transfers. **Tables 3–10** and **3–11** present the top chemicals for total releases and for total transfers, respectively. (Any evaluation of the relative health and environmental impacts of these releases and transfers must also take into account the toxicity of the chemicals involved, local climatic conditions and the proximity of people and/or ecologically sensitive areas to the released waste streams.)

Table 3–9
M 1995

The 25 Chemicals with the Largest Total Releases and Transfers in North America

CAS Number	Chemical	Forms Number	Forms (%)	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Total Releases and Transfers (%)	NPRI/TRI as % of Total: Forms (%)	NPRI/TRI as % of Total: Total Releases (%)	NPRI/TRI as % of Total: Total Transfers (%)	NPRI/TRI as % of Total: Total Releases and Transfers (%)
67-56-1	Methanol	2,614	4.1	140,929,504	57,511,085	198,440,589	15.1	8.6 / 91.4	21.3 / 78.7	3.6 / 96.4	16.2 / 83.8
—	Ammonia (total)	3,001	4.7	113,879,453	10,495,897	124,375,350	9.5	5.9 / 94.1	22.6 / 77.4	7.0 / 93.0	21.3 / 78.7
—	Zinc (and its compounds)	3,202	5.0	47,911,862	66,003,683	113,915,545	8.7	9.1 / 90.9	9.0 / 91.0	18.5 / 81.5	14.5 / 85.5
—	Nitric acid and nitrate compounds	2,530	3.9	73,960,409	39,557,469	113,517,878	8.7	4.7 / 95.3	2.7 / 97.3	10.1 / 89.9	5.3 / 94.7
108-88-3	Toluene	3,557	5.5	72,353,261	11,584,921	83,938,182	6.4	6.5 / 93.5	8.7 / 91.3	11.5 / 88.5	9.1 / 90.9
1330-20-7	Xylene (mixed isomers)	3,400	5.3	50,804,801	8,705,047	59,509,848	4.5	6.4 / 93.6	15.0 / 85.0	14.8 / 85.2	14.9 / 85.1
—	Manganese (and its compounds)	2,633	4.1	27,793,858	21,205,367	48,999,225	3.7	8.0 / 92.0	11.7 / 88.3	15.3 / 84.7	13.3 / 86.7
78-93-3	Methyl ethyl ketone	2,331	3.6	36,157,658	3,316,858	39,474,516	3.0	4.9 / 95.1	13.1 / 86.9	12.7 / 87.3	13.1 / 86.9
75-15-0	Carbon disulfide	95	0.1	38,185,683	176,322	38,362,005	2.9	5.3 / 94.7	0.0 / 100.0	4.6 / 95.4	0.1 / 99.9
—	Copper (and its compounds)	4,205	6.6	22,349,117	11,500,928	33,850,045	2.6	5.2 / 94.8	7.9 / 92.1	3.7 / 96.3	6.4 / 93.6
75-09-2	Dichloromethane	989	1.5	27,462,891	5,350,209	32,813,100	2.5	5.1 / 94.9	7.8 / 92.2	1.3 / 98.7	6.7 / 93.3
7782-50-5	Chlorine	1,433	2.2	31,250,845	319,777	31,570,622	2.4	8.0 / 92.0	4.0 / 96.0	0.0 / 100.0	4.0 / 96.0
7664-38-2	Phosphoric acid	2,913	4.5	26,226,274	3,636,946	29,863,220	2.3	6.6 / 93.4	0.5 / 99.5	12.9 / 87.1	2.0 / 98.0
107-21-1	Ethylene glycol	1,367	2.1	9,920,185	16,846,265	26,766,450	2.0	9.3 / 90.7	5.6 / 94.4	2.0 / 98.0	3.3 / 96.7
—	Chromium (and its compounds)	3,398	5.3	11,117,312	14,598,159	25,715,471	2.0	5.9 / 94.1	6.0 / 94.0	17.7 / 82.3	12.6 / 87.4
100-42-5	Styrene	1,548	2.4	19,714,825	3,982,106	23,696,931	1.8	4.3 / 95.7	3.7 / 96.3	5.8 / 94.2	4.1 / 95.9
—	Lead (and its compounds)	1,760	2.7	8,919,671	14,595,753	23,515,424	1.8	7.4 / 92.6	15.1 / 84.9	13.5 / 86.5	14.1 / 85.9
74-85-1	Ethylene	321	0.5	17,784,213	961,260	18,745,473	1.4	12.8 / 87.2	13.1 / 86.9	0.1 / 99.9	12.4 / 87.6
71-36-3	n-Butyl alcohol	1,158	1.8	13,798,234	1,890,575	15,688,809	1.2	6.6 / 93.4	9.3 / 90.7	11.5 / 88.5	9.5 / 90.5
75-05-8	Acetonitrile	87	0.1	13,167,356	2,325,055	15,492,411	1.2	2.3 / 97.7	0.6 / 99.4	0.0 / 100.0	0.5 / 99.5
79-01-6	Trichloroethylene	746	1.2	12,214,819	523,916	12,738,735	1.0	4.6 / 95.4	6.2 / 93.8	5.4 / 94.6	6.2 / 93.8
50-00-0	Formaldehyde	868	1.4	9,959,041	1,668,005	11,627,046	0.9	9.4 / 90.6	12.0 / 88.0	11.3 / 88.7	11.9 / 88.1
108-10-1	Methyl isobutyl ketone	1,041	1.6	10,471,302	997,971	11,469,273	0.9	5.4 / 94.6	6.5 / 93.5	6.7 / 93.3	6.5 / 93.5
115-07-1	Propylene	371	0.6	11,000,910	36,527	11,037,437	0.8	9.2 / 90.8	11.4 / 88.6	0.0 / 100.0	11.3 / 88.7
108-95-2	Phenol	785	1.2	6,241,997	4,020,333	10,262,330	0.8	7.3 / 92.7	6.9 / 93.1	5.8 / 94.2	6.4 / 93.6
	Subtotal	**46,353**	**72.3**	**853,575,481**	**301,810,434**	**1,155,385,915**	**88.2**	**6.6 / 93.4**	**11.8 / 88.2**	**10.7 / 89.3**	**11.5 / 88.5**
	% of Total	**72.3**		**89.5**	**84.8**	**88.2**					
	Total	**64,092**	**100.0**	**953,725,730**	**355,944,172**	**1,309,669,902**	**100.0**	**6.8/ 93.2**	**12.2 / 87.8**	**10.7 / 89.3**	**11.8 / 88.2**

➤ Canada and US data only, Mexico data not collected for 1995.

Table 3–10
M 1995

The 25 Chemicals with the Largest Releases in North America

CAS Number	Chemical	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)	NPRI/TRI as % of Total: Total Air Emissions (%)	Surface Water Discharges (%)	Underground Injection (%)	On-Site Land Releases (%)	Total Releases (%)
67-56-1	Methanol	113,497,304	13,741,846	12,929,937	754,503	140,929,504	16.1 / 83.9	72.4 / 27.6	14.1 / 85.9	1.3 / 98.7	21.3 / 78.7
—	Ammonia (total)	87,303,724	7,455,972	16,904,539	2,210,090	113,879,453	18.7 / 81.3	39.2 / 60.8	37.7 / 62.3	3.2 / 96.8	22.6 / 77.4
—	Nitric acid and nitrate compounds	1,178,102	41,615,918	29,823,509	1,339,431	73,960,409	2.1 / 97.9	3.8 / 96.2	1.1 / 98.9	3.5 / 96.5	2.7 / 97.3
108-88-3	Toluene	72,125,943	33,233	154,389	31,820	72,353,261	8.7 / 91.3	27.4 / 72.6	10.9 / 89.1	6.5 / 93.5	8.7 / 91.3
1330-20-7	Xylene (mixed isomers)	50,677,634	17,978	50,408	46,122	50,804,801	14.9 / 85.1	15.0 / 85.0	21.0 / 79.0	2.7 / 97.3	15.0 / 85.0
—	Zinc (and its compounds)	3,538,255	635,977	97,928	43,630,790	47,911,862	13.2 / 86.8	15.7 / 84.3	1.4 / 98.6	8.6 / 91.4	9.0 / 91.0
75-15-0	Carbon disulfide	38,162,372	20,379	1,812	120	38,185,683	0.0 / 100.0	11.3 / 88.7	0.3 / 99.7	0.0 / 100.0	0.0 / 100.0
78-93-3	Methyl ethyl ketone	34,898,676	30,210	1,182,429	39,959	36,157,658	10.9 / 89.1	7.9 / 92.1	78.7 / 21.3	0.3 / 99.7	13.1 / 86.9
7782-50-5	Chlorine	31,038,966	167,491	33,616	6,106	31,250,845	4.0 / 96.0	13.9 / 86.1	0.0 / 100.0	0.0 / 100.0	4.0 / 96.0
—	Manganese (and its compounds)	1,650,230	549,998	1,636	25,586,710	27,793,858	3.6 / 96.4	22.6 / 77.4	0.0 / 100.0	12.0 / 88.0	11.7 / 88.3
75-09-2	Dichloromethane	26,929,890	12,849	517,159	961	27,462,891	7.9 / 92.1	0.0 / 100.0	0.0 / 100.0	2.6 / 97.4	7.8 / 92.2
7664-38-2	Phosphoric acid	581,346	9,252,921	3,429	16,385,304	26,226,274	1.5 / 98.5	0.0 / 100.0	0.0 / 100.0	0.7 / 99.3	0.5 / 99.5
—	Copper (and its compounds)	1,814,158	66,142	133,283	20,330,759	22,349,117	23.5 / 76.5	17.5 / 82.5	0.0 / 100.0	6.5 / 93.5	7.9 / 92.1
100-42-5	Styrene	19,522,982	8,267	95,303	82,388	19,714,825	3.7 / 96.3	3.6 / 96.4	0.1 / 99.9	5.9 / 94.1	3.7 / 96.3
74-85-1	Ethylene	17,770,537	12,392	0	0	17,784,213	13.1 / 86.9	0.0 / 100.0	— / —	— / —	13.1 / 86.9
71-36-3	n-Butyl alcohol	12,697,601	66,752	1,026,466	2,405	13,798,234	9.9 / 90.1	21.6 / 78.4	0.0 / 100.0	12.8 / 87.2	9.3 / 90.7
75-05-8	Acetonitrile	539,374	3,405	12,624,572	5	13,167,356	14.7 / 85.3	0.4 / 99.6	0.0 / 100.0	0.0 / 100.0	0.6 / 99.4
79-01-6	Trichloroethylene	12,211,528	735	249	1,567	12,214,819	6.2 / 93.8	8.8 / 91.2	0.0 / 100.0	0.0 / 100.0	6.2 / 93.8
—	Chromium (and its compounds)	553,571	93,216	26,464	10,436,471	11,117,312	2.4 / 97.6	25.8 / 74.2	1.0 / 99.0	5.9 / 94.1	6.0 / 94.0
115-07-1	Propylene	10,998,825	1,834	0	19	11,000,910	11.4 / 88.6	0.0 / 100.0	— / —	0.0 / 100.0	11.4 / 88.6
108-10-1	Methyl isobutyl ketone	10,369,370	23,257	71,927	5,079	10,471,302	6.5 / 93.5	0.0 / 100.0	0.0 / 100.0	37.1 / 62.9	6.5 / 93.5
50-00-0	Formaldehyde	6,070,082	468,640	3,356,709	60,872	9,959,041	13.4 / 86.6	73.2 / 26.8	1.2 / 98.8	0.3 / 99.7	12.0 / 88.0
107-21-1	Ethylene glycol	3,617,442	423,229	5,693,338	182,416	9,920,185	13.0 / 87.0	14.7 / 85.3	0.0 / 100.0	8.5 / 91.5	5.6 / 94.4
—	Lead (and its compounds)	1,426,873	47,571	454	7,439,280	8,919,671	36.8 / 63.2	38.9 / 61.1	8.8 / 91.2	10.7 / 89.3	15.1 / 84.9
75-07-0	Acetaldehyde	6,233,723	115,624	404,778	70,486	6,824,611	2.3 / 97.7	11.4 / 88.6	32.1 / 67.9	0.0 / 100.0	4.2 / 95.8
	Subtotal	**565,408,508**	**74,865,836**	**85,134,334**	**128,643,663**	**854,158,095**	**11.6 / 88.4**	**20.3 / 79.7**	**11.3 / 88.7**	**7.6 / 92.4**	**11.8 / 88.2**
	as % of Total	**88.4**	**98.5**	**82.9**	**95.4**	**89.6**					
	Total	**639,954,996**	**75,990,103**	**102,720,500**	**134,910,378**	**953,725,730**	**12.4 / 87.6**	**20.3 / 79.7**	**9.7 / 90.3**	**8.7 / 91.3**	**12.2 / 87.8**

➤ Canada and US data only, Mexico data not collected for 1995.

Table 3–11
M 1995

The 25 Chemicals with the Largest Transfers in North America

CAS Number	Chemical	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	NPRI/TRI as % of Total: Treatment/ Destruction (%)	Sewage/ POTWs (%)	Disposal/ Containment (%)	Total Transfers (%)
—	Zinc (and its compounds)	10,726,002	276,073	55,001,608	66,003,683	28.1 / 71.9	4.7 / 95.3	16.7 / 83.3	18.5 / 81.5
67-56-1	Methanol	15,971,597	40,462,702	1,076,786	57,511,085	11.5 / 88.5	0.3 / 99.7	14.1 / 85.9	3.6 / 96.4
—	Nitric acid and nitrate compounds	6,560,983	28,316,726	4,679,760	39,557,469	1.3 / 98.7	13.2 / 86.8	3.6 / 96.4	10.1 / 89.9
—	Manganese (and its compounds)	2,867,989	185,711	18,151,666	21,205,367	16.7 / 83.3	2.0 / 98.0	15.3 / 84.7	15.3 / 84.7
107-21-1	Ethylene glycol	7,422,335	8,760,518	663,412	16,846,265	3.3 / 96.7	0.5 / 99.5	7.4 / 92.6	2.0 / 98.0
—	Chromium (and its compounds)	2,970,317	169,979	11,457,863	14,598,159	16.2 / 83.8	4.4 / 95.6	18.2 / 81.8	17.7 / 82.3
—	Lead (and its compounds)	3,901,620	29,011	10,665,122	14,595,753	12.6 / 87.4	8.8 / 91.2	13.8 / 86.2	13.5 / 86.5
108-88-3	Toluene	10,804,994	386,571	393,356	11,584,921	12.2 / 87.8	0.4 / 99.6	2.7 / 97.3	11.5 / 88.5
—	Copper (and its compounds)	1,535,355	151,773	9,813,800	11,500,928	6.7 / 93.3	2.5 / 97.5	3.2 / 96.8	3.7 / 96.3
—	Ammonia (total)	1,541,996	8,266,547	687,354	10,495,897	27.1 / 72.9	3.8 / 96.2	0.2 / 99.8	7.0 / 93.0
1330-20-7	Xylene (mixed isomers)	8,033,986	240,988	430,073	8,705,047	15.8 / 84.2	0.0 / 100.0	5.3 / 94.7	14.8 / 85.2
75-09-2	Dichloromethane	4,931,366	362,501	56,343	5,350,209	1.4 / 98.6	0.0 / 100.0	0.0 / 100.0	1.3 / 98.7
—	Nickel (and its compounds)	1,078,697	84,032	4,069,968	5,232,696	15.2 / 84.8	3.0 / 97.0	4.7 / 95.3	6.8 / 93.2
1332-21-4	Asbestos (friable)	2	341	5,112,168	5,112,511	0.0 / 100.0	0.0 / 100.0	63.6 / 36.4	63.6 / 36.4
108-05-4	Vinyl acetate	4,612,413	125,169	18,954	4,756,536	12.9 / 87.1	0.5 / 99.5	0.0 / 100.0	12.5 / 87.5
108-95-2	Phenol	1,650,182	1,779,730	590,421	4,020,333	11.5 / 88.5	1.7 / 98.3	2.2 / 97.8	5.8 / 94.2
100-42-5	Styrene	1,980,636	54,335	1,947,136	3,982,106	9.9 / 90.1	0.8 / 99.2	1.7 / 98.3	5.8 / 94.2
7664-38-2	Phosphoric acid	868,927	1,607,222	1,160,797	3,636,946	6.2 / 93.8	4.2 / 95.8	29.9 / 70.1	12.9 / 87.1
78-93-3	Methyl ethyl ketone	3,002,785	227,748	86,325	3,316,858	13.7 / 86.3	0.0 / 100.0	9.1 / 90.9	12.7 / 87.3
7429-90-5	Aluminum (fume or dust)	137,876	5,208	2,913,637	3,056,721	0.0 / 100.0	0.0 / 100.0	4.4 / 95.6	4.2 / 95.8
75-05-8	Acetonitrile	1,904,193	415,922	4,940	2,325,055	0.0 / 100.0	0.0 / 100.0	0.0 / 100.0	0.0 / 100.0
71-36-3	n-Butyl alcohol	858,904	807,130	224,541	1,890,575	21.6 / 78.4	0.4 / 99.6	12.4 / 87.6	11.5 / 88.5
—	Antimony (and its compounds)	403,484	51,386	1,426,403	1,881,274	0.0 / 100.0	0.2 / 99.8	0.2 / 99.8	0.2 / 99.8
7664-39-3	Hydrogen fluoride	1,109,028	174,188	459,246	1,742,462	0.5 / 99.5	0.0 / 100.0	0.0 / 100.0	0.3 / 99.7
50-00-0	Formaldehyde	465,474	1,070,329	132,202	1,668,005	33.3 / 66.7	0.9 / 99.1	17.9 / 82.1	11.3 / 88.7
	Subtotal	**95,341,141**	**94,011,840**	**131,223,881**	**320,576,861**	**12.3 / 87.7**	**4.6 / 95.4**	**15.4 / 84.6**	**11.3 / 88.7**
	as % of Total	**81.4**	**93.8**	**94.7**	**90.1**				
	Total	**117,107,768**	**100,254,236**	**138,582,168**	**355,944,172**	**11.2 / 88.8**	**4.4 / 95.6**	**14.9 / 85.1**	**10.7 / 89.3**

➤ Canada and US data only, Mexico data not collected for 1995.

Table 3–12
M 1995

North American Releases and Transfers of Known or Suspected Carcinogens*

CAS Number	Chemical	NPRI and TRI Total: Total Releases (kg)	NPRI and TRI Total: Total Transfers (kg)	NPRI and TRI Total: Total Releases and Transfers (kg)	NPRI/TRI as % of Total: Total Releases (%)	NPRI/TRI as % of Total: Total Transfers (%)	NPRI/TRI as % of Total: Total Releases and Transfers (%)
75-09-2	Dichloromethane	27,462,891	5,350,209	32,813,101	7.8 / 92.2	1.3 / 98.7	6.7 / 93.3
—	Chromium (and its compounds)	11,117,312	14,598,159	25,715,471	6.0 / 94.0	17.7 / 82.3	12.6 / 87.4
100-42-5	Styrene	19,714,825	3,982,106	23,696,931	3.7 / 96.3	5.8 / 94.2	4.1 / 95.9
—	Lead (and its compounds)	8,919,671	14,595,753	23,515,424	15.1 / 84.9	13.5 / 86.5	14.1 / 85.9
79-01-6	Trichloroethylene	12,214,819	523,916	12,738,735	6.2 / 93.8	5.4 / 94.6	6.2 / 93.8
50-00-0	Formaldehyde	9,959,041	1,668,005	11,627,046	12.0 / 88.0	11.3 / 88.7	11.9 / 88.1
75-07-0	Acetaldehyde	6,824,611	792,619	7,617,230	4.2 / 95.8	0.8 / 99.2	3.9 / 96.1
—	Nickel (and its compounds)	2,351,103	5,232,696	7,583,799	33.6 / 66.4	6.8 / 93.2	15.1 / 84.9
71-43-2	Benzene	6,113,271	1,066,295	7,179,566	29.3 / 70.7	12.1 / 87.9	26.8 / 73.2
108-05-4	Vinyl acetate	2,323,525	4,756,536	7,080,061	10.5 / 89.5	12.5 / 87.5	11.8 / 88.2
67-66-3	Chloroform	5,045,956	941,864	5,987,820	4.7 / 95.3	0.4 / 99.6	4.0 / 96.0
1332-21-4	Asbestos (friable)	284,554	5,112,511	5,397,066	78.5 / 21.5	63.6 / 36.4	64.4 / 35.6
127-18-4	Tetrachloroethylene	4,308,843	962,875	5,271,718	3.4 / 96.6	7.3 / 92.7	4.1 / 95.9
107-13-1	Acrylonitrile	2,951,754	527,230	3,478,983	0.6 / 99.4	6.5 / 93.5	1.5 / 98.5
79-06-1	Acrylamide	2,791,360	99,222	2,890,582	0.2 / 99.8	0.1 / 99.9	0.2 / 99.8
—	Arsenic (and its compounds)	748,947	1,254,586	2,003,533	7.1 / 92.9	1.3 / 98.7	3.5 / 96.5
117-81-7	Di(2-ethylhexyl) phthalate	355,997	1,519,501	1,875,499	16.7 / 83.3	2.7 / 97.3	5.4 / 94.6
106-99-0	1,3-Butadiene	1,546,894	106,087	1,652,980	14.4 / 85.6	56.6 / 43.4	17.1 / 82.9
107-06-2	1,2-Dichloroethane	579,279	902,467	1,481,746	1.1 / 98.9	0.0 / 100.0	0.4 / 99.6
—	Cadmium (and its compounds)	94,713	899,088	993,801	41.0 / 59.0	1.6 / 98.4	5.4 / 94.6
106-89-8	Epichlorohydrin	163,065	456,595	619,660	0.7 / 99.3	0.0 / 100.0	0.2 / 99.8
75-56-9	Propylene oxide	416,144	179,802	595,946	2.5 / 97.5	0.0 / 100.0	1.8 / 98.2
56-23-5	Carbon tetrachloride	211,333	351,948	563,281	3.7 / 96.3	3.7 / 96.3	3.7 / 96.3
75-01-4	Vinyl chloride	490,872	44,476	535,348	3.7 / 96.3	1.9 / 98.1	3.6 / 96.4
123-91-1	1,4-Dioxane	209,005	295,597	504,601	3.4 / 96.6	0.0 / 100.0	1.4 / 98.6
—	Cobalt (and its compounds)	210,408	269,655	480,063	13.8 / 86.2	2.1 / 97.9	7.2 / 92.8
75-21-8	Ethylene oxide	429,536	30,169	459,706	6.1 / 93.9	0.0 / 100.0	5.7 / 94.3
106-46-7	1,4-Dichlorobenzene	122,419	285,063	407,481	8.1 / 91.9	0.1 / 99.9	2.5 / 97.5
140-88-5	Ethyl acrylate	161,623	47,444	209,066	0.7 / 99.3	0.0 / 100.0	0.5 / 99.5
26471-62-5	Toluenediisocyanate (mixed isomers)	23,331	109,671	133,002	4.8 / 95.2	7.2 / 92.8	6.7 / 93.3
101-77-9	4,4'-Methylenedianiline	15,297	47,169	62,466	0.7 / 99.3	0.0 / 100.0	0.2 / 99.8
302-01-2	Hydrazine	5,909	13,727	19,636	0.0 / 100.0	0.0 / 100.0	0.0 / 100.0
79-46-9	2-Nitropropane	15,665	0	15,665	0.8 / 99.2	— / —	0.8 / 99.2
95-80-7	2,4-Diaminotoluene	227	13,503	13,730	0.0 / 100.0	0.0 / 100.0	0.0 / 100.0
62-56-6	Thiourea	3,790	7,686	11,476	0.0 / 100.0	0.0 / 100.0	0.0 / 100.0
96-45-7	Ethylene thiourea	238	10,181	10,420	0.0 / 100.0	0.0 / 100.0	0.0 / 100.0
584-84-9	Toluene-2,4-diisocyanate	3,840	5,645	9,484	7.8 / 92.2	1.8 / 98.2	4.2 / 95.8
64-67-5	Diethyl sulfate	3,173	2,442	5,615	0.3 / 99.7	0.0 / 100.0	0.1 / 99.9
139-13-9	Nitrilotriacetic acid	1,957	2,883	4,840	32 / 68	70.6 / 29.4	55.0 / 45.0
101-14-4	4,4'-Methylenebis(2-chloroaniline)	122	3,054	3,176	3.3 / 96.7	0.0 / 100.0	0.1 / 99.9
77-78-1	Dimethyl sulfate	2,917	1	2,919	0 / 100	0.0 / 100.0	0.0 / 100.0
91-08-7	Toluene-2,6-diisocyanate	1,380	715	2,095	0 / 100	0.0 / 100.0	0.0 / 100.0
90-94-8	Michler's ketone	715	0	715	0 / 100	— / —	0.0 / 100.0
94-59-7	Safrole	116	2	118	0 / 100	0.0 / 100.0	0.0 / 100.0
96-09-3	Styrene oxide	106	0	106	94.4 / 5.6	— / —	94.4 / 5.6
	Subtotal	**128,202,553**	**67,069,156**	**195,271,709**	**8.6 / 91.4**	**14.4 / 85.6**	**10.6 / 89.4**
	% of Total for Matched Chemicals	**13.4**	**18.8**	**14.9**			
	Total for Matched Chemicals	**953,725,730**	**355,944,172**	**1,309,669,902**	**12.2 / 87.8**	**10.7 / 89.3**	**11.8 / 88.2**

* 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 on Carcinogens.*

➤ A chemical (and its compounds) category is included if the chemical or any of its compounds are designated carcinogenic. Canada and US data only, Mexico data not collected for 1995.

As shown in **Table 3–9**, four chemicals were reported in amounts totaling more than 100 million kg (total releases and transfers) each: methanol, ammonia, zinc and its compounds, and nitric acid and nitrate compounds. Canadian facilities reported high quantities of the first three chemicals (compared to their proportion of facilities, forms, and total releases and transfers). US facilities accounted for a disproportionate share of releases and transfers of nitric acid and nitrate compounds (nearly 95 percent).

These differences arise from even greater differences in the release and transfer patterns of these chemicals in the two countries, as found in **Tables 3–10** and **3–11**. For example, Canadian facilities reported 12 percent of all North American releases, in this matched data set, but they accounted for 19 percent of the air emissions of ammonia, 39 percent of its surface water discharges, and 38 percent of its underground injection. At the same time, US facilities reported 96 percent of the transfers of methanol, compared to 89 percent of all transfers.

3.5.1 Carcinogenic Chemicals

Of the 1.3 billion kg of total releases and transfers reported in North America in 1995, 15 percent involved chemicals designated as carcinogenic (in *International Agency for Research on Cancer Monographs* or the *US National Toxicological Program Annual Report on Carcinogens).* Facilities reported on 45 of these known or suspected carcinogenic chemicals, as shown in **Table 3–12**. Releases were 128 million kg, nearly double the 67 million kg reported as transfers.

Releases and transfers of dichloromethane, the top carcinogen reported, totaled nearly 33 million kg. More than

10 million kg each were reported for chromium (and its compounds), styrene, lead (and its compounds), trichloroethylene, and formaldehyde.

About 30 percent of the releases of these chemicals come from 50 facilities in the two countries, as shown in **Table 3–13**. (This is the same proportion as for the top 50 facilities for total releases of all chemicals, presented in **Table 3–7**.) These top 50 facilities for releases of carcinogens accounted for most of the underground injection of such chemicals (92 percent), as well as much of the on-site land disposal (75 percent). At 16 of these facilities, emissions to air of dichloromethane accounted for more than 70 percent of all releases the facility reported.

Table 3–14 looks at the top 50 facilities for total releases and transfers of the carcinogens. They accounted for 29 percent of total reporting for these chemicals, including 36 percent of the transfers. For seven facilities, dichloromethane represented 70 percent or more of total releases and transfers. For another seven, chromium and its compounds held that position.

3.6 Reporting Industries

Three industries—chemicals, primary metals and paper products—accounted for two-thirds of the total releases and transfers reported in 1995, as shown in **Figure 3–5**.

The contribution of these industries to total North American releases and transfers does not arise simply from their having submitted a greater number of forms. In other words, their role in overall releases and transfer does not represent the results of "more" reporting than in other industries. Instead, as shown in **Table 3–15**, all three industries contributed a greater proportion of total releases and transfers than would be expected from the number of forms they submitted.

Submitting 28 percent of all forms, the chemical industry reported 37 percent of total releases and transfers. The primary metals industry submitted 10 percent of all forms, but it accounted for twice that proportion of total releases and transfers (20 percent). Paper and paper products manufacturers filed 3 percent of the forms, but reported 11 percent of total releases and transfers. The paper industry averaged the highest releases and transfers per form: 65,515 kg compared to 20,434 kg for all industries. (**Chapter 8** examines in greater detail PRTR reporting by the pulp and paper products industry, including reductions in releases and transfers, regulatory and other developments, and differences within the sector between Canada and the United States.)

In the Canadian NPRI, each facility reports only the one SIC code that best represents its dominant operations. In the US TRI, however, a facility reports all SIC codes that apply to its operations. Therefore, only US facilities appear in the "multiple codes" category, which ranked fourth for total releases and transfers.

Of the top 50 facilities for total releases and transfers, 29 reported in the chemical industry, 16 in primary metals, four in paper and paper products, and one with multiple SIC codes (see **Table 3–8**, above).

The same four industry groups ranked highest for total releases and for total off-site transfers (see **Tables 3–16** and **3–17**). The chemical industry led in all types of releases and transfers except on-site releases to land and transfers to disposal, both of which were dominated by the primary metal products industry.

3.7 Projections for Future Releases and Transfers

Both Canada and the United States require facilities to estimate PRTR releases and transfers for future years. Canadian facilities project total releases and total transfers, but US facilities make more detailed projections for on-site and off-site waste management. TRI includes one overall category for on-site releases and off-site disposal and another for off-site transfers to treatment. Together, these two categories—releases/off-site disposal plus off-site treatment—give projections for total releases and transfers. As **Table 3–18** shows, North American facilities overall expect to reduce their total releases and transfers by 5 percent through 1997, with Canadian facilities projecting a much greater percentage decrease (14 percent) than US facilities (4 percent).

Projected changes in releases and transfers varied markedly across industries (see **Table 3–19**). Those projecting the greatest percentage decreases also had relatively low releases and transfers in 1995. The apparel industry, projecting a 47 percent decrease through 1997, ranked 20th among 21 industry groups for total releases and transfers in 1995. Both Canadian and US apparel manufacturers have projected large net reductions, Canadian facilities at more than twice the rate projected by US facilities (75 percent and 34 percent, respectively).

Industries with the next largest projected reductions, in percentage terms, were measurement/ photographic instruments, miscellaneous manufacturing and textile mill products; these also ranked among the smaller sources of total releases and transfers in 1995.

Two industries projected increases by 1997: the relatively small tobacco products industry (6 percent) and the much larger primary metal products manufacturers (3 percent). Releases and transfers from tobacco products manufacturing ranked last among all industries in 1995, none were reported to NPRI. Primary metals producers ranked second for total releases and transfers in 1995. This industry's projected increase arose from TRI reporting (5 percent increase), which masked projected decreases reported to NPRI (9 percent decrease). On the other hand, large increases projected by some Canadian industries (e.g., industrial machinery, food) are outweighed by smaller percentage decreases projected by their US counterparts.

Figure 3–6 presents total releases and transfers projected for 1995–1997, from **Table 3–19**, and illustrates the contribution of industries projecting the largest absolute decreases. Chemical manufacturers in the United States and Canada have projected a reduction of nearly 32 million kg in total releases and transfers by 1997. This represents almost one-half the total net reduction across all industries. Paper products facilities projected a decrease of 14 million kg. The Canadian paper industry accounted for most (11 million kg) of this projection. (**Chapter 8** discusses the paper industry's progress in reducing releases and transfers from 1994 to 1995.) Two other industries recorded projected decreases of more than 5 million kg by 1997: fabricated metals (6 million kg) and rubber and plastics (a little over 5 million). Together, these four industries accounted for 83 percent of the net reduction in total releases and transfers expected by 1997.

Table 3–13
M 1995

Top 50 North American Facilities with Total Releases of Known or Suspected Carcinogens (sorted by total releases)

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	American Chrome & Chemicals	Corpus Christi, TX		28	1	2,426	113	0	4,263,039	4,265,578
2	Occidental Chemical Corp.	Castle Hayne, NC		28	1	2,651	16	0	3,310,707	3,313,375
3	ASARCO Inc.	East Helena, MT		33	4	24,221	156	0	1,906,985	1,931,363
4	Monsanto Co.	Luling, LA		28	2	8,617	0	1,815,374	0	1,823,991
5	BP Chemicals Inc.	Lima, OH		28	10	69,732	0	1,751,583	0	1,821,315
6	BP Chemicals Inc.	Port Lavaca, TX		28	5	14,617	0	1,383,401	32	1,398,051
7	Eastman Kodak Co.	Rochester, NY		38	10	1,324,223	28,324	0	0	1,352,547
8	ASARCO Inc.	Hayden, AZ		33	4	90,604	0	0	1,220,713	1,311,317
9	Angus Chemical Co.	Sterlington, LA		28	4	10,366	1,645	1,136,741	0	1,148,752
10	Cytec Industries Inc.	Westwego, LA		28	4	12,036	104	973,243	0	985,383
11	ASARCO Inc.	Annapolis, MO		33	4	173,483	10	0	787,457	960,950
12	Monsanto Co.	Alvin, TX		28	4	48,539	0	752,857	0	801,396
13	Doe Run Co.	Herculaneum, MO		333	6	92,715	363	0	692,685	785,764
14	Kennecott Utah Copper	Magna, UT		33	5	27,755	454	0	731,746	759,955
15	General Electric Plastics Co.	Mount Vernon, IN		28	4	697,647	426	0	0	698,073
16	Aquaglass Corp.	Adamsville, TN		30	1	665,652	0	0	0	665,652
17	Cyprus Miami Mining Corp.	Claypool, AZ		33	3	7,885	0	0	609,977	617,863
18	Northwestern Steel & Wire Co.	Sterling, IL		33	3	4,682	176	0	589,569	594,427
19	Upjohn Mfg. Co.	Arecibo, PR		28	2	590,522	0	0	0	590,522
20	Carpenter Co.	Verona, MS		30	2	580,417	0	0	0	580,417
21	Glenbrook Nickel Co.	Riddle, OR		33	1	5,019	7	0	542,689	547,714
22	Weyerhaeuser Co.	Longview, WA		Mult.	6	466,877	70,417	0	0	537,294
23	Abbott Chemicals Inc.	Barceloneta, PR		Mult.	1	520,117	0	0	0	520,117
24	Celanese Canada Inc.	Edmonton, AB	37	28	5	175,998	0	331,460	40	507,498
25	Inco Limited, Copper Cliff Smelter	Copper Cliff, ON	29	33	4	498,950	0	0	0	498,950
26	Sterling Chemicals Inc.	Texas City, TX		28	10	84,208	0	387,976	0	472,184
27	Dow Chemical Co.	Freeport, TX		28	21	438,861	23,240	0	312	462,413
28	Dofasco Inc.	Hamilton, ON	29	33	5	459,078	1,013	0	51	460,142
29	General Electric Chemicals Inc.	Ottawa, IL		28	6	455,356	1,886	0	0	457,242
30	Foamex L.P.	Corry, PA		30	2	448,334	0	0	0	448,334
31	Heatcraft Inc.	Grenada, MS		Mult.	1	447,951	0	0	0	447,951
32	Celanese Eng. Resins Inc.	Bishop, TX		28	4	205,624	635	240,952	0	447,211
33	Pharmacia & Upjohn Co.	Portage, MI		28	5	373,175	227	56,689	0	430,091
34	General Foam Corp.	West Hazelton, PA		30	3	419,152	0	0	0	419,152
35	Novopharm Limited	Scarborough, ON	37	28	1	418,410	0	0	0	418,410
36	Hoechst Celanese Chemical	Pasadena, TX		28	6	32,494	0	372,336	0	404,830
37	Noranda-Fonderie Horne	Rouyn Noranda, QC	29	33	6	396,500	2,480	0	0	398,980
38	Foamex International Inc.	Milan, TN		30	2	396,587	0	0	0	396,587
39	Great Lakes Chemical Corp.	El Dorado, AR		28	2	11,805	0	380,172	0	391,977
40	Elkem Metals Co.	Marietta, OH		33	4	4,149	454	0	358,730	363,332
41	Bayer Rubber Inc.	Sarnia, ON	37	28	5	361,413	62	0	0	361,475
42	Piper Impact Inc.	New Albany, MS		34	2	358,617	0	0	0	358,617
43	Carpenter Co.	Russellville, KY		Mult.	3	353,610	0	0	0	353,610
44	Carpenter Co.	Richmond, VA		Mult.	3	351,170	45	0	0	351,215
45	Vitafoam Inc.	High Point, NC		30	3	338,776	0	0	0	338,776
46	Co-Steel Lasco	Whitby, ON	29	33	3	1,559	39	0	333,300	334,898
47	Kimberly-Clark Corp.	Mobile, AL		26	2	320,635	11,791	0	0	332,426
48	Flexible Foam Products Inc.	Elkhart, IN		30	2	327,746	0	0	0	327,746
49	Federal Paper Board Co. Inc.	Riegelwood, NC		26	4	306,122	4,036	0	16,780	326,939
50	General Foam Corp.	Bridgeview, IL		30	3	323,982	0	0	0	323,982
	Subtotal				**204**	**13,751,068**	**148,121**	**9,582,785**	**15,364,813**	**38,846,787**
	% of Total				**1.2**	**14.3**	**12.3**	**91.9**	**74.6**	**30.3**
	Total				**16,789**	**95,949,158**	**1,200,871**	**10,428,060**	**20,587,117**	**128,202,553**

* Chemicals accounting for more than 70% of total carcinogenic releases from the facility.
➤ Canada and US data only, Mexico data not collected for 1995. UIJ=underground injection.

Rank	Major Chemicals Reported (Primary Media)*
1	Chromium and compounds (land)
2	Chromium and compounds (land)
3	Lead and compounds (land)
4	Formaldehyde (UIJ)
5	Acrylonitrile, acrylamide (UIJ)
6	Acrylamide, acrylonitrile (UIJ)
7	Dichloromethane (air)
8	Lead and compounds (land)
9	Formaldehyde (UIJ)
10	Acrylamide (UIJ)
11	Lead and compounds (land)
12	Acrylonitrile (UIJ)
13	Lead and compounds (land)
14	Lead/arsenic and compounds (land)
15	Dichloromethane (air)
16	Styrene (air)
17	Lead and compounds (land)
18	Lead/chromium and compounds (land)
19	Dichloromethane (air)
20	Dichloromethane (air)
21	Nickel and compounds (land)
22	Acetaldehyde, chloroform (air, water)
23	Dichloromethane (air)
24	Acetaldehyde, vinyl acetate (UIJ, air)
25	Nickel and compounds (air)
26	Acrylamide, acrylonitrile (UIJ)
27	Dichloromethane, benzene, epichlorohydrin, propylene oxide, 1,3-butadiene, 1,2-dichloroethane (air)
28	Benzene (air)
29	Styrene (air)
30	Dichloromethane (air)
31	Trichloroethylene (air)
32	Formaldehyde (air)
33	Dichloromethane (air)
34	Dichloromethane (air)
35	Dichloromethane (air)
36	Vinyl acetate, ethylene oxide (UIJ)
37	Lead and compounds (air)
38	Dichloromethane (air)
39	Dichloromethane (UIJ)
40	Chromium and compounds (land)
41	1,3-butadiene, benzene (air)
42	Tetrachloroethylene (air)
43	Dichloromethane (air)
44	Dichloromethane (air)
45	Dichloromethane (air)
46	Lead and compounds (land)
47	Chloroform (air)
48	Dichloromethane (air)
49	Chloroform (air)
50	Dichloromethane (air)

Table 3–14
M 1995

Top 50 North American Facilities with Total Releases and Transfers of Known or Suspected Carcinogens (sorted by total releases and transfers)

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	American Chrome & Chemicals	Corpus Christi, TX		28	1	2,426	113	0	4,263,039	4,265,578
2	Quantum Chemical Corp.	La Porte, TX		28	6	242,183	86	0	0	242,269
3	Occidental Chemical Corp.	Castle Hayne, NC		28	1	2,651	16	0	3,310,707	3,313,375
4	ASARCO Inc.	Hayden, AZ		33	4	90,604	0	0	1,220,713	1,311,317
5	Zinc Corp. of America	Monaca, PA		33	4	5,701	10	0	0	5,711
6	CXY Chemicals	Nanaimo, BC	37	28	1	0	0	0	0	0
7	ASARCO Inc.	East Helena, MT		33	4	24,221	156	0	1,906,985	1,931,363
8	Monsanto Co.	Luling, LA		28	2	8,617	0	1,815,374	0	1,823,991
9	BP Chemicals Inc.	Lima, OH		28	10	69,732	0	1,751,583	0	1,821,315
10	Pharmacia & Upjohn Co.	Portage, MI		28	5	373,175	227	56,689	0	430,091
11	Dominion Castings Ltd.	Hamilton, ON	29	33	1	1,027	100	0	0	1,127
12	BP Chemicals Inc.	Port Lavaca, TX		28	5	14,617	0	1,383,401	32	1,398,051
13	Eastman Kodak Co.	Rochester, NY		38	10	1,324,223	28,324	0	0	1,352,547
14	Electralloy Corp.	Oil City, PA		33	2	66,435	0	0	0	66,435
15	American Steel Foundries	Alliance, OH		33	3	36,590	340	0	340	37,270
16	Angus Chemical Co.	Sterlington, LA		28	4	10,366	1,645	1,136,741	0	1,148,752
17	Allegheny Ludlum Corp.	Brackenridge, PA		33	3	19,932	1,315	0	0	21,247
18	Co-Steel Lasco	Whitby, ON	29	33	3	1,559	39	0	333,300	334,898
19	Cytec Industries Inc.	Westwego, LA		28	4	12,036	104	973,243	0	985,383
20	ASARCO Inc.	Annapolis, MO		33	4	173,483	10	0	787,457	960,950
21	Kennecott Utah Copper	Magna, UT		33	5	27,755	454	0	731,746	759,955
22	Upjohn Mfg. Co..	Arecibo, PR		28	2	590,522	0	0	0	590,522
23	Monsanto Co.	Alvin, TX		28	4	48,539	0	752,857	0	801,396
24	Avesta Sheffield Plate Inc.	New Castle, IN		33	2	0	0	0	0	0
25	Doe Run Co.	Herculaneum, MO		333	6	92,715	363	0	692,685	785,764
26	Sequentia Inc.	Grand Junction, TN		30	1	33,412	0	0	0	33,412
27	General Electric Plastics Co.	Mount Vernon, IN		28	4	697,647	426	0	0	698,073
28	Quemetco Inc.	City of Industry, CA		33	3	746	0	0	0	747
29	General Battery Corp.	Reading, PA		33	3	2,010	31	0	0	2,041
30	Aquaglass Corp.	Adamsville, TN		30	1	665,652	0	0	0	665,652
31	Bayer Rubber Inc.	Sarnia, ON	37	28	5	361,413	62	0	0	361,475
32	AT Plastics Inc.	Edmonton, AB	37	28	1	35,598	0	0	485	36,083
33	Northwestern Steel & Wire Co.	Sterling, IL		33	3	4,682	176	0	589,569	594,427
34	Quemetco Inc.	Indianapolis, IN		33	3	3,618	0	0	0	3,618
35	Cyprus Miami Mining Corp.	Claypool, AZ		33	3	7,885	0	0	609,977	617,863
36	Birmingham Steel Corp.	Jackson, MS		33	3	302	0	0	0	302
37	Carpenter Co.	Verona, MS		30	2	580,417	0	0	0	580,417
38	Armstrong World Inds. Inc.	Lancaster, PA		39	2	29,551	0	0	113	29,665
39	Slater Steels	Fort Wayne, IN		33	2	3,946	0	0	0	3,946
40	Dofasco Inc.	Hamilton, ON	29	33	5	459,078	1,013	0	51	460,142
41	Glenbrook Nickel Co.	Riddle, OR		33	1	5,019	7	0	542,689	547,714
42	Celanese Canada Inc.	Edmonton, AB	37	28	5	175,998	0	331,460	40	507,498
43	Weyerhaeuser Co.	Longview, WA		Mult.	6	466,877	70,417	0	0	537,294
44	Monsanto Co.	Springfield, MA		Mult.	5	16,110	0	0	0	16,110
45	Allegheny Ludlum Corp.	New Castle, IN		33	2	458	227	0	0	685
46	Abbott Chemicals Inc.	Barceloneta, PR		Mult.	1	520,117	0	0	0	520,117
47	Sterling Chemicals Inc.	Texas City, TX		28	10	84,208	0	387,976	0	472,184
48	Inco Limited, Copper Cliff Smelter	Copper Cliff, ON	29	33	4	498,950	0	0	0	498,950
49	Pfizer Pharmaceuticals Inc.	Barceloneta, PR		28	1	42,177	0	0	0	42,177
50	Dow Chemical Co.	Freeport, TX		28	21	438,861	23,240	0	312	462,413
	Subtotal				**193**	**8,373,843**	**128,903**	**8,589,325**	**14,990,242**	**32,082,312**
	% of Total				**1.1**	**8.7**	**10.7**	**82.4**	**72.8**	**25.0**
	Total				**16,789**	**95,949,158**	**1,200,871**	**10,428,060**	**20,587,117**	**128,202,553**

* Chemicals accounting for more than 70% of total carcinogenic releases ans transfers from the facility.
➤ Canada and US data only, Mexico data not collected for 1995. UIJ=underground injection.

Rank	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
1	36,735	0	4,127	40,862	4,306,440	Chromium and compounds (land)
2	3,474,221	0	0	3,474,221	3,716,490	Vinyl acetate (air)
3	1,723	0	0	1,723	3,315,098	Chromium and compounds (land)
4	1,397,906	9	0	1,397,915	2,709,233	Lead and compounds (land, transfers to treatment)
5	762	0	2,518,890	2,519,652	2,525,363	Lead and compounds (transfers to disposal)
6	0	0	1,988,000	1,988,000	1,988,000	Asbestos (transfers to disposal)
7	0	121	0	121	1,931,484	Lead and compounds (land)
8	6,349	0	0	6,349	1,830,340	Formaldehyde (UIJ)
9	2,166	0	290	2,456	1,823,771	Acrylonitrile, acrylamide (UIJ)
10	1,090,184	163,492	1,460	1,255,136	1,685,227	Dichloromethane (transfers to treatment, air)
11	0	0	1,400,778	1,400,778	1,401,905	Chromium and compounds (transfers to disposal)
12	288	0	0	288	1,398,339	Acrylamide, acrylonitrile (UIJ)
13	12,405	0	3,227	15,632	1,368,180	Dichloromethane (air)
14	0	0	1,249,518	1,249,518	1,315,953	Chromium and compounds (transfers to disposal)
15	2,766	8,186	1,113,651	1,124,603	1,161,873	Chromium and compounds (transfers to disposal)
16	1,454	0	0	1,454	1,150,207	Formaldehyde (UIJ)
17	62,200	0	947,392	1,009,592	1,030,839	Chromium/nickel and compounds (transfers to disposal)
18	0	11	663,900	663,911	998,809	Lead and compounds (land, transfers to disposal)
19	12	0	2	14	985,397	Acrylamide (UIJ)
20	0	0	0	0	960,950	Lead and compounds (land)
21	0	0	70,726	70,726	830,680	Lead/arsenic and compounds (land)
22	195,011	16,327	0	211,338	801,859	Dichloromethane (air)
23	0	0	0	0	801,396	Acrylonitrile (UIJ)
24	801,049	0	0	801,049	801,049	Chromium and compounds (transfers to treatment)
25	0	371	0	371	786,135	Lead and compounds (land)
26	0	0	703,544	703,544	736,956	Styrene (transfers to disposal)
27	11,927	0	6,513	18,440	716,514	Dichloromethane (air)
28	0	55	701,587	701,643	702,390	Lead and compounds (transfers to disposal)
29	589,686	2	100,086	689,774	691,815	Lead and compounds (transfers to treatment)
30	0	0	0	0	665,652	Styrene (air)
31	110,500	0	168,000	278,500	639,975	1,3-butadiene, benzene (air, transfers to treatment)
32	588,390	0	0	588,390	624,473	Vinyl acetate (transfers to treatment)
33	25,850	0	0	25,850	620,278	Lead/chromium and compounds (land)
34	0	42	615,420	615,462	619,080	Lead and compounds (transfers to disposal)
35	0	0	0	0	617,863	Lead and compounds (land)
36	0	0	604,370	604,370	604,671	Lead and compounds (transfers to disposal)
37	0	0	0	0	580,417	Dichloromethane (air)
38	0	430	549,592	550,022	579,687	Di(2-ethylhexyl) phthalate (transfers to disposal)
39	567,755	1,315	0	569,070	573,016	Chromium and compounds (transfers to treatment)
40	0	388	110,080	110,468	570,610	Benzene (air)
41	0	0	0	0	547,714	Nickel and compounds (land)
42	0	0	35,041	35,041	542,539	Acetaldehyde, vinyl acetate (UIJ, air)
43	0	0	4,775	4,775	542,069	Acetaldehyde, chloroform (air, water)
44	18,845	503,851	0	522,696	538,806	Formaldehyde (transfers to sewage)
45	0	0	535,147	535,147	535,832	Nickel/chromium and compounds (transfers to disposal)
46	3,238	322	0	3,560	523,677	Dichloromethane (air)
47	6,530	115	21,384	28,029	500,214	Acrylamide, acrylonitrile (UIJ)
48	0	0	0	0	498,950	Nickel and compounds (air)
49	389,932	60,272	0	450,204	492,381	Dichloromethane (transfers to treatment)
50	27,594	0	0	27,594	490,007	Dichloromethane, benzene, epichlorohydrin, propylene oxide, 1,3-butadiene, 1,2-dichloroethane (air)
	9,425,480	**755,310**	**14,117,500**	**24,298,290**	**56,380,602**	
	34.5	**26.0**	**38.3**	**36.2**	**28.9**	
	27,301,331	**2,899,979**	**36,867,847**	**67,069,156**	**195,271,709**	

Table 3–15
M 1995

Total Releases and Transfers in North America, by Industry

US SIC Code	Industry	Forms Number	Forms (%)	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Total Releases and Transfers (%)	NPRI/TRI as % of Total: Forms (%)	NPRI/TRI as % of Total: Total Releases (%)	NPRI/TRI as % of Total: Total Transfers (kg)	NPRI/TRI as % of Total: Total Releases and Transfers (kg)
28	Chemicals	18,164	28.3	352,789,235	134,182,290	486,971,524	37.2	7.9 / 92.1	11.2 / 88.8	9.1 / 90.9	10.6 / 89.4
33	Primary Metal Industries	6,356	9.9	158,487,870	108,522,997	267,010,868	20.4	9.2 / 90.8	11.6 / 88.4	16.7 / 83.3	13.6 / 86.4
26	Paper Products	2,176	3.4	116,442,497	26,117,534	142,560,030	10.9	14.3 / 85.7	23.5 / 76.5	7.6 / 92.4	20.6 / 79.4
	Multiple Codes 20–39*	4,306	6.7	55,376,036	18,426,053	73,802,089	5.6	— / —	— / —	— / —	— / —
30	Rubber and Plastics Products	3,358	5.2	49,976,446	8,024,568	58,001,014	4.4	8.3 / 91.7	12.4 / 87.6	12.4 / 87.6	12.4 / 87.6
37	Transportation Equipment	4,070	6.4	47,833,930	8,739,820	56,573,750	4.3	7.5 / 92.5	14.6 / 85.4	11.0 / 89.0	14.1 / 85.9
34	Fabricated Metals Products	6,830	10.7	27,990,363	12,646,995	40,637,358	3.1	5.4 / 94.6	6.4 / 93.6	12.5 / 87.5	8.3 / 91.7
29	Petroleum and Coal Products	3,163	4.9	33,573,303	4,726,619	38,299,922	2.9	11.5 / 88.5	30.1 / 69.9	8.9 / 91.1	27.5 / 72.5
20	Food Products	3,283	5.1	14,737,009	10,057,813	24,794,822	1.9	3.2 / 96.8	1.8 / 98.2	4.1 / 95.9	2.7 / 97.3
36	Electronic/Electrical Equipment	2,694	4.2	9,853,655	9,835,385	19,689,040	1.5	3.4 / 96.6	2.7 / 97.3	5.7 / 94.3	4.2 / 95.8
25	Furniture and Fixtures	1,368	2.1	18,139,320	446,361	18,585,681	1.4	2.3 / 97.7	2.8 / 97.2	1.7 / 98.3	2.8 / 97.2
27	Printing and Publishing	454	0.7	14,823,145	432,587	15,255,731	1.2	8.8 / 91.2	7.6 / 92.4	39.9 / 60.1	8.5 / 91.5
24	Lumber and Wood Products	1,745	2.7	14,817,332	314,708	15,132,040	1.2	8.0 / 92.0	8.6 / 91.4	20.8 / 79.2	8.8 / 91.2
32	Stone/Clay/Glass Products	1,453	2.3	10,038,709	3,818,627	13,857,336	1.1	6.2 / 93.8	12.8 / 87.2	10.6 / 89.4	12.2 / 87.8
35	Industrial Machinery	2,480	3.9	8,699,134	2,970,849	11,669,983	0.9	2.8 / 97.2	5.6 / 94.4	4.3 / 95.7	5.3 / 94.7
22	Textile Mill Products	605	0.9	8,202,912	1,568,516	9,771,428	0.7	3.1 / 96.9	11.7 / 88.3	0.5 / 99.5	9.9 / 90.1
38	Measurement/Photographic Inst.	609	1.0	5,261,182	2,164,032	7,425,214	0.6	0.2 / 99.8	0.0 / 100.0	0.1 / 99.9	0.0 / 100.0
39	Misc. Manufacturing Industries	746	1.2	4,942,212	1,656,032	6,598,244	0.5	10.9 / 89.1	2.5 / 97.5	12.8 / 87.2	5.1 / 94.9
31	Leather Products	173	0.3	869,467	1,201,907	2,071,374	0.2	2.3 / 97.7	2.1 / 97.9	5.6 / 94.4	4.1 / 95.9
23	Apparel and Other Textile Products	40	0.1	674,527	40,021	714,548	0.1	5.0 / 95.0	33.4 / 66.6	0.0 / 100.0	31.5 / 68.5
21	Tobacco Products	19	0.0	197,446	50,458	247,903	0.0	— / —	— / —	— / —	— / —
	Total	**64,092**	**100.0**	**953,725,730**	**355,944,172**	**1,309,669,902**	**100.0**	**6.8 / 93.2**	**12.2 / 87.8**	**10.7 / 89.3**	**11.8 / 88.2**

* Multiple SIC codes reported only in US data.
➤ Canada and US data only, Mexico data not collected for 1995.

Table 3–16
M 1995

Releases in North America, by Industry

US SIC Code	Industry	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)	NPRI/TRI as % of Total: Total Air Emissions (%)	Surface Water Discharge (%)	Underground Injection (%)	On-Site Land Releases (%)	Total Releases (%)
28	Chemicals	187,579,068	40,934,626	95,679,440	28,514,210	352,789,235	17.3 / 82.7	3.6 / 96.4	5.0 / 95.0	1.8 / 98.2	11.2 / 88.8
33	Primary Metal Industries	58,619,854	5,368,445	82,528	94,394,510	158,487,870	10.4 / 89.6	31.1 / 68.9	0.0 / 100.0	11.2 / 88.8	11.6 / 88.4
26	Paper Products	95,262,441	19,501,395	100	1,675,197	116,442,497	16.1 / 83.9	60.9 / 39.1	0.0 / 100.0	8.4 / 91.6	23.5 / 76.5
	Multiple Codes 20–39*	43,987,844	4,316,580	820,340	6,251,273	55,376,036	— / —	— / —	— / —	— / —	— / —
30	Rubber and Plastics Products	49,623,335	140,348	0	205,184	49,976,446	12.2 / 87.8	51.0 / 49.0	— / —	25.3 / 74.7	12.4 / 87.6
37	Transportation Equipment	47,572,686	135,036	0	121,036	47,833,930	14.7 / 85.3	7.8 / 92.2	— / —	3.9 / 96.1	14.6 / 85.4
29	Petroleum and Coal Products	25,400,080	1,939,072	6,127,346	102,828	33,573,303	18.8 / 81.2	8.8 / 91.2	83.5 / 16.5	15.9 / 84.1	30.1 / 69.9
34	Fabricated Metals Products	27,468,173	166,570	309	341,784	27,990,363	6.5 / 93.5	0.1 / 99.9	0.0 / 100.0	1.0 / 99.0	6.4 / 93.6
25	Furniture and Fixtures	18,134,171	395	0	4,244	18,139,320	2.8 / 97.2	0.0 / 100.0	— / —	0.0 / 100.0	2.8 / 97.2
27	Printing and Publishing	14,807,921	12,638	0	2,086	14,823,145	7.5 / 92.5	49.4 / 50.6	— / —	0.0 / 100.0	7.6 / 92.4
24	Lumber and Wood Products	14,749,540	64,012	0	3,630	14,817,332	8.3 / 91.7	60.0 / 40.0	— / —	2.0 / 98.0	8.6 / 91.4
20	Food Products	9,834,588	2,663,093	10,435	2,228,691	14,737,009	1.7 / 98.3	1.5 / 98.5	0.0 / 100.0	2.5 / 97.5	1.8 / 98.2
32	Stone/Clay/Glass Products	9,402,933	113,478	0	519,639	10,038,709	13.0 / 87.0	53.4 / 46.6	— / —	0.0 / 100.0	12.8 / 87.2
36	Electronic/Electrical Equipment	9,490,456	179,720	2	180,322	9,853,654	2.3 / 97.7	7.3 / 92.7	0.0 / 100.0	17.9 / 82.1	2.7 / 97.3
35	Industrial Machinery	8,352,642	5,279	0	340,560	8,699,134	2.3 / 97.7	0.3 / 99.7	— / —	86.6 / 13.4	5.6 / 94.4
22	Textile Mill Products	8,086,346	113,338	0	3,128	8,202,912	11.9 / 88.1	0.0 / 100.0	— / —	0.0 / 100.0	11.7 / 88.3
38	Measurement/Photographic Inst.	4,979,162	279,405	0	2,615	5,261,182	0.0 / 100.0	0.0 / 100.0	— / —	0.0 / 100.0	0.0 / 100.0
39	Misc. Manufacturing Industries	4,925,148	683	0	12,600	4,942,212	2.3 / 97.7	0.0 / 100.0	— / —	47.9 / 52.1	2.5 / 97.5
31	Leather Products	811,332	51,408	0	6,727	869,467	2.3 / 97.7	0.0 / 100.0	— / —	0.0 / 100.0	2.1 / 97.9
23	Apparel and Other Textile Products	674,411	2	0	113	674,527	33.4 / 66.6	0.0 / 100.0	— / —	0.0 / 100.0	33.4 / 66.6
21	Tobacco Products	192,865	4,580	0	0	197,446	— / —	— / —	— / —	— / —	— / —
	Total	**639,954,996**	**75,990,103**	**102,720,500**	**134,910,378**	**953,725,730**	**12.4 / 87.6**	**20.3 / 79.7**	**9.7 / 90.3**	**8.7 / 91.3**	**12.2 / 87.8**

* Multiple SIC codes reported only in US data.
➤ Canada and US data only, Mexico data not collected for 1995.

Table 3–17
M 1995

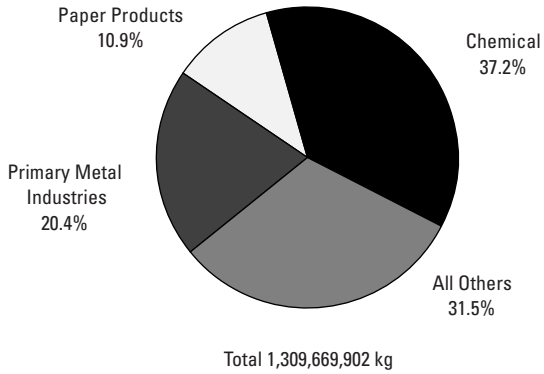
Transfers in North America, by Industry

US SIC Code	Industry	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	NPRI/TRI as % of Total: Treatment/ Destruction (%)	Sewage/ POTWs (%)	Disposal/ Containment (%)	Total Transfers (%)
28	Chemicals	67,705,191	50,844,281	15,632,818	134,182,290	7.2 / 92.8	6.7 / 93.3	25.0 / 75.0	9.1 / 90.9
33	Primary Metal Industries	17,974,402	2,588,866	87,959,730	108,522,997	22.2 / 77.8	10.6 / 89.4	15.7 / 84.3	16.7 / 83.3
26	Paper Products	5,575,362	18,911,821	1,630,350	26,117,534	27.9 / 72.1	0.1 / 99.9	24.5 / 75.5	7.6 / 92.4
	Multiple Codes 20–39*	8,408,450	5,946,552	4,071,051	18,426,053	— / —	— / —	— / —	— / —
34	Fabricated Metals Products	4,837,954	1,262,363	6,546,678	12,646,995	16.0 / 84.0	1.4 / 98.6	12.0 / 88.0	12.5 / 87.5
20	Food Products	445,821	9,310,610	301,382	10,057,813	2.3 / 97.7	4.3 / 95.7	0.0 / 100.0	4.1 / 95.9
36	Electronic/Electrical Equipment	2,448,821	3,195,228	4,191,336	9,835,385	11.7 / 88.3	0.8 / 99.2	5.9 / 94.1	5.7 / 94.3
37	Transportation Equipment	2,688,891	1,272,351	4,778,578	8,739,820	23.1 / 76.9	6.2 / 93.8	5.5 / 94.5	11.0 / 89.0
30	Rubber and Plastics Products	1,965,802	735,373	5,323,393	8,024,568	29.2 / 70.8	0.2 / 99.8	7.9 / 92.1	12.4 / 87.6
29	Petroleum and Coal Products	464,704	2,490,630	1,771,285	4,726,619	3.3 / 96.7	1.9 / 98.1	20.4 / 79.6	8.9 / 91.1
32	Stone/Clay/Glass Products	920,732	315,075	2,582,821	3,818,627	14.9 / 85.1	6.3 / 93.7	9.7 / 90.3	10.6 / 89.4
35	Industrial Machinery	637,615	911,487	1,421,747	2,970,849	6.5 / 93.5	0.0 / 100.0	6.2 / 93.8	4.3 / 95.7
38	Measurement/Photographic Inst.	1,592,000	282,196	289,836	2,164,032	0.1 / 99.9	0.0 / 100.0	0.0 / 100.0	0.1 / 99.9
39	Misc. Manufacturing Industries	281,561	387,477	986,993	1,656,032	10.7 / 89.3	21.5 / 78.5	10.0 / 90.0	12.8 / 87.2
22	Textile Mill Products	259,186	1,086,881	222,449	1,568,516	3.0 / 97.0	0.0 / 100.0	0.1 / 99.9	0.5 / 99.5
31	Leather Products	5,430	564,769	631,707	1,201,907	44.2 / 55.8	11.5 / 88.5	0.0 / 100.0	5.6 / 94.4
25	Furniture and Fixtures	360,087	38,203	48,071	446,361	2.2 / 97.8	0.0 / 100.0	0.1 / 99.9	1.7 / 98.3
27	Printing and Publishing	345,042	62,724	24,821	432,587	50.1 / 49.9	0.0 / 100.0	0.0 / 100.0	39.9 / 60.1
24	Lumber and Wood Products	161,308	8,284	145,116	314,708	32.8 / 67.2	0.0 / 100.0	8.6 / 91.4	20.8 / 79.2
21	Tobacco Products	2,063	38,949	9,445	50,458	— / —	— / —	— / —	— / —
23	Apparel and Other Textile Products	27,347	116	12,559	40,021	0.0 / 100.0	0.0 / 100.0	0.0 / 100.0	0.0 / 100.0
	Total	**117,107,768**	**100,254,236**	**138,582,168**	**355,944,172**	**11.2 / 88.8**	**4.4 / 95.6**	**14.9 / 85.1**	**10.7 / 89.3**

* Multiple SIC codes reported only in US data.
➤ Canada and US data only, Mexico data not collected for 1995.

Figure 3–5 M 1995

North American Top Three Industries for Total Releases and Transfers



Total 1,309,669,902 kg

Table 3–18 M 1995

North American Projections of Total Releases and Transfers, NPRI and TRI

	Actual Volume 1995 (kg)	Projections for 1996 (kg)	Change 1995–1996 (%)	Projections for 1997 (kg)	Change 1995–1997 (%)
NPRI	155,004,060	139,767,641	-9.8	132,655,719	-14.4
TRI*	1,138,388,073	1,124,535,737	-1.2	1,091,755,576	-4.1
Total	**1,293,392,133**	**1,264,303,378**	**-2.2**	**1,224,411,295**	**-5.3**

* Sections 8.1 plus 8.7 on TRI Form R.

➤ Canada and US data only, Mexico data not collected for 1995.

Figure 3–6 M 1995

Industries Projecting Large Reductions in Total Releases and Transfers, 1995–1997 (Greater than 5,000,000 kg Each)

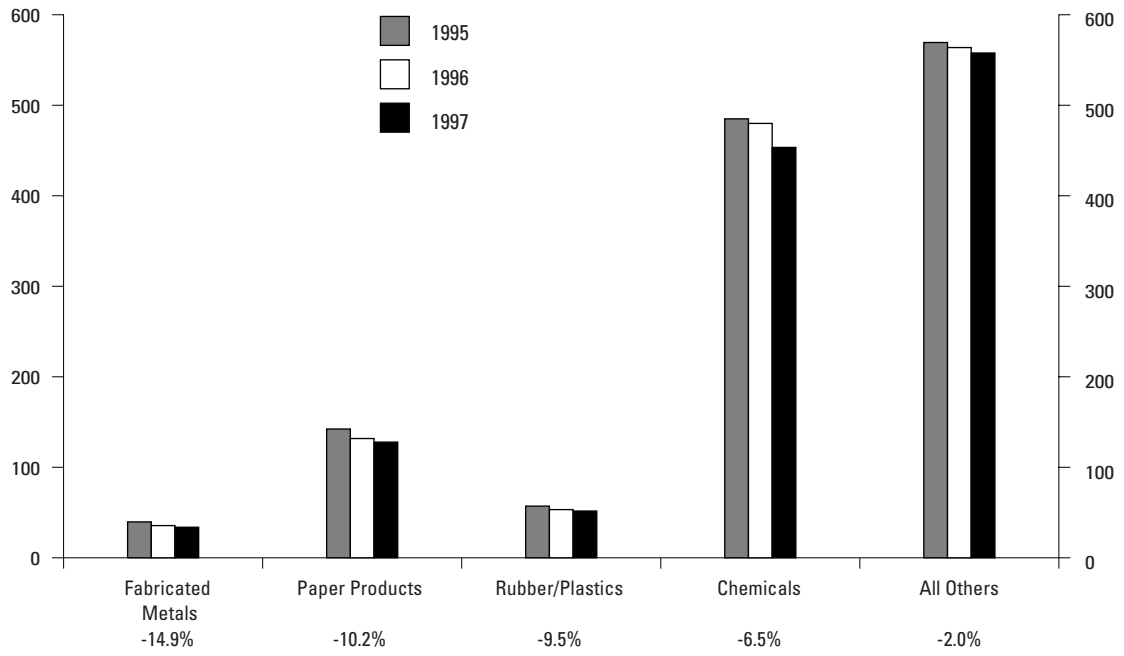


Table 3–19
M 1995

North American Projections of Total Releases and Transfers, NPRI and TRI, by Industry

US SIC Code	Industry	NPRI Number of Forms	NPRI Total Releases and Transfers 1995 (kg)	NPRI Projections for 1996 (kg)	NPRI Projections for 1997 (kg)	NPRI Change 1995–1997 (%)	TRI Number of Forms	TRI Total Releases and Transfers* 1995 (kg)	TRI Projections for 1996 (kg)	TRI Projections for 1997 (kg)	TRI Change 1995–1997 (%)
28	Chemicals	1,443	51,621,155	47,511,182	44,598,850	-13.6	16,721	433,370,269	432,422,237	408,832,542	-5.7
33	Primary Metal Industries	583	36,430,425	34,671,128	33,311,792	-8.6	5,773	220,649,551	228,187,444	232,064,690	5.2
26	Paper Products	312	29,332,344	20,024,874	18,253,669	-37.8	1,864	112,968,291	111,761,217	109,561,633	-3.0
	Multiple Codes 20–39**	0	0	0	0	—	4,306	72,652,034	74,088,668	71,235,975	-1.9
30	Rubber and Plastics Products	279	7,203,374	7,027,478	6,684,718	-7.2	3,079	49,893,476	46,213,275	44,979,067	-9.8
37	Transportation Equipment	304	7,965,107	7,602,059	7,384,559	-7.3	3,766	47,840,890	44,609,872	44,549,519	-6.9
34	Fabricated Metal Products	371	3,375,124	3,943,867	3,894,455	15.4	6,459	36,290,298	31,643,398	29,865,335	-17.7
29	Petroleum and Coal Products	364	10,514,283	10,407,630	10,263,648	-2.4	2,799	28,014,976	27,892,208	27,381,755	-2.3
20	Food Products	105	670,681	942,247	927,904	38.4	3,178	23,630,014	23,190,810	23,115,685	-2.2
25	Furniture and Fixtures	31	513,169	532,493	549,093	7.0	1,337	20,469,197	19,565,068	19,454,566	-5.0
36	Electronic/Electrical Equipment	91	824,859	770,555	718,850	-12.9	2,603	18,327,488	16,685,010	16,163,353	-11.8
24	Lumber and Wood Products	139	1,332,915	1,450,642	1,506,388	13.0	1,606	13,295,147	12,558,088	12,096,057	-9.0
27	Printing and Publishing	40	1,293,131	1,266,453	1,214,898	-6.0	414	12,948,230	12,446,123	12,291,883	-5.1
32	Stone/Clay/Glass Products	90	1,691,643	1,335,711	1,107,290	-34.5	1,363	11,956,761	11,061,434	10,621,638	-11.2
35	Industrial Machinery	69	616,503	865,601	1,045,644	69.6	2,411	10,649,645	9,900,643	9,073,835	-14.8
22	Textile Mill Products	19	971,404	937,658	826,658	-14.9	586	8,819,174	7,558,791	7,164,151	-18.8
38	Measurement/Photographic Inst.	1	1,501	1,501	1,501	0.0	608	7,425,856	6,250,744	5,670,287	-23.6
39	Misc. Manufacturing Industries	81	335,954	238,562	234,802	-30.1	665	6,513,186	5,879,521	5,248,764	-19.4
31	Leather Products	4	85,488	78,000	75,000	-12.3	169	1,938,873	1,873,315	1,802,784	-7.0
23	Apparel and Other Textile Products	2	225,000	160,000	56,000	-75.1	38	486,939	500,332	320,471	-34.2
21	Tobacco Products	0	0	0	0	—	19	247,777	247,541	261,586	5.6
	Total	**4,328**	**155,004,060**	**139,767,641**	**132,655,719**	**-14.4**	**59,764**	**1,138,388,073**	**1,124,535,737**	**1,091,755,576**	**-4.1**

* As reported in Sections 8.1 and 8.7 of TRI Form R.
** Multiple SIC codes reported only in US data.
➤ Canada and US data only, Mexico data not collected for 1995.

US SIC Code	Number of Forms	Total Releases and Transfers 1995 (kg)	Projections for 1996 (kg)	Projections for 1997 (kg)	Change 1995–1997 (%)
28	18,164	484,991,424	479,933,419	453,431,392	-6.5
33	6,356	257,079,976	262,858,572	265,376,482	3.2
26	2,176	142,300,635	131,786,091	127,815,302	-10.2
	4,306	72,652,034	74,088,668	71,235,975	-1.9
30	3,358	57,096,850	53,240,753	51,663,785	-9.5
37	4,070	55,805,997	52,211,931	51,934,078	-6.9
34	6,830	39,665,422	35,587,265	33,759,790	-14.9
29	3,163	38,529,259	38,299,838	37,645,403	-2.3
20	3,283	24,300,695	24,133,057	24,043,589	-1.1
25	1,368	20,982,366	20,097,561	20,003,659	-4.7
36	2,694	19,152,347	17,455,565	16,882,203	-11.9
24	1,745	14,628,062	14,008,730	13,602,445	-7.0
27	454	14,241,361	13,712,576	13,506,781	-5.2
32	1,453	13,648,404	12,397,145	11,728,928	-14.1
35	2,480	11,266,148	10,766,244	10,119,479	-10.2
22	605	9,790,578	8,496,449	7,990,809	-18.4
38	609	7,427,357	6,252,245	5,671,788	-23.6
39	746	6,849,140	6,118,083	5,483,566	-19.9
31	173	2,024,361	1,951,315	1,877,784	-7.2
23	40	711,939	660,332	376,471	-47.1
21	19	247,777	247,541	261,586	5.6
	64,092	**1,293,392,133**	**1,264,303,378**	**1,224,411,295**	**-5.3**

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

Chapter 4: Table of Contents

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

Key Findings

- The data reported on forms for chemicals and industrial categories common to both NPRI and TRI represented 68 percent of the total releases and transfers in the NPRI database and 84 percent of those in TRI. Distribution of the types of releases and transfers in the matched data set was similar to that in the individual databases.
- For 1995 to 1997, NPRI facilities projected a reduction in total releases and transfers of 14 percent, compared to 4 percent for TRI facilities (these TRI projections are based on waste management quantities for release, disposal, and transfers to treatment, comparable to total releases and transfers). Industries projecting the largest reductions were the Canadian pulp and paper industry and the US chemical industry—each with about one-half the net decrease projected for NPRI and for TRI, respectively.
- Average releases and transfers per facility were twice as high in NPRI as in TRI. This significant difference does not appear to arise from the average number of forms (chemicals) reported by each facility, from differences predominating in the use of chemicals at NPRI versus TRI facilities, or from differences in reporting thresholds between the two PRTRs.
- Differences in average releases and transfers between NPRI and TRI facilities also do not appear to reflect the distribution of industries in the two countries. Average releases and transfers per form were greater in NPRI for 15 of 20 matched industrial categories (using two-digit US SIC codes), including the industries with the largest total releases and transfers in both PRTRs. These differences were not consistent within industrial sectors. For some three-digit US SIC codes, NPRI releases and transfers are substantially greater than TRI releases and transfers, while for others, they are much smaller, as would be expected from the rather different distribution of industries in the two countries.

4.1 Introduction

Canada's NPRI and the US TRI cover different selections of chemicals and industrial categories. To obtain a better comparison between these databases, the chemicals and industrial groups that appear only in one or the other, but not both, were removed from the analysis. This meant omitting from both databases all forms from non-manufacturing facilities (those that report US SIC codes outside the range of 20 to 39), because TRI covers only manufacturing (plus federal facilities). In contrast, NPRI requires any facility that handles an NPRI chemical (with a few exceptions) to report. TRI will add certain non-manufacturing industry groups for 1998 (metal mining, coal mining, electric utilities, commercial hazardous waste treatment, wholesale chemical products, petroleum bulk stations and solvent recovery services).

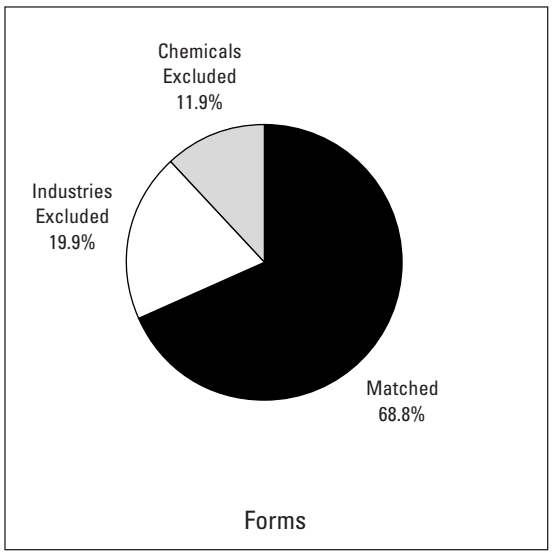
In addition, some chemicals on the NPRI list are not on the TRI list and vice versa. For this analysis, all forms for these chemicals were also removed, leaving a total of 169 chemicals that appeared on both lists in 1995.

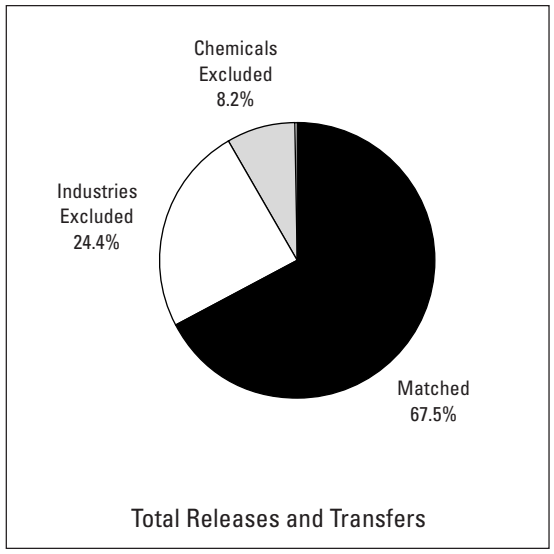
Chapter 3 summarized North American PRTR reporting for 1995, using this matched data set of common chemicals and industries. This chapter considers comparisons between NPRI and TRI, using the matched data. It also explores the striking difference between NPRI and TRI in average releases and transfers per facility.

Figure 4–1 M 1995

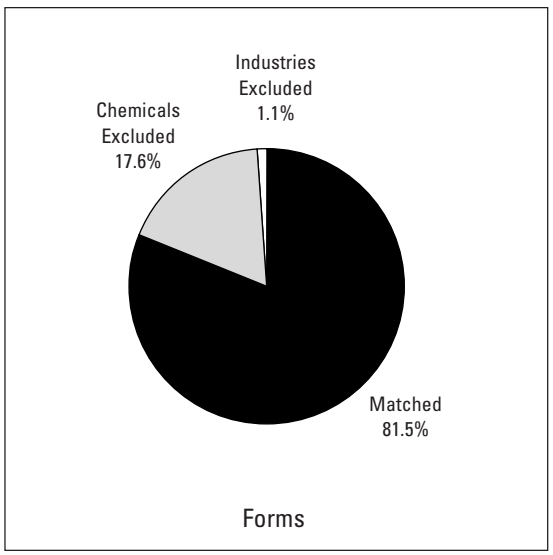
Matching NPRI and TRI for Chemicals and Industries (US SIC Codes)

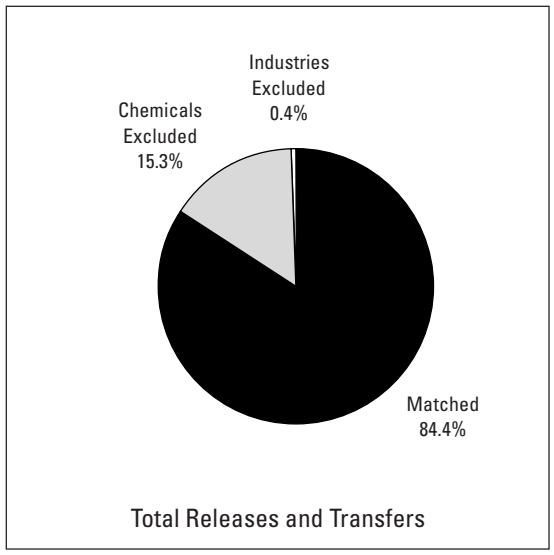
NPRI





TRI





4.2 Effects of Matching

Figure 4–1 illustrates the effect of removing the non-comparable elements. For NPRI, 20 percent of all reporting forms were excluded because the industry SIC code did not match TRI criteria. Twelve percent of NPRI forms were removed because of the chemical reported. For total releases and transfers, the effect was somewhat different: 24 percent were excluded because the facility did not engage primarily in manufacturing, but only 8 percent because the NPRI chemical did not appear on the TRI list. Thus, the net effect was to exclude 33 percent of NPRI total releases and transfers from the analysis.

For TRI, the effects were smaller and reversed: More forms were removed because of the chemicals reported (18 percent) than because of industrial group (1 percent), and the overall result was the exclusion of 16 percent of total releases and transfers. The resulting data set of matched industries and chemicals, therefore, incorporated 68 percent of the total NPRI releases and transfers and 84 percent of the total TRI releases and transfers.

Reduction of the two complete databases to these common elements makes little difference in the overall distribution of releases and transfers in the two systems, as seen in the summary tables in **Chapter 3** (**Tables 3–1** and **3–2**). It does mean, however, that some of the top NPRI facilities for total releases and transfers in the complete NPRI database were excluded, because they are non-manufacturing entities. Also, some top facilities in both NPRI and TRI were excluded because of differences in chemical coverage between the two systems (particularly in the forms of sulfuric acid and hydrochloric acid that are reportable).

Similarly, some chemicals with the largest releases or transfers in one

Table 4–1
M 1995

Releases and Transfers, NPRI and TRI

	NPRI		TRI	
	Number		Number	
Total Facilities	1,309		19,786	
Total Forms	4,328		59,764	
	kg	%	kg	%
Total Air Emissions	79,547,053	51.3	560,407,943	48.5
Surface Water Discharges	15,419,582	9.9	60,570,521	5.2
Underground Injection	9,937,227	6.4	92,783,273	8.0
On-Site Land Releases	11,690,712	7.5	123,219,666	10.7
Matched Releases	**116,744,327**	**75.3**	**836,981,403**	**72.5**
Treatment/Destruction	13,148,001	8.5	103,959,767	9.0
Sewage/POTWs	4,457,382	2.9	95,796,854	8.3
Disposal/Containment	20,654,350	13.3	117,927,818	10.2
Matched Transfers	**38,259,733**	**24.7**	**317,684,439**	**27.5**
Total Releases and Transfers	**155,004,060**	**100.0**	**1,154,665,842**	**100.0**

system or the other were excluded from the matched data set. Some are reportable only to TRI (for example, n-hexane), and others are reportable to the two PRTRs in different forms (for example, hydrochloric acid and sulfuric acid). Further, some chemicals with the largest releases or transfers in NPRI do not rank highly in the matched data set because they are reported largely by facilities in industries that do not report to TRI (for example, ethylene glycol, arsenic and carbon disulfide).

Industry differences also affect rankings of NPRI industries: metals mining, for example, is a significant factor in NPRI reporting but is excluded at present from TRI. On the other hand, the "multiple codes" category in TRI—facilities reporting more than one SIC code—remains in this analysis because these are all within the manufacturing range. This chapter concludes with a brief examination of 1995 reporting to NPRI by industries that will be added to TRI with the 1998 reporting year.

4.3 Patterns of Release and Transfer

The result of the exclusions described above is a matched set of consistent data to support direct comparison of the two PRTRs. **Table 4–1** presents summary NPRI and TRI data for this matched data set. The overall proportion of releases to transfers in the two PRTRs was similar: releases were about three times as large as transfers.

Air emissions were the largest release type, at 51 percent of total releases and transfers for NPRI and 49 percent for TRI. NPRI surface water discharges and TRI on-site land releases were the next largest types of releases, respectively. Disposal/containment was the largest transfer destination in both inventories, but a much smaller proportion of the NPRI total was directed to sewage/POTWs than was the case in TRI. **Figure 4–2** shows the relative distribution of releases and of transfers for both NPRI and TRI in the matched data set.

Figure 4–2
M 1995

Distribution of Releases and Transfers, NPRI and TRI

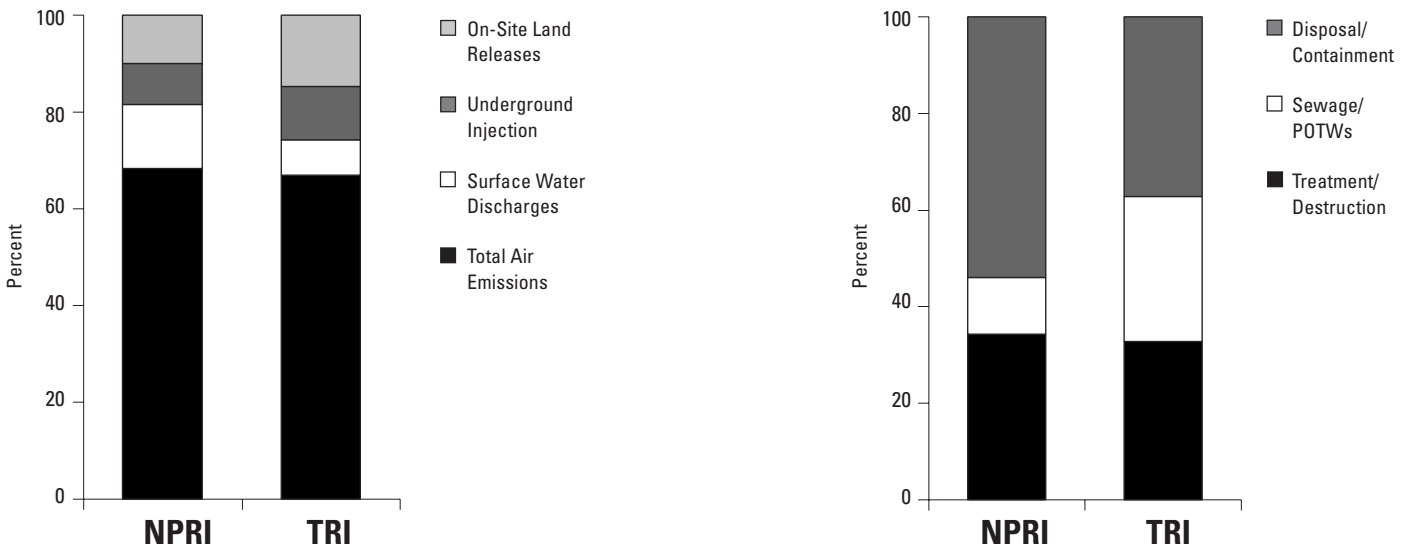


Table 4–2
M 1995

NPRI and TRI Surface Water Discharges and Transfers to Sewage/POTWs, by Industry (US SIC Codes)

US SIC Code	Industry	Forms		Surface Water Discharges			Transfers to Sewage/POTWs			Total		
		Number	%	kg	%	kg/form	kg	%	kg/form	kg	%	kg/form
NPRI												
26	Paper Products	90	12.4	11,879,113	77.0	131,990	21,133	0.5	235	11,900,246	59.9	132,225
28	Chemicals	186	25.7	1,459,115	9.5	7,845	3,424,972	76.8	18,414	4,884,087	24.6	26,259
20	Food Products	14	1.9	39,006	0.3	2,786	399,661	9.0	28,547	438,667	2.2	31,333
33	Primary Metal Industries	164	22.6	1,671,428	10.8	10,192	274,703	6.2	1,675	1,946,131	9.8	11,867
	Subtotal	**454**	**62.6**	**15,048,662**	**97.6**	**33,147**	**4,120,469**	**92.4**	**9,076**	**19,169,131**	**96.4**	**42,223**
	All Others	**271**	**37.4**	**370,920**	**2.4**	**1,369**	**336,913**	**7.6**	**1,243**	**707,833**	**3.6**	**2,612**
	NPRI Total	**725**	**100.0**	**15,419,582**	**100.0**	**21,268**	**4,457,382**	**100.0**	**6,148**	**19,876,964**	**100.0**	**27,417**
TRI												
26	Paper Products	900	5.4	7,622,282	12.6	8,469	18,890,688	19.7	20,990	26,512,970	17.0	29,459
28	Chemicals	4,845	29.1	39,475,511	65.2	8,146	47,419,309	49.5	9,785	86,894,819	55.6	17,931
20	Food Products	748	4.5	2,624,087	4.3	3,508	8,910,949	9.3	11,913	11,535,036	7.4	15,421
	Multiple Codes 20–39*	1,464	8.8	4,316,580	7.1	2,948	5,946,552	6.2	4,062	10,263,132	6.6	7,010
33	Primary Metal Industries	1,885	11.3	3,697,017	6.1	1,961	2,314,163	2.4	1,228	6,011,180	3.8	3,189
	Subtotal	**9,842**	**59.1**	**57,735,476**	**95.3**	**5,866**	**83,481,661**	**87.1**	**8,482**	**141,217,137**	**90.3**	**14,348**
	All Others	**6,823**	**40.9**	**2,835,045**	**4.7**	**416**	**12,315,192**	**12.9**	**1,805**	**15,150,237**	**9.7**	**2,220**
	TRI Total	**16,665**	**100.0**	**60,570,521**	**100.0**	**3,635**	**95,796,854**	**100.0**	**5,748**	**156,367,374**	**100.0**	**9,383**

* Multiple SIC codes reported only in US data.

4.3.1 Surface Water Discharges and Transfers to Sewage/POTWs

Canadian facilities reported a greater proportion of releases as discharges to surface water than did US facilities. In the matched data set, these direct releases to water totaled 15 million kg reported to NPRI and nearly 61 million kg reported to TRI. Of total releases and transfers, Canadian facilities reported releases of 10 percent to surface water, versus 5 percent for US facilities. This preponderance of surface water discharges in NPRI contrasted with TRI facilities' transfers to sewage/POTWs. Canadian facilities reported transfers of 3 percent to sewage/POTWs, versus 8 percent for US facilities (see **Table 4–1**).

The relationship between these two release/transfer categories is not arbitrary. Some listed chemicals in waste may be either directly discharged into surface water bodies or piped to municipal sewage treatment plants. Thus, the higher degree of surface water discharges in NPRI suggests that Canadian facilities may be making direct releases of listed substances, whereas their US counterparts are transferring similar waste streams to publicly owned plants for further potential processing. The degree to which this affords environmental protection will vary according to the methods used by the sewage treatment plant and according to the chemicals involved. Volatile chemicals, for example, are likely to evaporate into the air, whether released directly to water or sent to a municipal facility. Some sewage treatment plants may remove metals and dispose of them in landfills, but many will simply pass them through for further discharge to water.

Some amounts that would have been reported to NPRI as surface water discharges in 1994 may be reported as

Table 4–3
M 1995

NPRI and TRI Surface Water Discharges and Transfers to Sewage/POTWs, by Industry (US SIC Codes) Without Surface Water Discharges and Transfers to Sewage Greater than 1,500,000 kg

US SIC Code	Industry	Forms		Surface Water Discharges			Transfers to Sewage/POTWs			Total		
		Number	%	kg	%	kg/form	kg	%	kg/form	kg	%	kg/form
NPRI												
26	Paper Products	86	11.9	2,873,797	44.8	33,416	21,133	1.6	246	2,894,930	37.5	33,662
28	Chemicals	185	25.7	1,459,115	22.7	7,887	274,972	21.0	1,486	1,734,087	22.5	9,373
20	Food Products	14	1.9	39,006	0.6	2,786	399,661	30.6	28,547	438,667	5.7	31,333
33	Primary Metal Industries	164	22.8	1,671,428	26.1	10,192	274,703	21.0	1,675	1,946,131	25.2	11,867
	Subtotal	**449**	**62.4**	**6,043,346**	**94.2**	**36,850**	**970,469**	**74.2**	**5,917**	**7,013,815**	**90.8**	**42,767**
	All Others	**271**	**37.6**	**370,920**	**5.8**	**1,369**	**336,913**	**25.8**	**1,243**	**707,833**	**9.2**	**2,612**
	NPRI Total	**720**	**100.0**	**6,414,266**	**100.0**	**8,909**	**1,307,382**	**100.0**	**1,816**	**7,721,648**	**100.0**	**10,725**
TRI												
26	Paper Products	892	5.4	5,703,915	17.1	6,395	2,113,517	3.2	2,369	7,817,432	7.8	8,764
28	Chemicals	4,837	29.1	16,450,590	49.2	3,401	36,866,694	55.7	7,622	53,317,283	53.5	11,023
20	Food Products	747	4.5	2,624,087	7.9	3,513	6,648,735	10.0	8,901	9,272,822	9.3	12,413
	Multiple Codes 20–39*	1,463	8.8	2,094,358	6.3	1,432	5,946,552	9.0	4,065	8,040,910	8.1	5,496
33	Primary Metal Industries	1,885	11.3	3,697,017	11.1	1,961	2,314,163	3.5	1,228	6,011,180	6.0	3,189
	Subtotal	**9,824**	**59.0**	**30,569,966**	**91.5**	**3,112**	**53,889,661**	**81.4**	**5,486**	**84,459,627**	**84.8**	**8,597**
	All Others	**6,823**	**41.0**	**2,835,045**	**8.5**	**416**	**12,315,192**	**18.6**	**1,805**	**15,150,237**	**15.2**	**2,220**
	Total	**16,647**	**100.0**	**33,405,011**	**100.0**	**2,007**	**66,204,854**	**100.0**	**3,977**	**99,609,864**	**100.0**	**5,984**

* Multiple SIC codes reported only in US data.

transfers to sewage in 1995, in accordance with revised reporting requirements, as described in **Chapter 2**.

The same few industries in both countries (paper products, chemicals, food products, and primary metals), plus the "multiple codes" category in the US TRI, accounted for more than 90 percent of surface water discharges and transfers to sewage/POTWs combined. Significant differences appear, however, in comparing industry performances within NPRI and TRI and between the two PRTRs. **Tables 4–2** and **4–3** explore these differences.

The chief example occurred in the paper products industry, where NPRI facilities averaged 131,990 kg of surface water discharges per chemical form submitted. This was six times the national average for surface water releases for all industry groups. NPRI facilities in the paper industry also reported releasing to surface waters 550 times the amount of chemicals they transferred to sewage/POTWs.

These extreme results arose from the reporting by just a few facilities. Among the 90 forms from paper products facilities were four that exceeded 1.5 million kg of surface water discharges. Excluding these forms from the analysis would reduce overall NPRI surface water discharges from 15 million kg to 6 million. The remaining forms from the paper industry would average 33,416 kg each in surface water discharges, but this is still four times the surface-water average for all industries, without the large reporters. The paper industry's average for combined surface water and sewage/POTW reporting (per NPRI form) would also be almost four times the comparable average for TRI paper facilities.

Submitting 12 percent of all forms in NPRI, the paper industry accounted for 77 percent of all surface water

Table 4–4
M 1995

The 50 NPRI Facilities with Largest Total Releases

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	Sherritt Inc.	Fort Saskatchewan, AB	37	28	14	4,277,316	302,517	0	3,646	4,583,739
2	Sherritt Inc.	Redwater, AB	37	28	11	2,085,465	79,883	1,655,240	111,063	3,931,751
3	Irving Pulp and Paper/Irving Tissue Co.	Saint John, NB	27	26	3	275,185	3,387,916	0	0	3,663,101
4	Celanese Canada Inc.	Edmonton, AB	37	28	10	339,568	0	3,156,460	1,143	3,497,171
5	Methanex Corporation	Medicine Hat, AB	37	28	6	3,351,900	0	0	1,320	3,353,220
6	Canadian Fertilizers Limited	Medicine Hat, AB	37	28	4	2,618,992	25,663	0	0	2,644,759
7	Shell Scotford Refinery	Fort Saskatchewan, AB	36	29	11	53,925	112	2,515,001	662	2,569,700
8	Cartons St-Laurent Inc.	LaTuque, QC	27	26	5	489,840	1,930,205	0	0	2,420,045
9	Co-Steel Lasco	Whitby, ON	29	33	6	13,986	221	0	2,397,300	2,411,507
10	James River-Marathon, Ltd.	Marathon, ON	27	26	3	129,000	2,061,100	0	0	2,190,100
11	Novacor Chemicals Ltd.-St. Clair Site	Corunna, ON	37	28	9	2,155,900	790	0	0	2,156,690
12	Bayer Rubber Inc.	Sarnia, ON	37	28	15	2,035,106	1,845	0	0	2,036,951
13	General Chemical Canada Ltd.	Amherstburg, ON	37	28	2	1,758,300	184,400	0	0	1,942,700
14	Carseland Nitrogen Operations	Calgary, AB	37	28	4	1,920,250	0	0	500	1,920,750
15	Algoma Steel Inc.	Sault Ste. Marie, ON	29	33	17	209,120	328,558	0	1,372,425	1,911,731
16	Domtar Packaging, Red Rock Mill	Red Rock, ON	27	26	1	240,000	1,660,000	0	0	1,900,000
17	Petro-Canada, Edmonton Refinery	Edmonton, AB	36	29	15	186,100	600	1,698,800	2,100	1,887,600
18	Terra Lambton Works	Courtright, ON	37	28	5	1,584,700	42,700	0	0	1,627,400
19	General Motors of Canada Limited, Car Plant	Oshawa, ON	32	37	13	1,550,042	0	0	0	1,550,042
20	Sidbec Dosco (ISPAT) Inc.-Acierie	Contrecoeur, QC	29	33	5	98,575	972	0	1,410,840	1,510,387
21	Nutrite Inc.-Nitrogen Division	Maitland, ON	37	28	5	914,851	201,140	0	590	1,116,581
22	Strathcona Refinery, Imperial Oil	Edmonton, AB	36	29	22	201,930	3,960	900,784	905	1,107,579
23	Simplot Canada Ltd.	Brandon, MB	37	28	10	968,153	69,900	0	30,500	1,068,679
24	Avenor Inc.	Thunder Bay, ON	27	26	6	1,008,193	21,310	0	0	1,029,503
25	Peace River Pulp Division, Daishowa Marubeni	Peace River, AB	27	26	5	978,600	47,300	0	0	1,025,900
26	Canadian General-Tower Ltd.	Cambridge, ON	16	30	7	959,775	0	0	0	959,979
27	Standard Products (Can.) Ltd.-Rubber Plant #1	Stratford, ON	15	30	3	951,015	0	0	0	951,015
28	General Motors of Canada Limited, Truck Plant	Oshawa, ON	32	37	13	867,277	0	0	0	867,901
29	Les Papiers Perkins Lte.	Candiac, QC	27	26	2	842,660	0	0	0	842,660
30	Dofasco Inc.	Hamilton, ON	29	33	18	644,921	125,973	0	125	771,019
31	Gerdau MRM Steel Inc.	Selkirk, MB	29	33	4	0	0	0	762,000	762,000
32	Aciers Inoxydables Atlas	Tracy, QC	29	33	10	22,625	725,500	0	0	748,125
33	DuPont Canada Inc.-Maitland Site	Augusta, ON	37	28	16	327,005	375,410	0	42,500	744,915
34	Fletcher Challenge Canada (FCCL) Elk Falls Mill	Campbell River, BC	27	26	3	534,700	173,000	0	0	707,700
35	Sunworthy Wallcoverings, Borden Co.	Brampton, ON	27	26	5	705,800	0	0	0	705,800
36	Stelco Lake Erie Works	Nanticoke, ON	29	33	20	181,698	65,244	0	428,000	674,976
37	Weyerhaeuser Saskatchewan Ltd.	Prince Albert, SK	27	26	4	631,732	35,000	0	0	666,732
38	Union Carbide Canada Inc.	Red Deer, AB	37	28	5	653,025	0	0	0	653,459
39	Noranda-Fonderie Horne	Rouyn Noranda	29	33	12	633,430	13,280	0	0	648,045
40	Ford Motor Co., St. Thomas Assembly Plant	St. Thomas, ON	32	37	13	636,000	7,680	0	0	643,680
41	Morbern Incorporated	Cornwall, ON	16	30	3	632,240	0	0	0	632,240
42	AltaSteel Ltd.	Edmonton, AB	29	33	6	6,303	2,029	0	618,501	626,833
43	Saskferco Products Inc.	Belle Plaine, SK	37	28	6	626,300	0	0	0	626,319
44	Inco Limited Copper Cliff Smelter Complex	Copper Cliff, ON	29	33	6	621,640	0	0	0	621,640
45	St. Anne-Nackawic Pulp Company Ltd.	Nackawic, NB	27	26	8	508,177	91,940	0	10,690	610,807
46	Domtar Fine Papers	Cornwall, ON	27	26	5	323,630	250,890	0	0	574,520
47	Skeena Cellulose Pulp Operations	Prince Rupert, BC	27	26	3	562,000	0	0	0	562,000
48	Sydney Steel Corporation	Sydney, NS	29	33	10	0	3,000	0	530,500	533,500
49	Stelco Hilton Works	Hamilton, ON	29	33	21	264,485	235,030	0	1,800	503,095
50	Chrysler Canada Ltd.-Windsor Assembly Plant	Windsor, ON	32	37	12	501,398	0	0	0	501,398
	Subtotal				**422**	**42,082,833**	**12,455,068**	**9,926,285**	**7,727,110**	**72,197,944**
	% of Total				**9.8**	**52.9**	**80.8**	**99.9**	**66.1**	**61.8**
	Total				**4,328**	**79,547,053**	**15,419,582**	**9,937,227**	**11,690,712**	**116,744,327**

* Chemicals accounting for more than 70% of total releases from the facility. Data on all chemicals can be found on the Internet at <http://www.ec.gc.ca> for NPRI facilities.

➤ QIT-Fer et Titane Inc., Tracy, QC, erroneously reported 2,000 tonnes of total releases. The facility has been removed from this table. UIJ=underground injection.

Rank	Major Chemicals Reported (Primary Media)*
1	Ammonia, methanol (air)
2	Ammonia (air, UIJ)
3	Methanol (water)
4	Methanol, methyl ethyl ketone (UIJ)
5	Methanol (air)
6	Ammonia (air)
7	Ammonia (UIJ)
8	Methanol (water)
9	Copper/zinc and compounds (land)
10	Methanol (water)
11	Cyclohexane (air)
12	Chloromethane, cyclohexane, benzene (air)
13	Ammonia (air)
14	Ammonia (air)
15	Manganese and compounds, ammonia (land, water)
16	Methanol (water)
17	Ammonia (UIJ)
18	Ammonia (air)
19	Xylene, toluene (air)
20	Zinc and compounds (land)
21	Ammonia (air)
22	Ammonia (UIJ)
23	Ammonia (air)
24	Methanol (air)
25	Methanol (air)
26	Methyl ethyl ketone (air)
27	Xylene (air)
28	Xylene, toluene, n-butyl alcohol (air)
29	Xylene (air)
30	Benzene, ammonia (air, water)
31	Zinc and compounds (land)
32	Nitric acid and nitrate compounds (water)
33	Nitric acid and nitrate compounds, ammonia, cyclohexane (water, air)
34	Methanol (air)
35	Methyl ethyl ketone, toluene (air)
36	Manganese and compounds (land), benzene (air)
37	Methanol, chlorine (air)
38	Ethylene glycol, ethylene (air)
39	Lead/copper and compounds (air)
40	Xylene, methyl isobutyl ketone, n-butyl alcohol (air)
41	Methyl ethyl ketone (air)
42	Zinc/manganese and compounds (land)
43	Ammonia (air)
44	Nickel/copper and compounds (air)
45	Methanol, chlorine dioxide, chlorine, methyl ethyl ketone (air)
46	Methanol (air)
47	Methanol, chlorine (air)
48	Zinc/manganese and compounds (land)
49	Ammonia, benzene (water, air)
50	Xylene, methyl ethyl ketone (air)

discharges when all its forms are considered and 45 percent without the large reports. For the combined total of surface water discharges and transfers to sewage/POTWs, the paper industry led NPRI reporting both in total amounts and in average per form—with and without the large-quantity forms.

In contrast, TRI paper products manufacturers reported transfers to sewage/POTWs that were about two and a half times the quantity of their discharges to surface water. Their averages per form for these two categories also exceeded national averages for all manufacturing industries by two to three times. (**Chapter 8** further examines PRTR reporting by the Canadian and US pulp and paper industry.)

To a lesser degree, chemical manufacturers dominated NPRI reporting of transfers to sewage/POTWs. NPRI facilities in this industry averaged 18,414 kg of such transfers per chemical form submitted, three times the national average, and they reported 77 percent of all NPRI transfers to sewage/POTWs. Just one form, among 186 submitted, accounted for this disproportionate reporting. Omitting this form would substantially reduce the role of the chemical industry in NPRI transfers to sewage/POTWs, leaving food processors with the largest quantity and one of the largest averages per form submitted. Removing this large report would also leave chemical industry facilities in NPRI with a smaller average of surface water and sewage/POTW reporting combined (per form) than that of TRI chemical facilities.

In TRI, the chemical industry played the dominant role for both surface water discharges and transfers to sewage/POTWs. Averages per form submitted by this industry were roughly twice the national average in both categories. Eighteen TRI forms exceeded 1.5 million kg in these two release/transfer categories, including eight each from the chemical and paper industries. Removing the large reports would reduce TRI surface water discharges from 61 million kg to 33 million and sewage/POTW transfers from 96 million kg to 66 million.

4.4 Facility Reporting

Tables 4–4 through **4–7** list the 50 facilities in each country that reported the largest total releases, and the largest total releases and transfers, of the matched chemical/industrial data set in 1995. (As stated earlier, it is important to note that any evaluation of the relative health and environmental impacts of these facilities must also take into account the toxicity of the chemicals released, local climatic conditions and the proximity of people and ecologically sensitive areas to the released waste streams. Discussion of other issues involved in ranking facilities appears in the box in **Section 3.3** of **Chapter 3**.)

These tables also identify the chemicals and the release media or transfer types that accounted for at least 70 percent of the facility's reporting. (Data on all chemicals can be found on the Internet at <http://www.ec.gc.ca> for NPRI facilities and <http://www.rkt.net> for TRI facilities.) The top 10 facilities in each country for total releases and the top 10 for total releases and transfers also appear on **Map 4–1**.

As shown in **Table 4–4**, the top 50 NPRI facilities accounted for 62 percent of total NPRI releases. For 28 of the these facilities, a single chemical released to a single environmental medium accounted for more than 70 percent of the facility's releases, as is also indicated in **Table 4–4**. Most frequently, the chemical was ammonia or methane.

These 50 NPRI facilities reported 53 percent of NPRI air emissions and

Table 4–5
M 1995

The 50 NPRI Facilities with Largest Total Releases and Transfers

Rank	Facility	City, State/Province	SIC Codes Canada	SIC Codes US	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	Co-Steel Lasco	Whitby, ON	29	33	6	13,986	221	0	2,397,300	2,411,507
2	Sherritt Inc.	Fort Saskatchewan, AB	37	28	14	4,277,316	302,517	0	3,646	4,583,739
3	Sherritt Inc.	Redwater, AB	37	28	11	2,085,465	79,883	1,655,240	111,063	3,931,751
4	Irving Pulp and Paper/Irving Tissue Co.	Saint John, NB	27	26	3	275,185	3,387,916	0	0	3,663,101
5	Celanese Canada Inc.	Edmonton, AB	37	28	10	339,568	0	3,156,460	1,143	3,497,171
6	Methanex Corporation	Medicine Hat, AB	37	28	6	3,351,900	0	0	1,320	3,353,220
7	Dominion Colour Corp.	Ajax, ON	37	28	6	0	0	0	0	100
8	Dofasco Inc.	Hamilton, ON	29	33	18	644,921	125,973	0	125	771,019
9	Canadian Fertilizers Limited	Medicine Hat, AB	37	28	4	2,618,992	25,663	0	0	2,644,759
10	Shell Scotford Refinery	Fort Saskatchewan, AB	36	29	11	53,925	112	2,515,001	662	2,569,700
11	Cartons St-Laurent Inc.	LaTuque, QC	27	26	5	489,840	1,930,205	0	0	2,420,045
12	Bayer Rubber Inc.	Sarnia, ON	37	28	15	2,035,106	1,845	0	0	2,036,951
13	Novacor Chemicals Ltd.-St. Clair Site	Corunna, ON	37	28	9	2,155,900	790	0	0	2,156,690
14	James River-Marathon, Ltd.	Marathon, ON	27	26	3	129,000	2,061,100	0	0	2,190,100
15	CXY Chemicals	Nanaimo, BC	37	28	2	0	0	0	0	244
16	General Chemical Canada Ltd.	Amherstburg, ON	37	28	2	1,758,300	184,400	0	0	1,942,700
17	Carseland Nitrogen Operations	Calgary, AB	37	28	4	1,920,250	0	0	500	1,920,750
18	Algoma Steel Inc.	Sault Ste. Marie, ON	29	33	17	209,120	328,558	0	1,372,425	1,911,731
19	Domtar Packaging, Red Rock Mill	Red Rock, ON	27	26	1	240,000	1,660,000	0	0	1,900,000
20	Petro-Canada, Edmonton Refinery	Edmonton, AB	36	29	15	186,100	600	1,698,800	2,100	1,887,600
21	Stelco Mcmaster Lte.	Contrecoeur, QC	29	33	5	9,330	0	0	0	10,030
22	Fraser Inc.	Edmundston, NB	27	26	8	173,120	0	0	0	173,120
23	Terra Lambton Works	Courtright, ON	37	28	5	1,584,700	42,700	0	0	1,627,400
24	General Motors of Canada Limited, Car Plant	Oshawa, ON	32	37	13	1,550,042	0	0	0	1,550,042
25	Ivaco Rolling Mills	L'Orignal, ON	29	33	5	15,387	1	0	0	16,256
26	Sidbec Dosco (ISPAT) Inc.-Acierie	Contrecoeur, QC	29	33	5	98,575	972	0	1,410,840	1,510,387
27	Dominion Castings Ltd.	Hamilton, ON	29	33	3	1,027	100	0	0	1,227
28	Slater Steels, H.S.B. Division	Hamilton, ON	29	33	6	9,504	0	0	300	10,104
29	Aciers Inoxydables Atlas	Tracy, QC	29	33	10	22,625	725,500	0	0	748,125
30	Strathcona Refinery, Imperial Oil	Edmonton, AB	36	29	22	201,930	3,960	900,784	905	1,107,579
31	Nutrite Inc.-Nitrogen Division	Maitland, ON	37	28	5	914,851	201,140	0	590	1,116,581
32	Simplot Canada Ltd.	Brandon, MB	37	28	10	968,153	69,900	0	30,500	1,068,679
33	Avenor Inc.	Thunder Bay, ON	27	26	6	1,008,193	21,310	0	0	1,029,503
34	Peace River Pulp Division, Daishowa Marubeni	Peace River, AB	27	26	5	978,600	47,300	0	0	1,025,900
35	Standard Products (Can.) Ltd.-Rubber Plant #1	Stratford, ON	15	30	3	951,015	0	0	0	951,015
36	Canadian General-Tower Ltd.	Cambridge, ON	16	30	7	959,775	0	0	0	959,979
37	General Motors of Canada Ltd., Truck Plant	Oshawa, ON	32	37	13	867,277	0	0	0	867,901
38	Les Papiers Perkins Lte.	Candiac, QC	27	26	2	842,660	0	0	0	842,660
39	AltaSteel Ltd.	Edmonton, AB	29	33	6	6,303	2,029	0	618,501	626,833
40	Stelco Hilton Works	Hamilton, ON	29	33	21	264,485	235,030	0	1,800	503,095
41	Gerdau MRM Steel Inc.	Selkirk, MB	29	33	4	0	0	0	762,000	762,000
42	DuPont Canada Inc.-Maitland Site	Augusta, ON	37	28	16	327,005	375,410	0	42,500	744,915
43	AT Plastics Inc.	Edmonton, AB	37	28	4	148,788	0	0	485	149,778
44	Sunworthy Wallcoverings, Borden Co.	Brampton, ON	27	26	5	705,800	0	0	0	705,800
45	Fletcher Challenge Canada (FCCL) Elk Falls Mill	Campbell River, BC	27	26	3	534,700	173,000	0	0	707,700
46	Kronos Canada, Inc.	Varennes, QC	37	28	6	1,800	40,700	0	0	42,500
47	Stelco Lake Erie Works	Nanticoke, ON	29	33	20	181,698	65,244	0	428,000	674,976
48	Weyerhaeuser Saskatchewan Ltd.	Prince Albert, SK	27	26	4	631,732	35,000	0	0	666,732
49	Ford Motor Co., St. Thomas Assembly Plant	St. Thomas, ON	32	37	13	636,000	7,680	0	0	643,680
50	Union Carbide Canada Inc.	Red Deer, AB	37	28	5	653,025	0	0	0	653,459
	Subtotal				**402**	**38,032,974**	**12,136,759**	**9,926,285**	**7,186,705**	**67,290,834**
	% of Total				**9.3**	**47.8**	**78.7**	**99.9**	**61.5**	**57.6**
	Total				**4,328**	**79,547,053**	**15,419,582**	**9,937,227**	**11,690,712**	**116,744,327**

* Chemicals accounting for more than 70% of total releases and transfers from the facility. Data on all chemicals can be found on the Internet at <http://www.ec.gc.ca> for NPRI facilities.

➤ QIT-Fer et Titane Inc., Tracy, QC, erroneously reported 2,000 tonnes of total releases. The facility has been removed from this table. UIJ=underground injection.

Rank	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
1	0	24	6,030,800	6,030,824	8,442,331	Zinc and compounds (transfers to disposal)
2	0	0	16,370	16,370	4,600,109	Ammonia, methanol (air)
3	0	0	0	0	3,931,751	Ammonia (air)
4	0	0	0	0	3,663,101	Methanol (water)
5	0	0	35,658	35,658	3,532,829	Methanol, methyl ethyl ketone (UIJ)
6	0	74,900	30	74,930	3,428,150	Methanol (air)
7	0	3,150,000	186,100	3,336,100	3,336,200	Nitric acid and nitrate compounds (transfers to sewage)
8	0	1,830	1,929,455	1,931,285	2,702,304	Manganese/zinc and compounds (transfers to disposal), benzene (air)
9	0	0	0	0	2,644,759	Ammonia (air)
10	0	0	0	0	2,569,700	Ammonia (UIJ)
11	0	0	948	948	2,420,993	Methanol (water)
12	211,350	0	170,000	381,350	2,418,301	Chloromethane (air), cyclohexane, benzene (air, transfers to treatment)
13	15,120	0	25,140	40,260	2,196,950	Cyclohexane (air)
14	0	0	610	610	2,190,710	Methanol (water)
15	0	0	1,988,000	1,988,000	1,988,244	Asbestos (transfers to disposal)
16	0	0	0	0	1,942,700	Ammonia (air)
17	0	0	0	0	1,920,750	Ammonia (air)
18	0	0	0	0	1,911,731	Manganese and compounds, ammonia (land, water)
19	0	0	0	0	1,900,000	Methanol (water)
20	0	0	0	0	1,887,600	Ammonia (UIJ)
21	1,864,400	0	0	1,864,400	1,874,430	Zinc and compounds (transfers to treatment)
22	1,410,110	0	134,630	1,544,740	1,717,860	Methanol (transfers to treatment)
23	0	0	12,000	12,000	1,639,400	Ammonia (air)
24	0	87	15,625	15,712	1,565,754	Xylene, toluene (air)
25	0	0	1,532,610	1,532,610	1,548,866	Zinc and compounds (transfers to disposal)
26	0	0	0	0	1,510,387	Zinc and compounds (land)
27	0	0	1,485,964	1,485,964	1,487,191	Chromium and compounds (transfers to disposal)
28	1,445,650	245	0	1,445,895	1,455,999	Zinc/lead and compounds (transfers to treatment)
29	453,070	0	0	453,070	1,201,195	Nitric acid and nitrate comp., chromium and comp. (water, transfers to treatment)
30	0	0	32,100	32,100	1,139,679	Ammonia (UIJ)
31	0	0	3,000	3,000	1,119,581	Ammonia (air)
32	0	0	0	0	1,068,679	Ammonia (air)
33	0	0	0	0	1,029,503	Methanol (air)
34	0	0	0	0	1,025,900	Methanol (air)
35	6,379	0	10,986	17,365	968,380	Xylene (air)
36	4,299	0	160	4,459	964,438	Methyl ethyl ketone (air)
37	0	18,021	5,285	23,306	891,207	Xylene, toluene, n-butyl alcohol (air)
38	0	0	0	0	842,660	Xylene (air)
39	0	0	179,183	179,183	806,016	Zinc/manganese and compounds (land, transfers to disposal)
40	59,000	47,000	196,380	302,380	805,475	Ammonia, benzene, asbestos (water, air, transfers to disposal)
41	0	0	0	0	762,000	Zinc and compounds (land)
42	0	0	0	0	744,915	Nitric acid and nitrate compounds, ammonia, cyclohexane (water, air)
43	588,390	0	0	588,390	738,168	Vinyl acetate (transfers to treatment)
44	0	2,700	0	2,700	708,500	Methyl ethyl ketone, toluene (air)
45	0	0	0	0	707,700	Methanol (air)
46	0	0	633,000	633,000	675,500	Manganese and compounds (transfers to disposal)
47	0	0	0	0	674,976	Manganese and compounds (land), benzene (air)
48	0	0	0	0	666,732	Methanol, chlorine (air)
49	10,832	0	10,065	20,897	664,577	Xylene, methyl isobutyl ketone, n-butyl alcohol (air)
50	0	0	0	0	653,459	Ethylene glycol, ethylene (air)
	6,068,600	**3,294,807**	**14,634,099**	**23,997,506**	**91,288,340**	
	46.2	**73.9**	**70.9**	**62.7**	**58.9**	
	13,148,001	**4,457,382**	**20,654,350**	**38,259,733**	**155,004,060**	

66 percent of on-site land releases, but they were most notably dominant in surface water discharges (81 percent) and underground injection (nearly 100 percent).

For total releases and transfers, presented in **Table 4–5**, the top 50 facilities represented 59 percent of the NPRI reporting. In only two categories did these 50 facilities account for less than half of the NPRI total: emissions to air (48 percent) and transfers to treatment/destruction (46 percent).

This dominance of NPRI reporting by the largest facilities is much greater than in TRI, where the top 50 facilities accounted for 34 percent of total releases (see **Table 4–6**). The difference is particularly striking in reporting of emissions to air: TRI's top 50 facilities accounted for 15 percent of such releases, compared to 53 percent by the NPRI's largest reporters. A larger percentage of the top TRI facilities' releases were on-site land releases (74 percent) than was the case in NPRI. Thirty facilities reported one chemical and one environmental medium as more than 70 percent of their releases; the particular chemicals varied.

The top 50 TRI facilities for total releases and transfers, listed in **Table 4–7**, reported 29 percent of the TRI total. This, too, was a much smaller proportion than in NPRI. The largest TRI facilities accounted for more than half of two categories: 79 percent of underground injection and 68 percent of on-site land releases. One-third of their off-site transfers went to disposal.

Table 4–6
M 1995

The 50 TRI Facilities with Largest Total Releases

Rank	Facility	City, State	SIC Code	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	Magnesium Corp. of America	Rowley, UT	33	5	26,384,163	0	0	0	26,384,163
2	ASARCO Inc.	East Helena, MT	33	9	43,652	233	0	17,870,556	17,914,440
3	Courtaulds Fibers Inc.	Axis, AL	28	4	15,163,039	23,492	0	240,091	15,426,621
4	Cytec Industries Inc.	Westwego, LA	28	22	270,745	22,935	11,633,788	0	11,927,468
5	Lenzing Fibers Corp.	Lowland, TN	28	6	10,521,887	14,104	0	0	10,535,991
6	DuPont	Beaumont, TX	28	24	316,524	2,022	9,272,194	0	9,590,740
7	DuPont	Victoria, TX	28	29	164,471	708	9,338,080	4,194	9,507,453
8	ASARCO Inc.	Hayden, AZ	33	8	454,888	0	0	7,794,636	8,249,523
9	BASF Corp.	Freeport, TX	28	26	152,088	7,714,761	12,154	0	7,879,003
10	Arcadian Fertilizer L.P.	Geismar, LA	28	10	696,290	6,691,922	2	199,071	7,587,285
11	Northwestern Steel & Wire Co.	Sterling, IL	33	6	67,947	707	0	7,074,830	7,143,484
12	Elkem Metals Co.	Marietta, OH	33	6	1,956,983	273,469	0	4,858,957	7,089,410
13	Sterling Chemicals Inc.	Texas City, TX	28	36	479,409	558	6,170,968	0	6,650,935
14	General Motors Corp.	Defiance, OH	33	18	347,699	11,961	0	6,258,631	6,618,292
15	Hoechst Celanese Chemical	Pasadena, TX	28	20	456,104	0	5,715,283	0	6,171,388
16	Monsanto Co.	Cantonment, FL	28	22	84,873	486	5,954,254	0	6,039,612
17	PCS Phosphate Co. Inc.	Aurora, NC	28	6	1,610,757	2	0	4,414,671	6,025,431
18	BP Chemicals Inc.	Lima, OH	28	28	183,288	0	5,727,320	0	5,910,608
19	BP Chemicals Inc.	Port Lavaca, TX	28	17	90,938	327	5,634,195	4,106	5,729,566
20	IMC-Agrico Co.	St. James, LA	28	7	2,990,289	2,113,388	0	178,516	5,282,193
21	U.S. Steel	Gary, IN	33	29	3,177,896	14,576	0	2,038,392	5,230,864
22	Cyprus Miami Mining Corp.	Claypool, AZ	33	5	15,360	126	0	4,858,091	4,873,576
23	Phelps Dodge Hidalgo Inc.	Playas, NM	33	1	73,161	0	0	4,469,064	4,542,226
24	American Chrome & Chemicals	Corpus Christi, TX	28	3	41,088	1,837	0	4,263,039	4,305,964
25	Coastal Chem Inc.	Cheyenne, WY	28	13	492,449	0	3,704,308	272	4,197,029
26	IMC-Agrico Co.	Mulberry, FL	Mult.	2	249,161	0	0	3,673,469	3,922,630
27	Monsanto Co.	Alvin, TX	28	20	61,108	0	3,818,617	19,048	3,898,772
28	Bayer Corp.	New Martinsville, WV	28	29	243,410	3,589,628	0	261	3,833,298
29	Doe Run Co.	Herculaneum, MO	33	9	107,398	485	0	3,568,587	3,676,471
30	Rubicon Inc.	Geismar, LA	28	22	295,409	97	3,271,519	0	3,567,025
31	Vicksburg Chemical Co.	Vicksburg, MS	28	4	53,140	3,276,172	0	0	3,329,312
32	Occidental Chemical Corp.	Castle Hayne, NC	28	2	2,653	16	0	3,310,707	3,313,376
33	Pharmacia & Upjohn Co.	Portage, MI	28	26	498,449	58,299	2,748,934	0	3,305,683
34	PCS Phosphate	White Springs, FL	28	4	235,832	304	0	2,993,197	3,229,333
35	Chino Mines Co.	Hurley, NM	33	1	16,503	0	0	3,137,437	3,153,940
36	ASARCO Inc.	Annapolis, MO	33	6	177,505	20	0	2,782,020	2,959,545
37	Kennecott Utah Copper	Magna, UT	33	13	76,488	1,839	0	2,606,259	2,684,585
38	Eastman Kodak Co.	Rochester, NY	38	50	2,504,829	131,463	0	259	2,636,551
39	CF Industries, Inc.	Donaldsonville, LA	28	10	2,248,567	276,916	0	0	2,525,483
40	Weyerhaeuser Co.	Longview, WA	Mult.	16	2,283,871	219,354	0	0	2,503,225
41	Terra Nitrogen	Catoosa, OK	28	8	2,390,748	81,194	0	794	2,472,736
42	Angus Chemical Co.	Sterlington, LA	28	12	34,082	27,305	2,387,407	0	2,448,794
43	Granite City Steel	Granite City, IL	33	22	91,816	8,405	0	2,334,810	2,435,032
44	Westinghouse Electric Corp.	Hampton, SC	30	10	2,329,252	177	0	0	2,329,429
45	IBP Inc.	Joslin, IL	Mult.	5	16,333	2,239,116	0	18,254	2,273,703
46	Chemetals Inc.	New Johnsonville, TN	28	2	104,877	429	0	2,002,721	2,108,027
47	Dow Chemical Co.	Freeport, TX	28	70	1,748,165	320,325	0	28,943	2,097,433
48	Finch Pruyn & Co. Inc.	Glens Falls, NY	26	6	66,515	2,002,268	0	0	2,068,782
49	Shell Oil Co.	Deer Park, TX	Mult.	50	956,737	88,380	816,327	174,151	2,035,594
50	Monsanto Co.	Luling, LA	28	13	28,211	106,145	1,858,349	0	1,992,705
	Subtotal			**772**	**83,057,046**	**29,315,950**	**78,063,700**	**91,178,033**	**281,614,728**
	% of Total			**1.3**	**14.8**	**48.4**	**84.1**	**74.0**	**33.6**
	Total			**59,764**	**560,407,943**	**60,570,521**	**92,783,273**	**123,219,666**	**836,981,403**

* Chemicals accounting for more than 70% of total releases from the facility.
➤ UIJ=underground injection.

Rank	Major Chemicals Reported (Primary Media)*
1	Chlorine (air)
2	Zinc and compounds (land)
3	Carbon disulfide (air)
4	Acetonitrile, acrylic acid, ammonia (UIJ)
5	Carbon disulfide (air)
6	Nitric acid and nitrate compounds, acetonitrile (UIJ)
7	Nitric acid and nitrate compounds (UIJ)
8	Copper/zinc and compounds (land)
9	Nitric acid and nitrate compounds (water)
10	Phosphoric acid (water)
11	Zinc/manganese and compounds (land)
12	Manganese and compounds, ammonia (land, air)
13	Nitric acid and nitrate compounds, ammonia, methanol (UIJ)
14	Zinc and compounds (land)
15	Ethylene glycol (UIJ)
16	Nitric acid and nitrate compounds (UIJ)
17	Phosphoric acid (land)
18	Acetonitrile, acrylonitrile, ammonia, acrylamide (UIJ)
19	Acetonitrile, ammonia, acrylamide (UIJ)
20	Ammonia, phosphoric acid (air, water)
21	Ammonia, zinc/manganese and compounds (air, land)
22	Copper and compounds (land)
23	Copper and compounds (land)
24	Chromium and compounds (land)
25	Nitric acid and nitrate compounds (UIJ)
26	Phosphoric acid (land)
27	Ammonia, acrylonitrile, methanol (UIJ)
28	Nitric acid and nitrate compounds (water)
29	Zinc and compounds (land)
30	Nitric acid and nitrate compounds, ammonia (UIJ, air)
31	Nitric acid and nitrate compounds (water)
32	Chromium and compounds (land)
33	Methanol (UIJ)
34	Phosphoric acid (land)
35	Copper and compounds (land)
36	Zinc/lead and compounds (land)
37	Copper/zinc/lead and compounds (land)
38	Dichloromethane, methanol (air)
39	Ammonia (air)
40	Methanol, acetaldehyde (air)
41	Ammonia (air)
42	Nitric acid and nitrate compounds, formaldehyde (UIJ)
43	Zinc and compounds (land)
44	Methanol (air)
45	Nitric acid and nitrate compounds (water)
46	Manganese and compounds (land)
47	Ethylene, ammonia, propylene, chlorine, dichloromethane, benzene (air, water)
48	Nitric acid and nitrate compounds (water)
49	Phenol, methyl ethyl ketone, toluene, 4,4'-isopropylidenediphenol (UIJ, air, land)
50	Formaldehyde (UIJ)

Table 4–7
M 1995

The 50 TRI Facilities with Largest Total Releases and Transfers

Rank	Facility	City, State	SIC Code	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	Magnesium Corp. of America	Rowley, UT	33	5	26,384,163	0	0	0	26,384,163
2	ASARCO Inc.	East Helena, MT	33	9	43,652	233	0	17,870,556	17,914,440
3	Zinc Corp. of America	Monaca, PA	33	10	265,247	143	0	0	265,390
4	Courtaulds Fibers Inc.	Axis, AL	28	4	15,163,039	23,492	0	240,091	15,426,621
5	Cytec Industries Inc.	Westwego, LA	28	22	270,745	22,935	11,633,788	0	11,927,468
6	Lenzing Fibers Corp.	Lowland, TN	28	6	10,521,887	14,104	0	0	10,535,991
7	ASARCO Inc.	Hayden, AZ	33	8	454,888	0	0	7,794,636	8,249,523
8	DuPont	Victoria, TX	28	29	164,471	708	9,338,080	4,194	9,507,453
9	DuPont	Beaumont, TX	28	24	316,524	2,022	9,272,194	0	9,590,740
10	Air Products & Chemicals Inc.	Pasadena, TX	28	11	24,118	0	0	0	24,118
11	BASF Corp.	Freeport, TX	28	26	152,088	7,714,761	12,154	0	7,879,003
12	Arcadian Fertilizer L.P.	Geismar, LA	28	10	696,290	6,691,922	2	199,071	7,587,285
13	Hoechst Celanese Chemical	Pasadena, TX	28	20	456,104	0	5,715,283	0	6,171,388
14	Northwestern Steel & Wire Co.	Sterling, IL	33	6	67,947	707	0	7,074,830	7,143,484
15	Elkem Metals Co.	Marietta, OH	33	6	1,956,983	273,469	0	4,858,957	7,089,410
16	Sterling Chemicals Inc.	Texas City, TX	28	36	479,409	558	6,170,968	0	6,650,935
17	General Motors Corp.	Defiance, OH	33	18	347,699	11,961	0	6,258,631	6,618,292
18	National Steel Corp.	Ecorse, MI	33	15	137,793	7,604	0	0	145,397
19	Monsanto Co.	Cantonment, FL	28	22	84,873	486	5,954,254	0	6,039,612
20	PCS Phosphate Co. Inc.	Aurora, NC	28	6	1,610,757	2	0	4,414,671	6,025,431
21	BP Chemicals Inc.	Lima, OH	28	28	183,288	0	5,727,320	0	5,910,608
22	BP Chemicals Inc.	Port Lavaca, TX	28	17	90,938	327	5,634,195	4,106	5,729,566
23	IMC-Agrico Co.	St. James, LA	28	7	2,990,289	2,113,388	0	178,516	5,282,193
24	U.S. Steel	Gary, IN	33	29	3,177,896	14,576	0	2,038,392	5,230,864
25	Nucor Steel	Crawfordsville, IN	33	7	10,173	9	0	11	10,193
26	Quantum Chemical Corp.	La Porte, TX	28	23	1,006,231	2,880	0	8	1,009,119
27	Rouge Steel Co.	Dearborn, MI	33	8	20,755	5,469	0	0	26,224
28	DuPont	Leland, NC	28	21	1,016,099	203,813	0	170,628	1,390,539
29	Cyprus Miami Mining Corp.	Claypool, AZ	33	5	15,360	126	0	4,858,091	4,873,576
30	Pharmacia & Upjohn Co.	Portage, MI	28	26	498,449	58,299	2,748,934	0	3,305,683
31	Simpson Pasadena Paper Co.	Pasadena, TX	26	8	572,444	0	0	0	572,444
32	Phelps Dodge Hidalgo Inc.	Playas, NM	33	1	73,161	0	0	4,469,064	4,542,226
33	Consolidated Papers Inc.	Wisconsin Rapids, WI	26	13	1,180,410	340	0	0	1,180,751
34	American Chrome & Chemicals	Corpus Christi, TX	28	3	41,088	1,837	0	4,263,039	4,305,964
35	Coastal Chem Inc.	Cheyenne, WY	28	13	492,449	0	3,704,308	272	4,197,029
36	IMC-Agrico Co.	Mulberry, FL	Mult.	2	249,161	0	0	3,673,469	3,922,630
37	Monsanto Co.	Alvin, TX	28	20	61,108	0	3,818,617	19,048	3,898,772
38	Boise Cascade Corp.	Saint Helens, OR	26	8	266,397	0	0	0	266,397
39	Bayer Corp.	New Martinsville, WV	28	29	243,410	3,589,628	0	261	3,833,298
40	Rubicon Inc.	Geismar, LA	28	22	295,409	97	3,271,519	0	3,567,025
41	Doe Run Co.	Herculaneum, MO	33	9	107,398	485	0	3,568,587	3,676,471
42	Cerro Wire & Cable Co. Inc.	Hartselle, AL	33	3	14	7	0	0	20
43	Hercules Inc.	Hopewell, VA	28	12	358,380	0	0	0	358,380
44	Vicksburg Chemical Co.	Vicksburg, MS	28	4	53,140	3,276,172	0	0	3,329,312
45	Occidental Chemical Corp.	Castle Hayne, NC	28	2	2,653	16	0	3,310,707	3,313,376
46	PCS Phosphate	White Springs, FL	28	4	235,832	304	0	2,993,197	3,229,333
47	Stone Container Corp.	Panama City, FL	26	7	745,415	0	0	5,980	751,395
48	Chino Mines Co.	Hurley, NM	33	1	16,503	0	0	3,137,437	3,153,940
49	Keystone Steel & Wire Co.	Peoria, IL	33	3	29,206	717	0	55,692	85,615
50	ASARCO Inc.	Annapolis, MO	33	6	177,505	20	0	2,782,020	2,959,545
	Subtotal			**634**	**73,809,239**	**24,033,616**	**73,001,617**	**84,244,161**	**255,088,634**
	% of Total			**1.1**	**13.2**	**39.7**	**78.7**	**68.4**	**30.5**
	Total			**59,764**	**560,407,943**	**60,570,521**	**92,783,273**	**123,219,666**	**836,981,403**

* Chemicals accounting for more than 70% of total releases and transfers from the facility.
➤ UIJ=underground injection.

Rank	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
1	0	0	0	0	26,384,163	Chlorine (air)
2	0	180	0	180	17,914,620	Zinc and compounds (land)
3	12,172	0	15,717,212	15,729,385	15,994,775	Zinc/lead and compounds (transfers to disposal)
4	0	0	0	0	15,426,621	Carbon disulfide (air)
5	133	0	12,111	12,244	11,939,713	Acetonitrile, acrylic acid, ammonia (UIJ)
6	0	0	263,039	263,039	10,799,029	Carbon disulfide (air)
7	2,010,308	129	0	2,010,437	10,259,961	Copper/zinc and compounds (land)
8	737,706	0	0	737,706	10,245,159	Nitric acid and nitrate compounds (UIJ)
9	278,793	0	11,099	289,893	9,880,633	Nitric acid and nitrate compounds, acetonitrile (UIJ)
10	267,078	8,548,399	213	8,815,690	8,839,808	Nitric acid and nitrate compounds (transfers to sewage)
11	81,888	0	10,349	92,238	7,971,240	Nitric acid and nitrate compounds (water)
12	0	0	16,365	16,365	7,603,650	Phosphoric acid (water)
13	3,293	1,284,014	34,195	1,321,501	7,492,889	Ethylene glycol (UIJ)
14	311,565	0	0	311,565	7,455,049	Zinc/manganese and compounds (land)
15	0	0	23,129	23,129	7,112,539	Manganese and compounds, ammonia (land, air)
16	24,920	8,691	21,803	55,414	6,706,348	Nitric acid and nitrate compounds, ammonia, methanol (UIJ)
17	1,746	2,792	0	4,538	6,622,830	Zinc and compounds (land)
18	76,685	14,264	6,039,169	6,130,118	6,275,515	Zinc and compounds (transfers to disposal)
19	0	0	2,994	2,994	6,042,606	Nitric acid and nitrate compounds (UIJ)
20	0	0	0	0	6,025,431	Phosphoric acid (land)
21	6,807	0	630	7,438	5,918,045	Acetonitrile, acrylonitrile, ammonia, acrylamide (UIJ)
22	27,967	0	0	27,967	5,757,533	Acetonitrile, ammonia, acrylamide (UIJ)
23	0	0	0	0	5,282,193	Ammonia, phosphoric acid (air, water)
24	4,245	0	45,840	50,086	5,280,950	Ammonia, zinc/manganese and compounds (air, land)
25	1,478	0	5,203,062	5,204,540	5,214,733	Zinc and compounds (transfers to disposal)
26	4,142,622	0	0	4,142,622	5,151,741	Vinyl acetate (transfers to treatment)
27	0	0	5,071,787	5,071,787	5,098,011	Zinc and compounds (transfers to disposal)
28	3,557,400	0	31,333	3,588,733	4,979,273	Ethylene glycol (transfers to treatment)
29	0	0	0	0	4,873,576	Copper and compounds (land)
30	1,090,299	456,417	7,912	1,554,628	4,860,311	Methanol, dichloromethane (UIJ, transfers to treatment)
31	0	4,039,728	0	4,039,728	4,612,172	Methanol (transfers to sewage)
32	0	0	0	0	4,542,226	Copper and compounds (land)
33	3,308,755	0	0	3,308,755	4,489,506	Methanol (transfers to treatment)
34	36,735	0	4,127	40,862	4,346,825	Chromium and compounds (land)
35	0	0	48	48	4,197,077	Nitric acid and nitrate compounds (UIJ)
36	0	0	0	0	3,922,630	Phosphoric acid (land)
37	0	0	0	0	3,898,772	Ammonia, acrylonitrile, methanol (UIJ)
38	0	3,600,884	1,459	3,602,343	3,868,740	Methanol (transfers to sewage)
39	514	0	28,388	28,902	3,862,201	Nitric acid and nitrate compounds (water)
40	218,672	0	922	219,594	3,786,619	Nitric acid and nitrate compounds, ammonia (UIJ, air)
41	0	454	0	454	3,676,925	Zinc and compounds (land)
42	0	0	3,415,766	3,415,766	3,415,786	Copper and compounds (transfers to disposal)
43	0	2,974,425	0	2,974,425	3,332,805	Nitric acid and nitrate compounds, ethylene glycol (trans. to sewage)
44	0	0	0	0	3,329,312	Nitric acid and nitrate compounds (water)
45	1,723	0	0	1,723	3,315,100	Chromium and compounds (land)
46	0	0	0	0	3,229,333	Phosphoric acid (land)
47	0	2,403,175	0	2,403,175	3,154,570	Methanol (transfers to sewage)
48	0	0	0	0	3,153,940	Copper and compounds (land)
49	0	0	2,927,800	2,927,800	3,013,415	Zinc and compounds (transfers to disposal)
50	0	0	0	0	2,959,545	Zinc/lead and compounds (land)
	16,203,507	**23,333,552**	**38,890,752**	**78,427,811**	**333,516,445**	
	15.6	**24.4**	**33.0**	**24.7**	**28.9**	
	103,959,767	**95,796,854**	**117,927,818**	**317,684,439**	**1,154,665,842**	

Map 4–1
M 1995

Largest Sources of Releases and Transfers: Top 10 Facilities in Canada and Top 10 Facilities in the United States

4/3 Rank for Total Releases and Transfers/Rank for Total Releases (if among top 50 facilities for total releases)
Facility List: Rank for Total Releases and Transfers: Facility, City, State/Province – Amount of Total Releases and Transfers: Rank for Total Releases (if among top 50 facilities for total releases) – Amount of Total Releases

NPRI:Top 10 Facilities for Total Releases and Transfers and Top 10 Facilities for Total Releases

1 Co-Steel Lasco, Whitby, ON – 8,442,331 kg
9 –2,411,507 kg
2 Sherritt Inc., Fort Saskatchewan, AB – 4,600,109 kg
1 – 4,583,739 kg
3 Sherritt Inc., Redwater, AB – 3,931,751 kg
2 – 3,931,751
4 Irving Pulp and Paper, Saint John, NB – 3,663,101 kg
3 – 3,663,101 kg
5 Celanese Canada Inc., Edmonton, AB – 3,532,829 kg
4 – 3,497,171 kg
6 Methanex Corporation, Medicine Hat, AB – 3,428,150 kg
5 – 3,353,220 kg
7 Dominion Colour Corp., Ajax, ON – 3,336,200 kg
[—] – 100 kg
8 Dofasco Inc., Hamilton, ON – 2,702,304 kg
[30] – 771,019 kg
9 Canadian Fertilizers Limited, Medicine Hat, AB – 2,644,759 kg
6 – 2,644,759 kg
10 Shell Scotford Refinery, Fort Saskatchewan, AB – 2,569,700 kg
7 – 2,569,700 kg
(11) Cartons St-Laurent Inc., LaTuque, QC – 2,420,993 kg
8 – 2,420,045 kg
(14) James River-Marathon, Ltd., Marathon, ON – 2,190,710 kg
10 –2,190,100 kg

TRI: Top 10 Facilities for Total Releases and Transfers andTop 10 Facilities for Total Releases

1 Magnesium Corp. of America, Rowley, UT – 26,384,163 kg
1 – 26,384,163 kg
2 ASARCO Inc., East Helena, MT – 17,914,620 kg
2 – 17,914,440 kg
3 Zinc Corp. of America, Monaca, PA – 15,994,775 kg
[—] – 265,390 kg
4 Courtaulds Fibers Inc., Axis, AL – 15,426,621 kg
3 – 15,426,621 kg
5 Cytec Industries Inc., Westwego, LA – 11,939,713 kg
4 – 11,927,468 kg
6 Lenzing Fibers Corp., Lowland, TN – 10,799,029 kg
5 – 10,535,991 kg
7 ASARCO Inc., Hayden, AZ – 10,259,961 kg
8 – 8,249,523 kg
8 DuPont, Victoria, TX – 10,245,159 kg
7 – 9,507,453 kg
9 DuPont, Beaumont, TX – 9,880,633 kg
6 – 9,590,740 kg
10 Air Products & Chemicals Inc., Pasadena, TX – 8,839,808 kg
[—] – 24,118 kg
(11) BASF Corp., Freeport, TX – 7,971,240 kg
9 – 7,879,003 kg
(12) Arcadian Fertilizer L.P., Geismar, LA – 7,603,650 kg
10 – 7,587,285 kg

Table 4–8
M 1995

The 25 Chemicals with the Largest NPRI Releases

Rank	CAS Number	Chemical	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	67-56-1	Methanol	18,263,659	9,945,176	1,820,000	9,971	30,044,719
2	—	Ammonia (total)	16,320,324	2,924,323	6,380,300	70,419	25,700,495
3	1330-20-7	Xylene (mixed isomers)	7,575,733	2,692	10,570	1,253	7,602,908
4	108-88-3	Toluene	6,280,291	9,103	16,796	2,080	6,316,146
5	78-93-3	Methyl ethyl ketone	3,804,169	2,401	930,000	115	4,743,069
6	—	Zinc (and its compounds)	466,831	99,566	1,400	3,746,697	4,323,406
7	—	Manganese (and its compounds)	58,972	124,232	0	3,066,622	3,255,111
8	110-82-7	Cyclohexane	2,803,239	998	0	921	2,805,283
9	74-85-1	Ethylene	2,323,376	0	0	0	2,324,660
10	75-09-2	Dichloromethane	2,138,007	0	0	25	2,140,064
11	67-63-0	Isopropyl alcohol (manufacturing)	2,020,686	55,696	0	100	2,083,400
12	—	Nitric acid and nitrate compounds	24,807	1,575,263	320,000	46,535	1,970,053
13	71-43-2	Benzene	1,760,199	6,370	26,090	736	1,793,395
14	—	Copper (and its compounds)	426,508	11,604	0	1,314,104	1,756,991
15	7664-39-3	Hydrogen fluoride	1,696,230	0	0	0	1,696,245
16	—	Lead (and its compounds)	525,599	18,505	40	796,090	1,345,727
17	71-36-3	n-Butyl alcohol	1,258,281	14,438	0	308	1,278,038
18	7782-50-5	Chlorine	1,230,272	23,218	0	0	1,258,157
19	115-07-1	Propylene	1,248,709	0	0	0	1,248,941
20	7429-90-5	Aluminum (fume or dust)	18,546	1,300	0	1,202,650	1,225,797
21	50-00-0	Formaldehyde	813,117	342,972	40,140	180	1,199,147
22	10049-04-4	Chlorine dioxide	1,062,204	0	0	0	1,062,318
23	74-87-3	Chloromethane	970,780	66	0	0	970,846
24	—	Nickel (and its compounds)	638,252	43,045	0	105,933	789,712
25	79-01-6	Trichloroethylene	760,270	65	0	0	761,075
		Subtotal	**74,489,061**	**15,201,033**	**9,545,336**	**10,364,739**	**109,695,703**
		% of Total NPRI Releases	**93.6**	**98.6**	**96.1**	**88.7**	**94.0**
		Total NPRI Releases	**79,547,053**	**15,419,582**	**9,937,227**	**11,690,712**	**116,744,327**

4.5 Chemicals Reported

Tables 4–8 and **4–9** present the 25 chemicals from the matched data set with the largest reported releases in NPRI and TRI, respectively. Seventeen chemicals appear on both tables, and five of the top six chemicals are also the same in the two systems: methanol, ammonia, xylene (mixed isomers), toluene, and zinc (and its compounds).

The 25 chemicals with the largest reported transfers in NPRI and TRI, respectively, appear in **Tables 4–10** and **4–11**. Twenty-one chemicals appear on both tables, but among the top six, only four are the same: zinc (and its compounds), manganese, methanol, and nitric acid and nitrate compounds.

Figure 4–3 shows releases of the top five chemicals in NPRI and/or TRI, and **Figure 4–4** compares transfers of the top five NPRI and TRI chemicals.

Table 4–12 presents the top 10 chemicals in each release and transfer category for NPRI. This matrix shows that methanol, ammonia, and zinc (and its compounds) led the list because they ranked in the top 10 for at least five of the seven release/transfer categories. The clustering seen among chemicals ranked highly for releases or transfers remains quite striking. While theoretically 70 chemicals (seven categories of release/transfer with 10 top chemicals each) could be represented, only 28 are. Twenty of these were in the top 10 for at least two categories.

Table 4–13 presents the top 10 TRI chemicals in each release and transfer category. Methanol and nitric acid (and nitrates) led the TRI matrix, as they did for NPRI. The third chemical in TRI was ammonia. These chemicals also ranked in the top 10 for at least five of the seven categories. Thirty-three chemicals occupy the 70 positions in the matrix, and 20 were in the top 10 for at least two categories.

Table 4–9
M 1995

The 25 Chemicals with the Largest TRI Releases

Rank	CAS Number	Chemical	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
1	67-56-1	Methanol	95,233,645	3,796,670	11,109,937	744,532	110,884,785
2	—	Ammonia (total)	70,983,400	4,531,649	10,524,239	2,139,671	88,178,958
3	—	Nitric acid and nitrate compounds	1,153,295	40,040,655	29,503,509	1,292,896	71,990,356
4	108-88-3	Toluene	65,845,652	24,130	137,593	29,740	66,037,115
5	—	Zinc (and its compounds)	3,071,424	536,411	96,528	39,884,093	43,588,456
6	1330-20-7	Xylene (mixed isomers)	43,101,901	15,286	39,838	44,869	43,201,893
7	75-15-0	Carbon disulfide	38,152,222	18,079	1,807	120	38,172,228
8	78-93-3	Methyl ethyl ketone	31,094,507	27,809	252,429	39,844	31,414,589
9	7782-50-5	Chlorine	29,808,694	144,273	33,616	6,106	29,992,688
10	7664-38-2	Phosphoric acid	572,639	9,252,921	3,429	16,274,141	26,103,130
11	75-09-2	Dichloromethane	24,791,883	12,849	517,159	936	25,322,827
12	—	Manganese (and its compounds)	1,591,258	425,766	1,636	22,520,088	24,538,747
13	—	Copper (and its compounds)	1,387,650	54,538	133,283	19,016,655	20,592,126
14	100-42-5	Styrene	18,803,896	7,968	95,213	77,556	18,984,633
15	74-85-1	Ethylene	15,447,161	12,392	0	0	15,459,553
16	75-05-8	Acetonitrile	460,334	3,390	12,624,572	5	13,088,301
17	71-36-3	n-Butyl alcohol	11,439,320	52,314	1,026,466	2,097	12,520,196
18	79-01-6	Trichloroethylene	11,451,258	670	249	1,567	11,453,744
19	—	Chromium (and its compounds)	540,382	69,150	26,204	9,819,873	10,455,610
20	108-10-1	Methyl isobutyl ketone	9,696,594	23,257	71,927	3,193	9,794,972
21	115-07-1	Propylene	9,750,116	1,834	0	19	9,751,969
22	107-21-1	Ethylene glycol	3,145,663	360,830	5,693,338	166,991	9,366,823
23	50-00-0	Formaldehyde	5,256,965	125,668	3,316,569	60,692	8,759,894
24	—	Lead (and its compounds)	901,274	29,066	414	6,643,190	7,573,944
25	75-07-0	Acetaldehyde	6,087,542	102,424	274,778	70,456	6,535,200
		Subtotal	**499,768,675**	**59,670,000**	**75,484,732**	**118,839,330**	**753,762,737**
		% of Total TRI Releases	**89.2**	**98.5**	**81.4**	**96.4**	**90.1**
		Total TRI Releases	**560,407,943**	**60,570,521**	**92,783,273**	**123,219,666**	**836,981,403**

Table 4–10
M 1995

The 25 Chemicals with the Largest NPRI Transfers

Rank	CAS Number	Chemical	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)
1	—	Zinc (and its compounds)	3,013,951	12,922	9,191,307	12,218,180
2	—	Nitric acid and nitrate compounds	84,407	3,747,160	166,369	3,997,936
3	—	Manganese (and its compounds)	477,945	3,797	2,771,499	3,253,241
4	1332-21-4	Asbestos (friable)	0	0	3,252,048	3,252,048
5	—	Chromium (and its compounds)	481,074	7,510	2,090,853	2,579,437
6	67-56-1	Methanol	1,835,750	105,623	152,206	2,093,579
7	—	Lead (and its compounds)	491,433	2,558	1,476,296	1,970,287
8	108-88-3	Toluene	1,315,657	1,503	10,641	1,327,801
9	1330-20-7	Xylene (mixed isomers)	1,267,065	16	22,741	1,289,822
10	67-63-0	Isopropyl alcohol (manufacturing)	527,019	79,717	176,949	783,685
11	—	Ammonia (total)	418,580	315,470	1,159	735,209
12	108-05-4	Vinyl acetate	592,740	660	5	593,405
13	7664-38-2	Phosphoric acid	54,005	67,290	346,887	468,182
14	—	Copper (and its compounds)	102,633	3,844	314,884	421,361
15	78-93-3	Methyl ethyl ketone	412,837	72	7,873	420,782
16	—	Nickel (and its compounds)	164,479	2,541	189,277	356,297
17	107-21-1	Ethylene glycol	242,143	39,934	49,141	331,218
18	108-95-2	Phenol	189,850	30,029	13,137	233,016
19	100-42-5	Styrene	196,891	448	33,008	230,347
20	71-36-3	n-Butyl alcohol	185,749	3,370	27,852	216,971
21	50-00-0	Formaldehyde	154,806	9,640	23,715	188,161
22	71-43-2	Benzene	129,136	2	133	129,271
23	7429-90-5	Aluminum (fume or dust)	0	0	127,619	127,619
24	110-82-7	Cyclohexane	117,789	0	122	117,911
25	95-63-6	1,2,4-Trimethylbenzene	115,168	41	2,643	117,852
		Subtotal	**12,571,107**	**4,434,147**	**20,448,364**	**37,453,618**
		% of NPRI Transfers	**95.6**	**99.5**	**99.0**	**97.9**
		Total NPRI Transfers	**13,148,001**	**4,457,382**	**20,654,350**	**38,259,733**

Table 4–11
M 1995

The 25 Chemicals with the Largest TRI Transfers

Rank	CAS Number	Chemical	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)
1	67-56-1	Methanol	14,135,847	40,357,079	924,580	55,417,506
2	—	Zinc (and its compounds)	7,712,051	263,151	45,810,301	53,785,503
3	—	Nitric acid and nitrate compounds	6,476,576	24,569,566	4,513,391	35,559,533
4	—	Manganese (and its compounds)	2,390,044	181,914	15,380,167	17,952,126
5	107-21-1	Ethylene glycol	7,180,192	8,720,584	614,271	16,515,047
6	—	Lead (and its compounds)	3,410,187	26,453	9,188,826	12,625,466
7	—	Chromium (and its compounds)	2,489,243	162,469	9,367,010	12,018,722
8	—	Copper (and its compounds)	1,432,722	147,929	9,498,916	11,079,567
9	108-88-3	Toluene	9,489,337	385,068	382,715	10,257,120
10	—	Ammonia (total)	1,123,416	7,951,077	686,195	9,760,688
11	1330-20-7	Xylene (mixed isomers)	6,766,921	240,972	407,332	7,415,225
12	75-09-2	Dichloromethane	4,864,025	362,501	56,343	5,282,868
13	—	Nickel (and its compounds)	914,218	81,491	3,880,691	4,876,399
14	108-05-4	Vinyl acetate	4,019,673	124,509	18,949	4,163,131
15	108-95-2	Phenol	1,460,332	1,749,701	577,284	3,787,317
16	100-42-5	Styrene	1,783,745	53,887	1,914,128	3,751,759
17	7664-38-2	Phosphoric acid	814,922	1,539,932	813,910	3,168,764
18	7429-90-5	Aluminum (fume or dust)	137,876	5,208	2,786,018	2,929,102
19	78-93-3	Methyl ethyl ketone	2,589,948	227,676	78,452	2,896,076
20	75-05-8	Acetonitrile	1,904,193	415,922	4,940	2,325,055
21	—	Antimony (and its compounds)	403,484	51,306	1,423,429	1,878,220
22	1332-21-4	Asbestos (friable)	2	341	1,860,120	1,860,463
23	7664-39-3	Hydrogen fluoride	1,103,128	174,188	459,246	1,736,562
24	71-36-3	n-Butyl alcohol	673,155	803,760	196,689	1,673,604
25	50-00-0	Formaldehyde	310,668	1,060,689	108,487	1,479,844
		Subtotal	**83,585,905**	**89,657,374**	**110,952,390**	**284,195,669**
		% of Total TRI Transfers	**80.4**	**93.6**	**94.1**	**89.5**
		Total TRI Transfers	**103,959,767**	**95,796,854**	**117,927,818**	**317,684,439**

Figure 4–3
M 1995

Top Five Chemicals for Total Releases in NPRI and/or TRI

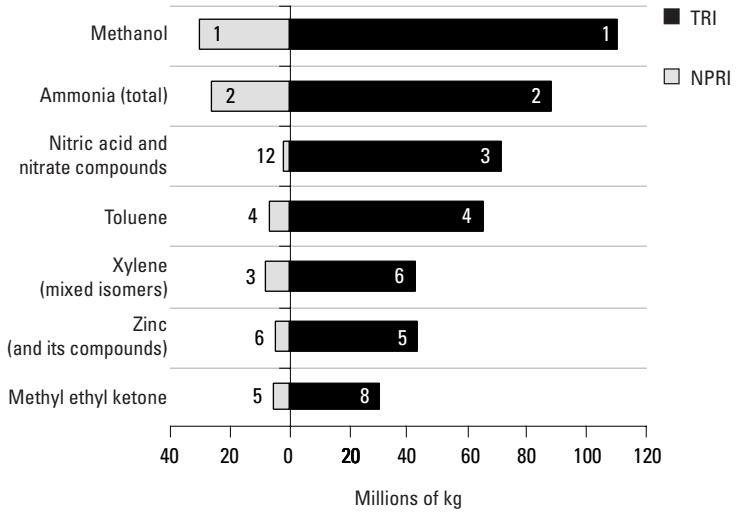


Figure 4–4
M 1995

Top Five Chemicals for Total Transfers in NPRI and/or TRI

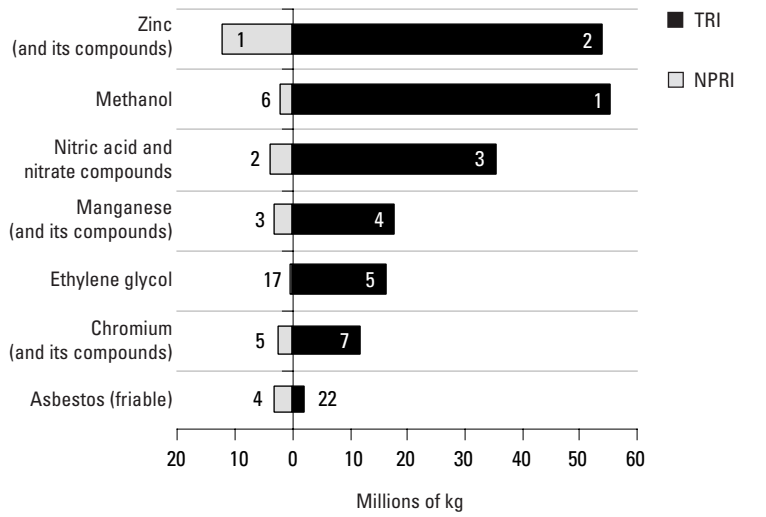


Table 4–12
M 1995

Top 10 NPRI Chemicals for Release/Transfer Categories

CAS Number	Chemical	Rankings by Release/Transfer Category: Releases: Air Emissions	Releases: Surface Water Discharges	Releases: Underground Injection	Releases: On-Site Land Releases	Transfers: Treatment/ Destruction	Transfers: Sewage/ POTWs	Transfers: Disposal/ Containment
67-56-1	Methanol	1	1	2	—	2	3	—
—	Ammonia (total)	2	2	1	—	10	2	—
—	Zinc (and its compounds)	—	6	—	1	1	8	1
1330-20-7	Xylene (mixed isomers)	3	—	—	—	4	—	—
108-88-3	Toluene	4	—	10	—	3	—	—
—	Manganese (and its compounds)	—	5	—	2	9	—	3
7697-37-2	Nitric acid and nitrate compounds	—	3	4	—	—	1	10
78-93-3	Methyl ethyl ketone	5	—	3	—	—	—	—
1332-21-4	Asbestos (friable)	—	—	—	7	—	—	2
—	Lead (and its compounds)	—	—	—	5	7	—	5
—	Chromium (and its compounds)	—	—	—	6	8	—	4
110-82-7	Cyclohexane	6	—	—	—	—	—	—
67-63-0	Isopropyl alcohol (manufacturing)	9	8	—	—	6	4	9
74-85-1	Ethylene	7	—	—	—	—	—	—
75-09-2	Dichloromethane	8	—	—	—	—	—	—
—	Copper (and its compounds)	—	—	—	3	—	—	7
71-43-2	Benzene	10	—	9	—	—	—	—
50-00-0	Formaldehyde	—	4	8	—	—	10	—
7429-90-5	Aluminum (fume or dust)	—	—	—	4	—	—	—
—	Nickel (and its compounds)	—	10	—	10	—	—	8
107-21-1	Ethylene glycol	—	7	—	—	—	6	—
108-05-4	Vinyl acetate	—	—	5	—	5	—	—
108-95-2	Phenol	—	9	—	—	—	7	—
7664-38-2	Phosphoric acid	—	—	—	9	—	5	6
75-07-0	Acetaldehyde	—	—	6	—	—	—	—
7440-62-2	Vanadium (fume or dust)	—	—	—	8	—	—	—
111-42-2	Diethanolamine	—	—	—	—	—	9	—
75-65-0	tert-Butyl alcohol	—	—	7	—	—	—	—

➤ Chemicals listed in descending order of total release and transfer quantities.

Table 4–13
M 1995

Top 10 TRI Chemicals for Release/Transfer Categories

CAS Number	Chemical	Rankings by Release/Transfer Category: Releases: Air Emissions	Releases: Surface Water Discharges	Releases: Underground Injection	Releases: On-Site Land Releases	Transfers: Treatment/ Destruction	Transfers: Sewage/ POTWs	Transfers: Disposal/ Containment
67-56-1	Methanol	1	4	3	—	1	1	—
—	Nitric acid and nitrate compounds	—	1	1	8	6	2	6
—	Ammonia (total)	2	3	4	7	—	4	—
—	Zinc (and its compounds)	—	5	—	1	3	—	1
108-88-3	Toluene	3	—	—	—	2	—	—
1330-20-7	Xylene (mixed isomers)	4	—	—	—	5	—	—
—	Manganese (and its compounds)	—	6	—	2	—	—	2
75-15-0	Carbon disulfide	5	—	—	—	—	—	—
78-93-3	Methyl ethyl ketone	6	—	—	—	10	—	—
—	Copper (and its compounds)	—	—	—	3	—	—	3
75-09-2	Dichloromethane	8	—	—	—	7	—	—
7782-50-5	Chlorine	7	10	—	—	—	—	—
7664-38-2	Phosphoric acid	—	2	—	4	—	6	—
107-21-1	Ethylene glycol	—	7	5	—	4	3	—
100-42-5	Styrene	9	—	—	—	—	—	9
—	Chromium (and its compounds)	—	—	—	5	—	—	4
—	Lead (and its compounds)	—	—	—	6	9	—	5
74-85-1	Ethylene	10	—	—	—	—	—	—
75-05-8	Acetonitrile	—	—	2	—	—	—	—
71-36-3	n-Butyl alcohol	—	—	—	—	—	9	—
50-00-0	Formaldehyde	—	—	7	—	—	7	—
108-95-2	Phenol	—	—	—	—	—	5	—
—	Nickel (and its compounds)	—	—	—	9	—	—	7
108-05-4	Vinyl acetate	—	—	—	—	8	—	—
67-66-3	Chloroform	—	9	—	—	—	—	—
7429-90-5	Aluminum (fume or dust)	—	—	—	10	—	—	8
79-10-7	Acrylic acid	—	—	6	—	—	—	—
107-13-1	Acrylonitrile	—	—	9	—	—	—	—
—	Cyanide compounds	—	—	10	—	—	—	—
79-06-1	Acrylamide	—	—	8	—	—	—	—
1332-21-4	Asbestos (friable)	—	—	—	—	—	—	10
111-42-2	Diethanolamine	—	8	—	—	—	8	—
109-86-4	2-Methoxyethanol	—	—	—	—	—	10	—

➤ Chemicals listed in descending order of total release and transfer quantities.

4.6 Industry Reporting

In both countries, the three industries with the largest reported total releases and transfers in the matched data set were the chemical, primary metal products and paper products industries (see **Tables 4–14** and **4–15**). Chemical manufacturers reported the largest releases in both countries and the largest transfers in TRI, while the primary metals industry reported the largest transfers in NPRI.

The chemical industry reported 33 percent of total releases and transfers in NPRI, but 38 percent in TRI. The primary metals industry, ranked second, accounted for nearly 24 percent of NPRI releases and transfers, compared to 20 percent in TRI. Among these leading industries, however, the greatest difference occurred in the paper industry, which reported nearly twice the percentage of NPRI total releases and transfers (19 percent) as for TRI (10 percent). (As mentioned above, **Chapter 8** further examines data from the paper products industry.) Thus, in NPRI, the three top industries accounted for three-quarters of total releases and transfers, but in TRI, only two-thirds, as shown in **Figure 4-5**.

Other differences between the two PRTRs can be noted not only in the ranking of industries, but also in the relationship of releases and transfers within industries. The primary metals industry reported almost equal amounts of releases and transfers to NPRI, but a higher percentage of releases to TRI—that is, releases were 50 percent of the industry's reporting to NPRI but 61 percent in TRI. Primary metals ranked first among NPRI industries for total transfers, but second in TRI. On the other hand, releases accounted for 93 percent of the paper products industry's reporting to NPRI, but in TRI, releases were 79 percent of this industry's total. The paper industry ranked second for total releases in NPRI, but third in TRI. **Figure 4–6** illustrates these differences.

Table 4–14
M 1995

NPRI Total Releases and Transfers, by Industry (US SIC Codes)

Rank	US SIC Code	Industry	Number of Forms	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	% of Total
1	28	Chemicals	1,443	39,413,177	12,207,978	51,621,155	33.3
2	33	Primary Metal Industries	583	18,355,170	18,075,255	36,430,425	23.5
3	26	Paper Products	312	27,352,922	1,979,422	29,332,344	18.9
4	29	Petroleum and Coal Products	364	10,091,591	422,692	10,514,283	6.8
5	37	Transportation Equipment	304	7,004,820	960,287	7,965,107	5.1
6	30	Rubber and Plastics Products	279	6,205,906	997,468	7,203,374	4.6
7	34	Fabricated Metal Products	371	1,799,212	1,575,912	3,375,124	2.2
8	32	Stone/Clay/Glass Products	90	1,285,015	406,628	1,691,643	1.1
9	24	Lumber and Wood Products	139	1,267,545	65,370	1,332,915	0.9
10	27	Printing and Publishing	40	1,120,378	172,753	1,293,131	0.8
11	22	Textile Mill Products	19	963,400	8,004	971,404	0.6
12	36	Electronic/Electrical Equipment	91	264,468	560,391	824,859	0.5
13	20	Food Products	105	260,777	409,904	670,681	0.4
14	35	Industrial Machinery	69	487,422	129,081	616,503	0.4
15	25	Furniture and Fixtures	31	505,376	7,793	513,169	0.3
16	39	Misc. Manufacturing Industries	81	123,789	212,165	335,954	0.2
17	23	Apparel and Other Textile Products	2	225,000	0	225,000	0.1
18	31	Leather Products	4	18,358	67,130	85,488	0.1
19	38	Measurement/Photographic Inst.	1	1	1,500	1,501	0.0
		Total NPRI Releases and Transfers	**4,328**	**116,744,327**	**38,259,733**	**155,004,060**	**100.0**

Table 4–15
M 1995

TRI Total Releases and Transfers, by Industry (US SIC Codes)

Rank	SIC Code	Industry	Number of Forms	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	% of Total
1	28	Chemicals	16,721	313,376,058	121,974,312	435,350,369	37.7
2	33	Primary Metal Industries	5,773	140,132,700	90,447,742	230,580,443	20.0
3	26	Paper Products	1,864	89,089,575	24,138,112	113,227,686	9.8
4		Multiple Codes 20–39	4,306	55,376,036	18,426,053	73,802,089	6.4
5	30	Rubber and Plastics Products	3,079	43,770,540	7,027,100	50,797,640	4.4
6	37	Transportation Equipment	3,766	40,829,110	7,779,533	48,608,643	4.2
7	34	Fabricated Metals Products	6,459	26,191,151	11,071,083	37,262,234	3.2
8	29	Petroleum and Coal Products	2,799	23,481,712	4,303,927	27,785,639	2.4
9	20	Food Products	3,178	14,476,232	9,647,909	24,124,141	2.1
10	36	Electronic/Electrical Equipment	2,603	9,589,186	9,274,994	18,864,181	1.6
11	25	Furniture and Fixtures	1,337	17,633,944	438,568	18,072,512	1.6
12	27	Printing and Publishing	414	13,702,767	259,834	13,962,600	1.2
13	24	Lumber and Wood Products	1,606	13,549,787	249,338	13,799,125	1.2
14	32	Stone/Clay/Glass Products	1,363	8,753,694	3,411,999	12,165,693	1.1
15	35	Industrial Machinery	2,411	8,211,712	2,841,768	11,053,480	1.0
16	22	Textile Mill Products	586	7,239,512	1,560,512	8,800,024	0.8
17	38	Measurement/Photographic Inst.	608	5,261,181	2,162,532	7,423,713	0.6
18	39	Misc. Manufacturing Industries	665	4,818,423	1,443,867	6,262,290	0.5
19	31	Leather Products	169	851,109	1,134,777	1,985,886	0.2
20	23	Apparel and Other Textile Products	38	449,527	40,021	489,548	0.0
21	21	Tobacco Products	19	197,446	50,458	247,903	0.0
		Total TRI Releases and Transfers	**59,764**	**836,981,403**	**317,684,439**	**1,154,665,842**	**100.0**

Figure 4–5
M 1995

Industries with Largest Total Releases and Transfers, NPRI and TRI

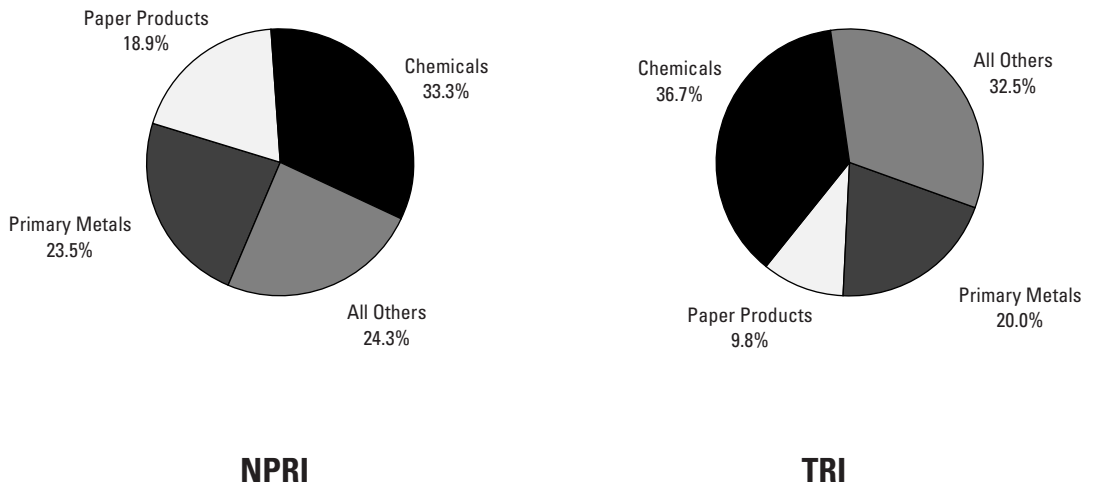


Figure 4–6
M 1995

Releases and Transfers of Industries with Largest Total Releases and Transfers, NPRI and TRI

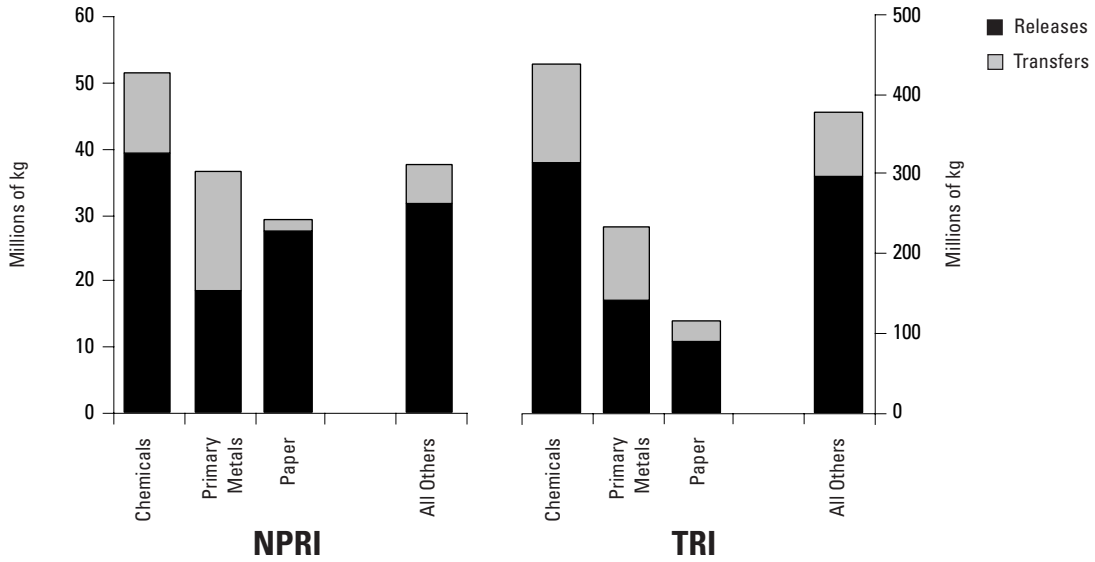


Table 4–16
M 1995

Projections of Total Releases and Transfers, NPRI and TRI, 1995–1997

	1995 (kg)	Projections for 1996 (kg)	Change 1995–1996 (%)	Projections for 1997 (kg)	Change 1995–1997 (%)
NPRI	155,004,060	139,767,641	-9.8	132,655,719	-14.4
TRI*	1,138,388,073	1,124,535,737	-1.2	1,091,755,576	-4.1

* As reported in Sections 8.1 and 8.7 on the TRI Form R.

4.7 Projections of Future Releases and Transfers

NPRI facilities project their total releases and total transfers for three years, while TRI facilities report projections in seven waste management categories two years ahead. Thus, projections can be compared only for the next two years and only with the two TRI categories (quantity released/disposed of and quantity treated off-site) that correspond to releases and transfers. The projections as well as current year amounts are provided in a different part of the TRI reporting form (in Section 8) than the amounts for releases and transfers (from Sections 5 and 6 of the TRI form) presented in other parts of this report. Therefore, the actual numbers for 1995 will differ somewhat.

Table 4–16 shows these projections for NPRI and TRI. NPRI facilities in the set of matched data projected a decrease in total releases and transfers of 10 percent from 1995 to 1996 and 14 percent from 1995 to 1997. Matched TRI facilities projected much smaller decreases: 1 percent from 1995 to 1996 and 4 percent from 1995 to 1997.

Table 4–17 analyzes the data from NPRI and TRI forms as they projected decreases, increases or no change in total releases and transfers. A slightly higher proportion of forms in NPRI (33 percent) projected decreases in total releases and transfers from 1995 to 1997 than in TRI (29 percent). A lower percentage of NPRI forms (24 percent) projected increases, compared to nearly 31 percent for TRI. Further, projected changes in NPRI averaged considerably higher per form than in TRI, especially for decreases. Thus, the greater projected reductions in NPRI arise more from the larger reduction projected on the average NPRI form than from having more forms that project decreases.

Projected percentage changes from 1995 to 1997 for individual chemicals varied widely from that for all matched chemicals for both countries. For methanol, the chemical with the largest total releases and transfers in both countries, NPRI facilities projected a decrease of 35 percent, while TRI facilities projected less than 7 percent decrease. NPRI projections for the top 25 chemicals for total releases and transfers ranged from an increase of 80 percent for hydrogen fluoride to a decrease of 77 percent for asbestos (see **Table 4–18**). Among the top 25 TRI chemicals, projections ranged from a 28 percent increase in total releases and transfers of copper and its compounds to a 33 percent decrease in ethylene glycol (see **Table 4–19**).

Tables 4–20 and **4–21** present the projected changes by industry. In NPRI, the paper products industry projected the greatest absolute change for 1995–1997 and a greater percentage reduction than other industries (except apparel, in which only two facilities reported). In TRI, the paper industry projected a rate of reduction for the period that is below the average for all industry sectors.

The chemicals industry projected substantial decreases in both PRTRs; in TRI, this amounted to more than half the net decrease projected by all industries. The primary metals industry projected the largest absolute increase in TRI, but in NPRI, its projection represents the third largest decrease.

Table 4–17
M 1995

Distribution of Forms with Projected Changes in Total Releases and Transfers, 1995–1997

NPRI

Change 1995–1996	Number of Forms	% of Total	1995 (kg)	Projections 1996 (kg)	% Change 1995–1996	Average Change per Form
Decrease	1,387	32.0	92,600,842	67,284,612	-27.3	-18,253
Increase	1,062	24.5	39,904,002	49,983,813	25.3	9,491
Stay same	1,879	43.4	22,499,216	22,499,216	0.0	
Total	**4,328**	**100.0**	**155,004,060**	**139,767,641**	**-9.8**	**-3,520**

Change 1995–1997	Number of Forms	% of Total	1995 (kg)	Projections 1997 (kg)	% Change 1995–1997	Average Change per Form
Decrease	1,443	33.3	94,135,123	61,999,289	-34.1	-22,270
Increase	1,045	24.1	39,248,922	49,036,415	24.9	9,366
Stay same	1,840	42.5	21,620,015	21,620,015	0.0	
Total	**4,328**	**100.0**	**155,004,060**	**132,655,719**	**-14.4**	**-5,164**

TRI

Change 1995–1996	Number of Forms	% of Total	1995 (kg)	Projections 1996 (kg)	% Change 1995–1996	Average Change per Form
Decrease	16,832	28.2	451,385,239	345,068,328	-23.6	-6,316
Increase	17,936	30.0	423,721,676	516,186,252	21.8	5,155
Stay same	24,996	41.8	263,281,158	263,281,157	0.0	
Total	**59,764**	**100.0**	**1,138,388,073**	**1,124,535,737**	**-1.2**	**-232**

Change 1995–1997	Number of Forms	% of Total	1995 (kg)	Projections 1997 (kg)	% Change 1995–1997	Average Change per Form
Decrease	17,460	29.2	474,105,146	320,366,133	-32.4	-8,805
Increase	18,201	30.5	421,742,122	528,848,637	25.4	5,885
Stay same	24,103	40.3	242,540,805	242,540,806	0.0	
Total	**59,764**	**100.0**	**1,138,388,073**	**1,091,755,576**	**-4.1**	**-780**

Table 4–18
M 1995

Projected Change for the 25 Chemicals with Largest NPRI Total Releases and Transfers, 1995–1997

CAS Number	Chemical	Number of Forms	1995 Total Releases and Transfers (kg)	Projected Change 1995–1996 kg	Projected Change 1995–1996 %	Projected Change 1995–1997 kg	Projected Change 1995–1997 %
67-56-1	Methanol	224	32,138,298	-8,593,697	-26.7	-11,152,259	-34.7
—	Ammonia (total)	177	26,435,704	-1,611,751	-6.1	-2,438,198	-9.2
—	Zinc (and its compounds)	290	16,541,586	-2,738,236	-16.6	-2,356,960	-14.2
1330-20-7	Xylene (mixed isomers)	217	8,892,730	-1,149,670	-12.9	-1,350,242	-15.2
108-88-3	Toluene	232	7,643,947	-706,481	-9.2	-1,177,699	-15.4
—	Manganese (and its compounds)	210	6,508,352	12,373	0.2	-70,382	-1.1
—	Nitric acid and nitrate compounds	120	5,967,989	37,961	0.6	-127,499	-2.1
78-93-3	Methyl ethyl ketone	114	5,163,851	147,592	2.9	46,243	0.9
1332-21-4	Asbestos (friable)	31	3,475,355	-2,236,055	-64.3	-2,678,733	-77.1
—	Lead (and its compounds)	130	3,316,014	1,878,367	56.6	433,438	13.1
—	Chromium (and its compounds)	202	3,241,139	-191,181	-5.9	11,850	0.4
110-82-7	Cyclohexane	31	2,923,194	-6,895	-0.2	-9,104	-0.3
67-63-0	Isopropyl alcohol (manufacturing)	175	2,867,085	-177,765	-6.2	-539,905	-18.8
74-85-1	Ethylene	41	2,325,242	-107,378	-4.6	-150,082	-6.5
75-09-2	Dichloromethane	50	2,207,405	-116,654	-5.3	-33,284	-1.5
—	Copper (and its compounds)	217	2,178,352	140,031	6.4	221,209	10.2
71-43-2	Benzene	44	1,922,666	-224,374	-11.7	-597,206	-31.1
7664-39-3	Hydrogen fluoride	32	1,702,145	1,363,109	80.1	1,360,109	79.9
71-36-3	n-Butyl alcohol	76	1,495,009	15,618	1.0	25,306	1.7
50-00-0	Formaldehyde	82	1,387,308	-231,386	-16.7	-209,704	-15.1
7429-90-5	Aluminum (fume or dust)	30	1,353,416	-746,721	-55.2	-746,712	-55.2
7782-50-5	Chlorine	114	1,258,157	-274,951	-21.9	-342,743	-27.2
115-07-1	Propylene	34	1,248,941	-86,362	-6.9	-131,985	-10.6
—	Nickel (and its compounds)	131	1,146,009	-30,426	-2.7	-42,194	-3.7
10049-04-4	Chlorine dioxide	43	1,062,318	-18,785	-1.8	-64,543	-6.1
	Subtotal	**3,047**	**144,402,212**	**-15,653,717**	**-10.8**	**-22,121,279**	**-15.3**
	as % of Total	**70.4**	**93.2**				
	Total	**4,328**	**155,004,060**	**-15,236,419**	**-9.8**	**-22,348,341**	**-14.4**

Table 4–19
M 1995

Projected Change for the 25 Chemicals with Largest TRI Total Releases and Transfers, 1995–1997

CAS Number	Chemical	Number of Forms	1995 Total Releases and Transfers* (kg)	Projected Change 1995–1996 kg	Projected Change 1995–1996 %	Projected Change 1995–1997 kg	Projected Change 1995–1997 %
67-56-1	Methanol	2,390	168,498,918	-8,293,687	-4.9	-11,020,498	-6.5
—	Nitric acid and nitrate compounds	2,410	109,301,028	9,475,155	8.7	7,235,679	6.6
—	Ammonia (total)	2,824	96,710,670	-557,766	-0.6	-3,185,912	-3.3
—	Zinc (and its compounds)	2,912	95,413,717	5,153,269	5.4	6,616,397	6.9
108-88-3	Toluene	3,325	73,680,385	-6,386,502	-8.7	-9,073,541	-12.3
1330-20-7	Xylene (mixed isomers)	3,183	48,784,133	-4,089,781	-8.4	-5,623,809	-11.5
—	Manganese (and its compounds)	2,423	41,879,814	1,041,886	2.5	1,746,034	4.2
75-15-0	Carbon disulfide	90	38,595,973	-2,757,603	-7.1	-10,782,960	-27.9
78-93-3	Methyl ethyl ketone	2,217	34,006,257	-3,223,292	-9.5	-5,154,758	-15.2
7782-50-5	Chlorine	1,319	30,521,258	784,898	2.6	-97,600	-0.3
75-09-2	Dichloromethane	939	30,516,849	-2,806,660	-9.2	-4,239,241	-13.9
—	Copper (and its compounds)	3,988	28,840,687	10,226,806	35.5	8,168,852	28.3
7664-38-2	Phosphoric acid	2,722	27,583,324	-3,295,486	-11.9	-6,155,646	-22.3
107-21-1	Ethylene glycol	1,240	25,349,680	-9,191,606	-36.3	-8,296,693	-32.7
100-42-5	Styrene	1,482	22,384,980	-93,240	-0.4	344,168	1.5
—	Chromium (and its compounds)	3,196	21,368,266	986,108	4.6	1,137,115	5.3
—	Lead (and its compounds)	1,630	18,017,865	526,204	2.9	669,959	3.7
74-85-1	Ethylene	280	16,220,878	2,133,763	13.2	1,083,703	6.7
75-05-8	Acetonitrile	85	15,932,937	1,434,317	9.0	116,498	0.7
71-36-3	n-Butyl alcohol	1,082	14,241,970	-501,405	-3.5	-97,265	-0.7
79-01-6	Trichloroethylene	712	12,374,645	-1,989,171	-16.1	-3,968,914	-32.1
108-10-1	Methyl isobutyl ketone	985	10,916,194	-693,722	-6.4	-1,634,584	-15.0
50-00-0	Formaldehyde	786	10,083,929	-104,434	-1.0	251,665	2.5
115-07-1	Propylene	337	9,467,334	1,445,787	15.3	761,828	8.0
108-95-2	Phenol	728	9,242,035	-535,315	-5.8	-1,386,847	-15.0
	Subtotal	**43,285**	**1,009,933,727**	**-11,311,475**	**-1.1**	**-42,586,370**	**-4.2**
	% of Total	**72.4**	**88.7**				
	Total	**59,764**	**1,138,388,073**	**-13,852,336**	**-1.2**	**-46,632,497**	**-4.1**

* As reported in Sections 8.1 and 8.7 on the TRI Form R.

Table 4–20
M 1995

Projected Change in NPRI Total Releases and Transfers, by Industry, 1995–1997

Rank	US SIC Code	Industry	Number of Forms	Releases and Transfers (kg)	Projected Change 1995–1996 kg	Projected Change 1995–1996 %	Projected Change 1995–1997 kg	Projected Change 1995–1997 %
1	28	Chemicals	1,443	51,621,155	-4,109,973	-8.0	-7,022,305	-13.6
2	33	Primary Metal Industries	583	36,430,425	-1,759,297	-4.8	-3,118,633	-8.6
3	26	Paper Products	312	29,332,344	-9,307,470	-31.7	-11,078,675	-37.8
4	29	Petroleum and Coal Products	364	10,514,283	-106,653	-1.0	-250,635	-2.4
5	37	Transportation Equipment	304	7,965,107	-363,048	-4.6	-580,548	-7.3
6	30	Rubber and Plastics Products	279	7,203,374	-175,896	-2.4	-518,656	-7.2
7	34	Fabricated Metal Products	371	3,375,124	568,743	16.9	519,331	15.4
8	32	Stone/Clay/Glass Products	90	1,691,643	-355,932	-21.0	-584,353	-34.5
9	24	Lumber and Wood Products	139	1,332,915	117,727	8.8	173,473	13.0
10	27	Printing and Publishing	40	1,293,131	-26,678	-2.1	-78,233	-6.0
11	22	Textile Mill Products	19	971,404	-33,746	-3.5	-144,746	-14.9
12	36	Electronic/Electrical Equipment	91	824,859	-54,304	-6.6	-106,009	-12.9
13	20	Food Products	105	670,681	271,566	40.5	257,223	38.4
14	35	Industrial Machinery	69	616,503	249,098	40.4	429,141	69.6
15	25	Furniture and Fixtures	31	513,169	19,324	3.8	35,924	7.0
16	39	Misc. Manufacturing Industries	81	335,954	-97,392	-29.0	-101,152	-30.1
17	23	Apparel and Other Textile Products	2	225,000	-65,000	-28.9	-169,000	-75.1
18	31	Leather Products	4	85,488	-7,488	-8.8	-10,488	-12.3
19	38	Measurement/Photographic Inst.	1	1,501	0	0.0	0	0.0
		Total	**4,328**	**155,004,060**	**-15,236,419**	**-9.8**	**-22,348,341**	**-14.4**

Table 4–21
M 1995

Projected Change in TRI Total Releases and Transfers, by Industry, 1995–1997

Rank	US SIC Code	Industry	Number of Forms	Releases and Transfers* (kg)	Projected Change 1995–1996 kg	Projected Change 1995–1996 %	Projected Change 1995–1997 kg	Projected Change 1995–1997 %
1	28	Chemicals	16,721	433,370,269	-948,032	-0.2	-24,537,727	-5.7
2	33	Primary Metal Industries	5,773	220,649,551	7,537,893	3.4	11,415,139	5.2
3	26	Paper Products	1,864	112,968,291	-1,207,074	-1.1	-3,406,659	-3.0
4		Multiple Codes 20–39	4,306	72,652,034	1,436,633	2.0	-1,416,060	-1.9
5	30	Rubber and Plastics Products	3,079	49,893,476	-3,680,201	-7.4	-4,914,410	-9.8
6	37	Transportation Equipment	3,766	47,840,890	-3,231,018	-6.8	-3,291,371	-6.9
7	34	Fabricated Metal Products	6,459	36,290,298	-4,646,899	-12.8	-6,424,963	-17.7
8	29	Petroleum and Coal Products	2,799	28,014,976	-122,769	-0.4	-633,222	-2.3
9	20	Food Products	3,178	23,630,014	-439,204	-1.9	-514,329	-2.2
10	25	Furniture and Fixtures	1,337	20,469,197	-904,129	-4.4	-1,014,631	-5.0
11	36	Electronic/Electrical Equipment	2,603	18,327,488	-1,642,478	-9.0	-2,164,135	-11.8
12	24	Lumber and Wood Products	1,606	13,295,147	-737,059	-5.5	-1,199,091	-9.0
13	27	Printing and Publishing	414	12,948,230	-502,107	-3.9	-656,347	-5.1
14	32	Stone/Clay/Glass Products	1,363	11,956,761	-895,326	-7.5	-1,335,122	-11.2
15	35	Industrial Machinery	2,411	10,649,645	-749,002	-7.0	-1,575,810	-14.8
16	22	Textile Mill Products	586	8,819,174	-1,260,383	-14.3	-1,655,022	-18.8
17	38	Measurement/Photographic Inst.	608	7,425,856	-1,175,112	-15.8	-1,755,569	-23.6
18	39	Misc. Manufacturing Industries	665	6,513,186	-633,665	-9.7	-1,264,422	-19.4
19	31	Leather Products	169	1,938,873	-65,558	-3.4	-136,089	-7.0
20	23	Apparel and Other Textile Products	38	486,939	13,392	2.8	-166,468	-34.2
21	21	Tobacco Products	19	247,777	-237	-0.1	13,809	5.6
		Total	**59,764**	**1,138,388,073**	**-13,852,335**	**-1.2**	**-46,632,497**	**-4.1**

* As reported in Sections 8.1 and 8.7 on TRI Form R.

Table 4–22
M 1995

Average Releases and Transfers per Facility, NPRI and TRI

	NPRI Number	TRI Number
Total Facilities	1,309	19,786
Total Forms	4,328	59,764
Average Forms per Facility	3.3	3.0
	kg	**kg**
Average Releases per Facility	89,186	42,302
Average Transfers per Facility	29,228	16,056
Average Releases and Transfers per Facility	118,414	58,358

4.8 Releases and Transfers per Facility

On average, releases and transfers from NPRI facilities were twice those of TRI facilities (118,414 kg per facility in NPRI versus 58,358 kg in TRI). NPRI facilities reported an average of 89,186 kg in total releases—more than twice the TRI average. Transfers averaged 29,228 kg per NPRI facility, which amounts to a little less than twice those in TRI (see **Table 4–22**).

Facilities in the two countries submitted roughly the same average number of forms: 3.3 forms per facility in Canada and 3.0 in the United States. Releases and transfers per form therefore show essentially the same differential as the average for facilities: 35,814 kg per form submitted to NPRI versus 19,320 kg per form in TRI, or almost twice as large for NPRI, on average, as for TRI (see **Table 4–23**).

Data in the matched data set can be analyzed for possible explanations of this significant discrepancy between the two systems. There are several possible reasons for these differences, some of which can be explored with the PRTR data and are examined in this chapter. These reasons include, for example, differing industrial or chemical mixes. Other possible reasons, such as differing regulatory environments in the two countries, cannot be examined with the PRTR data.

4.8.1 Releases and Transfers by Type

NPRI's tendency to have higher average releases and transfers per form holds true for all but one release/transfer type (transfers to sewage/POTWs, see **Table 4–23**). NPRI facilities averaged twice the air emissions per form, for example, as did TRI facilities. The contrast between NPRI and TRI reporting of surface water discharges, on the one hand, and transfers to sewage/POTWs, on the other, discussed above, also influences these averages. Surface water discharges averaged 3.5 times higher per form in NPRI than in TRI, while transfers to sewage/POTWs was the only category in which NPRI facilities averaged less per form than TRI.

Table 4–23
M 1995

Average Releases and Transfers per Form, NPRI and TRI

	NPRI Number		TRI Number		
Total Forms	4,328		59,764		
	kg	**kg/form**	**kg**	**kg/form**	**Ratio of Average per Form NPRI/TRI**
Total Air Emissions	79,547,053	18,380	560,407,943	9,377	2.0
Surface Water Discharges	15,419,582	3,563	60,570,521	1,013	3.5
Underground Injection	9,937,227	2,296	92,783,273	1,552	1.5
On-Site Land Releases	11,690,712	2,701	123,219,666	2,062	1.3
Matched Releases	**116,744,327**	**26,974**	**836,981,403**	**14,005**	**1.9**
Treatment/Destruction	13,148,001	3,038	103,959,767	1,740	1.7
Sewage/POTWs	4,457,382	1,030	95,796,854	1,603	0.6
Disposal/Containment	20,654,350	4,772	117,927,818	1,973	2.4
Matched Transfers	**38,259,733**	**8,840**	**317,684,439**	**5,316**	**1.7**
Total Releases and Transfers	**155,004,060**	**35,814**	**1,154,665,842**	**19,320**	**1.9**

Table 4–24
M 1995

Distribution of NPRI and TRI Total Releases and Transfers and Facilities

	NPRI		TRI	
Quantity per Facility	**Number of Facilities**	**Total Releases and Transfers (kg)**	**Number of Facilities**	**Total Releases and Transfers (kg)**
Greater than 4,000,000 kg	2	13,042,440	35	281,596,752
From 1,000,000 kg to 4,000,000 kg	33	68,284,527	153	267,517,387
From 100,000 kg to 1,000,000 kg	193	59,056,461	1,403	408,228,931
From 10,000 kg to 100,000 kg	367	13,689,295	5,123	171,692,502
From 1,000 kg to10,000 kg	225	866,771	5,323	24,248,380
From 1 to 1,000 kg	255	64,566	4,941	1,381,891
0 kg	234	0	2,808	0
Total	**1,309**	**155,004,060**	**19,786**	**1,154,665,842**
	% of Total	**% of Total**	**% of Total**	**% of Total**
Greater than 4,000,000 kg	0.2	8.4	0.2	24.4
From 1,000,000 kg to 4,000,000 kg	2.5	44.1	0.8	23.2
From 100,000 kg to 1,000,000 kg	14.7	38.1	7.1	35.4
From10,000 kg to 100,000 kg	28.0	8.8	25.9	14.9
From 1,000 kg to10,000 kg	17.2	0.6	26.9	2.1
From 1 to 1,000 kg	19.5	0.0	25.0	0.1
0 kg	17.9	0.0	14.2	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**

4.8.2 Facilities with Very Large or Very Small Releases

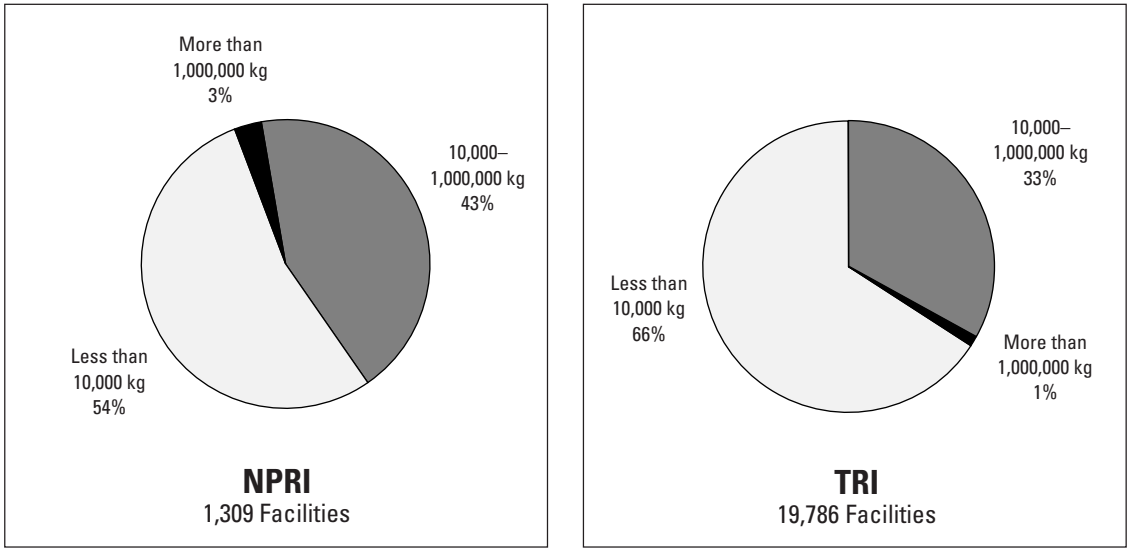
As noted above, the top 50 facilities account for twice the proportion (59 percent) of total releases and transfers in NPRI than do the top 50 facilities in TRI (29 percent). One reason for this difference is the relative numbers of facilities reporting large and small release and transfer amounts. In NPRI, 3 percent of facilities reported total releases and transfers greater than 1 million kg, while 1 percent of TRI facilities did. The medium-size facilities reporting between 10,000 and 1 million kg accounted for the other half of total releases and transfers in both countries' data, although they represented 33 percent of TRI facilities and 43 percent of NPRI facilities. Facilities reporting less than 10,000 kg comprised one-half of all NPRI facilities, but two-thirds of all TRI facilities (see **Table 4–24** and **Figure 4–7**).

In all of the upper ranges in **Table 4–24**, the NPRI facilities represented a greater percentage of the NPRI total than did the corresponding TRI facilities. Thus, there were relatively more facilities in NPRI reporting the largest total releases and transfers than there were in TRI, and more facilities in TRI reporting the smallest total releases and transfers than in NPRI. In short, releases and transfers in NPRI were more concentrated in fewer facilities.

Figure 4–7
M 1995

Distribution of Reporting in NPRI and TRI, by Amount of Total Releases and Transfers and according to Facility Output

Distribution of Facilities by Amount of Total Releases and Transfers



Distribution of Total Releases and Transfers according to Facility Output

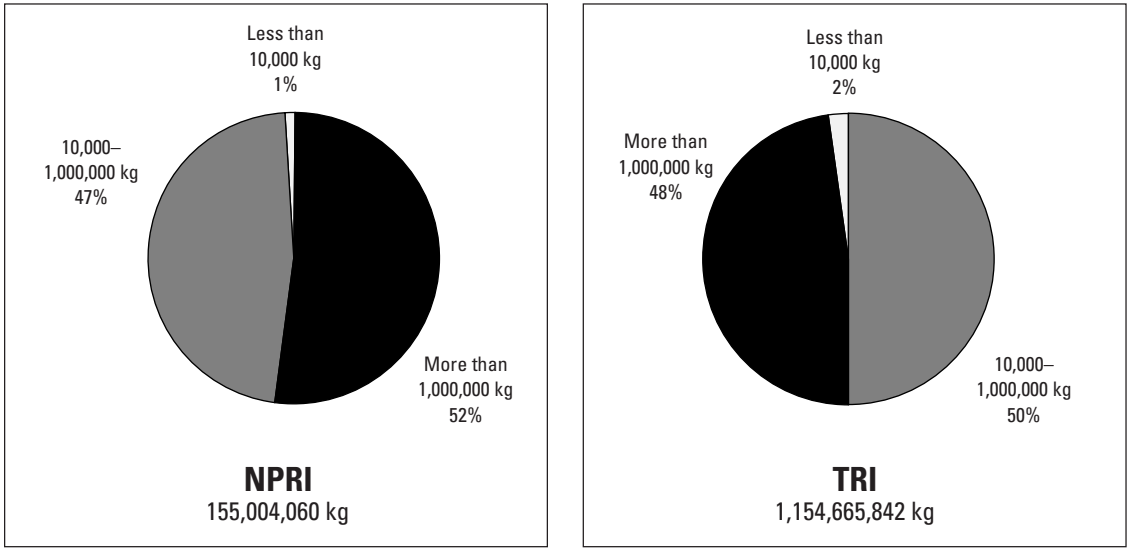


Table 4–25
M 1995

Average Total Releases and Transfers per Form, by Industry, NPRI and TRI

Rank	US SIC Code	Industry	NPRI (kg/form)	TRI (kg/form)	Ratio of Average per Form NPRI/TRI
1	23	Apparel and Other Textile Products	112,500	12,883	8.7
2	22	Textile Mill Products	51,127	15,017	3.4
3	29	Petroleum and Coal Products	28,885	9,927	2.9
4	32	Stone/Clay/Glass Products	18,796	8,926	2.1
5	37	Transportation Equipment	26,201	12,907	2.0
6	35	Industrial Machinery	8,935	4,585	1.9
7	31	Leather Products	21,372	11,751	1.8
8	30	Rubber and Plastics Products	25,819	16,498	1.6
9	33	Primary Metal Industries	62,488	39,941	1.6
10	34	Fabricated Metal Products	9,097	5,769	1.6
11	26	Paper Products	94,014	60,744	1.5
12	28	Chemicals	35,773	26,036	1.4
13	36	Electronic/Electrical Equipment	9,064	7,247	1.3
14	25	Furniture and Fixtures	16,554	13,517	1.2
15	24	Lumber and Wood Products	9,589	8,592	1.1
16	27	Printing and Publishing	32,328	33,726	1.0
17	20	Food Products	6,387	7,591	0.8
18	39	Misc. Manufacturing Industries	4,148	9,417	0.4
19	38	Measurement/Photographic Instruments	1,501	12,210	0.1
20		Multiple Codes 20–39*	—	17,139	—
21	21	Tobacco Products	—	13,048	—
		Total	**35,814**	**19,320**	**1.9**

* Multiple SIC codes reported only in US data.

4.8.3 Industrial Mix

Differences in the industrial mix of facilities reporting to the two PRTRs—within the matched set of industries—might account for some of the greater releases and transfers per facility in Canada. Relatively more producers of primary metal products, for instance, reported to NPRI than to TRI. Thirteen percent of NPRI forms in the matched data set came from the primary metals industry, compared to 10 percent of TRI forms (see **Tables 4–14** and **4–15**, above). If primary metals manufacturing tended to produce greater releases and transfers—in both countries—than other industries, then the relative prevalence of that industry in Canada would contribute to Canada's larger average of releases and transfers per facility. In fact, this is not the case.

Table 4–25 presents average releases and transfers per form for all industry groups. **Figure 4–8** illustrates these data. In 15 industry groups, NPRI data indicate higher releases and transfers per form than for TRI reporting in the same industries. Thus, differences in average releases and transfers between NPRI and TRI within industries outweigh the influence of the role of each industry within NPRI or TRI.

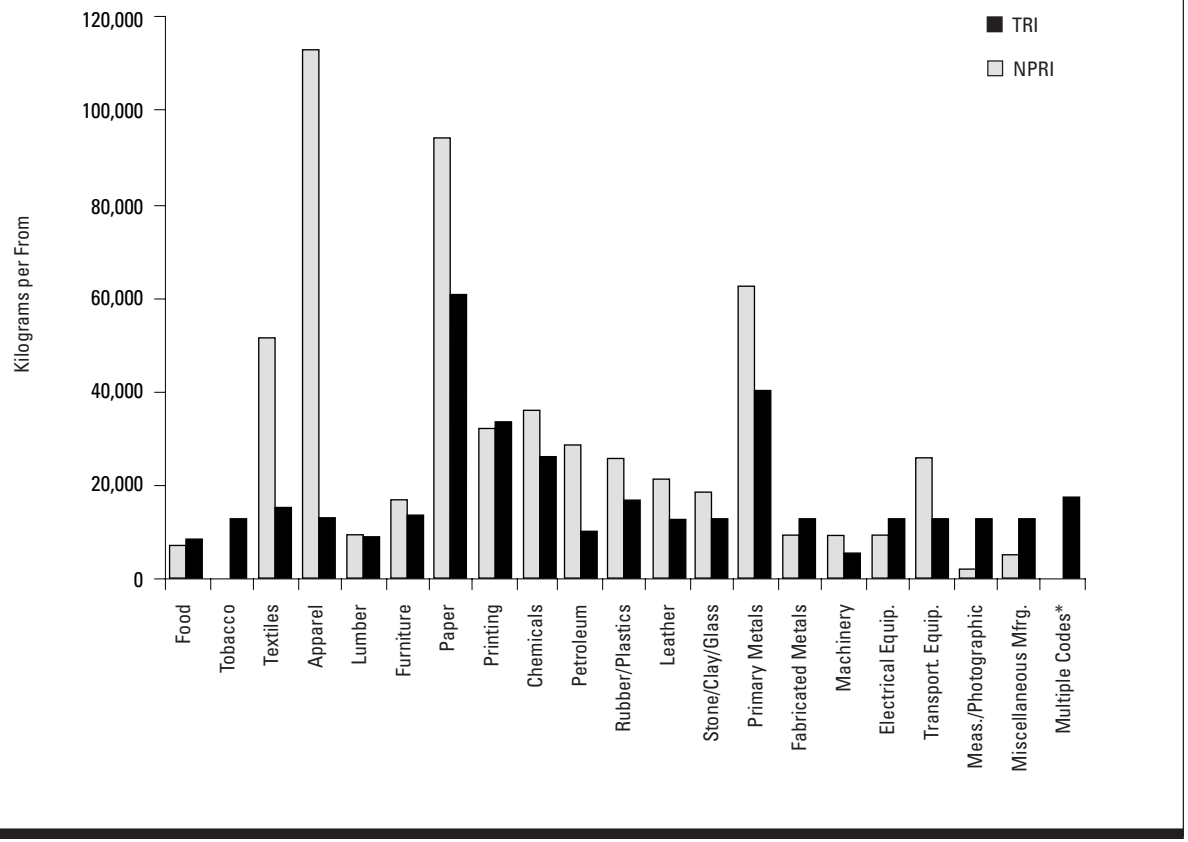
Canadian primary metals manufacturers, for example, averaged 62,488 kg per form in total releases and transfers, while their US counterparts averaged 39,941 kg per form. The greatest differences occurred in the apparel and textiles industries, but these NPRI averages reflect very few facilities (just one apparel manufacturer and nine in textile mill products). Other industries with NPRI averages more than twice as great as those in TRI were petroleum and coal products and stone/clay/glass manufacture. Industries with lower averages in Canada than in the United States were food products and miscellaneous manufacturing (the low ratio for measurement and photographic instruments depended on only one facility reporting to NPRI).

Differences between Canada and the United States in the mix of industrial activities within the major industrial groups could potentially explain differences in release and transfer patterns between the two countries. **Tables 4–26** through **4–28** examine three-digit SIC code activity for the chemical, primary metals, and pulp and paper industries, which were the three industrial categories with the largest releases and transfers in both PRTRs. Although the distribution of specific industrial activities varied considerably between the two countries, release-and-transfer patterns within the three-digit SIC codes varied even more. These data suggest that the higher NPRI averages for releases and transfers per form, in the industries contributing the most releases and transfers, do not arise from the mix of industrial activity at the three-digit level.

For example, in the chemical industry (SIC 28), NPRI releases and transfers per form were, on average, 37 percent higher than those in TRI. Industrial inorganic chemicals (SIC 281) represented one-quarter of the forms and

Figure 4–8
M 1995

Total Releases and Transfers per Form, by Industry, NPRI and TRI



*TRI only.

In the pulp and paper industry (SIC 26), release and transfer amounts per form were half again as high in NPRI as in TRI. Pulp mills (SIC 261) reporting to NPRI averaged 60 percent higher total releases and transfers per form than those reporting to TRI. Although they submitted roughly the same number of forms in each country (188 in NPRI versus 157 in TRI), pulp mills submitted 60 percent of the forms in SIC 26 for NPRI, but only 8 percent for TRI. Paper mills (SIC 262) accounted for similar shares of forms (20 percent) in the two systems, but their average releases and transfers per form were 44 percent higher in NPRI than in TRI.

The one three-digit group in which the TRI average greatly exceeded the NPRI average was paperboard mills (SIC 263); this group also constituted a larger share of TRI reporting in SIC 26. Facilities within SIC 26 reporting multiple SIC codes to TRI also had above-average release/transfer amounts per form (about the same as paperboard mills and pulp mills); NPRI includes no similar category. (See **Chapter 8** for further analysis of the pulp and paper industry.)

one-half of the releases and transfers in this industry in NPRI reporting. The resulting average per form was three times the comparable average in TRI. Thus, this industrial activity contributed to NPRI's higher average, not because it constituted a sizable portion of the Canadian chemical industry, but because its average releases and transfers per form were much higher than those of TRI facilities in the same business.

Some three-digit SIC code activities that played a smaller part still contributed a greater proportion to overall average releases and transfers. For agricultural chemicals (SIC 287), NPRI releases and transfers per form were four times as high as in TRI. Paints and allied products (SIC 285) represented 24 percent of NPRI forms in SIC 28 and only 4 percent of the corresponding releases and transfers. Average releases and transfers per form from this activity, however, were two-and-one-half times those of comparable US forms in SIC 28.

For primary metal products (SIC 33), releases and transfers per form in NPRI were 56 percent higher than those in TRI. NPRI releases and transfers per form were substantially higher for blast furnaces (SIC 331) and iron and steel foundries (SIC 332). These industries accounted for nearly half of both NPRI and TRI forms (46 percent and 44 percent, respectively) in SIC 33. These more than offset the very large average in TRI for primary nonferrous metals (SIC 333; nearly 14 times the average releases and transfers per form from NPRI facilities) and substantially higher TRI averages for other three-digit activities in the industry.

Table 4–26
M 1995

Total Releases and Transfers for Chemical Industry (US SIC Code 28)

US SIC Code	Industry	Number of Forms	% of All Forms	Total Releases and Transfers (kg)	% of Total	Average per Form (kg/form)
NPRI Facilities						
281	Industrial Inorganic Chemicals	353	24.5	27,162,560	52.6	76,948
282	Plastics Materials and Synthetics	207	14.3	5,692,918	11.0	27,502
283	Pharmaceuticals	42	2.9	1,698,833	3.3	40,448
284	Soap, Cleaners and Toilet Goods	149	10.3	172,452	0.3	1,157
285	Paints and Allied Products	349	24.2	1,999,473	3.9	5,729
286	Industrial Organic Chemicals	141	9.8	5,286,559	10.2	37,493
287	Agricultural Chemicals	50	3.5	8,998,974	17.4	179,979
289	Miscellaneous Chemical Products	152	10.5	609,386	1.2	4,009
	Total	**1,443**	**100.0**	**51,621,155**	**100.0**	**35,773**
TRI Facilities						
281	Industrial Inorganic Chemicals	1,061	6.3	25,529,088	5.9	24,061
282	Plastics Materials and Synthetics	1,765	10.6	42,633,420	9.8	24,155
283	Pharmaceuticals	564	3.4	23,130,352	5.3	41,011
284	Soap, Cleaners and Toilet Goods	810	4.8	2,955,754	0.7	3,649
285	Paints and Allied Products	2,673	16.0	6,136,849	1.4	2,296
286	Industrial Organic Chemicals	2,665	15.9	91,388,383	21.0	34,292
287	Agricultural Chemicals	854	5.1	35,179,849	8.1	41,194
289	Miscellaneous Chemical Products	1,786	10.7	12,135,990	2.8	6,795
	Multiple codes within SIC 28*	4,530	27.1	196,203,599	45.1	43,312
	SIC code not valid within SIC 28	13	0.1	57,087	0.0	4,391
	Total	**16,721**	**100.0**	**435,350,369**	**100.0**	**26,036**

* Multiple SIC codes reported only in US data.

Table 4–27
M 1995

Total Releases and Transfers for the Primary Metal Products Industry (US SIC Code 33)

US SIC Code	Industry	Number of Forms	% of All Forms	Total Releases and Transfers (kg)	% of Total	Average per Form (kg/form)
NPRI Facilities						
331	Blast Furnace and Basic Steel Products	193	33.1	25,551,663	70.1	132,392
332	Iron and Steel Foundries	75	12.9	5,802,435	15.9	77,366
333	Primary Nonferrous Metals	147	25.2	4,211,611	11.6	28,650
334	Secondary Nonferrous Metals	36	6.2	317,587	0.9	8,822
335	Nonferrous Rolling and Drawing	96	16.5	472,128	1.3	4,918
336	Nonferrous Foundries	25	4.3	74,273	0.2	2,971
339	Miscellaneous Primary Metal Products	11	1.9	728	0.0	66
	Total	**583**	**100.0**	**36,430,425**	**100.0**	**62,488**
TRI Facilities						
331	Blast Furnace and Basic Steel Products	1,514	26.2	74,597,530	32.4	49,272
332	Iron and Steel Foundries	1,051	18.2	23,551,196	10.2	22,408
333	Primary Nonferrous Metals	200	3.5	78,675,385	34.1	393,377
334	Secondary Nonferrous Metals	480	8.3	9,127,555	4.0	19,016
335	Nonferrous Rolling and Drawing	1,009	17.5	9,343,196	4.1	9,260
336	Nonferrous Foundries	624	10.8	2,366,490	1.0	3,792
339	Miscellaneous Primary Metal Products	393	6.8	2,579,317	1.1	6,563
	Multiple codes within SIC 33*	488	8.5	30,332,610	13.2	62,157
	SIC code not valid within SIC 33	14	0.2	7,164	0.0	512
	Total	**5,773**	**100.0**	**230,580,443**	**100.0**	**39,941**

* Multiple SIC codes reported only in US data.

Table 4–28
M 1995

Total Releases and Transfers for the Paper Products Industry (US SIC Code 26)

US SIC Code	Industry	Number of Forms	% of All Forms	Total Releases and Transfers (kg)	% of Total	Average per Form (kg/form)
NPRI Facilities						
261	Pulp Mills	188	60.3	21,991,313	80.2	116,975
262	Paper Mills	62	19.9	3,596,820	3.6	58,013
263	Paperboard Mills	4	1.3	95,770	1.3	23,943
265	Paperboard Boxes	7	2.2	146,803	0.3	20,972
267	Misc. Converted Paper Products	51	16.3	3,501,638	14.5	68,660
	Total	**312**	**100.0**	**29,332,344**	**100.0**	**94,014**
TRI Facilities						
261	Pulp Mills	157	8.4	11,532,702	10.2	73,457
262*	Paper Mills	373	20.0	14,982,441	13.2	40,167
263	Paperboard Mills	232	12.4	17,483,946	15.4	75,362
265	Paperboard Boxes	27	1.4	590,038	0.5	21,853
267**	Misc. Converted Paper Products	328	17.6	10,991,706	9.7	33,511
	Multiple codes within SIC 26***	747	40.1	57,646,853	50.9	77,171
	Total	**1,864**	**100.0**	**113,227,686**	**100.0**	**60,744**

* Includes 266 which was changed to 262 in 1987.
** Includes 264 which was changed to 267 in 1987.
*** Multiple SIC codes reported only in US data.

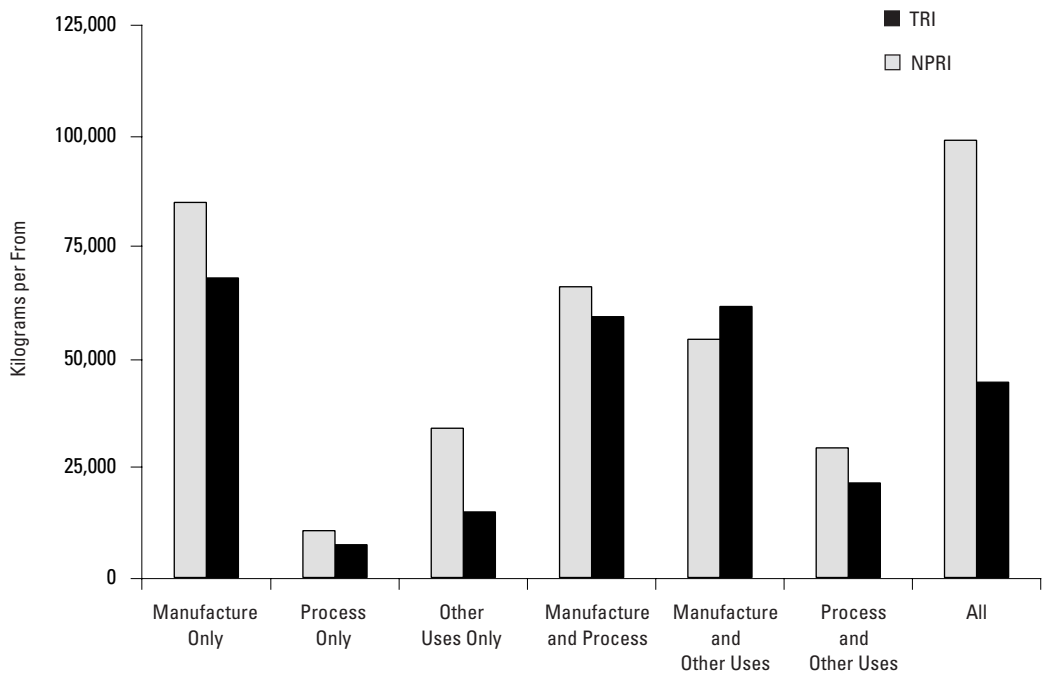
Table 4–29
M 1995

NPRI and TRI Average Total Releases and Transfers per Form, by Activity/Use Type

Type of Activity/Use	Average Total Releases and Transfers per Form: NPRI (kg)	Average Total Releases and Transfers per Form: TRI (kg)	Ratio of Average per Form NPRI/TRI
Manufacturing Only	84,513	68,067	1.2
Processing Only	11,212	7,698	1.5
Other Uses Only	33,658	14,679	2.3
Manufacturing and Processing	66,041	59,092	1.1
Manufacturing and Other Uses	54,350	61,594	0.9
Processing and Other Uses	29,241	21,513	1.4
All Three Activities/Uses	98,889	44,315	2.2
Total	**35,814**	**19,320**	**1.9**

Figure 4–9
M 1995

NPRI and TRI Average Total Releases and Transfers per Form, by Activity/Use Type



4.8.4 Chemical Use/Activity

Another potential reason for the higher releases and transfers per form of Canadian industries is to be found in the data indicating how facilities use the chemicals they report. Facilities may manufacture, process or otherwise use the chemicals they report, or they may report combinations of these activities. In all but one case, NPRI forms contained higher average total releases and transfers than those in TRI. The greatest differential appeared in forms reporting other uses only, with averages 2.3 times higher in NPRI than in TRI. Similarly, forms reporting all three activities had averages 2.2 times higher in NPRI. Only in the combination of manufacturing and other uses did NPRI forms carry a lower average than TRI forms (see **Table 4–29** and **Figure 4–9**).

4.8.5 Threshold Differences

The matched data set compiled for this analysis does not take into account two other differences between the two reporting systems: lower reporting thresholds in TRI for the "otherwise used" category and for chemicals identified as carcinogens by the United States Occupational Safety and Health Administration (OSHA). TRI facilities must report if they "otherwise use" more than 10,000 lbs (4,450 kg) of chemicals, whereas the threshold for reporting chemicals manufactured or processed is 25,000 lbs (11,350 kg). For OSHA-identified carcinogens, the TRI *de minimus* level for reporting is a concentration of 0.1 percent, rather than the 1.0 percent level that applies to all other TRI chemicals and to all NPRI chemicals.

Eliminating from the matched data set all TRI forms that report only in the "otherwise used" category and all forms from both PRTRs that report OSHA carcinogens controls for these differences. (Beginning in 1995, in calculating thresholds, NPRI facilities must also

Table 4–30
1995

Matching NPRI and TRI Forms on Thresholds

	Number of Forms	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Average per Form (kg)
TRI Matched Chemicals/Industries	59,764	836,981,403	317,684,439	1,154,665,842	19,320
Minus "Other Uses" Only	17,362	192,654,911	62,207,969	254,862,880	14,679
Minus *de minimus* Chemicals	12,091	87,910,277	33,712,535	121,622,812	10,059
Plus *de minimus*/Other Uses Only*	1,781	24,079,064	8,417,876	32,496,940	18,246
TRI Matched Thresholds	**32,092**	**580,495,279**	**230,181,810**	**810,677,090**	**25,261**
NPRI Matched Chemicals/Industries	4,328	116,744,327	38,259,733	155,004,060	35,814
Minus "Other Uses" Only	915	25,488,660	5,308,857	30,797,517	33,658
Minus *de minimus* Chemicals	606	7,948,175	4,463,749	12,411,924	20,482
Plus *de minimus*/Other Uses Only*	101	2,274,529	1,367,241	3,641,770	36,057
NPRI Matched Thresholds	**2,908**	**85,582,021**	**29,854,368**	**115,436,389**	**39,696**

* To avoid double subtraction.

count the weight of a by-product released or transferred to disposal, even those in mixtures less than 1 percent concentration. This difference cannot be removed from the analysis.)

In the result (see **Table 4–30**), NPRI forms still averaged more than one-and-a-half times the total releases and transfers of those in TRI. Adjusting for threshold differences thus accounts for only about one-fifth of the difference between NPRI and TRI averages.

4.9 TRI Industry Expansion

EPA has added various non-manufacturing industries to TRI: metal mining facilities, coal mining, oil- and coal-fired power plants, hazardous waste treatment facilities, chemical distributors, petroleum bulk storage facilities and solvent recovery services. These industries will begin reporting for 1998. NPRI, because it includes these industries, offers some perspective on the value of the information to be gained under this expansion. Although the proportion of total releases and transfers these industries will represent in TRI will no doubt differ somewhat from their role in NPRI, the NPRI data do suggest the extent to which the expansion will add to TRI's information base.

In NPRI, facilities in these industries reported releases and transfers totaling 23 million kg in 1995, as shown in **Table 4–31**. Representing 7 percent of NPRI facilities, they were responsible for 15 percent of NPRI total releases and transfers.

Currently, 24 percent of NPRI total releases and transfers must be excluded from the matched data set in this report because they are reported by non-manufacturing industries (see **Figure 4–1**, above). Had the TRI expansion industries reported in 1995, only 10 percent of the NPRI totals would have been excluded because of industrial activity, a substantial increase in comparability between the two databases.

Table 4–31
M 1995

1995 NPRI Releases and Transfers from Industries Added to TRI Reporting

US SIC Code	Industry	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Under-ground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)
10	Metal Mining	49	183	1,402,116	14,993,198	3,600,000	39,997	20,036,799	0	0	0	0	20,036,799
1021	Copper Ores	13	51	264,263	12,055,909	0	32,205	12,353,080	0	0	0	0	12,353,080
1031	Lead and Zinc Ores	7	39	1,038,416	2,807,715	0	7,792	3,854,023	0	0	0	0	3,854,023
1041	Gold Ores	26	84	64,694	127,482	3,600,000	0	3,792,861	0	0	0	0	3,792,861
1061	Ferroalloy Ores, except Vanadium	2	8	34,743	2,092	0	0	36,835	0	0	0	0	36,835
1099	Metal Ores, not elsewhere classified	1	1	0	0	0	0	0	0	0	0	0	0
12	Coal Mining												
1221	Bituminous Coal/Lignite Surface Mining	1	1	0	0	0	0	0	0	0	0	0	0
4911	Electric Generation, Transmission	21	41	1,946,874	19,038	0	464,317	2,430,229	16,512	0	313,320	329,832	2,760,061
4931	Electric and Other Services Combined	1	3	0	64,267	0	0	64,267	0	0	350	350	64,617
5169	Wholesale Trade of Chemicals	11	99	6,906	0	0	1,000	20,453	48,802	60	0	48,862	69,315
7389	Business Services (Solvent Recovery)	2	9	0	0	0	0	274	9,600	0	0	9,600	9,874
	Total in NPRI for TRI Expansion Industries	**85**	**336**	**3,355,896**	**15,076,503**	**3,600,000**	**505,314**	**22,552,022**	**74,914**	**60**	**313,670**	**388,644**	**22,940,666**
	Total in NPRI for Current TRI Industries/Matched Chemicals	**1,309**	**4,328**	**79,547,053**	**15,419,582**	**9,937,227**	**11,690,712**	**116,744,327**	**13,148,001**	**4,457,382**	**20,654,350**	**38,259,733**	**155,004,060**
	TRI Expansion Industries as % of Current TRI Industries, in NPRI	**6.5**	**7.8**	**4.2**	**97.8**	**36.2**	**4.3**	**19.3**	**0.6**	**0.0**	**1.5**	**1.0**	**14.8**

➤ Others on TRI expansion list but with no NPRI reports:
4939 Combination Utilities (Electric, Gas, Other)
4953 Refuse/Waste Disposal Systems
5171 Petroleum Bulk Stations and Terminals

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

Key Findings

- Releases decreased by 2 percent for Canadian facilities and 4 percent for US facilities from 1994 to 1995, for the matched 1994–1995 data set. Transfers increased by 25 percent for Canadian facilities and 2 percent for US facilities. This resulted in an increase in total releases and transfers of 4 percent for Canadian facilities and a 2 percent decrease for US facilities.
- Almost half of the net decrease from US facilities is attributable to facilities that did not report to TRI in 1995, which offset increases for the year caused by newly reporting facilities. For NPRI, the opposite was true. More facilities reported for 1995 than dropped out, and the net effect was an increase in total releases and transfers from this group of facilities.
- Among Canadian industries, paper products manufacturers accomplished the greatest reduction in total releases and transfers (a decrease of 4 million kg) from 1994 to 1995. The industry ranked third in 1995 for total releases and transfers, down from first for 1994. In TRI, facilities reporting multiple industry codes reported the largest reduction (a decrease of 10 million kg) from 1994 to 1995. Overall though, TRI industries showed very little change in ranking.
- The states and provinces with the largest releases and transfers were the same for 1994 and 1995 for the matched data set: Texas, Ohio and Louisiana, and Ontario, Quebec and Alberta, respectively. For total releases, the top Canadian provinces were the same, but in the United States, Ohio was fourth in both years, behind Alabama.
- Changes to NPRI reporting requirements in 1995, rather than absolute changes in releases and transfers, may be responsible for large increases reported by certain facilities. Chemical by-products generated in concentrations lower than 1 percent were not reportable in 1994, but were in 1995.

5.1 Introduction

PRTR data are collected annually and can be used to show how releases and transfers change from year to year. This chapter examines these changes for both NPRI and TRI and compares them for the two countries. Because some reporting requirements also changed from 1994 to 1995 in both NPRI and TRI, the set of chemicals that represents valid comparisons between these two years, because it excludes ammonia, ammonium nitrate, ammonium sulfate, nitric acid, and nitrate compounds, is smaller than in previous chapters where only the data for 1995 were being analyzed. Also, changes noted from 1994 to 1995 in this report may differ from those presented in Canada's summary report on NPRI and the United States' summary report on TRI, because the industry and chemical sets compared in their respective reports differ from the industry and chemical set used in this combined report.

Specific chemicals whose reporting requirements were altered from 1994 to 1995, as mentioned above, were ammonia, nitric acid and nitrate compounds. For the 1994-to-1995 comparison, these chemicals were omitted from the matched data set, and this is the only difference between the 1995 matched data set used in **Chapters 3** and **4** and the multi-year matched data set employed in this chapter. The industry set (manufacturing facilities only) remains the same as in **Chapters 3** and **4**.

New NPRI reporting requirements that did not add chemicals or change industrial definitions did affect reporting at some of the facilities with larger amounts of releases and transfers. In 1994, if a by-product generated in a

Table 5–1
MY 94-95

NPRI and TRI Releases and Transfers

	NPRI				TRI			
	1994	1995	Change 1994-1995		1994	1995	Change 1994-1995	
	Number	Number	Number	%	Number	Number	Number	%
Facilities	1,281	1,298	17	1.3	19,201	18,743	-458	-2.4
Forms	3,860	4,031	171	4.4	55,631	54,530	-1,101	-2.0
	kg	kg	kg	%	kg	kg	kg	
Releases								
Total Air Emissions	66,862,674	63,201,922	-3,660,752	-5.5	516,669,066	488,271,248	-28,397,818	-5.5
Surface Water Discharges	12,962,199	10,919,996	-2,042,203	-15.8	17,780,437	15,998,217	-1,782,220	-10.0
Underground Injection	872,126	3,236,927	2,364,801	271.2	42,849,332	52,755,525	9,906,193	23.1
On-Site Land Releases	10,390,568	11,573,758	1,183,190	11.4	125,617,755	119,787,099	-5,830,656	-4.6
Matched Releases	**91,252,202**	**89,073,779**	**-2,178,423**	**-2.4**	**702,916,591**	**676,812,089**	**-26,104,502**	**-3.7**
Transfers								
Treatment/Destruction	14,494,719	12,645,014	-1,849,705	-12.8	87,697,089	96,359,775	8,662,686	9.9
Sewage/POTWs	464,174	394,752	-69,422	-15.0	65,010,537	63,276,210	-1,734,327	-2.7
Disposal/Containment	11,808,310	20,486,822	8,678,512	73.5	114,260,621	112,728,232	-1,532,389	-1.3
Matched Transfers	**26,767,203**	**33,526,588**	**6,759,385**	**25.3**	**266,968,248**	**272,364,217**	**5,395,970**	**2.0**
Matched Releases and Transfers	**118,019,405**	**122,600,367**	**4,580,962**	**3.9**	**969,884,839**	**949,176,307**	**-20,708,532**	**-2.1**

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to both NPRI and TRI.

production process was not in the raw materials list, it did not have to be reported if it composed less than one percent of the waste stream. In 1995, the release of the same by-product had to be reported regardless of its concentration in the waste stream, assuming the facility also met other reporting criteria.

5.2 Summary of Changes

For the matched chemical/industry data set, NPRI facilities reported total releases and transfers 4 percent higher in 1995 than in 1994, as shown in **Table 5–1** and **Figure 5–1**. This increase came largely from transfers to disposal/containment, which showed an increase of 9 million kg or 74 percent. The second largest increase—2 million kg—came in underground injection. Overall, these changes were offset by decreases in air emissions of 4 million kg (about 6 percent) and discharges to surface waters of 2 million kg (a 16 percent decrease).

TRI manufacturing facilities reporting the matched chemicals showed an overall decrease of 2 percent (see **Table 5–1**). This came from decreases in air emissions of 28 million kg (approximately 6 percent) and on-site land releases of 6 million kg (a 5 percent decrease). It contrasted with a 2 percent increase in transfers reported by TRI facilities, including a 10 percent increase in transfers to treatment/destruction of 9 million kg. Increases were also reported for one type of release, underground injection, with 10 million kg more in 1995 than in 1994 (a 23 percent increase).

Figure 5–2 illustrates the relative significance of reductions in air emissions in both NPRI and TRI, as transfers have increased—to disposal/containment in NPRI and to treatment/destruction in TRI.

These net changes result both from individual facilities reporting increases and decreases and from facilities reporting in one year but not the other. In a multi-year analysis, facilities' reporting patterns place them in one of five categories. They may:

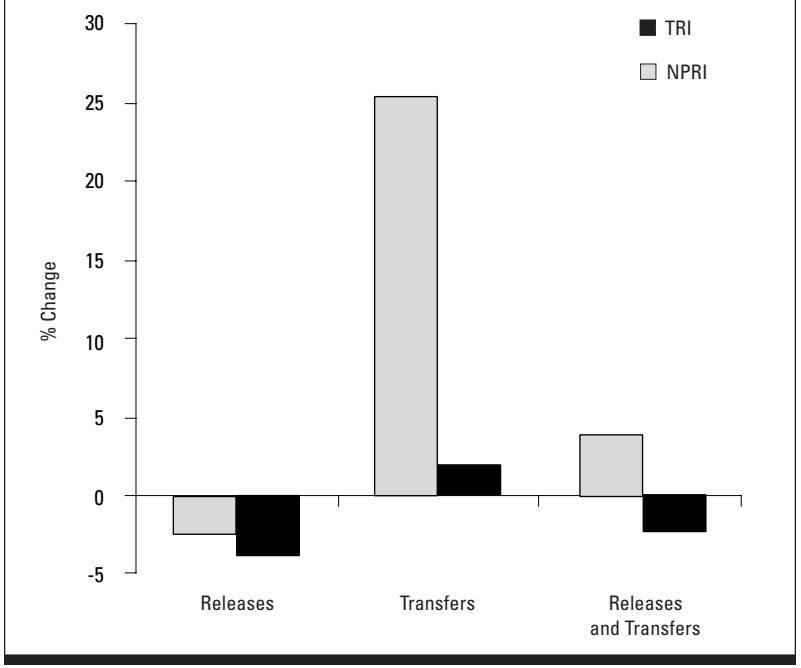
1. report larger amounts over time (sometimes called "increasers"),
2. report smaller amounts over time (sometimes called "decreasers"),
3. begin reporting in later years (these also contribute to overall increases in PRTR reporting),
4. file in earlier years and then stop reporting (these contribute to overall decreases), or
5. show no change over the period.

"Increasers" and newly reporting facilities (1 and 3 above) can be considered together, because both contribute to overall increases. Similarly, "decreasers" and those who stop reporting (2 and 4 above) may be summed for decreasing amounts. Alternatively, amounts submitted by facilities reporting in only one year (3 and 4 above) can be combined to show a net increase or decrease in their overall effect on PRTR quantities over time.

Thus, **Table 5–2** shows that NPRI facilities filing only in 1995 reported 2 million kg more than those that did so only in 1994. This resulted in a net increase of almost 50 percent for facilities reporting in only one year.

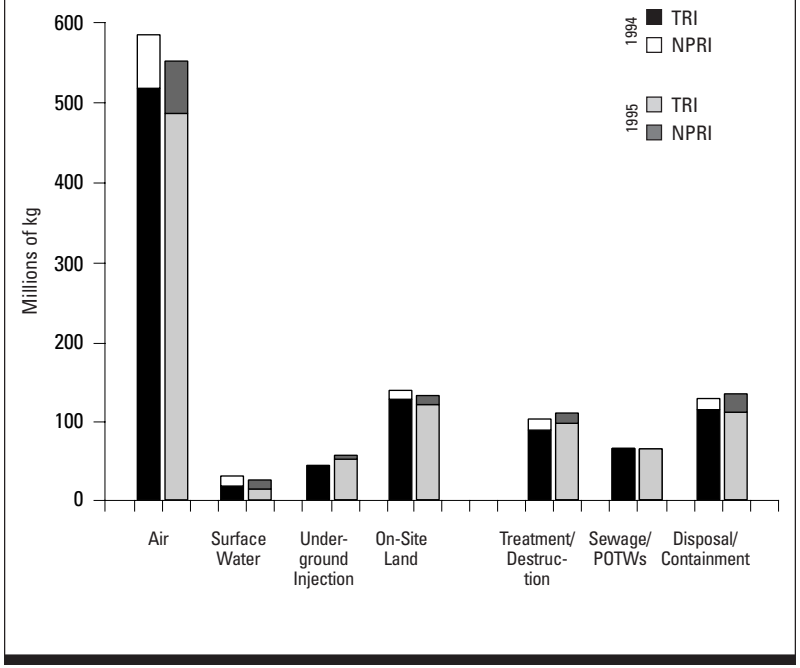
The majority of NPRI facilities reported in both years (1,194 facilities). More of these (499 facilities or 42 percent) reported smaller amounts in 1995 (the so-called "decreasers"), but their reductions were more than offset

Figure 5–1
MY 94-95
Percent Change in Releases and Transfers, NPRI and TRI



➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to both NPRI and TRI.

Figure 5–2
MY 94-95
Releases and Transfers, NPRI and TRI



➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to both NPRI and TRI.

by the total increases reported by the 451 facilities reporting increases ("increasers"). Facilities reporting smaller quantities in 1995 showed a total decrease of 26 million kg, while "increasers" reported nearly 29 million kg more. In the case of the 244 facilities reporting no change in total releases and transfers, overall they represented small totals (about 2 million kg in 1994 and 1995, or less than 2 percent of the NPRI total).

For TRI, facilities that reported only in 1994 submitted forms totaling 20 million kg of releases and transfers. Those filing only in 1995 reported 11 million kg, as shown in **Table 5–3**. Therefore, almost half (44 percent) of TRI's net decrease originated from facilities reporting in one year only.

Almost half of the TRI facilities reporting in both years reported decreases (8,276 out of 17,270 facilities, or 48 percent), and these decreases of 153 million kg were more than the amounts from facilities reporting increases, which totaled 142 million kg. As in the NPRI database, TRI facilities reporting no change from 1994 to 1995 had relatively small release and transfer amounts. There were 2,916 such facilities (17 percent of all those reporting in both years), and their releases and transfers amounted to only 2 million kg, or about 0.2 percent of the total.

Table 5–2
MY 94-95

NPRI Releases and Transfers

	1994					1995				
	Reported	Reported in Both Years				Reported	Reported in Both Years			
	1994 Only	Decrease	Same	Increase	Total	1995 Only	Decrease	Same	Increase	Total
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Facilities	87	499	244	451	1,281	104	499	244	451	1,298
Forms	174	1,736	450	1,500	3,860	254	1,660	448	1,669	4,031
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
Releases										
Total Air Emissions	4,043,857	38,259,318	1,286,867	23,272,632	66,862,674	2,211,648	28,033,317	1,286,867	31,670,090	63,201,922
Surface Water Discharges	462	9,218,552	13,336	3,729,849	12,962,199	109,669	4,867,295	13,322	5,929,710	10,919,996
Underground Injection	0	56,021	0	816,105	872,126	0	48,285	0	3,188,642	3,236,927
On-Site Land Releases	665	6,921,416	762,977	2,705,510	10,390,568	2,451,751	4,645,860	762,977	3,713,170	11,573,758
Matched Releases	**4,054,980**	**54,542,166**	**2,064,834**	**30,590,222**	**91,252,202**	**4,782,879**	**37,653,568**	**2,064,816**	**44,572,516**	**89,073,779**
Transfers										
Treatment/Destruction	518,640	10,999,453	187,714	2,788,912	14,494,719	134,868	4,470,172	187,714	7,852,260	12,645,014
Sewage/POTWs	12,187	369,808	35,554	46,625	464,174	2	241,032	35,549	118,169	394,752
Disposal/Containment	42,416	7,156,088	72,330	4,537,476	11,808,310	2,002,032	4,423,722	72,353	13,988,715	20,486,822
Matched Transfers	**573,243**	**18,525,349**	**295,598**	**7,373,013**	**26,767,203**	**2,136,902**	**9,134,926**	**295,616**	**21,959,144**	**33,526,588**
Matched Releases and Transfers	**4,628,223**	**73,067,515**	**2,360,432**	**37,963,235**	**118,019,405**	**6,919,781**	**46,788,494**	**2,360,432**	**66,531,660**	**122,600,367**

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

Change 1994–1995							
Reported One Year Only		Reported in Both Years				Total	
		Decrease		Increase			
Number	%	Number	%	Number	%	Number	%
17	19.5	0	0.0	0	0.0	17	1.3
80	46.0	-76	-4.4	169	11.3	171	4.4
kg	**%**	**kg**	**%**	**kg**	**%**	**kg**	**%**
-1,832,209	-45.3	-10,226,001	-26.7	8,397,458	36.1	-3,660,752	-5.5
109,207	23,637.9	-4,351,257	-47.2	2,199,861	59.0	-2,042,203	-15.8
0	—	-7,736	-13.8	2,372,537	290.7	2,364,801	271.2
2,451,086	368,584.4	-2,275,556	-32.9	1,007,660	37.2	1,183,190	11.4
727,899	**18.0**	**-16,888,598**	**-31.0**	**13,982,294**	**45.7**	**-2,178,423**	**-2.4**
-383,772	-74.0	-6,529,281	-59.4	5,063,348	181.6	-1,849,705	-12.8
-12,185	-100.0	-128,776	-34.8	71,544	153.4	-69,422	-15.0
1,959,616	4,620.0	-2,732,366	-38.2	9,451,239	208.3	8,678,512	73.5
1,563,659	**272.8**	**-9,390,423**	**-50.7**	**14,586,131**	**197.8**	**6,759,385**	**25.3**
2,291,558	**49.5**	**-26,279,021**	**-36.0**	**28,568,425**	**75.3**	**4,580,962**	**3.9**

Table 5–3
MY 94-95

TRI Releases and Transfers

	1994					1995				
	Reported	Reported in Both Years				Reported	Reported in Both Years			
	1994 Only	Decrease	Same	Increase	Total	1995 Only	Decrease	Same	Increase	Total
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Facilities	1,931	8,276	2,916	6,078	19,201	1,473	8,276	2,916	6,078	18,743
Forms	3,289	28,113	4,565	19,664	55,631	2,436	26,727	4,619	20,748	54,530
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
Releases										
Total Air Emissions	13,340,168	292,293,010	1,233,717	209,802,171	516,669,066	8,547,536	218,197,673	1,234,005	260,292,034	488,271,248
Surface Water Discharges	226,278	9,695,984	8,523	7,849,652	17,780,437	58,997	5,997,253	8,514	9,933,453	15,998,217
Underground Injection	2,224	15,255,714	113	27,591,281	42,849,332	2	12,781,037	113	39,974,372	52,755,525
On-Site Land Releases	254,400	81,408,243	528,268	43,426,844	125,617,755	211,289	61,101,397	526,659	57,947,755	119,787,099
Matched Releases	**13,823,070**	**398,652,951**	**1,770,622**	**288,669,948**	**702,916,591**	**8,817,824**	**298,077,360**	**1,769,292**	**368,147,614**	**676,812,089**
Transfers										
Treatment/Destruction	2,836,084	61,819,518	92,058	22,949,429	87,697,089	888,034	40,572,464	93,282	54,805,995	96,359,775
Sewage/POTWs	815,670	35,859,239	92,807	28,242,821	65,010,537	403,037	27,257,504	92,808	35,522,862	63,276,210
Disposal/Containment	2,913,627	49,234,461	193,724	61,918,810	114,260,621	1,104,741	26,416,483	193,829	85,013,180	112,728,232
Matched Transfers	**6,565,381**	**146,913,218**	**378,589**	**113,111,060**	**266,968,248**	**2,395,811**	**94,246,451**	**379,919**	**175,342,036**	**272,364,217**
Matched Releases and Transfers	**20,388,451**	**545,566,168**	**2,149,210**	**401,781,009**	**969,884,839**	**11,213,635**	**392,323,811**	**2,149,210**	**543,489,650**	**949,176,307**

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Change 1994–1995							
Reported One Year Only		Reported in Both Years					
		Decrease		Increase		Total	
Number	%	Number	%	Number	%	Number	%
-458	-23.7	0	0.0	0	0.0	-458	-2.4
-853	-25.9	-1,386	-4.9	1,084	5.5	-1,101	-2.0
		kg		kg		kg	
-4,792,632	-35.9	-74,095,337	-25.3	50,489,862	24.1	-28,397,818	-5.5
-167,281	-73.9	-3,698,732	-38.1	2,083,801	26.5	-1,782,220	-10.0
-2,222	-99.9	-2,474,677	-16.2	12,383,092	44.9	9,906,193	23.1
-43,111	-16.9	-20,306,846	-24.9	14,520,911	33.4	-5,830,656	-4.6
-5,005,246	**-36.2**	**-100,575,590**	**-25.2**	**79,477,665**	**27.5**	**-26,104,502**	**-3.7**
-1,948,050	-68.7	-21,247,054	-34.4	31,856,565	138.8	8,662,686	9.9
-412,634	-50.6	-8,601,735	-24.0	7,280,040	25.8	-1,734,327	-2.7
-1,808,886	-62.1	-22,817,979	-46.3	23,094,371	37.3	-1,532,389	-1.3
-4,169,570	**-63.5**	**-52,666,767**	**-35.8**	**62,230,976**	**55.0**	**5,395,970**	**2.0**
-9,174,816	**-45.0**	**-153,242,357**	**-28.1**	**141,708,641**	**35.3**	**-20,708,532**	**-2.1**

Table 5–4
MY 1995

North American Projections of Total Releases and Transfers, NPRI and TRI, 1994-1997

	Facilities Reporting Both Years							
	Actual 1994 (kg)	Projected Change for 1995 (kg)	Projections 1994–1995 (%)	Projected Change for 1996* (kg)	Projections 1995–1996 (%)			
NPRI	113,391,182	110,069,144	-2.9	95,407,522	-13.3			
TRI	931,572,081	900,398,260	-3.3	870,647,939	-3.3			
Total	**1,044,963,263**	**1,010,467,404**	**-3.3**	**966,055,461**	**-4.4**			
	Actual 1994 (kg)	Actual 1995 (kg)	Actual Change 1994–1995 (%)	Projections for 1996 (kg)	Projected Change 1995–1996 (%)	Projections for 1997 (kg)	Projected Change 1996–1997 (%)	
NPRI	113,391,182	115,680,586	2.0	103,684,000	-10.4	97,552,524	-5.9	
TRI	931,572,081	920,922,747	-1.1	898,125,883	-2.5	870,691,896	-3.1	
Total	**1,044,963,263**	**1,036,603,333**	**-0.8**	**1,001,809,883**	**-3.4**	**968,244,420**	**-3.4**	

* One facility erroneously projecting 93 million kilograms for 1996 on 1994 TRI form was not included.
➤ For TRI, amounts are Sections 8.1 plus 8.7 on TRI Form R.

5.3 Projections for Releases and Transfers

TRI requires projections for all types of production-related waste. These projections, as well as current year amounts, are listed in a different part of the TRI reporting form (in **Section 8**) than the amounts for releases and transfers (from **Sections 5** and **6** of the TRI form) discussed elsewhere in this report. Therefore, the actual numbers for 1995 will differ somewhat. Both NPRI and TRI require estimates of future years' releases and transfers. NPRI requires projections for both total releases and total transfers, while TRI requires them for all types of production-related waste. To compare these projections, therefore, NPRI releases and transfers are totaled and the two TRI quantities, released/disposed of plus treated off-site, are totaled.

Table 5–4 presents actual reported amounts for total releases and transfers for 1994 and 1995, along with projections made in both 1994 and 1995. The data in the table summarize only facilities that reported in both years.

As **Table 5–4** shows, in 1994 facilities projected larger reductions for 1995 than were achieved. For TRI, the projected decrease was slightly more than 3 percent, while the actual decrease was 1 percent. For NPRI, a decrease of nearly 3 percent was projected, while the actual amounts reported represented an increase of 2 percent. With the exception of the last figure, all these real or projected decreases are slightly less optimistic than were noted (**Tables 5–2** and **5–3**) in the population of all matched industries that filed in one or both years. Some of this increase is due to the change in the requirement for NPRI facilities to report on by-products, present in any concentration, released or sent off-site for disposal.

For 1996 and 1997, facilities in both TRI and NPRI are projecting decreases. NPRI facilities have projected a decrease of 10 percent from 1995 to 1996 and a further decrease of 6 percent from 1996 to 1997. The new projected decrease for 1995 to 1996, though, is smaller than that given on 1994 forms, which was 13 percent. TRI facilities projected smaller decreases of less than 3 percent from 1995 to 1996 and just over 3 percent from 1996 to 1997, figures which are similar to projections on the 1994 forms.

5.4 Changes by Industry

In 1994, the pulp and paper industry ranked first for total NPRI releases and transfers in the 1994–1995 matched data set because of its large releases (see **Table 5–5**). In 1995, however, the primary metals industry ranked first, because an increase of 8 million kg of transfers gave this industry a 30 percent increase in total releases and transfers. In fact, the pulp and paper industry registered the largest absolute decreases in 1995: 3 million kg in releases and 1 million kg in transfers, for a 13 percent decrease in total releases and transfers. (**Chapter 8** further examines developments in the Canadian and US pulp and paper industries.)

The largest percentage decrease among NPRI industries was reported by the measurement/photographic instruments industry: 88 percent. However, this industry submitted very few forms (two in 1994 and only one in 1995).

For TRI, the chemical industry ranked first in both 1994 and 1995 and reported an overall increase of 1 percent.

Table 5–5
MY 94-95

NPRI Releases and Transfers, by Two-Digit US SIC Code

US SIC Code	Industry	1994 Number of Forms	1994 Total Releases (kg)	1994 Total Transfers (kg)	1994 Total Releases and Transfers (kg)	1994 Rank	1995 Number of Forms	1995 Total Releases (kg)	1995 Total Transfers (kg)	1995 Total Releases and Transfers (kg)	1995 Rank
33	Primary Metal Industries	539	16,801,066	9,669,696	26,470,762	2	560	16,513,648	17,779,236	34,292,884	1
28	Chemicals	1,324	19,492,506	6,235,040	25,727,546	3	1,341	21,487,573	8,617,338	30,104,911	2
26	Paper Products	216	28,472,996	3,286,536	31,759,532	1	258	25,745,222	1,979,416	27,724,638	3
37	Transportation Equipment	244	6,851,309	1,470,035	8,321,344	4	293	6,963,607	889,270	7,852,877	4
30	Rubber and Plastics Products	261	6,383,889	1,180,689	7,564,578	5	270	6,196,654	972,096	7,168,750	5
29	Petroleum and Coal Products	375	5,204,831	605,716	5,810,547	6	347	4,599,531	401,117	5,000,648	6
34	Fabricated Metals Products	349	1,848,241	2,707,090	4,555,331	7	358	1,799,057	1,561,255	3,360,312	7
32	Stone/Clay/Glass Products	88	2,078,020	336,039	2,414,059	8	82	999,723	395,179	1,394,902	8
27	Printing and Publishing	44	1,361,546	217,893	1,579,439	9	39	1,119,878	172,753	1,292,631	9
24	Lumber and Wood Products	111	778,488	84,994	863,482	11	135	1,209,182	65,170	1,274,352	10
22	Textile Mill Products	21	557,644	15,276	572,920	13	19	963,400	8,004	971,404	11
35	Industrial Machinery	71	212,612	143,038	355,650	14	69	487,422	129,081	616,503	12
36	Electronic/Electrical Equipment	76	451,469	521,545	973,014	10	75	205,959	365,018	570,977	13
25	Furniture and Fixtures	23	530,200	51,091	581,291	12	30	505,376	7,793	513,169	14
39	Misc. Manufacturing Industries	25	138,076	3,377	141,453	16	76	123,788	129,000	252,788	15
23	Apparel and Other Textile Products	2	0	0	0	20	1	125,000	0	125,000	16
20	Food Products	85	27,224	228,637	255,861	15	74	10,900	47,332	58,232	17
31	Leather Products	4	50,065	10,511	60,576	17	3	17,858	6,030	23,888	18
38	Measurement/Photographic Instruments	2	12,020	0	12,020	18	1	1	1,500	1,501	19
21	Tobacco Products	0	0	0	0	19	0	0	0	0	20
	Total	3,860	91,252,202	26,767,203	118,019,405		4,031	89,073,779	33,526,588	122,600,367	

		Change 1994–1995 Number	Change 1994–1995 kg	Change 1994–1995 kg	Change 1994–1995 kg	Change 1994–1995 Rank	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 Rank
33	Primary Metal Industries	21	-287,418	8,109,540	7,822,122	20	3.9	-1.7	83.9	29.6	14
28	Chemicals	17	1,995,067	2,382,298	4,377,365	19	1.3	10.2	38.2	17.0	13
26	Paper Products	42	-2,727,774	-1,307,120	-4,034,894	1	19.4	-9.6	-39.8	-12.7	9
37	Transportation Equipment	49	112,298	-580,765	-468,467	5	20.1	1.6	-39.5	-5.6	11
30	Rubber and Plastics Products	9	-187,235	-208,593	-395,828	7	3.4	-2.9	-17.7	-5.2	12
29	Petroleum and Coal Products	-28	-605,300	-204,599	-809,899	4	-7.5	-11.6	-33.8	-13.9	8
34	Fabricated Metals Products	9	-49,184	-1,145,835	-1,195,019	2	2.6	-2.7	-42.3	-26.2	6
32	Stone/Clay/Glass Products	-6	-1,078,297	59,140	-1,019,157	3	-6.8	-51.9	17.6	-42.2	4
27	Printing and Publishing	-5	-241,668	-45,140	-286,808	8	-11.4	-17.7	-20.7	-18.2	7
24	Lumber and Wood Products	24	430,694	-19,824	410,870	18	21.6	55.3	-23.3	47.6	15
22	Textile Mill Products	-2	405,756	-7,272	398,484	17	-9.5	72.8	-47.6	69.6	16
35	Industrial Machinery	-2	274,810	-13,957	260,853	16	-2.8	129.3	-9.8	73.3	17
36	Electronic/Electrical Equipment	-1	-245,510	-156,527	-402,037	6	-1.3	-54.4	-30.0	-41.3	5
25	Furniture and Fixtures	7	-24,824	-43,298	-68,122	10	30.4	-4.7	-84.7	-11.7	10
39	Misc. Manufacturing Industries	51	-14,288	125,623	111,335	14	204.0	-10.3	3,720.0	78.7	18
23	Apparel and Other Textile Products	-1	125,000	0	125,000	15	-50.0	—	—	—	—
20	Food Products	-11	-16,324	-181,305	-197,629	9	-12.9	-60.0	-79.3	-77.2	2
31	Leather Products	-1	-32,207	-4,481	-36,688	11	-25.0	-64.3	-42.6	-60.6	3
38	Measurement/Photographic Instruments	-1	-12,019	1,500	-10,519	12	-50.0	-100.0	—	-87.5	1
21	Tobacco Products	0	0	0	0	13	—	—	—	—	—
	Total	**171**	**-2,178,423**	**6,759,385**	**4,580,962**		**4.4**	**-2.4**	**25.3**	**3.9**	

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

Table 5–6
MY 94-95

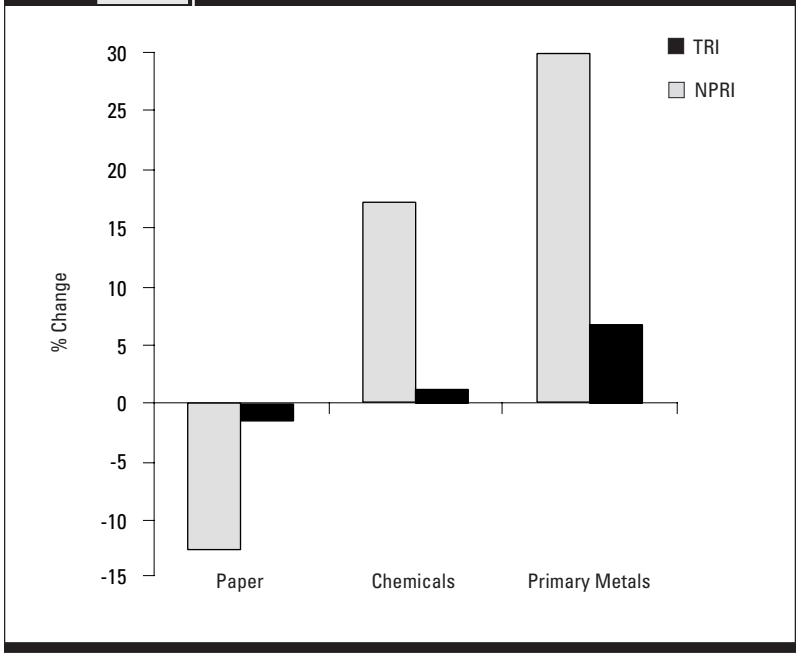
TRI Releases and Transfers, by Two-Digit US SIC Code

US SIC Code	Industry	1994 Number of Forms	1994 Total Releases (kg)	1994 Total Transfers (kg)	1994 Total Releases and Transfers (kg)	1994 Rank	1995 Number of Forms	1995 Total Releases (kg)	1995 Total Transfers (kg)	1995 Total Releases and Transfers (kg)	1995 Rank
28	Chemicals	15,580	207,369,611	97,620,599	304,990,210	1	15,327	206,346,987	101,735,785	308,082,772	1
33	Primary Metal Industries	5,493	120,176,532	80,399,909	200,576,441	2	5,413	128,886,591	85,015,050	213,901,641	2
26	Paper Products	1,621	81,343,733	23,500,702	104,844,435	3	1,604	79,549,534	23,792,193	103,341,727	3
	Multiple Codes 20–39	4,044	58,249,456	14,310,954	72,560,410	4	3,957	48,917,103	13,744,282	62,661,385	4
30	Rubber and Plastics Products	3,146	46,664,659	7,352,230	54,016,889	5	3,037	42,650,773	6,591,439	49,242,212	5
37	Transportation Equipment	3,621	44,889,317	7,260,555	52,149,873	6	3,575	40,504,862	6,222,025	46,726,887	6
34	Fabricated Metals Products	5,993	27,335,105	9,416,790	36,751,895	7	5,859	25,638,927	9,171,396	34,810,323	7
29	Petroleum and Coal Products	2,680	19,144,742	3,627,436	22,772,178	9	2,655	18,121,779	3,841,517	21,963,296	8
25	Furniture and Fixtures	1,494	22,181,486	928,377	23,109,863	8	1,336	17,633,944	438,568	18,072,512	9
36	Electronic/Electrical Equipment	2,206	10,724,005	5,926,161	16,650,166	10	2,170	8,934,118	5,740,951	14,675,070	10
27	Printing and Publishing	398	14,674,159	223,089	14,897,249	11	376	13,676,357	191,093	13,867,449	11
24	Lumber and Wood Products	1,686	14,346,720	290,195	14,636,915	12	1,582	13,181,012	242,332	13,423,344	12
35	Industrial Machinery	2,352	9,153,312	2,395,429	11,548,740	13	2,325	7,580,069	2,483,666	10,063,735	13
32	Stone/Clay/Glass Products	1,224	4,620,775	3,010,708	7,631,483	15	1,285	5,379,595	3,192,812	8,572,407	14
22	Textile Mill Products	544	6,822,708	1,247,059	8,069,767	14	526	6,543,979	1,291,889	7,835,868	15
20	Food Products	2,155	2,597,525	4,895,991	7,493,516	17	2,141	2,290,556	4,733,319	7,023,875	16
38	Measurement/Photographic Instruments	555	5,171,238	2,436,552	7,607,790	16	554	4,953,276	1,867,446	6,820,722	17
39	Misc. Manufacturing Industries	633	5,889,998	1,196,417	7,086,415	18	616	4,797,689	1,234,970	6,032,659	18
31	Leather Products	151	1,045,924	841,500	1,887,424	19	144	738,950	793,504	1,532,454	19
23	Apparel and Other Textile Products	46	454,466	87,591	542,057	20	36	443,241	39,908	483,149	20
21	Tobacco Products	9	61,121	2	61,123	21	12	42,747	72	42,819	21
	Total	**55,631**	**702,916,591**	**266,968,248**	**969,884,839**		**54,530**	**676,812,089**	**272,364,217**	**949,176,307**	

US SIC Code	Industry	Change 1994–1995 Number	Change 1994–1995 kg	Change 1994–1995 kg	Change 1994–1995 kg	Change 1994–1995 Rank	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 Rank
28	Chemicals	-253	-1,022,624	4,115,186	3,092,562	20	-1.6	-0.5	4.2	1.0	19
33	Primary Metal Industries	-80	8,710,059	4,615,141	13,325,200	21	-1.5	7.2	5.7	6.6	20
26	Paper Products	-17	-1,794,199	291,492	-1,502,707	7	-1.0	-2.2	1.2	-1.4	18
	Multiple Codes 20–39	-87	-9,332,353	-566,672	-9,899,025	1	-2.2	-16.0	-4.0	-13.6	5
30	Rubber and Plastics Products	-109	-4,013,886	-760,791	-4,774,677	4	-3.5	-8.6	-10.3	-8.8	11
37	Transportation Equipment	-46	-4,384,456	-1,038,530	-5,422,986	2	-1.3	-9.8	-14.3	-10.4	9
34	Fabricated Metals Products	-134	-1,696,178	-245,394	-1,941,572	6	-2.2	-6.2	-2.6	-5.3	15
29	Petroleum and Coal Products	-25	-1,022,964	214,081	-808,883	12	-0.9	-5.3	5.9	-3.6	16
25	Furniture and Fixtures	-158	-4,547,541	-489,810	-5,037,351	3	-10.6	-20.5	-52.8	-21.8	2
36	Electronic/Electrical Equipment	-36	-1,789,886	-185,210	-1,975,096	5	-1.6	-16.7	-3.1	-11.9	7
27	Printing and Publishing	-22	-997,802	-31,997	-1,029,799	11	-5.5	-6.8	-14.3	-6.9	13
24	Lumber and Wood Products	-104	-1,165,708	-47,863	-1,213,571	9	-6.2	-8.1	-16.5	-8.3	12
35	Industrial Machinery	-27	-1,573,242	88,237	-1,485,005	8	-1.1	-17.2	3.7	-12.9	6
32	Stone/Clay/Glass Products	61	758,820	182,103	940,924	19	5.0	16.4	6.0	12.3	21
22	Textile Mill Products	-18	-278,729	44,830	-233,899	16	-3.3	-4.1	3.6	-2.9	17
20	Food Products	-14	-306,969	-162,672	-469,640	14	-0.6	-11.8	-3.3	-6.3	14
38	Measurement/Photographic Instruments	-1	-217,962	-569,106	-787,068	13	-0.2	-4.2	-23.4	-10.3	10
39	Misc. Manufacturing Industries	-17	-1,092,309	38,552	-1,053,756	10	-2.7	-18.5	3.2	-14.9	4
31	Leather Products	-7	-306,974	-47,996	-354,970	15	-4.6	-29.3	-5.7	-18.8	3
23	Apparel and Other Textile Products	-10	-11,225	-47,683	-58,908	17	-21.7	-2.5	-54.4	-10.9	8
21	Tobacco Products	3	-18,374	70	-18,304	18	33.3	-30.1	3,080.0	-29.9	1
	Total	**-1,101**	**-26,104,502**	**5,395,970**	**-20,708,532**		**-2.0**	**-3.7**	**2.0**	**-2.1**	

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Figure 5–3
MY 94-95
Percent Change in Total Releases and Transfers for Primary Industries, NPRI and TRI



➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI and TRI.

This arose from an additional 4 million kg of transfers, despite a 1 million kg decrease in releases (see **Table 5–6**). Primary metals ranked second in both years and had the largest reported increase, of 13 million kg or 7 percent. The TRI industrial category showing the largest decreases was that reporting "multiple codes"—more than one SIC code—with decreases in releases of 9 million kg. Two other industrial categories (transportation equipment and furniture) reported decreases of more than 5 million kg in total releases and transfers.

Figure 5–3 shows the percent change in total releases and transfers for the three industrial groups (pulp and paper, chemicals and primary metals) that had the greatest releases and transfers in both Canada and the United States. They show similar changes—in both countries, the pulp and paper industry reported decreases and the chemical and primary metals industries reported increases—although greater percentage shifts occurred in Canada in each case.

5.5 Facilities with Large Increases and Decreases

A few facilities accounted for the large increases evidenced in NPRI. Changes in 1995 reporting requirements for NPRI (described in **Chapter 2**) may have affected increases reported by some of facilities. Some increases are not true increases, but are due to companies reporting releases and transfers that were not previously reportable. Examples include Alcan Smelters and Chemicals in Kitimat, British Columbia, and Northwood Pulp and Timber Ltd. in Prince George, British Columbia. Alcan reported releases of hydrogen fluoride and Northwood, releases of methanol, both for the first time in 1995, because of the change in reporting criteria to include by-products. Similarly, two facilities owned by Domtar (in Red Rock and Trenton, Ontario) appear on these tables because of the change in by-products reporting requirements. Domtar's Red Rock methanol emissions were actually lower in 1995 because of the start-up of its secondary effluent treatment system.

(As stated in earlier chapters, it is important to note that any evaluation of the relative health and environmental impacts of these facilities must also take into account the toxicity of the chemicals released, local climatic conditions and the proximity of people and ecologically sensitive areas to the released waste streams.)

The 50 facilities with the largest increases in releases, presented in **Table 5–7**, accounted for 76 percent (14 million of 19 million kg) of the increases that came from facilities reporting in both years and those that reported in 1995 but not in 1994. Data from facilities in the latter category can represent not true increases but simply responses to changes in reporting requirements, as discussed in **Chapter 2**. Two facilities—Celanese Canada Inc. in Edmonton, Alberta, and Domtar Packaging in Red Rock, Ontario—reported increases of more than 1 million kg. At six facilities, emissions of hydrogen fluoride to air amounted to more than 70 percent of the installation's total releases; which helped to make this the chemical with the largest increases in NPRI releases from 1994 to 1995 (see **Table 5–27**, later in this chapter).

The 50 facilities listed in **Table 5–8** accounted for 75 percent (27 million of 35 million kg) of the increases in total releases and transfers that came from facilities reporting in both years or only in 1995. Two of the seven facilities reporting an increase of more than 1 million kg had not reported in 1994: Domtar Packaging in Red Rock, Ontario (surface water discharges of methanol) and Dominion Castings Ltd. in Hamilton, Ontario (transfers to disposal /containment of chromium and its compounds). The Co-Steel Lasco facility in Whitby, Ontario, reported 6 million kg more in total releases and transfers in 1995 than in 1994 (primarily transfers to disposal/containment of zinc compounds), the largest increase reported.

Some facilities may also appear in these tables because of one-time events not related to continuing production. For example, CXY Chemicals in Nanaimo, British Columbia, ranking third for increases in total releases and transfers, reported transfers of asbestos of almost 2,000 tonnes as part of a one-time site remediation program in 1995. Formerly the site of a chlor-alkali plant, CXY's waste settling ponds contained asbestos from diaphragms used to separate anode and cathode compartments in electrochemical cells. Every 200 days, the diaphragms were refurbished, and the asbestos was collected in the settling ponds. In another example, the increase for Titan Steel and Wire in Surrey, British Columbia, was attributed to off-site transfers of wastes containing lead and zinc from a one-time removal of lagoon solids in 1995. In 1995, Co-Steel Lasco's Whitby facility, referred to above, had an additional one-time transfer of electric arc furnace dust that had been stored since the early 1990s. The dust is continually generated, but is now disposed of on an on-going basis. Also, Co-Steel Lasco operates a licensed on-site waste disposal site for shredder fluff, unlike other North American steel producers or scrap processors who transfer their wastes off-site. This landfill accounts for nearly 98 percent of all releases from the facility.

Facilities reporting large reductions in total releases represent a substantial portion—84 percent (18 million of 21 million kg)—of all NPRI decreases (both by facilities reporting smaller amounts in 1995 and those that reported in 1994 but not in 1995). As shown on **Table 5–9**, five of the top 50 reported decreases of more than 1 million kg, led by Western Pulp Limited Partnership of Port Alice, British Columbia. Two of the top five were paper products manufacturers, and three reported in the primary metals industry. These two paper products facilities were among the dozen facilities whose reductions occurred largely in releases of methanol to water or air. (**Chapter 8** more closely examines the pulp and paper industry.) Two of the primary metals facilities reported sizable decreases in zinc and its compounds, the chemical with the largest NPRI decreases (see **Table 5–28** later in this chapter).

Six NPRI facilities reported decreases of more than 1 million kg in total releases and transfers from 1994 to 1995, as shown in **Table 5–10**. The Kimberly-Clark plant in New Glasgow, Nova Scotia, reported the largest decrease, nearly 3 million kg (primarily decreases in transfers to treatment of methanol). Only one of these six facilities submitted forms in 1994 but not in 1995: the HBM&S Co. Smelter in Flin Flon, Manitoba (decreases of air emissions of lead and zinc and their compounds). The 50 facilities with the largest reductions accounted for 76 percent (24 million of 31 million kg) of all decreases reported by facilities reporting in both years plus those reporting only in 1994.

Facilities making large reductions may still have large releases and transfers, as reported in **Chapters 3** and **4**. (Tables in the present chapter analyze the 1994–1995 matched data set, which, as has been noted above,

Table 5–7
MY 94-95

NPRI Facilities Showing the Largest Increases in Total Releases

Rank	Facility	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases 1994 (kg)	Total Releases 1995 (kg)
1	Celanese Canada Inc.	Edmonton, AB	37	28	10	10	1,082,810	3,497,171
2	Domtar Packaging, Red Rock Mill	Red Rock, ON	27	26	0	1	0	1,900,000
3	Sherritt Inc.	Fort Saskatchewan, AB	37	28	12	12	1,417,645	2,129,987
4	Peace River Pulp Division, Daishowa Marubeni	Peace River, AB	27	26	4	4	237,826	948,000
5	General Motors of Canada Limited, Car Plant	Oshawa, ON	32	37	12	12	1,010,482	1,550,042
6	Co-Steel Lasco	Whitby, ON	29	33	5	6	1,873,682	2,411,507
7	Alcan Smelters and Chemicals Ltd.	Kitimat, BC	29	33	2	3	22,000	437,000
8	Consoltex Inc.	Alexandria, ON	19	22	0	4	0	371,043
9	Société Canadienne de Métaux Reynolds	Baie-Comeau, QC	29	33	4	5	3,925	363,461
10	Union Carbide Canada Inc.	Red Deer, AB	37	28	5	5	318,240	653,459
11	Irving Pulp and Paper/Irving Tissue Co.	Saint John, NB	27	26	3	3	3,385,771	3,663,101
12	Recyclage D'Aluminium Quebec Inc., Philip Env'l Inc.	Becancour, QC	29	33	0	1	0	265,000
13	Weyerhaeuser Saskatchewan Ltd.	Prince Albert, SK	27	26	2	3	391,042	631,732
14	Corporation Stone-Consolidated	La Baie, QC	27	26	1	4	0	237,600
15	Malette Kraft Pulp & Power, Tembec Inc.	Smooth Rock Falls, ON	27	26	0	2	0	214,560
16	Canac Kitchens Limited, Kohler Co.	Thornhill, ON	25	24	0	17	0	213,606
17	Cami Automotive Inc.	Ingersoll, ON	32	37	9	12	177,376	389,808
18	Usine Arvida, Alcan	Jonquiere, QC	29	33	4	4	17,900	228,570
19	Tarxien Components Corporation	Concord, ON	16	30	0	5	0	204,772
20	Aluminerie De Becancour Inc.	Ville De Becancour, QC	29	33	2	3	300	204,200
21	Les Aciers Canam	Saint-Gedeon, QC	30	34	0	6	0	200,100
22	Produits Forestiers Donohue Inc.	St-Felicien, QC	27	26	4	7	123,659	307,400
23	Domtar Packaging	Trenton, ON	27	26	0	2	0	183,225
24	Recyclage Cote Nord Inc., Philip Environmental Inc.	Baie Comeau, QC	29	33	0	1	0	175,000
25	General Motors of Canada Limited, Truck Plant	Oshawa, ON	32	37	9	11	701,690	867,901
26	Canadian General-Tower Ltd.	Cambridge, ON	16	30	7	7	795,763	959,979
27	HBM&S Co., Ltd.-Metallurgical Complex	Flin Flon, MB	29	33	5	5	119	156,689
28	Northwood Pulp and Timber Limited	Prince George, BC	27	26	2	3	55,000	210,800
29	St. Thomas Assembly Plant, Ford Motor Co.	St. Thomas, ON	32	37	12	12	487,774	636,280
30	Sherritt Inc.	Redwater, AB	37	28	6	8	95,170	238,448
31	Noranda-Fonderie Horne	Rouyn Noranda, QC	29	33	12	12	514,180	648,045
32	Bauer Industries Ltd.	Waterloo, ON	19	23	2	1	0	125,000
33	Montell Canada Inc.	Corunna, ON	37	28	0	3	0	123,805
34	Sydney Steel Corporation	Sydney, NS	29	33	10	10	411,800	533,500
35	Inco Limited Copper Cliff Smelter	Copper Cliff, ON	29	33	6	6	500,970	621,640
36	Aluminerie Lauralco Inc.	Deschambault, QC	29	33	0	1	0	116,190
37	Canadian Fertilizers Limited	Medicine Hat, AB	37	28	3	3	300,119	400,187
38	Alberta-Pacific Forest Industries Inc.	Boyle, AB	27	26	4	3	25,018	122,830
39	Plastcoat	Mississauga, ON	30	34	2	3	36,800	134,200
40	Dextran Products Limited	Scarborough, ON	37	28	2	3	15,600	105,300
41	North Atlantic Refining Limited	Come by Chance, NF	36	29	12	11	14,232	101,654
42	International Wallcoverings Ltd	Brampton, ON	27	26	4	4	229,500	316,000
43	Aluminerie Alouette Inc.	Sept-Iles, QC	29	33	0	1	0	84,200
44	Novacor Chemicals Ltd.-St. Clair Site	Corunna, ON	37	28	9	9	2,075,780	2,156,690
45	Millar Western Pulp (Meadow Lake) Ltd.	Meadow Lake, SK	27	26	0	1	0	80,000
46	Bowater Mersey Paper Co. Ltd.	Brooklyn, NS	27	26	0	1	0	80,000
47	Sulconam Inc.	Montreal-East, QC	37	28	1	1	130	80,000
48	Canadian Technical Tape	Cornwall, ON	27	26	1	1	8,100	82,100
49	KI Pembroke, Inc.	Pembroke, ON	26	25	1	1	71,600	145,100
50	Novacor Chemicals-Joffre Site	Red Deer, AB	37	28	11	11	169,796	239,930
	Total				**200**	**264**	**16,571,799**	**30,746,812**

* Chemicals accounting for more than 70% of the increase in total releases from the facility.
➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

Rank	Change 1994-1995 in Total Releases (kg)	Major Chemicals Reported with Increases (Primary Media with Increases)*
1	2,414,361	Methanol, methyl ethyl ketone (UIJ)
2	1,900,000	Methanol (water)
3	712,342	Methanol (air)
4	710,174	Methanol (air)
5	539,560	Xylene, toluene (air)
6	537,825	Copper/zinc and compounds (land)
7	415,000	Hydrogen fluoride (air)
8	371,043	Toluene, isopropyl alcohol (air)
9	359,536	Hydrogen fluoride (air)
10	335,219	Ethylene glycol (air)
11	277,330	Methanol (water)
12	265,000	Aluminum (land)
13	240,690	Methanol (air)
14	237,600	Formaldehyde, methanol (water)
15	214,560	Methanol (air)
16	213,606	Toluene, xylene, methyl ethyl ketone, n-butyl alcohol (air)
17	212,432	Xylene, methyl ethyl ketone (air)
18	210,670	Hydrogen fluoride (air)
19	204,772	Methanol, xylene, methyl isobutyl ketone (air)
20	203,900	Hydrogen fluoride (air)
21	200,100	Xylene (air)
22	183,741	Manganese and compounds (land)
23	183,225	Methanol (air)
24	175,000	Aluminum (land)
25	166,211	Xylene, methyl isobutyl ketone (air)
26	164,216	Toluene, methyl ethyl ketone (air)
27	156,570	Copper/zinc and compounds (air)
28	155,800	Methanol (air)
29	148,506	Xylene, methyl isobutyl ketone (air)
30	143,278	Phosphoric acid (land)
31	133,865	Lead and compounds (air)
32	125,000	Phenol (air)
33	123,805	Propylene (air)
34	121,700	Zinc/manganese and compounds (land)
35	120,670	Nickel/copper and compounds (air)
36	116,190	Hydrogen fluoride (air)
37	100,068	Methanol (air)
38	97,812	Methanol (air)
39	97,400	Methyl ethyl ketone, xylene (air)
40	89,700	Isopropyl alcohol (air)
41	87,422	Methyl tert-butyl ether (air)
42	86,500	Methyl ethyl ketone, toluene (air)
43	84,200	Hydrogen fluoride (air)
44	80,910	Cyclohexane, toluene (air)
45	80,000	Methanol (air)
46	80,000	Methanol (air)
47	79,870	Diethanolamine (land)
48	74,000	Toluene (air)
49	73,500	Xylene (air)
50	70,134	Ethylene, propylene (air)
	14,175,013	

covers somewhat fewer chemicals than the 1995 matched data examined in **Chapters 3** and **4**.) One example is the steelmaker, Dofasco Inc. of Hamilton, Ontario, which appears in **Table 5-10** with reductions in its off-site transfers of 765,000 kg (primarily zinc and its compounds). Dofasco notes that, since first reporting to NPRI in 1993, it has spent almost C$20 million (US$14 million) to reduce emissions of benzene to air and discharges of metals and particulates to surface waters. Dofasco, an integrated steel producer, processes iron ore. Its process generates non-essential materials it cannot readily recycle and that are sent to landfills. Dofasco notes that finding environmentally preferable ways to manage these materials would present a more difficult technical and economic challenge.

More TRI facilities reported increases or decreases exceeding 1 million kg than was the case in NPRI. However, as might be expected from TRI's larger number of facilities, the top 50 account for a smaller portion of increases and decreases than in NPRI.

In the category of increases, nine TRI facilities jumped by more than 1-million kg in total releases, as reported in **Table 5–11**, and the increases occurred in diverse chemicals. The largest increase—4 million kg—was reported by General Motors Powertrain in Defiance, Ohio. The top 50 facilities for increases in releases accounted for 42 percent (37 million out of 88 million kg) of all increases by facilities reporting in both years plus those reporting only in 1995. Among all 50, only two facilities reported substantial increases in acetonitrile, the chemical with the largest TRI increases from 1994 to 1995 (see **Table 5–33** later in this chapter).

Table 5–12 shows that 18 TRI facilities reported increases in total releases and transfers from 1994 to 1995 of over 1 million kg. The Quantum Chemical Corp. plant in La Porte, Texas, reported the largest increase, 4 million kg (primarily transfers to treatment of vinyl acetate, a chemical it did not report using in 1994). All facilities with the largest increases did report in both years. The 50 TRI facilities with the largest increases represented 38 percent (59 million out of 153 million kg) of the increases from facilities reporting in both years plus those reporting only in 1995.

Considering decreases in total TRI releases, by far the largest was that of IMC-Agrico in Mulberry, Florida—8 million kg of phosphoric acid, as shown in **Table 5–13**. The facility reported multiple SIC codes. Six other facilities, including three in the primary metals industry, reported reductions of 1 million to 2 million kg. The top 50 facilities with decreases accounted for 30 percent (34 million of 114 million kg) of the decreases of facilities reporting in both years and facilities reporting only in 1994. Twelve of the top 50 reported decreases in toluene, the chemical with the greatest decrease in TRI from 1994 to 1995 (see **Table 5–34** later in this chapter).

Fifteen TRI facilities reported decreases in total releases and transfers of over 1 million kg, as shown in **Table 5–14**. One of these was IMC-Agrico, discussed above. Two of the 15 facilities did not report in 1995: Ocean State Steel in East Providence, Rhode Island (transfers to disposal of manganese), and Autostyle Plastics in Grand Rapids, Michigan (air emissions of toluene). The 50 TRI facilities with the largest reductions represented 29 percent (50 million out of 174 million kg) of the decreases from facilities reporting in both years plus those reporting only in 1994.

Table 5–8
MY 94-95

NPRI Facilities Showing the Largest Increases in Total Releases and Transfers

Rank	Facility	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases and Transfers 1994 (kg)	Total Releases and Transfers 1995 (kg)
1	Co-Steel Lasco	Whitby, ON	29	33	5	6	2,714,982	8,442,331
2	Celanese Canada Inc.	Edmonton, AB	37	28	10	10	1,121,993	3,532,829
3	CXY Chemicals	Nanaimo, BC	37	28	1	2	205	1,988,244
4	Domtar Packaging, Red Rock Mill	Red Rock, ON	27	26	0	1	0	1,900,000
5	Stelco McMaster Lte.	Contrecoeur, QC	29	33	4	5	7,100	1,874,430
6	Dominion Castings Ltd.	Hamilton, ON	29	33	0	3	0	1,487,191
7	Fraser Inc./Noranda Forest Inc.	Edmundston, NB	27	26	4	8	274,920	1,717,860
8	Sherritt Inc.	Fort Saskatchewan, AB	37	28	12	12	1,430,925	2,146,357
9	Peace River Pulp Division, Daishowa Marubeni	Peace River, AB	27	26	4	4	237,826	948,000
10	General Motors of Canada Limited, Car Plant	Oshawa, ON	32	37	12	12	1,017,586	1,565,754
11	Alcan Smelters and Chemicals Ltd.	Kitimat, BC	29	33	2	3	22,000	437,000
12	Titan Steel & Wire Co. Ltd.	Surrey, BC	30	33	3	3	1,280	398,565
13	Consoltex Inc.	Alexandria, ON	19	22	0	4	0	371,043
14	Union Carbide Canada Inc.	Red Deer, AB	37	28	5	5	318,240	653,459
15	Irving Pulp and Paper/Irving Tissue Co.	Saint John, NB	27	26	3	3	3,385,771	3,663,101
16	Corporation Stone-Consolidated	La Baie, QC	27	26	1	4	66,000	337,300
17	Recyclage D'Aluminium Quebec Inc., Philip Env'l Inc.	Becancour, QC	29	33	0	1	0	265,000
18	Weyerhaeuser Saskatchewan Ltd.	Prince Albert, SK	27	26	2	3	391,042	631,732
19	Courtice Steel Inc.	Cambridge, ON	29	33	4	7	122,320	359,767
20	Les Aciers Canam	Saint-Gedeon, QC	30	34	0	6	0	215,700
21	Malette Kraft Pulp & Power, Tembec Inc.	Smooth Rock Falls, ON	27	26	0	2	0	214,560
22	Cami Automotive Inc.	Ingersoll, ON	32	37	9	12	182,054	395,774
23	Canac Kitchens Limited, Kohler Co.	Thornhill, ON	25	24	0	17	0	213,606
24	Usine Arvida, Alcan	Jonquiere, QC	29	33	4	4	17,900	228,570
25	Tarxien Components Corporation	Concord, ON	16	30	0	5	0	204,772
26	Aluminerie De Becancour Inc.	Ville De Becancour, QC	29	33	2	3	9,900	213,500
27	Chemrec Inc.	Cowansville, QC	37	28	7	7	93,992	290,640
28	Société Canadienne de Métaux Reynolds	Baie-Comeau, QC	29	33	4	5	176,936	364,961
29	Kronos Canada, Inc.	Varennes, QC	37	28	6	6	488,023	675,500
30	Les Produits Chimiques Delmar Inc.	Lasalle, QC	37	28	5	5	417,800	603,800
31	Produits Forestiers Donohue Inc.	St-Felicien, QC	27	26	4	7	123,659	307,400
32	Domtar Packaging	Trenton, ON	27	26	0	2	0	183,265
33	Recyclage Cote Nord Inc., Philip Env'l Inc.	Baie Comeau, QC	29	33	0	1	0	175,000
34	General Motors of Canada Limited, Truck Plant	Oshawa, ON	32	37	9	11	706,364	873,308
35	Atlas Specialty Steels	Welland, ON	29	33	5	5	136,840	297,441
36	HBM&S Co., Ltd.-Metallurgical Complex	Flin Flon, MB	29	33	5	5	119	156,689
37	Montell Canada Inc.	Corunna, ON	37	28	0	3	0	155,885
38	St. Thomas Assembly Plant, Ford Motor Co.	St. Thomas, ON	32	37	12	12	501,293	657,177
39	Northwood Pulp and Timber Limited	Prince George, BC	27	26	2	3	55,000	210,800
40	Western Cooperative Fertilizers Ltd.	Calgary, AB	37	28	0	1	0	154,000
41	Sherritt Inc.	Redwater, AB	37	28	6	8	95,170	238,448
42	BASF Canada Inc.	Windsor, ON	37	28	7	8	241,800	376,599
43	Noranda-Fonderie Horne	Rouyn Noranda, QC	29	33	12	12	514,180	648,045
44	Freightliner of Canada Ltd	St. Thomas, ON	32	37	3	4	206,260	334,410
45	Arrow Canada Ltd.	Leamington, ON	16	30	2	7	9,250	137,180
46	Bauer Industries Ltd.	Waterloo, ON	19	23	2	1	0	125,000
47	Sydney Steel Corporation	Sydney, NS	29	33	10	10	411,800	533,500
48	Inco Limited, Copper Cliff Smelter	Copper Cliff, ON	29	33	6	6	500,970	621,640
49	Les Forges de Sorel Inc., Slater Industries	St-Joseph-de-Sorel, QC	30	34	0	3	0	120,503
50	Aluminerie Lauralco Inc.	Deschambault, QC	29	33	0	1	0	116,190
	Total				**194**	**278**	**16,001,500**	**42,763,826**

* Chemicals accounting for more than 70% of the increase in total releases and transfers from the facility.

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

	Change 1994-1995			
Rank	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases)*
1	537,825	5,189,524	5,727,349	Zinc and compounds (transfers to disposal)
2	2,414,361	-3,525	2,410,836	Methanol, methyl ethyl ketone (UIJ)
3	39	1,988,000	1,988,039	Asbestos (transfers to disposal)
4	1,900,000	0	1,900,000	Methanol (water)
5	2,930	1,864,400	1,867,330	Zinc and compounds (transfers to treatment)
6	1,227	1,485,964	1,487,191	Chromium and compounds (transfers to disposal)
7	-101,800	1,544,740	1,442,940	Methanol (transfers to treatment)
8	712,342	3,090	715,432	Methanol (air)
9	710,174	0	710,174	Methanol (air)
10	539,560	8,608	548,168	Xylene, toluene (air)
11	415,000	0	415,000	Hydrogen fluoride (air)
12	-140	397,425	397,285	Zinc and compounds (transfers to disposal)
13	371,043	0	371,043	Toluene, isopropyl alcohol (air)
14	335,219	0	335,219	Ethylene glycol (air)
15	277,330	0	277,330	Methanol (water)
16	237,600	33,700	271,300	Formaldehyde, methanol (water)
17	265,000	0	265,000	Aluminum (land)
18	240,690	0	240,690	Methanol (air)
19	2,177	235,270	237,447	Zinc/lead and compounds (transfers to disposal)
20	200,100	15,600	215,700	Xylene (air)
21	214,560	0	214,560	Methanol (air)
22	212,432	1,288	213,720	Xylene, methyl ethyl ketone (air)
23	213,606	0	213,606	Toluene, xylene, methyl ethyl ketone, n-butyl alcohol (air)
24	210,670	0	210,670	Hydrogen fluoride (air)
25	204,772	0	204,772	Methanol, xylene, methyl isobutyl ketone (air)
26	203,900	-300	203,600	Hydrogen fluoride (air)
27	29,748	166,900	196,648	Toluene, xylene, dichloromethane, methyl ethyl ketone (transfers to treatment)
28	359,536	-171,511	188,025	Hydrogen fluoride (air)
29	-15,523	203,000	187,477	Manganese/chromium and compounds (transfers to disposal)
30	12,900	173,100	186,000	Toluene, isopropyl alcohol (transfers to treatment)
31	183,741	0	183,741	Manganese and compounds (land)
32	183,225	40	183,265	Methanol (air)
33	175,000	0	175,000	Aluminum (land)
34	166,211	733	166,944	Xylene, methyl isobutyl ketone (air)
35	-55,699	216,300	160,601	Chromium/manganese/zinc and compounds (transfers to disposal)
36	156,570	0	156,570	Copper/zinc and compounds (air)
37	123,805	32,080	155,885	Propylene (air)
38	148,506	7,378	155,884	Xylene, methyl isobutyl ketone (air)
39	155,800	0	155,800	Methanol (air)
40	0	154,000	154,000	Asbestos (transfers to disposal)
41	143,278	0	143,278	Phosphoric acid (land)
42	-4,284	139,083	134,799	Methyl ethyl ketone (transfers to treatment)
43	133,865	0	133,865	Lead and compounds (air)
44	60,460	67,690	128,150	Toluene (air, transfers to treatment)
45	36,740	91,190	127,930	Toluene, 2-methoxyethanol (transfers to treatment)
46	125,000	0	125,000	Phenol (air)
47	121,700	0	121,700	Zinc/manganese and compounds (land)
48	120,670	0	120,670	Nickel/copper and compounds (air)
49	703	119,800	120,503	Manganese/chromium and compounds (transfers to disposal, transfers to treatment)
50	116,190	0	119,190	Hydrogen fluoride (air)
	12,798,759	**13,963,567**	**26,765,326**	

Table 5–9
MY 94-95

NPRI Facilities Showing the Largest Decreases in Total Releases

Rank	Facility	City, State/Province	SIC Code		Number of Forms		Total Releases	
			Canada	US	1994	1995	1994 (kg)	1995 (kg)
1	Western Pulp Limited Partnership	Port Alice, BC	27	26	3	3	1,717,618	1,600
2	Sidbec Dosco (ISPAT) Inc.	Contrecoeur, QC	29	33	5	5	2,921,732	1,510,387
3	HBM&S Co., Ltd.-Smelter	Flin Flon, MB	29	33	5	0	1,356,367	0
4	Cartons St-Laurent Inc.	LaTuque, QC	27	26	3	4	3,561,268	2,407,638
5	Essex Aluminum Plant, Ford Motor Co.	Windsor, ON	29	33	10	9	1,113,551	53,620
6	Stora Forest Industries Ltd.	Port Hawkesbury, NS	27	26	3	4	1,091,475	187,328
7	Rexham Metallizing, Camvac Div.	Brantford, ON	27	26	5	0	814,000	0
8	Methanex Corporation	Medicine Hat, AB	37	28	4	5	4,132,490	3,353,220
9	3M Canada Inc.	Perth, ON	35	32	6	6	839,758	220,460
10	St. Anne-Nackawic Pulp Company Ltd.	Nackawic, NB	27	26	3	7	1,114,620	561,727
11	Windsor Assembly Plant, Chrysler Canada Ltd.	Windsor, ON	32	37	10	11	1,018,128	501,398
12	3M Canada Inc.	London, ON	35	32	8	8	725,384	317,282
13	Emballages Stone (Canada) Inc.	New Richmond, QC	27	26	1	0	350,000	0
14	Novacor Chemicals	Sarnia, ON	37	28	6	7	413,100	64,390
15	PaintPlas (1989) Inc.	Ajax, ON	32	30	6	0	331,830	0
16	West Hill Plant, Witco Corporation	Scarborough, ON	36	29	2	2	779,000	469,500
17	Les Papiers Perkins Ltee	Candiac, QC	27	26	2	2	1,152,050	842,660
18	Stelco Lake Erie Works	Nanticoke, ON	29	33	16	18	888,601	589,530
19	Papiers Domtar, Centre d'affaires Windsor	Windsor, QC	27	26	4	4	381,000	132,100
20	Bayer Rubber Inc.	Sarnia, ON	37	28	14	14	2,202,133	1,959,921
21	James River-Marathon, Ltd.	Marathon, ON	27	26	2	2	2,393,800	2,168,600
22	Polytech Coatings Limited	Mississauga, ON	30	34	4	0	224,488	0
23	Fonderies Canadiennes d'Acier, Atchison Casting	Montreal, QC	31	35	3	3	499,520	295,200
24	OSF Inc.	North York, ON	26	25	5	0	190,637	0
25	Pebra, Inc.	Peterborough, ON	16	30	3	4	376,825	186,999
26	Crane Valves	Brantford, ON	30	34	3	3	182,000	1,700
27	Oakville Assembly Plant, Ford Motor Co.	Oakville, ON	32	37	10	11	646,965	476,449
28	Osram Sylvania Lte	Drummondville, QC	33	36	2	0	162,860	0
29	Algoma Steel Inc.	Sault Ste. Marie, ON	29	33	15	16	1,750,732	1,598,056
30	Ethyl Canada Inc.	Corunna, ON	37	28	8	8	145,482	235
31	Navistar International Corporation Canada	Chatham, ON	32	37	5	5	193,118	63,950
32	AltaSteel Ltd.	Edmonton, AB	29	33	7	6	753,228	626,833
33	Quebecor Printing PE&E	Etobicoke, ON	28	27	3	3	448,507	330,444
34	Shell Canada Chemical Company	Corunna, ON	37	28	7	3	295,219	177,380
35	Domtar Fine Papers	Cornwall, ON	27	26	3	4	691,000	573,950
36	Industries James Maclaren Inc.	Masson-Anger, QC	27	26	1	1	192,780	80,507
37	Canadian Technical Tape	St-Laurent, QC	27	26	2	2	492,000	382,300
38	Cooper Automotive Products	Stratford, ON	32	37	1	1	106,287	447
39	Fraser Inc.	Edmundston, NB	27	26	4	8	274,920	173,120
40	Novopharm Limited	Scarborough, ON	37	28	2	2	581,230	479,720
41	Stelco Hilton Works	Hamilton, ON	29	33	16	20	346,886	247,745
42	Fasson Canada Inc.	Ajax, ON	27	26	1	1	148,500	49,400
43	AT Plastics Inc.	Edmonton, AB	37	28	4	4	248,865	149,778
44	Prince George Refinery	Prince George, BC	36	29	9	9	232,350	137,690
45	Standard Products (Canada) Ltd.	Mitchell, ON	15	30	6	5	199,903	105,984
46	Honda of Canada Inc.	Alliston, ON	32	37	10	10	334,041	240,623
47	Imperial Oil Chemical Division	Sarnia, ON	37	28	21	23	573,505	480,888
48	Celgar Pulp Company	Castlegar, BC	27	26	3	0	91,507	0
49	Foamex Canada Inc.	Montreal, QC	16	30	2	0	88,393	0
50	Fletcher Challenge Canada Ltd., Elk Falls Mill	Campbell River, BC	27	26	3	2	622,750	534,600
	Total				**281**	**265**	**40,392,403**	**22,735,359**

* Chemicals accounting for more than 70% of the decrease in total releases from the facility.

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

Rank	Change 1994–1995 in Total Releases (kg)	Major Chemicals Reported with Decreases (Primary Media with Decreases)*
1	-1,716,018	Methanol (water)
2	-1,411,345	Zinc and compounds (land)
3	-1,356,367	Lead/zinc and compounds (air)
4	-1,153,630	Methanol (water)
5	-1,059,931	Styrene (air)
6	-904,147	Methanol (water)
7	-814,000	Isopropyl alcohol, methyl ethyl ketone (air)
8	-779,270	Methanol (air)
9	-619,298	Xylene, toluene (air)
10	-552,893	Chlorine, chlorine dioxide (air)
11	-516,730	Xylene, methyl ethyl ketone (air)
12	-408,102	Toluene, xylene, isopropyl alcohol (air)
13	-350,000	Methanol (air)
14	-348,710	Benzene, ethylbenzene (air)
15	-331,830	Xylene, toluene (air)
16	-309,500	Methanol (air)
17	-309,390	Xylene (air)
18	-299,071	Manganese and compounds (land)
19	-248,900	Chlorine, chlorine dioxide (air)
20	-242,212	Chloromethane (air)
21	-225,200	Methanol (water)
22	-224,488	Xylene, methyl ethyl ketone (air)
23	-204,320	Chromium and compounds (land)
24	-190,637	Toluene, methyl ethyl ketone (air)
25	-189,826	Toluene (air)
26	-180,300	Zinc/copper and compounds (air)
27	-170,516	Methyl isobutyl ketone (air)
28	-162,860	Xylene (air)
29	-152,676	Benzene, manganese and compounds (air, land)
30	-145,247	Chloroethane (air)
31	-129,168	Toluene (air)
32	-126,395	Manganese/zinc and compounds (land)
33	-118,063	Toluene (air)
34	-117,839	Propylene (air)
35	-117,050	Methanol (water)
36	-112,273	Methanol (water)
37	-109,700	Toluene (air)
38	-105,840	Asbestos (land)
39	-101,800	Methanol (land)
40	-101,510	Dichloromethane (air)
41	-99,141	Benzene (air)
42	-99,100	Toluene (air)
43	-99,087	Ethylene (air)
44	-94,660	Toluene, ethylene, propylene, xylene (air)
45	-93,919	Trichloroethylene (air)
46	-93,418	Xylene (air)
47	-92,617	Ethylene, xylene (air)
48	-91,507	Methanol (air)
49	-88,393	Dichloromethane (air)
50	-88,150	Methanol (air)
	-17,657,044	

Table 5–10
MY 94-95

NPRI Facilities Showing the Largest Decreases in Total Releases and Transfers

Rank	Facility	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases and Transfers 1994 (kg)	Total Releases and Transfers 1995 (kg)
1	Kimberly-Clark Nova Scotia	New Glasgow, NS	27	26	3	3	3,059,910	399,750
2	Western Pulp Limited Partnership	Port Alice, BC	27	26	3	3	1,717,618	1,600
3	Sidbec Dosco (ISPAT) Inc.	Contrecoeur, QC	29	33	5	5	2,921,732	1,510,387
4	HBM&S Co., Ltd.-Smelter	Flin Flon, MB	29	33	5	0	1,356,367	0
5	Essex Aluminum Plant, Ford Motor Co.	Windsor, ON	29	33	10	9	1,370,671	141,985
6	Cartons St-Laurent Inc.	LaTuque, QC	27	26	3	4	3,565,113	2,408,582
7	Stora Forest Industries Ltd.	Port Hawkesbury, NS	27	26	3	4	1,091,475	187,328
8	Rexham Metallizing, Camvac Div.	Brantford, ON	27	26	5	0	814,000	0
9	Slater Steels, H.S.B. Division	Hamilton, ON	29	33	6	6	2,258,377	1,455,999
10	Methanex Corporation	Medicine Hat, AB	37	28	4	5	4,156,340	3,385,200
11	Dofasco Inc.	Hamilton, ON	29	33	18	17	3,273,372	2,507,984
12	General Motors of Canada Ltd., South Stamping	Oshawa, ON	32	34	1	2	653,121	0
13	3M Canada Inc.	Perth, ON	35	32	6	6	840,033	220,841
14	St. Anne-Nackawic Pulp Company Ltd.	Nackawic, NB	27	26	3	7	1,114,620	561,727
15	Windsor Assembly Plant, Chrysler Canada Ltd.	Windsor, ON	32	37	10	11	1,028,626	510,186
16	3M Canada Inc.	London, ON	35	32	8	8	811,605	380,407
17	Baycoat	Hamilton, ON	30	34	8	0	400,448	0
18	Les Papiers Perkins Ltee	Candiac, QC	27	26	2	2	1,209,625	842,660
19	Emballages Stone (Canada) Inc.	New Richmond, QC	27	26	1	0	350,000	0
20	Bombardier Inc Groupe Materiel de Transport	La Pocatiere, QC	32	37	4	4	348,250	0
21	PaintPlas (1989) Inc.	Ajax, ON	32	30	6	0	344,030	0
22	Sunworthy Wallcoverings, Borden Co.	Brampton, ON	27	26	5	5	1,039,800	708,500
23	Novacor Chemicals	Sarnia, ON	37	28	6	7	464,037	145,922
24	West Hill Plant, Witco Corporation	Scarborough, ON	36	29	2	2	793,000	491,500
25	Stelco Lake Erie Works	Nanticoke, ON	29	33	16	18	888,601	589,530
26	Papiers Domtar, Centre d'affaires Windsor	Windsor, QC	27	26	4	4	381,000	132,100
27	Raylo Chemicals Inc.	Edmonton, AB	37	28	4	5	236,384	14
28	James River-Marathon, Ltd.	Marathon, ON	27	26	2	2	2,394,450	2,169,210
29	Polytech Coatings Limited	Mississauga, ON	30	34	4	0	224,488	0
30	Fonderies Canadiennes d'Acier, Atchison Casting	Montreal, QC	31	35	3	3	500,520	295,410
31	OSF Inc.	North York, ON	26	25	5	0	197,462	0
32	Ethyl Canada Inc.	Corunna, ON	37	28	8	8	195,082	485
33	Pebra, Inc.	Peterborough, ON	16	30	3	4	376,825	188,199
34	Crane Valves	Brantford, ON	30	34	3	3	182,000	1,700
35	Oakville Assembly Plant, Ford Motor Co.	Oakville, ON	32	37	10	11	656,675	485,699
36	Osram Sylvania Lte	Drummondville, QC	33	36	2	0	165,680	0
37	Monsanto Canada Inc.	Ville Lasalle, QC	16	30	8	8	524,025	363,206
38	CEZinc (Zinc Electrolytique du Canada Lte)	Salaberry-de-Valleyfield, QC	29	33	8	8	345,733	185,561
39	Les Produits Shell Canada Ltee.	Montreal-Est, QC	36	29	23	21	540,846	384,920
40	Algoma Steel Inc.	Sault Ste. Marie, ON	29	33	15	16	1,750,732	1,598,056
41	Rohm and Haas Canada Inc.	Morrisburg, ON	37	28	1	1	153,600	3,440
42	Bayer Rubber Inc.	Sarnia, ON	37	28	14	14	2,485,833	2,341,271
43	Shell Canada Chemical Company	Corunna, ON	37	28	7	3	313,633	177,380
44	Uniboard Canada, Div. Unires	Val-D'or, QC	37	28	2	2	188,772	55,092
45	Navistar International Corporation Canada	Chatham, ON	32	37	5	5	193,200	64,018
46	Ontario Truck, Ford Motor Co.	Oakville, ON	32	37	6	9	708,850	582,836
47	Imperial Oil Chemical Division	Sarnia, ON	37	28	21	23	680,505	555,729
48	Quebecor Printing PE&E	Etobicoke, ON	28	27	3	3	456,632	332,890
49	Apex Metals Inc.	Kitchener, ON	32	34	3	3	255,000	136,000
50	Domtar Fine Papers	Cornwall, ON	27	26	3	4	691,000	574,150
	Total				**310**	**288**	**50,669,698**	**27,077,454**

* Chemicals accounting for more than 70% of the decrease in total releases and transfers from the facility.

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

	Change 1994–1995			
Rank	Total Releases (kg)	Total Transfers (kg)	Total Releases and transfers (kg)	Major Chemicals Reported with Decreases (Primary Media/transfers with Decreases)*
1	6,840	-2,667,000	-2,660,160	Methanol (transfers to treatment)
2	-1,716,018	0	-1,716,018	Methanol (water)
3	-1,411,345	0	-1,411,345	Zinc and compounds (land)
4	-1,356,367	0	-1,356,367	Lead/zinc and compounds (air)
5	-1,059,931	-168,755	-1,228,686	Styrene (air)
6	-1,153,630	-2,901	-1,156,531	Methanol (water)
7	-904,147	0	-904,147	Methanol (water)
8	-814,000	0	-814,000	Isopropyl alcohol, methyl ethyl ketone (air)
9	-509	-801,869	-802,378	Manganese and compounds (transfers to treatment)
10	-779,270	8,130	-771,140	Methanol (air)
11	-28,532	-736,856	-765,388	Zinc and compounds (transfers to disposal)
12	0	-653,121	-653,121	Zinc and compounds (transfers to disposal)
13	-619,298	106	-619,192	Xylene, toluene (air)
14	-552,893	0	-552,893	Chlorine, chlorine dioxide (air)
15	-516,730	-1,710	-518,440	Xylene, methyl ethyl ketone (air)
16	-408,102	-23,096	-431,198	Toluene, xylene, isopropyl alcohol (air)
17	-110	-400,338	-400,448	Methyl ethyl ketone, toluene, xylene (transfers to treatment)
18	-309,390	-57,575	-366,965	Xylene (air)
19	-350,000	0	-350,000	Methanol (air)
20	0	-348,250	-348,250	Chromium/nickel and compounds (transfers to disposal)
21	-331,830	-12,200	-344,030	Xylene, toluene (air)
22	-50,900	-280,400	-331,300	Toluene, methyl ethyl ketone (transfers to treatment)
23	-348,710	30,595	-318,115	Benzene, ethylbenzene (air)
24	-309,500	8,000	-301,500	Methanol (air)
25	-299,071	0	-299,071	Manganese and compounds (land)
26	-248,900	0	-248,900	Chlorine, chlorine dioxide (air)
27	1	-236,371	-236,370	Dichloromethane, methanol (transfers to treatment)
28	-225,200	-40	-225,240	Methanol (water)
29	-224,488	0	-224,488	Xylene, methyl ethyl ketone (air)
30	-204,320	-790	-205,110	Chromium and compounds (land)
31	-190,637	-6,825	-197,462	Toluene, methyl ethyl ketone (air)
32	-145,247	-49,350	-194,597	Chloroethane, lead and compounds (air, transfers to disposal)
33	-189,826	1,200	-188,626	Toluene (air)
34	-180,300	0	-180,300	Zinc/copper and compounds (air)
35	-170,516	-460	-170,976	Methyl isobutyl ketone (air)
36	-162,860	-2,820	-165,680	Xylene (air)
37	-43,885	-116,934	-160,819	Methanol (transfers to treatment)
38	-13,372	-146,800	-160,172	Selenium/zinc and compounds (transfers to disposal, air)
39	-3,267	-152,659	-155,926	Phenol (transfers to treatment)
40	-152,676	0	-152,676	Benzene, manganese and compounds (air, land)
41	-10,460	-139,700	-150,160	Methyl methacrylate (transfers to treatment)
42	-242,212	97,650	-144,562	Chloromethane (air)
43	-117,839	-18,414	-136,253	Propylene (air)
44	20	-133,700	-133,680	Formaldehyde, methanol (transfers to treatment)
45	-129,168	-14	-129,182	Toluene (air)
46	50,556	-176,570	-126,014	Toluene (transfers to treatment)
47	-92,617	-32,159	-124,776	Phosphoric acid, ethylene, xylene (transfers to disposal, air)
48	-118,063	-5,679	-123,742	Toluene (air)
49	0	-119,000	-119,000	Manganese and compounds (transfers to treatment)
50	-117,050	200	-116,850	Methanol (water)
	-16,245,769	**-7,346,475**	**-23,592,244**	

Table 5–11
MY 94-95

TRI Facilities Showing the Largest Increases in Total Releases

Rank	Facility	City, State	SIC Code	Number of Forms 1994	Number of Forms 1995	Total Releases 1994 (kg)	Total Releases 1995 (kg)
1	General Motors Powertrain	Defiance, OH	33	15	16	2,520,172	6,556,411
2	Magnesium Corp. of America	Rowley, UT	33	5	5	22,755,669	26,384,163
3	Hoechst Celanese Chemical	Pasadena, TX	28	31	20	3,343,442	6,171,388
4	U.S. Steel	Gary, IN	33	22	28	1,069,632	3,407,240
5	Arcadian Fertilizer L.P.	Geismar, LA	28	9	7	5,004,855	6,664,875
6	USS Fairfield Works	Fairfield, AL	33	8	8	200,965	1,822,918
7	DuPont	Beaumont, TX	28	25	21	1,980,810	3,467,997
8	Cyprus Miami Mining Corp.	Claypool, AZ	33	4	4	3,472,018	4,873,576
9	Huntsman Petrochemical Corp.	Port Arthur, TX	28	22	23	330,355	1,514,731
10	Weyerhaeuser Co.	Longview, WA	Mult.	13	14	1,436,025	2,409,963
11	Weyerhaeuser Co.	Valliant, OK	26	3	4	300,478	1,187,826
12	Lenzing Fibers Corp.	Lowland, TN	28	5	5	9,708,100	10,526,240
13	ICI Acrylics Inc.	Memphis, TN	Mult.	6	6	330,613	1,141,701
14	Reynolds Metals Co.	Sheffield, AL	34	12	12	563,709	1,285,787
15	Georgia-Pacific Corp.	Monticello, MS	Mult.	7	9	599,220	1,298,096
16	International Paper	Gardiner, OR	26	4	3	58,523	677,657
17	Glenbrook Nickel Co.	Riddle, OR	33	1	1	6,098	547,714
18	Northwestern Steel & Wire Co.	Sterling, IL	33	6	6	6,682,426	7,143,484
19	James River Corp.	Pennington, AL	26	11	11	261,483	721,982
20	Quebecor Printing Inc.	Dickson, TN	27	4	4	677,116	1,120,338
21	Upjohn Mfg. Co.	Arecibo, PR	28	7	7	439,909	866,984
22	General Electric Chemicals Inc.	Ottawa, IL	28	10	11	81,819	504,701
23	Sterling Chemicals Inc.	Texas City, TX	28	32	34	2,114,341	2,526,015
24	Champion International Corp.	Courtland, AL	26	13	11	432,442	814,536
25	Westinghouse Electric Corp.	Hampton, SC	30	10	10	1,957,951	2,329,429
26	Louisiana Pigment Co. L.P.	Westlake, LA	28	5	5	764,615	1,130,720
27	Phelps Dodge Hidalgo Inc.	Playas, NM	33	2	1	4,176,302	4,542,226
28	OXY Petrochemicals Inc.	Corpus Christi, TX	28	15	15	47,830	413,676
29	International Paper	Mansfield, LA	26	4	7	1,056,429	1,400,789
30	American Steel Foundries	Granite City, IL	33	3	5	195,011	528,954
31	Stone Container Corp.	Panama City, FL	26	6	7	417,988	751,395
32	Air Products & Chemicals Inc.	Pace, FL	28	8	7	112,633	443,270
33	Elf Atochem N.A. Inc.	Axis, AL	28	7	9	81,403	409,026
34	Geneva Steel	Vineyard, UT	33	20	20	80,936	408,537
35	Venture Industries Grand Blanc	Grand Blanc, MI	37	0	7	0	324,467
36	Federal Paper Board Co. Inc.	Riegelwood, NC	26	10	11	1,109,982	1,426,898
37	Citgo Petroleum Corp.	Lake Charles, LA	Mult.	27	27	736,683	1,026,187
38	Toyota Motor Mfg. USA Inc.	Georgetown, KY	37	21	25	459,320	736,553
39	CMI-Cast Parts Inc.	Cadillac, MI	33	1	2	2,055	270,340
40	Courtaulds Fibers Inc.	Axis, AL	28	5	4	15,163,605	15,426,621
41	Georgia-Pacific Corp.	Woodland, ME	26	1	2	14,739	268,528
42	Chevron Chemical Co.	Port Arthur, TX	28	0	15	0	252,655
43	Lion Oil Co.	El Dorado, AR	28	15	21	231,877	484,255
44	Cedarapids Inc.	Cedar Rapids, IA	35	7	7	44,540	296,129
45	Sid Richardson Carbon Co.	Big Spring, TX	28	0	1	0	244,161
46	Clark Refining & Marketing	Port Arthur, TX	29	0	25	0	237,331
47	Pharmacia & Upjohn Co.	Portage, MI	28	25	25	3,072,824	3,305,456
48	Chevron Products Co.	Pascagoula, MS	Mult.	27	26	527,122	758,660
49	Griffin Wheel Co.	Kansas City, KS	33	1	2	43,978	275,404
50	Clinton Laboratories	Clinton, IN	28	12	12	193,333	422,211
	Total			**481**	**568**	**94,861,374**	**131,750,203**

* Chemicals accounting for more than 70% of increase in total releases from the facility.

➤ Does not include ammonia, ammonium nitrate, amonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Rank	Change 1994–1995 in Total Releases (kg)	Major Chemicals Reported with Increases (Primary Media with Increases)*
1	4,036,239	Zinc and compounds (land)
2	3,628,494	Chlorine (air)
3	2,827,946	Ethylene glycol (UIJ)
4	2,337,608	Zinc/manganese and compounds (land)
5	1,660,020	Phosphoric acid (water)
6	1,621,953	Zinc and compounds (land)
7	1,487,188	Acetonitrile (UIJ)
8	1,401,558	Copper and compounds (land)
9	1,184,376	Propylene, benzene (air)
10	973,938	Methanol (air)
11	887,348	Methanol (air)
12	818,141	Carbon disulfide (air)
13	811,088	Methanol (air)
14	722,078	Methyl ethyl ketone, toluene (air)
15	698,876	Methanol (air)
16	619,134	Methanol (air)
17	541,616	Nickel and compounds (land)
18	461,058	Manganese/chromium and compounds (land)
19	460,500	Methanol (air)
20	443,222	Toluene (air)
21	427,075	Dichloromethane (air)
22	422,883	Styrene (air)
23	411,673	Acetonitrile (UIJ)
24	382,093	Methanol (air)
25	371,478	Phenol (air)
26	366,106	Manganese and compounds (land)
27	365,924	Copper and compounds (land)
28	365,846	Propylene (air)
29	344,360	Methanol (air)
30	333,942	Aluminum (land)
31	333,407	Methanol (air)
32	330,637	Methanol (air)
33	327,623	Methyl methacrylate, ethyl acrylate (air)
34	327,601	Manganese and compounds
35	324,467	Xylene, methyl ethyl ketone (air)
36	316,916	Methanol (air)
37	289,504	Methyl ethyl ketone, toluene (air)
38	277,234	Xylene, methyl isobutyl ketone, toluene, 1,2,4-trimethylbenzene (air)
39	268,285	Aluminum oxide (land)
40	263,016	Carbon disulfide (air)
41	253,789	Methanol (air)
42	252,655	Ethylene, propylene, benzene (air)
43	252,378	Toluene, xylene, ethylene, benzene, diethanolamine, propylene (air)
44	251,590	Xylene (air)
45	244,161	Carbon disulfide (air)
46	237,331	Methyl tert-butyl ether, styrene, cyclohexane, toluene, propylene (air)
47	232,632	Methanol (UIJ)
48	231,538	p-Xylene (air)
49	231,426	Manganese and compounds (air)
50	228,878	Dichloromethane, zinc and compounds (air, land)
	36,888,829	

Table 5–12
MY 94-95

TRI Facilities Showing the Largest Increases in Total Releases and Transfers

Rank	Facility	City, State	SIC Code	Number of Forms 1994	Number of Forms 1995	Total Releases and Transfers 1994 (kg)	Total Releases and Transfers 1995 (kg)
1	Quantum Chemical Corp.	La Porte, TX	28	21	22	1,061,093	5,148,907
2	General Motors Powertrain	Defiance, OH	33	15	16	2,521,440	6,558,455
3	Hoechst Celanese Chemical	Pasadena, TX	28	31	20	3,465,986	7,492,889
4	Nucor Steel	Crawfordsville, IN	33	7	7	1,328,123	5,214,733
5	Magnesium Corp. of America	Rowley, UT	33	5	5	22,755,669	26,384,163
6	Georgia-Pacific Resins Inc.	Elk Grove, CA	28	11	9	86,278	2,789,215
7	U.S. Steel	Gary, IN	33	22	28	1,151,932	3,457,326
8	Oregon Steel Mills Inc.	Portland, OR	Multiple	7	7	10,956	1,784,535
9	USS Fairfield Works	Fairfield, AL	33	8	8	200,965	1,822,918
10	Arcadian Fertilizer L.P.	Geismar, LA	28	9	7	5,066,533	6,681,240
11	ASARCO Inc.	Hayden, AZ	33	8	8	8,708,865	10,259,961
12	Cyprus Miami Mining Corp.	Claypool, AZ	33	4	4	3,472,018	4,873,576
13	Newport Steel Corp.	Wilder, KY	33	8	8	4,228	1,389,210
14	Stone Container Corp.	Panama City, FL	26	6	7	1,859,957	3,154,570
15	Electralloy Corp.	Oil City, PA	33	4	4	87,902	1,336,939
16	Ciba Geigy Corp.	Mc Intosh, AL	28	30	31	575,931	1,783,733
17	Huntsman Petrochemical Corp.	Port Arthur, TX	28	22	23	450,952	1,650,409
18	USS Clairton Works	Clairton, PA	33	14	17	100,789	1,103,418
19	Weyerhaeuser Co.	Longview, WA	Multiple	13	14	1,443,771	2,414,983
20	Weyerhaeuser Co.	Valliant, OK	26	3	4	300,478	1,187,826
21	Allegheny Ludlum Corp.	Brackenridge, PA	33	8	8	295,000	1,146,036
22	Birmingham Steel Corp.	Jackson, MS	33	5	5	1,145	841,426
23	Zeneca Specialties	Mount Pleasant, TN	28	14	14	256,776	1,079,472
24	ICI Acrylics Inc.	Memphis, TN	Multiple	6	6	377,600	1,188,510
25	Reynolds Metals Co.	Sheffield, AL	34	12	12	573,096	1,293,942
26	Georgia-Pacific Corp.	Monticello, MS	Multiple	7	9	599,220	1,298,096
27	Avesta Sheffield Plate Inc.	New Castle, IN	33	4	4	140,913	831,380
28	Parke-Davis	Holland, MI	28	12	11	1,407,587	2,080,785
29	Tennessee Eastman, Eastman Chemical Co.	Kingsport, TN	28	58	57	1,687,321	2,319,767
30	American Steel Foundries	Alliance, OH	33	5	7	652,873	1,272,043
31	International Paper	Gardiner, OR	26	4	3	58,523	677,657
32	Northwestern Steel & Wire Co.	Sterling, IL	33	6	6	6,845,801	7,455,049
33	Zinc Corp. of America	Monaca, PA	33	10	10	15,392,833	15,994,775
34	Lenzing Fibers Corp.	Lowland, TN	28	5	5	10,205,333	10,789,279
35	Glenbrook Nickel Co.	Riddle, OR	33	1	1	6,098	547,714
36	OSI Specialties Inc., Witco Corp.	Sistersville, WV	28	14	14	827,334	1,335,849
37	Regal Ware Inc.	Kewaskum, WI	34	6	6	48,076	538,862
38	American Steel Foundries	Granite City, IL	33	3	5	195,125	672,666
39	Allied-Signal Inc.	Pittsburg, KS	28	16	17	385,063	849,029
40	James River Corp.	Pennington, AL	26	11	11	261,483	721,982
41	Quebecor Printing Inc.	Dickson, TN	27	4	4	677,116	1,120,338
42	Rouge Steel Co.	Dearborn, MI	33	10	8	4,656,898	5,098,011
43	Arco Products Co.	Carson, CA	29	20	18	408,498	844,296
44	General Electric Chemicals Inc.	Ottawa, IL	28	10	11	84,998	504,701
45	Georgia-Pacific Resins Inc.	White City, OR	28	3	4	87,113	502,623
46	Essex Group Inc.	Lithonia, GA	33	3	3	168	403,263
47	Quality Chemicals Inc.	Tyrone, PA	28	5	8	16,455	417,383
48	DuPont	Circleville, OH	28	9	2	247,490	646,135
49	Hayes-Albion Corp.	Albion, MI	33	5	6	28,682	423,980
50	DuPont	Victoria, TX	28	26	26	1,224,674	1,618,116
	Total			**550**	**550**	**102,303,156**	**161,002,171**

* Chemicals accounting for more than 70% of increase in total releases and transfers from the facility.

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported

	Change 1994–1995			
Rank	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported with Increases (Primary Media/Transfers with Increases)*
1	13,944	4,073,870	4,087,815	Vinyl acetate (transfers to treatment)
2	4,036,239	776	4,037,015	Zinc and compounds (land)
3	2,827,946	1,198,957	4,026,902	Ethylene glycol (UIJ)
4	-13,399	3,900,009	3,886,610	Zinc and compounds (transfers to disposal)
5	3,628,494	0	3,628,494	Chlorine (air)
6	-88	2,703,024	2,702,937	Xylene (transfers to treatment)
7	2,337,608	-32,214	2,305,395	Zinc/manganese and compounds (land)
8	-3,178	1,776,758	1,773,580	Zinc and compounds (transfers to treatment)
9	1,621,953	0	1,621,953	Zinc and compounds (land)
10	1,660,020	-45,313	1,614,707	Phosphoric acid (water)
11	183,337	1,367,758	1,551,095	Lead/copper and compounds (transfers to treatment)
12	1,401,558	0	1,401,558	Copper and compounds (land)
13	39	1,384,943	1,384,983	Zinc and compounds (transfers to treatment)
14	333,407	961,205	1,294,612	Methanol (transfers to sewage)
15	62,963	1,186,074	1,249,038	Chromium and compounds (transfers to disposal)
16	-93,624	1,301,426	1,207,802	Methanol (transfers to treatment)
17	1,184,376	15,081	1,199,457	Propylene, benzene (air)
18	88,258	914,371	1,002,629	Ethylene (transfers to treatment)
19	973,938	-2,726	971,212	Methanol (air)
20	887,348	0	887,348	Methanol (air)
21	3,918	847,118	851,036	Nickel/lead and compounds (transfers to disposal)
22	53	840,229	840,282	Lead/manganese and compounds (transfers to disposal)
23	10,036	812,661	822,697	Methanol, toluene (transfers to treatment)
24	811,088	-179	810,910	Methanol (air)
25	722,078	-1,231	720,847	Methyl ethyl ketone, toluene, xylene (air)
26	698,876	0	698,876	Methanol (air)
27	0	690,466	690,466	Chromium and compounds (transfers to treatment)
28	-1,165,809	1,839,007	673,198	Toluene (transfers to treatment)
29	117,642	514,805	632,447	Xylene, acetonitrile (transfers to treatment)
30	37,293	581,878	619,170	Chromium and compounds (transfers to disposal)
31	619,134	0	619,134	Methanol (air)
32	461,058	148,190	609,247	Manganese/zinc and compounds (land)
33	-2,377	604,318	601,941	Zinc and compounds (transfers to disposal)
34	818,141	-234,195	583,946	Carbon disulfide (air)
35	541,616	0	541,616	Nickel and compounds (land)
36	27,927	480,587	508,514	Methanol (transfers to treatment)
37	0	490,786	490,786	Aluminum oxide (transfers to disposal)
38	333,942	143,599	477,541	Aluminum (land)
39	-15,551	479,517	463,966	Manganese and compounds (transfers to disposal)
40	460,500	0	460,500	Methanol (air)
41	443,222	0	443,222	Toluene (air)
42	1,849	439,264	441,113	Zinc and compounds (transfers to disposal)
43	62,399	373,399	435,798	Diethanolamine (transfers to sewage)
44	422,883	-3,179	419,703	Styrene (air)
45	185,019	230,491	415,510	Phenol, methanol (transfers to sewage, air)
46	-6	403,100	403,094	Copper and compounds (transfers to disposal)
47	4,987	395,940	400,927	Methanol, chlorobenzene (transfers to treatment)
48	-160,072	558,717	398,645	Ethylene glycol (transfers to treatment)
49	191,599	203,698	395,298	Manganese and compounds (transfers to disposal)
50	13,777	379,665	393,442	Cresol (transfers to treatment)
	26,776,363	**31,922,651**	**58,699,014**	

Table 5–13
MY 94-95

TRI Facilities Showing the Largest Decreases in Total Releases

Rank	Facility	City, State	SIC Code	Number of Forms 1994	Number of Forms 1995	Total Releases 1994 (kg)	Total Releases 1995 (kg)
1	IMC-Agrico Co.	Mulberry, FL	Mult.	1	1	11,383,220	3,673,469
2	Kennecott Utah Copper	Magna, UT	33	10	10	4,675,111	2,675,193
3	ASARCO Inc.	East Helena, MT	33	9	9	19,773,343	17,914,440
4	PCS Phosphate Co. Inc.	Aurora, NC	28	5	5	5,650,798	4,471,009
5	General Motors Powertrain	Saginaw, MI	33	14	12	2,347,585	1,180,950
6	Louisiana-Pacific Corp.	Samoa, CA	26	5	4	1,832,222	701,680
7	Autostyle Plastics Inc.	Grand Rapids, MI	30	6	0	1,124,628	0
8	IMC-Agrico Co.	St. James, LA	28	6	6	3,183,463	2,310,048
9	U.S. Agri-Chemicals Corp.	Fort Meade, FL	28	2	2	1,212,853	376,412
10	American Synthetic Rubber, Michelin Corp.	Louisville, KY	28	6	6	1,343,892	727,995
11	Chevron Port Arthur Dist.	Port Arthur, TX	29	28	3	593,893	26,540
12	IMC-Agrico Co.	Uncle Sam, LA	28	2	2	1,440,361	879,994
13	Boeing Wichita	Wichita, KS	Mult.	28	26	940,905	409,372
14	Quantum Chemical Co.	Clinton, IA	28	12	12	1,657,601	1,137,721
15	Cabot Corp.	Tuscola, IL	28	1	5	1,598,904	1,081,180
16	Doe Run Co.	Herculaneum, MO	33	8	9	4,190,190	3,676,471
17	Mobil Mining & Minerals Co.	Pasadena, TX	28	2	2	503,765	139
18	3M Co.	Bedford Park, IL	26	11	10	707,891	250,771
19	Tenneco Packaging	Tomahawk, WI	26	3	2	647,077	194,686
20	General Motors Truck & Bus Group	Flint, MI	37	14	12	830,353	395,595
21	Avery Dennison	Painesville, OH	26	4	4	548,546	132,599
22	General Motors MLCG Detroit/Hamtramck	Detroit, MI	37	16	16	777,096	362,828
23	Pfizer Inc.	Groton, CT	28	17	19	1,153,169	739,402
24	American Tape Co.	Marysville, MI	26	2	2	1,718,124	1,325,292
25	Cabot Corp.	Ville Platte, LA	28	3	3	1,999,161	1,614,127
26	R. J. Reynolds Tobacco Co.	Winston-Salem, NC	Mult.	6	0	382,800	0
27	International Paper	Pineville, LA	26	6	5	1,003,192	626,424
28	Steelcase Inc.	Grand Rapids, MI	25	10	8	874,510	500,299
29	Ringier America Inc.	Evans, GA	27	3	3	646,765	281,150
30	Merck & Co. Inc.	Elkton, VA	28	11	6	384,748	20,268
31	IMC-Agrico Co.	Mulberry, FL	28	1	1	1,768,707	1,405,896
32	Phillips Puerto Rico Core Inc.	Guayama, PR	29	17	13	618,379	258,697
33	ASARCO Inc.	Annapolis, MO	33	6	6	3,311,609	2,959,545
34	Goodyear Tire & Rubber Co.	Lincoln, NE	30	4	5	1,399,079	1,054,509
35	Exxon Chemical Americas	Baytown, TX	28	26	31	803,215	459,343
36	Wheeling-Pittsburgh Steel Corp	Follansbee, WV	33	13	14	1,036,885	700,372
37	Columbus Coated Fabrics	Columbus, OH	Mult.	8	8	506,150	172,183
38	General Motors NAO Mid-Lux Car Div.	Doraville, GA	37	13	11	457,327	127,930
39	Brunswick Corp.	Fond Du Lac, WI	35	12	12	441,133	118,847
40	3M Co.	Decatur, AL	Mult.	21	20	492,434	172,884
41	Chrysler Corp.	Fenton, MO	37	18	20	424,710	111,867
42	Basis Petroleum Inc.	Houston, TX	29	21	22	852,686	540,889
43	Hoechst Celanese	Bay City, TX	28	17	17	891,608	580,063
44	Columbian Chemicals Co.	El Dorado, AR	28	1	1	319,194	19,501
45	Ford Motor Co.	Hazelwood, MO	37	16	15	1,109,411	818,655
46	Bristol-Myers Squibb Co.	East Syracuse, NY	28	9	9	582,046	292,762
47	Mobil Chemical Co.	Beaumont, TX	28	19	22	1,509,026	1,220,267
48	Champion International Corp.	Cantonment, FL	26	12	10	1,246,214	962,435
49	Hoechst Celanese Polyester	Wilmington, NC	28	11	11	682,199	398,815
50	Lyondell-Citgo Refining Co.	Houston, TX	29	28	32	825,514	547,261
	Total			**524**	**484**	**94,403,693**	**60,608,772**

* Chemicals accounting for more than 70% of the decrease in total releases from the facility.

➤ Does not include ammonia, ammonium nitrate, amonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Rank	Change 1994–195 in Total Releases (kg)	Major Chemicals Reported with Decreases (Primary Media with Decreases)*
1	-7,709,751	Phosphoric acid (land)
2	-1,999,918	Copper/zinc and compounds (land)
3	-1,858,903	Zinc and compounds (land)
4	-1,179,789	Phosphoric acid (land)
5	-1,166,635	Zinc/manganese and compounds (land)
6	-1,130,542	Methanol (water)
7	-1,124,628	Toluene (air)
8	-873,415	Phosphoric acid (water)
9	-836,441	Phosphoric acid (land)
10	-615,897	Toluene (air)
11	-567,353	Benzene, methyl tert-butyl ether, toluene, propylene, ethylene (air)
12	-560,366	Phosphoric acid (water)
13	-531,533	Trichloroethylene, tetrachloroethylene, naphthalene (air)
14	-519,880	Propylene (air)
15	-517,725	Chlorine (air)
16	-513,719	Zinc/lead and compounds (land)
17	-503,626	Phosphoric acid (water)
18	-457,120	Xylene, cyclohexane (air)
19	-452,390	Methanol, zinc and compounds (air, land)
20	-434,758	Xylene, n-butyl alcohol, 1,2,4-trimethylbenzene (air)
21	-415,948	Toluene (air)
22	-414,268	Xylene, toluene, methanol (air)
23	-413,767	Methanol (water)
24	-392,832	Toluene (air)
25	-385,034	Carbon disulfide (air)
26	-382,800	Methyl ethyl ketone (air)
27	-376,768	Methanol (air)
28	-374,211	Xylene, toluene, ethylbenzene (air)
29	-365,615	Toluene (air)
30	-364,481	Xylene, chloromethane, methanol (air)
31	-362,812	Phosphoric acid (land)
32	-359,683	Toluene, xylene, cyclohexane (air)
33	-352,063	Zinc and compounds (land)
34	-344,571	Toluene (air)
35	-343,872	Chloromethane, ethylene (air)
36	-336,513	Ethylene, benzene (air)
37	-333,967	Methyl ethyl ketone (air)
38	-329,397	Xylene (air)
39	-322,286	Toluene, methyl ethyl ketone (air)
40	-319,551	Methanol (air)
41	-312,843	Xylene, n-butyl alcohol, ethylbenzene (air)
42	-311,797	Propylene (air)
43	-311,545	Vinyl acetate, propionaldehyde, acetaldehyde (air, UIJ)
44	-299,693	Carbon disulfide (air)
45	-290,756	Toluene (air)
46	-289,284	Methyl isobutyl ketone (air)
47	-288,759	Propylene (air)
48	-283,779	Methanol, acetaldehyde (air)
49	-283,384	Methanol, p-xylene (air)
50	-278,254	Xylene (air)
	-33,794,921	

Table 5–14
MY 94-95

TRI Facilities Showing the Largest Decreases in Total Releases and Transfers

Rank	Facility	City, State	SIC Code	Number of Forms 1994	Number of Forms 1995	Total Releases and Transfers 1994 (kg)	Total Releases and Transfers 1995 (kg)
1	IMC-Agrico Co.	Mulberry, FL	Multiple	1	1	11,383,220	3,673,469
2	Imco Recycling of Loudon	Loudon, TN	33	1	4	3,412,209	67,669
3	Kennecott Utah Copper	Magna, UT	33	10	10	5,088,313	2,845,238
4	ASARCO Inc.	East Helena, MT	33	9	9	19,773,379	17,914,620
5	Laclede Steel Co.	Alton, IL	33	8	12	1,849,566	159,198
6	Hoffmann-La Roche Inc.	Nutley, NJ	28	6	8	2,068,220	422,899
7	Ocean State Steel Inc.	East Providence, RI	33	1	0	1,472,163	0
8	Cookson Pigments Inc.	Newark, NJ	28	9	7	1,582,524	227,372
9	Revere Smelting & Refining	Middletown, NY	33	6	6	1,334,980	20,390
10	Biocraft Labs. Inc.	Mexico, MO	28	4	4	2,114,912	870,626
11	PCS Phosphate Co. Inc.	Aurora, NC	28	5	5	5,650,798	4,471,009
12	General Motors Powertrain	Saginaw, MI	33	14	12	2,348,846	1,182,596
13	Louisiana-Pacific Corp.	Samoa, CA	26	5	4	1,832,222	701,680
14	Autostyle Plastics Inc.	Grand Rapids, MI	30	6	0	1,124,628	0
15	Strick Corp.	Danville, PA	37	2	1	1,025,974	1,614
16	Gaston Copper Recycling Corp.	Gaston, SC	33	7	7	1,136,261	158,939
17	ASARCO Inc.	Omaha, NE	33	6	6	2,346,327	1,407,647
18	IMC-Agrico Co.	St. James, LA	28	6	6	3,183,463	2,310,048
19	U.S. Agri-Chemicals Corp.	Fort Meade, FL	28	2	2	1,212,853	376,412
20	Dextrex Corp.	Detroit, MI	28	3	3	772,371	9,903
21	Mallinckrodt Chemical Inc.	Saint Louis, MO	28	16	16	2,977,742	2,240,636
22	Doe Run Co.	Boss, MO	33	5	4	792,083	89,520
23	115th Street Corp., PMC Inc.	Chicago, IL	28	11	11	1,155,031	492,653
24	Enichem Elastomers Americas	Baytown, TX	28	3	3	668,923	8,780
25	Rohm & Haas Co.	Philadelphia, PA	28	25	8	874,137	233,907
26	American Synthetic Rubber, Michelin Corp.	Louisville, KY	28	6	6	1,346,105	728,013
27	USS Mon Valley Works	Braddock, PA	33	5	6	1,683,527	1,068,496
28	Chevron Port Arthur Dist.	Port Arthur, TX	29	28	3	666,557	52,481
29	Boeing Wichita	Wichita, KS	Multiple	28	26	1,057,580	466,104
30	American National Rubber	Cheektowaga, NY	30	1	1	591,787	6,249
31	DuPont	Leland, NC	28	19	19	5,352,385	4,776,109
32	Steelcase Inc.	Grand Rapids, MI	25	10	8	1,072,356	500,759
33	IMC-Agrico Co.	Uncle Sam, LA	28	2	2	1,440,361	879,994
34	Murray Inc.	Lawrenceburg, TN	Multiple	9	9	767,847	227,514
35	Hoffmann-La Roche Inc.	Freeport, TX	28	3	3	1,149,472	614,692
36	Simpson Pasadena Paper Co.	Pasadena, TX	26	9	7	4,854,099	4,331,900
37	Cabot Corp.	Tuscola, IL	28	1	5	1,598,904	1,081,180
38	Quantum Chemical Co.	Clinton, IA	28	12	12	1,660,957	1,145,996
39	Doe Run Co.	Herculaneum, MO	33	8	9	4,190,644	3,676,925
40	Mobil Mining & Minerals Co.	Pasadena, TX	28	2	2	503,765	139
41	Ferro Corp.	Hammond, IN	28	10	11	642,142	141,779
42	Ford Motor Co.	Brook Park, OH	33	13	12	1,417,559	932,365
43	3M Co.	Bedford Park, IL	26	11	10	730,678	275,471
44	Tenneco Packaging	Tomahawk, WI	26	3	2	647,077	194,686
45	Lilly Industrial Center	Indianapolis, IN	28	3	0	437,100	0
46	Lyondell-Citgo Refining Co.	Houston, TX	29	28	32	1,251,002	817,996
47	General Motors Truck & Bus Group	Flint, MI	37	14	12	842,245	411,185
48	Amoco Corp.	Wood River, IL	28	11	8	498,052	74,478
49	Avery Dennison	Painesville, OH	26	4	4	551,052	134,917
50	DuPont	Deepwater, NJ	28	41	40	1,341,376	928,010
	Total			**452**	**398**	**113,475,774**	**63,354,266**

* Chemicals accounting for more than 70% of the decrease in total releases and transfers from the facility.

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

	Change 1994–1995			
Rank	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfers with Decreases)*
1	-7,709,751	0	-7,709,751	Phosphoric acid (land)
2	-481	-3,344,059	-3,344,540	Aluminum (transfers to disposal)
3	-1,999,918	-243,156	-2,243,075	Copper/zinc/lead and compounds (land)
4	-1,858,903	144	-1,858,759	Zinc and compounds (land)
5	-26,343	-1,664,025	-1,690,368	Zinc and compounds (transfers to treatment)
6	-16,149	-1,629,172	-1,645,321	Methanol (transfers to treatment, sewage)
7	-45	-1,472,118	-1,472,163	Manganese and compounds (transfers to disposal)
8	-2,575	-1,352,578	-1,355,152	Methanol (transfers to sewage)
9	119	-1,314,709	-1,314,590	Lead and compounds (transfers to disposal)
10	1,220	-1,245,505	-1,244,285	Toluene (transfers to treatment)
11	-1,179,789	0	-1,179,789	Phosphoric acid (land)
12	-1,166,635	385	-1,166,250	Zinc and compounds (land)
13	-1,130,542	0	-1,130,542	Methanol (water)
14	-1,124,628	0	-1,124,628	Toluene (air)
15	499	-1,024,859	-1,024,360	Manganese and compounds (transfers to disposal)
16	-8,536	-968,786	-977,322	Copper and compounds (transfers to disposal)
17	-6,109	-932,571	-938,680	Zinc and compounds (transfers to disposal)
18	-873,415	0	-873,415	Phosphoric acid (water)
19	-836,441	0	-836,441	Phosphoric acid (land)
20	0	-762,468	-762,468	Trichloroethylene (transfers to treatment)
21	15,126	-752,232	-737,107	1,1,2-Trichloroethane (transfers to treatment)
22	-3,650	-698,912	-702,562	Lead/zinc and compounds (transfers to treatment)
23	-5,897	-656,481	-662,378	p-Cresol, aniline (transfers to sewage)
24	7,746	-667,889	-660,143	Cyclohexane (transfers to treatment)
25	-25,391	-614,839	-640,229	Methanol, methyl ethyl ketone, xylene, methyl isobutyl ketone (transfers to treatment)
26	-615,897	-2,195	-618,092	Toluene (air)
27	43,555	-658,586	-615,031	Zinc and compounds (transfers to disposal)
28	-567,353	-46,723	-614,077	Benzene, methyl tert-butyl ether, toluene, propylene, ethylene (air)
29	-531,533	-59,943	-591,476	Trichloroethylene, tetrachloroethylene, methyl ethyl ketone, naphthalene (air)
30	0	-585,538	-585,538	Zinc and compounds (transfers to disposal)
31	-263,289	-312,986	-576,276	Ethylene glycol, methanol (transfers to treatment, air)
32	-374,211	-197,386	-571,597	Xylene, toluene, ethylbenzene (air)
33	-560,366	0	-560,366	Phosphoric acid (water)
34	-162,118	-378,215	-540,333	Nickel and compounds, xylene (transfers to disposal, air)
35	2,938	-537,718	-534,780	Methanol (transfers to treatment)
36	-139,755	-382,444	-522,199	Methanol (transfers to sewage)
37	-517,725	0	-517,725	Chlorine (air)
38	-519,880	4,919	-514,961	Propylene (air)
39	-513,719	0	-513,719	Zinc/lead and compounds (land)
40	-503,626	0	-503,626	Phosphoric acid (water)
41	-248,426	-251,937	-500,363	1,2-Dichloroethane, n-butyl alcohol (air, transfers to sewage)
42	6,203	-491,397	-485,194	Manganese and compounds (transfers to disposal)
43	-457,120	1,912	-455,208	Xylene, cyclohexane (air)
44	-452,390	0	-452,390	Methanol, zinc and compounds (air, land)
45	-20,025	-417,075	-437,100	Methanol (transfers to treatment)
46	-278,254	-154,753	-433,006	Xylene, asbestos (air, transfers to disposal)
47	-434,758	3,698	-431,060	Xylene, n-butyl alcohol, 1,2,4-trimethylbenzene (air)
48	-8,902	-414,672	-423,574	Methanol, zinc and compounds (transfers to sewage, disposal)
49	-415,948	-186	-416,134	Toluene (air)
50	-30,440	-382,925	-413,365	Lead and compounds, 1,2-dichlorobenzene (transfers to treatment)
	-25,513,527	**-24,607,981**	**-50,121,508**	

Table 5–15
MY 94-95

NPRI and TRI Releases and Transfers of ARET Chemicals

	NPRI				TRI			
	1994	1995	Change 1994–1995		1994	1995	Change 1994–1995	
	Number	Number	Number	%	Number	Number	Number	%
Facilities	819	832	13	1.6	11,968	11,722	-246	-2.1
Forms	1,554	1,631	77	5.0	23,290	22,960	-330	-1.4
	kg	kg	kg	%	kg	kg	kg	%
Total Air Emissions	13,059,278	10,570,502	-2,488,776	-19.1	92,802,523	85,403,388	-7,399,135	-8.0
Surface Water Discharges	582,672	637,554	54,882	9.4	1,759,541	1,399,222	-360,319	-20.5
Underground Injection	106,097	202,322	96,225	90.7	13,045,425	14,154,152	1,108,727	8.5
On-Site Land Releases	7,388,297	6,873,173	-515,124	-7.0	74,368,485	77,697,111	3,328,626	4.5
Matched Releases	**21,195,540**	**18,331,920**	**-2,863,620**	**-13.5**	**181,975,973**	**178,653,873**	**-3,322,101**	**-1.8**
Treatment/Destruction	3,970,584	5,104,594	1,134,010	28.6	28,476,121	30,708,883	2,232,762	7.8
Sewage/POTWs	90,846	69,725	-21,121	-23.2	5,544,121	5,415,463	-128,658	-2.3
Disposal/Containment	7,909,300	16,632,231	8,722,931	110.3	79,937,053	83,916,680	3,979,627	5.0
Matched Transfers	**11,970,730**	**21,806,550**	**9,835,820**	**82.2**	**113,957,295**	**120,041,026**	**6,083,731**	**5.3**
Matched Releases and Transfers	**33,166,270**	**40,138,470**	**6,972,200**	**21.0**	**295,933,268**	**298,694,898**	**2,761,630**	**0.9**

5.6 Voluntary Reduction Programs

Both the United States and Canada have programs designed to encourage industry to achieve voluntary reductions of selected chemicals. The US effort was called the 33/50 Program (based on the call for a 33 percent reduction to be achieved by 1991 and a 50 percent reduction by 1995, based on amounts of releases and transfers reported to TRI in 1988) and encompassed 17 chemicals. The Canadian program is called ARET (Accelerated Reduction/Elimination of Toxics). This program set its reduction goals of 90 percent for persistent, bioaccumulative and toxic substances released on-site to air, water and soil, and 50 percent for other toxic substances by the year 2000, from the base year 1993. ARET goals are not specifically tied to NPRI reporting categories, and of its 117 target substances, 49 are on the NPRI list.

5.6.1 Accelerated Reduction/Elimination of Toxics (ARET)

The 49 chemicals co-listed by NPRI and ARET are also covered by TRI (see the box on the next page). Of the 17 33/50 chemicals, 16 are listed on both databases (1,1,1-trichloroethane is reportable in TRI but not in NPRI). All but four of the 33/50 chemicals—carbon tetrachloride, methyl ethyl ketone, toluene, and xylenes—are on the ARET chemical list.

Discussions leading to the ARET program began in late 1990 among corporate executives and leading environmentalists to improve environmental decision-making by organizations. The ARET Stakeholders Committee was formed by the Canadian federal environment minister to establish criteria for defining toxicity, to compile a list of target substances based on these criteria, and to establish a means for encouraging industry to reduce environmental releases of the target substances. It identified criteria for persistence, bioaccumulation and toxicity and prepared a list of 117 chemicals meeting one or more of the criteria. The "ARET Challenge," issued in March 1994, calls for industry to make voluntary reductions of 90 percent by the year 2000 of the target substances that meet all three criteria and 50 percent during the same time period for the other target substances. Reductions are measured against the 1993 base year.

Progress in reducing the 49 ARET chemicals reportable to NPRI is shown in **Table 5–15**. The goal of the ARET program is reduction in environmental releases to the air, water and soil (not including landfills). **Table 5–15** shows that reductions in total on-site releases of 14 percent were reported from 1994 to 1995; in the same period, air emissions

ARET AND 33/50 CHEMICALS ON BOTH NPRI AND TRI LISTS

ARET CHEMICALS ON BOTH NPRI AND TRI LISTS*

50-00-0	Formaldehyde
56-23-5	Carbon tetrachloride
62-53-3	Aniline
62-56-6	Thiourea
67-66-3	Chloroform
71-43-2	Benzene
75-07-0	Acetaldehyde
75-09-2	Dichloromethane
75-21-8	Ethylene oxide
77-47-4	Hexachlorocyclopentadiene
79-01-6	Trichloroethylene
79-06-1	Acrylamide
79-46-9	2-Nitropropane
86-30-6	N-Nitrosodiphenylamine
91-22-5	Quinoline
96-45-7	Ethylene thiourea
100-44-7	Benzyl chloride
101-14-4	4,4'-Methylenebis(2-chloroaniline)
106-46-7	1,4-Dichlorobenzene
106-89-8	Epichlorohydrin
106-99-0	1,3-Butadiene
107-06-2	1,2-Dichloroethane
107-13-1	Acrylonitrile
108-10-1	Methyl isobutyl ketone
108-95-2	Phenol
117-81-7	Di(2-ethylhexyl) phthalate
120-12-7	Anthracene
120-83-2	2,4-Dichlorophenol
121-14-2	2,4-Dinitrotoluene
123-91-1	1,4-Dioxane
127-18-4	Tetrachloroethylene
302-01-2	Hydrazine
534-52-1	4,6-Dinitro-o-cresol
606-20-2	2,6-Dinitrotoluene
1332-21-4	Asbestos (friable)
10049-04-4	Chlorine dioxide
26471-62-5	Toluenediisocyanate (mixed isomers)
—	Arsenic (and its compounds)
—	Cadmium (and its compounds)
—	Chromium (and its compounds)
—	Cobalt (and its compounds)
—	Copper (and its compounds)
—	Cyanide compounds
—	Lead (and its compounds)
—	Mercury (and its compounds)
—	Nickel (and its compounds)
—	Silver (and its compounds)
—	Zinc (and its compounds)

33/50 CHEMICALS ON BOTH NPRI AND TRI LISTS

56-23-5	Carbon tetrachloride
67-66-3	Chloroform
71-43-2	Benzene
75-09-2	Dichloromethane
78-93-3	Methyl ethyl ketone
79-01-6	Trichloroethylene
108-10-1	Methyl isobutyl ketone
108-88-3	Toluene
127-18-4	Tetrachloroethylene
—	Cadmium (and its compounds)
—	Chromium (and its compounds)
—	Cyanide compounds
—	Lead (and its compounds)
—	Mercury (and its compounds)
—	Nickel (and its compounds)
—	Xylenes

➤ Tetraethyl lead is listed as an ARET chemical separately from lead and lead compounds. It is included in lead and lead compounds in NPRI.

were reduced by 19 percent. TRI facilities reporting the ARET chemicals reported reductions of 2 percent in on-site releases, with air emissions reduced 8 percent in the same time period. For both NPRI and TRI facilities, off-site transfers of these chemicals increased from 1994 to 1995.

A few facilities accounted for the majority of the reported decreases. Two NPRI facilities (HBM & S Co. Ltd. and Sidbec Dosco—see **Table 5–16**) had apparent reductions of over 1 million kg in ARET chemicals. The one achieved these reductions to on-site landfills and the other, which had reported over 1 million kg of releases to air in 1994, had no reported releases of those chemicals for 1995. (Nor did the facility report transfers in 1995.)

Four TRI facilities reported reductions of more than 1 million kg in on-site releases (also metal compounds); another eight reported reductions of more than 1 million kg in off-site transfers of ARET chemicals (see **Tables 5–16** and **5–17**). On the other hand, just as few reported large increases in these chemicals. **Table 5–18** shows the one NPRI and 10 TRI facilities reporting more than 500,000 kg of increases in total releases, and **Table 5–19** shows the four NPRI and 17 TRI facilities with more than 1 million kg of increases in total releases and transfers.

Table 5–16
MY 94-95

NPRI and TRI Facilities Showing the Largest Decreases in Total Releases of ARET Chemicals

	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases 1994 (kg)	Total Releases 1995 (kg)	Change 1994–1995 in Total Releases (kg)	Major Chemicals Reported with Decreases (Primary Media with Decreases)*
NPRI Facilities									
HBM&S Co. Ltd.-Smelter	Flin Flon, MB	29	33	5	0	1,356,367	0	-1,356,367	Lead/zinc and compounds (air)
Sidbec Dosco (ISPAT) Inc.	Contrecoeur, QC	29	33	4	4	2,625,732	1,335,277	-1,290,455	Zinc and compounds (land)
Total				**9**	**4**	**3,982,099**	**1,335,277**	**-2,646,822**	
TRI Facilities									
Kennecott Utah Copper	Magna, UT		33	8	8	20,110,615	15,777,800	-4,332,815	Lead/zinc and compounds (land)
ASARCO Inc.	East Helena, MT		33	7	7	40,722,168	37,088,415	-3,633,753	Zinc and compounds (land)
General Motors Powertrain	Saginaw, MI		33	10	8	3,835,685	2,002,100	-1,833,585	Zinc and compounds (land)
Doe Run Co.	Herculaneum, MO		33	8	8	9,239,368	8,106,261	-1,133,107	Lead/zinc and compounds (land)
Total						**63,907,836**	**52,974,576**	**-10,933,260**	

* Chemical accounting for more than 70% of the decrease in total releases from the facility.

Table 5–17
MY 94-95

NPRI and TRI Facilities Showing the Largest Decreases in Total Releases and Transfers of ARET Chemicals

	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases and Transfers 1994 (kg)	Total Releases and Transfers 1995 (kg)	Change 1994–1995 Total Releases (kg)	Change 1994–1995 Total Transfers (kg)	Change 1994–1995 Total Releases and Transfers (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfer with Decreases)*
NPRI Facilities											
HBM&S Co. Ltd.-Smelter	Flin Flon, MB	29	33	5	0	1,356,367	0	-1,356,367	0	-1,356,367	Lead/zinc and compounds (air)
Sidbec Dosco (ISPAT) Inc.	Contrecoeur, QC	29	33	4	4	2,625,732	1,335,277	-1,290,455	0	-1,290,455	Zinc and compounds (land)
Total				**9**	**4**	**3,982,099**	**1,335,277**	**-2,646,822**	**0**	**-2,646,822**	
TRI Facilities											
Kennecott Utah Copper	Magna, UT		33	8	8	11,017,025	6,152,000	-4,332,815	-532,210	-4,865,025	Copper/zinc/lead and compounds (land)
Laclede Steel Co.	Alton, IL		33	4	7	3,989,535	267,356	4,958	-3,727,137	-3,722,179	Zinc and compounds (transfers to treatment)
ASARCO Inc.	East Helena, MT		33	7	7	40,722,218	37,088,810	-3,633,753	345	-3,633,408	Zinc and compounds (land)
Revere Smelting & Refining	Middletown, NY		33	5	5	2,925,766	43,157	257	-2,882,866	-2,882,609	Lead and compounds (transfers to disposal)
Gaston Copper Recyc. Corp.	Gaston, SC		33	6	6	2,478,373	346,868	-17,932	-2,113,573	-2,131,505	Copper/lead and compounds (transfers to disposal)
ASARCO Inc.	Omaha, NE		33	4	4	4,334,490	2,416,964	-9,560	-1,907,966	-1,917,526	Zinc and compounds (transfers to disposal)
General Motors Powertrain	Saginaw, MI		33	10	8	3,837,600	2,005,441	-1,833,585	1,426	-1,832,159	Zinc and compounds (land)
Dextrex Corp.	Detroit, MI		28	3	3	1,703,078	21,836	0	-1,681,242	-1,681,242	Trichloroethylene (transfers to treatment)
Doe Run Co.	Boss, MO		33	4	3	1,699,108	180,269	-7,759	-1,511,080	-1,518,839	Lead/zinc and compounds (transfers to disposal)
American National Rubber	Cheektowaga, NY		30	1	1	1,304,890	13,778	0	-1,291,112	-1,291,112	Zinc and compounds (transfers to disposal)
Doe Run Co.	Herculaneum, MO		33	8	8	9,240,369	8,107,262	-1,133,107	0	-1,133,107	Zinc/lead and compounds (land)
USS Mon Valley Works	Braddock, PA		33	4	4	3,148,932	2,089,914	79,364	-1,138,382	-1,059,018	Zinc and compounds (transfers to disposal)
Total				**64**	**64**	**86,401,384**	**58,733,655**	**-10,883,932**	**-16,783,797**	**-27,667,729**	

* Chemical accounting for more than 70% of the decrease in total releases and transfers from the facility.

Table 5–18
MY 94-95

NPRI and TRI Facilities Showing the Largest Increases in Total Releases of ARET Chemicals

	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases 1994 (kg)	Total Releases 1995 (kg)	Change 1994–1995 in Total Releases (kg)	Major Chemicals Reported with Increases (Primary Media with Increases)*
NPRI Facility									
Co-Steel Lasco	Whitby, ON	29	33	4	5	1,872,582	2,410,763	538,181	Copper/zinc and compounds (land)
TRI Facilities									
General Motors Powertrain	Defiance, OH		33	8	8	4,405,145	12,896,885	8,491,740	Zinc and compounds (land)
U.S. Steel	Gary, IN		33	8	10	1,166,820	4,831,512	3,664,692	Zinc and compounds (land)
Cyprus Miami Mining Corp.	Claypool, AZ		33	4	4	7,655,800	10,746,236	3,090,436	Copper and compounds (land)
USS Fairfield Works	Fairfield, AL		33	5	4	105,314	3,169,195	3,063,881	Zinc and compounds (land)
Glenbrook Nickel Co.	Riddle, OR		33	2	2	26,892	2,415,420	2,388,528	Nickel and compounds (land)
Shell Oil Co.	Deer Park, TX		Mult.	11	12	1,089,041	2,090,514	1,001,473	Phenol (UIJ)
Phelps Dodge Hidalgo Inc.	Playas, NM		33	1	1	9,207,995	10,015,608	807,613	Copper and compounds (land)
Granite City Steel	Granite City, IL		33	9	8	3,840,195	4,633,507	793,312	Zinc and compounds (land)
Upjohn Mfg. Co.	Arecibo, PR		28	2	2	551,250	1,302,100	750,850	Dichloromethane (air)
Westinghouse Electric Corp.	Hampton, SC		30	2	2	29,181	657,390	628,209	Phenol (air)
Total				**52**	**53**	**28,077,633**	**52,758,367**	**24,680,734**	

* Chemical accounting for more than 70% of the increase in total releases from the facility.

Table 5–19
MY 94-95

NPRI and TRI Facilities Showing the Largest Increases in Total Releases and Transfers of ARET Chemicals

	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases and Transfers 1994 (kg)	Total Releases and Transfers 1995 (kg)	Change 1994–1995 Total Releases (kg)	Change 1994–1995 Total Transfers (kg)	Change 1994–1995 Total Releases and Transfers (kg)	Major Chemicals Reported with Increases (Primary Media/Transfer with Increases)*
NPRI Facilities											
Co-Steel Lasco	Whitby, ON	29	33	4	5	2,654,882	8,146,583	538,181	4,953,520	5,491,701	Zinc and compounds (transfers to disposal)
CXY Chemicals	Nanaimo, BC	37	28	0	1	0	1,988,000	0	1,988,000	1,988,000	Asbestos (transfers to disposal)
Stelco McMaster Lte	Contrecoeur, QC	29	33	3	4	6,400	1,707,300	2,500	1,698,400	1,700,900	Zinc and compounds (transfers to treatment)
Dominion Castings Ltd.	Hamilton, ON	29	33	0	1	0	1,401,905	1,127	1,400,778	1,401,905	Chromium and compounds (transfers to disposal)
Total				**7**	**11**	**2,661,282**	**13,243,788**	**541,808**	**10,040,698**	**10,582,506**	
TRI Facilities											
General Motors Powertrain	Defiance, OH		33	8	8	4,407,695	12,900,821	8,491,740	1,386	8,493,126	Zinc and compounds (land)
Nucor Steel	Crawfordsville, IN		33	5	5	2,770,361	10,759,638	-28,169	8,017,446	7,989,277	Zinc and compounds (transfers to disposal)
U.S. Steel	Gary, IN		33	8	10	1,271,290	4,933,051	3,664,692	-2,931	3,661,761	Zinc and compounds (land)
Oregon Steel Mills Inc.	Portland, OR		Mult.	5	5	20,708	3,374,144	-9,081	3,362,517	3,353,436	Zinc and compounds (transfers to treatment)
ASARCO Inc.	Hayden, AZ		33	7	7	18,569,234	21,920,034	464,946	2,885,854	3,350,800	Lead and compounds (transfers to treatment)
Cyprus Miami Mining Corp.	Claypool, AZ		33	4	4	7,655,800	10,746,236	3,090,436	0	3,090,436	Copper and compounds (land)
USS Fairfield Works	Fairfield, AL		33	5	4	105,314	3,169,195	3,063,881	0	3,063,881	Zinc and compounds (land)
Electralloy Corp.	Oil City, PA		33	3	3	161,083	2,914,766	137,867	2,615,816	2,753,683	Chromium and compounds (transfers to disposal)
Newport Steel Corp.	Wilder, KY		33	6	6	7,300	2,640,708	208	2,633,200	2,633,408	Zinc and compounds (transfers to treatment)
Glenbrook Nickel Co.	Riddle, OR		33	2	2	26,892	2,415,420	2,388,528	0	2,388,528	Nickel and compounds (land)
Allegheny Ludlum Corp.	Brackenridge, PA		33	5	5	552,665	2,353,555	6,095	1,794,795	1,800,890	Nickel/lead and compounds (transfers to disposal)
Avesta Sheffield Plate Inc.	New Castle, IN		33	2	2	126,852	1,766,314	0	1,639,462	1,639,462	Chromium and compounds (transfers to treatment)
Zinc Corp. of America	Monaca, PA		33	8	8	30,600,153	32,007,126	-5,243	1,412,216	1,406,973	Zinc and compounds (transfers to disposal)
Quantum Chemical Corp.	La Porte, TX		28	7	7	144,074	1,527,285	615	1,382,596	1,383,211	Zinc and compounds (transfers to treatment)
Birmingham Steel Corp.	Jackson, MS		33	4	4	2,292	1,335,015	88	1,332,635	1,332,723	Lead and compounds (transfers to disposal)
American Steel Foundries	Alliance, OH		33	3	5	1,397,250	2,707,500	82,230	1,228,020	1,310,250	Chromium and compounds (transfesr to disposal)
Shell Oil Co.	Deer Park, TX		Mult.	11	12	1,998,809	3,017,559	1,001,473	17,277	1,018,750	Phenol (UIJ)
Total				**93**	**97**	**69,817,772**	**120,488,367**	**22,350,306**	**28,320,289**	**50,670,595**	

* Chemical accounting for more than 70% of the increase in total releases and transfers from the facility.

Table 5–20
MY 94-95

NPRI and TRI Releases and Transfers of 33/50 Chemicals

	NPRI				TRI			
	1994	1995	Change 1994–1995		1994	1995	Change 1994–1995	
	Number	Number	Number	%	Number	Number	Number	%
Forms	1,255	1,284	29	2.3	21,417	20,549	-868	-4.1
	kg	kg	kg	%	kg	kg	kg	%
Total Air Emissions	27,955,441	24,652,873	-3,302,568	-11.8	234,722,129	204,739,327	-29,982,802	-12.8
Surface Water Discharges	120,482	116,944	-3,538	-2.9	559,131	439,638	-119,493	-21.4
Underground Injection	341,050	983,756	642,706	188.4	3,172,252	3,576,863	404,611	12.8
On-Site Land Releases	1,707,550	1,549,528	-158,022	-9.3	17,803,755	17,858,404	54,649	0.3
Matched Releases	**30,178,941**	**27,353,849**	**-2,825,092**	**-9.4**	**256,257,267**	**226,614,232**	**-29,643,035**	**-11.6**
Treatment/Destruction	5,542,768	4,516,086	-1,026,682	-18.5	33,417,622	34,980,263	1,562,641	4.7
Sewage/POTWs	74,569	15,476	-59,093	-79.2	2,262,866	2,259,049	-3,816	-0.2
Disposal/Containment	1,651,466	3,826,060	2,174,594	131.7	23,985,788	24,493,191	507,404	2.1
Matched Transfers	**7,268,803**	**8,357,622**	**1,088,819**	**15.0**	**59,666,276**	**61,732,504**	**2,066,228**	**3.5**
Matched Releases and Transfers	**37,447,744**	**35,711,471**	**-1,736,273**	**-4.6**	**315,923,542**	**288,346,736**	**-27,576,807**	**-8.7**

5.6.2 The 33/50 Program

The 33/50 Program, established by the US EPA in 1991, is also a call for voluntary reductions by industry. The 17 substances subject to the program are TRI chemicals chosen for their high toxicity and the large volume of their reported releases and transfers. The goals of the program were a 33 percent reduction in total releases and transfers by 1992 and a 50 percent reduction by 1995, from a base level of 1988 TRI reporting. The 33/50 Program achieved its goals by 1994, one year early. **Table 5–20** shows that further reductions of 27 million kg, or 9 percent, were achieved from 1994 to 1995. This occurred, despite a nearly 4 percent increase in off-site transfers, because of large reductions in on-site releases, particularly air emissions. NPRI facilities reporting the same chemicals achieved similar reductions in on-site releases, but increased their transfers of these chemicals by 15 percent, for an overall reduction in total releases and transfers of 5 percent.

As a further examination of the reductions in total releases and transfers achieved over and above the stated goals of the 33/50 Program, **Table 5–21** shows reductions of 6 million kg from seven facilities, each of which reported greater than 500,000 kg in reductions from 1994 to 1995. This amounts to over 2 million kg in on-site releases and over 3 million kg in off-site transfers. Three NPRI facilities also reported decreases of more than 500,000 kg of 33/50 chemicals from 1994 to 1995. All these reductions were in on-site releases to air; they totaled more than 1.5 million kg.

Table 5–22 shows that from 1994 to 1995, many of the increases reported by the 10 facilities showing increases greater than 500,000 kg were in transfers. These increases totaled 9 million kg in off-site transfers and nearly 1.5 million kg in on-site releases. The one NPRI facility with an increase of more than 500,000 kg of any of the 33/50 chemicals reported an additional 650,000 kg over 1994 levels of methyl ethyl ketone sent to on-site underground injection.

Table 5–21
MY 94-95

NPRI and TRI Facilities Showing the Largest Decreases in Total Releases and Transfers of 33/50 Chemicals

	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases and Transfers 1994 (kg)	Total Releases and Transfers 1995 (kg)	Change 1994–1995 Total Releases (kg)	Change 1994–1995 Total Transfers (kg)	Change 1994–1995 Total Releases and Transfers (kg)	Major Chemicals Reported with Decreases (Primary Media/Transfer with Decreases)*
NPRI Facilities											
3M Canada Inc.	Perth, ON	35	32	2	2	745,174	172,609	-572,565	0	-572,565	Xylene (air)
Chrysler Canada Ltd., Windsor Assembly Plant	Windsor, ON	32	37	4	4	957,325	425,196	-532,118	-11	-532,129	Xylene, methyl ethyl ketone (air)
Rexham Metallising, Camvac Division	Brantford, ON	27	26	2	0	516,000	0	-516,000	0	-516,000	Methyl ethyl ketone (air)
Total				**8**	**6**	**2,218,499**	**597,805**	**-1,620,683**	**-11**	**-1,620,694**	
TRI Facilities											
Revere Smelting & Refining	Middletown, NY		33	2	2	1,309,662	18,660	91	-1,291,093	-1,291,002	Lead and compounds (transfers to disposal)
Autostyle Plastics Inc.	Grand Rapids, MI		28	4	0	1,113,754	0	-1,113,754	0	-1,113,754	Toluene (air)
Biocraft Labs. Inc.	Mexico, MO		28	1	1	1,710,204	730,520	948	-980,632	-979,684	Toluene (transfers to treatment)
Dextrex Corp.	Detroit, MI		28	3	3	772,371	9,903	0	-762,468	-762,468	Trichloroethylene (transfers to treatment)
American Synthetic Rubber	Louisville, KY		28	1	1	1,338,458	720,335	-617,551	-572	-618,123	Toluene (air)
Murray Inc.	Lawrenceburg, TN		Mult.	6	6	750,502	219,056	-152,932	-378,515	-531,446	Nickel/chromium & comp's (transf. to disposal), xylene (air)
Boeing Wichita	Wichita, KS		Mult.	11	11	930,995	424,349	-454,916	-51,730	-506,646	Trichloro- and tetrachloroethylene, methyl ethyl ketone (air)
Total				**28**	**24**	**7,925,947**	**2,122,823**	**-2,338,114**	**-3,465,010**	**-5,803,124**	

* Chemical accounting for more than 70% of the decrease in total releases and transfers from the facility.

Table 5–22
MY 94-95

NPRI and TRI Facilities Showing the Largest Increases in Total Releases and Transfers of 33/50 Chemicals

	City, State/Province	SIC Code Canada	SIC Code US	Number of Forms 1994	Number of Forms 1995	Total Releases and Transfers 1994 (kg)	Total Releases and Transfers 1995 (kg)	Change 1994–1995 Total Releases (kg)	Change 1994–1995 Total Transfers (kg)	Change 1994–1995 Total Releases and Transfers (kg)	Major Chemicals Reported with Increases (Primary Media/Transfer with Increases)*
NPRI Facility											
Celanese Canada Inc.	Edmonton, AB	37	28	2	2	359,802	1,013,239	653,467	-30	653,437	Methyl ethyl ketone (UIJ)
TRI Facilities											
Georgia-Pacific Resins Inc.	Elk Grove, CA		28	3	3	16	2,558,539	73	2,558,450	2,558,523	Xylene (transfers to treatment)
Parke-Davis	Holland, MI		28	6	6	39,265	1,628,860	21	1,589,574	1,589,595	Toluene (transfers to treatment)
Electralloy Corp.	Oil City, PA		33	2	2	67,798	1,315,953	62,219	1,185,936	1,248,155	Chromium and compounds (transfers to disposal)
ASARCO Inc.	Hayden, AZ		33	3	3	922,132	1,979,573	183,829	873,611	1,057,441	Lead and compounds (land, transfers to treatment)
Allegheny Ludlum Corp.	Brackenridge, PA		33	3	3	237,259	1,030,839	1,902	791,678	793,580	Nickel/lead and compounds (transfers to disposal)
Avesta Sheffield Plate Inc.	New Castle, IN		33	2	2	57,529	801,049	0	743,520	743,520	Chromium and compounds (transfers to treatment)
Reynolds Metals Co.	Sheffield, AL		34	5	5	469,319	1,116,759	648,073	-633	647,440	Methyl ethyl ketone, toluene, xylene (air)
Birmingham Steel Corp.	Jackson, MS		33	3	3	346	604,671	-44	604,370	604,325	Lead and compounds (transfers to disposal)
Glenbrook Nickel Co.	Riddle, OR		33	1	1	6,098	547,714	541,616	0	541,616	Nickel and compounds (land)
American Steel Foundries	Alliance, OH		33	1	2	632,313	1,158,086	31,488	494,286	525,773	Chromium and compounds (transfers to disposal)
Total				**29**	**30**	**2,432,074**	**12,742,044**	**1,469,177**	**8,840,792**	**10,309,969**	

* Chemical accounting for more than 70% of the increase in total releases and transfers from the facility.

5.7 Geographic Change

The Canadian provinces with the largest releases—and the largest releases and transfers—for the matched data set were Ontario, Quebec and Alberta in both 1994 and 1995 (see **Tables 5–23** and **5–24**). Quebec and Alberta had increases in both releases and transfers. Ontario's 2 million kg decrease in releases was offset by a larger increase in transfers, due in part to one facility's reporting of 5.7 million kg more in 1995, as shown in **Table 5–8**, above. Ontario was also the only province in which fewer facilities reported in 1995 than in 1994. The net increase from Ontario facilities amounted to less than 2 percent, while the increase from facilities located in Quebec was nearly 9 percent and from those in Alberta nearly 31 percent. The province of Nova Scotia reported the largest reduction because of the 3 million kg decrease of one facility, as shown in **Table 5–10**, above.

The change in NPRI reporting requirements relating to by-products, described in **Chapter 2**, may affect these geographical changes from 1994 to 1995. Also, as noted earlier, analyses of year-to-year changes in both Canada's summary report on NPRI and that of the United States on TRI may differ from findings in this chapter because the industry and chemical sets analyzed in their respective reports are different from that used here.

For TRI, the three states with the largest releases in both 1994 and 1995 were Texas, Louisiana and Alabama (see **Table 5–25**). For total releases and transfers, however, the top states were Texas, Ohio and Louisiana, and all three reported larger amounts in 1995 (see **Table 5–26**). Differences in the relative amounts released or transferred caused a number of states to rank quite differently on **Tables 5–25** and **5–26**. Fourteenth for releases, for example, Pennsylvania ranked fourth for total releases and transfers.

Increases in total releases and transfers from 1994 to 1995 amounted to about 6 percent for Texas and Ohio and about 7 percent for Louisiana. Two facilities in Texas reported increases that were among the largest in TRI, as shown in **Table 5–12**, above. Michigan, the fourth-ranked state for 1994, reported 5 million kg less in 1995 (a 9 percent decrease) and dropped to sixth place.

The state with the largest absolute decrease in total releases and transfers was Florida. Even though 14 more facilities reported from Florida in 1995 than in 1994, the state showed a 22 percent net decrease—7 million kg. As shown in **Table 5–14** above, this was due to one facility (IMC-Agrico) reporting a decrease of nearly 8 million kg in releases. Rhode Island had the largest percentage decrease reported (51 percent). Again, this represents the influence of one facility, which reported only in 1994 (see **Table 5–14**).

As shown in **Maps 5–1** and **5–2**, somewhat different geographic patterns appear for the changes in total releases versus total releases and transfers. **Map 5–1** shows that larger percentage increases in total releases occurred primarily in the western half of the continent, but larger decreases also were found on the West Coast, as well as in parts of the eastern half of the continent. For total releases and transfers, however, **Map 5–2** shows a greater concentration of the large-percentage increases in the West Coast provinces and states and in the far northeast, with larger decreases in mid-continent.

Table 5–23
MY 94-95

NPRI Releases, by Province (Ordered by Total Releases)

Province	Total Releases 1994 (kg)	Total Releases 1995 (kg)	Change 1994–1995 kg	Change 1994–1995 %
Ontario	44,446,445	42,045,989	-2,400,456	-5.4
Quebec	18,253,317	18,417,316	163,999	0.9
Alberta	10,906,911	14,517,124	3,610,213	33.1
British Columbia	6,771,359	5,147,645	-1,623,714	-24.0
New Brunswick	5,181,793	4,785,863	-395,930	-7.6
Nova Scotia	2,403,484	1,630,226	-773,258	-32.2
Manitoba	2,629,811	1,441,968	-1,187,843	-45.2
Saskatchewan	628,471	972,364	343,893	54.7
Newfoundland	15,122	102,264	87,142	576.3
Prince Edward Island	15,489	13,020	-2,469	-15.9
Total	**91,252,202**	**89,073,779**	**-2,178,423**	**-2.4**

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

Table 5–24
MY 94-95

NPRI Releases and Transfers, by Province

Province	1994 Number of Facilities	1994 Number of Forms	1994 Total Releases (kg)	1994 Total Transfers (kg)	1994 Total Releases and Transfers (kg)	1994 Rank	1995 Number of Facilities	1995 Number of Forms	1995 Total Releases (kg)	1995 Total Transfers (kg)	1995 Total Releases and Transfers (kg)	1995 Rank
Ontario	732	2,253	44,446,445	17,721,423	62,167,868	1	714	2,303	42,045,989	21,086,183	63,132,172	1
Quebec	301	832	18,253,317	4,676,614	22,929,931	2	324	892	18,417,316	6,534,369	24,951,685	2
Alberta	84	303	10,906,911	1,191,393	12,098,304	3	88	332	14,517,124	1,268,874	15,785,998	3
British Columbia	75	224	6,771,359	178,539	6,949,898	4	74	222	5,147,645	2,662,832	7,810,477	4
New Brunswick	17	45	5,181,793	1,480	5,183,273	5	20	60	4,785,863	1,558,583	6,344,446	5
Manitoba	33	79	2,629,811	217,073	2,846,884	7	36	86	1,441,968	301,145	1,743,113	6
Nova Scotia	19	65	2,403,484	2,756,780	5,160,264	6	22	72	1,630,226	107,917	1,738,143	7
Saskatchewan	15	39	628,471	22,301	650,772	8	15	44	972,364	6,257	978,621	8
Newfoundland	3	17	15,122	0	15,122	10	3	17	102,264	28	102,292	9
Prince Edward Island	2	3	15,489	1,600	17,089	9	2	3	13,020	400	13,420	10
Total	**1,281**	**3,860**	**91,252,202**	**26,767,203**	**118,019,405**		**1,298**	**4,031**	**89,073,779**	**33,526,588**	**122,600,367**	

Province	Change 1994–1995 Number	Change 1994–1995 Number	Change 1994–1995 kg	Change 1994–1995 kg	Change 1994–1995 kg	Change 1994–1995 Rank	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 %	Percent Change 1994–1995 Rank
Ontario	-18	50	-2,400,456	3,364,760	964,304	7	-2.5	2.2	-5.4	19.0	1.6	4
Quebec	23	60	163,999	1,857,755	2,021,754	9	7.6	7.2	0.9	39.7	8.8	5
Alberta	4	29	3,610,213	77,481	3,687,694	10	4.8	9.6	33.1	6.5	30.5	8
British Columbia	-1	-2	-1,623,714	2,484,293	860,579	6	-1.3	-0.9	-24.0	1,391.5	12.4	6
New Brunswick	3	15	-395,930	1,557,103	1,161,173	8	17.6	33.3	-7.6	105,209.7	22.4	7
Manitoba	3	7	-1,187,843	84,072	-1,103,771	2	9.1	8.9	-45.2	38.7	-38.8	2
Nova Scotia	3	7	-773,258	-2,648,863	-3,422,121	1	15.8	10.8	-32.2	-96.1	-66.3	1
Saskatchewan	0	5	343,893	-16,044	327,849	5	0.0	12.8	54.7	-71.9	50.4	9
Newfoundland	0	0	87,142	28	87,170	4	0.0	0.0	576.3	—	576.4	10
Prince Edward Island	0	0	-2,469	-1,200	-3,669	3	0.0	0.0	-15.9	-75.0	-21.5	3
Total	**17**	**171**	**-2,178,423**	**6,759,385**	**4,580,962**		**1.3**	**4.4**	**-2.4**	**25.3**	**3.9**	

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

Table 5–25
MY 94-95

TRI Releases, by State (Ordered by Total Releases)

State	Total Releases 1994 (kg)	Total Releases 1995 (kg)	Change 1994–1995 kg	Change 1994–1995 %
Texas	74,809,849	75,632,867	823,018	1.1
Louisiana	48,115,270	51,431,278	3,316,007	6.9
Alabama	36,878,795	38,980,776	2,101,981	5.7
Ohio	35,546,514	37,848,227	2,301,713	6.5
Tennessee	36,228,947	37,472,097	1,243,150	3.4
Utah	29,043,277	30,521,185	1,477,908	5.1
North Carolina	33,607,775	30,054,289	-3,553,486	-10.6
Illinois	30,882,286	29,135,439	-1,746,847	-5.7
Indiana	26,362,402	26,171,593	-190,809	-0.7
Michigan	28,704,101	22,542,143	-6,161,958	-21.5
Florida	30,808,473	22,090,673	-8,717,800	-28.3
Montana	21,018,982	19,325,797	-1,693,185	-8.1
South Carolina	17,963,840	18,777,490	813,650	4.5
Pennsylvania	18,671,365	17,125,611	-1,545,754	-8.3
Virginia	18,361,077	17,079,066	-1,282,011	-7.0
Missouri	18,578,215	16,946,349	-1,631,866	-8.8
Mississippi	17,241,192	16,267,240	-973,952	-5.6
Georgia	16,902,911	15,211,287	-1,691,624	-10.0
Arizona	13,426,423	15,015,727	1,589,303	11.8
Kentucky	12,292,671	11,566,868	-725,803	-5.9
New York	12,004,386	10,348,889	-1,655,497	-13.8
Arkansas	11,834,775	9,869,597	-1,965,177	-16.6
Wisconsin	11,396,273	9,756,571	-1,639,702	-14.4
Washington	7,791,766	8,520,216	728,451	9.3
Iowa	8,945,597	8,286,117	-659,481	-7.4
New Mexico	7,719,921	8,076,253	356,332	4.6
Oregon	6,945,966	7,861,186	915,220	13.2
California	8,047,203	7,021,959	-1,025,244	-12.7
Minnesota	8,134,867	6,995,782	-1,139,085	-14.0
West Virginia	7,298,750	6,463,614	-835,136	-11.4
Kansas	6,826,025	6,332,830	-493,195	-7.2
Oklahoma	4,727,735	5,154,010	426,275	9.0
New Jersey	4,969,122	4,426,177	-542,945	-10.9
Maryland	3,892,011	3,640,107	-251,903	-6.5
Puerto Rico	3,790,222	3,437,253	-352,969	-9.3
Nebraska	3,421,363	3,097,034	-324,329	-9.5
Connecticut	3,784,070	2,980,862	-803,208	-21.2
Massachusetts	3,350,770	2,813,141	-537,628	-16.0
Maine	2,475,854	2,531,831	55,977	2.3
Nevada	1,352,709	1,429,379	76,670	5.7
Idaho	1,061,319	1,181,105	119,785	11.3
Colorado	1,211,522	1,119,955	-91,567	-7.6
Delaware	1,493,342	1,112,455	-380,887	-25.5
Rhode Island	1,224,771	1,085,941	-138,830	-11.3
New Hampshire	926,070	769,811	-156,259	-16.9
Alaska	490,420	760,595	270,176	55.1
South Dakota	772,909	742,440	-30,469	-3.9
Virgin Islands	428,148	524,038	95,889	22.4
North Dakota	394,369	499,198	104,829	26.6
Wyoming	305,247	404,400	99,152	32.5
Vermont	270,194	228,934	-41,260	-15.3
Hawaii	184,532	144,408	-40,124	-21.7
American Samoa	0	0	0	—
District of Columbia	0	0	0	—
Total	**702,916,591**	**676,812,089**	**-26,104,502**	**-3.7**

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Table 5–26
MY 94-95

TRI Releases and Transfers, by State

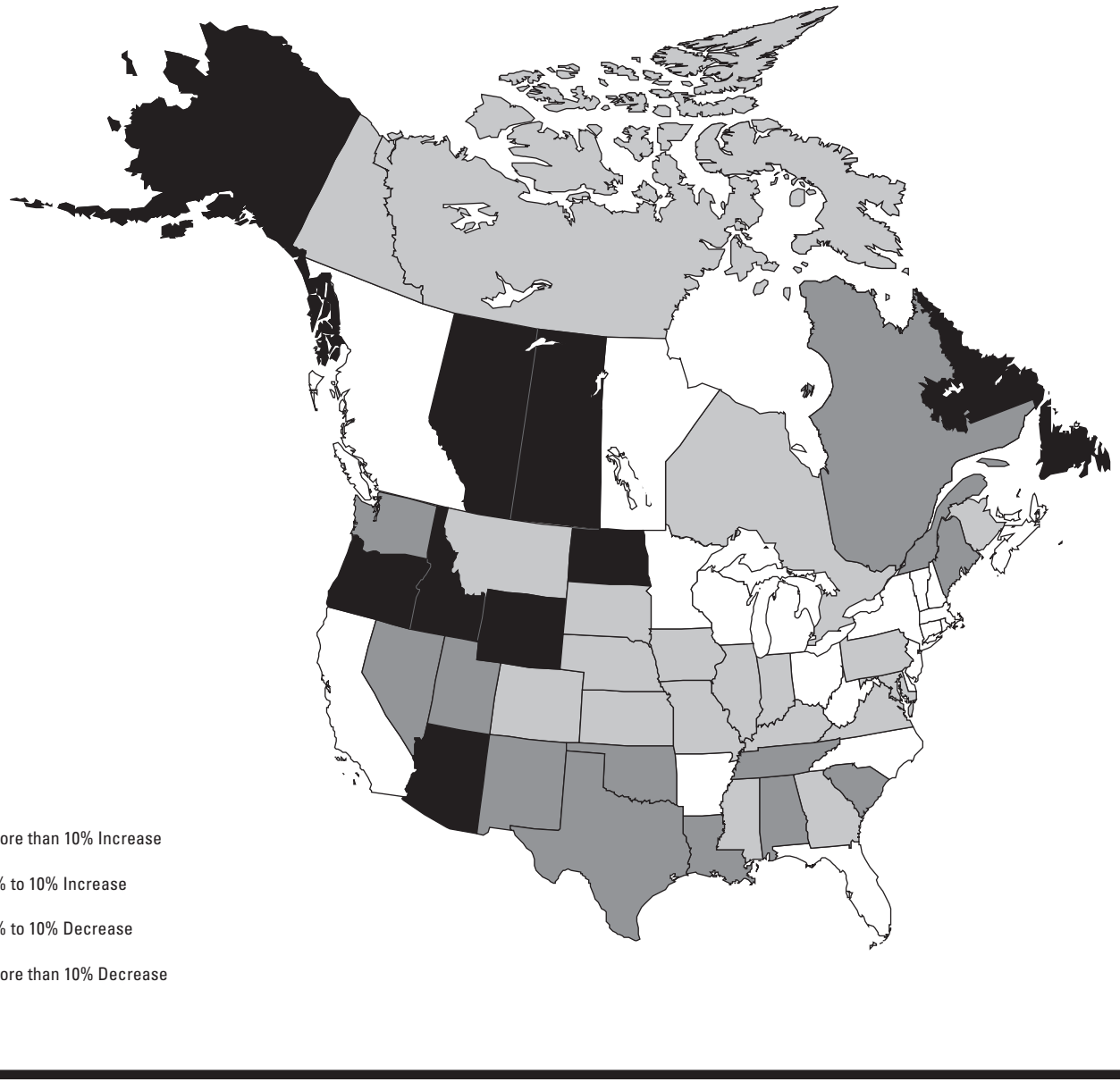
State	1994 Number of Facilities	1994 Number of Forms	1994 Total Releases (kg)	1994 Total Transfers (kg)	1994 Total Releases and Transfers (kg)	1994 Rank	1995 Number of Facilities	1995 Number of Forms	1995 Total Releases (kg)	1995 Total Transfers (kg)	1995 Total Releases and Transfers (kg)	1995 Rank
Texas	1,023	4,313	74,809,849	23,506,737	98,316,586	1	1,027	4,333	75,632,867	28,801,098	104,433,966	1
Ohio	1,497	4,366	35,546,514	18,038,973	53,585,487	2	1,439	4,202	37,848,227	19,147,478	56,995,704	2
Louisiana	266	1,530	48,115,270	2,992,286	51,107,556	3	266	1,555	51,431,278	3,450,249	54,881,527	3
Pennsylvania	1,100	3,139	18,671,365	31,348,992	50,020,357	5	1,082	3,112	17,125,611	33,390,768	50,516,379	4
Alabama	453	1,463	36,878,795	6,924,112	43,802,907	8	449	1,448	38,980,776	7,980,151	46,960,927	5
Michigan	817	2,596	28,704,101	21,463,596	50,167,698	4	780	2,462	22,542,143	22,933,229	45,475,372	6
Tennessee	587	1,629	36,228,947	10,674,342	46,903,289	7	572	1,608	37,472,097	7,281,262	44,753,358	7
Illinois	1,180	3,539	30,882,286	16,138,651	47,020,937	6	1,143	3,447	29,135,439	12,832,347	41,967,786	8
Indiana	925	2,707	26,362,402	11,781,499	38,143,901	10	902	2,624	26,171,593	15,250,390	41,421,983	9
North Carolina	776	2,096	33,607,775	7,000,909	40,608,683	9	742	2,009	30,054,289	6,771,063	36,825,351	10
Utah	134	405	29,043,277	1,104,070	30,147,347	12	122	369	30,521,185	511,057	31,032,242	11
Florida	425	930	30,808,473	2,861,270	33,669,743	11	439	955	22,090,673	4,227,298	26,317,971	12
South Carolina	435	1,377	17,963,840	5,360,094	23,323,934	15	448	1,409	18,777,490	4,638,578	23,416,068	13
Missouri	508	1,407	18,578,215	9,204,380	27,782,595	13	492	1,384	16,946,349	5,974,005	22,920,354	14
Virginia	395	1,136	18,361,077	5,020,373	23,381,450	14	386	1,105	17,079,066	5,063,587	22,142,653	15
Montana	18	110	21,018,982	14,340	21,033,322	17	21	115	19,325,797	24,647	19,350,444	16
Wisconsin	763	1,945	11,396,273	9,812,340	21,208,612	16	759	1,964	9,756,571	9,089,912	18,846,483	17
California	1,135	2,748	8,047,203	8,279,266	16,326,468	22	1,094	2,669	7,021,959	11,714,921	18,736,880	18
Mississippi	277	844	17,241,192	1,702,380	18,943,572	21	268	824	16,267,240	2,340,549	18,607,789	19
Georgia	602	1,609	16,902,911	2,511,346	19,414,257	20	605	1,580	15,211,287	2,985,045	18,196,332	20
Arizona	140	306	13,426,423	967,925	14,394,348	24	145	303	15,015,727	2,555,117	17,570,843	21
Kentucky	364	1,212	12,292,671	3,613,562	15,906,234	23	365	1,181	11,566,868	5,153,797	16,720,666	22
New York	637	1,649	12,004,386	8,015,112	20,019,499	19	604	1,563	10,348,889	5,811,238	16,160,127	23
New Jersey	556	1,747	4,969,122	15,862,956	20,832,079	18	516	1,613	4,426,177	11,693,727	16,119,904	24
Oregon	219	532	6,945,966	4,523,631	11,469,597	28	219	536	7,861,186	6,311,667	14,172,854	25
Iowa	355	911	8,945,597	4,255,351	13,200,949	25	347	879	8,286,117	4,659,532	12,945,649	26
Arkansas	349	997	11,834,775	1,348,258	13,183,033	26	328	953	9,869,597	1,299,429	11,169,026	27
West Virginia	134	531	7,298,750	3,598,806	10,897,556	29	126	516	6,463,614	3,952,911	10,416,525	28
Minnesota	430	1,009	8,134,867	3,387,732	11,522,599	27	429	1,005	6,995,782	3,022,587	10,018,369	29
Washington	254	670	7,791,766	490,072	8,281,838	31	246	637	8,520,216	456,117	8,976,333	30
New Mexico	35	112	7,719,921	195,365	7,915,286	32	32	108	8,076,253	127,045	8,203,298	31
Kansas	247	727	6,826,025	1,474,920	8,300,945	30	244	722	6,332,830	1,798,436	8,131,266	32
Massachusetts	441	1,024	3,350,770	4,331,024	7,681,794	33	419	1,002	2,813,141	4,344,441	7,157,582	33
Puerto Rico	134	353	3,790,222	3,791,682	7,581,904	34	135	361	3,437,253	3,572,850	7,010,103	34
Oklahoma	249	668	4,727,735	1,544,809	6,272,544	36	241	671	5,154,010	1,793,944	6,947,954	35
Connecticut	302	721	3,784,070	2,807,047	6,591,117	35	281	694	2,980,862	3,236,438	6,217,300	36
Maryland	154	440	3,892,011	2,290,697	6,182,707	38	160	441	3,640,107	2,344,384	5,984,492	37
Nebraska	134	336	3,421,363	2,773,725	6,195,088	37	138	350	3,097,034	1,733,258	4,830,292	38
Maine	83	219	2,475,854	530,258	3,006,112	41	75	219	2,531,831	778,378	3,310,209	39
Delaware	59	178	1,493,342	1,715,344	3,208,686	39	61	180	1,112,455	1,471,557	2,584,012	40
Colorado	143	330	1,211,522	954,083	2,165,605	42	145	334	1,119,955	652,992	1,772,947	41
Rhode Island	127	275	1,224,771	1,955,959	3,180,730	40	126	280	1,085,941	481,902	1,567,843	42
Nevada	33	65	1,352,709	37,318	1,390,028	43	31	61	1,429,379	28,192	1,457,571	43
Idaho	50	101	1,061,319	85,489	1,146,809	45	47	110	1,181,105	62,805	1,243,909	44
New Hampshire	90	203	926,070	235,498	1,161,568	44	86	199	769,811	201,156	970,967	45
South Dakota	63	115	772,909	71,059	843,968	46	66	119	742,440	86,114	828,554	46
Alaska	8	27	490,420	29	490,449	48	8	28	760,595	2,748	763,344	47
Virgin Islands	3	20	428,148	187,739	615,888	47	2	21	524,038	86,684	610,722	48
North Dakota	31	57	394,369	58,352	452,721	49	27	64	499,198	27,739	526,937	49
Wyoming	19	99	305,247	4,260	309,507	51	18	105	404,400	4,237	408,637	50
Vermont	28	62	270,194	107,351	377,545	50	28	59	228,934	127,897	356,831	51
Hawaii	12	44	184,532	12,873	197,405	52	11	41	144,408	77,259	221,667	52
District of Columbia	1	1	0	2	2	53	1	1	0	2	2	53
American Samoa	1	1	0	0	0	54	0	0	0	0	0	54
Total	**19,201**	**55,631**	**702,916,591**	**266,968,248**	**969,884,839**		**18,743**	**54,530**	**676,812,089**	**272,364,217**	**949,176,307**	

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

	Change 1994–1995						Percent Change 1994–1995					
State	Number of Facilities	Number of Forms	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Rank	Number of Facilities	Number of Forms	Total Releases (%)	Total Transfers (%)	Total Releases and Transfers (%)	Rank
Texas	4	20	823,018	5,294,361	6,117,380	54	0.4	0.5	1.1	22.5	6.2	38
Ohio	-58	-164	2,301,713	1,108,505	3,410,218	52	-3.9	-3.8	6.5	6.1	6.4	39
Louisiana	0	25	3,316,007	457,963	3,773,971	53	0.0	1.6	6.9	15.3	7.4	41
Pennsylvania	-18	-27	-1,545,754	2,041,776	496,021	42	-1.6	-0.9	-8.3	6.5	1.0	33
Alabama	-4	-15	2,101,981	1,056,039	3,158,020	49	-0.9	-1.0	5.7	15.3	7.2	40
Michigan	-37	-134	-6,161,958	1,469,632	-4,692,326	5	-4.5	-5.2	-21.5	6.8	-9.4	14
Tennessee	-15	-21	1,243,150	-3,393,080	-2,149,931	9	-2.6	-1.3	3.4	-31.8	-4.6	23
Illinois	-37	-92	-1,746,847	-3,306,304	-5,053,151	2	-3.1	-2.6	-5.7	-20.5	-10.7	13
Indiana	-23	-83	-190,809	3,468,892	3,278,083	51	-2.5	-3.1	-0.7	29.4	8.6	44
North Carolina	-34	-87	-3,553,486	-229,846	-3,783,332	7	-4.4	-4.2	-10.6	-3.3	-9.3	15
Utah	-12	-36	1,477,908	-593,013	884,895	46	-9.0	-8.9	5.1	-53.7	2.9	34
Florida	14	25	-8,717,800	1,366,029	-7,351,771	1	3.3	2.7	-28.3	47.7	-21.8	4
South Carolina	13	32	813,650	-721,516	92,134	36	3.0	2.3	4.5	-13.5	0.4	32
Missouri	-16	-23	-1,631,866	-3,230,374	-4,862,240	3	-3.1	-1.6	-8.8	-35.1	-17.5	8
Virginia	-9	-31	-1,282,011	43,215	-1,238,797	15	-2.3	-2.7	-7.0	0.9	-5.3	22
Montana	3	5	-1,693,185	10,307	-1,682,878	11	16.7	4.5	-8.1	71.9	-8.0	16
Wisconsin	-4	19	-1,639,702	-722,427	-2,362,129	8	-0.5	1.0	-14.4	-7.4	-11.1	12
California	-41	-79	-1,025,244	3,435,655	2,410,411	47	-3.6	-2.9	-12.7	41.5	14.8	48
Mississippi	-9	-20	-973,952	638,169	-335,783	23	-3.2	-2.4	-5.6	37.5	-1.8	29
Georgia	3	-29	-1,691,624	473,699	-1,217,925	16	0.5	-1.8	-10.0	18.9	-6.3	19
Arizona	5	-3	1,589,303	1,587,192	3,176,495	50	3.6	-1.0	11.8	164.0	22.1	50
Kentucky	1	-31	-725,803	1,540,235	814,432	45	0.3	-2.6	-5.9	42.6	5.1	37
New York	-33	-86	-1,655,497	-2,203,874	-3,859,371	6	-5.2	-5.2	-13.8	-27.5	-19.3	6
New Jersey	-40	-134	-542,945	-4,169,229	-4,712,175	4	-7.2	-7.7	-10.9	-26.3	-22.6	2
Oregon	0	4	915,220	1,788,036	2,703,257	48	0.0	0.8	13.2	39.5	23.6	51
Iowa	-8	-32	-659,481	404,181	-255,300	24	-2.3	-3.5	-7.4	9.5	-1.9	27
Arkansas	-21	-44	-1,965,177	-48,829	-2,014,007	10	-6.0	-4.4	-16.6	-3.6	-15.3	10
West Virginia	-8	-15	-835,136	354,105	-481,031	20	-6.0	-2.8	-11.4	9.8	-4.4	24
Minnesota	-1	-4	-1,139,085	-365,145	-1,504,230	13	-0.2	-0.4	-14.0	-10.8	-13.1	11
Washington	-8	-33	728,451	-33,956	694,495	44	-3.1	-4.9	9.3	-6.9	8.4	42
New Mexico	-3	-4	356,332	-68,319	288,013	40	-8.6	-3.6	4.6	-35.0	3.6	35
Kansas	-3	-5	-493,195	323,516	-169,679	27	-1.2	-0.7	-7.2	21.9	-2.0	26
Massachusetts	-22	-22	-537,628	13,417	-524,211	19	-5.0	-2.1	-16.0	0.3	-6.8	18
Puerto Rico	1	8	-352,969	-218,832	-571,800	18	0.7	2.3	-9.3	-5.8	-7.5	17
Oklahoma	-8	3	426,275	249,135	675,410	43	-3.2	0.4	9.0	16.1	10.8	46
Connecticut	-21	-27	-803,208	429,391	-373,817	22	-7.0	-3.7	-21.2	15.3	-5.7	20
Maryland	6	1	-251,903	53,688	-198,216	25	3.9	0.2	-6.5	2.3	-3.2	25
Nebraska	4	14	-324,329	-1,040,468	-1,364,796	14	3.0	4.2	-9.5	-37.5	-22.0	3
Maine	-8	0	55,977	248,120	304,098	41	-9.6	0.0	2.3	46.8	10.1	45
Delaware	2	2	-380,887	-243,786	-624,673	17	3.4	1.1	-25.5	-14.2	-19.5	5
Colorado	2	4	-91,567	-301,091	-392,658	21	1.4	1.2	-7.6	-31.6	-18.1	7
Rhode Island	-1	5	-138,830	-1,474,057	-1,612,888	12	-0.8	1.8	-11.3	-75.4	-50.7	1
Nevada	-2	-4	76,670	-9,127	67,543	34	-6.1	-6.2	5.7	-24.5	4.9	36
Idaho	-3	9	119,785	-22,685	97,101	37	-6.0	8.9	11.3	-26.5	8.5	43
New Hampshire	-4	-4	-156,259	-34,342	-190,601	26	-4.4	-2.0	-16.9	-14.6	-16.4	9
South Dakota	3	4	-30,469	15,055	-15,414	29	4.8	3.5	-3.9	21.2	-1.8	28
Alaska	0	1	270,176	2,719	272,894	39	0.0	3.7	55.1	9,223.1	55.6	53
Virgin Islands	-1	1	95,889	-101,055	-5,166	30	-33.3	5.0	22.4	-53.8	-0.8	30
North Dakota	-4	7	104,829	-30,613	74,216	35	-12.9	12.3	26.6	-52.5	16.4	49
Wyoming	-1	6	99,152	-23	99,130	38	-5.3	6.1	32.5	-0.5	32.0	52
Vermont	0	-3	-41,260	20,546	-20,714	28	0.0	-4.8	-15.3	19.1	-5.5	21
Hawaii	-1	-3	-40,124	64,385	24,262	33	-8.3	-6.8	-21.7	500.1	12.3	47
District of Columbia	0	0	0	0	0	32	0.0	0.0	—	0.0	0.0	31
American Samoa	-1	-1	0	0	0	31	-100.0	-100.0	—	—	—	—
	-458	**-1,101**	**-26,104,502**	**5,395,970**	**-20,708,532**		**-2.4**	**-2.0**	**-3.7**	**2.0**	**-2.1**	

Map 5–1
MY 94-95

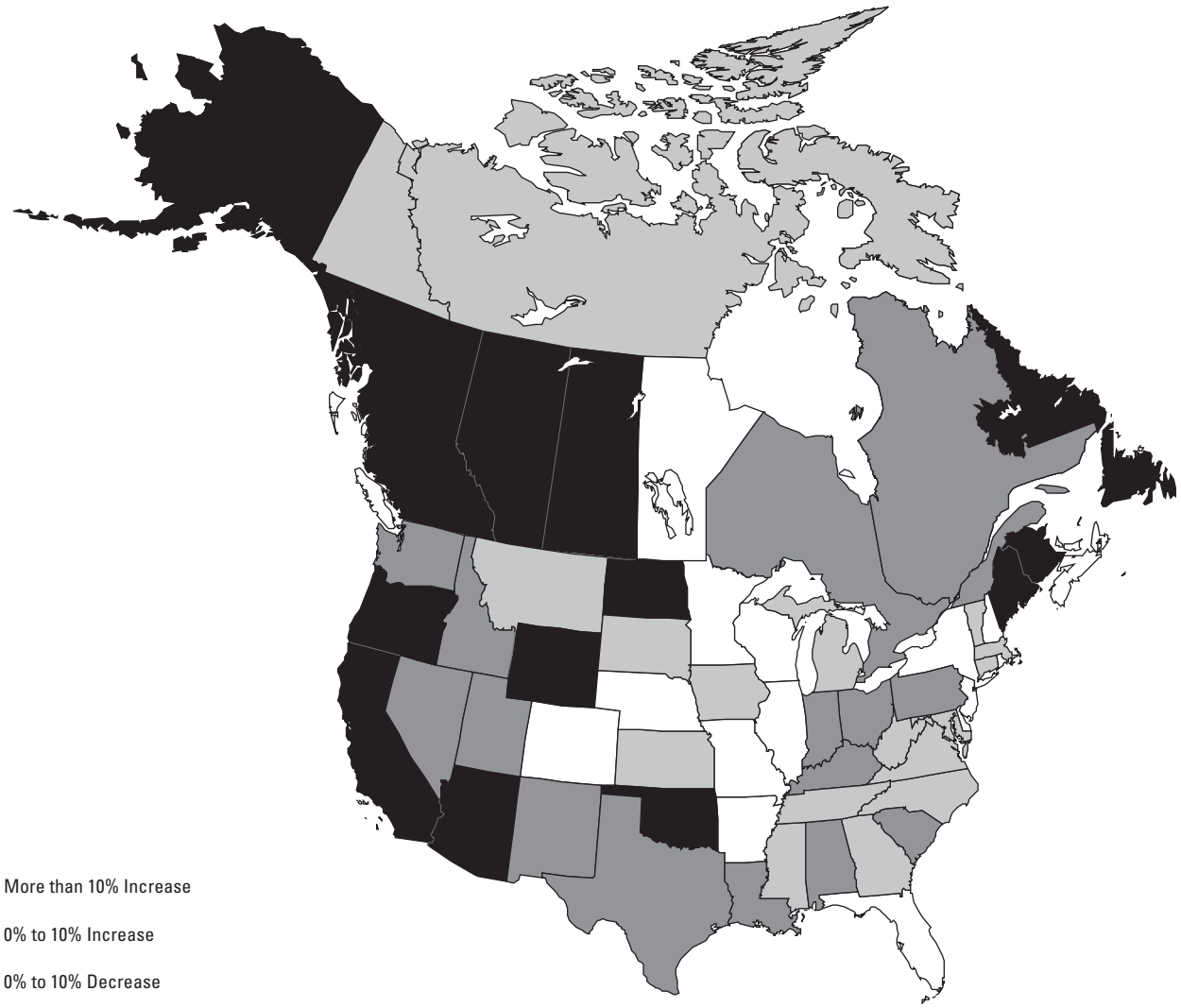
Change in Total Releases, by State/Province



➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to both NPRI and TRI.

Map 5–2
MY 94-95

Change in Total Releases and Transfers, by State/Province



➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to both NPRI and TRI.

5.8 Changes by Chemical

NPRI releases decreased by 2 percent from 1994 to 1995. **Table 5–27** shows the 10 chemicals with the largest increase in releases, **Table 5–28**, the 10 chemicals with the largest decreases. Two chemicals (hydrogen fluoride and aluminum) increased by more than 1 million kg, while three (zinc and its compounds, toluene and styrene) had decreases of more than 1 million kg. None of these tabulations of the top 10 chemicals for releases and transfers (**Tables 5–27** through **5–30**) include ammonia, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and any chemicals not reported to TRI.

NPRI transfers increased by 25 percent from 1994 to 1995. One chemical, zinc and its compounds, increased by 6 million kg, with two others (asbestos, and chromium and its compounds) also exhibiting increases of more than 1 million kg (see **Table 5–29**). Only one chemical, methanol, decreased by more than 1 million kg (see **Table 5–30**).

Changes in 1995 reporting requirements for NPRI (described in **Chapter 2**) may affect some of these reported increases.

The increase in transfers brought about NPRI's 4 percent overall increase in total releases and transfers. Chemicals playing the largest role in this change were zinc and its compounds (a 4 million kg increase in total releases and transfers) and asbestos (nearly 3 million kg; see **Table 5–31**). Three other chemicals (hydrogen fluoride, chromium and its compounds, and aluminum) showed increases in total releases and transfers of more than 1 million kg. There were also three chemicals with decreases of more than 1 million kg (toluene, styrene and methanol), as shown in **Table 5–32**.

Releases from TRI facilities decreased by 4 percent from 1994 to 1995. **Tables 5–33** and **5–34** show the 10 chemicals with the largest increases and decreases from 1994 to 1995. The chemical with the largest increase was acetonitrile with 5 million kg. Two chemicals, toluene and phosphoric acid, had decreases of 11 million kg each. As earlier, none of these tabulations of the top 10 chemicals for releases and transfers (**Tables 5–31** through **5–36**) include ammonia, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and any chemicals not reported to NPRI.

TRI transfers increased by 2 percent from 1994 to 1995. The chemical with the largest increase—nearly 7 million kg—was zinc and its compounds (see **Table 5-35**). Three other chemicals (vinyl acetate, xylene, and chromium and its compounds) had increases greater than 2 million kg. Three (methanol, aluminum, and manganese and its compounds) had decreases of greater than 1 million kg (see **Table 5-36**).

Total releases and transfers from TRI facilities decreased by 2 percent from 1994 to 1995. While zinc and its compounds had the largest increase, of nearly 9 million kg, phosphoric acid and toluene both had decreases of more than 11 million kg (see **Tables 5-37** and **5-38**).

The chemicals with the largest changes from 1994 to 1995 under NPRI and TRI were not in general the same. One exception is zinc and its compounds, which had the largest increases in transfers and, hence, in total releases and transfers in both countries. Toluene registered high in decreases in both countries. In the NPRI database, toluene had the second largest decreases in both releases and transfers and, hence, was the chemical with the largest overall decrease. For TRI, toluene had the second largest decrease in total releases and transfers because of its large decreases in releases.

Many of the large increases or decreases for a single chemical in both TRI and NPRI are due to reporting from one facility. **Tables 5–7** through **5–14**, above, indicate the relevant facilities.

Table 5–27 MY 94-95 The 10 Chemicals with the Largest Increases in NPRI Releases

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
7664-39-3	Hydrogen fluoride	1,670,750	6,553.2
7429-90-5	Aluminum (fume or dust)	1,169,381	2,072.8
78-93-3	Methyl ethyl ketone	373,863	8.6
67-56-1	Methanol	311,672	1.0
—	Manganese (and its compounds)	271,344	9.1
67-66-3	Chloroform	238,411	138,611.0
108-95-2	Phenol	222,609	108.2
—	Copper (and its compounds)	198,202	12.7
7440-62-2	Vanadium (fume or dust)	196,841	1,709.9
107-21-1	Ethylene glycol	171,303	44.8

Table 5–28 MY 94-95 The 10 Chemicals with the Largest Decreases in NPRI Releases

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
—	Zinc (and its compounds)	-1,401,952	-24.5
108-88-3	Toluene	-1,065,597	-14.4
100-42-5	Styrene	-1,049,256	-59.0
1330-20-7	Xylene (mixed isomers)	-890,615	-10.5
7782-50-5	Chlorine	-772,888	-38.1
10049-04-4	Chlorine dioxide	-673,219	-38.8
71-43-2	Benzene	-653,560	-26.7
—	Lead (and its compounds)	-436,926	-24.5
74-87-3	Chloromethane	-206,054	-17.5
108-10-1	Methyl isobutyl ketone	-194,082	-22.3

Table 5–29 MY 94-95 The 10 Chemicals with the Largest Increases in NPRI Transfers

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
—	Zinc (and its compounds)	5,711,650	87.8
1332-21-4	Asbestos (friable)	2,606,268	403.6
—	Chromium (and its compounds)	1,514,129	142.1
—	Lead (and its compounds)	717,152	57.2
108-05-4	Vinyl acetate	128,429	27.6
107-21-1	Ethylene glycol	92,234	38.6
95-63-6	1,2,4-Trimethylbenzene	65,994	127.3
67-63-0	Isopropyl alcohol (manufacturing)	65,030	9.0
109-86-4	2-Methoxyethanol	31,779	1,498.3
107-13-1	Acrylonitrile	15,149	80.0

Table 5–30 MY 94-95 The 10 Chemicals with the Largest Decreases in NPRI Transfers

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
67-56-1	Methanol	-1,423,035	-40.5
108-88-3	Toluene	-570,956	-30.1
—	Manganese (and its compounds)	-539,213	-14.2
78-93-3	Methyl ethyl ketone	-185,955	-30.6
80-62-6	Methyl methacrylate	-180,181	-68.4
108-95-2	Phenol	-158,574	-40.5
—	Nickel (and its compounds)	-140,172	-28.2
7429-90-5	Aluminum (fume or dust)	-132,433	-50.9
75-09-2	Dichloromethane	-113,766	-62.8
7664-38-2	Phosphoric acid	-111,508	-19.2

Table 5–31
MY 94-95

The 10 Chemicals with the Largest Increases in NPRI Total Releases and Transfers

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
—	Zinc (and its compounds)	4,309,698	35.2
1332-21-4	Asbestos (friable)	2,610,978	302.1
7664-39-3	Hydrogen fluoride	1,668,700	4,989.4
—	Chromium (and its compounds)	1,377,142	73.9
7429-90-5	Aluminum (fume or dust)	1,036,948	327.7
—	Lead (and its compounds)	280,226	9.2
107-21-1	Ethylene glycol	263,537	42.4
108-05-4	Vinyl acetate	248,360	42.1
67-66-3	Chloroform	241,821	134,345.0
7440-62-2	Vanadium (fume or dust)	196,003	1,315.3

➤ Calculation of top chemicals does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

Table 5–32
MY 94-95

The 10 Chemicals with the Largest Decreases in NPRI Total Releases and Transfers

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
108-88-3	Toluene	-1,636,553	-17.6
100-42-5	Styrene	-1,129,127	-54.0
67-56-1	Methanol	-1,111,363	-3.3
1330-20-7	Xylene (mixed isomers)	-975,988	-9.9
7782-50-5	Chlorine	-784,888	-38.4
10049-04-4	Chlorine dioxide	-673,219	-38.8
71-43-2	Benzene	-649,541	-25.3
—	Manganese (and its compounds)	-267,869	-4.0
108-10-1	Methyl isobutyl ketone	-259,470	-25.9
74-87-3	Chloromethane	-206,054	-17.5

➤ Calculation of top chemicals does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to TRI.

Table 5–33 MY 94-95 The 10 Chemicals with the Largest Increases in TRI Releases

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
75-05-8	Acetonitrile	4,830,964	58.5
7782-50-5	Chlorine	2,638,517	9.6
107-21-1	Ethylene glycol	2,211,710	30.9
—	Zinc (and its compounds)	1,953,608	4.7
—	Copper (and its compounds)	1,609,165	8.5
—	Manganese (and its compounds)	1,489,543	6.5
7664-39-3	Hydrogen fluoride	1,042,900	27.9
79-10-7	Acrylic acid	652,077	20.7
75-07-0	Acetaldehyde	627,010	10.6
100-42-5	Styrene	612,329	3.3

➤ Calculation of top chemicals does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Table 5–34 MY 94-95 The 10 Chemicals with the Largest Decreases in TRI Releases

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
108-88-3	Toluene	-10,787,001	-14.0
7664-38-2	Phosphoric acid	-10,619,193	-28.9
1330-20-7	Xylene (mixed isomers)	-6,602,074	-13.3
78-93-3	Methyl ethyl ketone	-4,611,915	-12.8
75-09-2	Dichloromethane	-2,906,000	-10.3
79-01-6	Trichloroethylene	-2,249,638	-16.4
108-10-1	Methyl isobutyl ketone	-1,782,162	-15.4
71-36-3	n-Butyl alcohol	-1,122,159	-8.2
100-41-4	Ethylbenzene	-942,143	-16.4
127-18-4	Tetrachloroethylene	-438,137	-9.5

➤ Calculation of top chemicals does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Table 5–35 MY 94-95 The 10 Chemicals with the Largest Increases in TRI Transfers

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
—	Zinc (and its compounds)	6,638,139	14.1
108-05-4	Vinyl acetate	3,485,195	514.1
1330-20-7	Xylene (mixed isomers)	2,787,342	60.2
—	Chromium (and its compounds)	2,146,955	21.7
107-21-1	Ethylene glycol	980,425	6.3
74-85-1	Ethylene	948,689	7913.5
1344-28-1	Aluminum oxide (fibrous forms)	652,201	95.5
117-81-7	Di(2-ethylhexyl) phthalate	468,191	46.4
108-95-2	Phenol	403,956	11.9
75-07-0	Acetaldehyde	381,336	94.2

➤ Calculation of top chemicals does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Table 5–36 MY 94-95 The 10 Chemicals with the Largest Decreases in TRI Transfers

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
67-56-1	Methanol	-2,885,371	-4.9
7429-90-5	Aluminum (fume or dust)	-2,835,584	-49.2
—	Manganese (and its compounds)	-1,440,688	-7.4
—	Copper (and its compounds)	-899,418	-7.5
79-01-6	Trichloroethylene	-792,780	-61.5
79-00-5	1,1,2-Trichloroethane	-657,282	-30.8
7664-38-2	Phosphoric acid	-641,957	-16.8
110-82-7	Cyclohexane	-584,448	-52.4
—	Antimony (and its compounds)	-443,759	-19.1
—	Cobalt (and its compounds)	-442,259	-62.6

➤ Calculation of top chemicals does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Table 5–37
MY 94-95

The 10 Chemicals with the Largest Increases in TRI Total Releases and Transfers

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
—	Zinc (and its compounds)	8,591,747	9.7
75-05-8	Acetonitrile	4,935,361	47.1
108-05-4	Vinyl acetate	3,414,549	120.8
107-21-1	Ethylene glycol	3,192,135	14.1
7782-50-5	Chlorine	2,451,148	8.8
—	Chromium (and its compounds)	2,086,190	10.2
7664-39-3	Hydrogen fluoride	1,132,807	21.0
75-07-0	Acetaldehyde	1,008,346	16.0
1344-28-1	Aluminum oxide (fibrous forms)	960,765	131.5
108-95-2	Phenol	917,528	10.6

➤ Calculation of top chemicals does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Table 5–38
MY 94-95

The 10 Chemicals with the Largest Decreases in TRI Total Releases and Transfers

CAS Number	Chemical	Change 1994–1995 kg	Change 1994–1995 %
7664-38-2	Phosphoric acid	-11,261,150	-27.8
108-88-3	Toluene	-11,124,541	-12.7
78-93-3	Methyl ethyl ketone	-4,804,561	-12.3
1330-20-7	Xylene (mixed isomers)	-3,814,732	-7.0
75-09-2	Dichloromethane	-3,274,999	-9.7
79-01-6	Trichloroethylene	-3,042,418	-20.3
67-56-1	Methanol	-2,678,868	-1.6
7429-90-5	Aluminum (fume or dust)	-2,480,211	-34.6
108-10-1	Methyl isobutyl ketone	-1,844,278	-14.7
71-36-3	n-Butyl alcohol	-1,366,351	-8.8

➤ Calculation of top chemicals does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to NPRI.

Chapter 6: Table of Contents

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

Key Findings

- Top parent companies (companies that owned reporting facilities) accounted for a greater proportion of NPRI releases and transfers (30 percent) than the top parent companies in TRI (18 percent). Differences within individual release and transfer categories was even more extreme between the two groups: 28 percent of air emissions, 39 percent of surface water discharges, and 91 percent of underground injection within the totals reported to NPRI in 1995, as opposed to 14 percent, 6 percent, and 46 percent of the respective totals reported to TRI.
- Canadian facilities were required to report the reason for year-to-year changes in total releases and transfers only in fairly general terms. Forms citing production-level changes as the reason for changes—alone or in conjunction with other factors—accounted for 30 percent of NPRI's total releases and 54 percent of total transfers. No specific reporting on source reduction activities was required by NPRI in 1995.
- US facilities report the amount of year-to-year change and projections of future changes for separate categories of total production-related waste.Total production-related waste was projected to decrease overall, as was the amount of the waste released or disposed of.
- US facilities also report on source reduction activity. While 29 percent of TRI facilities reported some source reduction activity undertaken during 1995, only 21 percent of the forms indicated such activity.

6.1 Introduction

Some data common to both PRTRs can be refined for further comparisons. Parent company reporting and analyses of chemical groups of particular interest are two examples. In addition, differences in the specific data that must be reported in each country support analyses specific to one country or the other. This chapter presents these types of analyses. Some analyses below draw on data from the complete NPRI and TRI databases (see **Table 3–4** in **Chapter 3**). Others examine data from the matched data set, representing chemicals and industries covered in both PRTRs, as presented in **Chapters 3** and **4**.

Table 6–1
M 1995

The 10 Parent Companies with Largest NPRI Releases

Parent Company	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)	Major Chemicals Reported (Primary Media/Transfers)*
Sherritt Inc.	3	26	6,362,781	382,400	1,655,240	114,709	8,516,490	Ammonia, methanol (air)
Irving Forest Services Inc.	3	7	275,743	3,498,449	0	0	3,774,192	Methanol (water)
Methanex Corporation	2	13	3,639,483	9,000	0	1,320	3,649,803	Methanol (air)
Shell Canada	7	76	1,000,314	17,096	2,515,001	3,928	3,538,462	Ammonia (UIJ)
Celanese Canada Inc.	3	17	374,996	4,864	3,156,460	1,202	3,537,844	Methanol, methyl ethyl ketone (UIJ)
Domtar Inc.	6	20	1,202,918	2,005,797	0	40	3,208,755	Methanol (water, air)
Novacor Chemicals Ltd.	6	50	2,982,888	921	5,215	6,022	2,995,066	Cyclohexane, ethylene (air)
General Motors of Canada	11	73	2,901,179	1,772	0	0	2,904,068	Xylene, toluene, n-butyl alcohol (air)
CF Industries, Inc.	1	4	2,618,992	25,663	0	0	2,644,759	Ammonia (air)
Petro-Canada	4	59	695,502	51,368	1,698,800	2,100	2,448,264	Ammonia (water, air)
Subtotal	**46**	**345**	**22,054,796**	**5,997,330**	**9,030,716**	**129,321**	**37,217,703**	
% of Total	**3.5**	**8.0**	**27.7**	**38.9**	**90.9**	**1.1**	**31.9**	
Total	**1,309**	**4,328**	**79,547,053**	**15,419,582**	**9,937,227**	**11,690,712**	**116,744,327**	

* Chemicals accounting for more than 70% of the total releases from the facilities belonging to the parent company. UIJ= underground injection.

6.2 Parent Company Reporting

Both NPRI and TRI require a facility to report parent company information. NPRI collects the parent company name and address. More than one parent company can be listed, if needed, with the percentage of ownership given. TRI collects the parent company name and its Dun and Bradstreet number (an identification number supplied by this corporate information service). Compiling chemical reports by parent company requires the direct inspection of names, addresses, and identification numbers. Complicating this is the fact that company nomenclature is not standardized in the databases. In TRI, for example, facilities belonging to the General Motors Corporation may identify their parent company by half a dozen or more variations, such as GMC or GM Corporation or Delco Div., GMC.

In 1995, the top 10 parent companies in NPRI accounted for nearly one-third of total releases reported in Canada in the matched data set of chemicals and industries common to both NPRI and TRI. In the US, the top 10 reported about one-fifth of TRI's total releases. **Tables 6–1** and **6–2** list the top 10 parent companies for total releases in each country. As mentioned previously, any evaluation of the relative health and environmental impacts of these facilities must also take into account the toxicity of the chemicals released, local climatic conditions, and the proximity of people and/or ecologically sensitive areas to the released waste streams.

NPRI parent companies accounted for twice the proportion of air emissions (28 percent of all NPRI air emissions), compared to TRI parent companies (14 percent). Differences in other release media were much greater: facilities of the top NPRI parent companies were responsible for a much larger proportion of surface water discharges (39 percent) and underground injection (91 percent) than their TRI counterparts, but very little of the on-site land releases (1 percent). On the other hand, facilities of the top TRI companies reported smaller proportions of releases to surface water (6 percent) and underground injection (46 percent) and a much larger proportion of on-site land releases (33 percent).

The tables also include, for each parent company, the chemicals and type of release that accounted for the majority of total releases. Thus, for Canada, the parent company with the largest releases, Sherritt Inc., owned three reporting facilities whose releases were primarily emissions to air of ammonia

Table 6–2
M 1995

The 10 Parent Companies with Largest TRI Releases

Parent Company	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)	Major Chemicals Reported (Primary Media/Transfers)*
Renco Group Inc.	12	43	26,635,191	3,971	0	3,858,683	30,497,845	Chlorine (air)
ASARCO Inc.	10	72	870,012	4,298	79,753	28,449,940	29,404,003	Zinc/copper and compounds (land)
DuPont	61	600	6,076,361	1,486,924	20,078,524	238,697	27,880,505	Nitric acid/nitrate cmpds., acetonitrile, ammonia (UIJ), methanol (air)
Courtaulds U. S. Inc.	9	45	15,738,031	23,524	0	240,091	16,001,646	Carbon disulfide (air)
General Motors Corp.	99	696	8,017,407	19,153	0	7,439,923	15,476,483	Zinc and compounds (land), xylene, n-butyl alcohol (air)
Monsanto Co.	26	205	910,411	302,262	11,631,220	27,404	12,871,297	Nitric acid and nitrate compounds, ammonia, formaldehyde (UIJ)
Cytec Industries Inc.	16	129	935,111	208,305	11,645,332	8,724	12,797,472	Acetonitrile, ammonia, methanol (UIJ)
International Paper Co.	54	258	12,282,595	481,287	0	24,014	12,787,895	Methanol (air)
Arcadian Fertilizer L.P.	8	59	5,075,167	7,128,612	2	200,586	12,404,367	Phosphoric acid (water), ammonia (air)
BP America Inc.	8	118	637,217	64,183	11,361,515	5,698	12,068,612	Acetonitrile, ammonia, acrylamide, acrylonitrile (UIJ)
Subtotal	**303**	**2,225**	**77,177,502**	**9,722,519**	**54,796,346**	**40,493,758**	**182,190,125**	
% of Total	**1.8**	**4.1**	**13.9**	**6.2**	**45.8**	**32.8**	**19.2**	
Total	**19,786**	**59,764**	**560,407,943**	**60,570,521**	**92,783,273**	**123,219,666**	**836,981,403**	

* Chemicals accounting for more than 70% of total releases from the facilities belonging to the parent company. UIJ= underground injection.

and methanol. For eight of the top 10 NPRI parent companies, ammonia and/or methanol represented a large portion of releases. For the United States, 12 facilities of the Renco Group Inc., the top parent company for releases, reported primarily chlorine emissions to air. Altogether, the chemicals reported in the greatest amounts by the top 10 TRI companies were more diverse than those in NPRI.

Tables 6–3 and **6–4** list the 10 parent companies in each country with the largest total releases and transfers from the common set of chemicals and industries. Facilities of the top 10 companies reported 30 percent of NPRI's total releases and transfers (**Table 6–3**), while facilities of the top 10 in TRI accounted for 18 percent of that total (**Table 6–4**).

Three companies that did not appear among the top 10 NPRI parent companies for releases did rank among the top 10 for total releases and transfers because they owned facilities that reported sizable transfers (**Tables 6–1** and **6–3**). Likewise, two TRI companies in the top 10 for total releases and transfers were not among the top 10 for releases (**Tables 6–2** and **6–4**). Notably, parent companies accounted for about the same percentage of transfers to treatment/destruction in each country (15 to 16 percent), but 76 percent of transfers to sewage/POTWs in NPRI and 6 percent in TRI.

Because the matched data set includes only those industries that report in both databases—that is, manufacturing industries—NPRI parent companies in other industries do not appear in this analysis, although their facilities may report significant amounts of releases and transfers. Companies whose facilities engage in mining are one example.

Table 6–3
M 1995

The 10 Parent Companies with Largest NPRI Releases and Transfers

Parent Company	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
Sherritt Inc.	3	26	6,362,781	382,400	1,655,240	114,709	8,516,490
Co-Steel Incorporated	1	6	13,986	221	0	2,397,300	2,411,507
Stelco Inc.	12	69	462,160	302,938	0	1,048,301	1,816,607
Irving Forest Services Inc.	3	7	275,743	3,498,449	0	0	3,774,192
Methanex Corporation	2	13	3,639,483	9,000	0	1,320	3,649,803
Shell Canada	7	76	1,000,314	17,096	2,515,001	3,928	3,538,462
Celanese Canada Inc.	3	17	374,996	4,864	3,156,460	1,202	3,537,844
Kikuchi Color & Chemicals Corp.	1	6	0	0	0	0	100
Novacor Chemicals Ltd.	6	50	2,982,888	921	5,215	6,022	2,995,066
Domtar Inc.	6	20	1,202,918	2,005,797	0	40	3,208,755
Subtotal	**44**	**290**	**16,315,269**	**6,221,686**	**7,331,916**	**3,572,822**	**33,448,826**
% of Total	**3.4**	**6.7**	**20.5**	**40.3**	**73.8**	**30.6**	**28.7**
Total	**1,309**	**4,328**	**79,547,053**	**15,419,582**	**9,937,227**	**11,690,712**	**116,744,327**

Parent Company	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
Sherritt Inc.	0	0	16,370	16,370	8,532,860	Ammonia, methanol (air)
Co-Steel Incorporated	0	24	6,030,800	6,030,824	8,442,331	Zinc and compounds (transfers to disposal)
Stelco Inc.	2,008,189	182,304	464,773	2,655,266	4,471,873	Zinc/manganese and compounds (transfers to treatment, land), ammonia (water, transfers to sewage)
Irving Forest Services Inc.	81	0	0	81	3,774,273	Methanol (water)
Methanex Corporation	0	74,900	30	74,930	3,724,733	Methanol (air)
Shell Canada	731	0	51,382	52,113	3,590,575	Ammonia (UIJ)
Celanese Canada Inc.	0	0	35,688	35,688	3,573,532	Methanol, methyl ethyl ketone (UIJ)
Kikuchi Color & Chemicals Corp.	0	3,150,000	186,100	3,336,100	3,336,200	Nitric acid and nitrate compounds (transfers to sewage)
Novacor Chemicals Ltd.	76,449	0	256,693	333,142	3,328,208	Cyclohexane, ethylene (air)
Domtar Inc.	200	0	6,940	7,140	3,215,895	Methanol (water, air)
Subtotal	**2,085,650**	**3,407,228**	**7,048,776**	**12,541,654**	**45,990,480**	
% of Total	**15.9**	**76.4**	**34.1**	**32.8**	**29.7**	
Total	**13,148,001**	**4,457,382**	**20,654,350**	**38,259,733**	**155,004,060**	

* Chemicals accounting for more than 70% of the total releases and transfers from the facilities belonging to the parent company. UIJ= underground injection.

Table 6–4
M 1995

The 10 Parent Companies with Largest TRI Releases and Transfers

Parent Company	Number of Facilities	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
DuPont	61	600	6,076,361	1,486,924	20,078,524	238,697	27,880,505
ASARCO Inc.	10	72	870,012	4,298	79,753	28,449,940	29,404,003
Renco Group Inc.	12	43	26,635,191	3,971	0	3,858,683	30,497,845
General Motors Corp.	99	696	8,017,407	19,153	0	7,439,923	15,476,483
Horsehead Industries Inc.	7	42	281,497	6,247	712	3,187	291,644
Monsanto Co.	26	205	910,411	302,262	11,631,220	27,404	12,871,297
Courtaulds United States Inc.	9	45	15,738,031	23,524	0	240,091	16,001,646
International Paper Co.	54	258	12,282,595	481,287	0	24,014	12,787,895
Georgia-Pacific Corp.	80	338	9,348,795	975,805	0	537,254	10,861,854
Cytec Industries Inc.	16	129	935,111	208,305	11,645,332	8,724	12,797,472
Subtotal	**374**	**2,428**	**81,095,410**	**3,511,776**	**43,435,541**	**40,827,915**	**168,870,643**
% of Total	**1.9**	**4.1**	**14.5**	**5.8**	**46.8**	**33.1**	**20.2**
Total	**19,786**	**59,764**	**560,407,943**	**60,570,521**	**92,783,273**	**123,219,666**	**836,981,403**

Parent Company	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Total Releases and Transfers (kg)	Major Chemicals Reported (Primary Media/Transfers)*
DuPont	8,982,849	550,279	159,826	9,692,954	37,573,459	Nitric acid and nitrate compounds, acetonitrile, ammonia (UIJ), methanol (air), ethylene glycol (transfers to treatment)
ASARCO Inc.	2,220,831	842	1,521,025	3,742,698	33,146,701	Zinc/lead and compounds (land)
Renco Group Inc.	3,968	13,465	113,717	131,150	30,628,995	Chlorine (air)
General Motors Corp.	397,610	263,924	1,255,508	1,917,043	17,393,527	Zinc/manganese and compounds (land), xylene, n-butyl alcohol (air)
Horsehead Industries Inc.	12,172	547	16,559,567	16,572,286	16,863,930	Zinc/lead and compounds (transfers to disposal)
Monsanto Co.	1,259,158	2,430,202	14,919	3,704,279	16,575,576	Nitric acid and nitrate compounds, formaldehyde, ammonia, methanol (UIJ)
Courtaulds United States Inc.	47,726	11,626	84,493	143,845	16,145,491	Carbon disulfide (air)
International Paper Co.	409,610	1,697,827	17,893	2,125,330	14,913,225	Methanol (air)
Georgia-Pacific Corp.	2,559,927	457,572	22,399	3,039,898	13,901,751	Methanol, formaldehyde (air), xylene (transfers to treatment)
Cytec Industries Inc.	70,180	282,788	139,233	492,201	13,289,673	Acetonitrile, acrylic acid, ammonia, methanol (UIJ)
Subtotal	**15,964,033**	**5,709,072**	**19,888,581**	**41,561,686**	**210,432,328**	
% of Total	**15.4**	**6.0**	**16.9**	**13.1**	**18.2**	
Total	**103,959,767**	**95,796,854**	**117,927,818**	**317,684,439**	**1,154,665,842**	

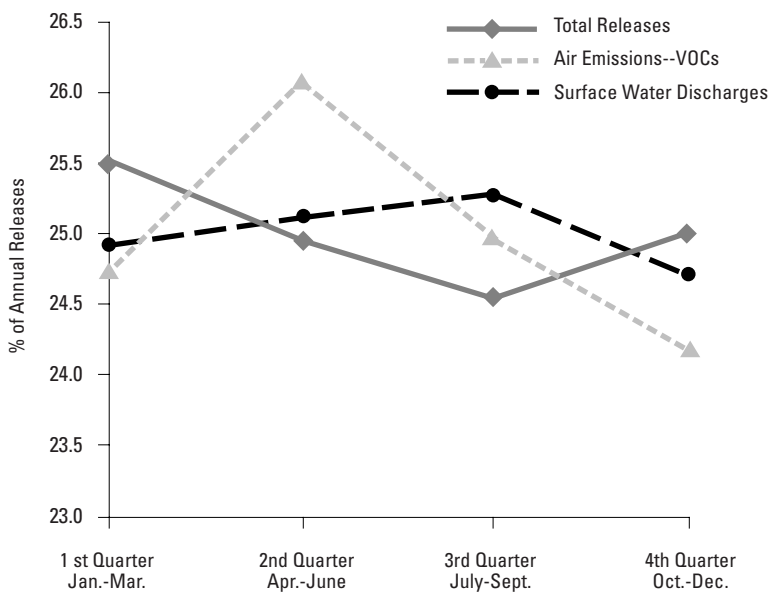
* Chemicals accounting for more than 70% of total releases and transfers from the facilities belonging to the parent company. UIJ= underground injection.

Table 6–5 A 1995 NPRI Quarterly Breakdown of Releases*

Type of Release	Quarterly Breakdown: First Quarter (kg)	Second Quarter (kg)	Third Quarter (kg)	Fourth Quarter (kg)	Total (kg)
Total Releases	42,964,498	42,076,795	41,432,628	41,840,799	168,314,720
% of Total	25.5	25.0	24.6	24.9	100.0
Total Air Emissions of VOCs**	16,205,278	17,117,979	16,454,759	15,916,832	65,694,848
% of Total	24.7	26.1	25.0	24.2	100.0
Surface Water Discharges***	4,421,204	4,447,224	4,484,885	4,373,085	17,726,398
% of Total	24.9	25.1	25.3	24.7	100.0

* Does not include forms with no quarterly breakdown.
** Includes forms with releases to air for volatile organic chemicals only.
*** Includes forms with releases to surface water only.

Figure 6–1 A 1995 NPRI Quarterly Breakdown of Releases*



* See notes, Table 6–5.

6.3 Data Specific to Each PRTR

The specific data that must be reported to each country differ in several respects. In its additional data collection, NPRI expands its concentration on releases and transfers by requiring an estimate of the percentage of annual releases by quarter, and breaking down the major release categories into routine releases, storage or handling releases, and spills, leaks, and other non-routine releases. It also asks in general terms the reasons for changes in releases and/or transfers from the previous year. NPRI is more thorough than TRI in characterizing the facility by asking for the number of employees and the address of the parent company.

For its part, TRI expanded reporting in 1991 to include on-site waste management and the types of source reduction activity undertaken at the facility (but not the amounts of any reductions produced—see the section below on Source Reduction Activities). Neither sort of information is specifically collected by NPRI. TRI also requires that facilities report transfer amounts for each off-site destination. In contrast, NPRI asks only for a total amount for each off-site transfer type, but does not inquire where the specific amounts are sent. (NPRI will begin collecting this information in the 1998 reporting year.) The ramifications of this difference will become evident in **Chapter 7**: Border and Transborder Analyses.

6.3.1 Additional Data in NPRI

Seasonal Reporting

Quarterly data collected by NPRI indicated only small seasonal fluctuations in releases (see **Table 6–5** and **Figure 6–1**). Data for volatile organic compounds (VOCs), which could contribute to air pollution inversions in the summer months, show slightly more air emissions in spring and summer. On the other hand, discharges of pollutants to surface waters may do more damage in periods of low flow during the winter than at other times. Such releases, as reported to NPRI, also tended to occur in the second and third quarters (spring and summer). For total releases, however, the peak occurred in the first quarter (winter).

Reasons for Change from Previous Year's Releases and Transfers

The NPRI form requires facilities to indicate generally why the amount of releases and transfers changed from the previous year. Facilities indicate whether changes in total releases and, separately, changes in total transfers, arose from production-level changes, the use of different estimation methods, or other changes (including accidents, spills or breakdowns).

As **Table 6–6** shows, half of the forms indicated no significant change in releases. (The table shows only the magnitude of the changes, irrespective of whether they were increases or decreases.) But these forms represented relatively small amounts, 21 percent of total releases. The 18 percent of the forms that cited only "other" reasons for changes in release volumes represented 35 percent of total releases.

For transfers, this distribution was even more pronounced (see **Table 6–7**). No significant change was reported on two-thirds of the forms, representing just 11 percent of total transfers, while the 14 percent of the forms that cited only "other" reasons supplied 27 percent of the transfers. For transfers, however, changes in production level alone were cited by 11 percent of forms and accounted for 31 percent of the transfers. The forms that attribute

Table 6–6
A 1995

Distribution of Reasons for Change in NPRI Releases

	Forms		Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases	
	Number	%					kg	%
Reason for Change in Releases								
Production Level	1,018	16.2	21,771,713	4,094,967	4,497,197	4,487,598	34,898,545	20.6
Production, Estimate	159	2.5	3,610,732	79,680	208,774	424,198	4,332,161	2.6
Production, Estimate, Other	12	0.2	5,009,883	0	4,550	800	5,015,233	3.0
Production, Other	98	1.6	5,598,685	319,032	83,326	251,394	6,253,375	3.7
Estimate	390	6.2	5,745,214	2,618,978	2,328,250	1,754,185	12,460,179	7.4
Estimate, Other	46	0.7	2,692,947	17,771	1,495,849	1,443	4,208,112	2.5
Other	1,108	17.6	37,923,899	13,237,319	2,752,910	5,408,248	59,337,135	35.1
No Significant Change	3,172	50.4	16,951,237	12,703,009	4,714,626	1,482,618	35,972,051	21.3
Not Applicable (NA)	291	4.6	3,233,191	1,338,706	0	2,011,651	6,593,152	3.9
Total	**6,294**	**100.0**	**102,537,501**	**34,409,462**	**16,085,482**	**15,822,135**	**169,069,943**	**100.0**
Reasons for Change Reported at Least Once*								
Production Level Change	1,287	20.4	35,991,013	4,493,679	4,793,847	5,163,990	50,499,314	29.9
Estimation Method Change	607	9.6	17,058,776	2,716,429	4,037,423	2,180,626	26,015,685	15.4
Other Change	1,264	20.1	51,225,414	13,574,122	4,336,635	5,661,885	74,813,855	44.3
Total for Forms Counted*	**2,831**	**45.0**	**82,353,073**	**20,367,747**	**11,370,856**	**12,327,866**	**126,504,740**	**74.8**
No Change Reported								
No Significant Change	3,172	50.4	16,951,237	12,703,009	4,714,626	1,482,618	35,972,051	21.3
Not Applicable (NA)	291	4.6	3,233,191	1,338,706	0	2,011,651	6,593,152	3.9
Total for Forms Counted	**3,463**	**55.0**	**20,184,428**	**14,041,715**	**4,714,626**	**3,494,269**	**42,565,203**	**25.2**

* Data for forms that report more than one reason for change are included in all applicable categories, but only once in the Total for Forms Counted.

Table 6–7 A 1995

Distribution of Reasons for Change in NPRI Transfers

	Forms		Treatment/ Destruction	Sewage/ POTWs	Disposal/ Containment	Total Transfers	
	Number	%	(kg)	(kg)	(kg)	kg	%
Reason for Change in Transfers							
Production Level	674	10.7	5,811,832	672,161	12,400,771	18,884,764	31.3
Production, Estimate	82	1.3	777,340	60,080	4,680,974	5,518,394	9.1
Production, Estimate, Other	9	0.1	15,980	230	216,635	232,845	0.4
Production, Other	60	1.0	1,733,176	5,884	6,379,237	8,118,297	13.4
Estimate	202	3.2	573,501	93,603	1,183,971	1,851,075	3.1
Estimate, Other	12	0.2	11,710	63	222,844	234,617	0.4
Other	893	14.2	3,905,014	4,650,752	7,720,880	16,276,646	26.9
No Significant Change	4,061	64.5	3,515,351	614,516	2,752,876	6,882,743	11.4
Not Applicable	301	4.8	204,283	27,822	2,190,178	2,422,283	4.0
Total	**6,294**	**100.0**	**16,548,187**	**6,125,111**	**37,748,366**	**60,421,664**	**100.0**
Reasons for Change Reported at Least Once*							
Production Level Change	825	13.1	8,338,328	738,355	23,677,617	32,754,300	54.2
Estimation Method Change	305	4.8	1,378,531	153,976	6,304,424	7,836,931	13.0
Other Change	974	15.5	5,665,880	4,656,929	14,539,596	24,862,405	41.1
Total for Forms Counted*	**1,932**	**30.7**	**12,828,553**	**5,482,773**	**32,805,312**	**51,116,638**	**84.6**
No Change Reported							
No Significant Change	4,061	64.5	3,515,351	614,516	2,752,876	6,882,743	11.4
Not Applicable	301	4.8	204,283	27,822	2,190,178	2,422,283	4.0
Total for Forms Counted	**4,362**	**69.3**	**3,719,634**	**642,338**	**4,943,054**	**9,305,026**	**15.4**

* Data for forms that report more than one reason for change are included in all applicable categories, but only once in the "Total for Forms Counted" category.

changes in releases and transfers to production-level changes, alone or with other causes, accounted for 30 percent of total releases and 54 percent of total transfers.

6.3.2 Additional Data in TRI

Waste Management Categories

Beginning in 1991, TRI facilities have also reported the amounts of listed substances in waste, on- and off-site, by waste management category: recycling, energy recovery, treatment, and release/disposal. (This last category includes all on-site releases plus transfers off-site to disposal.) Only production-related waste is reported in these categories; any waste of chemicals resulting from accidents or a facility's remedial actions is reported separately. NPRI invites, but does not require, facilities to report transfers off-site for energy recovery and recycling.

The quantity of waste that was released/disposed of, plus the quantity treated off-site, corresponds to the amount of total releases and transfers, as discussed in earlier chapters of this report, except that releases or transfers from accidents or remedial actions are not included. **Table 6–8** shows that releases and transfers—as covered in other parts of the TRI form and reported in similar categories to NPRI—represented only 9 percent of all production-related waste reported to TRI in 1995. The largest portions of production-related waste are the amount of TRI chemicals in waste recycled and treated on-site, neither of which are reported to NPRI. On-site recycling accounted for 54 percent of the total waste reported to TRI in 1995, and on-site treatment for another 21 percent. Off-site recycling and energy recovery—optionally reported to NPRI—together amounted to just 8 percent of TRI production-related waste.

Table 6–8
A 1995

Actual and Projected Quantities of TRI Chemicals in Waste, 1995–1997

Management Activity	Actual 1995 (kg)	% of Total	Projected 1996 (kg)	% of Total	1997 (kg)	% of Total
Recycled On-Site	8,638,803,505	54.4	8,584,747,202	54.3	8,567,712,159	54.3
Recycled Off-Site	1,035,856,688	6.5	1,043,936,790	6.6	1,053,466,918	6.7
Energy Recovery On-Site	1,316,540,049	8.3	1,335,686,627	8.4	1,317,043,733	8.4
Energy Recovery Off-Site	227,066,956	1.4	219,963,895	1.4	217,915,246	1.4
Treated On-Site	3,306,291,859	20.8	3,308,897,348	20.9	3,319,760,709	21.1
Total Releases and Transfers	**1,360,728,115**	**8.6**	**1,328,939,581**	**8.4**	**1,290,200,488**	**8.2**
Treated Off-Site	252,642,651	1.6	233,170,302	1.5	231,909,440	1.5
Quantity Released/Disposed of	1,108,085,464	7.0	1,095,769,279	6.9	1,058,291,048	6.7
Total Production-Related Waste	**15,885,287,174**	**100.0**	**15,822,171,443**	**100.0**	**15,766,099,254**	**100.0**

Year-to-Year Change

TRI also takes a different approach from NPRI with regard to year-to-year changes. TRI facilities must report waste management data for the previous year as well as the current one, plus projections for the following two, while NPRI requires projections of releases and transfers (separately) for the next three years (with fourth and fifth years optional).

The goal of the Pollution Prevention Act of 1990 that added these reporting elements to TRI was to stress the importance of pollution prevention by making source reduction the first priority and by focusing waste management, where source reduction was not feasible, on doing the least harm to the environment. After source reduction, the waste management categories are prioritized, with recycling as the most desirable option, to energy recovery, then treatment, and finally releases and disposal as least desirable.

Indeed, the projected change from 1995 to 1997 shows that the quantity released or disposed of was expected to show a greater percentage decrease than that projected for total production-related waste. Releases/disposal were projected to decline from 8.6 percent to 8.2 percent of the total. The data do not indicate, however, that facilities expected to reduce releases and transfers by increasing recycling, the top of the hierarchy. On- and off-site recycling were projected to increase only from 60.9 percent to 61.0 percent of the total production-related waste over the two years (see **Table 6–8**).

Source Reduction Activity

Although TRI captures actual and projected changes, the reasons for these changes are not reported. One aspect, however, that is reflected in TRI data is source reduction activity. Each facility, for each TRI-listed chemical, reports what type of source reduction activity was undertaken during the year, if any. Facilities select specific activities in eight major categories from a list of 43. While 29 percent of TRI facilities reported some source reduction activity undertaken during 1995, only 21 percent of the forms reflected this, since facilities did not necessarily engage in such activities for all chemicals they released. The most commonly reported activities were improvements in operating practices and process modifications (see **Table 6–9**).

In addition, facilities indicate the methods they used to identify each source reduction activity, choosing from a list of 11. Participative team management and internal pollution prevention audits are the methods most often used to identify source reduction opportunities (see **Table 6–10**).

It is important to realize that TRI facilities do not report the results of their source reduction activities, that is, the amounts of waste reduced. However, projection data for total production-related waste can be evaluated for forms that indicate source reduction activity and compared with those for which no source reduction activity was reported. Not only can changes in total production-related waste be examined, but differences in the various waste management options can also be evaluated between the two groups.

Forms indicating source reduction activity in 1995 projected decreases in the quantities of TRI chemicals in waste over the next two years, as shown in **Figure 6–2**, which illustrates data from **Table 6–11**. For the year 1997, these forms projected 7 percent less production-related waste. In contrast, forms indicating no source reduction activity during 1995 projected increases in the following two years.

Changes projected for the different waste management options indicate overall movement away from releases and disposal, but they also indicate that forms reporting source reduction activity will accomplish this to a greater degree. **Table 6–11** shows that forms indicating source reduction activity projected reductions of 13 percent from 1995 to 1997 in the quantities released/disposed of. For forms indicating no source reduction activity, however, quantities released or disposed of were projected to decrease by only 1 percent. Instead, these forms show a greater percentage reduction expected in off-site treatment over the two years.

Table 6–9 A 1995 — TRI Facilities and Forms Reporting Source Reduction Activity, by Category

Source Reduction Activity Categories	Facilities Reporting Source Reduction Activity: Number	Facilities Reporting Source Reduction Activity: As % of All TRI Facilities	Forms Reporting Source Reduction Activity*: Number	Forms Reporting Source Reduction Activity*: As % of All TRI Forms
Good Operating Practices	2,829	12.9	6,662	9.1
Inventory Control	700	3.2	1,599	2.2
Spill and Leak Prevention	1,361	6.2	3,441	4.7
Raw Material Modifications	1,601	7.3	2,667	3.6
Process Modifications	2,261	10.3	4,869	6.6
Cleaning and Degreasing	855	3.9	1,236	1.7
Surface Preparation/Finishing	767	3.5	1,579	2.2
Product Modification	666	3.0	1,265	1.7
Any Source Reduction Activity**	**6,309**	**28.7**	**15,082**	**20.6**

* All source reduction activities on a form are counted in the corresponding category.
** The numerical totals do not equal the sum of the above categories because facilities and forms may report more than one type of source reduction activity.

Figure 6–2 A 1995 — TRI Source Reduction Activity Reporting and Projected Change in Chemicals in Waste

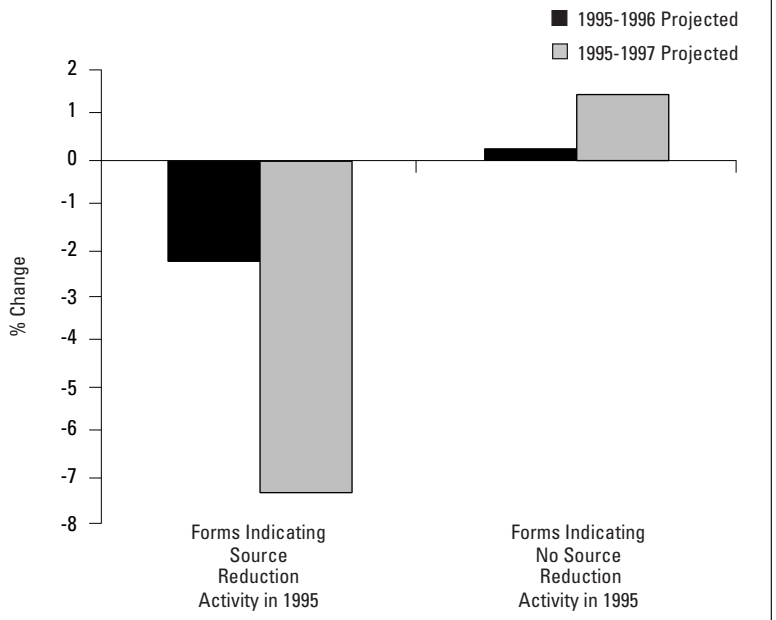


Table 6–10 A 1995 — TRI Source Reduction Activity Reporting

Source Reduction Activity Categories	Number of Occurrences*: Number	Number of Occurrences*: As % of All Occurrences
Good Operating Practices	12,829	28.4
Inventory Control	3,467	7.7
Spill and Leak Prevention	7,039	15.6
Raw Material Modifications	4,526	10.0
Process Modifications	9,032	20.0
Cleaning and Degreasing	1,720	3.8
Surface Preparation/Finishing	4,398	9.7
Product Modification	2,184	4.8
Total Occurrences	**45,195**	**100.0**

Methods Used to Identify Source Reduction Activity	Number of Occurrences*: Number	Number of Occurrences*: As % of All Occurrences
Pollution Prevention Opportunity Audit		
Internal	9,883	21.9
External	989	2.2
Materials Balance Audit	3,413	7.6
Participative Team Management	12,560	27.8
Employee Recommendation		
Informal	4,378	9.7
Formal Program	2,457	5.4
State Program	333	0.7
Federal Program	83	0.2
Trade/Industry Program	1,536	3.4
Vendor Assistance	5,226	11.6
Other 4,337	9.6	
Total Occurrences	**45,195**	**100.0**

* Each TRI form can report any number of the 43 activity categories or 11 methods. Occurrences count each time an activity or method was reported.

Table 6–11
A 1995

Actual and Projected Quantities of TRI Chemicals in Waste for Forms with and without Source Reduction Activity Reported

	Actual	Projected		Projected Change	
	1995	1996	1997	1995–1996	1995–1997
	(kg)	(kg)	(kg)	(%)	(%)
Forms Indicating Source Reduction Activity in 1995					
Recycled On-Site	2,154,411,172	2,107,238,787	1,919,484,727	-2.2	-10.9
Recycled Off-Site	225,374,503	235,086,859	231,069,106	4.3	2.5
Energy Recovery On-Site	184,676,542	185,361,049	190,942,077	0.4	3.4
Energy Recovery Off-Site	85,807,002	84,310,545	82,945,203	-1.7	-3.3
Treated On-Site	836,029,417	816,141,610	823,993,785	-2.4	-1.4
Treated Off-Site	77,093,717	71,987,781	72,513,610	-6.6	-5.9
Quantity Released/Disposed of	320,533,280	294,405,164	278,935,925	-8.2	-13.0
Total Production-Related Waste	**3,883,925,635**	**3,794,531,795**	**3,599,884,433**	**-2.3**	**-7.3**
Forms Indicating No Source Reduction Activity in 1995					
Recycled On-Site	6,484,392,333	6,477,508,415	6,648,227,433	-0.1	2.5
Recycled Off-Site	810,482,185	808,849,931	822,397,812	-0.2	1.5
Energy Recovery On-Site	1,131,863,507	1,150,325,578	1,126,101,656	1.6	-0.5
Energy Recovery Off-Site	141,259,954	135,653,350	134,970,043	-4.0	-4.5
Treated On-Site	2,470,262,442	2,492,755,738	2,495,766,924	0.9	1.0
Treated Off-Site	175,548,934	161,182,521	159,395,831	-8.2	-9.2
Quantity Released/Disposed of	787,552,184	801,364,116	779,355,123	1.8	-1.0
Total Production-Related Waste	**12,001,361,539**	**12,027,639,648**	**12,166,214,821**	**0.2**	**1.4**

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

Key Findings

- By far, more cross-border transfers were sent for recycling in 1995 than for any other waste management option: shipments to recycling amounted to 96 percent of US transfers sent outside the country and at least 72 percent of those were from Canada to the United States.
- Off-Site transfers in NPRI cannot be completely analyzed by their geographic destinations. Although NPRI requires that off-site transfers to treatment or disposal be reported, many reporting forms show transfers to more than one receiving site (e.g., two landfills). However, only the total sent off-site is required, not the specific amount to each site. Thus, the actual amount that Canadian facilities transport to other provinces or to individual US states cannot be precisely known, only a range of values. (Beginning with reporting year 1996, the quantity of pollutants transferred to each off-site location will be reported.)
- Excluding transfers to recycling and energy recovery, which are subject only to voluntary reporting in NPRI, transfers from Canada to sites in the United States and vice versa were approximately equal. Canadian facilities transferred between 1.1–1.5 million kg to US sites in 1995; while US facilities transferred 1.5 million kg to Canadian sites.
- Releases and transfers by facilities along the Canadian-US border were smaller than the numbers of such facilities would suggest. While 79 percent of NPRI facilities and 20 percent of TRI facilities were located within 100 kilometers of the border, their total releases and transfers represented, respectively, 66 percent and 13 percent of Canadian and US totals for 1995.
- The Great Lakes region overwhelmingly dominates any border analysis, containing 89 percent of all facilities that are located within 100 kilometers of the Canadian-US border. Here, unlike in other regions, TRI facilities outnumber those reporting to NPRI by a margin of almost six to one.

7.1 Introduction

Cross-boundary issues that can be examined with PRTR data include transfers of chemicals from facilities in one country to sites in another and releases and transfers reported by facilities located near borders. US TRI data supply information on transfers across the US-Mexican and US-Canadian borders, while Canadian NPRI data give an indication of pollutants in waste transferred into the United States. In addition, this chapter examines data from facilities located within 100 kilometers on either side of the US-Canadian border.

Table 7–1 A 1995

TRI Off-Site Transfers to Other Countries from the United States

Country	Transfers to Recycling (kg)	Transfers to Energy Recovery (kg)	Treatment/ Destruction (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	% of Transfers Outside US
Belgium	58,840	0	12	0	58,852	0.1
Bermuda	32,653	0	0	0	32,653	0.0
Canada	44,164,957	88,073	1,770,740	118,810	46,142,579	61.3
Alberta	9,478	0	2	0	9,481	0.0
British Columbia	112,391	660	6,159	2,933	122,143	0.2
New Brunswick	113,379	0	0	0	113,379	0.2
Nova Scotia	196	0	0	0	196	0.0
Ontario	33,511,727	53,446	1,075,462	34,636	34,675,270	46.1
Quebec	10,417,785	33,967	689,117	81,240	11,222,110	14.9
Finland	17,746	0	0	0	17,746	0.0
France	182,052	0	0	0	182,052	0.2
Germany	930,868	0	0	0	930,868	1.2
Japan	466,782	0	0	0	466,782	0.6
Mexico	25,893,443	0	226,076	570,413	26,689,931	35.5
Monterrey	23,980,493	0	226,076	570,413	24,776,981	32.9
Other Cities	1,912,950	0	0	0	1,912,950	2.5
Netherlands	113,832	0	0	0	113,832	0.2
Singapore	9,572	0	0	0	9,572	0.0
Spain	43,265	0	0	0	43,265	0.1
Sweden	22,180	0	0	0	22,180	0.0
United Arab Emirates	176,589	0	0	0	176,589	0.2
United Kingdom	344,100	0	3	0	344,103	0.5
Total Transferred Outside US	**72,456,880**	**88,073**	**1,996,830**	**689,222**	**75,231,005**	**100.0**

7.2 Off-Site Transfers across Borders

The amount of chemicals in waste transferred from reporting facilities to off-site locations is reported to both NPRI and TRI, along with the address of the site to which the chemical waste stream is shipped. Most reported transfers occurred to sites within a nation's borders, but listed substances can also be shipped to a North American neighbor or to other countries. Transfers to sewage/POTWs are not included in this analysis because they rarely cross national or even state/provincial boundaries. **Map 7–1** illustrates 1995 data for transfers across North American borders.

For data through 1995, it is not possible to know how much was transferred to individual provinces within Canada or from Canada to individual US states. Both PRTRs require facilities to report the amount of transfer by type of waste management activity undertaken at the off-site location. Under TRI, each transfer is identified by off-site location, but in NPRI, the transfer amount has not been uniquely associated with the receiving site. For example, if a facility sends transfers to two landfills, NPRI lists the total amount sent to landfills and the names and addresses of the destinations, but not the amount directed to each. Because there are reports where recipient sites, such as the landfills, are located in different provinces or in different countries, analysis of what is being transported between the countries is not possible. With the 1996 reporting year, NPRI facilities will begin specifying the amounts sent to each receiving location.

For the current analysis, however, data are presented as a range of values. The low end of the range is calculated by attributing to a given destination none of the amount reported to multiple destinations, and the high end by attributing all of the amount reported to individual sites.

7.2.1 Off-Site Transfers from TRI Facilities

In 1995, TRI facilities reported transferring 75 million kg of chemicals out of the country (see **Table 7–1**); these represented 5 percent of all US transfers. The majority of these transfers were sent for recycling to sites in Canada (59 percent) and Mexico (34 percent). Indeed, 96 percent of all transfers that US facilities sent outside the country were for recycling, compared to 66 percent of transfers that took place within US borders (see **Table 7–2** and **Figure 7–1**).

Facilities in 34 states sent transfers to six Canadian provinces (see **Table 7–3**). Sites in Ontario and Quebec received most of these. In fact, Ontario received 46 percent of all US transfers sent out of the country. Facilities located in Ohio and Arizona originated the most; even though Arizona is located on the US-Mexican border, all of its out-of-country transfers went north to Canada. Ten states did send transfers to Mexico (see **Table 7–4**), almost all of which were directed to several sites in the city of Monterrey. Specifically, TRI chemical waste sent to Monterrey came from nine states, with facilities located in Texas and Illinois originating the most.

Map 7–1
A 1995

Off-Site Transfers across North American Borders

➤ Amounts appear in receiving countries. Mexico data not collected for 1995.

Table 7–2
A 1995

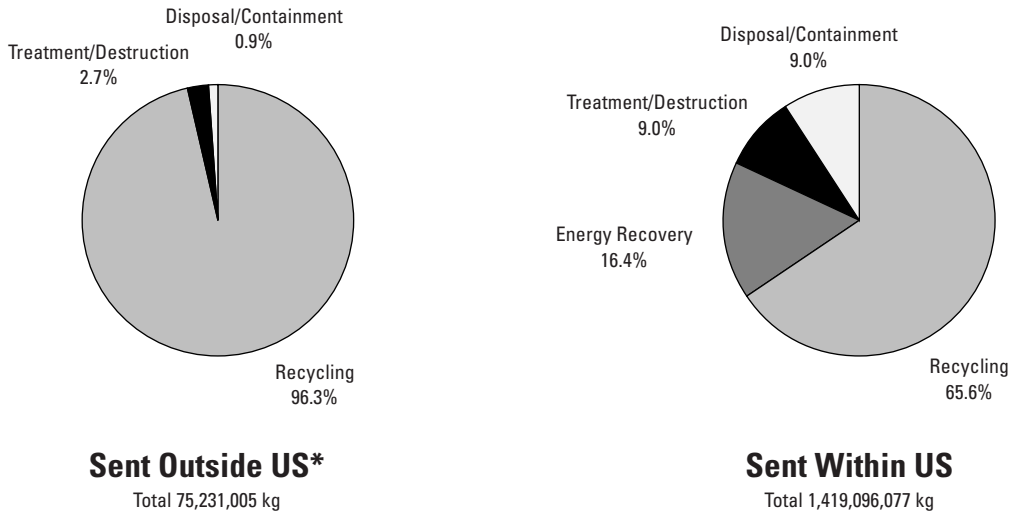
TRI Off-Site Transfers within the United States and to Other Countries

	Location of Receiving Sites					
	Outside US		Within US		Total Off-Site Transfers	
	kg	%	kg	%	kg	%
Transfers to:						
Recycling	72,456,880	96.3	931,502,934	65.6	1,003,959,814	67.2
Energy Recovery	88,073	0.1	232,124,955	16.4	232,213,028	15.5
Treatment/Destruction	1,996,830	2.7	128,423,516	9.0	130,420,346	8.7
Disposal/Containment	689,222	0.9	127,044,772	9.0	127,733,994	8.5
Total Transfers	**75,231,005**	**100.0**	**1,419,096,177**	**100.0**	**1,494,327,182**	**100.0**
% of Total	**5.0**		**95.0**		**100.0**	

➤ Does not include transfers to sewage/POTWs.

Figure 7–1
A 1995

Distribution of TRI Off-Site Transfers outside and within the United States



* 0.1% for Energy Recovery does not appear.
➤ Does not include transfers to sewage/POTWs.

Table 7–3
A 1995

TRI Off-Site Transfers to Canada from the United States

To Canadian Province / From US State	Transfers to Recycling (kg)	Transfers to Energy Recovery (kg)	Treatment/ Destruction (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	% of Transfers Outside US
Alberta						
Montana	8,163	0	2	0	8,166	0.0
Ohio	1,315	0	0	0	1,315	0.0
British Columbia						
Washington	64,352	0	5,894	0	70,247	0.2
Texas	34,467	0	0	0	34,467	0.1
California	12,710	0	0	0	12,710	0.0
North Carolina	0	0	0	2,933	2,933	0.0
Montana	862	0	104	0	966	0.0
Oregon	0	656	160	0	816	0.0
Alaska	0	5	0	0	5	0.0
New Brunswick						
California	113,379	0	0	0	113,379	0.2
Nova Scotia						
New York	196	0	0	0	196	0.0
Ontario						
Ohio	9,846,559	0	8	17,740	9,864,307	21.4
Arizona	7,627,387	0	0	579	7,627,966	16.5
Mississippi	4,421,514	0	0	0	4,421,514	9.6
Michigan	1,784,168	22,907	849,101	5,081	2,661,258	5.8
Indiana	1,785,422	30,539	162	7	1,816,130	3.9
Kentucky	1,524,293	0	0	0	1,524,293	3.3
New York	996,209	0	225,986	491	1,222,686	2.6
Nebraska	984,735	0	0	0	984,735	2.1
Texas	915,424	0	0	0	915,424	2.0
Wisconsin	829,639	0	0	0	829,639	1.8
California	590,158	0	0	0	590,158	1.3
Illinois	541,075	0	0	0	541,075	1.2
West Virginia	330,612	0	91	951	331,654	0.7
Virginia	295,194	0	0	0	295,194	0.6
Massachusetts	195,523	0	0	0	195,523	0.4
Arkansas	185,073	0	0	0	185,073	0.4
Pennsylvania	180,239	0	0	456	180,695	0.4
Minnesota	124,444	0	0	0	124,444	0.3
Ontario, continued						
Georgia	113,515	0	0	0	113,515	0.2
Connecticut	109,441	0	0	0	109,441	0.2
Kansas	38,899	0	0	0	38,899	0.1
Alabama	30,952	0	113	0	31,066	0.1
North Carolina	17,071	0	0	8,765	25,836	0.1
New Hampshire	16,426	0	0	0	16,426	0.0
Washington	14,516	0	0	0	14,516	0.0
South Carolina	12,150	0	0	0	12,150	0.0
New Jersey	454	0	0	567	1,020	0.0
Rhode Island	634	0	0	0	634	0.0
Quebec						
Pennsylvania	2,748,231	0	143,900	4,719	2,896,849	6.3
New York	2,026,451	0	126,981	36,489	2,189,922	4.7
Delaware	1,829,809	0	0	0	1,829,809	4.0
Arkansas	919,215	0	0	0	919,215	2.0
Illinois	781,359	0	0	0	781,359	1.7
Kentucky	772,979	0	0	1,043	774,022	1.7
Ohio	399,654	0	0	0	399,654	0.9
Connecticut	276,272	0	69,330	24,278	369,880	0.8
Massachusetts	117,341	33,967	124,595	2,203	278,106	0.6
New Jersey	119,085	0	119,736	1,581	240,402	0.5
Virginia	142,676	0	0	0	142,676	0.3
Georgia	116,532	0	7,279	0	123,811	0.3
California	96,553	0	0	0	96,553	0.2
Maine	31	0	93,902	1,780	95,714	0.2
Wisconsin	30,457	0	0	0	30,457	0.1
Michigan	25,584	0	0	0	25,584	0.1
Rhode Island	0	0	383	8,341	8,724	0.0
Minnesota	6,122	0	0	0	6,122	0.0
North Carolina	4,989	0	0	69	5,058	0.0
Mississippi	4,444	0	0	0	4,444	0.0
Louisiana	0	0	2,895	0	2,895	0.0
Washington	0	0	116	680	795	0.0
Texas	0	0	0	57	57	0.0
Total	**44,164,957**	**88,073**	**1,770,740**	**118,810**	**46,142,579**	**100.0**

Table 7–4
A 1995

TRI Off-Site Transfers to Mexico from the United States

To Mexican City / From US State	Transfers to Recycling (kg)	Transfers to Energy Recovery (kg)	Treatment/ Destruction (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	% of Transfers Outside US
Monterrey, Nuevo León						
Alabama	2,576,289	0	0	0	2,576,289	9.7
Arkansas	3,754,044	0	0	0	3,754,044	14.1
Illinois	4,504,997	0	0	0	4,504,997	16.9
Mississippi	0	0	0	570,413	570,413	2.1
Missouri	1,326,848	0	0	0	1,326,848	5.0
Oklahoma	1,448,767	0	226,076	0	1,674,843	6.3
Oregon	1,091,043	0	0	0	1,091,043	4.1
Texas	9,064,876	0	0	0	9,064,876	34.0
Utah	213,629	0	0	0	213,629	0.8
Other Cities						
California	79,766	0	0	0	79,766	0.3
Texas	1,833,184	0	0	0	1,833,184	6.9
Total	**25,893,443**	**0**	**226,076**	**570,413**	**26,689,931**	**100.0**

Table 7–5
A 1995

NPRI Off-Site Transfers within Canada and to Other Countries

	Recycling* (kg)	Energy Recovery* (kg)	Treatment/ Destruction (kg)	Disposal/ Containment (kg)	Total Transfers (kg)	Percent of Total
Canada Only	141,325,471	2,027,960	15,608,757	31,897,342	190,859,530	87.0
Both US and Canada	6,402,080	696,981	81,326	487,029	7,667,416	3.5
United States Only	14,421,037	19,843	804,103	4,811,849	20,056,832	9.1
Other						
Japan	122,713	0	0	0	122,713	0.1
United Kingdom	84,000	0	0	0	84,000	0.0
Unknown	0	0	54,000	552,140	606,140	0.3
Total	**162,355,301**	**2,744,784**	**16,548,186**	**37,748,360**	**219,396,632**	**100.0**

* Voluntary reporting so may not represent all such transfers.
➤ Does not include transfers to sewage/POTWs.

7.2.2 Off-Site Transfers from NPRI Facilities

The majority of NPRI off-site transfers stayed within Canada. **Table 7–5** shows that 87 percent of off-site transfers reported to NPRI fell into this category, while 9 percent went to the United States. Because reporting off-site transfers to recycling and energy recovery is voluntary under NPRI, these numbers represent a lower-end estimate of off-site transfers.

Although the actual transfer amounts that Canadian facilities ship across borders cannot be determined, recycling appears to play a larger role in out-of-country transfers in Canada, as it does in the United States. Again, because reporting of off-site transfers for recycling and energy recovery is optional, the actual proportions of waste sent to various waste management options may well differ from the reported data. These data show, however, that off-site recycling sites received 72 percent of NPRI transfers sent to the United States, 84 percent of NPRI transfers to both US and Canadian destinations, and 74 percent of transfers within Canada (see **Tables 7–5** and **7–6**, graphed in **Figure 7–2**).

7.2.3 Off-Site Transfers between Canada and the United States

Taking the subset of reports for industries and chemicals for which reporting is required under both NPRI and TRI, **Table 7–7** shows the amounts transported across the border to and from US states and Canadian provinces, excluding transfers to recycling and energy recovery as well as to sewage/POTWs. US facilities reported a total of 1.5 million kg of transfers to sites in Canada, and Canadian facilities reported transfers in a range from 1.1–1.5 million kg to US sites. Some NPRI forms report shipments to multiple states, but because

Table 7–6
A 1995

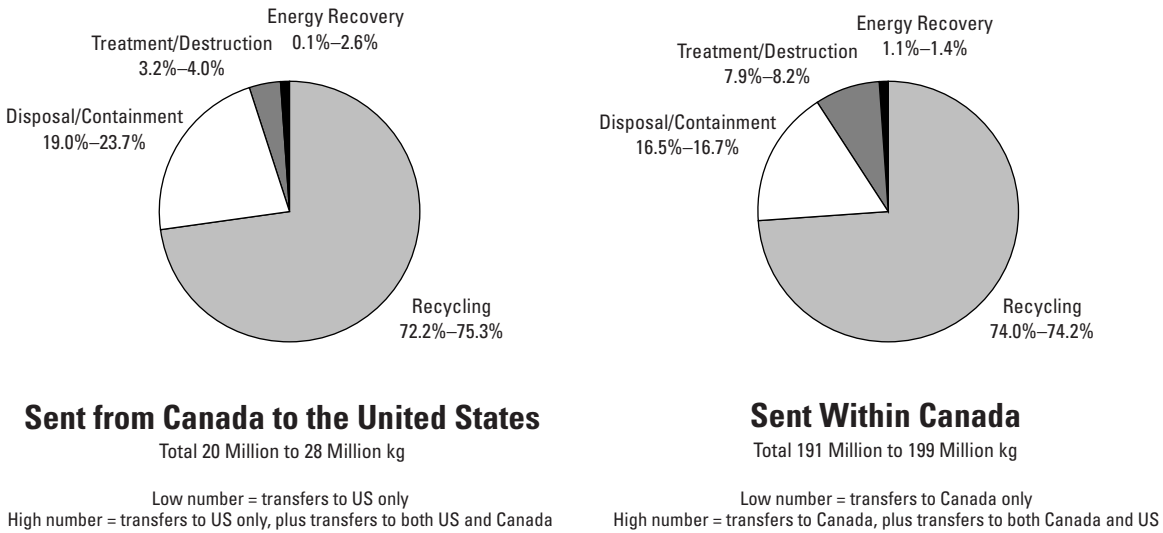
NPRI Off-Site Transfers within Canada and to Other Countries

	Outside Canada		Both US and Canada		Within Canada**		Total NPRI Transfers	
Transfers to:	**kg**	**%**	**kg**	**%**	**kg**	**%**	**kg**	**%**
Recycling*	14,627,750	72.2	6,402,080	83.5	141,325,471	74.0	162,355,301	74.0
Energy Recovery*	19,843	0.1	696,981	9.1	2,027,960	1.1	2,744,784	1.3
Treatment/Destruction	804,103	4.0	81,326	1.1	15,662,757	8.2	16,548,186	7.5
Disposal/Containment	4,811,849	23.7	487,029	6.4	32,449,482	16.7	37,748,360	17.2
Total Transfers	**20,263,545**	**100.0**	**7,667,416**	**100.0**	**191,465,670**	**100.0**	**219,396,632**	**100.0**
% of Total	**9.2**		**3.5**		**87.3**		**100.0**	

* Voluntary reporting so may not represent all such transfers.
** Includes unknown.
➤ Does not include transfers to sewage/POTWs.

Figure 7–2
A 1995

Distribution of NPRI Off-Site Transfers outside and within Canada



➤ Reporting of transfers to recycling and to energy recovery is voluntary; amounts given may not represent all such transfers. Does not include transfers to sewage/POTWs.

they do not specify the quantity for each state, amounts reported on these forms can only be assigned to the Canada-to-United States total; they cannot be allocated to any one state.

For transfers to treatment and to disposal, 20 US states reported sending off-site transfers to four Canadian provinces, led by shipments from Michigan to sites in Ontario. The province of Quebec received the second largest amount of transfers; facilities in three states (New York, Massachusetts, and New Jersey) sent more than 120,000 kg each to sites there. The same four Canadian provinces sent transfers to eight US states. Facilities located in Ontario sent the largest amounts, directed primarily to sites in Michigan, Illinois, Ohio and Pennsylvania. **Map 7–2** illustrates the flow of off-site transfers between the United States and Canada.

Among the NPRI transfers that can be identified as sent to the United States (from NPRI forms reporting only one transfer destination), transfers to disposal amounted to nearly 5 million kg (see **Table 7–5**, above). This is 40 times the amount of all transfers sent from the United States to Canada for disposal (119,000 kg, as shown in **Table 7–3**, above). One facility reported the majority of NPRI transfers in this category: Ethyl Canada in Corunna, Ontario, which transferred more than 4 million kg, mostly of sulfuric acid, to Ohio for underground injection, as shown in **Table 7–8**. In contrast, the largest US transfers for disposal in Canada represented smaller amounts of various chemicals, primarily to be landfilled. The largest transfer, 34,000 kg of zinc (and compounds) for "other land disposal" came from a General Electric facility in Waterford, New York.

Table 7–7
M 1995

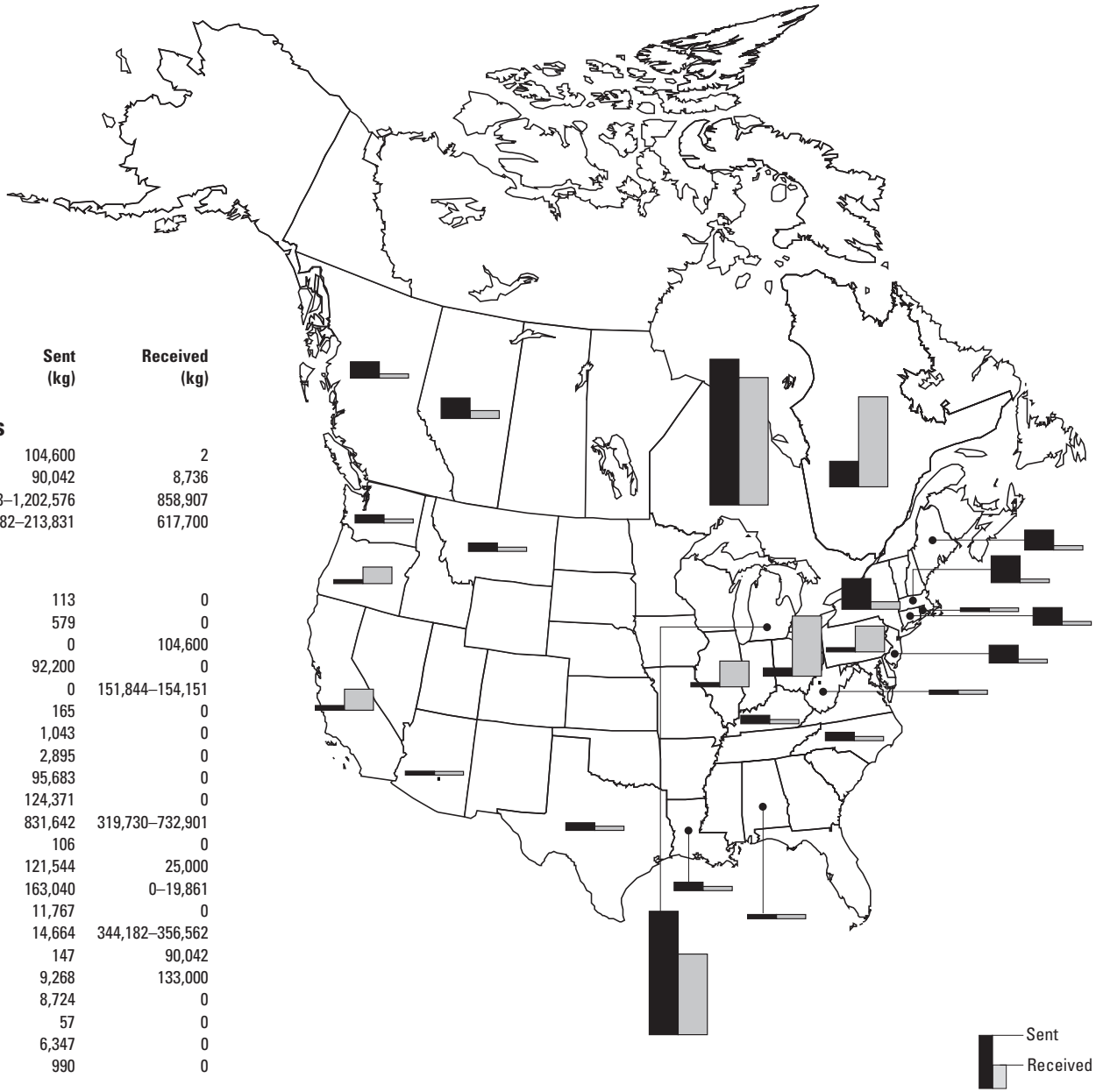
Off-Site Transfers across National Boundaries, between the United States and Canada

	Canadian Province									
	Alberta		British Columbia		Ontario		Quebec		Total Cross-Boundary Transfers	
US State	To Alberta (kg)	From Alberta (kg)	To B. C. (kg)	From B. C. (kg)	To Ontario (kg)	From Ontario (kg)	To Quebec (kg)	From Quebec (kg)	To Canada (kg)	From Canada (kg)
Alabama	0	0	0	0	113	0	0	0	113	0
Arizona	0	0	0	0	579	0	0	0	579	0
California	0	104,600	0	0	0	0	0	0	0	104,600
Connecticut	0	0	0	0	0	0	92,200	0	92,200	0
Illinois	0	0	0	0	0	151,844–154,151	0	0	0	151,844–154,151
Indiana	0	0	0	0	165	0	0	0	165	0
Kentucky	0	0	0	0	0	0	1,043	0	1,043	0
Louisiana	0	0	0	0	0	0	2,895	0	2,895	0
Maine	0	0	0	0	0	0	95,683	0	95,683	0
Massachusetts	0	0	0	0	0	0	124,371	0	124,371	0
Michigan	0	0	0	0	831,642	319,730–732,252	0	0–649	831,642	319,730–732,901
Montana	2	0	104	0	0	0	0	0	106	0
New Jersey	0	0	0	0	454	25,000	121,090	0	121,544	25,000
New York	0	0	0	0	1,080	0–19,861	161,960	0	163,040	0–19,861
North Carolina	0	0	2,933	0	8,765	0	69	0	11,767	0
Ohio	0	0	0	0	14,664	131,000–143,380	0	213,182	14,664	344,182–356,562
Oregon	0	0	147	90,042	0	0	0	0	147	90,042
Pennsylvania	0	0	0	0	456	133,000	8,812	0	9,268	133,000
Rhode Island	0	0	0	0	0	0	8,724	0	8,724	0
Texas	0	0	0	0	0	0	57	0	57	0
Washington	0	0	5,552	0	0	0	795	0	6,347	0
West Virginia	0	0	0	0	990	0	0	0	990	0
Total	**2**	**104,600**	**8,736**	**90,042**	**858,907**	**760,913–1,202,576**	**617,700**	**213,182–213,831**	**1,485,345**	**1,067,256–1,508,058**

➤ Does not include transfers to sewage/POTWs, recycling or energy recovery.
Rows and columns of Canadian data do not add to the totals presented because data from NPRI forms that report transfers to multiple states cannot be allocated to any one state. See explanation in text.

Map 7–2
M 1995

Off-Site Transfers between the United States and Canada



	Sent (kg)	Received (kg)
Canadian Provinces		
Alberta	104,600	2
British Columbia	90,042	8,736
Ontario	760,913–1,202,576	858,907
Quebec	213,182–213,831	617,700
US States		
Alabama	113	0
Arizona	579	0
California	0	104,600
Connecticut	92,200	0
Illinois	0	151,844–154,151
Indiana	165	0
Kentucky	1,043	0
Louisiana	2,895	0
Maine	95,683	0
Massachusetts	124,371	0
Michigan	831,642	319,730–732,901
Montana	106	0
New Jersey	121,544	25,000
New York	163,040	0–19,861
North Carolina	11,767	0
Ohio	14,664	344,182–356,562
Oregon	147	90,042
Pennsylvania	9,268	133,000
Rhode Island	8,724	0
Texas	57	0
Washington	6,347	0
West Virginia	990	0

Table 7–8
A 1995

Largest North American Off-Site Transfers to Disposal across Canada-US Border

Sending Facility	City, State/Province	Receiving Site	City, State/Province	Chemical	Transfer Amount (kg)	Type of Disposal
Ethyl Canada Inc.	Corunna, ON	Chemical Waste Management	Vickery, OH	Sulfuric acid*	4,350,000	Underground injection
				Nitric acid and nitrate compounds	131,000	Underground injection
				Total	4,481,000	
General Electric Co.	Waterford, NY	Noranda Copper Smelting	Rouyn-Noranda, QC	Zinc (and its compounds)	33,560	Other land disposal
Summit Corp. of America	Thomaston, CT	Stablex Canada Inorganic Waste	Ste-Thérèse-de-Blainville, QC	Copper (and its compounds)	5,170	Landfill
				Lead (and its compounds)	1,587	Landfill
				Nickel (and its compounds)	5,760	Landfill
				Cyanide compounds	32	Landfill
				Total	12,549	
Reilly Ind. Inc.	Cleveland, OH	Laidlaw Env. Services	Corunna, ON	Anthracene	608	Landfill
				Phenanthrene*	2,210	Landfill
				Benzene	276	Landfill
				Xylene (mixed isomers)	276	Landfill
				Styrene	83	Landfill
				Phenol	553	Landfill
				Cresol (mixed isomers)	276	Landfill
				Naphthalene	6,079	Landfill
				Biphenyl	553	Landfill
				Total	10,914	

* Not a matched chemical.

Map 7–3
M 1995

The 100-Kilometer Zone and the Five Geographical Regions of the Canadian-US Border Area

7.3 Canadian-US Border Regions

The border area in this analysis is taken as the 100 kilometers on either side of the border (see the shaded area in **Map 7–3**) and is divided into five regions from west to east: the Northwestern region, comprising the Alaskan panhandle and northern British Columbia; the Western region, extending from the Pacific coast to the continental divide; the Plains and northern Mississippi basin; the Great Lakes and Lake of the Woods area; and the Eastern region, encompassing the Saint Lawrence River to the Atlantic. Facilities report their latitude and longitude to TRI and either their latitude and longitude or their Universal Transverse Mercator (UTM) coordinates to NPRI. These data were used to determine if the given facility was located within 100 kilometers of the border. In cases where geographic coordinates were not given, the city or postal code where the facility is located was used.

Seventy-nine percent of NPRI facilities and 20 percent of TRI facilities were located within 100 kilometers of the Canadian-US border (see **Table 7–9**). Their total releases and transfers, however, represented a smaller percentage of the databases: 66 percent for NPRI and 13 percent for TRI. Thus, although NPRI facilities generally cluster near the border, for both NPRI and TRI the facilities reporting the largest amounts of releases and transfers were not necessarily located in the border area.

7.3.1 Releases and Transfers in the Border Regions

The five border regions vary substantially (see **Map 7–4**). Eighty-nine percent of all border facilities were located in the area surrounding the Great Lakes, and this region contained almost six times as many TRI facilities as NPRI facilities (3,773 TRI and 657 NPRI). In the Eastern region, the ratio was reversed: four times as many facilities reported to NPRI as to TRI. In the Plains, the ratio was three NPRI facilities for each TRI facility (see **Figure 7–3**).

Total releases and transfers from NPRI and TRI facilities within each border region show roughly similar patterns. TRI facilities accounted for 138 million kg, or 67 percent of the total for the Great Lakes region (versus 85 percent of the facilities). However, for the Eastern region, NPRI facilities reported 28 million kg or 90 percent of that region's total (with 82 percent of the facilities). For the Plains region, NPRI facilities accounted for the majority of releases and transfers—1.7 million kg or 88 percent of the total (with 76 percent of the facilities—see **Figure 7–4**).

As **Figures 7–3** and **7–4** show, the NPRI portion of total releases and transfers in each border region exceeds NPRI's share of facilities reporting in the region, as it does in North America as a whole. (The one exception, the Northwestern region, was where just one facility each in NPRI and TRI reported, with approximately equal releases.)

Emissions to air tended to be more prominent in the border regions than for the national databases as a whole (see **Table 7–10** and **Figure 7–5**). This was particularly true in the Great Lakes, Plains and Western regions, where air emissions amounted to more than 75 percent of the total releases for both

Table 7–9
M 1995

Releases and Transfers for Border Regions

	Facilities		Total Releases	Total Transfers	Total Releases and Transfers	
	Number	%	(kg)	(kg)	kg	%
NPRI-Canadian Facilities						
Eastern	290	22.2	18,877,271	8,936,406	27,813,677	17.9
Great Lakes	657	50.2	44,056,078	23,590,440	67,646,518	43.6
Plains	32	2.4	1,362,734	307,416	1,670,150	1.1
Western	53	4.0	1,353,640	2,675,522	4,029,162	2.6
Northwestern	1	0.1	562,000	0	562,000	0.4
Subtotal	**1,033**	**78.9**	**66,211,723**	**35,509,784**	**101,721,507**	**65.6**
Total for All Canada	**1,309**	**100.0**	**116,744,327**	**38,259,733**	**155,004,060**	**100.0**
TRI-US Facilities						
Eastern	65	0.3	2,428,172	557,945	2,986,117	0.3
Great Lakes	3,773	19.1	79,138,714	59,044,858	138,183,572	12.0
Plains	10	0.1	223,146	11,187	234,333	0.0
Western	69	0.3	2,802,871	193,457	2,996,328	0.3
Northwestern	1	0.0	577,234	0	577,234	0.0
Subtotal	**3,918**	**19.8**	**85,170,137**	**59,807,446**	**144,977,583**	**12.6**
Total for All US	**19,786**	**100.0**	**836,981,403**	**317,684,439**	**1,154,665,842**	**100.0**
Totals for US and Canadian Facilities						
Eastern	355	1.7	21,305,443	9,494,351	30,799,794	2.4
Great Lakes	4,430	21.0	123,194,792	82,635,298	205,830,090	15.7
Plains	42	0.2	1,585,880	318,603	1,904,483	0.1
Western	122	0.6	4,156,511	2,868,979	7,025,490	0.5
Northwestern	2	0.0	1,139,234	0	1,139,234	0.1
Subtotal	**4,951**	**23.5**	**151,381,860**	**95,317,230**	**246,699,090**	**18.8**
Total for All Canada and US	**21,095**	**100.0**	**953,725,730**	**355,944,172**	**1,309,669,902**	**100.0**

NPRI and TRI facilities. Underground injection, on the other hand, is not widely practiced in the border regions; only TRI facilities in the Great Lakes region reported this release. Discharges to surface water formed a greater part of releases in the Eastern (25 percent) and Northwestern (36 percent) regions.

Transfer patterns varied by border region and, except in the Great Lakes region, did not resemble national patterns (see **Table 7–11** and **Figure 7–6**):

- In the Eastern region, transfers to treatment/destruction accounted for 61 percent of the total for NPRI facilities, while for TRI facilities, transfers to disposal represented 56 percent of all transfers.
- In the Great Lakes region, both NPRI and TRI transfers to disposal represented more than half of all transfers, and transfers to sewage/POTWs from TRI facilities were greater than for NPRI facilities, as was true for the overall databases.
- In the Plains region, NPRI facilities predominantly reported transfers to treatment/destruction, while more TRI transfers were sent to sewage/POTWs.
- In the Western region, disposal/containment represented 98 percent of all NPRI transfers, but TRI transfers were more evenly distributed among transfer types.

7.3.2 Bioaccumulating Chemicals in the Great Lakes Region

The Great Lakes region is the site of more facilities than any other border region, as noted in **Chapter 3**, and thus it is not unexpected that total releases and transfers from facilities in the states and provinces surrounding the Great Lakes were among the largest found anywhere.

Map 7–4
M 1995

NPRI and TRI Facilities in the Canada-US Border Regions

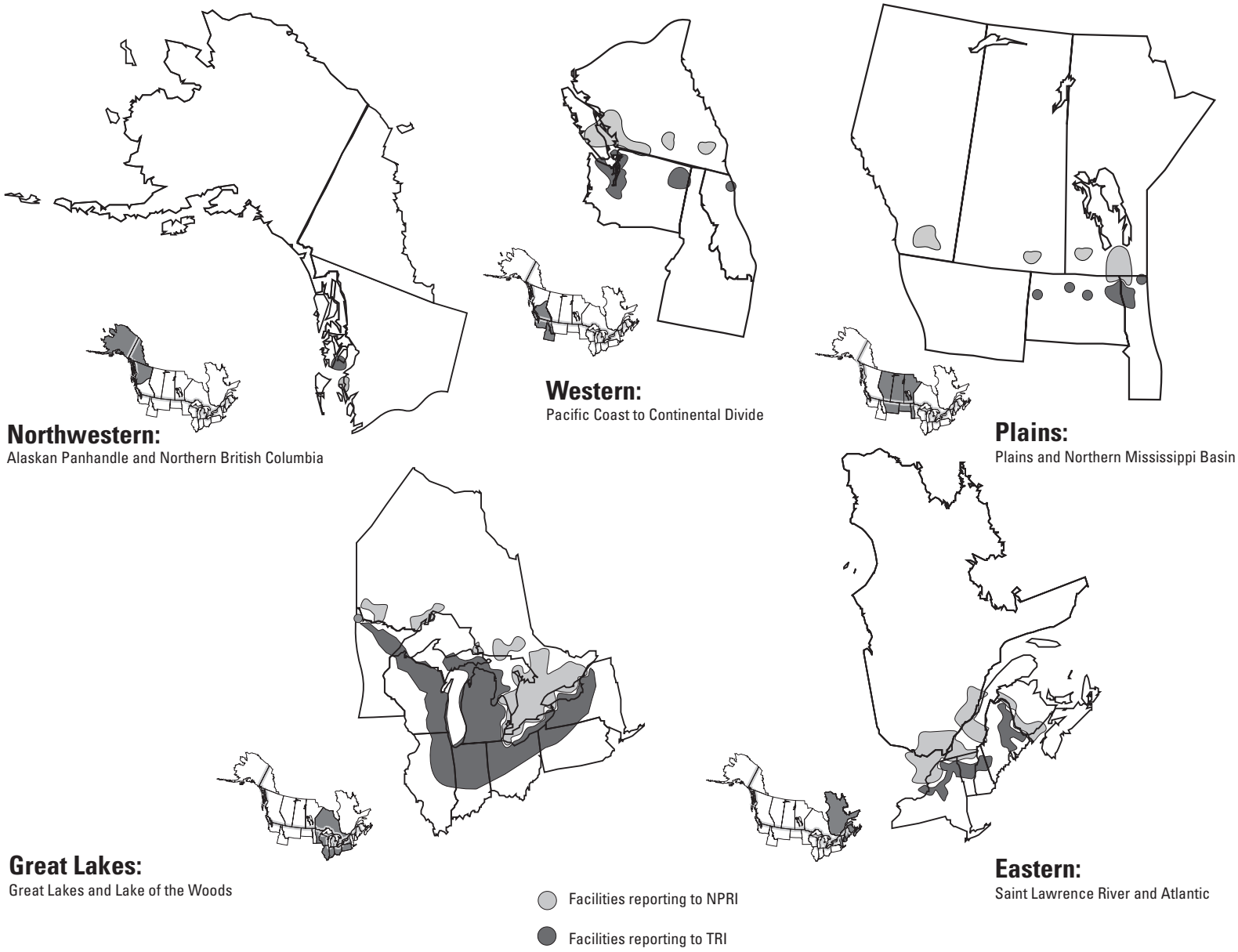


Figure 7–3 **M** 1995

Distribution of NPRI and TRI Facilities in the Border Regions

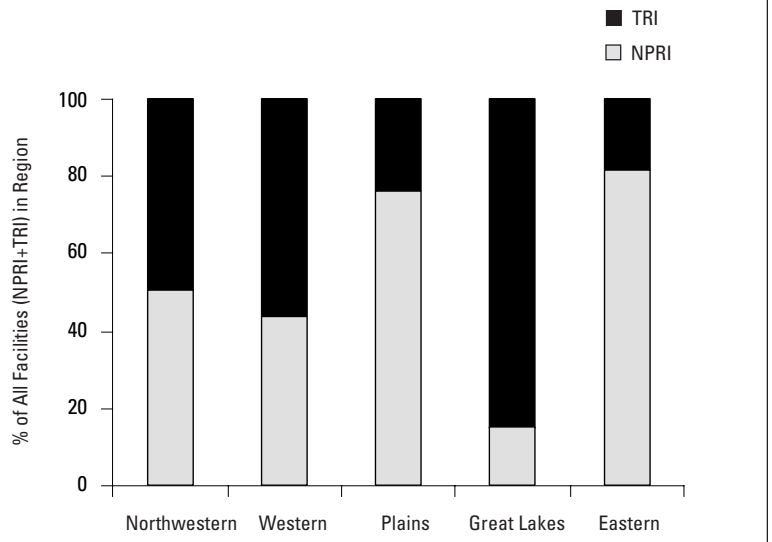
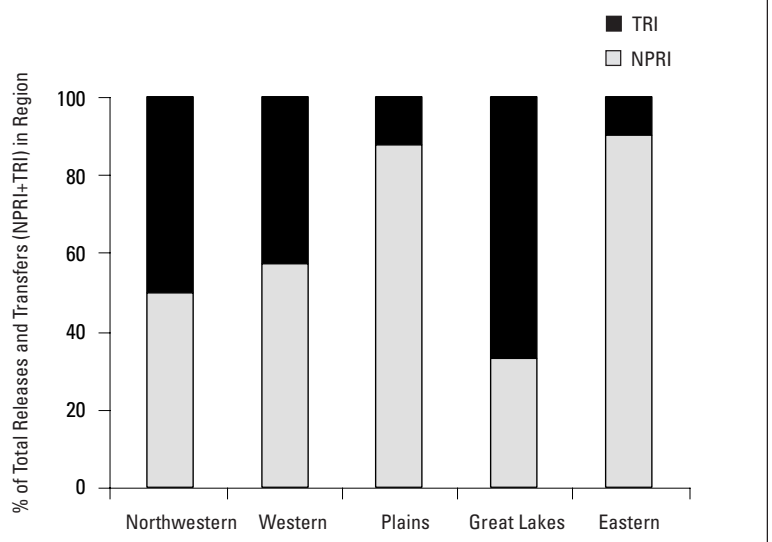


Figure 7–4 **M** 1995

Distribution of NPRI and TRI Total Releases and Transfers in the Border Regions



In addition, bioaccumulating chemicals have been identified as a special class of substances of concern in this area under the International Joint Commission (IJC). The IJC is an independent agency established by the Boundary Waters Treaty of 1909 between Canada and the United States for prevention and resolution of disputes, primarily those involving water quantity and quality. Although all water bodies along the Canada-US border fall within the IJC mandate, the Great Lakes programs are the largest and most comprehensive.

Bioaccumulating chemicals considered by the IJC include 13 persistent, bioaccumulative and toxic substances that are of immediate concern in the Great Lakes system and another 26 substances that have a demonstrated potential to impair the Great Lakes basin ecosystem (see the Environment Canada Web page on the Canada-Ontario Agreement: <http://www.cciw.ca/glimr/data/canada-ontario-agreement>). Five of these 39 substances are on the NPRI list and 13 appear on the TRI list, as shown in **Table 7–12**. The other substances on the IJC list include dioxins, furans, polycyclic aromatic hydrocarbons (which are combustion by-products and not manufactured), and DDT and related compounds (which, though no longer manufactured in the United States or Canada, continue to be in Mexico).

While few direct discharges of these substances to water were reported in the PRTR data, releases to the other environmental media can end up in lakes and rivers through air deposition or via groundwater. Data on current releases also do not measure existing concentrations of these persistent substances, and for some, such as metals, local releases may be less important than major sources located outside and upwind of the immediate area. Furthermore, PRTR data do not include non-manufacturing uses of these chemicals in the United States, and pesticides are not listed on Canada's NPRI.

7.3.3 Industries in the Border Regions

As for the PRTRs as a whole, two industrial sectors accounted for one-half or more of total releases and transfers in each region (see **Table 7–13**). The industries dominant on one side of the border, however, were not necessarily so on the other. In the Eastern region, paper products led both NPRI and TRI reporting, but the chemical industry was second for NPRI and the much smaller lumber industry second for TRI. In the Plains region, the chemical industry reported the largest releases and transfers among NPRI facilities, while the transportation equipment industry dominated TRI reporting.

Chemical and paper production led the Western region for NPRI, whereas paper was first and transportation equipment second for TRI. Only in the Great Lakes were the two top industries for total releases and transfers the same in NPRI and TRI: primary metals products, followed by chemical manufacture, as was true for the border area as a whole. The only two facilities reporting in the Northwestern region were both paper facilities.

Of all these industries, only food products and lumber fell outside the top six in the combined rankings for Canada and the United States, as shown in **Chapter 3** (see **Table 3–15**).

Table 7–10
M 1995

Releases for Border Regions

	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
NPRI-Canadian Facilities					
Eastern	11,548,488	4,970,621	0	2,331,885	18,877,271
Great Lakes	34,270,494	5,125,345	0	4,571,659	44,056,078
Plains	1,175,660	105,710	0	76,530	1,362,734
Western	1,185,624	71,890	0	89,434	1,353,640
Northwestern	562,000	0	0	0	562,000
Subtotal	**48,742,266**	**10,273,566**	**0**	**7,069,508**	**66,211,723**
% of Subtotal	**73.6**	**15.5**	**0.0**	**10.7**	**100.0**
Total for All Canada	**79,547,053**	**15,419,582**	**9,937,227**	**11,690,712**	**116,744,327**
% of Total	**68.1**	**13.2**	**8.5**	**10.0**	**100.0**
TRI-US Facilities					
Eastern	2,151,264	262,566	0	14,342	2,428,172
Great Lakes	62,051,152	1,719,372	2,940,845	12,427,345	79,138,714
Plains	214,457	8,349	0	340	223,146
Western	2,147,263	652,476	0	3,133	2,802,871
Northwestern	162,277	414,943	0	14	577,234
Subtotal	**66,726,412**	**3,057,706**	**2,940,845**	**12,445,173**	**85,170,137**
% of Subtotal	**78.3**	**3.6**	**3.5**	**14.6**	**100.0**
Total for All US	**560,407,943**	**60,570,521**	**92,783,273**	**123,219,666**	**836,981,403**
% of Total	**67.0**	**7.2**	**11.1**	**14.7**	**100.0**
Totals for Canadian and US Facilities					
Eastern	13,699,752	5,233,187	0	2,346,227	21,305,443
Great Lakes	96,321,646	6,844,717	2,940,845	16,999,004	123,194,792
Plains	1,390,117	114,059	0	76,870	1,585,880
Western	3,332,887	724,366	0	92,567	4,156,511
Northwestern	724,277	414,943	0	14	1,139,234
Subtotal	**115,468,678**	**13,331,272**	**2,940,845**	**19,514,681**	**151,381,860**
% of Subtotal	**76.3**	**8.8**	**1.9**	**12.9**	**100.0**
Total	**639,954,996**	**75,990,103**	**102,720,500**	**134,910,378**	**953,725,730**
% of Total	**67.1**	**8.0**	**10.8**	**14.1**	**100.0**

Figure 7–5
M 1995

NPRI and TRI Releases in the Border Regions

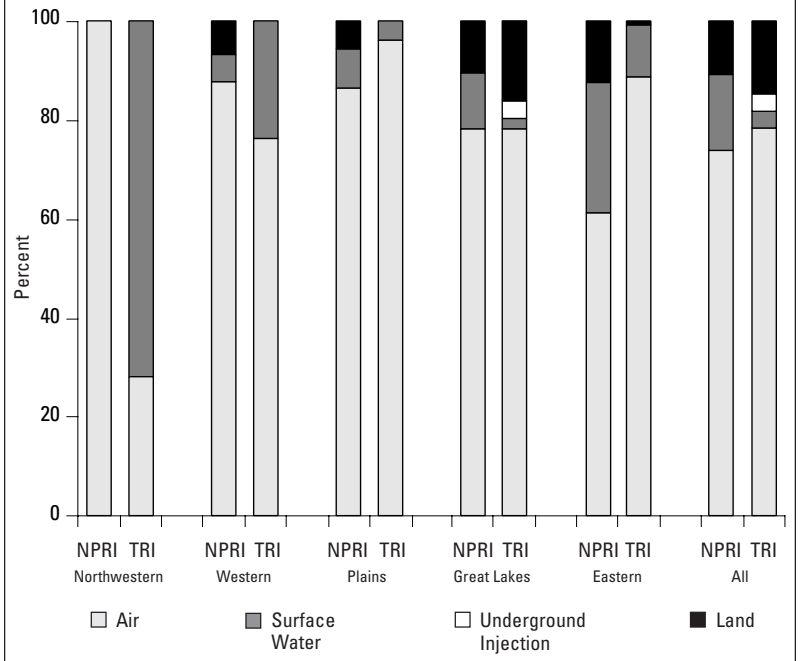


Table 7–11
M 1995

Transfers for Border Regions

	Treatment/ Destruction (kg)	Sewage/ POTWs (kg)	Disposal/ Containment (kg)	Total Transfers (kg)
NPRI-Canadian Facilities				
Eastern	5,423,540	371,788	3,141,078	8,936,406
Great Lakes	5,944,041	3,936,854	13,709,545	23,590,440
Plains	223,823	7,280	76,313	307,416
Western	34,328	15,096	2,626,098	2,675,522
Northwestern	0	0	0	0
Subtotal	**11,625,732**	**4,331,018**	**19,553,034**	**35,509,784**
% of Subtotal	**32.7**	**12.2**	**55.1**	**100.0**
Total for All Canada	**13,148,001**	**4,457,382**	**20,654,350**	**38,259,733**
% of Total	**34.4**	**11.7**	**54.0**	**100.0**
TRI-US Facilities				
Eastern	210,778	37,292	309,874	557,945
Great Lakes	14,292,910	14,862,758	29,889,190	59,044,858
Plains	2,290	8,556	340	11,187
Western	78,788	69,263	45,405	193,457
Northwestern	0	0	0	0
Subtotal	**14,584,767**	**14,977,870**	**30,244,810**	**59,807,446**
% of Subtotal	**24.4**	**25.0**	**50.6**	**100.0**
Total for All US	**103,959,767**	**95,796,854**	**117,927,818**	**317,684,439**
% of Total	**32.7**	**30.2**	**37.1**	**100.0**
Totals for Canadian and US Facilities				
Eastern	5,634,318	409,080	3,450,952	9,494,351
Great Lakes	20,236,951	18,799,612	43,598,735	82,635,298
Plains	226,113	15,836	76,653	318,603
Western	113,116	84,359	2,671,503	2,868,979
Northwestern	0	0	0	0
Subtotal	**26,210,499**	**19,308,888**	**49,797,844**	**95,317,230**
% of Subtotal	**27.5**	**20.3**	**52.2**	**100.0**
Total	**117,107,768**	**100,254,236**	**138,582,168**	**355,944,172**
% of Total	**32.9**	**28.2**	**38.9**	**100.0**

Figure 7–6
M 1995

NPRI and TRI Transfers in the Border Regions

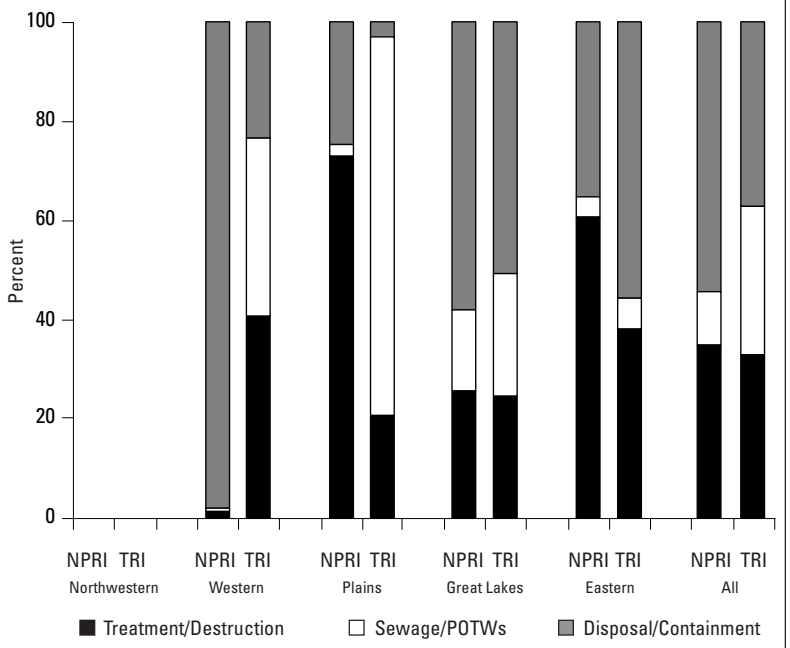


Table 7–12
M 1995

Releases of Bioaccumulators from Great Lakes Region Facilities

CAS Number	Chemical	Number of Forms	Total Air Emissions (kg)	Surface Water Discharges (kg)	Underground Injection (kg)	On-Site Land Releases (kg)	Total Releases (kg)
NPRI-Canadian Great Lakes Facilities							
120-12-7	Anthracene	5	1,190	0	0	10	1,200
—	Cadmium (and its compounds)	7	135	4	0	6,600	6,967
106-46-7	1,4-Dichlorobenzene	1	0	0	0	0	0
—	Mercury (and its compounds)	1	0	0	0	12	12
101-14-4	4,4'-Methylene-bis(2-chloroaniline)	1	0	0	0	0	4
	Total for NPRI Chemicals	**15**	**1,325**	**4**	**0**	**6,622**	**8,183**
TRI-US Great Lakes Facilities							
309-00-2	Aldrin	0	0	0	0	0	0
120-12-7	Anthracene	8	23,999	1,945	0	0	25,944
—	Cadmium (and its compounds)	28	4,609	3	0	0	4,612
57-74-9	Chlordane	0	0	0	0	0	0
106-46-7	1,4-Dichlorobenzene	1	3,261	0	0	0	3,261
91-94-1	3,3'-Dichlorobenzidine	1	5	0	0	0	5
118-74-1	Hexachlorobenzene	0	0	0	0	0	0
319-84-6	alpha-Hexachlorocyclohexane	0	0	0	0	0	0
—	Mercury (and its compounds)	5	757	2	0	395	1,154
101-14-4	4,4'-Methylene-bis(2-chloroaniline)	8	116	0	0	0	116
87-86-5	Pentachlorophenol	1	0	0	0	0	0
1336-36-3	Polychlorinated biphenyls (PCBs)	4	0	0	0	0	0
8001-35-2	Toxaphene	0	0	0	0	0	0
	Total for TRI Chemicals	**56**	**32,746**	**1,951**	**0**	**395**	**35,091**

Table 7–13
M 1995

NPRI and TRI Releases and Transfers for Border Regions, for Top Industries

US SIC Code	Industry	NPRI Total Releases (kg)	NPRI Total Transfers (kg)	NPRI Total Releases and Transfers (kg)	US SIC Code	Industry	TRI Total Releases (kg)	TRI Total Transfers (kg)	TRI Total Releases and Transfers (kg)
	Eastern					**Eastern**			
26	Paper	7,434,078	1,747,487	9,181,565	26	Paper	2,025,339	468,154	2,493,493
28	Chemicals	4,068,771	1,880,779	5,949,550	24	Lumber	140,641	0	140,641
	Subtotal	11,502,849	3,628,266	15,131,115		Subtotal	2,165,980	468,154	2,634,134
	% of Total	60.9	40.6	54.4		% of Total	89.2	83.9	88.2
	Total for Region	18,877,271	8,936,406	27,813,677		Total for Region	2,428,172	557,945	2,986,117
	Great Lakes					**Great Lakes**			
33	Primary Metals	8,097,401	12,934,094	21,031,495	33	Primary Metals	20,307,795	22,543,052	42,850,847
28	Chemicals	10,948,536	6,831,599	17,780,135	28	Chemicals	10,733,887	14,416,655	25,150,541
	Subtotal	19,045,937	19,765,693	38,811,630		Subtotal	31,041,682	36,959,707	68,001,389
	% of Total	43.2	83.8	57.4		% of Total	39.2	62.6	49.2
	Total for Region	44,056,078	23,590,440	67,646,518		Total for Region	79,138,714	59,044,858	138,183,572
	Plains					**Plains**			
28	Chemicals	1,093,536	173,311	1,266,847	37	Transportation	90,345	2,290	92,635
20	Food	138,710	6,280	144,990	20	Food	71,791	8,216	80,008
	Subtotal	1,232,246	179,591	1,411,837		Subtotal	162,136	10,507	172,643
	% of Total	90.4	58.4	84.5		% of Total	72.7	93.9	73.7
	Total for Region	1,362,734	307,416	1,670,150		Total for Region	223,146	11,187	234,333
	Western					**Western**			
28	Chemicals	31,382	2,054,345	2,085,727	26	Paper	1,000,790	470	1,001,260
26	Paper	823,198	97,200	920,398	37	Transportation	408,084	66,086	474,170
	Subtotal	854,580	2,151,545	3,006,125		Subtotal	1,408,874	66,556	1,475,430
	% of Total	63.1	80.4	74.6		% of Total	50.3	34.4	49.2
	Total for Region	1,353,640	2,675,522	4,029,162		Total for Region	2,802,871	193,457	2,996,328
	Northwestern					**Northwestern**			
26	Paper	562,000	0	562,000	26	Paper	577,234	0	577,234
	Total for Border Area					**Total for Border Area**			
33	Primary Metals	10,346,514	17,100,793	27,447,307	33	Primary Metals	20,711,835	22,569,808	43,281,644
28	Chemicals	16,142,225	10,940,034	27,082,259	28	Chemicals	10,767,675	14,445,230	25,212,905
	Subtotal	**26,488,739**	**28,040,827**	**54,529,566**		**Subtotal**	**31,479,510**	**37,015,039**	**68,494,549**
	% of Total	**40.0**	**79.0**	**53.6**		**% of Total**	**37.0**	**61.9**	**47.2**
	Total	**66,211,723**	**35,509,784**	**101,721,507**		**Total**	**85,170,137**	**59,807,446**	**144,977,583**

Chapter 8: Table of Contents

LEGEND

M Matched Chemicals/Industries

MY Multi-year Matched Chemicals/Industries

A All Chemicals/Industries

Key Findings

- The pulp and paper industry is the third largest contributor of releases and transfers in both Canada and the United States. However, the types of pulp and paper facilities reporting, and the distribution of releases and transfers from the facilities, differ significantly in the two countries.
- The Canadian pulp and paper industry is dominated by pulp mills, which report large discharges to surface waters. However, these discharges are decreasing, due in part to new federal and provincial regulations that place stricter limits on such discharges. Because many Canadian mills made changes late in 1995 and virtually all mills had secondary treatment plants in operation by 31 December 1995, the impact of these changes may be further reflected in decreases in releases in 1996 NPRI data.
- The US pulp and paper industry has a wider variety of types of paper-making facilities and, for the most part, transfers its wastewaters to sewage treatment rather than discharging them to surface waters.
- Canadian pulp and paper industry facilities report almost exclusively on-site releases (93 percent of their total releases and transfers) with very few transfers, while TRI paper industry facilities report 79 percent of their total as releases and 21 percent as transfers.
- The Canadian pulp and paper industry has reported reductions in surface water discharges of 15 percent from 1994 to 1995, despite an increase in the number of reporting facilities of 14 percent. TRI pulp and paper industry releases and transfers remain about the same from 1994 to 1995. The Canadian pulp and paper industry is projecting a 38 percent decrease in releases and transfers from 1995 to 1997, compared to 3 percent for US pulp and paper facilities.
- Pulp and paper industry facilities in both countries are moving to install new processes that will drastically reduce or even eliminate some of their releases and transfers in the future. In Canada, regulations governing releases of pollutants are changing as well.

8.1 Introduction

As noted in **Chapter 4**, in 1995 the pulp and paper industry in Canada had average releases and transfers per reporting form that were one-and-one-half times those reported to TRI. This chapter investigates the differences in paper-industry reporting to NPRI and TRI in more detail. The paper industry was chosen for special analysis because:

- In 1994 and 1995, the pulp and paper industry was one of the top three industries in North America for releases and transfers.
- In Canada, this industrial sector has made major investments to reduce pollutants, driven, in part, by changing regulatory requirements.
- The pulp and paper industry contributes a greater proportion of total releases and transfers than would be expected based on the number of forms submitted. In 1995, pulp and paper facilities filed 3 percent of the total number of forms, but reported 11 percent of total releases and transfers in North America.
- In 1995, the pulp and paper industry also averaged the highest releases and transfers per form in North America: 65,515 kg compared to 20,434 kg for all industries.
- Of the top 50 facilities for total releases and transfers in North America, four were from pulp and paper facilities: Simpson Pasadena Paper Co. of Pasadena, Texas; Consolidated Papers Inc. of Wisconsin Rapids, Wisconsin; Boise Cascade Corporation of Saint Helens, Oregon, and Irving Pulp and Paper of Saint John, New Brunswick (**Table 3–8** in **Chapter 3**).

- Methanol is the chemical with the largest total releases in North America (**Table 3–10**), and the paper industry contributes the majority of this chemical—releasing almost 54 percent of the North American total or 76 million kg of methanol each year.

Analyses in this chapter address the matched set of chemicals common to both NPRI and TRI, as in **Chapters 3** and **4**. Where pulp and paper industry reporting is analyzed for 1994 to 1995, the multi-year matched data set of **Chapter 5** is used. Thus, differences found here do not arise from the difference in the NPRI and TRI chemical lists.

8.2 Major Trends in the Pulp and Paper Industry

The pulp and paper industry is diverse: many different types of materials and processes are used to produce numerous products. Pulp mills, traditionally large operations, separate the wood fibers using chemical or mechanical methods or a combination of both. The cellulose molecules in wood fibers are held together by lignin (an almost tar-like substance in cell walls with a complex chemical structure), which must be chemically degraded or mechanically broken down in the pulping process. Often mills are integrated—wood pulp is produced and made into paper or paper products at the same location. In other mills, wood pulp can be dried, baled and then shipped. The type of cellulosic raw material or mix of timber species entering the pulp mill, the type of process, and the nature of the treatment systems installed all affect the amounts and types of pollutants released.

In paper mills, wood pulp is mixed into a slurry with water and put on a screen. The water is then removed by gravity, vacuum, pressure, or heat, forcing the fibers in the pulp to bond together. The properties of the paper, including its strength, thickness, moisture content, and finish, are closely controlled. Each of the numerous kinds of paper made have a specific purpose, ranging from fine writing paper to newsprint to sanitary papers.

The pulp and paper industry has typically experienced great swings in market supply and demand, and often these economic cycles have been matched by large technological changes. During the period covered in this report, 1994–1995, the industry continued to experience economic, technological and regulatory change, briefly described in the following sections.

8.2.1 Changing Economic Environment

The world demand for paper has doubled in the last 20 years and is projected to double again by the year 2010. The industry has been stimulated by the lowering of tariffs, including the phasing out of European Union tariffs on non-newsprint grades by 2000 and newsprint by 2002.

The US paper and paperboard industry is the largest in the world, producing over 24 percent of the world's capacity in 1993. In 1995 the industry employed 486,000 in manufacturing jobs. This amounts to four percent of all US manufacturing employees. In 1995, over five percent of all shipments involved paper products—an increase of 30 percent since 1992—while employment has increased four percent (source: American Forestry & Paper Association <www.afandpa.org> and US Census of Manufacturers).

Canada, however, was the world's largest producer and exporter of newsprint (supplying 26 percent of world demand) and the second largest supplier of wood pulp (producing 29 percent of all wood pulp) in 1996. The forest industry directly employs approximately 250,000 people across Canada. In 1996, the pulp and paper industry had net exports reaching C$17 billion (US$12 billion). Since 1990, pulp and paper production in Canada has increased approximately 20 percent.

The US pulp and paper industry has made major investments to lessen the environmental impact of its production processes. From 1984 to 1993, the industry spent $290 US billion (C$375 billion) on environmental research and, since 1970, the costs related directly to addressing environmental concerns, per ton of paper produced, have doubled. Over the past two decades, paper companies have also reduced the usage of non-renewable fossil fuels by 38 percent (source: American Forestry & Paper Association <www.afandpa.org>).

In a Statistics Canada survey of environmental protection spending in 1995, the pulp and paper industry reported investing C$952 million (US$694 million) on capital projects for environmental protection, the largest such amounts of any Canadian industry. This was a 55 percent increase from 1994 for the pulp and paper industry, and represents nearly one-half of all Canadian industry spending on capital projects for environmental protection. Capital spending centered on pollution abatement and control projects, "in large part to comply with the new environmental regulations that [came] into effect at the end of 1994" (source: *Environment Industry, 1995, Preliminary Data,* Statistics Canada, June 1997, Catalogue Number 16F0007XPE).

8.2.2 Changing Technology

Technological changes in the pulp and paper sector have been profound. Driven by changing regulatory requirements, the need to stay globally competitive and the demands of the marketplace, most pulp and paper mills have made major investments in reducing pollutants. Some have switched from the traditional chlorine-based bleaching process to one utilizing chlorine dioxide or oxygen. Others have upgraded secondary treatment systems or even installed such systems for the first time. These investments have yielded direct environmental effects: providing documented reductions in total suspended solids, biological oxygen demand, dioxin and furan emissions and acute lethal toxicity.

In the late 1980s and early 1990s, public concern over the potential health and environmental impacts of chlorine came to a head. At the time, most pulp and paper mills used chlorine as a chemical agent to degrade (or "bleach") the lignin in the wood pulp, a process that releases dioxins and furans as by-products of the reaction. Like other harmful compounds with complex ring structures, such as DDT and PCBs, dioxins and furans persist in the environment for decades. They are found in all environmental media—air, water, and soil—where they tend to accumulate in sediments. From there they make their way into the food web and hence into human and animal tissues (source: *Priority Substances List Assessment,* CEPA, 1990).

Industry has responded by employing improved defoamers to reduce the potential for dioxin and furan formation, and switching from chlorine-based bleaching to an elemental-chlorine-free bleaching process (ECF) or to a totally chlorine-free process (TCF). In ECF, chlorine dioxide replaces elemental chlorine in the bleaching process, resulting in significantly fewer chlorine atoms that can react to form dioxins and furans. In a mill using TCF, by contrast, no chlorine dioxide is permitted; instead, a variety of agents such as hydrogen peroxide and ozone are used to bleach the pulp.

The switch to ECF bleaching has been rapid in the United States and Canada—accounting for approximately 25 percent of US production in 1995 (source: D. Reeve, ECF bleaching and TCF bleaching versus chlorine bleaching, *Canadian Market Pulp,* September 1995). Between 1988 and 1995, the use of elemental chlorine bleaching has decreased 87 percent in Canada. Other countries, such as Sweden and Finland, have moved toward TCF. One study of nearly 50 plants in six countries that had invested in ECF and TCF bleaching found that these facilities showed improved financial performance even when national differences in organochlorine legislation were taken into account—another example of "pollution prevention pays" (source: Chad Nehrt, Process changes pay off for mills investing in pollution control, *Pulp and Paper Magazine,* 1 September 1995).

Some pulp and paper mills are using "closed loop" systems where no effluent is released. Using a variety of technologies, waste is recycled for use within the plant. Although adoption of closed loop systems may increase transfers off-site, interest in these new systems is high, with a major C$88 million (US$63 million) research effort underway. One example is the installation of a pilot project at Avenor Inc.'s mill in Thunder Bay, Ontario.

Installation or upgrading of secondary treatment systems also contributes to substantial reductions in releases. These systems use bacteria to break down organic pollutants and reduce their concentrations, including such NPRI and TRI substances as methanol and phosphoric acid.

Not only are mills changing their processes and pollution systems, but the nature of their raw material has also changed. Many mills now use recycled paper as a source of fiber and so have added de-inking technology to their process. In 1989 only one newsprint mill in Canada used recycled fiber; now a total of 62 mills use recycled paper as a fiber source—approximately 23 do so for the production of newsprint. From 1990 to 1995 consumption of recycled paper grew at an average of 17 percent per year. Canadian mills used 4.5 million tonnes of recycled fiber in 1996 and had to import nearly one-half of this amount to meet demand (source: CPPA, 1996).

In 1993, the US paper industry set its goal to recover—for recycling and reuse—50 percent of all paper used in the United States in the year 2000. By 1996, the US paper recovery rate was an estimated 45 percent. Exports of recovered paper fell from 1994 to 1996, but domestic use of recovered paper largely offset this decline. Had exports not declined, the US paper recovery rate would have exceeded 48 percent. About 400 of the 550 facilities in the United States that make paper, paperboard and building products use recovered paper as a raw material, and more than 200 rely on it entirely (source: American Forestry and Paper Association <www.afandpa.org>).

8.2.3 Changing Regulatory Environment

The pulp and paper sector is subject to numerous environmental programs, both mandatory and voluntary, in Canada and the United States.

Canadian Regulations

In Canada, three new federal regulations set limits on pollutants released from the pulp and paper industry. In 1992 the new Pulp and Paper Mill Chlorinated Dioxins and Furans Regulation required mills that use chlorine bleaching to implement process changes to prevent the formation of dioxin and furans, and to monitor dioxin and furan concentrations. The regulation prohibits the discharge of measurable concentrations of 2,3,7,8-tetrachlorodibenzodioxin (TCDD) and 2,3,7,8-tetrachlorodibenzofuran (TCDF). The measurable concentration for 2,3,7,8-TCDD is 15±5 parts per quadrillion (ppq) and for 2,3,7,8-TCDF is 50 ppq. Of the 46 mills using chlorine bleaching, the regulation required one group of mills to comply immediately in 1992; the second group of 25 mills were allowed a phase-in period until 1 January 1994.

Another new federal regulation limits the quantities of total suspended solids and biological oxygen demand that can be released into lakes and rivers, and prohibits the discharge of any acutely lethal effluent. The quantity of pollutant that can be released depends on the mill's production rate over the past three years. This regulation applies to all 157 pulp and paper mills in Canada, but allowed 79 mills an extended phase-in period to achieve compliance. Full compliance was required by 31 December 1995. While industry was free to choose any technology or system that could meet these limits, many mills reported installing secondary treatment. Because many mills made changes late in 1995, the 1996 NPRI reporting year will be the first year to reflect their full effects.

A third federal regulation, which became effective 20 May 1992, places restrictions on defoamers and the use of polychlorinated phenol-treated wood chips to prevent the formation of dioxins and furans. In addition to these three new federal regulations, many provinces have also set standards limiting pollutants in pulp and paper mill discharges.

These new regulations are significantly more stringent than the previous Canadian federal pulp and paper regulation which did not state explicitly whether the standards applied only to new or expanded sections of a mill, and did not provide standards that reflected current technology. Furthermore, the old regulation did not apply to mills that began operation before 1971 (an estimated 90 percent of Canadian mills).

In addition to these regulations limiting pollutants, the reporting criteria for NPRI changed in 1995, requiring substances at concentrations lower than 1 percent to be included in the calculation. This important reporting change has been noted by many mills to be a reason for increased quantities of pollutants reported in 1995.

US Regulations

In the United States, the pulp and paper sector is influenced by numerous pieces of legislation, including Executive Order 127873 and EPA's newly promulgated "Cluster Rules." The Executive Order on the purchase of environmentally preferable products by the federal government, issued in October 1993, required a minimum recycled fiber content of 50 percent in uncoated printing and writing papers for federal purchases. As of March 1996, this was reduced to a 20 percent requirement for some papers. This Order might be expected to have had a noticeable effect on the market for paper because the federal government is a major consumer of paper products, not only directly, but also through its contractors.

Quantifying its exact contribution, and that of other factors, in stimulating strong growth in the recycled paper market is difficult, though. It has recently been reported, for instance, that available de-inking capacity has outstripped the demand for recycled paper (perhaps reflecting an influx of low-cost pulp in international markets). To the extent that recycled fibers, and post-consumer fibers in particular, attain an increased market share, the composition of the paper industry will be transformed, in terms of the relative prevalence of operations with very different chemical characteristics.

The new "Cluster Rule" represents the EPA's attempt at regulatory rationalization by combining regulatory criteria for industry sectors into a coherent system intended to reflect the operating characteristics of each industry. This stands in marked contrast to the historical pattern, dictated by EPA's multiple independent legislative mandates, of separately specifying regulations for each environmental medium (air, water, soil, etc.).

The Cluster Rule for the pulp and paper industry, originally proposed in December 1993, was made final on 14 November 1997. Since its initial proposal, the rule has been the impetus for significant debate and considerable research.

Procedurally, the "Cluster Rule" is primarily concerned with setting National Emission Standards for Hazardous Air Pollutants under the Clean Air Act and Effluent Guideline Limitations under the Clean Water Act. A key concept introduced with the 1990 amendments to the Clean Air Act was the determination of "Maximum Available Control Technology," designed to encourage the use of advanced technology.

Substantively, a key focus of the Cluster Rule has been the generation of highly toxic and frequently bioaccumulative chlorinated organic compounds, including 2,3,7,8-TCDD as well as other chlorinated dioxins and dibenzofurans, trihalomethanes such as chloroform, and other compounds.

Among the innovations of the Cluster Rule are the addition of several new classes of chemicals to the list of those regulated for this industry. In addition to dioxin, 12 chlorinated phenolics, and tetrachlorodibenzofuran, the regulation addresses a composite parameter, "AOX," representing adsorbable organic halides. Regulation of pollutants, including biological oxygen demand, chemical oxygen demand, and total suspended solids in water, would also be made more stringent.

Over the four-year development of the Cluster Rule, much debate centered on whether EPA would accept the substitution of chlorine dioxide for chlorine—the ECF process—as "Best Available Technology." There was industry concern that EPA would require the use of totally chlorine-free technologies, or require oxygen delignification (oxygen-based removal of lignin) in addition to substitution of chlorine dioxide. Industry sources argued that this approach offers no environmental improvement and would pose substantial cost. In the final rule, EPA accepted ECF for the bleached paper-grade kraft and soda subcategory, as well as for ammonium-based and specialty paper-grade sulfite mills. TCF bleaching was specified for calcium-, magnesium-, and sodium-based paper-grade sulfite mills.

The potential of these rules to affect TRI reporting in future years appears significant. Whether, during the years they have been undergoing debate as a proposed measure, the rules have already encouraged the ongoing switch to chlorine dioxide is uncertain, given the influence of both market factors and existing regulations.

8.2.4 Voluntary Reduction Efforts

In addition to new mandatory effluent limits, approximately one-half of the production of Canada's pulp and paper mills is also subject to voluntary reductions of specific pollutants under the Accelerated Reduction/Elimination of Toxics (ARET) program. The participating pulp and paper companies achieved a 5 percent, or 473 tonne, net decrease in releases from 1993 to 1995 and have committed themselves to an 80 percent overall reduction of releases by the year 2000. While the pulp and paper sector remains the largest contributor to total 1995 ARET releases, releases of chlorinated dioxins and furans have been reduced by 95 percent. Almost half of the ARET substances are also on the NPRI list, including pollutants commonly released from the pulp and paper sector, such as chlorine dioxide and chloroform, for which the short-term goal is a 50 percent reduction by 2000 (source: ARET Leaders Report, January 1997).

US EPA's 33/50 Program was established in 1991 to elicit voluntary commitments from TRI facilities for reductions of 17 targeted chemicals. The program sought to achieve a reduction in total releases and transfers of 33 percent from 1988 to 1992 and 50 percent from 1988 to 1995. More than 1,290 companies pledged reduction goals, including 60 that own paper facilities. TRI paper products facilities, whose companies made a commitment to the program, achieved a 66 percent reduction in total releases and transfers of the 33/50 Program chemicals from 1988 through 1995. TRI paper industry facilities as a whole achieved reductions of 60 percent, and the total for all TRI facilities was 56 percent.

8.3 Overview of Paper Industry Reporting

As noted in **Chapter 4** of this report, in 1995 paper industry facilities reporting to NPRI and those reporting to TRI showed significant differences. While total releases and transfers were much larger in TRI than NPRI, there were also four times as many TRI paper facilities as NPRI facilities (see **Table 8–1**).

Most pollutants were released rather than transferred from paper facilities in both Canada and the United States. However, the pattern was more exaggerated in Canada, where releases accounted for 93 percent of total releases and transfers, than in the United States, where releases were 79 percent of the total.

NPRI and TRI also showed significant differences in the medium to which listed chemical substances was released. In NPRI, releases from the paper industry were split between air and water, with somewhat more released into the air (56 percent) than to water (43 percent). However, almost 90 percent of TRI releases were to the air, with almost 9 percent to water and the remainder to land.

One of the most striking differences between the industry's reporting to NPRI and to TRI came in the area of transfers. Not only did the Canadian paper industry transfer significantly less as a percentage than such facilities in the United States; what was transferred went to very different places. In Canada, the paper industry transferred less than 0.1 percent of total releases and transfers to sewage treatment plants, whereas in the United States, the paper industry reported large quantities sent to sewage treatment plants, almost 17 percent of total releases and transfers.

Another difference was in the number of substances for which reporting forms were submitted. NPRI paper facilities submitted an average of 2.7 forms, while TRI paper facilities averaged 4.2 (see **Table 8–1**). This meant that TRI paper facilities reported on one to two more substances, on average, than did NPRI paper facilities. These are counted from the same matched list of substances and do not include any chemicals on the larger TRI list that are not also on the NPRI list.

The effect of this can be seen by comparing average releases and transfers per form and per facility between NPRI and TRI. Average total releases and transfers per facility were about the same in both countries (255,064 kg for NPRI and 253,306 kg for TRI).

Table 8–1
M 1995

Releases and Transfers for Paper Industry (US SIC Code 26)

	NPRI		TRI	
	Number	Average per Facility Number	Number	Average per Facility Number
Facilities	115		447	
Forms	312	2.7	1,864	4.2

	Total Releases and Transfers									
	kg	% of Medium	% of Total	kg/facility	kg/form	kg	% of Medium	% of Total	kg/facility	kg/form
Total Air Emissions	15,330,306	56.0	52.3	133,307	49,136	79,932,135	89.7	70.6	178,819	42,882
Surface Water Discharges	11,879,113	43.4	40.5	103,297	38,074	7,622,282	8.6	6.7	17,052	4,089
Underground Injection	0	0.0	0.0	0	0	100	0.0	0.0	0	0
On-Site Land Releases	140,139	0.5	0.5	1,219	449	1,535,058	1.7	1.4	3,434	824
Matched Releases	**27,352,922**	**100.0**	**93.3**	**237,851**	**87,670**	**89,089,575**	**100.0**	**78.7**	**199,306**	**47,795**
Treatment/Destruction	1,558,207	78.7	5.3	13,550	4,994	4,017,155	16.6	3.5	8,987	2,155
Sewage/POTWs	21,133	1.1	0.1	184	68	18,890,688	78.3	16.7	42,261	10,134
Disposal/Containment	400,082	20.2	1.4	3,479	1,282	1,230,268	5.1	1.1	2,752	660
Matched Transfers	**1,979,422**	**100.0**	**6.7**	**17,212**	**6,344**	**24,138,112**	**100.0**	**21.3**	**54,000**	**12,950**
Matched Releases and Transfers	**29,332,344**		**100.0**	**255,064**	**94,014**	**113,227,686**		**100.0**	**253,306**	**60,744**

However, average total releases and transfers per form, that is, per chemical substance reported, were 55 percent higher for NPRI than for TRI (94,014 kg versus 60,744 kg).

Also striking were the differences in the distribution of releases compared to transfers seen as averages per form from NPRI and TRI paper facilities. Releases per form for NPRI were 83 percent greater than for TRI (87,670 kg/form in NPRI versus 47,795 kg/form in TRI). Average transfers per form for NPRI were 49 percent lower than for TRI (6,344 kg/form in NPRI versus 12,950 kg/form in TRI).

NPRI and TRI facilities averaged about the same amount of air emissions per form (49,136 kg versus 42,882 kg); the significant differences were in surface water discharges from NPRI paper facilities and transfers to sewage treatment from facilities in the US. NPRI facilities reported an average of 38,074 kg per form discharged to surface waters, while for TRI forms this was 4,089 kg on average. TRI facilities reported an average of 10,134 kg per form of transfers to sewage treatment, while NPRI forms averaged just 68 kg.

Pulp and paper mills in Canada projected a 38 percent decrease in releases and transfers from 1995–1997, compared to a three percent projected reduction for TRI releases and transfers (refer back to **Tables 4–20** and **4–21**).

Table 8–2
MY 94-95

Changes in NPRI and TRI Releases and Transfers for Paper Industry (US SIC Code 26)

	NPRI				TRI			
	1994	1995	Change 1994-1995		1994	1995	Change 1994-1995	
	Number	Number	Number	%	Number	Number	Number	%
Facilities	94	107	13	13.8	450	425	-25	-5.6
Forms	216	258	42	19.4	1,621	1,604	-17	-1.0
	kg	kg	kg	%	kg	kg	kg	%
Total Air Emissions	16,092,936	15,221,226	-871,710	-5.4	75,347,549	74,900,879	-446,670	-0.6
Surface Water Discharges	12,245,868	10,381,420	-1,864,448	-15.2	3,906,082	3,128,034	-778,048	-19.9
Underground Injection	0	0	0	—	0	100	100	—
On-Site Land Releases	132,249	140,139	7,890	6.0	2,090,102	1,520,522	-569,580	-27.3
Matched Releases	**28,472,996**	**25,745,222**	**-2,727,774**	**-9.6**	**81,343,733**	**79,549,534**	**-1,794,199**	**-2.2**
Treatment/Destruction	3,028,911	1,558,207	-1,470,704	-48.6	3,930,777	4,013,526	82,749	2.1
Sewage/POTWs	77,475	21,133	-56,342	-72.7	18,343,323	18,566,102	222,779	1.2
Disposal/Containment	180,150	400,076	219,926	122.1	1,226,601	1,212,565	-14,036	-1.1
Matched Transfers	**3,286,536**	**1,979,416**	**-1,307,120**	**-39.8**	**23,500,702**	**23,792,193**	**291,492**	**1.2**
Matched Releases and Transfers	**31,759,532**	**27,724,638**	**-4,034,894**	**-12.7**	**104,844,435**	**103,341,727**	**-1,502,707**	**-1.4**

➤ Does not include ammonia, ammonium nitrate, ammonium sulfate, hydrochloric acid, nitric acid, nitrate compounds, sulfuric acid, and chemicals not reported to both NPRI and TRI.

8.4 Changes in Reporting 1994–1995

Between 1994 and 1995, pulp and paper industry reporting to NPRI showed significant changes while that to TRI changed very little. In 1995 paper industry reporting to NPRI increased substantially (14 percent increase in facilities and 19 percent increase in forms). On the other hand, releases from NPRI paper facilities were reduced by almost 10 percent and transfers by 40 percent from 1994 to 1995. These reductions in releases and transfers are all the more significant given that they occurred at the same time as the number of facilities was increasing (see **Table 8–2**). Many mills continued to make changes to reduce pollutants in 1996, which will be reflected in the 1996 NPRI data.

In contrast, paper facilities reporting to TRI in 1995 showed little change from 1994. Total releases were reduced two percent and total transfers increased by one percent from 1994 to 1995. The largest reductions were in surface water discharges (a decrease of 20 percent).

Discussion of changes from 1994 to 1995, however, is based on a different set of chemicals because the reporting definition for some of the listed chemicals changed between 1994 and 1995. This is the multi-year matched data set analyzed in **Chapter 5**.

8.4.1 NPRI Facilities with Significant Changes, 1994–1995

For many NPRI facilities in the paper industry, 1995 was a year of change. Facilities faced new regulations requiring compliance by December 1995 and new NPRI reporting criteria for by-products. Both of these factors can have a major effect on 1995 NPRI reporting. As was seen in **Table 5–10**, 12 of the 50 NPRI facilities with the greatest reductions in total releases and transfers were in the paper industry. On the other hand, 10 of the 50 NPRI facilities with the greatest increases (**Table 5–8**) were paper facilities. For TRI, where overall changes were slight, five of the 50 TRI facilities reporting the largest decreases (**Table 5–14**) and four of the TRI facilities reporting the largest increases (**Table 5–12**) were from the paper industry.

Explanations of the facilities' changes in the amounts they reported from 1994 to 1995, as detailed in the following sections, were obtained in personal communications with facility representatives.

NPRI Facilities with Large Decreases

The data indicated that six NPRI facilities had apparent decreases of over 450,000 kg (1 million lbs) in releases and transfers from 1994 to 1995. These were contacted to determine possible reasons for such significant reductions (see **Table 5–10**). The facilities are Kimberly-Clark in New Glasgow, Nova Scotia; Western Pulp in Port Alice, British Columbia; Cartons St-Laurent in La Tuque, Quebec; Stora Forest Industries in Port Hawkesbury, Nova Scotia; Rexham Metallizing, Camvac Division, in Brantford, Ontario; and St. Anne-Nackawic Pulp Company in Nackawic, New Brunswick.

Because methanol is degraded in secondary treatment systems, the reported reductions in methanol releases could reflect the new Canadian federal effluent regulation, which required final compliance by 31 December 1995. The new Canadian dioxin and furan regulations, effective 1 January 1994, may have triggered reductions in the use of chlorine, resulting in continuously reduced releases of chlorine.

Of the six facilities whose data showed significant reductions, three had installed or improved secondary treatment plants which could account for the reductions (Kimberly-Clark, Cartons St-Laurent, and Stora Forest Industries), and one facility had made process and treatment changes. In addition, one facility reported an error and one did not report at all in 1995. All facilities that had made equipment or process changes identified the new federal or provincial regulations as a significant factor in their decisions either to initiate the changes or to increase the speed at which they were made. Companies reporting reductions in chlorine releases also cited increased demand for ECF paper as a reason for reductions.

The pulp mill with the largest reductions from 1994 to 1995 was Kimberly-Clark in New Glasgow, Nova Scotia, which reported reductions of nearly 3 million kg. Kimberly-Clark reported transferring 2 million kg of methanol to an off-site treatment plant in 1994, but none in 1995. This large reduction was due to the treatment plant being leased in 1995, which changed the transfer to a release, and improvements in aeration made at the treatment plant reduced the release of the methanol. Process changes in the plant also reduced chlorine use.

Cartons St-Laurent in La Tuque, Quebec, attributed its 1-million kg reduction in released methanol to the installation of a new secondary treatment plant. The company was predicting additional reductions in 1996, when the system would have been operating for a whole year. The reductions in pollutants could be seen in physical changes in the bay surrounding the plant. Stora Forest Industries in Port Hawkesbury, Nova Scotia, also gave credit for the significant 1995 reductions in methanol released to water to the installation of a new secondary treatment plant.

St. Anne-Nackawic Pulp Company, Ltd., in Nackawic, New Brunswick, has installed a bleach plant scrubber, which resulted in significant reductions in chlorine and chlorine dioxide from 1994 to 1995. The mill can use a variety of chemicals to bleach pulp, thereby ensuring ECF grades of wood pulp for European markets. The facility has also installed a secondary treatment plant and is conducting air emission testing to confirm its estimates of emission factors.

Western Pulp, in Port Alice, British Columbia, which reported a reduction in methanol releases of nearly 2 million kg in 1995, indicated that the 1994 estimate had been in error and the accurate value was zero for 1994. Thus, this may be a "paper" reduction, that is, a change in reporting that does not reflect a change in actual releases. Western Pulp has also changed its bleaching process and installed secondary treatment.

Rexham Metallizing, Camvac Division, in Brantford, Ontario, did not submit any forms in 1995.

Therefore, the new federal regulations requiring reductions of biological oxygen demand and total suspended solids, which prompted many mills to install or upgrade secondary treatment or make process changes, could account for some of the large reductions seen in methanol releases to water. The combination of market demand for ECF paper and the federal and provincial regulations limiting dioxins and furans could account for some of the reductions in chlorine releases. Environment Canada is producing a report in 1998 on the results of the chemical monitoring required under these regulations.

NPRI Facilities with Large Increases

The three facilities reporting increases in releases and transfers of over 450,000 kg from 1994 to 1995 (**Table 5–8**) were contacted to determine possible reasons for these increases. The three facilities are Domtar Packaging in Red Rock, Ontario; Fraser Inc./Noranda Forest in Edmunston, New Brunswick; and Peace River Pulp Division in Peace River, Alberta. All three facilities reported increased releases or transfers of methanol in 1995.

The paper facility reporting the greatest increase in 1995 was Domtar Packaging in Red Rock, Ontario. In 1994, the facility did not report any releases of methanol, but this increased to nearly 2 million kg in 1995. An important change in 1995, which accounts for this increase, is that by-products are included in the calculation of the threshold, regardless of their concentration. At Domtar's mill, methanol is produced as a by-product in low concentrations, and so the revised threshold requirement brought this release within the scope of NPRI reporting for 1995. The mill installed secondary treatment in the fall of 1995, which will substantially reduce methanol releases to water in 1996.

Fraser Inc./Noranda Forest in Edmunston, New Brunswick, noted that an error accounted for the reported increase of more than 1 million kg of methanol transferred in 1995. The company stated that in 1994 it transferred more than 1 million kg of methanol instead of the recorded value of zero, so the amount of methanol transferred had not increased from 1994 to 1995, but rather remained consistently above 1 million kg.

The Peace River Pulp Division in Peace River, Alberta, reported increases of 600,000 kg of methanol to air from 1994 to 1995. In 1995, the mill switched from relying on engineering calculations to actual monitoring data for methanol releases. This change in estimation methods accounted for the increase in methanol releases reported to NPRI.

TRI Facilities with Significant Changes

A few facilities did have notable changes in reporting to TRI from 1994 to 1995. They had little influence on overall reporting because so few reported large changes. Six facilities that had changes in releases and transfers of greater than 1 million pounds (454,000 kg) were contacted to determine the reasons for these changes. Of this set of six facilities, three registered decreases and three, increases. No consistent pattern or explanatory factor was seen in either group.

TRI Facilities with Large Decreases

TRI facilities with large decreases in total releases and transfers (see **Table 5–14**) included a Louisiana-Pacific Corp. pulp mill in Samoa, California, which reported a decrease of more than 1 million kg from 1994 to 1995, primarily reflecting decreased discharges to surface water of methanol. The Simpson-Pasadena pulp and paper facility in Pasadena, Texas, reported a decrease of more than 500,000 kg, largely in transfers to sewage and point source air emissions of methanol. The 3M Tape Manufacturing Division in Bedford Park, Illinois, reported a decrease of nearly 500,000 kg. This was due to decreases in point source air emissions of several solvents, notably mixed xylenes and cyclohexane.

The explanations for these changes are as diverse as the facilities that reported them and the chemicals and media for which changes were reported. Changes at the Louisiana-Pacific pulp mill in California reflected the installation of a steam stripper, so that condensates that had been sewered in previous years were now being incinerated. This capital investment in pollution control technology was made pursuant to a consent decree with the US EPA.

Simpson Pasadena's combined pulp and paper mill in Texas noted that market factors were primarily responsible for its decreased release estimates. This older facility operated at only two-thirds capacity in 1995. A representative indicated that variability in feedstock (for example, the age and species' characteristics of the trees being pulped) and operating conditions would also cause non-systematic changes in reporting, as were reflected in the results of twelve 24-hour-long sampling events conducted over the course of a year.

The 3M tape manufacturing facility in Illinois indicated that changes in its solvent emissions did not reflect changes in its own operations or reporting methods, but rather in the composition of solvent mixtures that it purchased from suppliers. In general, the amounts of TRI chemicals in these solvents had been decreasing since 1990, but were variable. Ethylbenzene content, for example, increased from 1993 to 1994, decreased from 1994 to 1995, and increased from 1995 to 1996.

TRI Facilities with Large Increases

TRI facilities with large increases (see **Table 5–12**) included a Stone Container Corp. pulp and paper facility in Panama City, Florida, reporting more than 1 million kg more releases and transfers in 1995 than in 1994. These were primarily transfers to sewage of methanol, but also air emissions, primarily point source, of methanol. Weyerhaeuser's paperboard mill in Valliant, Oklahoma, reported nearly 1 million additional kg of releases and transfers, almost entirely due to point source air emissions of methanol. International Paper's pulp and paperboard mill in Gardiner, Oregon, reported more than 600,000 kg of additional releases and transfers, in which a large increase in point source air emissions of methanol was not offset by decreases in other releases or transfers.

As was the case for facilities reporting large decreases, a wide range of factors was responsible for the reporting changes by these facilities. Market factors explain the changes at Stone Container Corporation's Florida mill, with changes in releases and transfers closely tracking an increase in production volume from 1994 (noted as a bad year for paper sales) and 1995.

For Weyerhaeuser's paperboard mill in Oklahoma, the fourfold change in reported air emissions reflected the use of new estimation factors. Actual operations at the plant had not changed, and production volume was reported as fairly constant from 1994 to 1995.

The increases at International Paper's pulp and paperboard mill in Oregon were due to a change in waste management process under regulatory constraints. For more than three decades, the plant had been collecting, concentrating, and burning methanol produced by its operations. The Oregon Department of Environmental Quality insisted that these operations were not appropriately permitted. Because a satisfactory resolution could not be reached between the company and the state, the company ceased collection and concentration of methanol, allowing it to escape throughout the process. While eliminating the problem of permit compliance, this increased reportable air emissions of methanol by nearly an order of magnitude.

8.5 Differences in Guidelines for Calculating Estimates

Each country has its own guidelines for pulp and paper industry reporting to PRTRs. In the United States, the National Council of the Paper Industry for Air and Stream Improvement (NCASI), provides a handbook of chemical-specific guidance on estimation for TRI reporting *(NCASI Handbook of Chemical Specific Information for SARA 313 Form R Reporting).* In Canada, the Canadian Pulp and Paper Association has published a guideline for mills reporting to NPRI, which is based on the NCASI handbook. Canadian mills tend to use both the CPPA and NCASI guidelines.

Over the years, as a series of research efforts have provided additional information on the generation and release of TRI chemicals from pulp and paper-making operations, guidance from NCASI has undergone significant revision. These revisions can have a profound effect on the reporting of releases and transfers, independent of any actual change in activity within this industry.

The emission factors contained in the 1994 Handbook, for example, reflected data obtained in sampling programs that indicated that methanol and acetaldehyde air emissions from certain processes at Kraft, sulfite, and semi-chemical pulp mills were considerably greater than had previously been believed. Reported air releases of methanol accordingly increased by 38 percent for pulp and paper mills, by 41 percent for chemical wood pulp mills, and by 17 percent for TRI pulp and paper facilities. Air emissions of cresol from this industry went from zero to more than 50 percent of the TRI total, and those of acetaldehyde increased nearly eightfold, from 13 percent of the TRI total to 39 percent. Specific case studies of Kraft mills conducted by NCASI have shown that use of these emission factors for different classes of mills would lead to major changes in methanol point source air emissions estimates for the reporting years 1991, 1992 and/or 1994, depending upon the particular mill's characteristics.

Similar changes can be seen for other chemicals subject to TRI reporting. For methyl ethyl ketone, reporting would begin in 1991, with subsequent decreases in 1992 and further decreases in 1994 for some plant types. An initial reporting of acetaldehyde air emissions for two types of mills in 1993 would be followed by much greater reporting of this chemical by all three types of mills studied in 1994 and subsequent years.

Paper facilities in the two countries may use guidance to estimate their releases, as do facilities in other

industries. Therefore, because PRTR reporting may be estimated based on different guidance, apparent differences in reporting between NPRI and TRI—whether in trends or at a particular point in time—may or may not reflect actual differences in releases or transfers.

8.6 Investigation of Industrial Mix

The paper industries in the two countries also differ in the types of facilities making up the industrial sector as a whole, which further influences the types and amounts of releases and transfers reported.

8.6.1 Industrial Sub-Sectors

This section analyzes releases and transfers from facilities that reported under US SIC code 26 or the Canadian code SIC 27. The US pulp and paper industry is divided into five subsectors:

SIC 261—Pulp Mills. These mills may engage in the de-inking of newsprint or in the production of pulp from fibrous materials as diverse as wood, rags, wastepaper, linters, straw or bagasse (sugarcane residue).

SIC 262—Paper Mills. These facilities primarily make paper from wood pulp or other pulp, and may or may not also include the manufacture of pulp in their operations. The papers produced may include cotton fiber paper, asbestos paper and asbestos-filled paper, and saturated felts, in addition to an array of specialty papers based on wood pulp.

SIC 263—Paperboard Mills. Again, these mills may produce a broad variety of products, including specialty coated boards, such as are used for food containers, and even paperboard materials for construction.

SIC 265—Paperboard Containers and Boxes. These facilities primarily manufacture containers from purchased paperboard.

SIC 267—Miscellaneous Converted Paper Products. As might be expected from the name, these facilities produce a wide variety of paper-based products, including coated and laminated paper; plastic, foil and coated paper bags; cardboard; and sanitary paper products.

The Canadian paper industry facilities report under Canadian SIC code 27, and they must also indicate the corresponding US SIC subsector code under US SIC code 26. The two classification systems cover the same types of facilities for the paper industry, although the subsectors at the three-digit level do differ. The Canadian paper industry subsectors are—

1. all mills (pulp, newsprint, paperboard, and other paper mills),
2. folding cartons and set-up boxes,
3. corrugated boxes and paper bags, and
4. converted paper products.

Paper and pulp mills, as distinguished at the three-digit level under the US SIC code system, show marked differences in PRTR reporting. The US SIC code system must be used because only the Canadian facilities report both.

8.6.2 Multiple Codes

Any analysis of NPRI and TRI must take into account both the different subsectors within the paper industry and the different number of facilities within each subsector. The pulp and paper sector consists of a diverse set of industries, and the releases and transfers that pertain to a facility in one of these subsectors can be very different from those found in another.

One considerable barrier to comparison is that a NPRI facility reports only one (US) SIC code that best represents the facility, while a TRI facility must report all SIC codes that describe its operations. For a US facility reporting multiple codes, it is not possible to break down the reported releases and transfers of a pollutant into individual SIC codes. For example, a US facility that chooses SIC codes 261 and 262 to describe its operations may report 3,000 kg of methanol releases. One cannot determine what proportion of this 3,000 kg total is released from operations within SIC 261 and what proportion from within SIC 262.

Data for US facilities that report multiple codes are thus not easily comparable to those for facilities reporting a single three-digit SIC code. Facilities reporting multiple SIC codes represent 23 percent of TRI paper industry facilities, 40 percent of forms, and 51 percent of total releases and transfers. For the purposes of this section, TRI data are first presented excluding data from facilities reporting multiple codes, and then including the facilities with multiple codes (see **Tables 8–3** and **8–4**).

To investigate the effect of facilities reporting multiple SIC codes, TRI data are presented in two ways within each table. First, only those facilities reporting a single three-digit SIC code are treated, and then secondly, to the single-SIC group are added all facilities that reported the same three-digit SIC code among their multiple codes.

Table 8–3 shows the TRI data with the facilities with multiple operations assigned to the individual subsectors. In this table, for each subsector, all facilities with the corresponding SIC code are added. For example, there are 57 facilities with the codes 261 and 262; nine facilities with codes 261, 262, and 263; nine facilities with 261 and 263; five facilities with 261, 262, and 267; two facilities with 261, 262, 263, and 267; and one facility each with 261 and 267, and with 261, 262, 263, 265, and 267. These additional 84 facilities are added to the 22 facilities reporting only SIC code 261 (see **Table 8–5** for PRTR facility totals), for a total of 106 facilities. Similarly, all facilities that reported code 262 from among the multiple codes (including, for example, the 57 reporting codes 261 and 262) are added to the 108 paper mills that reported the single code of 262, for a total of 193 paper mill facilities.

Some TRI facilities still report SIC codes 264 (7 facilities) and 266 (1 facility). These SIC codes have not been valid since 1987. For this analysis, forms with these SIC codes have been assigned to the codes that replaced them. The releases and transfers reported under these old codes are less than 0.5 percent of total TRI releases and transfers.

Table 8–3
M 1995

Releases and Transfers for Paper Industry (US SIC Code 26), by Subsector

US SIC Code	Industry	Facilities Number	Facilities %	Forms Number	Forms %	Total Releases (kg)	Total Transfers (kg)	Total Releases and Transfers kg	Total Releases and Transfers % of Total
NPRI									
261	Pulp Mills	53	46.1	188	60.3	20,331,495	1,659,818	21,991,313	75.0
262	Paper Mills	26	22.6	62	19.9	3,466,491	130,329	3,596,820	12.3
263	Paperboard Mills	2	1.7	4	1.3	95,770	0	95,770	0.3
265	Paperboard Boxes	5	4.3	7	2.2	139,564	7,239	146,803	0.5
267	Misc. Converted Paper Products	29	25.2	51	16.3	3,319,602	182,036	3,501,638	11.9
Total for NPRI Facilities		**115**	**100.0**	**312**	**100.0**	**27,352,922**	**1,979,422**	**29,332,344**	**100.0**
TRI									
TRI Facilities with Single SIC Codes									
261	Pulp Mills	22	4.9	157	8.4	8,207,657	3,325,045	11,532,702	10.2
262	Paper Mills	108	24.2	373	20.0	12,930,980	2,051,461	14,982,441	13.2
263	Paperboard Mills	50	11.2	232	12.4	17,291,148	192,798	17,483,946	15.4
265	Paperboard Boxes	21	4.7	27	1.4	563,009	27,029	590,038	0.5
267	Misc. Converted Paper Products	143	32.0	328	17.6	10,452,562	539,143	10,991,706	9.7
Subtotal for Single SIC Codes		**344**	**77.0**	**1,117**	**59.9**	**49,445,356**	**6,135,476**	**55,580,833**	**49.1**
TRI Facilities with Multiple SIC Codes									
261/262		57	12.8	466	25.0	22,354,321	16,103,351	38,457,672	34.0
261/262/263		9	2.0	82	4.4	6,158,293	7,529	6,165,821	5.4
261/262/263/265/267		1	0.2	8	0.4	268,490	0	268,490	0.2
261/262/263/267		2	0.4	21	1.1	1,099,732	0	1,099,732	1.0
261/262/267		5	1.1	29	1.6	1,003,025	0	1,003,025	0.9
261/263		9	2.0	66	3.5	5,632,683	1,887,567	7,520,250	6.6
261/267		1	0.2	3	0.2	21,931	0	21,931	0.0
262/263		3	0.7	21	1.1	1,338,514	0	1,338,514	1.2
262/263/267		2	0.4	9	0.5	756,016	0	756,016	0.7
262/267		6	1.3	21	1.1	69,109	3,299	72,409	0.1
263/265		5	1.1	13	0.7	233,248	888	234,136	0.2
263/267		2	0.4	7	0.4	706,636	0	706,636	0.6
265/267		1	0.2	1	0.1	2,222	0	2,222	0.0
Subtotal for Multiple SIC Codes		**103**	**23.0**	**747**	**40.1**	**39,644,219**	**18,002,634**	**57,646,853**	**50.9**
Total for TRI Facilities		**447**	**100.0**	**1,864**	**100.0**	**89,089,575**	**24,138,111**	**113,227,686**	**100.0**

➤ For TRI facilities, SIC 262 includes SIC 266, which was changed in 1987, and SIC 267 includes SIC 264, which was changed in 1987.

8.7 Industrial Subsectors—Detailed PRTR Data

Whether viewed in terms of number of facilities, number of forms submitted, or releases and transfers, the distribution of industrial subsectors within the paper industry as a whole varies markedly between NPRI and TRI. As shown in **Tables 8–3** and **8–4**, by all three measures, pulp mills (US SIC 261) play a major role in NPRI reporting, but paper mills (US SIC 262) and paperboard mills (US SIC 263) are a more dominant feature of the TRI paper industry reporting. The following sections look into these subsectors in detail.

8.7.1 Pulp Mills (US SIC 261)

Pulp mills represent half of the paper industry facilities in NPRI, but a much smaller fraction in TRI. Fifty-three pulp mills reported to NPRI in 1995, and 22 single-operation pulp mills, with another 84 pulp/paper-making combination mills, reported to TRI (see **Table 8–5**).

Average releases and transfers per facility were higher in TRI than in NPRI. However, the US facilities submitted reports for twice as many of the listed substances as did the Canadian facilities. [These substances come from the matched list of chemicals that are reportable in both countries.] As a result, the average releases and transfers per chemical form were 47 percent higher for NPRI than for TRI for pulp mills. Also, NPRI pulp mills reported average on-site releases per form twice as high as TRI pulp mills.

Releases and Transfers from Pulp Mills

As **Figure 8–1** shows, pulp mills in Canada reported roughly half of their releases as air emissions and half as surface water discharges, while for TRI

Table 8–4
M 1995

Releases and Transfers for TRI Paper Industry (US SIC Code 26), by Subsector

US SIC Code	Industry	Facilities: Single SIC Codes Only (Number)	Facilities: Multiple SIC Code Facilities Included* (Number)	Forms: Single SIC Codes Only (Number)	Forms: Multiple SIC Code Facilities Included* (Number)	Total Releases: Single SIC Codes Only (kg)	Total Releases: Multiple SIC Code Facilities Included* (kg)	Total Transfers: Single SIC Codes Only (kg)	Total Transfers: Multiple SIC Code Facilities Included* (kg)	Total Releases and Transfers: Single SIC Codes Only (kg)	Total Releases and Transfers: Multiple SIC Code Facilities Included* (kg)
261	Pulp Mills	22	106	157	832	8,207,657	44,746,130	3,325,045	21,323,493	11,532,702	66,069,622
262	Paper Mills	108	193	373	1,029	12,930,980	45,978,441	2,051,461	18,165,527	14,982,441	64,143,968
263	Paperboard Mills	50	83	232	460	17,291,148	33,484,759	192,798	2,088,782	17,483,946	35,573,541
265	Paperboard Boxes	21	28	27	49	563,009	1,066,969	27,029	27,917	590,038	1,094,886
267	Misc. Converted Paper Products	143	163	328	427	10,452,562	14,361,757	539,143	542,399	10,991,706	14,904,156
Total for TRI Facilities		**447**		**1,864**		**89,089,575**		**24,138,111**		**113,227,686**	

* Multiple SIC code columns cannot be added because multiple SIC code amounts are added to each subsector where a SIC code was reported.
➤ For TRI facilities, SIC 262 includes the former SIC 266, and SIC 267 includes SIC 264. Both of these subsector designations were changed in 1987.

pulp mills, over 80 percent of their releases were air emissions. Transfers were almost exclusively to treatment for both NPRI and TRI facilities, except for those with multiple codes. TRI pulp mills with other types of paper-making operations as well reported more than 80 percent of their transfers as transfers to sewage. This was due to six facilities reporting as both pulp and paper mills (SIC codes 261 and 262). These six facilities reported transfers to sewage of more than 1 million kg of methanol. There were five NPRI pulp mills with similarly large amounts of methanol, but the NPRI facilities reported these as discharges to surface water.

Chemicals from Pulp Mills

Methanol. As **Table 8–5** shows, releases of methanol reported to NPRI in 1995 totaled over 16 million kg. They accounted for more than half of the total methanol reported to NPRI from all industrial facilities. Pulp mills reported releases of 6 million kg and transfers of 3 million kg to TRI in 1995, representing 5.5 percent of total releases and transfers of methanol reported to TRI. Pulp mills with other paper operations (TRI facilities reporting multiple SIC codes including 261) reported an additional 31 million kg of methanol releases and 20 million kg of methanol transfers. Together, these facilities accounted for 30 percent of total TRI releases and transfers of methanol in 1995.

Methanol is a volatile organic compound that does not bioaccumulate and biodegrades rapidly. In the pulp and paper industry, methanol is a by-product of the pulping and bleaching processes and can be released from a number of sources within a pulp mill, including the bleach plant, evaporators, and from the manufacturing of chlorine dioxide. Secondary treatment can be 80 to 98 percent effective in reducing methanol releases.

In both NPRI and TRI, the bulk of reported releases from pulp mills consist of methanol (81 percent of NPRI releases from pulp mills and 82 percent of TRI releases from all pulp and combination pulp mills—see **Table 8–5**). The average quantity of methanol released by NPRI facilities with pulping operations was 18 percent higher than the average released by combination TRI mills (399,361 and 334,871 kg per form, respectively). As noted above, a few TRI combination pulp and paper mills reported large transfers to sewage of methanol. When transfers are also considered, the average total releases and transfers per form are 26 percent higher for TRI than for NPRI.

In Canada, methanol releases and transfers were reduced by 16 percent from 1994 to 1995, in spite of a 13 percent increase in the number of pulp mills reporting methanol. Most of this reduction represented reduced releases to water, which decreased from almost 12 million kg to just over 8 million kg—a 31 percent reduction. However, methanol released to air increased 20 percent from 1994 to 1995. In the United States, pulp mills and combination pulp mills reported almost no change in methanol releases or transfers. Releases increased by 1 percent and transfers increased by 0.5 percent.

Chlorine Compounds. After methanol, chlorine and chlorine dioxide were the chemicals with the next largest releases from pulp mills reporting to NPRI, each representing approximately 5 percent of total releases. Chlorine can be used to bleach pulp, treat effluent and may be inadvertently formed in the generation of chlorine dioxide. Chlorine dioxide can also be used to bleach pulp

Table 8–5
M 1995

Releases and Transfers for Pulp Mills (US SIC Code 261)

	NPRI (Number)	TRI Single SIC Codes (Number)	TRI Multiple SIC Code Facilities Included (Number)
Facilities	53	22	106
Forms	188	157	832
	kg	**kg**	**kg**
Total Air Emissions	10,644,916	6,579,966	37,916,957
Surface Water Discharges	9,546,873	1,616,941	6,185,960
Underground Injection	0	0	0
On-Site Land Releases	138,612	10,750	643,213
Matched Releases	**20,331,495**	**8,207,694**	**44,746,130**
Treatment/Destruction	1,410,310	3,308,918	3,407,210
Sewage/POTWs	0	113	17,325,482
Disposal/Containment	249,508	16,014	590,800
Matched Transfers	**1,659,818**	**3,325,045**	**21,323,493**
Matched Releases and Transfers	**21,991,313**	**11,532,702**	**66,069,622**
Average Forms/Facility	3.5	7.1	8.0
Average Releases			
per Facility	383,613	373,075	422,133
per Form	108,146	52,278	53,781
Average Transfers			
per Facility	31,317	151,138	201,165
per Form	8,829	21,179	25,629
Average Releases and Transfers			
per Facility	414,930	524,214	623,298
per Form	116,975	73,457	79,411
Methanol	**Number**	**Number**	**Number**
Forms	41	16	109
	kg	**kg**	**kg**
Total Air Emissions	8,329,563	4,691,275	32,862,393
Surface Water Discharges	8,037,936	1,165,341	3,377,259
Underground Injection	0	0	0
On-Site Land Releases	6,312	10,385	261,239
Matched Releases	**16,373,811**	**5,867,002**	**36,500,891**
Treatment/Destruction	1,339,100	3,265,306	6,535,057
Sewage/POTWs	0	0	16,777,195
Disposal/Containment	134,384	15,646	46,104
Matched Transfers	**1,473,484**	**3,280,952**	**23,358,356**
Matched Releases and Transfers	**17,847,295**	**9,147,955**	**59,859,247**
Average Releases per Form	399,361	366,688	334,871
Average Transfers per Form	35,939	205,060	214,297
Average Releases and Transfers per Form	435,300	571,747	549,167

and to treat raw water and as a slimicide. Almost 1 million kg each of chlorine and chlorine dioxide were released from pulp mills in 1995, a substantial reduction from nearly 1.6 million kg each in 1994. For TRI, chloroform was second to methanol, with 23 percent of total releases from single-operation pulp mills and 7 percent from all TRI facilities with pulp mill operations.

Just as the reductions in methanol could have been prompted by the new federal regulations limiting biological oxygen demand and total suspended solids, one might expect reductions in chlorine releases from mills from 1994 to 1995, as a result of the federal dioxin and furan regulations and the increased demand for ECF paper. In fact, chlorine releases from pulp mills did decrease 44 percent from 1994 to 1995, and this may reflect process changes within the mills. There was virtually no change in releases and transfers of chloroform from TRI pulp mills and combination pulp mills from 1994 to 1995.

Figure 8–1
M 1995

Releases and Transfers for Pulp Mills (US SIC Code 261)

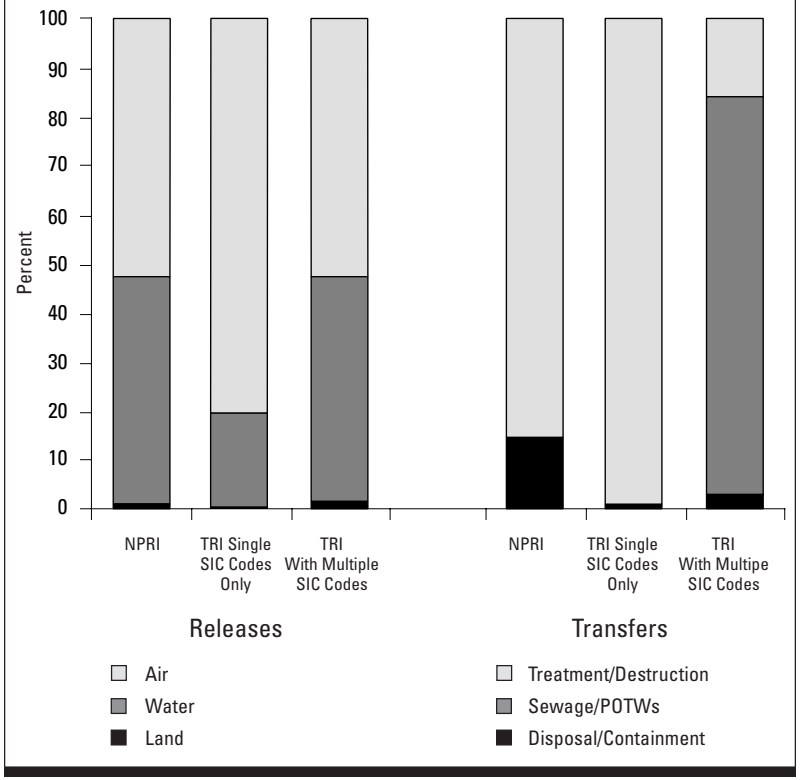


Table 8–6
M 1995

Releases and Transfers for Paper Mills (US SIC Code 262)

	NPRI (Number)	TRI Single SIC Codes (Number)	TRI Multiple SIC Code Facilities Included (Number)
Facilities	26	108	193
Forms	62	372	1,029
	kg	**kg**	**kg**
Total Air Emissions	1,191,494	11,680,878	39,563,067
Surface Water Discharges	2,273,707	1,123,863	5,551,671
Underground Injection	0	100	100
On-Site Land Releases	147	126,139	863,604
Matched Releases	**3,466,491**	**12,930,980**	**45,978,441**
Treatment/Destruction	81	130,911	232,500
Sewage/POTWs	0	1,339,855	16,778,687
Disposal/Containment	130,248	580,695	1,154,341
Matched Transfers	**130,329**	**2,051,461**	**18,165,527**
Matched Releases and Transfers	**3,596,820**	**14,982,441**	**64,143,968**
Average Forms/Facility	2.4	3.4	5.3
Average Releases			
per Facility	133,327	119,731	238,230
per Form	55,911	34,761	44,683
Average Transfers			
per Facility	5,013	18,995	94,122
per Form	2,102	5,515	17,654
Average Releases and Transfers			
per Facility	138,339	138,726	332,352
per Form	58,013	40,275	62,336
Methanol	**Number**	**Number**	**Number**
Forms	10	40	112
	kg	**kg**	**kg**
Total Air Emissions	1,063,661	8,692,388	29,089,190
Surface Water Discharges	1,861,430	340,541	1,330,226
Underground Injection	0	0	0
On-Site Land Releases	107	14,330	415,366
Matched Releases	**2,925,298**	**9,047,259**	**30,834,782**
Treatment/Destruction	81	109,218	113,663
Sewage/POTWs	0	1,215,421	16,178,558
Disposal/Containment	6	33,101	46,778
Matched Transfers	**87**	**1,357,740**	**16,338,999**
Matched Releases and Transfers	**2,925,385**	**10,404,999**	**47,173,780**
Average Releases per Form	292,530	226,181	275,311
Average Transfers per Form	9	33,944	145,884
Average Releases and Transfers per Form	292,539	260,125	421,194

8.7.2 Paper Mills (SIC 262)

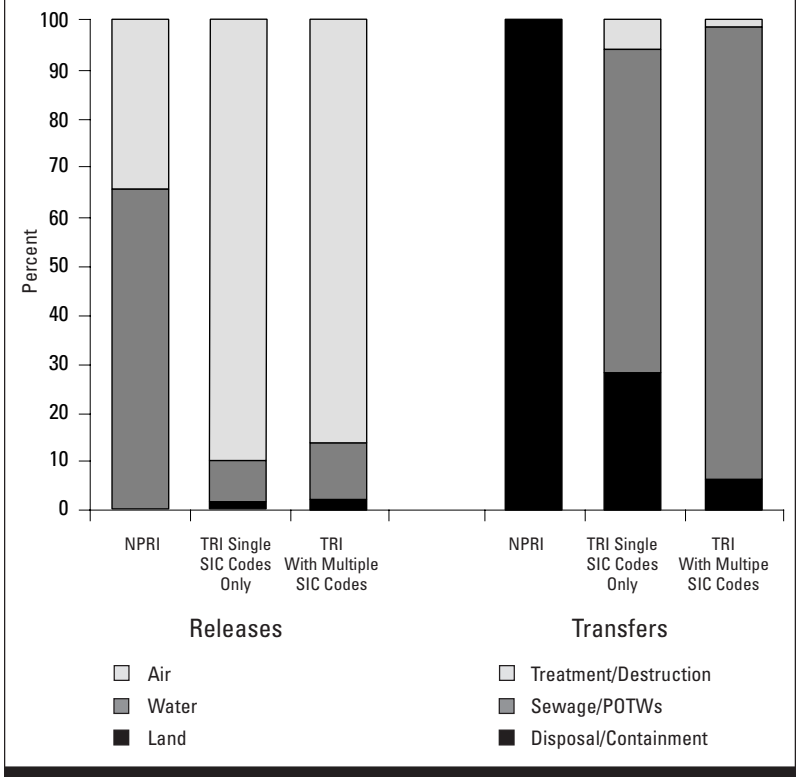
Paper mills represent a larger portion of the pulp and paper industry reporting to TRI than to NPRI. Twenty-six paper mills reported to NPRI and 108 to TRI (with an additional 85 combination paper mills and other paper-making operations—see **Table 8–6**). In both NPRI and TRI, paper mills contributed a smaller fraction of total releases and transfers for the paper sector than would be expected based on the number of facilities (23 percent of total facilities and 12 percent of total releases and transfers). However, when TRI paper mills with combinations of other paper-making operations are included, such facilities represent 43 percent of TRI paper industry facilities and 58 percent of total releases and transfers.

Releases and Transfers from Paper Mills

Figure 8–2 shows the distribution of releases and transfers for paper mills. In this case, NPRI paper mill reporting shows that 66 percent of releases were discharges to surface waters and 34 percent to the air, while TRI paper mills released about 90 percent of their discharges to the air. Again, transfers differ for TRI facilities, depending on whether facilities with multiple SIC codes are included, because the same six facilities with large methanol transfers to sewage are included in this

Figure 8–2
M 1995

Releases and Transfers for Paper Mills (US SIC Code 262)



subsector as well. For NPRI facilities, paper mills reported transfers to disposal while NPRI pulp mills, as seen above, reported transfers to treatment.

Total releases and transfers per form submitted by paper mills were the same for NPRI and TRI paper mills, with TRI combination paper mills reporting just 7 percent higher average releases and transfers. However, on-site releases from NPRI paper mills represented 96 percent of total releases and transfers in NPRI and approximately 70 percent of releases and transfers reported to TRI. Releases were higher on average in NPRI than in TRI, whether or not the combination paper mills are included (55,911 versus 34,761 kg/form for paper mills and 44,683 kg/form for combination paper mills).

Similar to the trend observed for pulp mills, paper mills in Canada reported fewer chemicals, on average, than facilities in the United States (2.4 versus 3.4 forms per facility for paper mills and 5.3 forms per facility for combination paper mills). In both NPRI and TRI, only three chemicals (methanol, phosphoric acid, and chlorine) were reported by more than 20 percent of the paper mills. Phosphoric acid is used as a nutrient in wastewater treatment and for paint removal.

Unlike most other sectors, releases from paper mills reported to NPRI showed an increase in 1995 from 1994 levels. However, this was almost entirely due to one facility, Domtar in Red Rock, Ontario. As discussed above, Domtar Red Rock had to report its releases of methanol for the first time in 1995 because of the change in reporting requirements concerning by-products.

Chemicals from Paper Mills

Methanol. As was the case for pulp mills, most of the reported releases from paper mills were methanol, accounting for 84 percent of reported releases from paper mills to NPRI, and 70 percent in TRI. The proportion of facilities submitting forms, though, was similar, 38 percent for NPRI to 37 percent for TRI. Those facilities that submitted forms for methanol to NPRI, however, reported just 6 percent higher average releases per form than those in TRI (292,530 kg versus 275,311 kg per reporting facility). NPRI facilities reported minimal transfers of methanol, unlike their TRI counterparts. Therefore, total releases and transfers of methanol from TRI paper mills are, on average, 30 percent higher per form.

8.7.3 Paperboard Mills (SIC 263)

Only one paperboard mill reported to NPRI in 1994 and 1995. The mill, Dover Industries of Burlington, Ontario, halved its releases of isopropyl alcohol and methyl ethyl ketone from 1994 to 1995.

Fifty paperboard mills reported to TRI in 1995, representing 11 percent of all TRI facilities and 15 percent of total releases and transfers in the paper industry. An additional 33 TRI facilities had combination paper-making operations that included paperboard. With these facilities included, paperboard mills accounted for 19 percent of paper industry facilities and 31 percent of total releases and transfers. More than 94 percent of releases from paperboard mills were to the air, and more than 99 percent of transfers were to sewage. The limited number of paperboard mills reporting to NPRI does not permit detailed quantitative comparison between TRI and NPRI.

8.7.4 Paperboard Boxes (SIC 265)

Five paperboard box manufacturing facilities reported to NPRI, and 21 reported to TRI, with an additional seven TRI facilities manufacturing paperboard boxes in combination with other paper-making operations. This amounts to only 4 percent of NPRI facilities and about 6 percent of TRI facilities for the paper sector, but an even smaller fraction of total forms (less than 3 percent in both NPRI and TRI). Releases and transfers reported on these forms represented 1 percent of total releases and transfers for the paper sector for both NPRI and TRI.

Releases and transfers per facility in this subsector were the lowest of any in the paper industry (29,361 kg/facility in NPRI, 28,097 kg/facility in TRI for single SIC code facilities and 39,102 kg/facility when multiple SIC code facilities are included). Due to the small role this sector plays in the overall paper industry and the diverse nature of the sector, a detailed analysis is not presented.

8.7.5 Miscellaneous Converted Paper Products (SIC 267)

Twenty-nine NPRI and 143 TRI facilities reported in this diverse subsector (plus an additional 20 TRI facilities with other paper-making operations in combination with converted paper products operations—see **Table 8–7**). Altogether, these facilities constituted 25 percent of the total paper sector facilities reporting to NPRI, and 32 percent of TRI facilities. They reported a smaller fraction of total releases and transfers for the paper sector than would be expected from the number of reporting facilities (roughly half as much): 12 percent of NPRI releases and transfers, and 10 percent of TRI releases and transfers (13 percent when the multiple operations facilities are included).

Figure 8–3 shows the distribution of releases and transfers for facilities producing converted paper products. Both TRI and NPRI facilities in this subsector reported practically all releases to air, and over 80 percent of transfers were to treatment.

Average total releases and transfers per facility for NPRI facilities in this subsector were higher than those for TRI. They were 57 percent higher than for TRI facilities that make only converted paper products and 32 percent higher than for those TRI facilities in combination with others that have additional paper-making operations. TRI facilities in this subsector submitted somewhat more forms than did NPRI facilities (2.3 to 2.6 forms per TRI facility versus 1.8 forms per NPRI facility).

As opposed to the situation prevailing for many of the other subsectors in the pulp and paper industry, in miscellaneous converted paper products manufacturing there is a pronounced difference in the pattern of reporting between NPRI and TRI facilities. This difference does not appear simply in the amounts or identities of reported chemicals. While both NPRI and TRI forms here cover a wide range of chemicals (18 with non-zero releases for NPRI, 30 for TRI), no single chemical was reported by more than 30 percent of NPRI facilities, while more than 70 percent of the TRI facilities in this subsector reported toluene, and more than 40 percent reported methyl ethyl ketone.

Toluene was the chemical responsible for the largest share of releases and transfers in both NPRI and TRI reports from this subsector, but it accounted for only 27 percent of the NPRI total, while representing 52 percent in TRI. The NPRI facilities manufacturing converted paper products reported significant releases of toluene and xylene—for NPRI in 1995, seven facilities reported 13 percent of the total toluene reported to the entire NPRI database, and two facilities reported 10 percent of the total

Table 8–7
M 1995

Releases and Transfers for Converted Paper Products (US SIC Code 267)

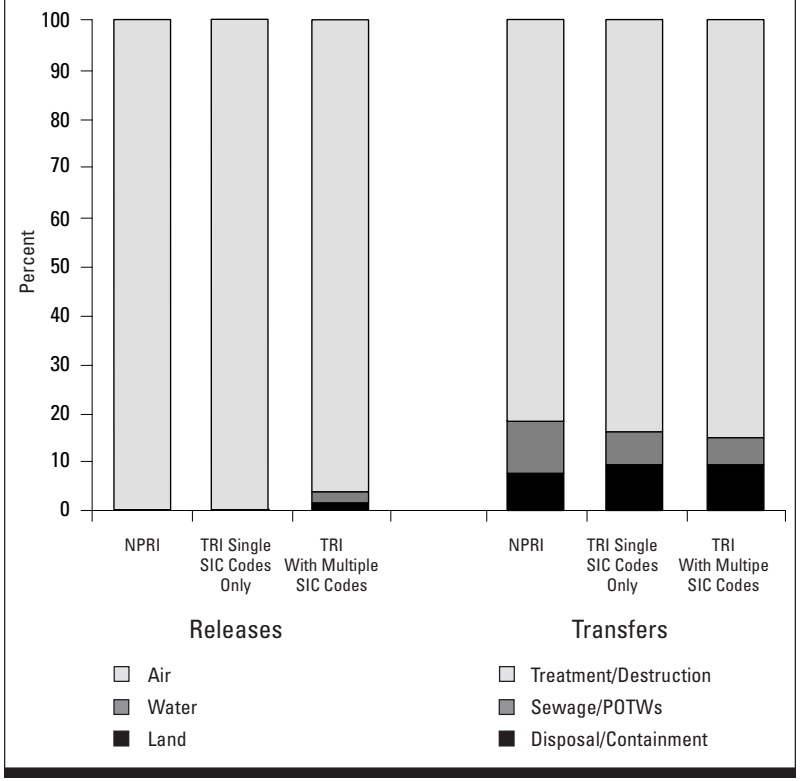
	NPRI (Number)	TRI Single SIC Codes (Number)	TRI Multiple SIC Code Facilities Included (Number)
Facilities	29	143	163
Forms	51	328	427
	kg	**kg**	**kg**
Total Air Emissions	3,315,865	10,452,434	13,881,276
Surface Water Discharges	1,500	15	288,425
Underground Injection	0	0	0
On-Site Land Releases	1,210	113	192,056
Matched Releases	**3,319,602**	**10,452,562**	**14,361,757**
Treatment/Destruction	147,816	453,432	456,686
Sewage/POTWs	20,986	37,249	37,249
Disposal/Containment	13,234	48,462	48,464
Matched Transfers	**182,036**	**539,143**	**542,399**
Matched Releases and Transfers	**3,501,638**	**10,991,706**	**14,904,157**
Average Forms/Facility	1.8	2.3	2.6
Average Releases			
per Facility	114,469	73,095	88,109
per Form	65,090	31,868	33,634
Average Transfers			
per Facility	6,277	3,770	3,328
per Form	3,569	1,644	1,270
Average Releases and Transfers			
per Facility	120,746	76,865	91,437
per Form	68,660	33,511	34,904
Toluene	**Number**	**Number**	**Number**
Forms	8	97	100
	kg	**kg**	**kg**
Total Air Emissions	904,217	7,514,127	7,552,782
Surface Water Discharges	0	5	5
Underground Injection	0	0	0
On-Site Land Releases	0	113	113
Matched Releases	**904,217**	**7,514,245**	**7,552,900**
Treatment/Destruction	26,000	129,929	132,983
Sewage/POTWs	0	1,985	1,985
Disposal/Containment	0	1,935	1,935
Matched Transfers	**26,000**	**133,849**	**136,902**
Matched Releases and Transfers	**930,217**	**7,648,094**	**7,689,803**
Average Releases per Form	113,027	77,466	75,529
Average Transfers per Form	3,250	1,380	1,369
Average Releases and Transfers per Form	116,277	78,846	76,898

xylene. This sector also had the number one facility for both toluene (Canadian Technical Tape in St-Laurent, Quebec) and xylenes (Les Papiers Perkins, Ltee, in Candiac, Quebec) for all NPRI releases in 1994.

For those facilities that reported releases or transfers of toluene, the average total releases and transfers for NPRI was 50 percent greater than for TRI.

Figure 8–3
M 1995

Releases and Transfers for Converted Paper Products (US SIC Code 267)



8.8 Conclusions

While the pulp and paper industry is a major contributor to the total reported releases and transfers in each country, marked differences exist between NPRI and TRI in the reporting from the sector. The differences include the distribution of the types of releases and transfers, the number of substances reported, and the types of pulping and paper-making operations at the facilities. In addition, from 1994 to 1995, substantial reductions in pollutants were reported from NPRI facilities while almost no change was reported by TRI facilities. Differences in regulations and estimating guidelines are also factors that may have affected the results.

- The distribution of types of releases and transfers is different. For NPRI, air emissions represented 52 percent and surface water discharges 40 percent of total releases and transfers. For TRI, air emissions accounted for 71 percent and transfers to sewage 17 percent of the total.
- TRI pulp and paper facilities submitted reports, on average, for more chemicals than did those reporting to NPRI. The TRI average was 4.2 forms per facility as opposed to 2.7 for NPRI. [This is for the common list of substances reportable to both countries.]
- Overall, the average releases and transfers reported by paper industry facilities was about the same in both countries. However, because TRI paper industry facilities submitted more chemical forms, the average releases and transfers per form for TRI was lower than the average per form from an NPRI paper industry facility.
- The NPRI paper industry is dominated by pulp mills while the TRI paper industry has fewer pulp mills and more paper mills and facilities manufacturing converted paper products. Pulp mills in both countries reported the highest average releases and transfers. Canadian pulp mills reported about the same average releases and transfers per facility as those reporting to TRI, but the figure is higher when looked at on a per form basis.
- For NPRI, total releases were 10 percent lower in 1995 than in 1994, despite a 14 percent increase in the number of facilities reporting. Total transfers were 40 percent lower. TRI paper industry facilities reported almost no change from 1994 to 1995.
- The reductions reported by NPRI facilities may have been driven, in part, by new federal and provincial regulations in Canada that came into effect in the 1994–1995 time period requiring process and end-of-pipe controls.
- For TRI, significant changes have been observed in reported releases and transfers for the pulp and paper industry in previous years. These changes reflect both real shifts in the industry that are symptomatic of a complex interplay between existing and proposed regulations and market demand, and changes in estimation methods that do not reflect actual production or operational changes.
- Paper industry facilities in both countries are switching from chlorine-based bleaching to processes using chlorine dioxide or oxygen, and these should further reduce pollutant levels in future years.

Appendix A
1995

A Comparison of Chemicals Listed under 1995 TRI, NPRI and RETC

CAS Number	Chemical Name	Nom Chimique	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		X
51-75-2	Nitrogen mustard	Moutarde azotée	Mostaza de nitrógeno	X		
51-79-6	Urethane	Uréthane	Uretano	X		
52-51-7	2-Bromo-2-nitropropane-1,3-diol	2-Bromo-2-nitropropane-1,3-diol	2-bromo-2-nitropropano-1,3-diol	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		X
56-38-2	Parathion	Parathion	Paratión	X		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		X
60-09-3	4-Aminoazobenzene	4-Aminoazobenzène	4-Aminoazobenceno	X		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		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	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		

Appendix A
1995

A Comparison of Chemicals Listed under 1995 TRI, NPRI and RETC

CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
64-17-5	Ethanol	Éthanol	Etanol			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	
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	X
75-21-8	Ethylene oxide	Oxyde d'éthylène	Óxido de etileno	X	X	X
75-25-2	Bromoform	Bromoforme	Bromoformo	X		X
75-27-4	Dichlorobromomethane	Dichlorobromométhane	Diclorobromometano	X		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	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		
75-55-8	Propylenimine	Propylènimine	Propilenimina	X		

Appendix A
1995

A Comparison of Chemicals Listed under 1995 TRI, NPRI and RETC

CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
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		
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		
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		
75-86-5	2-Methyllactonitrile	Acétonecyanhydrine	2-Metillactonitrilo	X		
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	Chloro-1,1,1-trifluoroéthane (HCFC-133a)	2-Cloro-1,1,1-trifluoroetano (HCFC-133a)	X		
76-01-7	Pentachloroethane	Pentachloroéthane	Pentacloroetano	X		X
76-02-8	Trichloroacetyl chloride	Chlorure de trichloroacétyle	Cloruro de tricloroacetilo	X		
76-06-2	Chloropicrin	Chloropicrine	Cloropicrina	X		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	1,1,2-Trichloro-1,2,2-trifluoroéthane (CFC-113)	1,1,2-Tricloro-1,2,2-trifluoroetano (CFC-113)	X		
76-14-2	Dichlorotetrafluoroethane (CFC-114)	Dichlorotétrafluoroéthane (CFC-114)	Diclorotetrafluoroetano (CFC-114)	X		
76-15-3	Monochloropentafluoroethane (CFC-115)	Chloropentafluoroéthane (CFC-115)	Cloropentafluoroetano (CFC-115)	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	
78-00-2	Tetraethyl lead	Plomb tétraéthyle	Tetraetilo de plomo			X
78-48-8	S,S,S-Tributyltrithiophosphate	Trithiophosphate de S,S,S-tributyle	S,S,S-Tributiltritiofosfato	X		
78-83-1	i-Butyl alcohol	2-Méthylpropan-1-ol	Alcohol i-butílico		X	X
78-84-2	Isobutyraldehyde	Isobutyraldéhyde	Isobutiraldehído	X	X	
78-87-5	1,2-Dichloropropane	1,2-Dichloropropane	1,2-Dicloropropano	X	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	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	

Appendix A
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A Comparison of Chemicals Listed under 1995 TRI, NPRI and RETC

CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
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	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		
83-32-9	Acenaphthene	Acénaphtène	Acenafteno			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	X
86-30-6	N-Nitrosodiphenylamine	N-Nitrosodiphénylamine	N-Nitrosodifenilamina	X	X	X
87-62-7	2,6-Xylidine	2,6-Xylidine	2,6-Xilidina	X		
87-68-3	1,1,2,3,4,4-Hexachloro-1,3-butadiene	1,1,2,3,4,4-Hexachloro-1,3-butadiène	1,1,2,3,4,4-Hexacloro-1,3-butadieno	X		X
87-86-5	Pentachlorophenol	Pentachlorophénol	Pentaclorofenol	X		X
88-06-2	2,4,6-Trichlorophenol	2,4,6-Trichlorophénol	2,4,6-Triclorofenol	X		X
88-75-5	2-Nitrophenol	2-Nitrophénol	2-Nitrofenol	X		
88-85-7	Dinitrobutyl phenol	Dinosébé	Dinitrobutilfenol	X		
88-89-1	Picric acid	Acide picrique	Ácido pícrico	X		
90-04-0	o-Anisidine	o-Anisidine	o-Anisidina	X		X
90-43-7	2-Phenylphenol	o-Phénylphénol	2-Fenilfenol	X	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	X
91-22-5	Quinoline	Quinoléine	Quinoleína	X	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		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		
93-72-1	Silvex	Silvex	Silvex			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

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
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	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	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		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	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	X
99-30-9	Dichloran	Chlorure de dichlorobenzalkonium	Cloruro de diclorobenzalconio	X		
99-55-8	5-Nitro-o-toluidine	5-Nitro-o-toluidine	5-Nitro-o-toluidina	X		
99-59-2	5-Nitro-o-anisidine	5-Nitro-o-anisidine	5-Nitro-o-anisidina	X		
99-65-0	m-Dinitrobenzene	m-Dinitrobenzène	m-Dinitrobenceno	X		
100-00-5	1-Chloro-4-nitrobenzene	1-Chloro-4-nitrobenzène	1-Cloro-4-nitrobeceno			X
100-01-6	p-Nitroaniline	p-Nitroaniline	p-Nitroanilina	X		
100-02-7	4-Nitrophenol	p-Nitrophénol	4-Nitrofenol	X	X	X
100-25-4	p-Dinitrobenzene	p-Dinitrobenzène	p-Dinitrobenceno	X		
100-41-4	Ethylbenzene	Éthylbenzène	Etilbenceno	X	X	X
100-42-5	Styrene	Styrène	Estireno	X	X	X
100-44-7	Benzyl chloride	Chlorure de benzyle	Cloruro de bencilo	X	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	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		X
101-68-8	Methylenebis(phenylisocyanate)	Méthylènebis(phénylisocyanate)	Metilenobis(fenilisocianato)		X	

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
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		X
106-42-3	p-Xylene	p-Xylène	p-Xileno	X	X	
106-44-5	p-Cresol	p-Crésol	p-Cresol	X	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		X
106-99-0	1,3-Butadiene	Buta-1,3-diène	1,3-Butadieno	X	X	X
107-02-8	Acrolein	Acroléine	Acroleína	X		X
107-04-0	1-Bromo-2-chloroethane	1-Bromo-2-chloroéthane	1-Bromo-2-cloroetano			X
107-05-1	Allyl chloride	Chlorure d'allyle	Cloruro de alilo	X	X	
107-06-2	1,2-Dichloroethane	1,2-Dichloroéthane	1,2-Dicloroetano	X	X	X
107-11-9	Allylamine	Allylamine	Alil amina	X		
107-13-1	Acrylonitrile	Acrylonitrile	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	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	X
108-45-2	1,3-Phenylenediamine	m-Phénylènediamine	1,3-Fenilendiamina	X		
108-60-1	Bis(2-chloro-1-methylethyl) ether	Éther di(2-chloro-1-méthyléthyle)	Éter bis(2-cloro-1-metil etil)	X		X
108-88-3	Toluene	Toluène	Tolueno	X	X	X
108-90-7	Chlorobenzene	Chlorobenzène	Clorobenceno	X	X	X
108-93-0	Cyclohexanol	Cyclohexanol	Ciclohexanol	X		
108-95-2	Phenol	Phénol	Fenol	X	X	X
109-06-8	2-Methylpyridine	2-Méthylpyridine	2-Metilpiridina	X		X
109-77-3	Malononitrile	Malononitrile	Malononitrilo	X		

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
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		X
111-91-1	Bis(2-chloroethoxy) methane	Méthane di(2-chloroéthoxy)	Bis(2-cloroetoxi) metano	X		
112-40-3	n-Dodecano	n-Dodécane	n-Dodecano			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		
115-32-2	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	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	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		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		X
123-31-9	Hydroquinone	Hydroquinone	Hidroquinona	X	X	
123-38-6	Propionaldehyde	Propionaldéhyde	Propionaldehído	X	X	
123-63-7	Paraldehyde	Paraldéhyde	Paraldehído	X		

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
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		
124-48-1	Chlorodibromomethane	Chlorodibromométhane	Clorodibromometano			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	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		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		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	

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
298-00-0	Methyl parathion	Parathion-méthyl	Metilparatión	X		X
300-76-5	Naled	Naled	Naled	X		
301-12-2	Oxydemeton methyl	Oxydéméton-méthyl	Metiloximetón	X		
302-01-2	Hydrazine	Hydrazine	Hidracina	X	X	X
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	2,2-Dichlo-1,1,1-trifluoroéthane (HCFC-123)	2,2-Dicloro-1,1,1-trifluoroetano (HCFC-123)	X		
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		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		X
334-88-3	Diazomethane	Diazométhane	Diazometano	X		
353-59-3	Bromochlorodifluoromethane (halon 1211)	Bromochlorodifluorométhane (halon 1211)	Bromoclorodifluorometano (halon 1211)	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		
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		
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		X
542-75-6	1,3-Dichloropropylene	1,3-Dichloropropylène	1,3-Dicloropropileno	X		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

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
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	
576-26-1	2,6-Dimethylphenol	2,6-Diméthylphénol	2,6-Dimetilfenol	X		X
584-84-9	Toluene-2,4-diisocyanate	Toluène-2,4-diisocyanate	Toluen-2,4-diisocianato	X	X	X
593-60-2	Vinyl bromide	Bromure de vinyle	Bromuro de vinilo	X		X
594-42-3	Perchloromethyl mercaptan	Perchlorométhylmercaptan	Percloremetilmercaptano	X		
606-20-2	2,6-Dinitrotoluene	2,6-Dinitrotoluène	2,6-Dinitrotolueno	X	X	X
612-82-8	3,3'-Dimethylbenzidine dihydrochloride	Dichlorhydrate de 4,4'-bi-o-toluidine	Dihidrocloruro de 3,3'-dimetilbencidina	X		
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	Dichlorhydrate de 3,3'-dichlorobenzidine	Dihidrocloruro de 3,3'-diclorobencidina	X		
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		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		
630-08-0	Carbon monoxide	Monoxyde de carbone	Monóxido de carbono			X
630-20-6	1,1,1,2-Tetrachloroethane	1,1,1,2-Tétrachloroéthane	1,1,1,2-Tetracloroetano	X		X
636-21-5	o-Toluidine hydrochloride	Chlorydrate de o-toluidine	o-Toluidina hidrocloruro	X		
639-58-7	Triphenyltin chloride	Chlorure de triphénylétain	Cloruro de trifenilestaño	X		
680-31-9	Hexamethylphosphoramide	Hexaméthylphosphoramide	Hexametilfosforamida	X		
684-93-5	N-Nitroso-N-methylurea	N-Nitroso-N-méthylurée	N-Nitroso-N-metilurea	X		
688-73-3	Tributyltin hydride	Hydride de tributylétain	Tributilestaño			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		
760-23-8	1,2-Dichloro-3-butane	1,2-Dichloro-3-butane	1,2-Dicloro-3-butane			X
764-41-0	1,4-Dichloro-2-butene	1,4-Dichloro-2-butène	1,4-Dicloro-2-buteno	X		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		
959-98-8	Endosulfan	Endosulfan	Endosulfán			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	
1024-57-3	Heptachlor epoxide	Époxyde d'heptachlore	Heptachlorepoxido			X
1114-71-2	Pebulate	Pébulate	Pebulato	X		

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
1120-71-4	Propane sultone	Propanesultone	Propane sultone	X		
1134-23-2	Cycloate	Cycloate	Ciclolato	X		
1163-19-5	Decabromodiphenyl oxide	Oxyde de décabromodiphényle	Óxido de decabromodifenilo	X	X	
1300-71-6	Dimethylphenol (mixed isomers)	Diméthylphénol (mélange d'isomères)	Dimetilfenol (mezcla de isómeros)			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		
1344-28-1	Aluminum oxide (fibrous forms)	Oxyde d'aluminium (formes fibreuses)	Óxido de aluminio (formas fibrosas)	X	X	
1464-53-5	Diepoxybutane	Diépoxybutane	Diepoxibutano	X		
1563-66-2	Carbofuran	Carbofuran	Carbofurano	X		
1582-09-8	Trifluralin	Trifluraline	Trifluralín	X		X
1634-04-4	Methyl tert-butyl ether	Oxyde de tert-butyle et de méthyle	Éter metil terbutílico	X	X	
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1,2-Dichloro-1,1-difluoroéthane (HCFC-132b)	1,2-Dicloro-1,1-difluoroetano (HCFC-132b)	X		
1689-84-5	Bromoxynil	Bromoxynil	Bromoxinilo	X		
1689-99-2	Bromoxynil octanoate	Octanoate de 2,6-dibromo-4-cyanophényle	Bromoxinil octanoato	X		
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	1,1-Dichloro-1-fluoroéthane (HCFC-141b)	1,1-Dicloro-1-fluoroetano (HCFC-141b)	X		
1746-01-6	2,3,7,8-Tetrachlordibenzo-p-dioxin	2,3,7,8-Tétrachlordibenzo-p-dioxine	2,3,7,8-Tetraclorodibenzo-p-dioxina			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		

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
2212-67-1	Molinate	Molinate	Molinato	X		
2234-13-1	Octochloronaphthalene	Octochloronaphtalène	Octacloronaftaleno	X		
2300-66-5	Dimethylamine dicamba	Acide 3,6-dichloro-o-anisique, composé avec diméthylamine	Dicamba dimetilamina	X		
2303-16-4	Diallate	Diallate	Diallate	X		
2303-17-5	Triallate	Triallate	Trialato	X		
2312-35-8	Propargite	Propargite	Propargita	X		
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		
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		
2921-88-2	Chlorpyrifos	Chlorpyrifos	Clorpirifos			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	
4901-51-3	2,3,4,5-Tetrachlorophenol	2,3,4,5-Tétrachlorophénol	2,3,4,5-tetraclorofenol			X
5234-68-4	Carboxin	Carboxine	Carboxina	X		
5598-13-0	Chlorpyrifos methyl	Chlorpyrifos-méthyl	Metil clorpirifos	X		
5902-51-2	Terbacil	Terbacile	Metilterbacilo	X		
6459-94-5	C.I. Acid Red 114	Indice de couleur Rouge acide 114	Índice de color rojo ácido 114	X		
6484-52-2	Amonium nitrate (solution)	Nitrate d'amonium (en solution)	Nitrato de amonio (solución)	X	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		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		

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
7440-38-2	Arsenic	Arsenic	Arsénico	X		
7440-39-3	Barium	Baryum	Bario	X		
7440-41-7	Beryllium	Béryllium	Berilio	X		
7440-42-8	Boron	Bore	Boro			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
7783-20-2	Ammonium sulfate (solution)	Sulfate d'ammonium (en solution)	Sulfato de amonio (solución)	X	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		
10024-97-2	Nitrous oxide	Oxide nitreux	Óxido nitroso			X
10028-15-6	Ozone	Ozone	Ozono	X		
10034-93-2	Hydrazine sulfate	Sulfate d'hydrazine	Sulfato de hidracina	X		
10049-04-4	Chlorine dioxide	Dioxyde de chlore	Dióxido de cloro	X	X	X
10061-02-6	trans-1,3-Dichloropropene	(E)-1,3-Dichloroprop-1-ène	Trans-1,3-dicloropropeno	X		
10294-34-5	Boron trichloride	Trichlorure de bore	Tricloruro de Boro	X		
10453-86-8	Resmethrin	Resméthrine	Resmetrina	X		

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CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
11096-82-5	Aroclor 1260	Arochlore 1260	Aroclor 1260			X
12122-67-7	Zineb	Zinèbe	Zineb	X		
12427-38-2	Maneb	Manèbe	Maneb	X		
12674-11-2	Aroclor 1016	Arochlore 1016	Aroclor 1016			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		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		
22967-92-6	Methylmercury	Méthylmercure	Metil mercurio			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	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		
29082-74-4	Octachlorostyrene	Octachlorostyrène	Percloroestireno			X

Appendix A
1995

A Comparison of Chemicals Listed under 1995 TRI, NPRI and RETC

CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
29232-93-7	Pirimiphos methyl	Pirimiphos-méthyl	Metilpirimifos	X		
30402-15-4	Pentachlorodibenzofurans	Pentachlorodibenzofuranes	Pentaclorodibenzofuranos			X
30560-19-1	Acephate	Acéphate	Acefato	X		
31218-83-4	Propetamphos	Propétamphos	Propetamfos	X		
33089-61-1	Amitraz	Amitraze	Amitraz	X		
34014-18-1	Tebuthiuron	Tébuthiuron	Tebutiurón	X		
34077-87-7	Dichlorotrifluoroethane	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		
36088-22-9	Pentachloro-p-dioxin	Pentachloro-p-dioxine	Pentaclorodibenzo-p-dioxina			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		
51207-31-9	2,3,7,8-Tetrachlorodibenzo furan	2,3,7,8-Tétrachlorodibenzofurane	2,3,7,8-Tetraclorodibenzo furano			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		
53469-21-9	Aroclor 1242	Arochlore 1242	Aroclor 1242			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, composé avec triéthylamine	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		

Appendix A
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A Comparison of Chemicals Listed under 1995 TRI, NPRI and RETC

CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
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		
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-225^{e}b)	1,1-Dicloro-1,2,3,3,3-pentafluoropropano (HCFC-225eb)	X		
111984-09-9	3,3′-Dimethoxybenzidine hydrochloride	Hydrochlorure de 3,3′-ddiméthoxybenzidine	Hidrocloruro de 3,3´-dimetoxibencidina	X		
127564-92-5	Dichloropentafluoropropane	Dichloropentafluoropropane	Dicloropentafluoropropane	X		
128903-21-9	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	2,2-Dicloro-1,1,1,3,3-pentafluoropropano (HCFC-225aa)	X		
136013-79-1	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1,3-Dicloro-1,1,2,3,3-pentafluoropropano (HCFC-225ea)	X		
	Antimony 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		X
	Beryllium compounds	Béryllium (et ses composés)	Berilio y compuestos	X		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	X
	Copper compounds	Cuivre (et ses composés)	Cobre y compuestos	X	X	X
	Cyanide compounds	Cyanure (et ses composés)	Cianuro y compuestos	X	X	X
	Diisocyanates	Diisocyanates	Diisocianatos	X		
	Ethylenebisdithiocarbamic acid, salts and esters	Acide, sels et éthers éthylènebisdithiocarbamiques	Ácido etilenobisditiocarbámico, sales y ésteres	X		
	Glycol ethers	Éthers glycoliques	Éteres glicólicos	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

Appendix A
1995

A Comparison of Chemicals Listed under 1995 TRI, NPRI and RETC

CAS Number	Chemical Name	Nom Chimique	Sustancia	TRI	NPRI	RETC
	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		
	Nitrogen oxides (NO_x)	Oxydes d'azote (NO_x)	Óxidos de nitrógeno (NO_x)			
	Polybrominated biphenyls	Biphényles polybromés	Bifenilos polibromados	X		
	Polychlorinated alkanes	Alcanes poychlorés	Alcanos policlorinados	X		
	Polycyclic aromatic amines	Amines aromatiques polycycliques	Nitro-hidrocarburos aromáticos policíclicos			X
	Polycyclic aromatic compounds	Composés aromatiques polycycliques	Compuestos aromáticos policíclicos	X		X
	Polycyclic aromatic hydrocarbons (PAHs)	Hydrocarbures aromatiques polycycliques (HAP)	Hidrocarburos aromáticos policíclicos			X
	Selenium compounds	Sélénium (et ses composés)	Selenio y compuestos	X	X	X
	Silver compounds	Argent (et ses composés)	Plata y compuestos	X	X	X
	Strychnine and salts	Strychnine et sels	Estricnina y sales	X		
	Sulfur oxides (SO_x)	Oxydes de soufre (SO_x)	Óxidos de azufre (SO_x)			X
	Thallium compounds	Thallium (et ses composés)	Talio y compuestos	X		
	Uranium	Uranium	Uranio			X
	Warfarin and salts	Warfarine et sels	Warfarina y sales	X		X
	Zinc compounds	Zinc (et ses composés)	Zinc y compuestos	X	X	X

* Elemental compounds are reported separately from their respective element in TRI and RETC and aggregated with it in NPRI.

EPA
United States Environmental Protection Agency

FORM R

TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

WHERE TO SEND COMPLETED FORMS: 1. EPCRA Reporting Center, P.O. Box 3348, Merrifield, VA 22116-3348, ATTN: TOXIC CHEMICAL RELEASE INVENTORY 2. APPROPRIATE STATE OFFICE (See instructions in Appendix F)

Enter "X" here if this is a revision ☐

For EPA use only

IMPORTANT: **See instructions to determine when "Not Applicable (NA)" boxes should be checked.**

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR 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 a or b; check c **if** applicable) 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 R
PART II. CHEMICAL - SPECIFIC INFORMATION

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 1.TOXIC CHEMICAL IDENTITY

(Important: DO NOT complete this section if you completed Section 2 below.)

1.1	CAS NUMBER (IMPORTANT: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete **only** if Part I, Section 2.1 is checked "yes". Generic name must be structurally descriptive.)

SECTION 2. MIXTURE COMPONENT IDENTITY

(Important: DO NOT complete this section if you complete Section 1 above.)

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY (Important: Check all that apply.)

3.1 Manufacture the toxic chemical:	3.2 Process the toxic chemical:	3.3 Otherwise use the toxic chemical:
a. ☐ Produce b. ☐ Import		
If produce or import:		
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)(enter range from instructions or estimate)	B. Basis of estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	NA ☐			
5.2	Stack or point air emissions	NA ☐			
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
	Stream or Water Body Name				
5.3.1					
5.3.2					
5.3.3					
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.)

Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

		NA	A. **Total Release** (pounds/year) (enter range code from instructions 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**

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 6. 2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (continued)

A. Total Transfers (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1.M
2.	2.	2.M
3.	3.	3.M
4.	4.	4.M

6.2 ___ OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)

Off-Site Location Name

Off-Site Address

City | State | County | Zip

Is location under control of reporting facility or parent company? ☐ **Yes** ☐ **No**

A. Total Transfers (pound/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1.M
2.	2.	2.M
3.	3.	3.M
4.	4.	4.M

SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ **Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.**

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence [enter 3-character code(s)]	c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data?
7A.1a	7A.1b: 1 2 3 4 5 6 7 8	7A.1c	7A.1d %	7A.1e Yes ☐ No ☐
7A.2a	7A.2b: 1 2 3 4 5 6 7 8	7A.2c	7A.2d %	7A.2e Yes ☐ No ☐
7A.3a	7A.3b: 1 2 3 4 5 6 7 8	7A.3c	7A.3d %	7A.3e Yes ☐ No ☐
7A.4a	7A.4b: 1 2 3 4 5 6 7 8	7A.4c	7A.4d %	7A.4e Yes ☐ No ☐
7A.5a	7A.5b: 1 2 3 4 5 6 7 8	7A.5c	7A.5d %	7A.5e Yes ☐ No ☐

If additional pages of Part II, 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- 499 pounds; C= 500 - 999 pounds.

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☐ **Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.**

Energy Recovery Methods [enter 3-character code (s)]

1 ☐ 2 ☐ 3 ☐ 4 ☐

SECTION 7C. ON-SITE RECYCLING PROCESSES

☐ **Not applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.**

Recycling Methods [enter 3-character code(s)]

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐

SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

	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.

Please print all required information, including information required at the bottom of each page.

A1.0	Reporting Year	
A1.1	NPRI ID	

A2.0	**FACILITY IDENTIFICATION & SITE ADDRESS**			
A2.1	Facility Name			
A2.2	Address			
A2.3				
A2.4				
A2.5	City			
A2.6	Prov / Territory Code		Postal Code	

A3.0	Full-Time Employees	[ ] (or Equivalent)

A4.0	**FACILITY PUBLIC CONTACT**			
A4.1	Name			
A4.2	Telephone No.	( ) -	Ext	
A4.4	Facsimile No.	( ) -		

A5.0	**FACILITY TECHNICAL CONTACT**			
A5.1	Name			
A5.2	Position			
A5.3	Telephone No	( ) -	Ext	
A5.5	Facsimile No	( ) -		

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A6.0	**FACILITY TECHNICAL CONTACT ADDRESS**			
Is the mailing address for the technical contact in A5.0 different from the facility's street address? If you answer Yes, please provide the technical contact address below.				[ ] **Y/N**
A6.2	Address			
A6.3				
A6.4				
A6.5	City			
A6.6	Prov/Territory Code		Postal Code	
A6.8	State Code			
A6.9	Country			
A6.10	Zip Code or Other			

A7.0	**COMPANY COORDINATOR**			
Would you like to have information sent to a central contact?				[ ] **Y/N**
A7.1	Name			
A7.2	Position			
A7.3	Telephone No.	( ) -	Ext	
A7.5	Facsimile No.	( ) -		

A8.0	**COMPANY COORDINATOR ADDRESS**			
Is the mailing address for the company coordinator in A7.0 different from the facility's street address? If yes, please complete the following section.				[ ] **Y/N**
A8.2	Address			
A8.3				
A8.4				
A8.5	City			
A8.6	Prov / Territory Code		Postal Code	
A8.8	State Code			
A8.9	Country			
A8.10	Zip Code or Other			

A9.0	FACILITY LOCATION	
A9.1	Latitude	_ _ ° _ _ ' _ _ " (Degrees° Minutes' Seconds")
A9.2	Longitude	_ _ _ ° _ _ ' _ _ " (Degrees° Minutes' Seconds")
A9.3	UTM Zone	
A9.4	UTM Northing	_ , _ _ _ , _ _ _ (Metres)
A9.5	UTM Easting	_ _ _ , _ _ _ (Metres)

A10.0	STANDARD INDUSTRIAL CLASSIFICATION CODE (SIC)	
A10.1	2-digit Canadian SIC Code	
A10.2	4-digit Canadian SIC Code	
A10.3	4-digit U.S. SIC Code	

A11.0	PARENT COMPANY INFORMATION	
A11.1	Is the facility controlled by another company or companies ? If Yes, please provide the required information using Appendix A.	[ ] **Y/N**

A12.0	REGULATIONS AND PERMITS The submission of this information is optional.	
	Do you report under other environmental regulations or permits ? If you choose to provide it, please use Appendix C.	[ ] **Y/N**

A13.0	OFF-SITE TRANSFERS	
	Do you send waste containing NPRI substances, for which you are reporting, to an off-site facility or municipal sewage treatment plant OR do you send NPRI substances, for which you are reporting, for recovery/re-use /recycling to an off-site facility? If Yes, please use Appendix B to list all off-site facilities.	[ ] **Y/N**

A14.0	RELEASES TO SURFACE WATER BODIES	
	Do you release any NPRI substances, for which you are reporting, to surface waters ? If Yes, please use Appendix D to list all surface water bodies.	[ ] **Y/N**

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A15.0	**COMMENTS**	[ ] **Y/N**

A16.0	**CERTIFICATION**	
A16.1	Executive Contact Name	
A16.2	Position	

A17.0	**ADDRESS OF EXECUTIVE**			
	Is the mailing address for the executive contact in A16.0 different from the facility's street address? If yes, please complete the following section.			[ ] **Y/N**
A17.1	Company Name			
A17.2	Address			
A17.3				
A17.4				
A17.5	City			
A17.6	Prov / Territory Code		Postal Code	
A17.8	State Code			
A17.9	Country			
A17.10	Zip Code or Other			

B1.0	**SUBSTANCE IDENTITY** Enter the CAS Registry Number or the substance name exactly as shown on the NPRI Substance List.	
B1.1	CAS Registry Number	
B1.2	Substance Name	

B2.0	**NATURE OF ACTIVITIES** (Mark choice with a 'Y')	
B2.1	Manufacture the Substance	a) [ ] For On-Site Use / Processing b) [ ] For Sale / Distribution c) [ ] As a Byproduct d) [ ] As an Impurity
B2.2	Process the Substance	a) [ ] As a Reactant b) [ ] As a Formulation Component c) [ ] As an Article Component d) [ ] Repackaging Only
B2.3	Otherwise Use the Substance	a) [ ] As a Chemical Processing Aid b) [ ] As a Manufacturing Aid c) [ ] Ancillary / Other Use

B3.0	**ON-SITE RELEASES**	
	Do you release this substance on-site? If no, then go to section B7.0	[ ] **Y/N**

B4.0	**REPORTING RELEASES LESS THAN ONE TONNE**	
	If total releases are less than one (1) tonne, are you reporting this amount as a sum for all media? If yes, then go to section B5.5	[ ] **Y/N**

B5.0	**ON-SITE RELEASES OF THE SUBSTANCE TO THE ENVIRONMENT** (Tonnes)		
B5.1	**Air Releases**	**Basis of Estimate**	**Amount Released**
	Stack / Point		
	Storage / Handling		
	Fugitive		
	Spills		
	Other Non-Point		

B5.2	**Underground Injection**	**Basis of Estimate**	**Amount Released**	
B5.3	**Releases to Water**	**Basis of Estimate**	**Amount Released**	**Water Codes** (from Appendix D)
	Direct Discharges			
	Spills			
	Leaks			
B5.4	**Releases to Land**	**Basis of Estimate**	**Amount Released**	
	Landfill			
	Land Treatment			
	Spills			
	Leaks			
	Other			
B5.5	**Total Releases**			

B6.0	**YEARLY BREAKDOWN OF RELEASES BY PERCENTAGE IN EACH QUARTER**			
	(Jan-Mar)	(Apr-Jun)	(Jul-Sep)	(Oct-Dec)

B7.0	**CHANGES IN REPORTED RELEASES FROM PREVIOUS YEAR**(Tonnes)	
B7.1	Releases in 1995 (Total from B5.5)	
B7.2	Reasons for Changes in Quantities Released From Previous Year (Mark choice with a 'Y')	
	[ ] Changes of Production Levels	
	[ ] Changes in Estimation Methods	
	[ ] Other	
	[ ] No Significant Change (i.e., <10%)	
	[ ] Not Applicable (first year reporting)	

B7.3	Comments	[ ] **Y/N**

B8.0	**ANTICIPATED RELEASES** (Tonnes)		
	1996	1997	1998
	1999-2000 are Optional	1999	2000

B9.0	**RECOVERY, RE-USE OR RECYCLE TO OFF-SITE LOCATIONS** (Tonnes) (Optional)		
	Source	**Amount**	**Off-Site Codes** (from Appendix B)
B9.1	Recovery/Re-use/ Recycle		
B9.2	Energy Recovery		
B9.3	**ANTICIPATED 3 'R'S** (Tonnes)		
	1996	1997	1998
	1999	2000	
B9.4	Comments		[ ] **Y/N**

B10.0	**TRANSFERS OF THE SUBSTANCE IN WASTE TO OFF-SITE LOCATIONS** (Tonnes)	
B10.1	Do You Transfer this NPRI Substance in Waste Off-site for Final Disposal?	[ ] **Y/N**
B10.2	Total Quantity of Substance Transferred (Tonnes)	
B10.3	Comments	[ ] **Y/N**

B10.4	**Disposal Method of B10.2 (Tonnes)**			
	Treatment Method	**Percent of B10.2**	**Amount**	**Off-Site Codes** (from Appendix B)
	Physical Treatment			
	Chemical Treatment			
	Biological Treatment			
	Incineration / Thermal			
	MS Treatment Plants			
	Underground Injection			
	Land Treatment			
	Containment Method	**Percent of B10.2**	**Amount**	**Off-Site Codes** (from Appendix B)
	Landfill			
	Other Storage			
	Totals			

B11.0	**CHANGES IN REPORTED TRANSFERS FROM PREVIOUS YEAR** (Tonnes)	
B11.1	Transfers in 1995 (Total from B10.2)	
B11.2	Reasons for changes in quantities transferred from previous year (Mark choice with a 'Y')	
	[ ] Changes in Production Levels	
	[ ] Changes in Estimation Methods	
	[ ] Other	
	[ ] No Significant Change	
	[ ] Not Applicable (first year reporting)	
B11.3	Comments	[ ] **Y/N**

B12.0	**ANTICIPATED TRANSFERS** (Tonnes)		
	1996	1997	1998
	1999-2000 are Optional	1999	2000

	PARENT COMPANIES			
P1.0	Ownership percentage			
P1.1	Company Name			
P1.2	Address			
P1.3				
P1.4				
P1.5	City			
P1.6	Prov/Territory Code		Postal Code	
P1.8	State Code			
P1.9	Country			
P1.10	Zip Code or Other			

	PARENT COMPANIES			
P1.0	Ownership percentage			
P1.1	Company Name			
P1.2	Address			
P1.3				
P1.4				
P1.5	City			
P1.6	Prov/Territory Code		Postal Code	
P1.8	State Code			
P1.9	Country			
P1.10	Zip Code or Other			

	PARENT COMPANIES			
P1.0	Ownership percentage			
P1.1	Company Name			
P1.2	Address			
P1.3				
P1.4				
P1.5	City			
P1.6	Prov/Territory Code		Postal Code	
P1.8	State Code			
P1.9	Country			
P1.10	Zip Code or Other			

	OFF-SITE FACILITIES			
S1.0	Off-Site Code	**Start at 01. Codes are used in Part B, sections B9 and B10**		
S1.1	Facility or MSTP Name			
S1.2	Address			
S1.3				
S1.4				
S1.5	City			
S1.6	Prov/Territory Code		Postal Code	
S1.8	State Code			
S1.9	Country			
S1.10	Zip Code or Other			

	OFF-SITE FACILITIES			
S1.0	Off-Site Code			
S1.1	Facility or MSTP Name			
S1.2	Address			
S1.3				
S1.4				
S1.5	City			
S1.6	Prov/Territory Code		Postal Code	
S1.8	State Code			
S1.9	Country			
S1.10	Zip Code or Other			

	OFF-SITE FACILITIES			
S1.0	Off-Site Code			
S1.1	Facility or MSTP Name			
S1.2	Address			
S1.3				
S1.4				
S1.5	City			
S1.6	Prov/Territory Code		Postal Code	
S1.8	State Code			
S1.9	Country			
S1.10	Zip Code or Other			

	OTHER ENVIRONMENTAL REGULATIONS & PERMITS	
	ID Number	Government Department, Agency, or Program Name

	SURFACE WATER BODIES (Codes are used in Part B, Section B5.3)	
	Alphabetical Code (Start with A)	Name of water body, stream, creek, river, etc.

FORM COA

CERTIFICATE FOR THE OPERATION OF INDUSTRIAL FACILITIES UNDER FEDERAL JURISDICTION FOR THE YEAR _____

TO BE COMPLETED BY INE-SEMARNAP	
1) APPLICATION NUMBER:	**2) ENVIRONMENTAL REGISTRATION NUMBER:**
3) RECEIVED BY: _____ Name and signature	(Signature with date received)

In compliance with Articles 5, sections VI, XII and XVII, 109 BIS, 109 BIS 1 and 111, of the General Law of Ecological Equilibrium and Environmental Protection (LGEEPA); Articles 86, 88, 89, 90 and 91 of the Law on National Waters; and pursuant to the Agreement through which the National Ecological Institute (INE), shall issue a Single Environmental License and request an Annual Operation Certificate, the company I represent hereby provides the following information to INE regarding the annual facility operations covered by Environmental Registration Number: _____

TO BE COMPLETED BY THE INDUSTRIAL FACILITY	
5) PLACE AND DATE OF CERTIFICATE COMPLETION: Day: ☐ Month: ☐☐ Year: ☐☐ I declare that the information contained in this request and the appendices thereto is true. In case of any omissions or false declarations, SEMARNAP may cancel this application or apply appropriate administrative sanctions.	_____ Name and signature of the legal representative _____ Name and signature of the technical officer

WHO SHOULD MAKE THIS APPLICATION?

This form shall be submitted by industrial facilities having a Single Environmental License or an Operating License.

INSTRUCTIONS FOR THE COMPLETION OF THIS FORM:

The data in the tables provided in the General Catalogue of Instructions shall be used to complete this form. The following instructions must also be followed:

1) One certificate form shall be completed for each facility.
2) This form shall be completed in typescript or in clearly printed letters in blue or black ink.
3) Those spaces where facility data are identical to those reported in the LAU (Single Environmental License) or to those reported previously with this same form for the last Operation Certificate shall not be completed. If an electronic version of the form is being used, ensure that the previously reported data which the form included have not been altered.
4) The Operation Certificate Form shall be prepared in one original and one copy and/or in electronic form (floppy disk), with a printed cover page duly signed by the legal representative and the technical officer.
5) If the requested information is not available, this should be indicated by ND (Not Available); if the information is nil, this should be indicated by 0 (zero). If the information is not applicable, this should be indicated by NA (Not Applicable).
6) If the space provided on the printed form is not large enough to contain the requested information, additional pages should be appended following the model of that heading.
7) The General Operational Diagram requested shall be prepared according to the example included in Appendix 3 of the General Instructions.
8) Section V of the Operation Certificate shall be completed only for substances or chemical categories listed in Table 18 of the General Catalogue of Instructions.
9) Facilities using this Operation Certificate form for the first time shall also complete as an appendix, on a one-time basis, the Registration Data on the application form for the Single Environmental License, pages 3 and 4.

I. GENERAL TECHNICAL INFORMATION

If the facility is using this reporting form for the first time, it shall complete the general technical information requested in this section of the Certificate. If the facility has a Single Environmental License or has used this reporting form previously, it shall enter only the changes made for the reported year. We remind you that changes of Name, Company Name, process or reductions or increases in production should have been reported when they took place at the Applications Office. If there was a change of address or transfer of the facility, the company would have applied for a new License and would therefore have a new Environmental Registration Number. Annual data on raw material and fuel consumption and production shall also be reported in this section.

1.1 CHANGE OF NAME OR COMPANY NAME Date of notice : Day ☐☐ Month ☐☐ Year ☐☐

1.2 CHANGE OF LEGAL REPRESENTATIVE Date of notice : Day ☐☐ Month ☐☐ Year ☐☐

1.3 COMPANY REPRESENTATIVE[1]

Name or company name:	RFC:
Address. Street: _____	
Building and Floor Numbers:_____ Neighbourhood:_____	
Locality (except Mexico City.): _____ Postal Code:_____	
Municipality or Delegation:_____ Federal Body:_____	
Telephones:_____ Fax:_____ Electronic Mail:_____	

1.4 EQUIVALENT NUMBER OF EMPLOYEES[2] **:**

1.5 RISKS AND CONTINGENCIES

1.5.1 Date of submission of the last Risk Assessment: Day ☐☐ Month ☐☐ Year ☐☐

1.5.2 Date of the last update of the Accident Prevention Program: Day ☐☐ Month ☐☐ Year ☐☐

1.5.3 If applicable, date of update of the Contingency Program: Day ☐☐ Month ☐☐ Year ☐☐

1.5.4 If located in the Metropolitan Area of Mexico City, or in an area having an Environmental Contingency Program, give the date your Participation Plan for the Program was submitted: Day ☐☐ Month ☐☐ Year ☐☐

[1] Information on the facility representative authorized to deal with the public and clarify any information supplied in this Certificate.
[2] Divide the total number of man hours (total facility staff) by 2000 hours.

1.6 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. The diagram shall include all areas (production, wastewater treatment, waste management, services, etc.) where there are consumption points of raw materials, water or energy, or where pollutants are generated, stored or released.

1.7 RAW MATERIALS (not applicable to hazardous waste treatment facilities)

Name[3]			Consumption point[4]	Physical state[5]	Type of storage[6]	Annual consumption	
Commercial	Chemical	CAS Number				Amount[7]	Unit[8]

1.8 PRODUCTS (not applicable to hazardous waste treatment facilities)

Product name	Type of storage [6]	Installed production capacity		Annual production	
		Amount [7]	Unit [8]	Amount [7]	Unit [8]

1.9 ENERGY CONSUMPTION

Consumption points[9]	Energy type[10]	Annual consumption	
		Amount [7]	Unit [8]

[3] Indicate both names when possible and if available the Chemical Abstracts Service identification number (CAS number).
[4] **Consumption point.** Number appearing in the General Operating Diagram.
[5] **Physical state.** Physical State Codes may be consulted in Table 1 of the General Catalogue.
[6] **Type of storage.** According to Table 2 of the General Catalogue.
[7] **Amount.** According to the Table in which it appears, referring to value of, consumption, release, transfer, storage, etc.
[8] **Unit.** Any unit customarily used in the facility may be used; we recommend use of the Decimal Metric System or by default the Imperial System.
[9] When energy consumption per process is unknown, consumption point could refer to the facility's input point(s).
[10] Indicate whether the energy comes from an electrical current input (EE) or if it is internally generated in the facility through fossil fuel combustion (CF), use of combustible waste (RC) or through another generation method (OM).

1.10 FUEL(S) USED

Combustion equipment	Capacity		Burner type	Fuel type	Consump-tion point[11]	Is it pre-heated? [12]	Annual consumption	
	Amount	Unit					Amount	Unit

##

II. ATMOSPHERIC POLLUTION

Pursuant to Article 19 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 POLLUTANT RELEASE POINTS

Name of machine, equipment or activity	Release point[13]	Release expense		Estimation method[14]	Control equipment or method	Estimated efficiency of control equipment[15]
		Amount	Unit			

[11] When energy consumption per process is unknown, consumption point could refer to the facility's input point(s).
[12] State Yes or No.
[13] **Release point.** Number appearing in the General Operating Diagram.
[14] **Estimation method.** According to Table 3 of the General Catalogue, when no standard applies.
[15] Efficiency of the pollutant reduction control equipment, in percent.

2.2 RELEASE DUCTS

2.2.1 If any emissions are not ducted, give the technical reasons for this situation (append document).

2.2.2 If there are release ducts indicate:

Duct or chimney number[16]	Release point [17]	Height (m)[18]	Inner diameter (m)	Gas flow speed (m/sec)	Output temperature (ºC)	Sampling platform[19]

2.3 RELEASES INTO THE ATMOSPHERE BY COMBUSTION EQUIPMENT[20]

2.3.1 Combustion gases[21]

Release point	NO_x			SO_2			CO			HC[22]		
	Amount	Unit	Estimation method[23]	Amount	Unit	Estimation method	Amount	Unit	Estimation method	Amount	Unit	Estimation method

2.3.2 Particles and excess air[20]

Release point	Particles[24]			Smoke density	Excess air % vol
	Amount	Unit	Estimation method		

III. WATER USE AND DISCHARGE OF WASTEWATERS

[16] Enumerate in progressive order.
[17] Release **point.** Number appearing in the General Operating Diagram.
[18] Height in meters of the smokestack or release duct measured from the ground up.
[19] Indicate whether there is one or not.
[20] Reported values must comply with NOM-085-ECOL-1994.
[21] If NOM-085-ECOL-1994 is applicable, the facility shall report here the average value of concentrations of combustion gases measured, in ppm, or use ppm to calculate the annual total released. If this is not the case, an estimate shall be made of the releases, indicating the method used.
[22] If the facility has total hydrocarbon measurements the average value in ppm or total annual releases shall be reported here. If this is not the case, it shall report the estimated releases of specific hydrocarbons in Section Five of this Certificate.
[23] When the NOM-085-ECOL-1994 standard is applicable, only direct measurement may be used. If this is not the case, specify the estimation method according to Table 3 of the General Catalogue.
[24] If NOM-085-ECOL-1994, is applicable, the facility shall report here the average value of concentrations of combustion gases measured, in $\mu g/m^3$ or use them to calculate the annual total released. If this is not the case, an estimate shall be made of the releases, indicating the method used.

If this form is being used for the first time or if the data requested are different from those called for in the Application for a Single Environmental License or in the last Operation Certificate, the following data shall be provided for purposes of information.

3.1 ANNUAL WATER USE

Concession or assignment license number[25]			
Water extraction source:		Amount [7]	Unit [8]
	Drinking water network		
	Surface		
	Underground		
	Salt water		
	Treated (reuse)		
	Other (specify)		

3.2 DISCHARGE OF WASTEWATERS

3.2.1 Changes to the permit or authorized discharge registration

Discharge permit or registration number	
Certificate of change number issued by the Public Registry of Water Rights (REPDA)	

3.2.2 General discharge data

Discharge type[26]	Release point[27]	Discharge number[28]	Hydrological region[29]	Discharge frequency[30]	Crop Irrigation[31]	Treatment *in situ*		
						Code[32]	Amount	Unit

[25] If there is no grant of concession or assignment, append a copy of the confirmation of connection to the drinking water system.
[26] **Discharge type.** According to Table 4 of the General Catalogue.
[27] **Release point.** Number appearing in the General Operating Diagram
[28] When pertinent, state the relationship between the release points identified in the diagram of the facility's consumption and release points and the discharge numbers appearing in the application made to the National Water Commission.
[29] According to Table 17 of the General Catalogue.
[30] Indicate if continuous (C), intermittent (I) or occasional (F).
[31] Indicate whether restricted (R) or not restricted (N).
[32] **Treatment methods.** See Tables 5, 6 and 7 of the General Catalogue.

3.2.3 Wastewater discharge quality description[33]

Parameter	Discharge number[34]							
Annual volume [liters]								
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 nitrogen [mg/l]								
Total phosphorus [mg/l]								
Fecal coliform bacteria [NMP/100 ml]								
Helminth eggs [organisms/l]								

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IV. HAZARDOUS WASTE GENERATION, TREATMENT AND TRANSFER

Pursuant to NOM-052-ECOL-93, NOM-053-ECOL-93 or when providing hazardous waste treatment services, industrial facilities shall provide the following information when this form is used for the first time or when the data requested are different from those reported in the Single Environmental License or the last Certificate of Operation:

4.1 HAZARDOUS WASTE GENERATION AND TREATMENT WITHIN THE FACILITY

Generation point[35]	Waste identification		Annual generation		Treatment or disposal method		
	NOM-052-ECOL-93[38]	Code[36]	Amount	Unit	Code[37]	Treatment capacity	
						Amount	Unit

[33] Annual average as a function of the volume. Value estimated based on the data presented during the reported year to the authorities (if the CNA, use the figures given in the quarterly declarations for the right to release).
[34] Enter discharge numbers appearing in the application made to the National Water Commission.
[35] **Generation point.** Number appearing in the General Operating Diagram.
[36] **Hazardous waste code** according to Table 8 of the General Catalogue.
[37] **Treatment or disposal methods**. See Tables 5, 6, 7, 9, 10, 11, 12 13 and 14 of the General Catalogue.
[38] Waste identification number according to NOM-052-ECOL-93, indicating Table number and appendix where listed or CRETIB code. If the waste is not listed, the corresponding CRETIB analysis should be attached.

4.2 HAZARDOUS WASTE STORAGE WITHIN THE FACILITY

Gene-ration point	Waste identification		Storage[39]							
	NOM-052-ECOL-93[43]	Code[40]	Type[41]	Storage description[42]				Capacity		Time (days)
				Site	Material	Ventilation	Lighting	Amount	Unit	

4.3 HAZARDOUS WASTE TRANSFERS[44]

Generation point	Waste identification		Handling company[45]	Total transferred	
	NOM-052-ECOL-93	Code		Amount	Unit

4.4 HAZARDOUS WASTE TREATMENT COMPANIES[46]

Waste identification		Treatment or disposal method [47]	Annual total handled	
NOM-052-ECOL-93	Code		Amount	Unit

[39] Pursuant to Articles 14 to 21 of the LGEEPA Hazardous Wastes Regulations, append a detailed description of how the waste is stored and the site or sites within the facility, indicating drainage and water networks within the storage area as well as the safety measures taken.
[40] **Hazardous waste code** according to Table 8 of the General Catalogue.
[41] **Type of storage.** See Table 2 of the General Catalogue.
[42] **Storage features**. See Table 15 of the General Catalogue.
[43] Waste identification number according to NOM-052-ECOL-93, indicating Table number and appendix where listed or CRETIB code. If the waste is not listed, the corresponding CRETIB analysis should be attached.
[44] The hazardous wastes generator shall contract only the services of companies authorized to handle such wastes by the INE (Articles 151 BIS of the LGEEPA and 10 of the Hazardous Wastes Regulations).
[45] Enter the Hazardous Wastes Treatment Permit Number issued by the INE.
[46] This section is to be completed only by companies providing hazardous waste treatment services.
[47] **Treatment method code.** See Tables 5, 6 7, 10, 11, 12, 13 and 14 of the General Catalogue.

V. ANNUAL RELEASES AND TRANSFER OF LISTED POLLUTANTS

This section is to be completed by industrial facilities releasing or transferring any substance or type of chemical listed in Table 18 of the General Catalogue.

5.1 IDENTIFICATION AND USES

Pollutant identification		Use[50]	Consumption or release point[51]	Amount	Unit	Estimation method[52]
Name[48]	Key[49]					

5.1.1 Information required *only* for hazardous waste treatment and wastewater treatment facilities:

Pollutant identification		Generator identification[53]	Amount received	
Name	Key		Amount	Unit

[48] **Substances.** Chemical name according to Table 18 of the General Catalogue.
[49] **Code** according to Table 18 of the General Catalogue.
[50] Indicate if used as a direct input (ID), indirect input (II), kept in storage (IA) or generated in-plant (EG) by a production, treatment or service process.
[51] **Consumption or release point.** Number appearing in the General Operating Diagram.
[52] **Estimation method**. See Table 3 of the General Catalogue.
[53] Hazardous Wastes Generator Registration Number issued by the INE.

5.2 POLLUTANT RELEASES

Pollutant code[54]	Into air				Into water				Into ground			
	Release point	Amount	Unit	Estimation method[55]	Discharge number[56]	Amount	Unit	Estimation method	Deposit point[57]	Amount	Unit	Estimation method

5.2.1 Pollutant releases to any medium due to accidents and/or contingencies:

Pollutant code	Event code[58]	Amount	Unit	Estimation method

[54] **Code** according to Table 18 of the General Catalogue.
[55] **Estimation method.** See Table 3 of the General Catalogue.
[56] Enter discharge numbers appearing in the application made to the National Water Commission.
[57] Point within the facility where the pollutant is deposited for treatment or final disposal.
[58] **Events.** Enter the event Code according to Table 16 of the General Catalogue.

5.3 POLLUTANT TRANSFERS

5.3.1 Transfer to a hazardous wastes treatment facility or to wastewater treatment facilities

Pollutant code[59]	Physical state[60]	Handling company[61]	Treatment or disposal method code[62]	Amount	Unit	Estimation method[63]

5.3.2 Transfer to the public sewage system

Pollutant code	Release point	Amount	Unit	Estimation method

[59] **Code** according to Table 18 of the General Catalogue.
[60] **Physical state.** See Table 1 of the General Catalogue.
[61] Environmental Registration Number of the facility authorized to handle hazardous wastes.
[62] **Treatment or disposal methods.** See Tables 5, 6, 7, 9, 10, 11, 12, 13 and 14 of the General Catalogue.
[63] **Estimation method.** See Table 3 of the General Catalogue.

5.4 POLLUTION PREVENTION AND CONTROL

5.4.1 Total releases and activity indicators

Pollutant code	Total releases (air + water + soil)						Activity indicators[64]	
	Previous year		Reported year		Estimate for next year			
	Amount	Unit	Amount	Unit	Amount	Unit	Previous year	Reported year

5.4.2 Pollution prevention and control activities

Pollutant code	Control activity[65]	Treatment *in situ*							
		Storage		Treatment		Physical state[68]	Amount	Unit	Estimation method[69]
		Form[66]	Length (days)	Method code[67]	Estimated efficiency				

[64] The reported activity index may be calculated based on the amount of chemical used as raw material or produced.
[65] Indicate if there have been: Changes in operating practices (CPO), Treatment *in situ* (TS), Inventory control (CI), Spill and leakage prevention (PDF), Changes to inputs (CMP), Product changes (CP), Changes in the production process (MPP), Changes in cleaning practices (CPL), Others (O).
[66] **Type of storage.** See Table 2 of the General Catalogue.
[67] **Treatment methods.** See Tables 5, 6 and 7 of the General Catalogue.
[68] **Physical state.** See Table 1 of the General Catalogue
[69] **Estimation method.** See Table 3 of the General Catalogue