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.

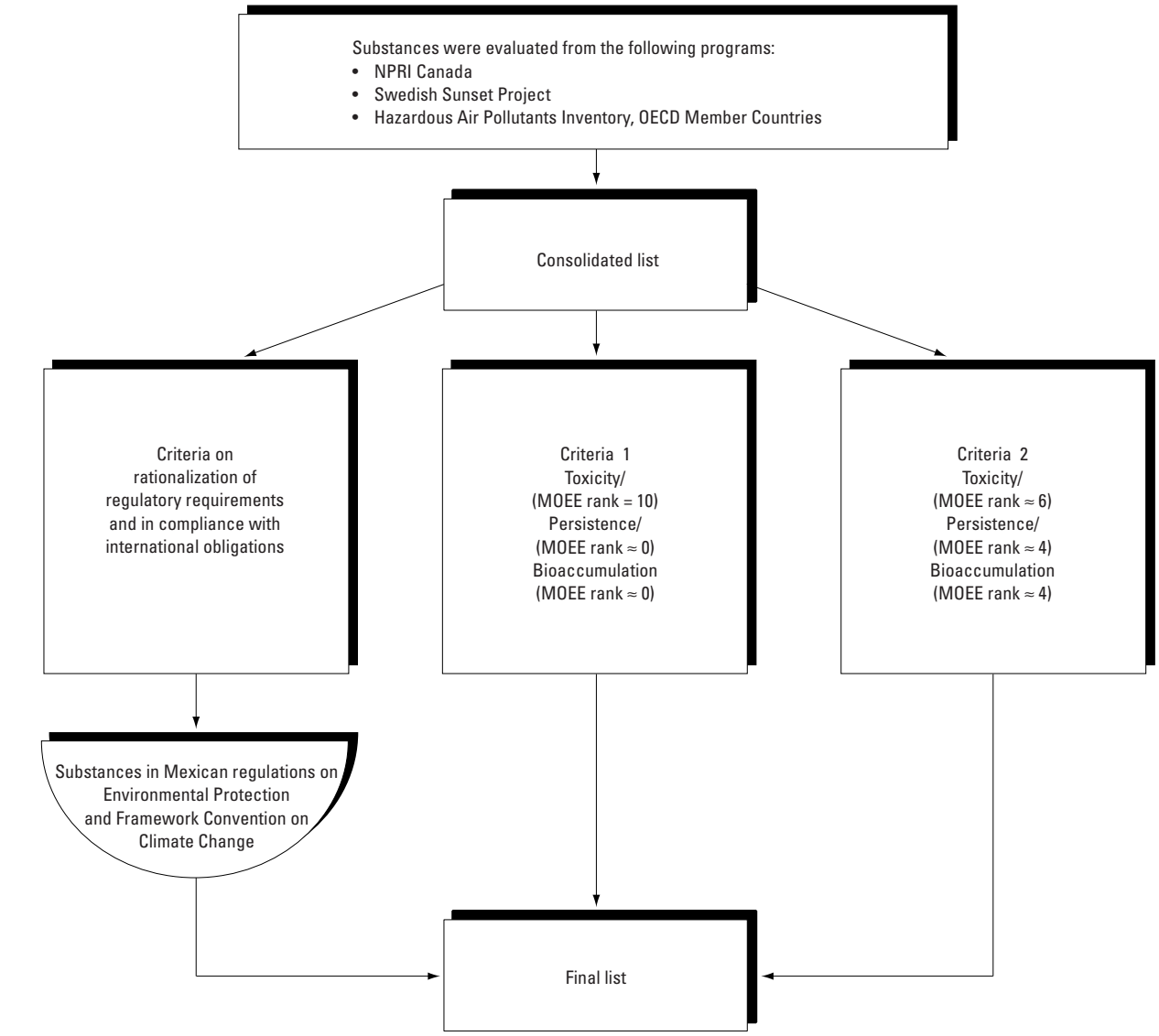
Activities of the *Grupo Nacional Coordinador*

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

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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>