TAKING STOCK 2000

North American Pollutant Releases and Transfers

SUMMARY

Commission for Environmental Cooperation of North America

April 2003

The Commission for Environmental Cooperation (CEC) was established under the North American Agreement on Environmental Cooperation to address environmental issues in North America from a continental perspective, with a particular focus on those arising in the context of liberalized trade.

This publication was prepared by the Secretariat of the CEC. The views contained herein do not necessarily reflect those of the governments of Canada, Mexico or the United States of America.

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Disclaimer

The National Pollutant Release Inventory (NPRI) and the Toxics Release Inventory (TRI) data sets are constantly evolving, as facilities revise previous submissions to correct reporting errors or make other changes. For this reason, both Canada and the United States "lock" their data sets on a specific date and use the "locked" data set for annual summary reports. Each year, both countries issue revised databases that cover all reporting years.

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

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Preface

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

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

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

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

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

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

Victor Shantora

Acting Executive Director

ACKNOWLEDGEMENTS

Numerous groups and individuals have played important roles in bringing this report to fruition.

Officials from Environment Canada, Semarnat and the US EPA contributed vital information and assistance throughout the report's development. This past year we have worked with the following officials from these agencies: Canada— Alain Chung, François Lavallée and Michelle Raizenne; Mexico—Sergio Sanchez Martinéz, Maricruz Rodríguez Gallego, Juan David Reyes Vázquez and Floreida Paz; and the United States—Maria Doa, John Dombrowski and John Harman.

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

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

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

Introduction

Did you know that...

- North America has reduced industrial releases and transfers of chemicals by 5 percent in the six years from 1995 to 2000.
- Reductions of releases of carcinogens were greater, almost 10 percent.
- A few facilities with the largest amounts reported large decreases; however, many facilities with smaller amounts showed significant increases.
- In 2000, more than one-quarter of the 3.3 million tonnes of releases and transfers were on-site air releases.
- A few industries account for a large portion of releases and transfers. The primary metals sector, which includes steel mills, reported the largest—over 20 percent of the total.
- Electric utilities reported over one-quarter of total releases.

Information such as this can be drawn from pollutant release and transfer registers (PRTRs), which provide detailed information on the types, locations and amounts of chemicals released or transferred by facilities.

This report is intended to serve as an information source for governments, industry and communities in analyzing such data and for identifying opportunities for pollution reduction. The analyses are based on **1995–2000 data** from the US Toxics Release Inventory (TRI) and the Canadian National Pollutant Release Inventory (NPRI). Results from 2000, trends over the six years from 1995 to 2000 and changes from 1998 to 2000 are presented here. As data become available from the Mexican *Registro de Emisiones y Transferencia de Contaminantes* (voluntary for the 2000 reporting year), they will be included in future reports.

This report is the seventh in the CEC's *Taking Stock* series on sources and management of industrial pollutants in North America. This *Summary* report, the more detailed *Sourcebook*, past volumes of *Taking Stock* (as PDF files), and searchable access to the data sets used in *Taking Stock* analyses are all available at *Taking Stock Online* on the CEC's web site at <www.cec.org/takingstock>.

What's in this YEAR'S REPORT?

Taking Stock is based on data collected by the national governments. Each year, some of the reporting requirements change, presenting new opportunities for this report.

Focus of this year's report:

- a six-year picture of trends in releases and transfers of chemicals;
- analyses of groups of chemicals:
  - metals and their compounds,
  - carcinogens,
  - California Proposition 65 chemicals (chemicals associated with cancer, reproductive and developmental effects), and
  - Canadian Environmental Protection Act toxics;
- a special look at the chemical benzene and its sources; and
- reporting for the first time on persistent bioaccumulative toxics (PBTs), including mercury, dioxins and furans, hexachlorobenzene and polycyclic aromatic compounds.

The report also:

- highlights Mexico's significant progress towards a mandatory and publicly accessible PRTR system, and
- outlines areas of ongoing work in an Action Plan to increase the comparability among the national PRTR systems.

Further information on PRTR systems can be found in the section "Background on pollutant release and transfer registers" on page 66 (end of this report).

While this report can provide answers to many questions, readers may need to go to other sources for more information. The report does not provide information on:

- all pollutants—only those chemicals common to TRI and NPRI,
- all sources of chemicals—only facilities in certain industry sectors common to TRI and NPRI,
- data from facilities in Mexico,
- environmental damage, or
- health risks.

SUMMARY of key findings

Results from 2000 data

Large amounts of chemicals were being released and transferred in North America in 2000.

- More than 3.3 million tonnes of 206 "matched" chemicals (chemicals common to NPRI and TRI) were reported to TRI and NPRI in 2000 by manufacturing facilities, electric utilities, hazardous waste management/solvent recovery facilities and coal mines.

Some of these chemicals are carcinogens or cause developmental or reproductive effects.

- Fourteen percent of total releases, or 219,000 tonnes of chemicals, were known or suspected carcinogens.
- Sixteen percent of total releases, or 254,000 tonnes of chemicals, were linked to cancer, birth defects and other reproductive harm (California Proposition 65 chemicals).

Many of these chemicals are being released into the air.

- Almost one-half of the 3.3 million tonnes were releases on- and off-site, with over one-quarter being on-site releases to air.

Most of these chemicals are being released and transferred from a few industrial sectors.

- The primary metals sector, which includes steel mills, reported the largest total amounts of releases and transfers.
- Electric utilities reported the largest total releases (on- and off-site) of all sectors in North America in 2000 and ranked third for total reported amounts of releases and transfers.

Many of these chemicals are being released and transferred in large quantities by a few jurisdictions.

- In 2000, the jurisdictions with the largest total reported amounts of releases and transfers were Texas, Ohio, Ontario and Pennsylvania. Together, they accounted for more than one-quarter of the total reported.
- The jurisdictions with the largest total releases (on- and off-site) of the matched chemicals were Ohio, Texas, Pennsylvania and Indiana.
- These same four jurisdictions, Ohio, Texas, Pennsylvania and Indiana, also had the largest chemical "loadings" in 2000 (see explanation of "loadings" on page 15).

Almost 700 tonnes of mercury were released and transferred in North America in 2000.

- Lowering the reporting threshold for mercury and its compounds resulted in twenty times more industrial facilities reporting mercury in 2000, and a greatly improved picture of mercury releases and transfers.
  - Over 74 tonnes of mercury were released into the air.
  - Electric utilities released the largest amounts of mercury to air and water.
  - Hazardous waste/solvent recovery facilities had the largest total reported releases on- and off-site of mercury (these releases were mainly land disposal).
  - Texas, Illinois and Pennsylvania reported the largest amounts of mercury released (on- and off-site).
  - Facilities reporting to NPRI were more likely to send mercury to recycling than TRI facilities, and less likely to send mercury off-site for disposal or dispose of mercury in on-site landfills.

TAKING STOCK online

Do you have a particular question about a facility, industrial sector, or state or province? Try *Taking Stock Online* at <www.cec.org/takingstock>. The web site permits searches of the entire matched data sets from 1995 to 2000 and allows users to customize reports. You can query by chemical, facility, sector, or geographic region. The site also includes links to electronic versions of *Taking Stock*, the three North American PRTRs, and other PRTR-related information.

Data from 2000 provide first picture of releases and transfers of the persistent bioaccumulative toxics dioxins and furans.

- Reporting on dioxins and furans differs between TRI and NPRI and so amounts cannot be compared.
- TRI: Any TRI facility meeting a reporting threshold of 0.1 grams of dioxins and furans must report. This includes the manufacturing industries and electric utilities and hazardous waste management facilities.
  - The chemical sector released the largest amount of dioxins and furans reported to TRI, largely due to inorganic pigment manufacturing, an activity not required to report to NPRI.
  - Twenty-five TRI facilities were responsible for over 80 percent of the total TRI amount of dioxins and furans (in grams-iTEQ) released on- and off-site.
- NPRI: Only certain activities, such as incinerating waste, secondary smelting, and wood preservation, are required to report on dioxins and furans to NPRI.
  - Paper products, primary metals, and air, water, and solid waste management facilities (primarily municipal incinerators) reported the largest releases on- and off-site of dioxins and furans to NPRI.
  - Twenty-five NPRI facilities were responsible for 85 percent of total NPRI dioxins and furans released on- and off-site in 2000.
  - Incinerators burning municipal waste (included in air, water, and solid waste management) released 14 percent of the total dioxins reported to NPRI. Such incinerators are not required to report to TRI.

Over the three years from 1998 to 2000, releases and transfers decreased overall by 4 percent; NPRI and TRI showed different trends.

- On-site releases by TRI facilities decreased by 7 percent while on-site releases of NPRI facilities increased by 12 percent.
- Off-site releases of NPRI facilities decreased by 39 percent while they increased by 7 percent for TRI facilities.
- There was little change in amounts sent for recycling: transfers to recycling increased by less than 1 percent for both TRI and NPRI.
- Other transfers for further management (transfers to energy recovery, treatment and sewage) decreased by 11 percent for TRI but increased by 17 percent for NPRI.

Facilities reporting smaller amounts of chemicals showed considerable increases in releases and transfers of chemicals, as compared with the top-reporting facilities, which showed overall decreases.

- There are approximately four times as many facilities reporting smaller releases and transfers as compared with facilities reporting larger releases and transfers of over 100 tonnes per year (15,000 versus 3,600 facilities).
- In both TRI and NPRI, facilities reporting the largest amounts reported reductions of 7 percent. Facilities reporting smaller amounts, on the other hand, reported substantial increases in all types of releases, for a total increase of 66 percent for NPRI facilities and 29 percent for TRI in the three years from 1998 to 2000.

Cross-border transfers changed considerably from 1998 to 2000, with Canada becoming a net exporter of chemicals for management or disposal and the US a net importer.

- From 1998 to 2000, transfers from Canada to sites in the US increased by 12 percent. Transfers in the opposite direction, from the US to Canada, decreased by 43 percent.
- Only a handful of facilities are responsible for the bulk of the cross-border transfers.
- Most of the chemicals are still transferred within national boundaries.

Some sectors reduced releases and transfers from 1998 to 2000, while others increased them.

- The hazardous waste/solvent recovery sector decreased its releases and transfers by 91,000 tonnes or 25 percent from 1998 to 2000. Facilities within this sector show both large decreases and large increases.
- The fabricated metals sector had the largest increases in releases and transfers, an increase of 16,000 tonnes or 7 percent.
- The sectors with the largest reported amounts in both 1998 and 2000 showed little change: primary metals decreased by 3 percent, and chemicals and electric utilities each decreased by 1 percent.

Over the six years from 1995 to 2000, some progress was made in North America in reducing on-site releases.

- Overall, on-site releases (releases to air, water, land, and underground injection at the facility) from manufacturing facilities decreased 17 percent from 1995 to 2000 in North America. TRI facilities decreased on-site releases by 19 percent and NPRI facilities, by 3 percent.

- Facilities seem to be paying particular attention to reducing releases to air, which decreased by 28 percent over the six years. TRI facilities decreased air releases by 31 percent and NPRI facilities, by 5 percent.
- There was little progress in reducing amounts of chemicals sent off-site. In fact, off-site releases (transfers of all chemicals to disposal plus metals transferred to sewage and treatment) showed the opposite pattern to the overall on-site decreases, with an increase of 41 percent from 1995 to 2000. These off-site releases are mainly transfers for disposal in landfills.
- Over the six years, facilities increased the amounts of chemicals sent off-site for treatment or in sewage by 15 percent from 1995 to 2000.
- While on-site releases decreased, chemicals sent off-site for disposal or treatment increased substantially. Taken overall, the change in total releases and transfers was a 5-percent reduction in the amount of chemicals requiring management over the six years.
- For chemicals with health and environmental significance, the results were mixed. Compared with a decrease of total releases of 8 percent from 1995 to 2000 for all matched chemicals:
  - Benzene total releases decreased by 34 percent.
  - Carcinogens decreased by 10 percent.
  - California Proposition 65 chemicals (chemicals listed because of their carcinogenic, reproductive or development effects) decreased by 28 percent.
  - Releases of the Canadian list of CEPA toxics decreased by 17 percent.
  - However, metals and their compounds had a 24-percent increase in total releases from 1995 to 2000.

MEXICAN RETC reporting in 2000

Mexico took a giant step towards mandatory reporting of releases and transfers with the passage of enabling legislation in late 2001. Until regulations are passed, the reporting to Mexico's PRTR (the RETC) remains voluntary. The following 172 facilities voluntarily reported data on releases and transfers of listed chemicals for 2000, according to the latest available information from Semarnat. Congratulations to these companies for showing leadership in reporting their data. This will contribute to the further development of the RETC program, help these and other facilities find cost savings and efficiency improvements, and assist communities in better understanding their neighbors. The reports were under Sections 5.2 (Listed Pollutant Releases) and/or 5.3 (Listed Pollutant Transfers) of the COA.

CONGRATULATIONS TO THESE EARLY LEADERS in reporting on their environmental releases and tranfers in Mexico for 2000.

FACILITY NAME	CITY/STATE
ACABADOS QUIMICOS MEXICANOS, S.A. DE C.V.	TLAQUEPAQUE/JALISCO
ADHESIVOS, S. DE R. L.	CUERNAVACA/MORELOS
AGRICULTURA NACIONAL, S.A. DE C.V.	IZUCAR DE MATAMOROS/PUEBLA
ALKEMIN, S. DE R.L. DE C.V.	MORELIA/MICHOACAN
ARTEVA SPECIALTIES, S. DE R.L. DE C.V.	QUERETARO/QUERETARO
BARNICES MEXICANOS, S.A. DE C.V.	TLAQUEPAQUE/JALISCO
BENEFICIADORA E INDUSTRIALIZADORA, S.A. DE C.V.	ECATEPEC/MEXICO
BICILEYCA, S.A. DE C.V.	YAUHQUEMEHCAN/TLAXCALA
CARTONAJES ESTRELLA, S.A. DE C.V.	AZCAPOTZALCO/DISTRITO FEDERAL
CELANESE MEXICANA, S.A. DE C.V.	CELAYA/GUANAJUATO
CELANESE MEXICANA, S.A. DE C.V.	PONCITLAN/JALISCO
CELULOSA Y DERIVADOS, S.A. DE C.V. PLANTA CRYSEL	EL SALTO/JALISCO
CEMENTOS APASCO, S.A. DE C.V.	APAXCO/MEXICO
CFE.CENTRAL TERMOELECTRICA CICLO COMBINADO TULA	TULA DE ALLENDE/HIDALGO
CIA HULERA TORNEL, PLANTA 4	TULTITLAN/MEXICO
CIA HULERA TORNEL, S.A. DE C.V. PLANTA 1	AZCAPOTZALCO/DISTRITO FEDERAL
CIA. HULERA TORNEL, S.A. DE C.V. PLANTA 2	AZCAPOTZALCO/DISTRITO FEDERAL
CLARIANT PRODUCTOS QUIMICOS, S.A. DE C.V.	ECATEPEC/MEXICO
CLOROBENCENOS, S.A. DE C.V.	EL CARMEN TEQUEXQUITLA/TLAXCALA
COMISION FEDERAL DE ELECTRICIDAD CENTRAL TURBOGAS LAS CRUCES	ACAPULCO DE JUAREZ/GUERRERO
COMPAÑIA DE NITROGENO DE CANTARELL, S.A. DE C.V.	CARMEN/CAMPECHE
COMPAÑIA MINERA BASIS, S.A. DE C.V.	OTAEZ/DURANGO
CROMADOS TOVAR	GUADALAJARA/JALISCO

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

CONGRATULATIONS (continued)

FACILITY NAME	CITY/STATE
DERIVADOS MACROQUIMICOS, S.A. DE C.V.	ZACAPU/MICHOACAN
DOW AGROSCIENCES DE MEXICO, S.A. DE C.V.	TETLA/TLAXCALA
DOW QUIMICA MEXICANA, S.A. DE C.V.	TETLA/TLAXCALA
DUPONT, S.A. DE C.V.	LERMA/MEXICO
DURAMAX, S.A. DE C.V.	TLALNEPANTLA/MEXICO
EJES TRACTIVOS, S.A. DE C.V.	TLALNEPANTLA/MEXICO
EL BRONCO AUTOPARTES, S.A. DE C.V.	GUADALAJARA/JALISCO
EMPAQUES DE CARTON UNITED, S.A. DE C.V. PTA. DE PAPEL	VENUSTIANO CARRANZA/DISTRITO FEDERAL
EMPRESAS CALE DE TLAXCALA, S.A. DE C.V.	TETLA/TLAXCALA
ENERTEC MEXICO, S. DE R.L. DE C.V.	TORREON/COAHUILA
EXPORTACIONES DE MINERALES DE TOPIA, S.A. DE C.V.	CANELAS/DURANGO
FABRICA DE PAPEL SANTA CLARA, S.A. DE C.V.	ECATEPEC/MEXICO
FENOQUIMIA, S.A. DE C.V.	COSOLEACAQUE/VERACRUZ
FERSINSA GIST BROCADES, S.A. DE C.V. PLANTA SINTESIS	RAMOS ARIZPE/COAHUILA
FIBRAS PARA EL ASEO, S.A. DE C.V.	TETLA/TLAXCALA
FORD MOTOR COMPANY, S.A. DE C.V.	CUAUTITLAN IZCALLI/MEXICO
FORMULABS DE MEXICO, S.A. DE C.V.	IZTAPALAPA/DISTRITO FEDERAL
GALVANIZADO INDUSTRIAL JESUS ALVARADO GARCIA	GUADALAJARA/JALISCO
GOLDSCHMIDT QUIMICA DE MEXICO, S.A. DE C.V.	SAN LUIS POTOSI/SAN LUIS POTOSI
GRUPO INDUSTRIAL C AND F, S.A. DE C.V.	SAN LUIS POTOSI/SAN LUIS POTOSI
GUANTES VITEX S.A. DE C.V.	CALPULALPAN/TLAXCALA
HULES BANDA S.A. DE C.V.	CUAUTITILAN/MEXICO
IDASA INTERNACIONAL DE ACEROS, S.A. DE C.V.	LA CANADA/QUERETARO
INDUSTRIA DE ACUMULADORES DE JALISCO, S.A. DE C.V.	TLAQUEPAQUE/JALISCO
INDUSTRIA QUIMICA DEL ISTMO, S.A. DE C.V.	XALOZTOC/TLAXCALA
INDUSTRIAS CIDSA BAYER, S.A. DE C.V.	COATZACOALCOS/VERACRUZ
INDUSTRIAS OKEN, S.A. DE C.V.	MORELIA/MICHOACAN
INDUSTRIAS POLYREY, S.A. DE C.V.	GUADALAJARA/JALISCO
INSECTICIDAS DEL PACIFICO, S.A. DE C.V.	CIUDAD OBREGON/SONORA
INVESTIGACION APLICADA, S.A. DE C.V.	TEHUACAN/PUEBLA
JOHNSON MATTHEY DE MEXICO, S.A. DE C.V.	LA CANADA/QUERETARO
KENDALL DE MEXICO	AZCAPOTZALCO/DISTRITO FEDERAL
KENWORTH MEXICANA, S.A. DE C.V.	MEXICALI/BAJA CALIFORNIA
KIMBERLY CLARK DE MEXICO, S.A. DE C.V.	RAMOS ARIZPE/COAHUILA
LABORATORIO AGROENZIMAS, S.A. DE C.V.	TETLA/TLAXCALA
LABORATORIOS FUSTERY, S.A. DE C.V.	TLALPAN/DISTRITO FEDERAL
LEAR CORPORATION MEXICO, S.A. DE C.V.	HERMOSILLO/SONORA
MAQUILADORA DE TERMOPLASTICOS, S.A. DE C.V.	ARENAL/JALISCO
METALES KENDAL, S.A. DE C.V.	PAPALOTLA/TLAXCALA
MEXALIT INDUSTRIAL, S.A. DE C.V. DIVISION NORTE	CHIHUAHUA/CHIHUAHUA
MINERA SANTA MARIA, S.A. DE C.V.	NOMBRE DE DIOS/DURANGO
NUTRIMENTOS MINERALES, S.A. DE C.V. (PLANTA II)	TIZAYUCA/HIDALGO
OPERADORA DE TERMINALES MARITIMAS, S.A. DE C.V.	ALTAMIRA/TAMAULIPAS
PEMEX EXPLOR. Y PROD. ESTAC. DE RECOLECC. DE GAS TEPETITAN	MACUSPANA/TABASCO
PEMEX EXP. Y PROD. BATERIA SEP. PAREDON	HUIMANGUILLO/TABASCO
PEMEX EXP. Y PROD. BATERIA SEPARACION SANTUARIO PEP REGION S	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. BAT. DE SEPARACION RODADOR	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. BATER. DE SEP. SANCHEZ MAGALLANES NO. 3	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. ESTAC COMPRES CUNDUACAN ACTIVO SAMARIA S	CUNDUACAN/TABASCO
PEMEX EXPLOR. Y PROD. ESTAC DE COMPRES 5 PRESIDENTES NO. 1	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. ESTAC DE COMPRES 5 PRESIDENTES NO. 2	CARDENAS/TABASCO
PEMEX EXPLOR. Y PRODUCCION ESTACION DE COMPRESION OGARRIO	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. PROD. BATERIA DE SEPARACION BELLOTA MODULAR	CUNDUACAN/TABASCO
PEMEX EXPLOR. PROD. BATERIA DE SEPARACION BELLOTA	CUNDUACAN/TABASCO
PEMEX EXPLOR. PROD. ESTAC DE COMPRES AGAVE ACTVO PROD MUSPAC	TEAPA/TABASCO
PEMEX EXPLOR. PROD. ESTACION DE COMPRESION CATASRRICAL	COMALCALCO/TABASCO
PEMEX EXPLOR. PROD. ESTACION DE COMPRESION CHILAPILLA	MACUSPANA/TABASCO
PEMEX EXPLOR. PROD. ESTACION DE RECOLECCION USUMACINTA	JONUTA/TABASCO
PEMEX EXPLOR. PROD. BATERIA DE SEPAR. GOLPE I	COMALCALCO/TABASCO
PEMEX EXPLOR. PROD. EST. COMPRESION CATASRRICAL	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. BAT. SEPAR. 5 PRESIDENTES	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. BAT. SEPAR. 5 PRESIDENTES NO 1	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. BAT. SEPAR. SANCHEZ MAGALLANES 7 REG S	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. BAT. SEPAR. SANCHEZ MAGALLANES NO. 1	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. BAT. DE SEPAR OXIACAQUE ACTIVO PROD SAMA	JALPA DE MENDEZ/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA DE SEPARAC. 5 PRESIDENTES NO. 2	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. CENTRAL DE ALMACENAM Y BOMBEO CUNDUACAN	CUNDUACAN/TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION SAN RAMON	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA DE SEPAR. CARDENAS NORTE	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA DE SEPARACION AGAVE ACTI MUSP	TEAPA/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA DE SEPARACION TUPILCO II	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. BLASILLO	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. CARRIZO	CENTRO/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. LUNA	CENTLA/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. OGARRIO NO. 2	HUIMANGUILLO/TABASCO

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

CONGRATULATIONS (continued)

FACILITY NAME	CITY/STATE
PEMEX EXPLOR. Y PROD. BATERIA SEP. SAMARIA III	CENTRO/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. SANCHEZ MAGALLANES NO. 5	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEP. SANCHEZ MAGALLANES NO. 4	CARDENAS/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA SEPARACION. OGARRIO NO. 5	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION BELLOTA	CUNDUACAN/TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION CARDENAS NORTE	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION SAMARIA II	CUNDUACAN/TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION TECOMINOACAN	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESION TUPILCO	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. EST. COMPRESORA LA VENTA	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. ESTAC. DE COMPRESORAS BACAL	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. ESTACION COMPRESION PAREDON	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION GOLPE	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION JOSE COLOMO	MACUSPANA/TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION JUJO	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. ESTACION DE COMPRESION SANTUARIO	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. PLANTA DESHIDRATADORA EL GOLPE	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. PTA. INYECCION DE AGUA 5 PRESIDENTES P	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. PTA. INYECCION DE AGUA OGARRIO	HUIMANGUILLO/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA DE SEPAR. TUPILCO I	COMALCALCO/TABASCO
PEMEX EXPLOR. Y PROD. BATERIA PROVICIONAL SEN	CUNDUACAN/TABASCO
PEMEX EXPLORACION Y PROD. BAT. DE SEPARACION TINTAL	CARDENAS/TABASCO
PEMEX EXPLORACION Y PROD. BATERIA DE SEP. BACAL	HUIMANGUILLO/TABASCO
PEMEX EXPLORACION Y PROD. BATERIA DE SEP. VERNET	MACUSPANA/TABASCO
PEMEX EXPLORACION Y PROD. BATERIA DE SEPARACION JUJO	HUIMANGUILLO/TABASCO
PEMEX EXPLORACION Y PROD. BATERIA SEP. MODULAR MORA	CUNDUACAN/TABASCO
PEMEX EXPLORACION Y PROD. BATERIA Y SEPARACION CUNDUCACAN	CUNDUACAN/TABASCO
PEMEX EXPLORACION Y PRODUCCION BATERIA DE SEPARACION IRIDE	CUNDUACAN/TABASCO
PEMEX EXPLORACION Y PRODUCCION BATERIA DE SEPARACION PIJIJE	CENTLA/TABASCO
PEMEX EXPLORACION Y PRODUCCION ESTACION DE COMPRESION OTATES	HUIMANGUILLO/TABASCO
PEMEX REFINACION	MEXICALI/BAJA CALIFORNIA
PEMEX REFINACION	MEXICALI/BAJA CALIFORNIA
PEMEX REFINACION (TERMINAL SATELITE)	MANZANILLO/COLIMA
PEMEX REFINACION TERMINAL DE ALMACENAM Y DISTRIBUCION COLIMA	COLIMA/COLIMA
PETROQUIMICA PENNWALT, S.A. DE C.V.	IXHUATLAN DEL SURESTE/VERACRUZ
PINTURA ESTAMPADO Y MONTAJE, S.A. DE C.V.	CELAYA/GUANAJUATO
PIVIDE, S.A. DE C.V.	CALPULALPAN/TLAXCALA
PLATINADORA BAJA, S.A. DE C.V.	TIJUANA/BAJA CALIFORNIA
POLAQUIMIA DE TLAXCALA, S.A. DE C.V.	XALOZTOC/TLAXCALA
POLICYD, S.A. DE C.V.	ALTAMIRA/TAMAULIPAS
POLIMEROS DE MEXICO, S.A. DE C.V.	XICOTZINGO/TLAXCALA
POLY FORM DE MEXICO, S.A. DE C.V.	IZTAPALAPA/DISTRITO FEDERAL
POWER SONIC, S.A. DE C.V.	TIJUANA/BAJA CALIFORNIA
PPG INDUSTRIES DE MEXICO, SA. DE C.V.	SAN JUAN DEL RIO/QUERETARO
PRAXAIR MEXICO, S.A. DE C.V.	TULTITLAN/MEXICO
PRODUCTOS FARMACÉUTICOS, S.A. DE C.V.	MIGUEL HIDALGO/DISTRITO FEDERAL
PRODUCTOS QUIMICOS Y PINTURAS, S.A. DE C.V.	TEXCOCO/MEXICO
PROTERM DE MEXICO, S.A. DE C.V.	CUAUTITLAN IZCALLI/MEXICO
QUEST INTERNATIONAL DE MEXICO, S.A. DE C.V.	PEDRO ESCOBEDO/QUERETARO
QUIMICA CENTRAL DE MEXICO, S.A. DE C.V.	SAN FRANCISCO DEL RINCON/GUANAJUATO
QUIMICAL, S.A. DE C.V.	MEXICALI/BAJA CALIFORNIA
REBECA OCAMPO GONZALEZ	NEZAHUALCOYOTL/MEXICO
RESIRENE, S.A. DE C.V.	XICOTZINGO/TLAXCALA
ROHM AND SAAS MEXICO, S.A. DE C.V.	ATLANGATEPEC/TLAXCALA
RUST INTERNATIONAL, S.A. DE C.V.	QUERETARO/QUERETARO
SCHENECTADY MEXICO, S.A. DE C.V.	ECATEPEC/MEXICO
SCHNEIDER ELECTRIC MEXICO, S.A. DE C.V.	ACUAMANALA/TLAXCALA
SEALED POWER MEXICANA, S.A. DE C.V.	JESUS MARIA/AGUASCALIENTES
SMITHKLINE & FRENCH, S.A. DE C.V. (PTA. 2)	ALVARO OBREGON/DISTRITO FEDERAL
SMITHKLINE BEECHAM MEXICO, S.A. DE C.V. (PTA. 1)	COYOACAN/DISTRITO FEDERAL
SUELAS PUSA, S.A. DE C.V.	GUADALAJARA/JALISCO
SUELAS PUSA, S.A. DE C.V.	GUADALAJARA/JALISCO
TAUROS MEXICANA, S.A. DE C.V.	TEOLOCHOLCO/TLAXCALA
TECSIQUIM, S.A. DE C.V.	IZTACALCO/DISTRITO FEDERAL
TEKCHEM, S.A. DE C.V.	SALAMANCA/GUANAJUATO
TEMINAL DE PRODUCTOS ESPECIALIZADOS, S.A. DE C.V.	ALTAMIRA/TAMAULIPAS
TETRA PAK QUERETARO, S.A. DE C.V.	CORREGIDORA/QUERETARO
TEXTILES TECNICOS, S.A. DE C.V.	ACATLAN/HIDALGO
TRATAMIENTOS DE DESECHOS MEDICOS, S.A. DE C.V.	LERMA/MEXICO
UQUIFA MEXICO, S.A. DE C.V.	JIUTEPEC/MORELOS
URATO INDUSTRIAL, S.A. DE C.V.	CARMEN/NUEVO LEON
USEM DE MEXICO, S.A. DE C.V.	APODACA/NUEVO LEON
VALEO MATERIALES DE FRICCION DE MEXICO, S.A. DE C.V.	QUERETARO/QUERETARO
VIDRIO PLANO DE MEXICO, S.A. DE C.V.	TLALNEPANTLA/MEXICO

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

Using and understanding this report

This report uses data from Canada and the United States. Mexico data will be included in future reports as they become available. Specific terms are used to describe releases and transfers of chemicals. Taking a few moments to familiarize yourself with the differences in these data sets and terms will help you to better use and understand the information presented in this report.

TABLE 1. FEATURES OF NORTH AMERICAN PRTRs
for the 2000 Reporting Year

FEATURE	US TOXICS RELEASE INVENTORY (TRI)	CANADIAN NATIONAL POLLUTANT RELEASE INVENTORY (NPRI)	MEXICAN *REGISTRO DE EMISIONES Y TRANSFERENCIA DE CONTAMINANTES* (RETC, SECTION V OF COA)
Who reports?	• Manufacturing, federal facilities, coal mines, metal mines, electric utilities, hazardous waste management facilities, solvent recovery facilities, chemical wholesale distributors and petroleum bulk terminals • Facilities also need to meet reporting thresholds	• Any facility manufacturing or using a listed chemical, except for research, repair and retail sales and a few other exemptions • Facilities also need to meet reporting thresholds	Any facility under federal jurisdiction (11 sectors) whose processes include thermal treatment or a foundry. The 11 sectors are: petroleum, chemical/ petrochemical, paints/inks, metallurgy (iron/steel), automobile manufacture, cellulose/paper, cement/limestone, asbestos, glass, electric power generation and hazardous waste management
Number of chemicals on list for reporting	648 chemicals	267 chemicals	104 chemicals
What media/transfers are covered?	Air, water, land, underground injection, transfers to recycling, energy recovery, treatment, sewage and disposal	Air, water, land, underground injection, transfers to recycling, energy recovery, treatment, sewage and disposal	Air, water, land, transfers to treatment, sewage and disposal; underground injection into wells not practiced in Mexico
Mandatory for facilities to report?	Yes	Yes	No
How often is reporting required?	Annually	Annually	Annually
Public access to data?	Annual summary report; full database publicly accessible	Annual summary report; full database publicly accessible	Annual summary report (does not include facility-specific data); database not available to the public

CEC ACTION PLAN
to enhance the comparability of pollutant release and transfer registers in North America

The governments of Canada, Mexico and the United States have worked with the CEC to develop an action plan to implement changes in their respective PRTRs that will enhance the comparability of the three systems. Much progress has already been made, including:

- expanding the number of industries covered under TRI,
- adding mandatory reporting of transfers to recycling and energy recovery to the NPRI,
- expanding both the chemical lists and the reporting on PBT chemicals (NPRI and TRI), and
- requiring reporting on pollution prevention activities (NPRI).

Perhaps the greatest progress is the adoption of a mandatory requirement for RETC reporting in Mexico.

The Action Plan to Enhance the Comparability of PRTRs in North America, adopted by the CEC Council in June 2002, identifies specific issues for which action is still needed, such as:

- the way in which release and transfer types are categorized,
- the lists of chemicals,
- the use of standardized North American industry-sector classification codes, and
- the types of reporting thresholds and exemptions used.

The Action Plan includes a description of such issues and outlines steps to be taken by the national programs to increase the comparability among the three systems. The Action Plan can be found on the CEC web site at <www.cec.org>.

TABLE 2. FEATURES OF THE THREE DATA SETS in *TAKING STOCK 2000*

FEATURE	2000 DATA SET 2000 ONLY	1998–2000 DATA SET 1998–2000	1995–2000 DATA SET 1995–2000
Number of Chemicals	206 chemicals	159 chemicals	159 chemicals
Industry Sectors			
Manufacturing Facilities	✓	✓	✓
Electric Utilities	✓	✓	
Hazardous Waste Management/Solvent Recovery	✓	✓	
Chemical Wholesalers	✓	✓	
Coal Mines	✓	✓	
On-site Releases to Air, Water, Land, Underground Injection	✓	✓	✓
Off-site Releases (transfers to disposal)	✓	✓	✓
Transfers to Sewage and Treatment	✓	✓	✓
Transfers to Recycling/ Energy Recovery	✓	✓	

SCOPE OF the analyses

Taking Stock is developed by looking at the information that is comparable among the national PRTR programs of North America. While Canada, Mexico and the United States have the same basic pollutant release and transfer register, there are significant differences between them (Table 1). Some of the most important differences include the number of chemicals listed, the types of industrial sectors covered, whether reporting is mandatory or voluntary, and the degree of public access to the facility data.

When using the report, it is important to keep in mind that there are three different data sets (Table 2):

- 2000 data (used to present data for 2000 only),
- 1998–2000 data (used to present year-to-year changes since 1998), and
- 1995–2000 data (used to present six-year trends).

The data in this report are taken from the US and Canadian PRTRs. The data are "matched" for a particular span of years; that is, they are based on chemicals and industrial sectors that are common to both TRI and NPRI for the year(s) in question. Reporting to the Mexican PRTR system was voluntary for 2000 and prior years, and thus the data are not comparable to those reported in the US and Canada. As outlined in Table 2, the three data sets are different. Thus, the conclusions drawn from one data set cannot be applied to another. Each data set is clearly marked in the text and on each table and figure. The chemicals in the matched data sets are listed in the Appendix.

TERMINOLOGY

Taking Stock 2000 uses the following categories for presenting information on pollutant releases and transfers:

- **"On-site releases"** describes releases that occur at the facility—i.e., chemicals put into the air or water, injected into underground wells, or put in landfills "inside the fenceline."
- **"Off-site releases"** describes chemicals sent off-site to other locations for disposal, as well as metals sent to treatment, sewage, and energy recovery.
- **"Total releases on- and off-site"** or simply **"total releases"** is the sum of on- and off-site releases.
- **"Total releases (adjusted)"** is the sum of on- and off-site releases minus those off-site releases that are reported as on-site releases by another NPRI or TRI facility.
- **"Transfers to recycling"** describes chemicals sent off-site for recycling.
- **"Other transfers for further management"** describes chemicals (other than metals) sent for treatment and energy recovery and to sewage plants.
- **"Transfers for further management"** encompasses: (1) chemicals sent for recycling and (2) other transfers for further management, i.e., chemicals (other than metals) sent for treatment and energy recovery and to sewage plants.
- **"Total reported amounts"** describes the sum of all of the above categories: on- and off-site releases, recycling, and other transfers for further management. All releases as reported are included. While not perfect, this is the closest estimate available from the matched North American PRTR data of the total amount of chemicals arising from a facility's activities that need to be managed.

This *Taking Stock* report includes an "adjustment analysis" that adjusts the total release numbers for "double-counting." Double-counting can occur when a facility sends chemicals for disposal or metals to treatment, sewage, or energy recovery to another facility that also reports on its releases and transfers. This creates the possibility of the same chemicals being reported twice: once as an off-site release by the first facility, and again as an on-site release by the second facility.

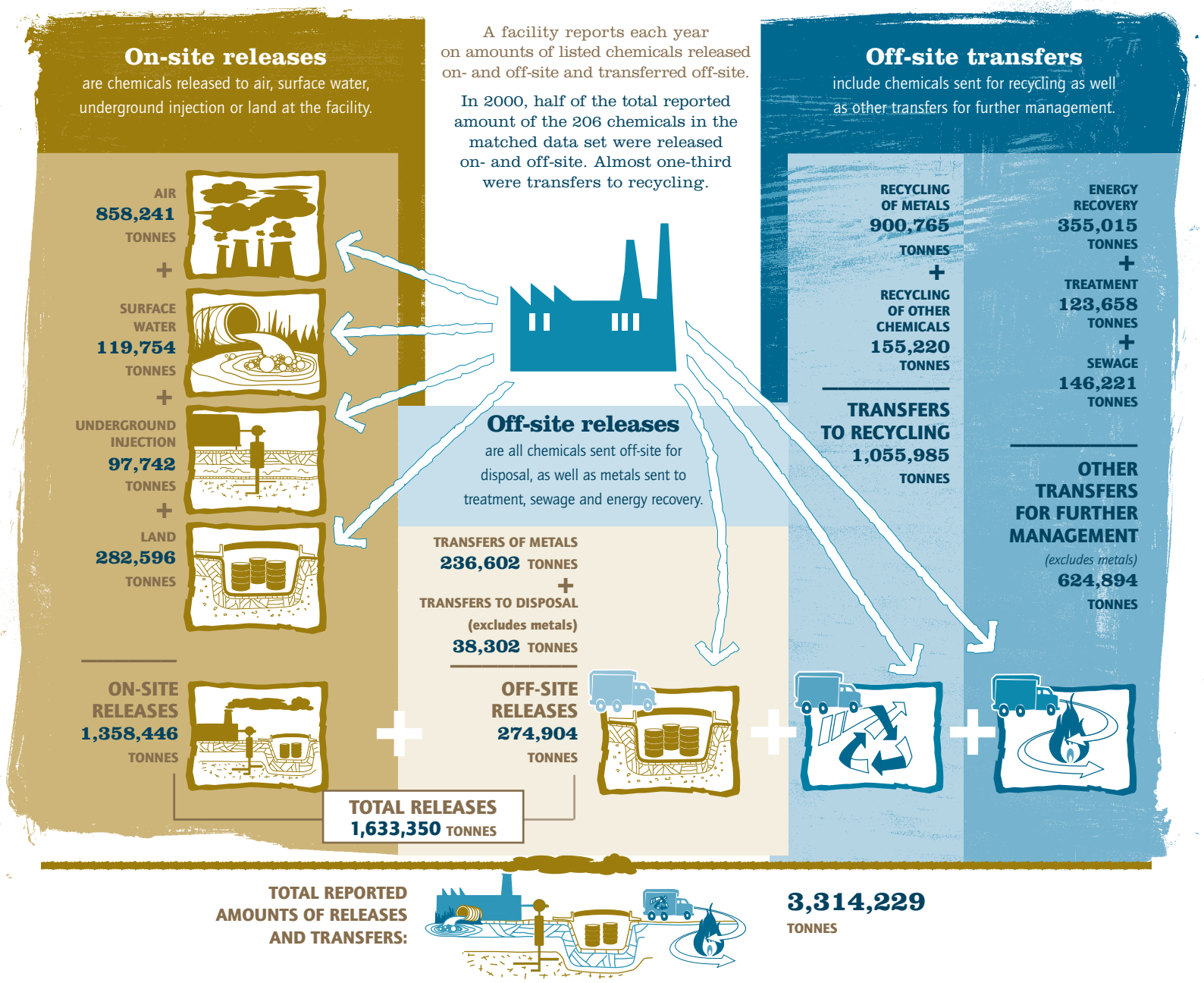
It is not necessary to adjust releases when considering total reported amounts, which are an estimate of total amounts generated that require handling or management. Double-counting became more likely with the addition of hazardous waste management/solvent recovery facilities to TRI in 1998.

The categorization used in this report includes, as part of off-site releases, those metals that are sent off-site to disposal, to treatment, for energy recovery, or to sewage. This categorization is needed to make TRI and NPRI data comparable. TRI has a special method for classifying transfers of metals in which transfers of metals to sewage, treatment, or energy recovery are considered releases because metals are not destroyed by treatment or burned in energy recovery.

While it may seem confusing at first to those who are accustomed to seeing "releases" refer to on-site activities and "transfers" refer to off-site activities, this categorization has several benefits and is supported by all three governments. It aggregates similar activities; for example, all chemicals that are landfilled are called releases, regardless of where the landfill is located. It preserves the sense of location of releases, either on or off the site of the facility. The approach also recognizes the physical nature of metals and acknowledges that metals sent to disposal, sewage, treatment, and energy recovery are not likely to be destroyed or burned and so may eventually enter the environment.

FIGURE 1. POLLUTANT RELEASES AND TRANSFERS in North America, 2000

(2000 Matched Chemicals and Industries)



Note: Canada and US data only. Mexico data not available for 2000. Analyses are based on the matched set of chemicals and industry sectors for which comparable data are available for 2000. Total on-site releases are greater than the sum of the individual media because an NPRI facility can report only the total if it is less than one tonne.

2000 Results

This section presents results from the 2000 reporting year. The data in this section include reporting on:

- the set of 206 chemicals common to both NPRI and TRI;
- manufacturing facilities, as well as electric utilities, hazardous waste management/solvent recovery facilities, wholesale chemical distributors and coal mining; and
- all categories of releases and transfers, including transfers to recycling and energy recovery.

THE BIG picture

How many tonnes of chemicals were reported released or transferred in North America in 2000?

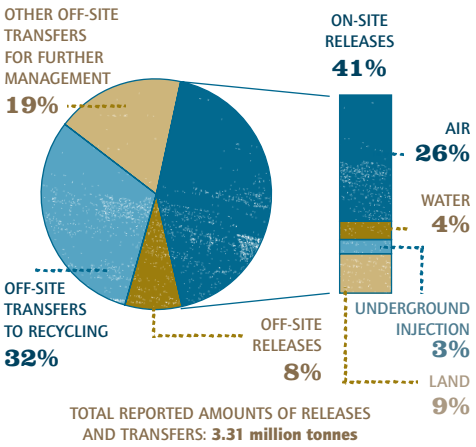
As shown in Figure 1, in 2000, over 3.31 million tonnes of matched chemicals were released and transferred in North America. Almost half of the total reported amounts of releases and transfers (1.63 million tonnes) were released on- and off-site. Over 858,000 tonnes of chemicals were released into the air at facility sites.

About one-third of the total reported amounts, over 1 million tonnes, were substances sent off-site for recycling (Table 3 and Figure 2). Less than one-fifth, or 625,000 tonnes, were other transfers for further management, including to energy recovery, treatment, and sewage.

NPRI facilities reported 9 percent of the total North American amounts, while those in the TRI database had 91 percent of the North American total reported amounts.

FIGURE 2.
TOTAL REPORTED AMOUNTS of releases and transfers in North America by category, 2000

(2000 Matched Chemicals and Industries)



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

What is being released into our air, land and water and injected underground?

In 2000, most chemicals being released at the site of the facility went into the air. Over 858,000 tonnes of chemicals were released into the air in 2000 in North America. This large amount of chemicals emitted to the air was more than all the chemicals released to land, water and underground injection combined. The next-largest amount of on-site releases, 282,500 tonnes of chemicals, was disposed of on land at facility sites. In addition, transfers off-site for disposal (mostly to landfills) totaled 275,000 tonnes. Facilities also discharged 120,000 tonnes of chemicals into rivers, lakes and streams and injected 97,500 tonnes of chemicals underground in 2000.

TABLE 3. SUMMARY OF TOTAL REPORTED AMOUNTS
of releases and transfers in North America, NPRI and TRI, 2000
(2000 Matched Chemicals and industries)

	NORTH AMERICA number		NPRI * number		TRI number		NPRI AS % OF NORTH AMERICAN TOTAL	TRI AS % OF NORTH AMERICAN TOTAL
Total Facilities	22,036		1,698		20,338		8	92
Total Forms	76,681		6,162		70,519		8	92
Releases On- and Off-site	**tonnes**	**%**	**tonnes**	**%**	**tonnes**	**%**	**%**	**%**
On-site Releases	**1,358,446**	**41**	**121,823**	**39**	**1,236,623**	**41**	**9**	**91**
Air	858,241	26	91,892	29	766,349	26	11	89
Surface Water	119,754	4	6,644	2	113,110	4	6	94
Underground Injection	97,742	3	3,591	1	94,152	3	4	96
Land	282,595	9	19,584	6	263,012	9	7	93
Off-site Releases	**274,904**	**8**	**31,341**	**10**	**243,564**	**8**	**11**	**89**
Transfers to Disposal (except metals)	38,302	1	5,919	2	32,383	1	15	85
Transfers of Metals**	236,603	7	25,421	8	211,181	7	11	89
Total Releases On- and Off-site	**1,633,350**	**49**	**153,164**	**49**	**1,480,187**	**49**	**9**	**91**
Off-Site Transfers for Further Management								
Off-site Transfers to Recycling	**1,055,985**	**32**	**125,372**	**40**	**930,613**	**31**	**12**	**88**
Transfers to Recycling of Metals	900,765	27	109,890	35	790,875	26	12	88
Transfers to Recycling (except metals)	155,220	5	15,482	5	139,738	5	10	90
Other Off-site Transfers for Further Management	**624,894**	**19**	**33,588**	**11**	**591,306**	**20**	**5**	**95**
Energy Recovery (except metals)	355,016	11	15,430	5	339,585	11	4	96
Treatment (except metals)	123,658	4	10,955	4	112,703	4	9	91
Sewage/To POTWs (except metals)	146,221	4	7,203	2	139,018	5	5	95
Total Reported Amounts of Releases and Transfers	**3,314,229**	**100**	**312,124**	**100**	**3,002,106**	**100**	**9**	**91**

Note: Canada and US data only. Mexico data not available for 2000. Data include 206 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data in combination with other information can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.

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

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

Which states and provinces reported the largest releases in North America in 2000?

In 2000, the jurisdictions with the largest total releases, both on- and off-site, of the matched chemicals from manufacturing sectors were Ohio, Texas, Pennsylvania, and Indiana, each reporting more than 80,000 tonnes. These four jurisdictions were responsible for more than one-quarter of all releases on- and off-site of chemicals in North America in 2000 (Map 1).

Ohio topped the list because it had the largest releases to air, mainly from electric utilities.

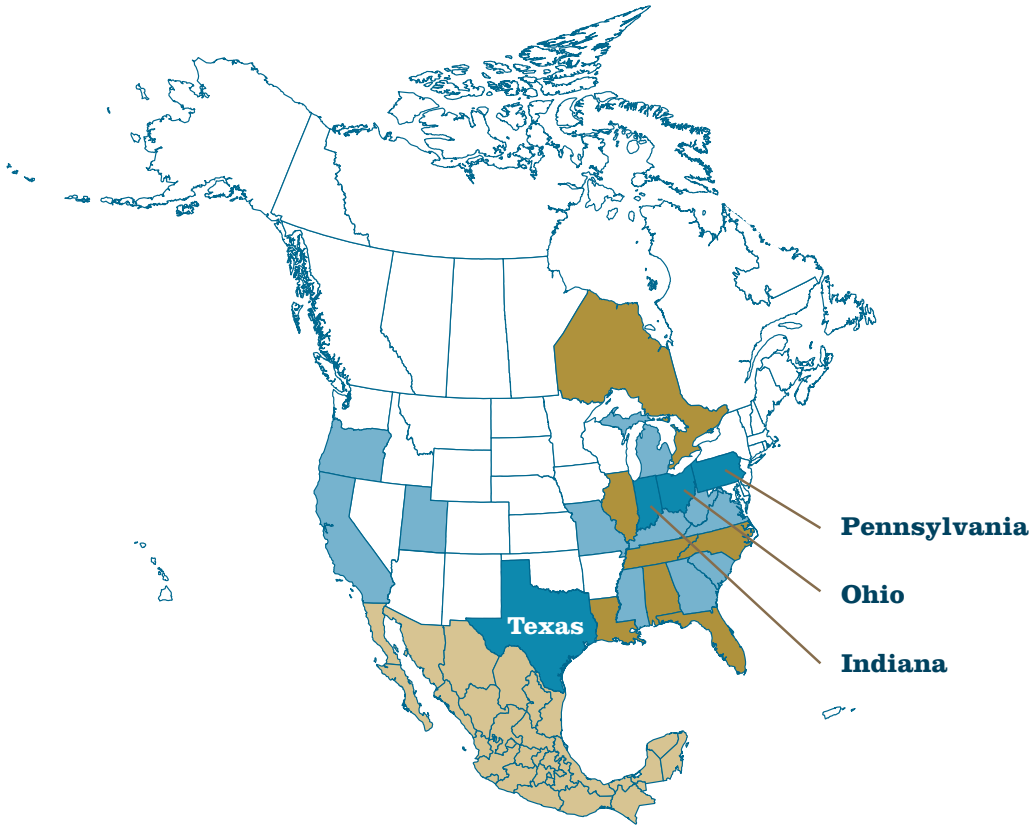
Facilities in Texas released the largest amounts of chemicals on-site. Texas facilities also reported the largest amounts of chemicals injected underground at facility sites of any jurisdiction in North America.

Pennsylvania had the highest on-site releases to water in North America in 2000, mainly due to one AK Steel Corp. facility in Butler, Pennsylvania, which released over 12,500 tonnes to water, or over 10 percent of all water releases in North America.

Indiana facilities reported releasing the second-largest amount off-site in North America, mainly transfers of metals to disposal.

Three of these four jurisdictions also had the largest on-site releases in 2000 in North America. In order, they were Texas, Ohio, and Pennsylvania—each reporting more than 65,000 tonnes. These three jurisdictions were responsible for almost one-fifth of all on-site releases of chemicals in North America in 2000.

MAP 1. LARGEST SOURCES OF TOTAL RELEASES
on- and off-site in North America, 2000: states and provinces
(2000 Matched Chemicals and Industries)



Which states and provinces reported the largest total releases and transfers in North America in 2000?

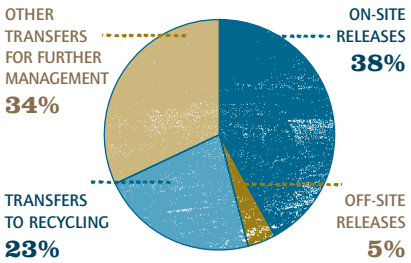
When looking at total reported amounts, which includes releases on- and off-site, transfers to recycling and other transfers for further management, the rankings by jurisdiction were: Texas, Ohio, Ontario, Pennsylvania, Michigan and Indiana, each reporting more than 160,000 tonnes. Except for Texas, these states and provinces are located around the Great Lakes. These six jurisdictions accounted for a significant portion of the chemicals reported released and transferred in North America in 2000. They accounted for 37 percent of the total amounts of chemicals released and transferred, 33 percent of the total releases, 42 percent of the transfers to recycling, and 39 percent of the total other transfers for further management.

Texas facilities reported the largest amounts of on-site releases (Figure 3). Ohio reported the second-largest amounts of on-site releases and the largest amounts of total releases. While Ontario ranked third overall, facilities in that jurisdiction reported the largest amounts of transfers to recycling. Pennsylvania facilities, ranked fourth overall, reported the largest off-site releases. Michigan, ranked fifth overall, reported the second-largest amounts of transfers for further management. Indiana, ranked sixth overall, reported the second-largest amounts of off-site releases.

FIGURE 3. STATES/PROVINCES WITH LARGEST TOTAL RELEASES or largest total reported amounts in 2000

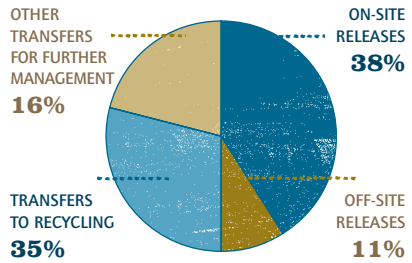
(Ordered by Total Reported Amounts)

Texas



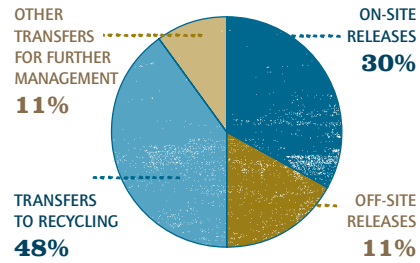
	tonnes
On-site Releases	99,388
Off-site Releases	12,221
Transfers to Recycling	61,075
Other Transfers for Further Management	89,170
Total Reported Amounts of Releases and Transfers	**261,854**
Number of Facilities	1,261
2000 Population (000)	20,947
Land Area (sq km)	678,305
2000 Gross Domestic Product (millions of US$)	742,274

Ohio



	tonnes
On-site Releases	88,686
Off-site Releases	25,519
Transfers to Recycling	81,583
Other Transfers for Further Management	36,975
Total Reported Amounts of Releases and Transfers	**232,763**
Number of Facilities	1,550
2000 Population (000)	11,360
Land Area (sq km)	106,060
2000 Gross Domestic Product (millions of US$)	372,640

Ontario



	tonnes
On-site Releases	59,146
Off-site Releases	21,602
Transfers to Recycling	96,908
Other Transfers for Further Management	22,851
Total Reported Amounts of Releases and Transfers	**200,507**
Number of Facilities	878
2000 Population (000)	11,685
Land Area (sq km)	1,068,586
2000 Gross Domestic Product (millions of US$)	289,160

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

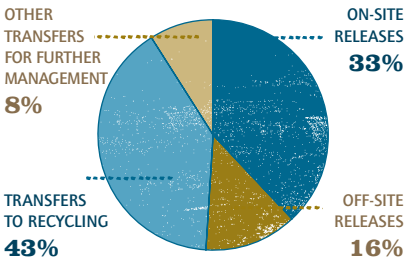
WHICH STATES AND PROVINCES had the largest chemical "loadings"?

Chemicals that end up within a jurisdiction's borders include (1) amounts released by facilities located within the state/province, (2) amounts that facilities within the state/province sent to other facilities also located within the jurisdiction, and (3) amounts received by facilities within the state/province from facilities outside its borders. These amounts provide an estimate of chemical "loadings."

These chemical loadings will be underestimates, as they do not include chemicals that can be received from long-range transport by wind or water, do not include all sources of chemicals (only those industry sectors that report to both TRI and NPRI), and do not include all chemicals (only the 206 matched chemicals reported to TRI and NPRI). Nor do they include substances sent to recycling or energy recovery. It should also be recognized that some chemicals persist in the environment for a long time and may bioaccumulate in living organisms, while others may break down relatively quickly.

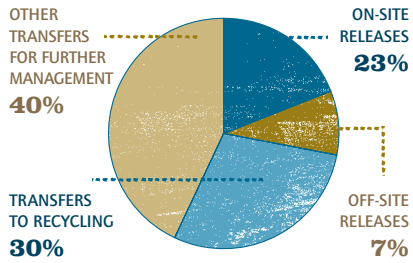
FIGURE 3. (continued)

Pennsylvania



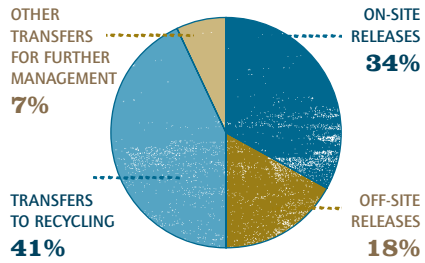
	tonnes
On-site Releases	66,228
Off-site Releases	30,560
Transfers to Recycling	85,970
Other Transfers for Further Management	15,615
Total Reported Amounts of Releases and Transfers	**198,373**
Number of Facilities	1,237
2000 Population (000)	12,283
Land Area (sq km)	116,075
2000 Gross Domestic Product (millions of US$)	403,985

Michigan



	tonnes
On-site Releases	38,793
Off-site Releases	11,480
Transfers to Recycling	50,470
Other Transfers for Further Management	67,840
Total Reported Amounts of Releases and Transfers	**168,583**
Number of Facilities	820
2000 Population (000)	9,952
Land Area (sq km)	147,124
2000 Gross Domestic Product (millions of US$)	325,384

Indiana



	tonnes
On-site Releases	56,181
Off-site Releases	29,369
Transfers to Recycling	67,490
Other Transfers for Further Management	11,915
Total Reported Amounts of Releases and Transfers	**164,955**
Number of Facilities	945
2000 Population (000)	6,090
Land Area (sq km)	92,896
2000 Gross Domestic Product (millions of US$)	192,195

Note (continued): *Other transfers for further management include transfers to energy recovery, treatment and sewage except for metals, which are included in off-site releases.*

Using this chemical loading approach, Ohio, Texas, and Pennsylvania had the largest amounts of chemicals released, sent and received within their jurisdictions (Figure 4 and Table 4).

The "loadings" analyses also show the large quantities of chemicals that are transported for disposal within many jurisdictions. Chemicals destined for off-site disposal are generated on site and generally moved by truck or train to another community. Pennsylvania transported about 26,500 tonnes within its borders, compared with the 66,000 tonnes that facilities in this state released on-site in 2000. Ohio transferred the next-largest amount within its borders—18,000 tonnes.

The chemical loading approach also demonstrates that some jurisdictions have large quantities of waste being received for disposal from facilities outside their jurisdictions. In this, Ohio led all other jurisdictions, receiving 17,500 tonnes of chemicals from facilities located outside the state. Pennsylvania followed with 9,500 tonnes of chemicals received for disposal from facilities elsewhere.

What amounts of chemicals are being transported through communities?

Facilities in North America produce large quantities of chemicals that may require transportation to off-site landfills, incinerators or treatment facilities. Almost 900,000 tonnes of chemicals were reported sent off-site to these types of facilities in 2000. In addition, large quantities of substances, over 1 million tonnes, also required transport to recyclers.

There are risks and benefits to transporting chemicals. On the risk side, chemicals may be released during handling, involved in an accident during transportation and contribute to the noise, dust and emissions from transportation. On the benefit side, transporting chemicals to another facility may result in treatment or disposal methods that more effectively reduce their potential to cause environmental and health damage.

FIGURE 4. JURISDICTIONS with the largest chemical "loadings" in 2000
(2000 Matched Chemicals and Industries)

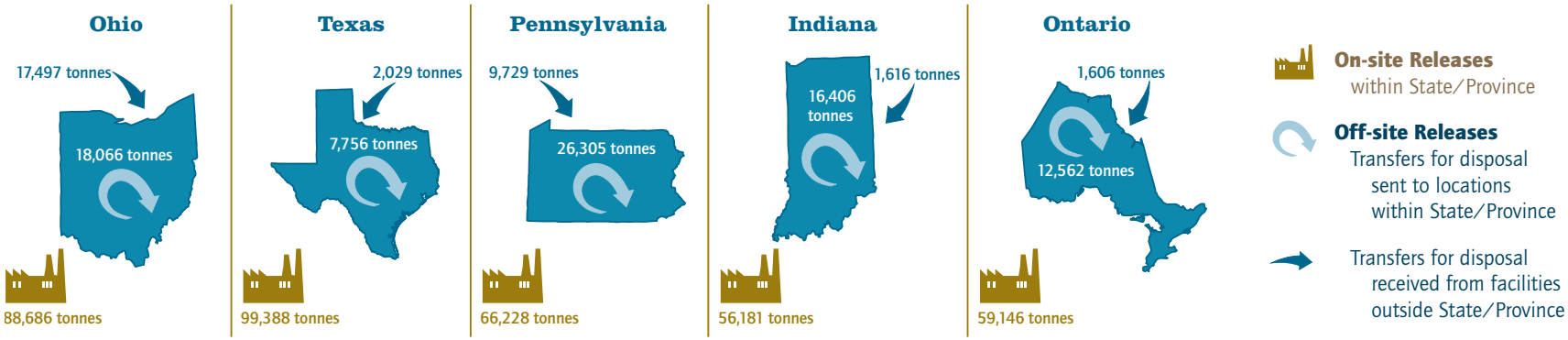


TABLE 4. TOTAL RELEASES (adjusted) within state/province, 2000

(2000 Matched Chemicals and Industries)

STATE/PROVINCE	TOTAL ON-SITE RELEASES kg	Rank	OFF-SITE RELEASES (adjusted)* TRANSFERS FROM FACILITIES WITHIN STATE/PROVIINCE TO LOCATIONS WITHIN STATE/PROVINCE: TRANSFERS OFF-SITE TO DISPOSAL (EXCEPT METALS) kg	TRANSFERS OF METALS kg	TRANSFERS FROM FACILITIES OUTSIDE STATE/PROVINCE TO LOCATIONS WITHIN STATE/PROVINCE: TRANSFERS OFF-SITE TO DISPOSAL (EXCEPT METALS) kg	TRANSFERS OF METALS kg	TOTAL RELEASES (adjusted) WITHIN STATE/PROVINCE* kg	Rank
Alabama	51,754,095	11	325,284	1,922,975	51,650	354,584	54,408,587	12
Alaska	127,281	61	0	0	624	229	128,134	61
Alberta	17,027,320	27	1,106,528	1,085,021	37,126	153,332	19,409,326	29
Arizona	18,849,335	25	50,210	265,841	123,351	126,556	19,415,293	28
Arkansas	12,170,185	31	20,870	408,323	180,165	450,739	13,230,282	32
British Columbia	10,971,935	33	219,451	162,814	2,565	9	11,356,774	34
California	21,877,519	23	1,006,155	738,339	50,224	5,341	23,677,578	23
Colorado	3,085,914	48	11,988	288,068	94,143	10,385	3,490,498	48
Connecticut	2,677,542	49	29,203	206,925	20,964	150,086	3,084,720	50
Delaware	3,750,751	46	220	1,578,880	0	2,135	5,331,985	43
District of Columbia	24,128	64	0	0	0	205	24,333	64
Florida	57,232,844	6	574,650	602,368	92,370	40,546	58,542,778	9
Georgia	44,156,200	13	142,842	1,098,215	74,011	631,049	46,102,318	14
Guam	92,698	63	0	0	0	0	92,698	63
Hawaii	403,849	57	373	359	0	0	404,581	58
Idaho	15,203,659	29	105,493	5,697	560	7,393,829	22,709,238	24
Illinois	49,399,657	12	2,047,174	7,653,341	72,164	5,957,258	65,129,594	6
Indiana	56,181,037	7	418,359	15,987,396	260,210	1,356,249	74,203,252	4
Iowa	12,137,112	32	153,153	743,304	2,284	31,499	13,067,352	33
Kansas	7,481,740	39	39,273	438,868	10,740	94,993	8,065,614	39
Kentucky	36,943,294	15	1,056,564	993,289	747,498	513,876	40,254,522	15
Louisiana	53,780,816	8	409,411	1,228,026	1,719,690	2,736,514	59,874,458	8
Maine	3,670,435	47	13,816	397,613	11,854	32,853	4,126,572	47
Manitoba	4,638,381	44	4,309	219,108	179,073	728	5,041,599	44
Maryland	18,534,617	26	11,221	213,522	8,750	44,652	18,812,761	30
Massachusetts	3,792,052	45	56,975	545,724	70,220	61,025	4,525,997	46
Michigan	38,793,050	14	699,703	9,842,943	258,604	6,488,459	56,082,759	10
Minnesota	7,611,586	38	84,408	537,579	0	41,589	8,275,161	38
Mississippi	31,500,787	18	52,275	261,413	77,437	22,978	31,914,890	18
Missouri	28,692,277	19	111,205	1,905,222	14,929	159,981	30,883,615	20
Montana	22,318,808	22	167	16,626	0	0	22,335,601	25
Nebraska	8,510,281	36	135,171	253,584	21,962	832,340	9,753,336	36
Nevada	1,308,369	55	2,548	1,035,053	32,597	462,506	2,841,073	51

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

TABLE 4. (continued) *(2000 Matched Chemicals and Industries)*

STATE/PROVINCE	TOTAL ON-SITE RELEASES kg	Rank	OFF-SITE RELEASES (adjusted)* TRANSFERS FROM FACILITIES WITHIN STATE/PROVIINCE TO LOCATIONS WITHIN STATE/PROVINCE: TRANSFERS OFF-SITE TO DISPOSAL (EXCEPT METALS) kg	TRANSFERS OF METALS kg	TRANSFERS FROM FACILITIES OUTSIDE STATE/PROVINCE TO LOCATIONS WITHIN STATE/PROVINCE: TRANSFERS OFF-SITE TO DISPOSAL (EXCEPT METALS) kg	TRANSFERS OF METALS kg	TOTAL RELEASES (adjusted) WITHIN STATE/PROVINCE* kg	Rank
New Brunswick	6,363,076	41	21,098	474,982	0	534	6,859,690	40
New Hampshire	2,350,345	50	344	101,824	16,133	71,109	2,539,756	52
New Jersey	9,473,022	34	115,920	1,287,863	35,415	244,470	11,156,691	35
New Mexico	1,382,623	54	3,276	238,600	5,965	14,292	1,644,756	54
New York	20,230,204	24	191,628	1,673,467	116,503	-51,609	22,160,193	26
Newfoundland	522,490	56	0	0	0	0	522,490	56
North Carolina	61,007,285	4	891,734	1,547,882	41,714	173,862	63,662,478	7
North Dakota	2,250,712	52	0	975,833	0	11	3,226,557	49
Nova Scotia	4,694,937	43	72,149	147,197	53,320	286	4,967,889	45
Ohio	88,686,354	2	1,083,471	16,982,583	122,730	17,374,373	124,249,511	1
Oklahoma	8,884,389	35	42,672	661,635	3,822,524	286,831	13,698,051	31
Ontario	59,145,705	5	2,825,542	9,736,332	934,761	670,990	73,313,329	5
Oregon	32,363,525	17	22,422	436,458	77,991	103,836	33,004,233	17
Pennsylvania	66,227,883	3	960,263	25,344,606	186,804	9,542,454	102,262,011	3
Prince Edward Island	227,773	59	5	86	0	0	227,865	59
Puerto Rico	6,477,426	40	69,612	178,356	0	0	6,725,394	41
Quebec	16,768,558	28	293,353	4,600,519	232,830	2,002,869	23,898,128	22
Rhode Island	333,631	58	7,844	16,975	30,723	34,206	423,380	57
Saskatchewan	1,462,752	53	8,256	3,287	0	0	1,474,295	55
South Carolina	25,760,762	21	95,210	1,718,330	166,017	349,956	28,090,274	21
South Dakota	2,349,821	51	822	17,539	0	166	2,368,348	53
Tennessee	52,345,521	9	406,228	2,132,133	149,305	104,390	55,137,577	11
Texas	99,387,755	1	2,697,979	5,058,016	1,046,161	982,886	109,172,797	2
Utah	51,828,793	10	86,337	80,728	903,868	624,590	53,524,315	13
Vermont	109,891	62	0	3,892	3,238	656	117,677	62
Virgin Islands	207,263	60	0	0	0	0	207,263	60
Virginia	28,007,959	20	287,257	2,633,971	26,124	77,551	31,032,861	19
Washington	8,493,167	37	94,460	656,504	2,479	62,313	9,308,923	37
West Virginia	36,819,400	16	31,126	1,186,050	3,731	65,255	38,105,560	16
Wisconsin	14,041,925	30	773,887	3,322,738	118,316	1,640,961	19,897,826	27
Wyoming	5,541,267	42	2	53,160	0	7	5,594,435	42
Total	**1,358,445,770**		**19,971,896**	**131,907,984**	**12,312,414**	**62,785,687**	**1,585,171,834**	

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

TRANSPORTATION OF CHEMICALS
off-site and across borders in 2000

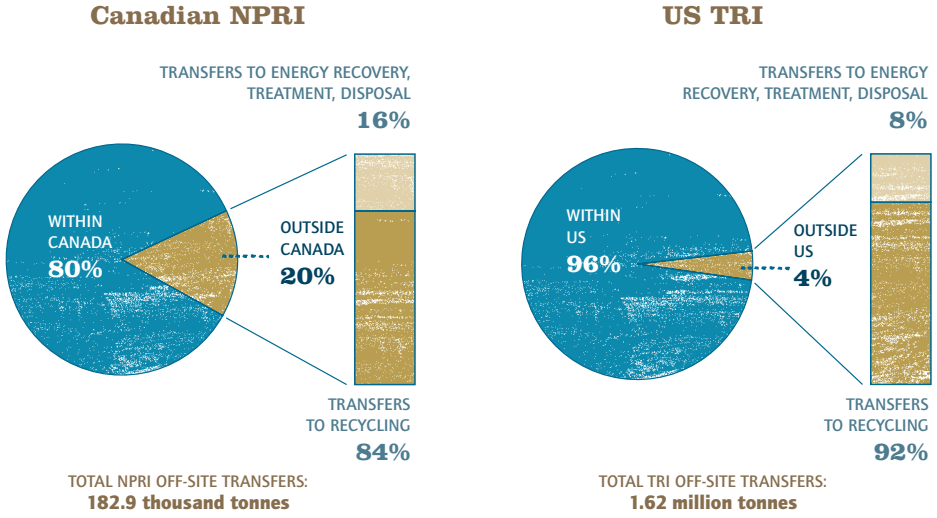
What amounts of chemicals are transported across borders?

Chemicals may be sent for disposal, treatment or recycling. Looking at all types of transfers, we see that in 2000, most chemicals were transferred to sites within national boundaries. Only 4 percent of all transfers in the US were sent outside the country and most of these were sent for recycling in Mexico and Canada (Figure 5). The US sent almost 20,000 tonnes to sites in Canada, most of which went to Ontario and Quebec (Map 2). The US also sent over 35,500 tonnes to sites in Mexico. Data are not available for transfers sent from Mexico to Canadian and US sites in 2000.

Canadian facilities sent 20 percent of all of their reported transfers outside the country, almost all of it to the US. Canada sent almost 36,000 tonnes to sites in the US, with over 75 percent as metals sent for recycling. Most of this material was sent to Michigan, Pennsylvania and Ohio, states near the Canada-US border.

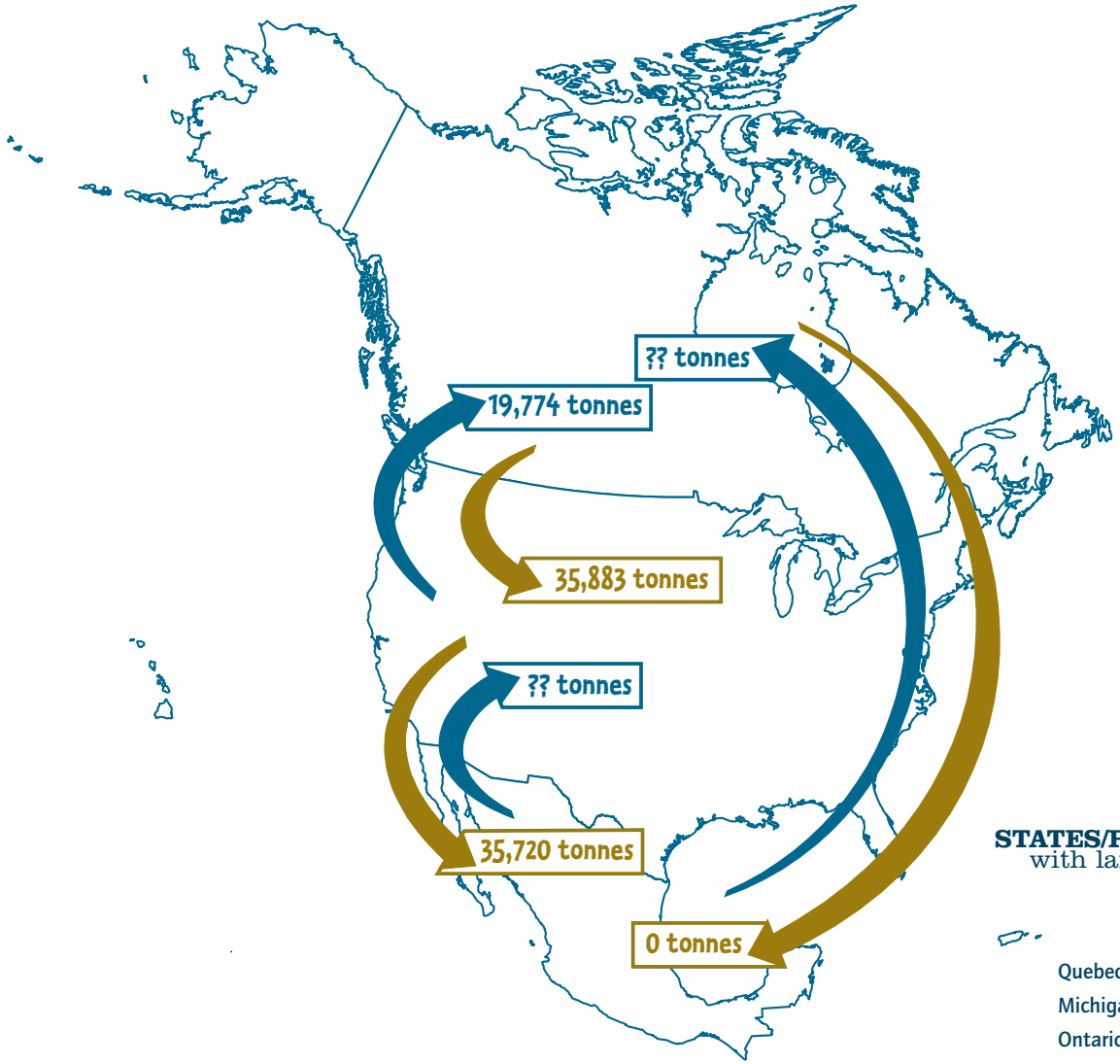
Only a handful of facilities in each country sent the majority of chemicals crossing the Canada-US border. A total of 10 facilities in the US accounted for half of the total cross-border transfers to Canada and 10 facilities in Canada accounted for half of the transfers to the US.

FIGURE 5. PERCENTAGE OF TRANSFERS SENT WITHIN and outside country, NPRI and TRI, 2000
(2000 Matched Chemicals and Industries)



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

MAP 2. OFF-SITE TRANSFERS
across North America, 2000



STATES/PROVINCES
with largest transfers received

	TO tonnes	FROM tonnes
Quebec	9,866	5,468
Michigan	9,780	2,160
Ontario	8,348	26,936
Pennsylvania	8,152	4,115

2000 HIGHLIGHTS BY facility, sector, and chemical

Which facilities reported the largest total amounts of releases and transfers in North America in 2000?

In North America, a relatively small number of facilities account for a large proportion of releases and transfers. In 2000, just 15 out of more than 22,000 facilities in North America reported a total of over 255,500 tonnes of chemicals released and transferred (Table 5). In other words, less than 0.1 percent of the total number of facilities reported 8 percent of the total reported amounts of releases and transfers. Fourteen of the 15 facilities were located in the US. Six of the 15 were primary metals facilities and five were hazardous waste management/solvent recovery facilities.

These 15 facilities accounted for 9 percent of total releases, 14 percent of transfers for further management (transfers to energy recovery, treatment and sewage), and 2 percent of transfers to recycling.

Which facilities reported the largest total releases in North America in 2000?

If we look just at total releases, we see a similar pattern: a small number of facilities accounted for a large portion of total releases. In 2000, 15 facilities reported 214,500 tonnes of releases, accounting for 13 percent of total releases in North America (Table 6). They were all located in the US.

Seven of the facilities were primary metals facilities, four were hazardous waste management/solvent recovery facilities, two were electric utilities and two were chemical manufacturers. These facilities accounted for 14 percent of all on-site releases and for 9 percent of all off-site releases (transfers to disposal) in 2000.

TABLE 5. THE 15 NORTH AMERICAN FACILITIES
with the largest total reported amounts of releases and transfers, 2000

(2000 Matched Chemicals and Industries)

RANK	FACILITY	CITY, STATE/ PROVINCE	SIC CODES CANADA	SIC CODES US	TOTAL ON- AND OFF-SITE RELEASES REPORTED	TOTAL TRANSFERS TO RECYCLING	TOTAL OTHER TRANSFERS FOR FURTHER MANAGEMENT	TOTAL REPORTED AMOUNTS OF RELEASES AND TRANSFERS	MAJOR CHEMICALS REPORTED (PRIMARY MEDIA/TRANSFERS) (CHEMICALS ACCOUNTING FOR MORE THAN 70% OF TOTAL REPORTED AMOUNTS FROM THE FACILITY)
					kg	kg	kg	kg	
1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	24,506,699	14	5	24,506,718	Copper/Arsenic/Zinc and compounds (land)
2	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	24,370,365	0	2,545	24,372,910	Aluminum oxide, Asbestos (land)
3	ASARCO Inc.	East Helena, MT		33	21,274,271	0	0	21,274,271	Zinc and compounds (land)
4	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	19,923,810	0	0	19,923,810	Chlorine (air)
5	Rineco	Benton, AR		495/738	32,396	0	18,037,462	18,069,858	Xylenes, Toluene, Methyl ethyl ketone, Methanol (transfers to energy recovery)
6	Pharmacia & Upjohn Co., Pharmacia Corp.	Kalamazoo, MI		28	284,146	0	17,680,009	17,964,155	Methanol, Toluene (transfers to energy recovery), Dichloromethane (transfers to treatment)
7	AK Steel Corp., Butler Works (Rte. 8 S)	Butler, PA		33	14,272,635	3,007,721	107	17,280,463	Nitric acid and nitrate compounds (water)
8	ASARCO Inc., Ray Complex/ Hayden Smelter & Concentrator, Grupo México S.A. de C.V.	Hayden, AZ		33	16,094,206	969,285	0	17,063,491	Copper/Zinc and compounds (land)
9	Solutia Inc.	Cantonment, FL		28	15,652,331	50,746	0	15,703,077	Nitric acid and nitrate compounds (UIJ)
10	Petro-Chem Processing Group/ Solvent Distillers Group, Nortru Inc.	Detroit, MI		495/738	294	0	14,732,869	14,733,163	Toluene, Xylenes, Methanol, Methyl isobutyl ketone, Methyl ethyl ketone (transfers to energy recovery)
11	Pfizer Inc., Parke-Davis Div.	Holland, MI		28	831,937	268,435	12,535,603	13,635,975	Methanol, Toluene (transfers to energy recovery)
12	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13,540,659	0	0	13,540,659	Zinc and compounds (transfers of metals to disposal)
13	Karmax Heavy Stamping, Cosma International Inc.	Milton, ON	32	34	300	13,490,000	0	13,490,300	Zinc/Manganese and compounds (transfers to recycling)
14	Marisol Inc.	Middlesex, NJ		495/738	108,507	0	11,905,410	12,013,916	Toluene, Xylenes, Methanol, Methyl ethyl ketone (transfers to energy recovery)
15	Safety-Kleen Sys. Inc.	Smithfield, KY		495/738	15,107	0	11,984,962	12,000,069	Cyclohexane, Xylenes, Toluene, Methyl ethyl ketone (transfers to energy recovery)
	Subtotal				**150,907,661**	**17,786,202**	**86,878,971**	**255,572,834**	
	% of Total				***9***	***2***	***14***	***8***	
	Total				**1,633,350**	**1,055,985,045**	**624,894,030**	**3,314,229,305**	

Note: *Canada and US data only. Mexico data not available for 2000. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements. UIJ=underground injection.*

TABLE 6. THE 15 NORTH AMERICAN FACILITIES with the largest total reported releases, 2000

(2000 Matched Chemicals and Industries)

RANK	FACILITY	CITY, STATE/ PROVINCE	SIC CODES CANADA	SIC CODES US	NUMBER OF FORMS	TOTAL ON-SITE RELEASES	TOTAL OFF-SITE RELEASES kg	TOTAL REPORTED RELEASES ON- AND OFF-SITE kg	MAJOR CHEMICALS REPORTED (PRIMARY MEDIA/TRANSFERS) (CHEMICALS ACCOUNTING FOR MORE THAN 70% OF TOTAL RELEASES FROM THE FACILITY) kg
1	Kennecott Utah Copper Smelter & Refy., Kennecott Holdings Corp.	Magna, UT		33	18	24,470,780	35,919	24,506,699	Copper/Arsenic/Zinc and compounds (land)
2	Chemical Waste Management of the Northwest Inc., Waste Management Inc.	Arlington, OR		495/738	55	24,369,891	474	24,370,365	Aluminum oxide, Asbestos (land)
3	ASARCO Inc.	East Helena, MT		33	11	18,838,422	2,435,849	21,274,271	Zinc and compounds (land)
4	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT		33	2	19,923,810	0	19,923,810	Chlorine (air)
5	ASARCO Inc., Ray Complex/ Hayden Smelter & Concentrator, Grupo México S.A. de C.V.	Hayden, AZ		33	12	16,094,049	156	16,094,206	Copper and compounds, Zinc and compounds (land)
6	Solutia Inc.	Cantonment, FL		28	22	15,650,319	2,012	15,652,331	Nitric acid and nitrate compounds (UIJ)
7	AK Steel Corp., Butler Works (Rte. 8 S)	Butler, PA		33	13	14,205,761	66,874	14,272,635	Nitric acid and nitrate compounds (water)
8	Zinc Corp. of America Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	13	421,465	13,119,194	13,540,659	Zinc and compounds (transfers of metals)
9	BASF Corp.	Freeport, TX		28	30	10,998,654	35,243	11,033,897	Nitric acid and nitrate compounds (water)
10	Chemical Waste Management Inc., Waste Management Inc.	Kettleman City, CA		495/738	18	9,471,121	2,203	9,473,324	Asbestos, Aluminum oxide, Lead/Zinc and compounds (land)
11	Steel Dynamics Inc.	Butler, IN		33	8	13,713	9,178,259	9,191,972	Zinc and compounds (transfers of metals)
12	Chemical Waste Management, Waste Management Inc.	Emelle, AL		495/738	22	8,981,955	174,060	9,156,015	Copper and compounds, Zinc and compounds (land)
13	CP&L Roxboro Steam Electric Plant, Progress Energy	Semora, NC		491/493	13	9,146,056	49	9,146,105	Hydrochloric acid (air)
14	Reliant Energies Inc., Keystone Power Plant	Shelocta, PA		491/493	11	8,543,414	0	8,543,414	Hydrochloric acid (air)
15	Peoria Disposal Co. #1, Coulter Cos. Inc.	Peoria, IL		495/738	9	8,457,437	2	8,457,439	Zinc and compounds (land)
	Subtotal				**257**	**189,586,847**	**25,050,293**	**214,637,140**	
	% of Total				***0.3***	***14***	***9***	***13***	
	Total				**76,679**	**1,358,445,770**	**274,904,461**	**1,633,350,231**	

Note: *Canada and US data only. Mexico data not available for 2000. The data are estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of human exposure or environmental impact. The rankings are not meant to imply that a facility, state or province is not meeting its legal requirements.*
UIJ=underground injection.

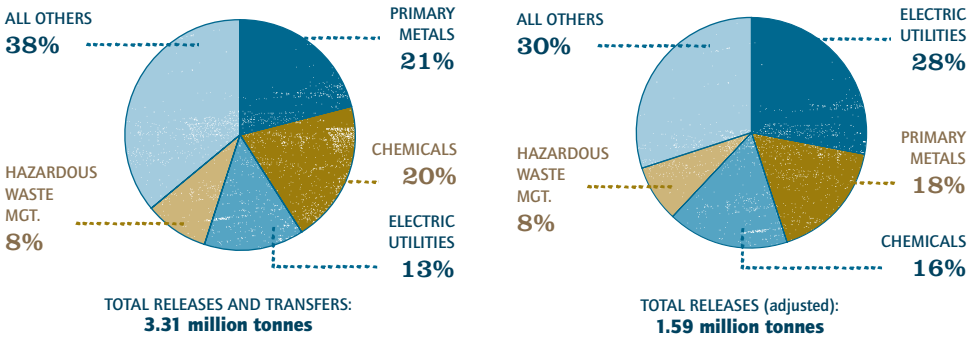
Which industry sectors reported the largest amounts in North America in 2000?

Many different types of industry sectors report to TRI and NPRI. Of these, four industries—primary metals, chemical manufacturing, electric utilities, and hazardous waste management/solvent recovery—accounted for almost two-thirds of total releases and transfers in North America in 2000 (Figure 6).

These same four industries released the largest amounts as well, accounting for 70 percent of total releases. However, electric utilities reported the largest releases, while the primary metals sector reported the largest total releases and transfers.

FIGURE 6. CONTRIBUTION OF NPRI AND TRI TOP INDUSTRY sectors to total reported amounts of releases and transfers and total releases, 2000

(2000 Matched Chemicals and Industries)



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

1998–2000 Results

Taking Stock has the opportunity to analyze changes in releases and transfers over time. The data in this section have been consistently reported over the 1998–2000 period and include:

- 159 chemicals; and
- manufacturing facilities, electric utilities, hazardous waste management facilities, chemical wholesalers, and coal mines.

This data set is different from the 2000 data set, which analyzes an expanded set of 206 chemicals. The additional chemicals for the 2000 data set were added to NPRI for the 1999 reporting year, or their reporting definition has changed since 1998.

OVERALL changes

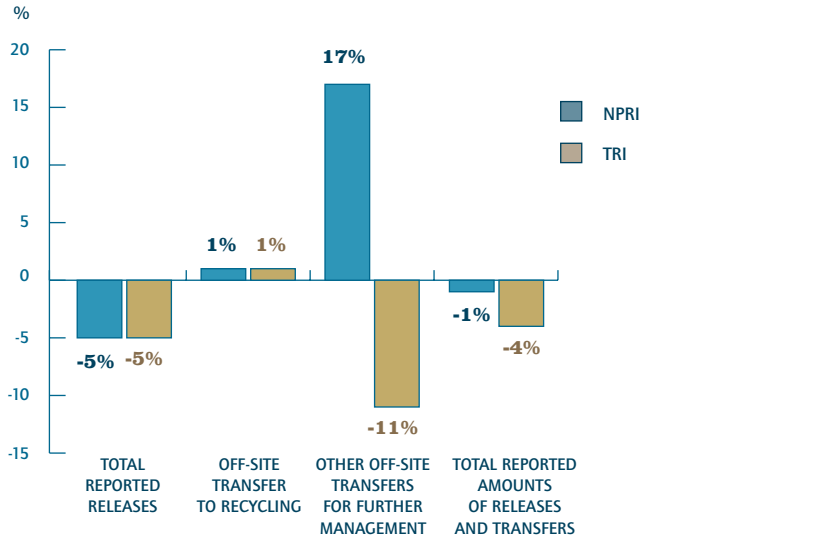
What has changed from 1998 to 2000?

In general, total releases and transfers in North America decreased by 4 percent from 1998 to 2000, with total releases decreasing 5 percent, transfers to recycling increasing by less than 1 percent and other transfers for further management decreasing by 9 percent (Table 7).

Total reported amounts of releases and transfers decreased by less than 1 percent for NPRI and by 4 percent for TRI. For both NPRI and TRI, total releases decreased by 5 percent and transfers to recycling increased by less than 1 percent (Figure 7). However, off-site transfers for further management, which are transfers to energy recovery, treatment and sewage, decreased by 11 percent for TRI but increased by 17 percent for NPRI.

FIGURE 7. PERCENT CHANGE IN RELEASES AND TRANSFERS, NPRI and TRI, 1998–2000

(1998–2000 Matched Chemicals and Industries)



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

TABLE 7. SUMMARY OF TOTAL REPORTED AMOUNTS OF RELEASES AND TRANSFERS in North America, 1998–2000

(1998–2000 Matched Chemicals and Industries)

	NORTH AMERICA				NPRI				TRI			
	1998 number	2000 number	CHANGE 1998–2000 number	%	1998 number	2000 number	CHANGE 1998–2000 number	%	1998 number	2000 number	CHANGE 1998–2000 number	%
Total Facilities	21,776	21,335	-441	-2	1,511	1,664	153	10	20,265	19,671	-594	-3
Total Forms	71,837	70,982	-855	-1	5,072	5,757	685	14	66,765	65,225	-1,540	-2
	tonnes	tonnes	tonnes	%	tonnes	tonnes	tonnes	%	tonnes	tonnes	tonnes	%
Total Reported Releases On- and Off-site	**1,658,259**	**1,577,852**	**-80,407**	**-5**	**156,518**	**148,655**	**-7,863**	**-5**	**1,501,741**	**1,429,197**	**-72,544**	**-5**
On-site Releases	1,380,914	1,304,676	-76,238	-6	105,129	117,421	12,291	12	1,275,785	1,187,256	-88,529	-7
Off-site Releases*	277,345	273,175	-4,170	-2	51,389	31,234	-20,155	-39	225,957	241,941	15,985	7
Off-site Transfers for Further Management												
Off-site Transfers to Recycling	1,033,665	1,042,426	8,762	0.8	124,283	125,322	1,040	0.8	909,382	917,104	7,722	0.8
Other Off-site Transfers for Further Management**	652,016	590,923	-61,093	-9	28,113	33,002	4,890	17	623,903	557,921	-65,983	-11
Total Reported Amounts of Releases and Transfers	**3,343,940**	**3,211,201**	**-132,739**	**-4**	**308,913**	**306,979**	**-1,934**	**-0.6**	**3,035,027**	**2,904,222**	**-130,805**	**-4**

Note: *Canada and US data only. Mexico data not available for 1998–2000. Data include 159 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities which involve these chemicals.*

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

*** Includes transfers to energy recovery, treatment, and sewage for all chemicals except metals and metal compounds.*

Changes in releases from 1998 to 2000 were different for TRI and NPRI

The changes in releases for NPRI and TRI differed in important respects. Major shifts occurred in releases on- and off-site in both TRI and NPRI. Total releases (adjusted)[1] decreased by 10 percent in NPRI and by 4 percent in TRI (Figure 8). However, for NPRI the reductions occurred in off-site releases while on-site releases increased by 12 percent. Both on-site air emissions and on-site land releases increased by more than 4,000 tonnes in NPRI from 1998 to 2000. The opposite was true for TRI, where on-site releases (particularly air and land releases) decreased and off-site releases increased (Table 8).

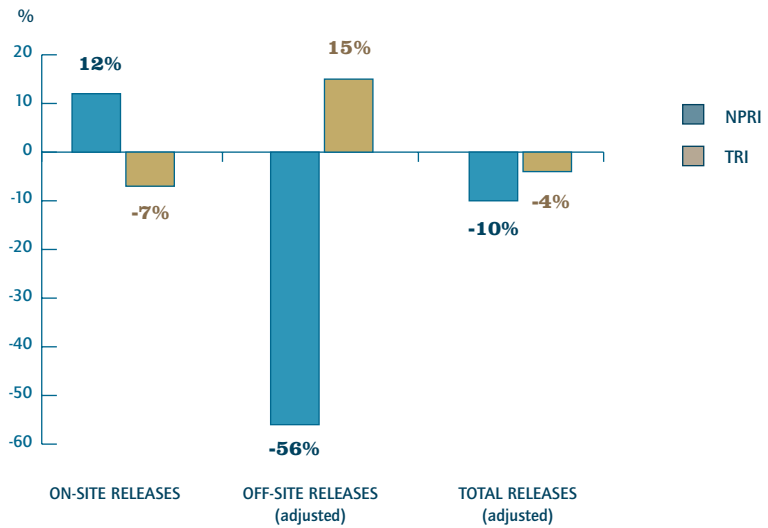
A few facilities in North America had large changes in on-site air releases. The five facilities with the largest increases and the five with the largest decreases were all electric utilities except for one primary metals facility (Table 9). Half of the increase of 6,000 tonnes in air releases in NPRI can be accounted for by one facility, Ontario Power Generation's Nanticoke Generating Station, which reported an increase of almost 3,000 tonnes. The primary metals facility Magnesium Corp. of America in Rowley, Utah, reported a decrease of 6,000 tonnes in air releases in TRI. The other eight facilities in North America with the largest change (both increases and decreases) were electric utilities located in the US.

The large increase in on-site land disposal in NPRI is due to one facility, Safety-Kleen's Lambton facility in Corunna, Ontario, which reported an increase of 7,000 tonnes from 1998 to 2000, primarily of the metal zinc and its compounds. Off-site disposal of metals in NPRI, however, decreased by 16,500 tonnes, or 40 percent, largely due to three facilities that were among the five in North America with the largest decreases in off-site disposal of metals (Table 10). Two were hazardous waste management facilities owned by Philip Services and located in Hamilton, Ontario, and one was a primary metals facility, Co-Steel Lasco in Whitby, Ontario. These three facilities accounted for almost 17,000 tonnes of reductions.

The four facilities with the largest increases in off-site disposal of metals were TRI primary metals or fabricated metals facilities. These four accounted for 16,000 tonnes of increases.

[1] *"Adjusted" releases are total releases minus off-site releases also reported as on-site releases at another TRI or NPRI facility.*

FIGURE 8. CHANGE IN RELEASES ON- AND OFF-SITE (adjusted)
NPRI and TRI, 1998–2000
(1998–2000 Matched Chemicals and Industries)



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

TABLE 8. RELEASES ON- AND OFF-SITE in North America, 1998–2000

(1998–2000 Matched Chemicals and Industries)

	NORTH AMERICA				NPRI*				TRI			
	1998 tonnes	2000 tonnes	CHANGE 1998–2000 tonnes	%	1998 tonnes	2000 tonnes	CHANGE 1998–2000 tonnes	%	1998 tonnes	2000 tonnes	CHANGE 1998–2000 tonnes	%
On-site Releases	**1,380,914**	**1,304,676**	**-76,238**	**-6**	**105,129**	**117,421**	**12,291**	**12**	**1,275,785**	**1,187,256**	**-88,529**	**-7**
Air	872,134	814,925	-57,209	-7	81,623	87,591	5,969	7	790,512	727,334	-63,178	-8
Surface Water	111,340	118,964	7,623	7	4,841	6,605	1,764	36	106,499	112,359	5,860	6
Underground Injection	85,676	88,754	3,078	4	3,700	3,569	-132	-4	81,975	85,185	3,210	4
Land	311,638	281,926	-29,712	-10	14,840	19,549	4,709	32	296,798	262,378	-34,421	-12
Off-site Releases	**277,345**	**273,175**	**-4,170**	**-2**	**51,389**	**31,234**	**-20,155**	**-39**	**225,957**	**241,941**	**15,985**	**7**
Transfers to Disposal (except metals)	32,734	37,006	4,272	13	9,283	5,838	-3,445	-37	23,451	31,168	7,716	33
Transfers of Metals**	244,611	236,170	-8,442	-3	42,106	25,396	-16,710	-40	202,505	210,774	8,269	4
Total Reported Releases On- and Off-site	**1,658,259**	**1,577,852**	**-80,407**	**-5**	**156,518**	**148,655**	**-7,863**	**-5**	**1,501,741**	**1,429,197**	**-72,544**	**-5**
Transfers Omitted for Adjustment Analysis***	(50,733)	(48,146)	--	--	(1,110)	(8,886)	--	--	(49,622)	(39,260)	--	--
Total Releases On- and Off-site (adjusted)* **	**1,607,526**	**1,529,705**	**-77,821**	**-5**	**155,407**	**139,768**	**-15,639**	**-10**	**1,452,119**	**1,389,937**	**-62,182**	**-4**

Note: Canada and US data only. Mexico data not available for 1998–2000. Data include 159 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities that involve these chemicals.

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

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

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

TABLE 9. THE NORTH AMERICAN FACILITIES
with the largest change in on-site air releases, 1998–2000 *(1998–2000 Matched Chemicals and Industries)*

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

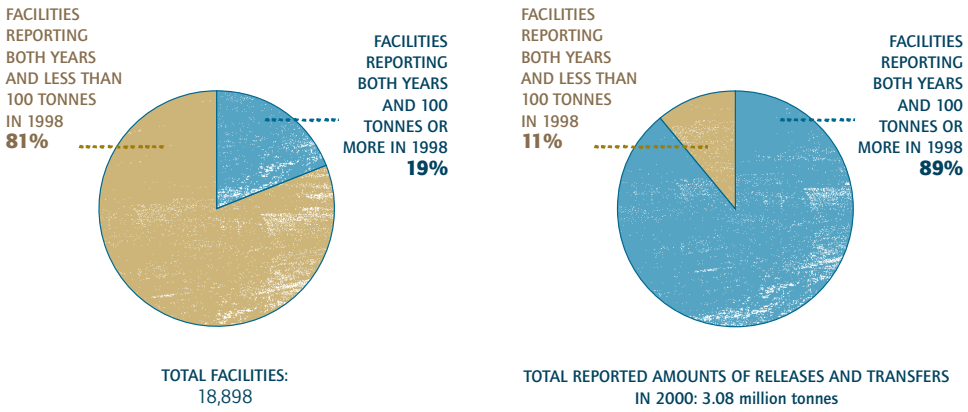
TABLE 10. THE NORTH AMERICAN FACILITIES
with the largest change in transfers of metals, 1998–2000 *(1998–2000 Matched Chemicals and Industries)*

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

TOP-REPORTING FACILITIES reported decreases while others showed overall increases

The overall changes in releases and transfers in North America are dominated by the facilities reporting the largest releases and transfers. There were approximately 3,600 facilities that reported 100 tonnes or more of releases and transfers in 1998. This group of facilities reported almost 3 million tonnes in 1998 and reductions of almost 208,000 tonnes, or 7 percent, from 1998 to 2000. They represented almost 20 percent of the facilities reporting in both 1998 and 2000, but almost 90 percent of the releases and transfers in 2000 (Figure 9).

FIGURE 9. CONTRIBUTION OF FACILITIES REPORTING less than 100 tonnes compared to facilities reporting 100 tonnes or more in 1998, total releases and transfers in North America, 1998–2000 *(1998–2000 Matched Chemicals and Industries)*



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

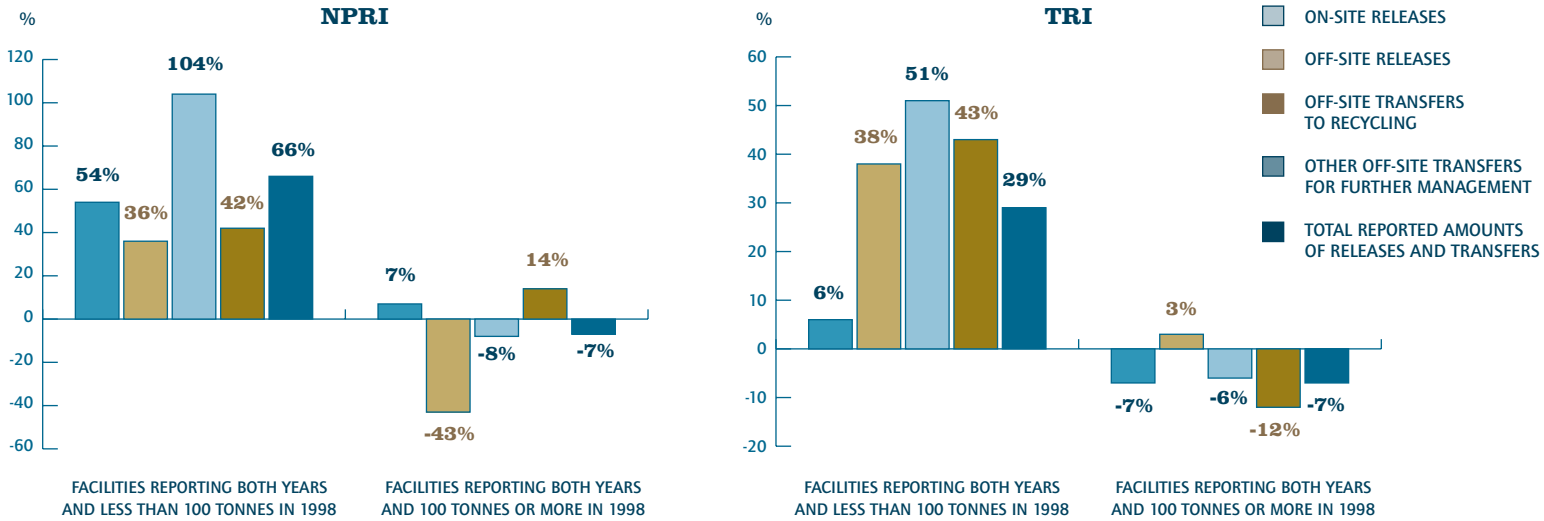
In contrast, the 15,000 facilities reporting less than 100 tonnes in 1998 showed remarkably different patterns over the period from 1998 to 2000[2]. While the group of facilities reporting 100 tonnes or more were generally decreasing their releases and transfers, the numerous facilities with less than 100 tonnes reported an increase of 32 percent, or 82,000 tonnes, from 1998 to 2000.

Indeed, the group of facilities reporting less than 100 tonnes reported increases in all types of on-site releases and off-site transfers from 1998 to 2000. For this group of facilities, on-site releases increased by 9 percent, off-site releases by 38 percent, off-site transfers to recycling by 55 percent, and other off-site transfers for further management by 43 percent. This pattern of increases was true for both NPRI and TRI (Figure 10).

The overall changes in releases and transfers within a jurisdiction, nation or sector are often dominated by changes in the group of facilities reporting the largest releases and transfers. However, the facilities reporting smaller releases and transfers also tell an important story. These much more numerous facilities, located in communities throughout Canada and the US, are increasing in every category: on-site releases, off-site releases and transfers.

[2] *Does not include 14 facilities reporting less than 100 tonnes in 1998 and greater than 1,000 tonnes in 2000.*

FIGURE 10. PERCENT CHANGE IN RELEASES AND TRANSFERS
by facilities reporting less than 100 tonnes compared to facilities reporting 100 tonnes or more in 1998, 1998–2000 *(1998–2000 Matched Chemicals and Industries)*



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

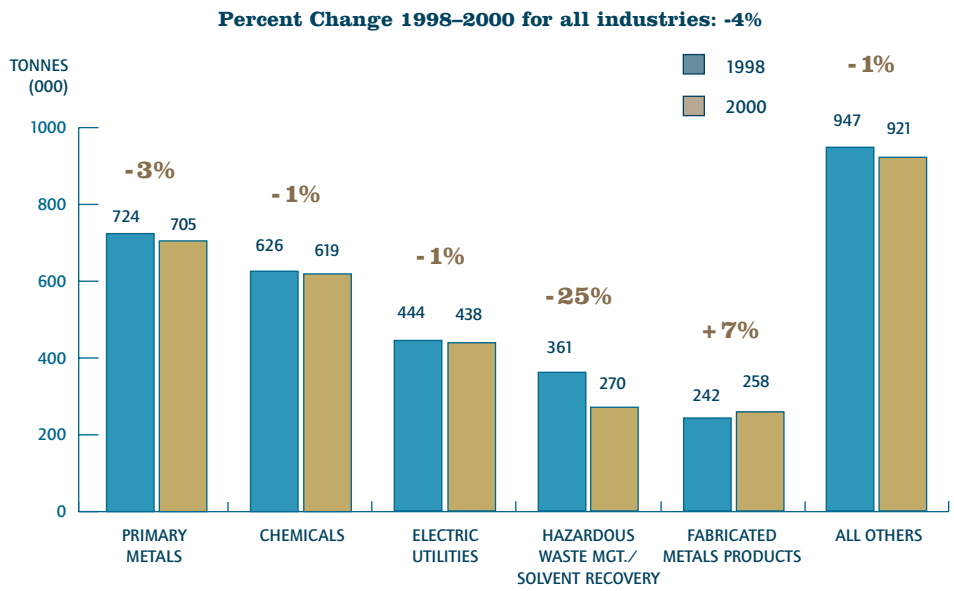
CHANGES IN INDUSTRY SECTORS
and geographic jurisdictions

Which industry sectors had the greatest changes from 1998 to 2000?

The hazardous waste management and solvent recovery sector showed the largest decrease in total reported releases and transfers from 1998 to 2000. This industry sector reported a reduction of 90,500 tonnes, or 25 percent, and had the fourth-largest total releases and transfers of any industry sector in both 1998 and 2000 (Figure 11). As noted above, several hazardous waste management facilities in Canada reported large decreases.

The fabricated metals industry reported the largest increase in total releases and transfers from 1998 to 2000, with an increase of 16,000 tonnes, or 7 percent. This industry sector reported the fifth-largest total releases and transfers in both 1998 and 2000.

FIGURE 11. CHANGE IN TOTAL REPORTED AMOUNTS
of releases and transfers in North America for industries with largest total releases and transfers, 1998–2000
(1998–2000 Matched Chemicals and Industries)



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

The three sectors with the largest total releases and transfers in both 1998 and 2000 had relatively small changes from 1998 to 2000. The primary metals sector, with the largest total releases and transfers in both years, reported a 3-percent decrease. Chemical manufacturers and electric utilities, with the second- and third-largest totals in both 1998 and 2000, reported 1-percent decreases.

Which states and provinces reported decreases in releases and transfers from 1998 to 2000?

Michigan reported the largest reduction in total releases and transfers of the matched chemicals from 1998 to 2000, a decrease of 59,000 tonnes, or 27 percent. One hazardous waste management facility in Detroit, Michigan, Petro-Chem Processing Group, reported a reduction of more than 35,000 tonnes in transfers to energy recovery.

Ohio had the second-largest reduction, a decrease of 53,500 tonnes (or 19 percent) in releases and transfers. One hazardous waste management facility, Envirosafe Services of Ohio, in Oregon, Ohio, reported a reduction of more than 15,000 tonnes in on-site land releases and another, North East Chemical Corp. in Cleveland, Ohio, reported 10,000 tonnes of transfers to energy recovery in 1998 and none in 2000.

Ohio also had the largest decreases in total reported releases, with a reduction of 27,500 tonnes, or 20 percent. Ontario reported the second-largest reduction in total releases, with a decrease of 12,500 tonnes, or 14 percent. Two hazardous waste management facilities owned by Philip Services Inc. and located in Ontario, reported reductions in transfers to disposal of almost 3,500 tonnes from 1998 to 2000.

Which states and provinces reported increases in releases and transfers from 1998 to 2000?

Arkansas reported the largest increase in total releases and transfers from 1998 to 2000, an increase of 25,500 tonnes (55 percent). One hazardous waste management facility, Rineco, in Benton, Arkansas, reported an increase of 14,500 tonnes in transfers to energy recovery.

Pennsylvania reported the second-largest increase—22,500 tonnes, or 13 percent. One fabricated metals facility, the US Mint of the US Department of the Treasury in Philadelphia, Pennsylvania, reported an increase of 9,500 tonnes in transfers to recycling due to increased production of coins.

Oregon reported the largest increase in total releases—12,500 tonnes, or 51 percent—and Alabama had the second-largest, an increase of 5,500 tonnes, or 10 percent.

IF YOU WOULD LIKE TO KNOW

what facilities had the largest change in your state, use the "query builder" function on the *Taking Stock Online* web site <www.cec.org/takingstock>.

How to do it:

In **Step 1,** select Facility report.
In **Step 2,** select the years 1998 and 2000.
In **Step 3,** select Your State or Province for the geographic area,
select All for the chemical,
select All Industries for the industrial sector.
In **Step 4,** select Total Releases and Transfers.

Then click on Run the Query.

Then go to the column titled "Change from 1998–2000" and click on the arrow pointing up to get the 10 facilities with the largest decrease.

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

CHANGES IN CROSS-BORDER transfers

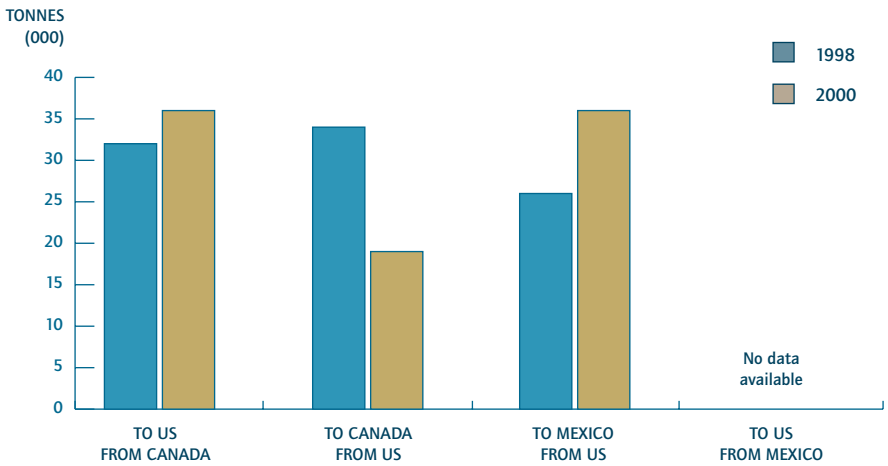
Chemicals may be transferred off-site for disposal, treatment, energy recovery, or recycling. Most materials are transferred to sites within state and national boundaries. However, each year, some materials are sent outside the country. Cross-border transfers between the US and Canada changed considerably from 1998 to 2000. Increases in transfers to the US from Canada and decreases in transfers from the US to Canada resulted in Canada becoming a net exporter to the US.

Cross-border transfers to the US from Canada increased by 12 percent from 1998 to 2000

The amount of transfers for disposal, recycling, energy recovery, and treatment sent to the US from Canada increased by 4,000 tonnes, or 12 percent, from 1998 to 2000 (Figure 12). These increases included a 5,500-tonne increase (25 percent) in transfers of metals and metal compounds for recycling. Three sites in Pennsylvania, Michigan and Ohio each received transfers from Canadian facilities of over 1,000 tonnes in 2000 whereas in 1998, they received no such cross-border transfers.

FIGURE 12. CHANGE IN OFF-SITE TRANSFERS to/from Canada, US and Mexico, 1998–2000

(1998–2000 Matched Chemicals and Industries)



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

Cross border transfers to Canada from the US decreased by 43 percent from 1998 to 2000

The amount of transfers for disposal, treatment, energy recovery, and recycling sent to Canada from the US decreased by 14,500 tonnes, or 43 percent, from 1998 to 2000 (Figure 12). Transfers of metals for recycling decreased by 10,500 tonnes, a 42-percent decrease, and transfers to treatment of substances other than metals decreased by 2,000 tonnes, or 58 percent. One site in Hamilton, Ontario, experienced a decrease of 7,000 tonnes from 1998 to 2000 in cross-border transfers from US facilities.

Cross border transfers to Mexico

On the other hand, transfers to Mexico from the US increased by 35 percent, from 26,500 tonnes to 35,500 tonnes. Taking into account transfers from the US to both Canada and Mexico, cross-border transfers to other North American countries from the US decreased by 5,500 tonnes from 1998 to 2000. Canadian facilities did not report any transfers to Mexico. Data on the amount of transfers to the US or Canada from Mexico are not available for the years 1998–2000.

Six year trends: 1995–2000 results

Taking Stock 2000 has a unique opportunity to analyze trends in releases and transfers of chemicals in North America over the six years, from 1995 to 2000. The data in this section have been consistently reported over this six-year period and include:

- 159 chemicals,
- manufacturing industries, and
- on- and off-site releases and transfers to treatment and sewage.

TABLE 11. RELEASES AND TRANSFERS in North America, 1995–2000

(1995–2000 Matched Chemicals and Industries)

	NORTH AMERICA				NPRI				TRI			
	1995 number	2000 number	CHANGE 1995–2000 number	%	1995 number	2000 number	CHANGE 1995–2000 number	%	1995 number	2000 number	CHANGE 1995–2000 number	%
Total Facilities	20,805	19,982	-823	-4	1,250	1,585	335	27	19,555	18,398	-1157	-6
Total Forms	63,746	62,302	-1,444	-2	4,004	5,321	1,317	33	59,742	56,982	-2,760	-5
	tonnes	tonnes	tonnes	%	tonnes	tonnes	tonnes	%	tonnes	tonnes	tonnes	%
Total Releases On- and Off-site	**1,104,238**	**1,012,562**	**-91,675**	**-8**	**120,971**	**116,351**	**-4,620**	**-4**	**983,267**	**896,211**	**-87,055**	**-9**
On-site Releases	937,151	776,243	-160,909	-17	95,318	92,558	-2,760	-3	841,834	683,685	-158,149	-19
Off-site Releases	167,087	236,320	69,233	41	25,653	23,794	-1,860	-7	141,433	212,526	71,093	50
Total Transfers Off-site for Further Management	**209,652**	**240,233**	**30,581**	**15**	**10,099**	**15,065**	**4,966**	**49**	**199,553**	**225,168**	**25,615**	**13**
Total Releases and Transfers	**1,313,890**	**1,252,795**	**-61,095**	**-5**	**131,070**	**131,416**	**346**	**0.3**	**1,182,819**	**1,121,379**	**-61,440**	**-5**

Note: Canada and US data only. Mexico data not available for 1995–2000. Data include 159 chemicals common to both NPRI and TRI lists from selected industrial and other sources. The data reflect estimates of releases and transfers of chemicals, not exposures of the public to those chemicals. The data, in combination with other information, can be used as a starting point in evaluating exposures that may result from releases and other management activities that involve these chemicals.

This section differs from the previous sections of 2000 and 1998–2000 data in that it includes neither the chemicals and industry sectors added to NPRI or TRI since 1995 nor transfers to recycling and energy recovery.

Given the diversity of industries reporting, the large number of facilities and the length of time, it is surprising how little the total amounts of releases and transfers of chemicals changed over the six years from 1995 to 2000 in North America. Over that six-year period, total releases and transfers increased slightly and then decreased slightly; the overall trend was a slight decrease of 5 percent. Total releases and transfers of the matched chemicals were 1.31 million tonnes in 1995 and 1.25 million tonnes in 2000 (Table 11). However, within this slight overall change there were substantial changes within the countries and for the different media and transfers.

What are some of the most notable **TRENDS OVER THE SIX YEARS** from 1995 to 2000?

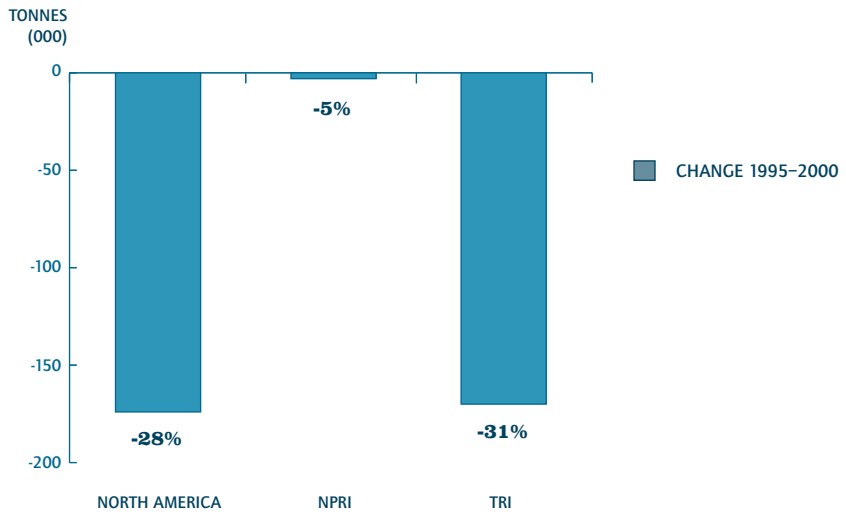
On-site air releases decreased by 28 percent from 1995 to 2000, primarily in the US

On-site air releases decreased by 28 percent from 1995 to 2000. However, for NPRI the decrease was 5 percent and for TRI the decrease was 31 percent (Figure 13). Three Canadian provinces were among the five jurisdictions with the largest increases in air emissions (Table 12). Five US states each reported decreases in air emissions of 9,500 tonnes or more, or 30 percent.

Most industry sectors reported overall decreases, with chemical manufacturers reporting a reduction of almost 60,500 tonnes (Table 13). Only three sectors, lumber and wood products, stone/clay/glass products, and food products, reported increases from 1998 to 2000.

FIGURE 13. CHANGE IN ON-SITE AIR RELEASES in North America, 1995–2000

(1998–2000 Matched Chemicals and Industries)



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

TABLE 12. STATES/PROVINCES WITH LARGEST CHANGE in on-site air releases, 1995–2000

(1995–2000 Matched Chemicals and Industries)

RANK	STATE/PROVINCE	ON-SITE AIR RELEASES 1995 tonnes	2000 tonnes	CHANGE 1995–2000 tonnes	%
	Largest Increase				
1	British Columbia	5,752	8,489	2,736	48
2	Manitoba	798	2,627	1,829	229
3	Florida	10,975	12,285	1,310	12
4	New Brunswick	2,107	2,752	645	31
5	Montana	1,468	2,009	541	37
	Largest Decrease				
1	Alabama	36,740	17,780	-18,959	-52
2	Texas	49,200	35,893	-13,307	-27
3	Tennessee	37,307	27,276	-10,031	-27
4	North Carolina	24,409	14,462	-9,947	-41
5	Utah	30,554	21,063	-9,491	-31

TABLE 13. INDUSTRIES WITH LARGEST CHANGE in on-site air releases, 1995–2000

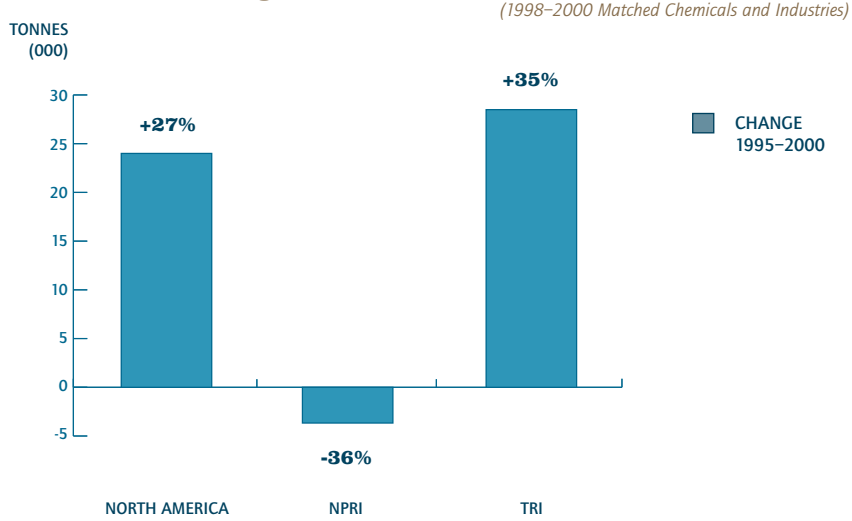
(1995–2000 Matched Chemicals and Industries)

RANK	SIC CODE US	INDUSTRY	ON-SITE AIR RELEASES 1995 tonnes	2000 tonnes	CHANGE 1995–2000 tonnes	%
		Largest Increase				
1	24	Lumber and Wood Products	15,230	17,999	2,769	18
2	32	Stone/Clay/Glass Products	9,850	11,189	1,340	14
3	20	Food Products	4,086	4,319	233	6
		Largest Decrease				
1	28	Chemicals	151,638	91,139	-60,499	-40
2	--	Multiple Codes 20–39*	44,895	24,355	-20,540	-46
3	33	Primary Metals	59,608	42,694	-16,913	-28
4	26	Paper Products	111,297	97,470	-13,827	-12
5	25	Furniture and Fixtures	18,500	6,092	-12,408	-67

** Multiple codes reported only in TRI.*

FIGURE 14. CHANGE IN ON-SITE SURFACE WATER discharges in North America, 1995–2000

(1998–2000 Matched Chemicals and Industries)



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

TABLE 14. INDUSTRIES WITH LARGEST CHANGE in on-site surface water discharges, 1995–2000

(1995–2000 Matched Chemicals and Industries)

RANK	SIC CODE US	INDUSTRY	ON-SITE SURFACE WATER DISCHARGES 1995 tonnes	2000 tonnes	CHANGE 1995–2000 tonnes	%
		Largest Increase				
1	33	Primary Metals	14,843	31,261	16,417	111
2	20	Food Products	14,903	26,019	11,116	75
3	29	Petroleum and Coal Products	3,303	8,322	5,018	152
4	Mult.	Multiple Codes 20–39*	5,882	6,483	602	10
5	21	Tobacco Products	7	254	247	3,492
		Largest Decrease				
1	26	Paper Products	16,454	12,030	-4,425	-27
2	28	Chemicals	33,320	29,653	-3,667	-11
3	34	Fabricated Metals Products	1,209	845	-364	-30
4	35	Industrial Machinery	190	22	-168	-89
5	37	Transportation Equipment	240	90	-150	-62

** Multiple codes reported only in TRI.*

On-site surface water discharges increased by 35 percent in the US but decreased by 36 percent in Canada

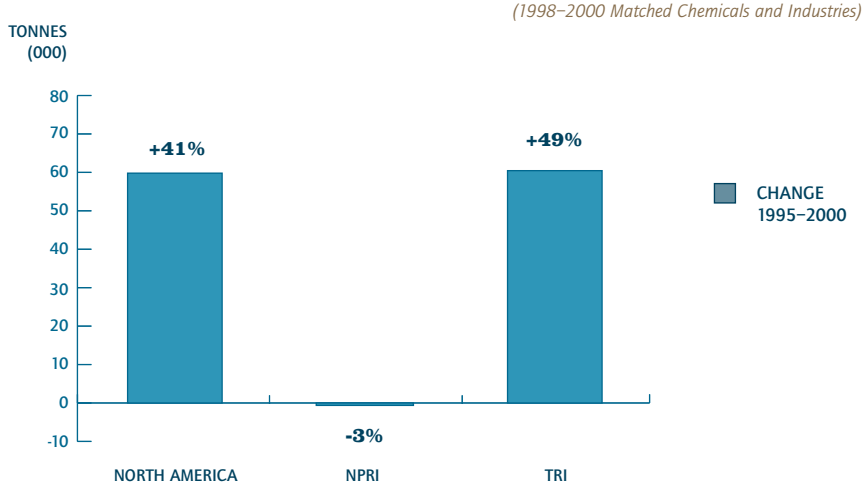
On-site surface water discharges increased from 93,000 tonnes in 1995 to 117,500 tonnes in 2000, an increase of over one-quarter. However, NPRI facilities reported an overall reduction of 36 percent while TRI facilities reported an increase of 35 percent (Figure 14). The paper products sector had the largest decreases (Table 14). Three NPRI paper products facilities accounted for the largest decreases, with each reporting reductions of 1,500 tonnes or more from 1995 to 2000 (Table 15). On the other hand, the primary metals sector reported the largest increases, with two primary metals facilities in the US reporting increases in surface water discharges of over 5,000 tonnes.

TABLE 15. THE NORTH AMERICAN FACILITIES
with the largest change in on-site surface water discharges, 1995–2000 *(1995–2000 Matched Chemicals and Industries)*

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

FIGURE 15. CHANGE IN TRANSFERS of metals in North America, 1995–2000

(1998–2000 Matched Chemicals and Industries)



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

Transfers of metals for disposal increased by 41 percent, primarily in the US

Transfers of metals for disposal increased by 60,000 tonnes, or 41 percent, from 1995 to 2000 (Figure 15). The overall increase was due to facilities in the US, which reported increases of 60,500 tonnes, or 49 percent (Table 16). Over 40 percent of the increase (26,000 tonnes) was due to just four facilities. NPRI facilities reported a decrease of 3 percent in transfers of metals. Primary metals facilities in both countries had large changes, both up and down.

TABLE 16. THE NORTH AMERICAN FACILITIES with the largest change in transfers of metals, 1995–2000

(1995–2000 Matched Chemicals and Industries)

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

Chemicals

In this *Taking Stock* report, we take a special look at chemicals, both individually and in groups. Metals and their compounds, known or suspected carcinogens, Canadian Environmental Protection Act (CEPA) toxics, California Proposition 65 chemicals, the chemical benzene, and PBTs (persistent bioaccumulative toxic chemicals) were analyzed.

Focusing on these groups calls attention to chemicals that we know can cause health effects and for which it is particularly important to achieve reductions and reduce potential exposure.

Appendices in the companion *Sourcebook* describe the uses and the health effects of the chemicals with the largest releases and transfers.

Metals and their Compounds

Over 40 percent of total releases and transfers in North America in 2000 were metals and their compounds, such as copper, zinc and lead and their compounds. Health effects of metals and their compounds vary. For example, exposure to lead can affect almost every organ and system. Children are most sensitive. Lead can cause premature births, growth deficits and mental impairment in offspring of exposed mothers. Exposure to copper dust and fumes can irritate eyes, nose and throat and may also cause "metal fume fever," with symptoms similar to flu. Repeated high exposure can affect liver, kidneys and blood. While zinc is an essential element in the human diet, prolonged ingestion of excessive levels can cause anemia, damage the pancreas, and reduce beneficial cholesterol.

Metals and their compounds comprised about 30 percent of total releases (mainly in landfills either on- or off-site) and 85 percent of transfers to recycling in 2000. Copper and its compounds were reported in the largest quantities, with 456,000 tonnes (32 percent of the total releases and transfers of metals). Total releases and transfers of metals decreased by 8 percent from 1998 to 2000, with lead and zinc and their compounds registering the largest decreases, compared with a 4-percent decrease for all matched chemicals. However, total releases on- and off-site of metals and their compounds increased by 24 percent from 1995 to 2000, compared with an 8-percent decrease for all matched chemicals.

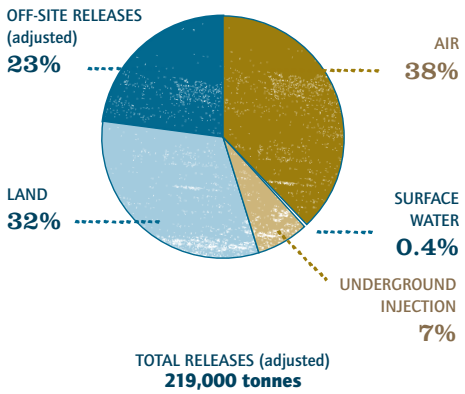
Carcinogens

In 2000, almost 220,000 tonnes, or 14 percent of total releases of known or suspected carcinogens, were released on- and off-site in North America (Figure 16). Over one-third of the designated carcinogens were released to the air, and one-third were disposed of on land on-site (mainly in landfills). Facilities in Texas and around the Great Lakes (including Ohio, Indiana and Ontario) reported more than one-quarter of total releases of designated carcinogens in 2000 (Map 3).

FIGURE 16.

ON- and OFF-SITE RELEASES in North America of known or suspected carcinogens, 2000

(2000 Matched Chemicals and Industries)



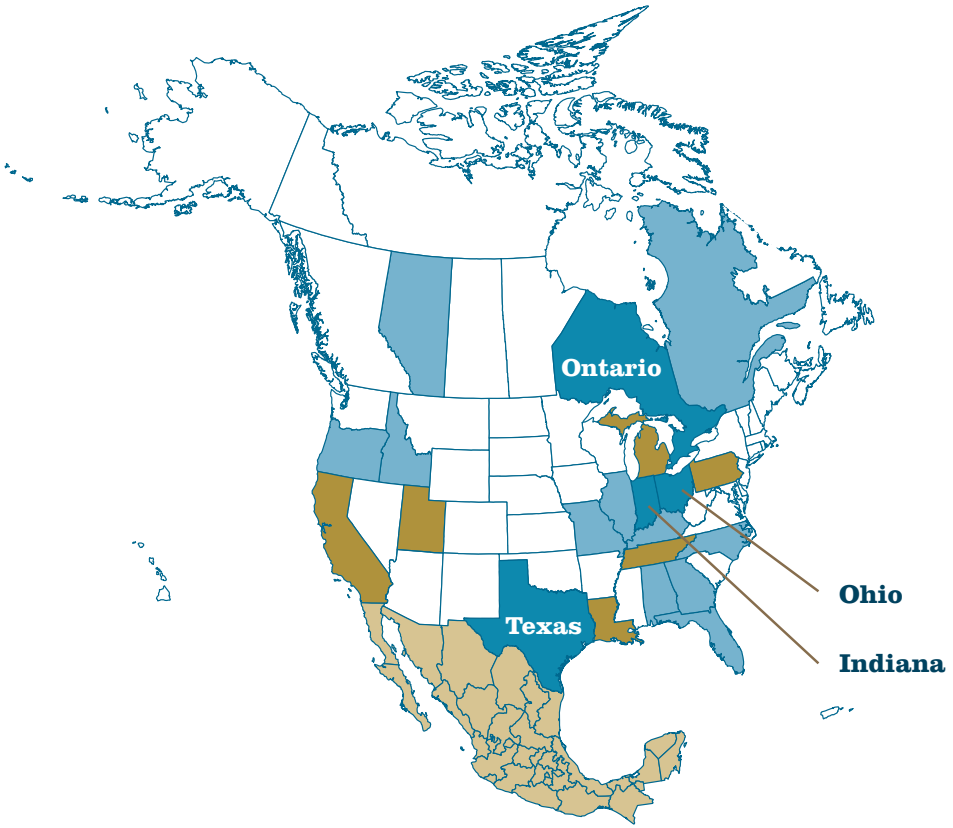
Note: Canada and US data only. Mexico data not available for 2000. A chemical (and its compounds) is included if the chemical or any of its compounds is a designated carcinogen. Carginogenic substances are those chemicals or chemical compounds listed by the International Agency for Research on Cancer (IARC) of the US National Toxicology Program (NTP).
"Adjusted" releases do not include off-site releases also reported as on-site releases by another NPRI or TRI facility.

Of the 206 chemicals in the matched data set (see listing in the **Appendix**), about one-quarter (58 chemicals) are designated known or suspected carcinogens. Of the designated carcinogens, lead and its compounds were released in the largest amounts, followed by chromium and its compounds.

Carcinogens showed a different pattern from other matched chemicals. Carcinogens were more likely to be landfilled or sent off-site for disposal and less likely to be released to air and water than other matched chemicals.

From 1995 to 2000 total releases of designated carcinogens decreased by 10 percent, a greater decrease than all matched chemicals, which decreased by 8 percent. The carcinogens with the greatest decreases were dichloromethane and trichloroethylene. Not all carcinogens showed decreases, however. Styrene had the greatest increase in releases of all carcinogens from 1995 to 2000, with an increase of 35 percent, and lead and its compounds had the second-largest increase, rising 27 percent over the six years.

MAP 3. LARGEST SOURCES OF TOTAL RELEASES (adjusted) of known or suspected carcinogens in North America, 2000: states and provinces *(2000 Matched Chemicals and Industries)*



RANGE in tonnes

- 11.8 to 20 thousand
- 7 to 11.8 thousand
- 4 to 7 thousand
- 0 to 4 thousand
- no data

EACH SHADE =one-quarter of total releases

- 4 states/provinces
- 6 states/provinces
- 11 states/provinces
- 43 states/provinces
- 32 states/provinces

California Proposition 65 Chemicals

The state of California has compiled a list of chemicals linked to cancer, birth defects and other reproductive harm, called the Proposition 65 chemicals. Total releases of these chemicals that are also in the matched data set were 254,000 tonnes, or 16 percent of total releases of all matched chemicals. Almost 45 percent of the total was released to the air at facility sites (Figure 17). Facilities in four jurisdictions (Tennessee, Texas, Ontario, and Ohio) reported more than one-quarter of all releases of Proposition 65 chemicals in 2000 (Map 4).

Toluene and lead and its compounds were the Proposition 65 chemicals with the largest releases; each had more than 37,500 tonnes of releases in 2000. Total releases of these chemicals fell by 28 percent from 1995 to 2000, greater than the decrease of 8 percent for all matched chemicals. Toluene had the largest decrease—almost 31,000 tonnes, or 42 percent.

CEPA Toxics

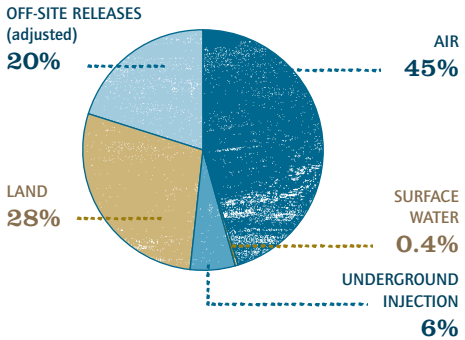
Chemicals considered toxic under the Canadian Environmental Protection Act (CEPA) accounted for 13 percent of total releases in 2000. On-site air emissions and land releases each accounted for over one-third of total releases of CEPA toxics in 2000 (Figure 18). Facilities in four jurisdictions (Ohio, Texas, Pennsylvania and Ontario) reported more than one-quarter of total releases of CEPA toxics in 2000 (Map 5).

Hydrogen fluoride and lead and its compounds were the chemicals with the largest releases, each representing about 18 percent of total releases for CEPA toxics. Total releases of CEPA toxics fell by 17 percent from 1995 to 2000, greater than the decrease of 8 percent for all matched chemicals. Dichloromethane had the largest decrease—12,500 tonnes, or 44 percent.

FIGURE 17.

ON- and OFF-SITE RELEASES in North America of California Proposition 65 chemicals, 2000

(2000 Matched Chemicals and Industries)



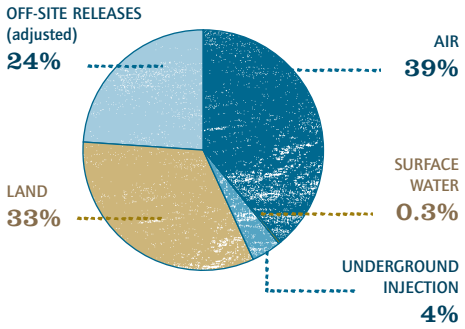
TOTAL RELEASES (adjusted):
253,800 tonnes

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

FIGURE 18.

ON- and OFF-SITE RELEASES in North America of CEPA toxics, 2000

(2000 Matched Chemicals and Industries)

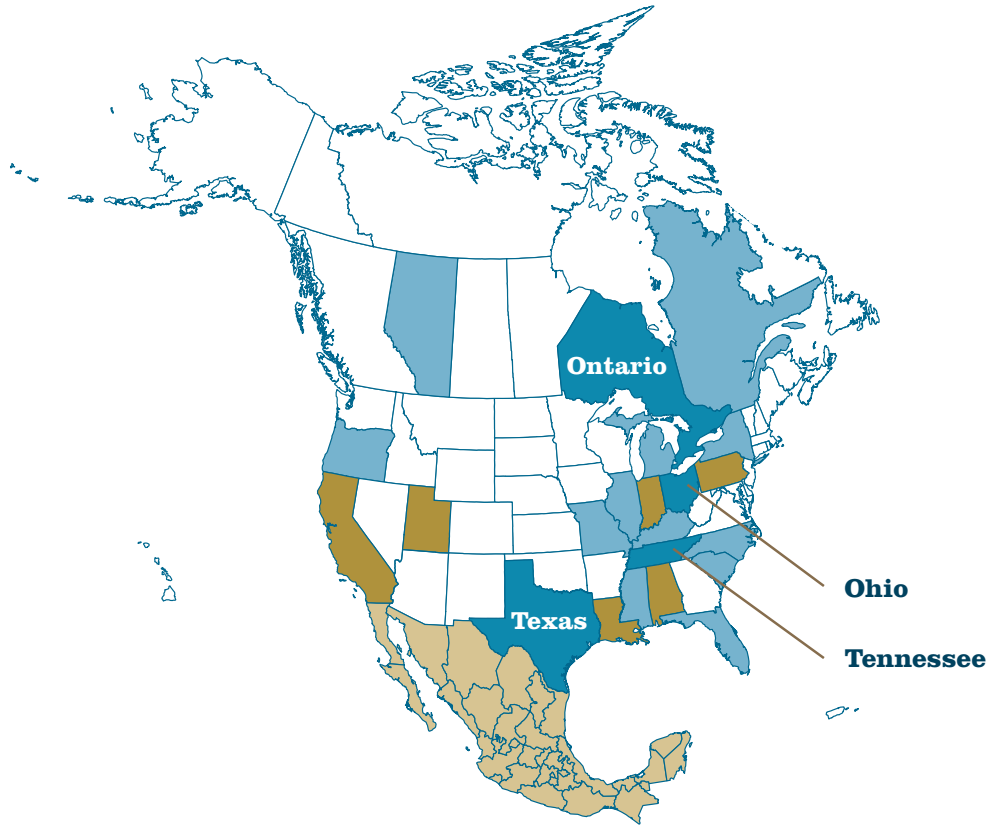


TOTAL RELEASES (adjusted):
205,000 tonnes

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

MAP 4. LARGEST SOURCES OF TOTAL RELEASES (adjusted) of California Proposition 65 chemicals in North America, 2000: states and provinces

(2000 Matched Chemicals and Industries)



RANGE
in tonnes

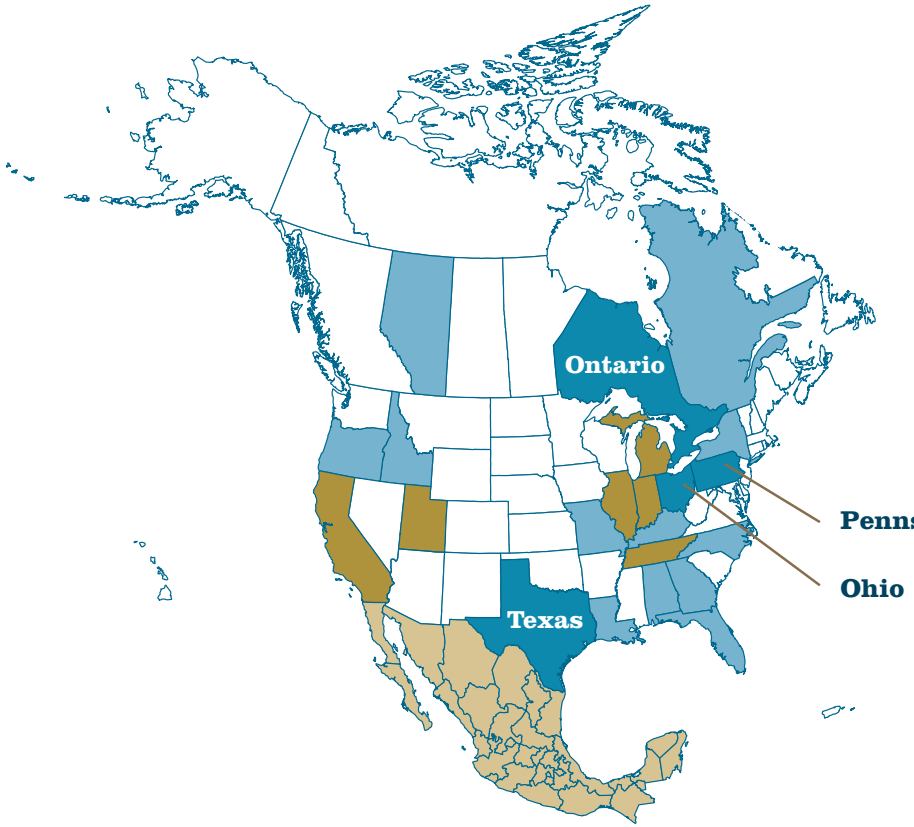
- 13 to 22 thousand
- 9 to 13 thousand
- 4.4 to 9 thousand
- 0 to 4.4 thousand
- no data

EACH SHADE
=one-quarter of total releases

- 4 states/provinces
- 6 states/provinces
- 11 states/provinces
- 43 states/provinces
- 32 states/provinces

MAP 5. LARGEST SOURCES OF TOTAL RELEASES (adjusted)
of Canadian Environmental Protection Act toxics
in North America, 2000: states and provinces

(2000 Matched Chemicals and Industries)



RANGE
in tonnes

- 11 to 17 thousand
- 6.3 to 11 thousand
- 3.9 to 6.3 thousand
- 0 to 3.9 thousand
- no data

EACH SHADE
=one-quarter of total releases

- 4 states/provinces
- 6 states/provinces
- 11 states/provinces
- 43 states/provinces
- 32 states/provinces

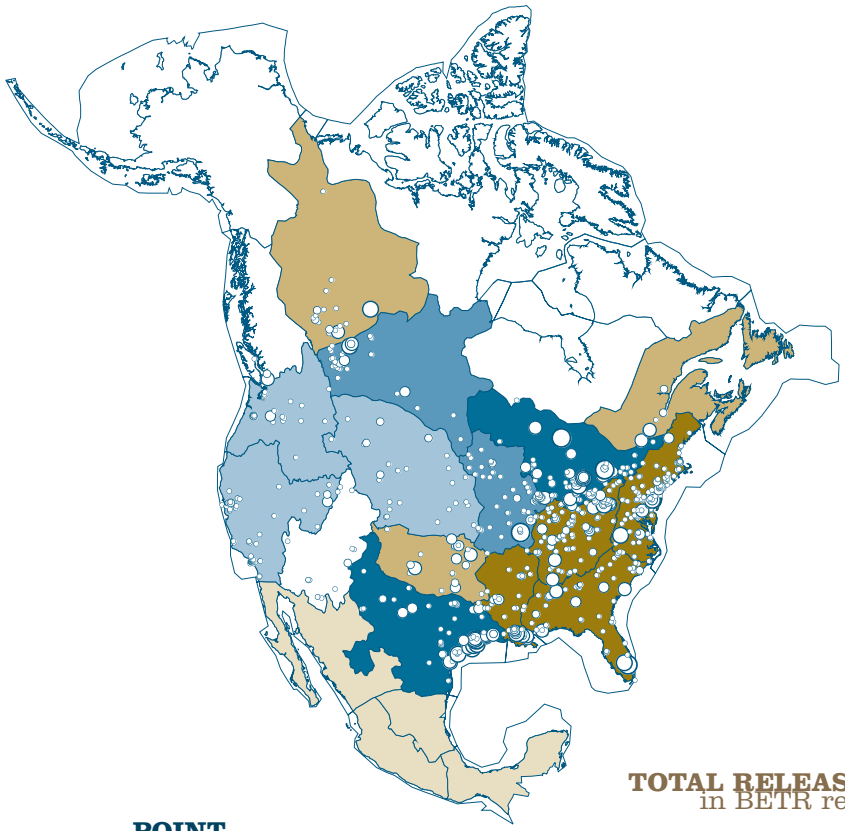
Benzene

Benzene has been reported to both NPRI and TRI since their beginnings. It is a carcinogen, developmental toxin and neurotoxin. Benzene can enter the environment from car and truck emissions, industrial sources such as refineries and chemical manufacturing, cigarette smoking, gasoline service stations, and natural sources such as forest fires. It is a "high volume" chemical, produced in excess of one million pounds (454,000 kg) annually in the US. It is used as a chemical intermediary in the production of many industrial compounds, including plastics, dyes, pharmaceuticals and pesticides. It is no longer widely used as a solvent because of its health hazards.

Benzene is a highly volatile chemical and, once in the air, can be broken down into a variety of other toxic chemicals. Most human exposure to benzene is from the air.

The matched TRI and NPRI data report that over 7,500 tonnes of benzene were released and transferred in North America in 2000. Over half of that amount was air emissions, with 18 percent transferred for energy recovery, 13 percent for treatment or to sewage, and 11 percent transferred for recycling. The profile of benzene releases and transfers, however, was different for NPRI from what it was for TRI. For NPRI, over 70 percent of all releases and transfers of benzene were air emissions, mostly fugitive air emissions. Over half of NPRI fugitive air emissions were from three Ontario steel plants. TRI facilities were more likely to transfer benzene for recycling than were NPRI facilities.

MAP 6. PRTR REPORTED BENZENE
emissions to air in 2000



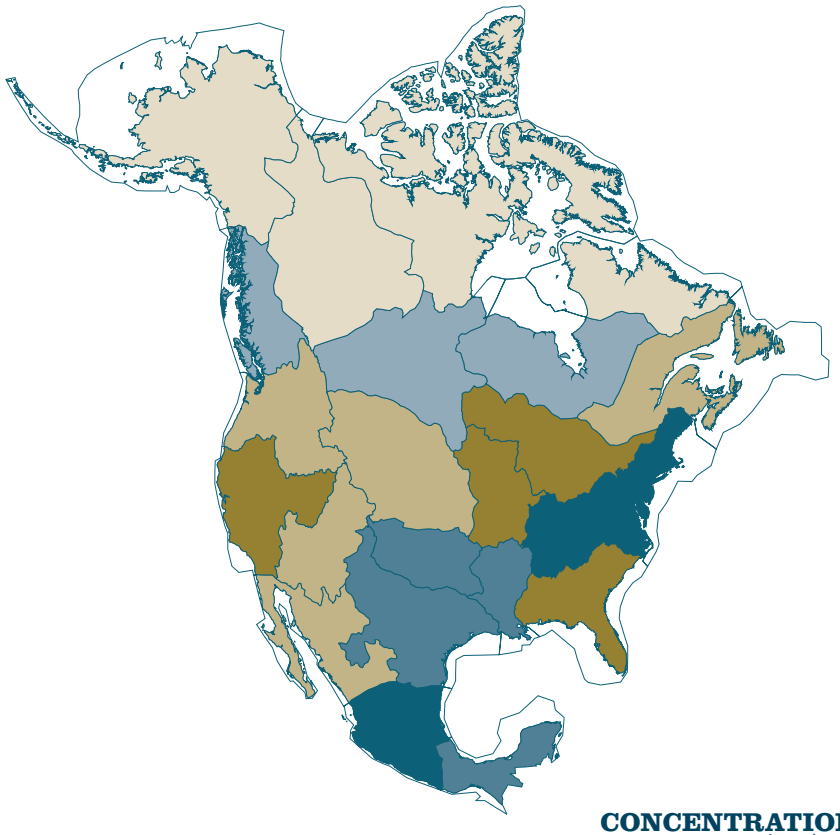
Releases and transfers of benzene from industrial manufacturing sources decreased by 34 percent from 1995 to 2000. On-site air emissions, including fugitive releases, also decreased by one-third or more.

Other sources of benzene air releases have experienced reductions as well. In Canada, average benzene levels in Canadian cities have fallen by almost half since 1989. In the US, 95 urban monitoring sites showed a drop of 47 percent in benzene levels from 1996 to 2000. These reductions may reflect reduced levels of benzene in gasoline, new car emissions standards, and new standards for benzene emitted from oil refineries and chemical processes.

Researchers from two academic institutions have developed a continental-scale computer model that incorporates PRTR and other data to map contaminant concentrations and long-range transport across North America. The Berkeley-Trent (BETR) model is the first model detailed enough to predict the fate and the movement of toxics between different regions in North America.

The model demonstrates that mobile sources account for a large amount of the background benzene concentrations across North America. The PRTR data account for a large amount of the higher benzene concentrations in many local communities. The resulting maps show the close correlation between the location of the release of benzene and higher benzene concentrations, which is expected since the volatility of benzene reduces the possibility of long-range transport (Maps 6 and 7).

MAP 7. MODELED BENZENE CONCENTRATION
in air due to PRTR and diffuse emissions



Persistent Bioaccumulative Toxic Chemicals

Many persistent bioaccumulative toxics (PBTs) were required to be reported to the North American PRTRs for the first time in 2000. These chemicals have properties that make them an environmental and health threat. Even small quantities are a concern because when PBTs are released into the environment, they persist (i.e., they do not break down easily into other compounds), meaning their exposure to humans and the environment can potentially occur over longer periods of time than with other chemicals. They can be transported in the atmosphere over long distances and end up far from the source of their release. They also bioaccumulate in the food chain, so exposure to these chemicals may arise through food consumption. They are also toxic, often causing damage to humans, plants and wildlife.

Because of reporting differences, PBTs are generally not in the matched data set. Nevertheless, we have taken a look at what information is available and what the impacts of the reporting differences are as part of the continuing effort to work for changes in the reporting systems that will enhance the comparability of the data.

Mercury and its Compounds

Mercury is a neuro- and reproductive toxicant. Exposure to certain forms of mercury has been associated with reduced IQ, learning and behavioral disabilities, and development delays. Given the ability of some mercury compounds to have environmental and health effects at very low levels, both TRI and NPRI lowered their reporting threshold for mercury in 2000. The threshold for reporting was lowered from approximately 10 tonnes to approximately 5 kg, giving a more complete picture of releases and transfers of mercury from industrial sources.

All three countries have developed mercury emissions inventories to help provide an overview of sources of mercury to air. In Canada the major source of air emissions of mercury is estimated to be base metal smelting; in Mexico it is gold mining and refining; and in the US it is combustion, particularly at coal-fired power plants. Each country has developed guidelines or regulations to set limits on mercury emissions from specific industrial sectors.

A major pathway of human exposure to mercury is through the food chain. Mercury in the air is deposited in water or runs off the land into water. It bioaccumulates in fish, and humans are exposed through their consumption of fish, shellfish and marine mammals. Children are also exposed to mercury in utero and from breast milk.

2000 Data for Mercury and Mercury Compounds

Based on the matched TRI and NPRI data, 1,617 facilities in North America reported on releases and transfers of mercury and its compounds in 2000. Under the less stringent threshold in 1999, 76 facilities had reported. Lowering the mercury threshold resulted in approximately twenty times more facilities reporting mercury, resulting in a greatly improved picture of mercury releases and transfers.

In North America, almost 700 tonnes of mercury and its compounds were released and transferred in 2000. Over 74 tonnes of mercury and its compounds were released into the air. Almost two-thirds of the total releases and transfers of mercury and its compounds, or 433 tonnes, were off-site releases (transfers to disposal).

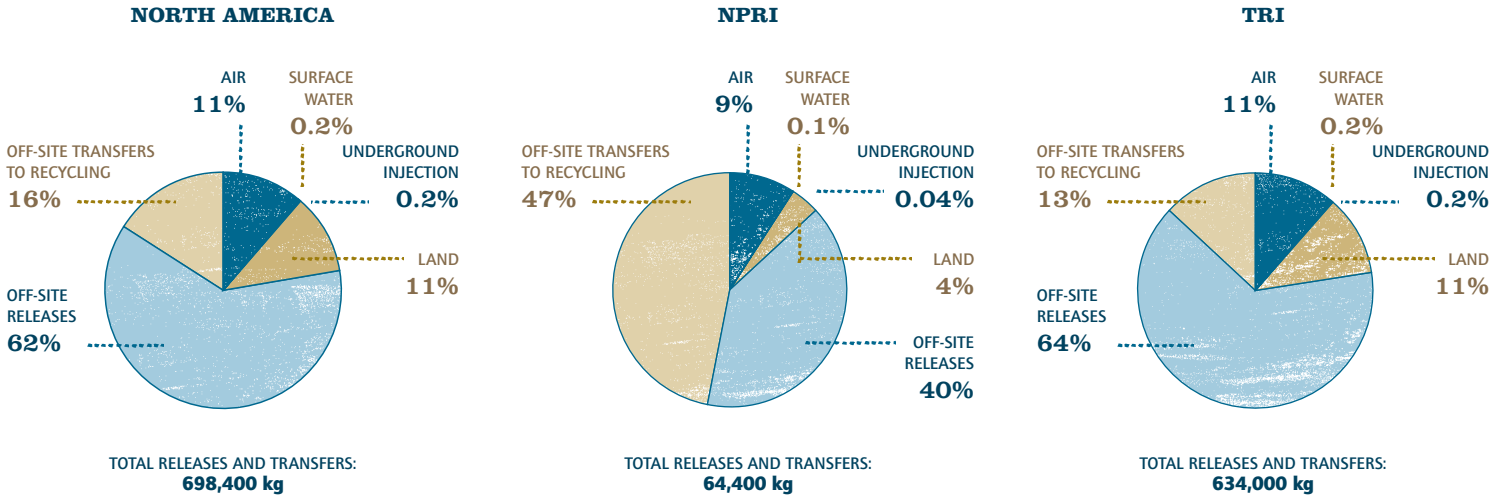
TRI and NPRI had different patterns for mercury transfers. Facilities reporting to NPRI were more likely to send mercury to recycling than TRI facilities, and less likely to send mercury off-site for disposal or dispose of mercury in on-site landfills (Figure 19). The Waste Management Inc. facility in Port Arthur, Texas, reported almost 262,000 kg of mercury compounds sent off-site for disposal (Table 17). This represented over one-third of all reported releases and transfers in 2000.

Five hazardous waste management facilities were among the top six facilities with the largest releases and transfers in 2000. As a result, the hazardous waste/solvent recovery sector had the largest releases and transfers of mercury and its compounds in 2000. Electric utilities had the largest on-site releases to air and water of mercury and its compounds.

1995–1999 Data for Mercury and Mercury Compounds

Total releases on- and off-site of mercury and its compounds decreased by 62 percent from 1995 to 1999, from 128 tonnes to 48 tonnes. However, air emissions of mercury and its compounds increased by 1 percent. This time trend is based on mercury reporting at the less stringent threshold.

FIGURE 19. RELEASES AND TRANSFERS IN NORTH AMERICA
for mercury and its compounds, NPRI and TRI, 2000
(2000 Matched Chemicals and Industries)



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

TABLE 17. FACILITIES IN US AND CANADA
with the largest total releases and transfers of mercury and its compounds, 2000

(2000 Matched Chemicals and Industries)

NORTH AMERICAN RANK	FACILITY	CITY PROVINCE/ STATE	SIC CODES CANADA	SIC CODES US	ON-SITE RELEASES AIR kg	ON-SITE RELEASES WATER kg	ON-SITE RELEASES UNDERGROUND INJECTION kg	ON-SITE RELEASES LAND kg	TOTAL ON-SITE RELEASES kg	TOTAL OFF-SITE RELEASES kg	TOTAL REPORTED RELEASES ON- AND OFF-SITE kg	TOTAL OFF-SITE TRANSFERS TO RECYCLING kg	TOTAL REPORTED AMOUNTS OF RELEASES AND TRANSFERS kg
	US												
1	Waste Management Inc.	Port Arthur, TX		495/738	391	0	0	0	391	261,555	261,946	0	261,946
2	Clean Harbors of Braintree Inc., Clean Harbors Inc.	Braintree, MA		495/738	0	0	0	0	0	26,532	26,532	17,728	44,260
3	Zinc Corp. of America, Monaca Smelter, Horsehead Inds. Inc.	Monaca, PA		33	59	0	0	0	59	24,535	24,594	0	24,594
4	Clean Harbors Services Inc., Clean Harbors Inc.	Chicago, IL		495/738	0	0	0	0	0	20,634	20,634	2,164	22,799
5	Chemical Waste Management, Waste Management Inc.	Emelle, AL		495/738	0	0	0	14,523	14,523	824	15,347	0	15,347
	CANADA												
6	Services Safety-Kleen (Québec) Ltée, Centre de transfert de Thurso	Thurso, QC	77	495/738	0	0	0	0	0	4,372	4,372	9,280	13,652
14	Ivaco Rolling Mills	L'Orignal, ON	29	33	2	0	0	0	2	6,068	6,069	251	6,320
18	Stablex Canada Inc., Centre de traitement de résidus industriels	Blainville, QC	77	495/738	0	0	0	49	49	0	49	5,000	5,049
22	GE Lighting, Canada, Oakville Lamp Plant	Oakville, ON	33	36	42	0	0	0	42	108	151	4,139	4,290
23	Safety-Kleen Ltd., Safety-Kleen (Niagara) Ltd.	Thorold, ON	49	495/738	0	0	0	0	0	283	283	3,894	4,177

Dioxins and Furans

Dioxin and furans are persistent bioaccumulative toxics. They are a family of chemicals of which some members are considered to be carcinogens or suspected to be neurotoxicants, developmental toxicants and endocrine disruptors. For more information on potential health effects of these chemicals see US EPA, *2002 Priority PBTs; Dioxins and Furans*, Office of Pollution Prevention and Toxics, Persistent, Bioaccumulative and Toxic (PBT) Program, available at <www.epa.gov/pbt/> and Scorecard, *About the Chemicals*, available at <www.scorecard.org>.

TABLE 18. TRI DIOXIN/FURAN REPORTING REQUIREMENTS

Reporting threshold: 0.1 grams
Employee threshold: 10 employees
Amounts reported in grams
Distribution of congeners also reported
Industrial activities: reporting for all activities for certain industry

US SIC CODE	INDUSTRY SECTORS REQUIRED TO REPORT	INDUSTRY SECTORS REPORTING RELEASES AND TRANSFERS, 2000
10	Metal Mining	✓
12	Coal Mining	✓
20	Food Products	✓
21	Tobacco Products	✓
22	Textile Mill Products	✓
23	Apparel and Other Textile Products	
24	Lumber and Wood Products	✓
25	Furniture and Fixtures	✓
26	Paper Products	✓
27	Printing and Publishing	
28	Chemicals	✓
29	Petroleum and Coal Products	✓
30	Rubber and Plastics Products	✓
31	Leather Products	
32	Stone/Clay/Glass Products	✓
33	Primary Metals	✓
34	Fabricated Metals Products	✓
35	Industrial Machinery	✓
36	Electronic/Electrical Equipment	✓
37	Transportation Equipment	✓
38	Measurement/Photographic Instruments	✓
39	Misc. Manufacturing Industries	
491/493	Electric Utilities	✓
495/738	Hazardous Waste Mgt./Solvent Recovery	✓
5169	Chemical Wholesalers	
5171	Petroleum Bulk Terminals	✓

Dioxins and furans can come from a number of sources, including incomplete combustion such as backyard burning, agricultural field burning, incineration, and industrial sources. All three countries have developed dioxin inventories to estimate releases of dioxins and furans from many sources. The inventories show that releases have been decreasing in recent years. Programs in all three countries have helped to reduce releases for many industrial sources of dioxins and furans.

Dioxins and furans can travel far from their source. Human exposure to dioxins and furans occurs largely through food. Dioxins and furans enter the food chain when animals eat contaminated plants or feed, or when fish consume contaminated water or food. Children can also be exposed in utero and through breast milk.

Dioxins and furans were required to be reported to NPRI and TRI for the first time in the 2000 reporting year. However, the reporting requirements differed. The PRTR data on dioxins and furans are not comparable because:

- Only certain industrial activities are required to report on dioxins and furans to NPRI. In contrast, a broader list of industrial sectors (manufacturing and related industries such as electric utilities and hazardous waste management facilities) are required to report dioxins and furans to TRI (Tables 18 and 19).
- The activities for which dioxins and furans must be reported to NPRI cover primarily the paper products industry, the primary metals industry, lumber and wood products, electric utilities, and incinerators. Municipal incinerators (listed under SIC Code Air, Water & Solid Waste Management) are not covered under TRI (Table 20).

- TRI facilities report if they meet a reporting threshold of 0.1 grams. NPRI does not have a reporting threshold for dioxins and furans; a facility conducting any of the covered activities must report. With the TRI reporting threshold of 0.1 grams, there are likely to be facilities that are not required to report to TRI but which would have had to report had they been covered by NPRI.
- Similarly, the 10-employee threshold does not apply to wood preservation and incineration under NPRI, so TRI will miss an unknown number of such facilities that would have had to report under NPRI.
- TRI and NPRI report dioxins and furans in different units that are not easily compared.

TABLE 19. NPRI DIOXIN/FURAN REPORTING REQUIREMENTS

Reporting threshold: 0 grams
Amounts reported in grams-iTEQ
Industrial activities: reporting restricted to certain activities

	PRIMARY INDUSTRY SECTORS REPORTING THESE ACTIVITIES IN 2000
Specific activities (10-employee threshold):	
Base metals smelting (copper, lead, nickel, zinc)	Metal mining, Primary metals
Smelting of secondary lead or secondary aluminum	Primary metals
Sintering process in manufacture of iron	Primary metals
Electric arc furnace in steel making and steel foundries	Primary metals
Production of magnesium	Primary metals
Manufacture of Portland cement	Stone/Clay/Glass products
Production of chlorinated organic solvents	Chemicals
Combustion of fossil fuel to produce electricity	Electric utilities, Paper products
Combustion of salt-laden logs in pulp and paper sector	Paper products
Combustion of fuel in kraft liquor boilers in pulp and paper sector	Paper products
Specific activities (No employee threshold):	
Wood preservation using pentachlorophenol	Lumber and wood products
Non-hazardous/hospital/hazardous waste/ sewage sludge incineration	Lumber and wood products, Air/Water/ Solid waste management*, Paper products, Hazardous waste management, Sewerage systems*

Note: *See Guide for Reporting to the National Pollutant Release Inventory 2000 <www.ec.gc.ca/pdb/npri/documents/Guide_2000.pdf> for complete description of activities.*
** Facilities not required to report under TRI.*

TABLE 20. FACILITIES REPORTING DIOXINS/FURANS, TRI AND NPRI, 2000

(2000 All Chemicals and Industries)

US-SIC CODE	INDUSTRY	NUMBER OF FACILITIES REPORTING TO TRI	NUMBER OF TRI FACILITIES REPORTING DIOXINS/FURANS		NUMBER OF FACILITIES REPORTING TO NPRI	NUMBER OF NPRI FACILITIES REPORTING DIOXINS/FURANS	
			NUMBER OF FACILITIES	% OF ALL FACILITIES		NUMBER OF FACILITIES	% OF ALL FACILITIES
Manufacturing Industry Sectors							
20	Food Products	1,710	24	1	129	1	0.8
21	Tobacco Products	27	2	7	0	0	0
22	Textile Mill Products	292	1	0.3	10	0	0
23	Apparel	15	0	0	3	0	0
24	Lumber and Wood Products	857	103	12	154	64	42
25	Furniture and Fixtures	324	2	0.6	23	0	0
26	Paper Products	496	164	33	140	51	36
27	Printing	202	0	0	23	0	0
28	Chemicals	3,745	135	4	445	9	2
29	Petroleum and Coal Products	550	58	11	37	0	0
30	Rubber and Plastics Products	1,888	2	0.1	175	0	0
31	Leather	75	0	0	4	0	0
32	Stone/Clay/Glass Products	757	112	15	58	14	24
33	Primary Metals	1,948	110	6	179	48	27
34	Fabricated Metals Products	2,893	1	0.0	196	3	2
35	Industrial Machinery	1,109	2	0.2	38	1	3
36	Electronic/Electrical Equipment	1,197	1	0.1	55	1	2
37	Transportation Equipment	1,302	5	0.4	122	2	2
38	Measurement/Photographic Instruments	257	1	0.4	1	0	0
39	Misc. Manufacturing Industries	302	0	0	75	2	3
--	Multiple Manufacturing Codes 20–39*	1,248	42	3	--	--	--
Other Industry Sectors							
08	Forestry Products	NA	NA		2	1	50
09	Fishing, Hunting, Trapping	NA	NA		1	1	100
10	Metal Mining**	97	10	10	59	5	8
12	Coal Mining	81	1	1	1	0	0
13	Oil and Gas Exploration	NA	NA		110	2	2
14	Nonmetallic Minerals Mining	NA	NA		15	1	7
47	Transportation Services	NA	NA		1	1	100
49	Sewerage Systems	NA	NA		86	7	8
491/493	Electric Utilities	706	465	66	43	33	77
495/738	Hazardous Waste Mgt./Solvent Recovery	215	16	7	37	6	16
50	Wholesale Durable Goods	NA	NA		28	1	4
5169	Chemical Wholesale Distributors	467	0	0	6	0	0
5171	Petroleum Bulk Terminals	566	2	0.4	1	0	0
80	Health and Allied Services	NA	NA		3	2	67
95	Air, Water, & Solid Waste Management	NA	NA		53	41	77
--	No codes 20–39***	158	11	7	--	--	--
	Total	**23,484**	**1,270**	**5**	**2,313**	**297**	**13**

NA= Not applicable (Sector not required to report).
** Multiple SIC codes reported only in TRI.*
*** Metal mining sector must report chemicals in waste rock in TRI but not in NPRI.*
**** Includes US Federal Facilities and facilities reporting no SIC code or an invalid SIC code.*

Both NPRI and TRI reporting is based on the same 17 members (congeners) of the dioxin/furan family. However, NPRI reports using a toxicity-weighted measure in grams-iTEQ, and TRI reports using a total mass of dioxins and furans reported in grams. These two units are not the same. TRI facilities also report a distribution of the17 individual congeners of the dioxin/furan family. Grams of dioxins and furans reported under TRI can be converted into grams-iTEQ, as is reported to NPRI, using this TRI distribution. For TRI facilities, the amount of each congener is multiplied by its specific toxic equivalency factor (an index number that compares the toxicity of each congener to that of the most toxic) to give an individual TEQ. These individual TEQs for each congener are then added together to give one overall number, the total TEQ for the mixture. The toxic equivalency factors (TEFs) used in NPRI are those adopted by international convention in 1989. These International TEFs have been used to calculate the grams-iTEQ for the TRI 2000 data.

This approach of converting grams into grams-iTEQ has some important limitations. Not all TRI facilities reported the congener distribution (although distributions were reported for 97 percent of the total amount in grams of dioxins and furans). Also, facilities could chose whether to report the distribution of their total releases or the distribution of their best distribution in one medium, and it is not clear from the data which type of distribution was reported. Many facilities are calculating distributions for the first time, the facilities may have very limited data to decide upon distributions, and distributions can change under different operating conditions.

TRI Reporting on Dioxins and Furans

About 5 percent of all TRI facilities reported on dioxins and furans in 2000. All TRI facilities (that is, manufacturing facilities, electric utilities, hazardous waste management facilities, metal mines, coal mines, chemicals wholesale distributors, and petroleum bulk terminals) employing more than 10 employees and meeting a reporting threshold of 0.1 grams/year are required to report on dioxins and furans (see Table 18, above). Almost 99,900 grams of dioxins and furans were released on- and off-site in 2000.

The facilities that reported distributions accounted for 97 percent of the total amount of grams reported released. The grams of releases can be converted into grams expressed as grams-iTEQ using the distributions. The total releases for dioxins and furans from these TRI facilities were calculated to be 1,098 grams-iTEQ in 2000.

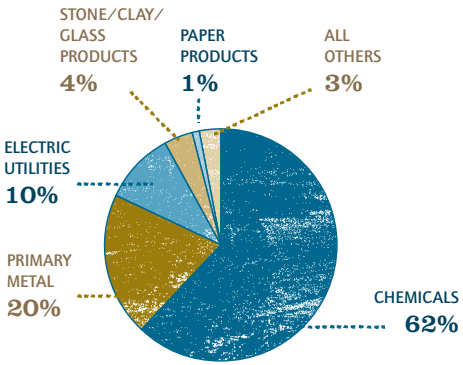
The chemical manufacturing industry had the largest total releases on- and off-site, accounting for 62 percent of total releases (grams-iTEQ). This was primarily due to inorganic pigment manufacturers, an activity that is not required to report on dioxins and furans under NPRI. Four of the ten TRI facilities with the largest total releases were inorganic pigment manufacturers (US SIC code 2816) (these pigments include the chemical titanium dioxide, used as a whitener in pigments). In all, such facilities reported over 360 grams-iTEQ, or over half of the amount reported by all chemical manufacturers (Table 21). The primary metals sector had the second-largest, accounting for 20 percent of the total releases (Figure 20). Most of this sector's total was from the secondary non-ferrous metals sector (smelting and refining of copper, zinc, nickel or lead from scrap metals). Electric utilities had the third-largest total releases of dioxins and furans, with 10 percent of the total.

FIGURE 20.

TOTAL RELEASES ON-SITE
and off-site of dioxin/furans in grams-iTEQ, by industry, TRI, 2000

(2000 All Chemicals and Industries)

Based on reporting by manufacturing and related industries required to report to TRI.



TOTAL RELEASES: **1,098 gm-iTEQ** FROM CERTAIN INDUSTRY SECTORS

Note: *Grams-iTEQ calculated from reported weight, congener distribution, and toxic equivalency factors developed by international convention adopted in 1989.*

TABLE 21. TRI FACILITIES WITH LARGEST RELEASES
on- and off-site of Dioxins/Furans (grams-iTEQ), 2000 *(2000 All Chemicals and Industries)*

RANK	FACILITY	CITY/STATE	US SIC CODES	NPRI REPORTING (BASED ON US SIC CODES	TOTAL RELEASES ON- AND OFF-SITE gm*	gm-iTEQ**
1	Oxy Vinyls L.P. LaPorte VCM Plant, Occidental Petroleum Corp.	LaPorte, TX	2812		6,384.22	162.12
2	DuPont Edgemoor	Edgemoor, DE	2816	Such a facility probably would not be required to report under NPRI reporting parameters.	38,676.09	96.30
3	Millennium Inorganic Chemicals Inc., Hawkins Point Plant, Millennium Chemicals Inc.	Baltimore, MD	2816	Such a facility probably would not be required to report under NPRI reporting parameters.	2,663.79	89.32
4	DuPont Delisle Plant	Pass Christian, MS	2816	Such a facility probably would not be required to report under NPRI reporting parameters.	19,493.17	82.70
5	DuPont Johnsonville Plant	New Johnsonville, TN	2816	Such a facility probably would not be required to report under NPRI reporting parameters.	6,100.88	71.32
6	Dow Chemical Co. Freeport	Freeport, TX	2812, 2813, 2819, 2821, 2869, 2891		4,678.06	71.08
7	Northern States Power Co.	Becker, MN	4911		724.73	68.33
8	PPG Inds. Inc.	Lake Charles, LA	2812, 2816, 2869		210.10	24.82
9	Imco Recycling Inc.	Morgantown, KY	3341		251.30	24.66
10	TXI Ops. L.P., Hunter Cement Plant, TXI Ops. L.P.	New Braunfels, TX	3241		145.51	22.79
11	City of Fremont Department of Utilities, Lon D. Wright Power	Fremont, NE	4931		429.00	19.77
12	Waupaca Fndy. Inc., Plant 5, Budd Co.	Tell City, IN	3321		106.70	18.37
13	Imco Recycling of Ohio Inc., Imco Recycling Inc.	Uhrichsville, OH	3341		167.01	16.37
14	Dow Chemical Co., Louisiana Div., Dow Chemical Co.	Plaquemine, LA	2812, 2821, 2869		1,590.56	15.71
15	Magnesium Corp. of America, Renco Group Inc.	Rowley, UT	3339		2,284.00	13.87
16	Dow Chemical Co., Midland Ops.	Midland, MI	2899, 2819, 2821, 2834, 2869, 2879		326.75	12.87
17	Wabash Alloys L.L.C., Connell L.P.	Wabash, IN	3341		130.69	12.05
18	Bethlehem Steel Corp., Sparrows Point Div., Bethlehem Steel Corp.	Sparrows Point, MD	3312, 3316		76.80	10.81
19	Southwire Co.	Carrollton, GA	3341, 3357, 3569		1,093.04	9.59
20	Bethlehem Steel Corp., Burns Harbor Div., Bethlehem Steel Corp.	Burns Harbor, IN	3312		82.20	8.95
21	Safety-Kleen (Aragonite) Inc., Safety-Kleen Corp.	Aragonite, UT	4953		19.10	8.95
22	Louisiana Pigment Co. L.P.	Westlake, LA	2816	Such a facility probably would not be required to report under NPRI reporting parameters.	349.76	8.48
23	Millennium Chemicals Ashtabula Plant 2, Millennium Chemicals Inc.	Ashtabula, OH	2816	Such a facility probably would not be required to report under NPRI reporting parameters.	160.88	7.95
24	Wabash Alloys L.L.C., Connell L.P.	Benton, AR	3341		28.68	7.65
25	Formosa Plastics Corp. Louisiana, Formosa Plastics Corp. USA	Baton Rouge, LA	2821, 2869, 2812		441.01	7.47
	Subtotal				**86,614.02**	**892.30**
	% of Total				***87***	***81***
	Total				**99,856.78**	**1,097.81**

** Grams are reported to TRI. For breakdown by medium of releases in grams see <www.epa.gov/triexplorer>.*

*** Calculation of grams-iTEQ based on distribution of dioxin/furan congeners reported to TRI and toxic equivalency factors developed by international convention adopted in 1989. Breakdown by medium of releases in grams-iTEQ not available.*

TABLE 22. NPRI FACILITIES WITH LARGEST RELEASES
on- and off-site of Dioxins/Furans (grams-iTEQ), 2000 *(2000 All Chemicals and Industries)*

RANK	FACILITY	CITY	NUMBER OF EMPLOYEES	SIC CODES CANADA	SIC CODES US	COMPARABLE TRI REPORTING	ACTIVITY REPORTED
1	Wabash Alloys	Mississauga, ON	73	2999	3341		Smelting of secondary aluminum
2	Pacifica Papers, Alberni Specialties	Port Alberni, BC	840	2712	2621		Combustion of salt-laden logs
3	Howe Sound Pulp and Paper Limited Partnership	Port Mellon, BC	588	2711	2611		Combustion of salt-laden logs, combustion of fossil fuel in a boiler unit to produce electricity, combustion of fuel in kraft liquor boilers
4	Dow Chemical Canada Incorporated	Fort Saskatchewan, AB	1,695	3711	2812		Production of chlorinated organic solvents, combustion of fossil fuel in a boiler unit to produce electricity
5	Wabash Alloys	Guelph, ON	32	2999	3341		Smelting of secondary aluminum
6	Pacifica Papers Inc.	Powell River, BC	917	2712	2621		Non-hazardous solid waste incineration, combustion of salt-laden logs, combustion of fuel in kraft liquor boilers
7	AltaSteel Ltd.	Edmonton, AB	347	2919	3312		Operation of electric arc furnace in steel manufacture
8	Skeena Cellulose Inc., Skeena Pulp Operations	Port Edward, BC	750	2711	2611		Combustion of salt-laden logs, combustion of fossil fuel in a boiler unit to produce electricity, combustion of fuel in kraft liquor boilers, non-hazardous solid waste and sewage sludge
9	Exploits Regional Services Board, Solid Waste Disposal Site	Grand Falls-Windsor, NF	3	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
10	Conception Bay North Incinerator Association	Harbour Grace, NF	5	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
11	Pope & Talbot Ltd., Harmac Pulp Operations	Nanaimo, BC	608	2711	2611		Combustion of salt-laden logs, combustion of fuel in kraft liquor boilers
12	Stelco Inc., Hilton Works	Hamilton, ON	6,800	2919	3312		Manufacture of iron using sintering process
13	Canadian Waste Services Inc., SWARU Incinerator	Hamilton, ON	38	4911	4911	Facility not required to report under TRI	Non-hazardous solid waste incineration
14	Ispat Sidbec Inc., Aciérie	Contrecoeur, QC	331	2912	3325		Operation of electric arc furnace in steel manufacture
15	Gerdau MRM Steel Inc.	Selkirk, MB	465	2919	3312		Operation of electric arc furnace in steel manufacture
16	Norske Skog Canada Mackenzie Pulp Ltd.,	Mackenzie, BC	242	2711	2611		Combustion of fuel in kraft liquor boilers
17	Norske Skog Canada Limited, Crofton Pulp and Paper	Crofton, BC	1,100	2711	2611		Combustion of salt-laden logs, combustion of fossil fuel in a boiler unit to produce electricity, combustion of fuel in kraft liquor boilers
18	Norske Skog Canada, Elk Falls Mill	Campbell River, BC	1,000	2711	2611		Combustion of salt-laden logs, combustion of fuel in kraft liquor boilers
19	Town of Wabush Incinerator	Wabush, NF	2	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
20	Selkirk Forest Products	Galloway, BC	20	2591	2491		Wood preservation using pentachlorophenol
21	Town of Marystown, Waste Disposal Site Jean de Baie	Marystown, NF	1	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
22	Ontario Power Generation Inc, Nanticoke Generating Station	Nanticoke, ON	594	4911	4911		Combustion of fossil fuel in a boiler unit to produce electricity
23	Town of Holyrood Incinerator	Holyrood, NF	1	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
24	Town of Channel–Port aux Basques Incinerator	Port aux Basques, NF	1	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
25	Town of Deer Lake Incinerator	Deer Lake, NF	1	8373	9511	Facility not required to report under TRI	Non-hazardous solid waste incineration
	Subtotal						
	% of Total						
	Total						

Note: *Grams-iTEQ are reported to NPRI and are based on toxic equivalency factors developed by international convention adopted in 1989.*

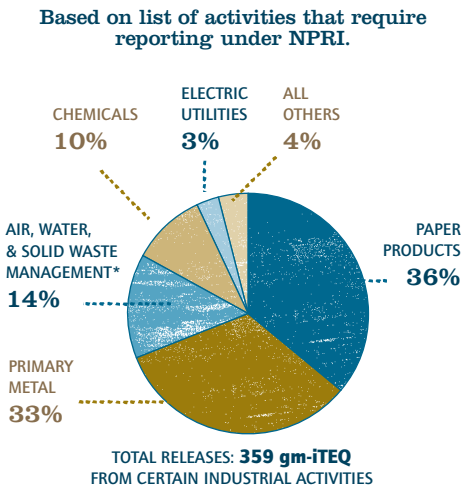
TABLE 22. (continued)

AIR (gm-iTEQ)	SURFACE WATER (gm-iTEQ)	UNDERGROUND INJECTION (gm-iTEQ)	LAND (gm-iTEQ)	TOTAL ON-SITE RELEASES (gm-iTEQ)	TOTAL OFF-SITE RELEASES (gm-iTEQ)	TOTAL RELEASES ON- AND OFF-SITE (gm-iTEQ)
2.51	0.00	0.00	0.00	2.51	51.02	53.53
0.96	0.00	0.00	0.00	0.96	39.90	40.86
1.23	0.00	0.00	35.35	36.57	0.00	36.57
0.02	0.00	18.57	16.94	35.53	0.00	35.53
1.58	0.00	0.00	0.00	1.58	23.48	25.06
0.30	0.00	0.00	0.00	0.30	19.45	19.75
0.20	0.00	0.00	5.63	5.82	4.77	10.59
9.17	0.00	0.00	0.00	9.17	0.00	9.17
8.01	0.00	0.00	0.00	8.01	0.00	8.01
7.17	0.00	0.00	0.00	7.17	0.00	7.17
0.09	0.88	0.00	5.98	6.95	0.00	6.95
6.25	0.00	0.00	0.00	6.25	0.00	6.25
5.49	0.00	0.00	0.00	5.49	0.00	5.49
3.69	0.00	0.00	1.09	4.78	0.00	4.78
0.65	0.00	0.00	3.67	4.31	0.00	4.31
0.00	0.00	0.00	4.20	4.20	0.00	4.20
0.67	0.00	0.00	3.22	3.89	0.00	3.89
0.55	0.00	0.00	3.16	3.71	0.00	3.71
3.52	0.00	0.00	0.00	3.52	0.00	3.52
0.00	0.00	0.00	0.00	0.00	3.42	3.42
3.26	0.00	0.00	0.00	3.26	0.00	3.26
0.01	0.00	0.00	3.22	3.23	0.00	3.23
2.58	0.00	0.00	0.00	2.58	0.00	2.58
2.56	0.00	0.00	0.00	2.56	0.00	2.56
2.56	0.00	0.00	0.00	2.56	0.00	2.56
63.03	**0.88**	**18.57**	**82.46**	**164.91**	**142.04**	**306.95**
61	***75***	***100***	***95***	***78***	***95***	***85***
103.92	**1.17**	**18.57**	**86.60**	**210.25**	**148.83**	**359.08**

FIGURE 21.

TOTAL RELEASES ON-SITE and off-site of dioxin/furans by industry, NPRI, 2000

(2000 All Chemicals and Industries)



Note: *Grams-iTEQ as reported are based on toxic equivalency factors developed by international convention adopted in 1989.*
**Facilities not required to report under TRI.*

NPRI Reporting on Dioxins and Furans

Only certain NPRI facilities must report on dioxins and furans based on activities or processes used at the facility (see Table 19, above). The activities include types of metal smelting, combustion of fossil fuel to generate electricity, certain combustion processes used by the pulp and paper sector, the manufacture of Portland cement, and others. All amounts are reportable for facilities employing 10 employees or more. Other activities (wood preservation and incineration) have no employee limit.

About 13 percent of all NPRI facilities reported on dioxins and furans in 2000. For the activities that are required to report dioxins and furans to NPRI, releases on- and off-site totaled 359 grams-iTEQ in 2000.

Among the activities required to report dioxins and furans in NPRI, the paper products industry reported the largest total releases on- and off-site for 2000, with 36 percent (Figure 21). Four paper products facilities were among the ten NPRI facilities with the largest total releases (Table 22). The primary metals sector reported the second-largest amount of total releases of dioxins and furans, with 33 percent of the total. Municipal waste incinerators, which are not required to report to TRI, had the third-largest amount, with 14 percent of total releases.

Comparing the Two Approaches to Reporting Dioxins and Furans

The reporting of dioxins and furans differs between TRI and NPRI. This provides a unique opportunity for countries to learn from each other's PRTRs. Looking at NPRI reporting, municipal incinerators are identified as an important source of dioxins and furans. However, this sector does not report to TRI. The NPRI approach of specifying selected activities that are required to report dioxins and furans has the potential to get information from these sources, but misses other less known sources of dioxin. For example, looking at the TRI reporting provides evidence to suggest that inorganic pigments facilities are sources of dioxins and furans and could be considered for addition to the NPRI list.

The CEC Sound Management of Chemicals (SMOC) program is developing a North American Regional Action Plan (NARAP) on dioxins, furans and hexachlorobenzene. The SMOC substance-specific NARAPs outline:

- specific objectives for reducing exposure to the substances of North American ecosystems, fish and wildlife, and especially humans, and preventing and promoting continuing reductions in anthropogenic releases to the environment of the substances;
- current conditions with respect to the use of the chemical in each country; and
- joint and individual actions the three governments can take to improve the capacity in the region to reduce the use and release of, and exposures to, the chemical.

See <www.cec.org> for further details.

The three countries annually review progress and have developed an *Action Plan To Enhance the Comparability of Pollutant Release and Transfer Registers in North America*. As part of this process, the dioxin/furan data will be reviewed.

Hexachlorobenzene

Reports on hexachlorobenzene (HCB) were required for the first time by NPRI for the 2000 reporting year. However, the reporting requirements differ for NPRI and TRI so the PRTR data on hexachlorobenzene are not comparable. Hexachlorobenzene has been reported to TRI since the program's inception. However, for the 2000 reporting year, TRI lowered the reporting threshold to 10 pounds (4.5 kilograms). Reporting to NPRI does not depend on such a threshold. Other aspects of the reporting requirements also differ in the two countries, such as which industry sectors are required to report. The same activities that require NPRI facilities to report on dioxins and furans also require them to report on hexachlorobenzene (see Table 19, above). All TRI facilities (i.e., manufacturing and related industries, see Table 18, above) at or above the 10-pound threshold are required to report under TRI. Therefore, direct comparison of the data on hexachlorobenzene is not possible.

A US air emissions inventory of hexachlorobenzene indicated that the manufacture of industrial inorganic chemicals such as silicone products contributed over half of the total of 0.9 tonnes from the US in 1996. The preliminary 1999 Canadian inventory estimated that 0.057 tonnes were released from all media. Mexico has not yet developed an HCB inventory.

Hexachlorobenzene stays in the atmosphere a long time and can be transported long distances. Human exposure occurs mainly through eating contaminated fish and plants, breathing HCB in urban air, or contact with pesticides containing HCB. The use of HCB as a pesticide was cancelled in the US in 1984.

Hexachlorobenzene is a probable carcinogen and considered to be among the top 10 percent of compounds most hazardous to ecosystems and human health.

TRI chemical manufacturers accounted for 81 percent of the 70,500 kg of total reported releases and transfers of hexachlorobenzene in 2000. One chemical manufacturing facility reported one-third of the US total, all of it transferred to energy recovery.

The NPRI electric utility sector accounted for 39 percent of the 48.50 kg total reported releases and transfers of hexachlorobenzene in 2000 and for half of all air emissions. One primary metals facility accounted for 25 percent of the NPRI total reported amounts, most of which was transferred to treatment.

However, note that TRI and NPRI reporting on hexachlorobenzene are not comparable because the two systems cover different industrial activities at different reporting thresholds.

Polycyclic Aromatic Compounds

Reports on polycyclic aromatic compounds (PACs) were required for the first time in NPRI at an alternative threshold. Under its PBT program, TRI added two PACs and lowered the threshold for others in 2000. However, reporting requirements differ, so the PRTR data on PACs are not comparable. The NPRI alternative threshold is 50 kg released and/or transferred for the group of 17 PACs together. The TRI threshold is 100 pounds (45.5 kg) manufactured, processed or otherwise used for any individual PAC of the 21 listed. Thus, both the thresholds and the substances covered are different for the two systems.

The main sources of PACs are combustion byproducts although some are in use as commercial chemicals. Human exposure to PACs includes breathing contaminated air from wood stoves, agricultural burning, certain industrial facilities, vehicles and tobacco smoke.

Almost 84 percent of the 617,350 kg of total releases and transfers of PACs listed on NPRI were on-site air emissions. Half of the total was for PACs that were also reported to TRI as PBTs at the lower thresholds. Most PACs reported to NPRI were released from primary metals facilities. Three primary metals facilities owned by Alcan Primary Metals Group reported almost 70 percent of the PACs also reported to TRI.

For the PACs listed on TRI at the lower thresholds, half of the 3.0 million kg of total releases and transfers was off-site releases (transfers to disposal) and 29 percent was on-site air releases. Ten facilities reported 63 percent of the total PACs reported to TRI at the lower thresholds.

Note that TRI and NPRI reporting on PACs are not comparable because of the different reporting thresholds and substances covered by the two systems.

Frequently asked questions on *Taking Stock*

The following section presents questions frequently asked about the information in *Taking Stock*.

How do PRTR data relate **TO ENVIRONMENTAL PROBLEMS** and public health?

Toxic chemicals

Many of the matched chemicals are persistent, bioaccumulative and/or toxic. Chemicals that are persistent are slow to break down and can continue to circulate in the environment for many years. Chemicals that are bioaccumulative can be readily taken into fish or animals and can accumulate over time in fatty tissue. Chemicals that are toxic can damage plants or animals.

The TRI and NPRI data can assist in estimating loadings of these toxic chemicals into the air, water, land and injected underground, which may help to identify local "hot spots" or areas of high contamination.

Drinking water

Many of the chemicals covered in *Taking Stock* have drinking water standards or guidelines that prescribe the maximum allowable concentration of the chemical in drinking water. The data in this report describe the total amount of a chemical released from each facility into the water over a year. Thus, PRTR data are useful for estimating industrial loadings or amounts of chemicals put into a local river or lake but not so good at determining the concentration of a chemical in a particular river or lake. The data in this report could be used to identify chemicals that need to be monitored in a lake or river that feeds a drinking water plant, but they would not provide good estimates of drinking water quality.

Long-range pollution

Many of the chemicals in this report can travel large distances through the "grasshopper effect." A chemical evaporates, travels with the wind and is deposited, only to be evaporated, carried again and redeposited, often hundreds of miles from its source.

Because of the ability of many chemicals to travel long distances, substances released from one facility may travel throughout North America. For example, some chemicals deposited in the ecologically sensitive Arctic have been released thousands of miles away.

Smog

Many of the chemicals analyzed in this report can contribute to smog. Ground-level ozone, one of the main components of smog, is often produced when volatile organic compounds and nitrogen oxides react in the presence of sunlight. Many of the matched chemicals (e.g., methanol, benzene and cyclohexane) are considered volatile organic compounds. Other sources, such as vehicle emissions, incinerators and evaporation from gasoline, solvents and paints, also release volatile organic compounds.

However, nitrogen oxides are not among the chemicals analyzed in this report because data on nitrogen oxides are not currently collected under the TRI and NPRI programs. They are required to be reported in Section 3 of the Mexican COA form and, starting with the 2002 reporting year, NPRI will require reporting of criteria air contaminants such as nitrogen oxides, which will help provide information on some sources of smog.

SOUND MANAGEMENT of Chemicals Program

The three NAFTA countries are working together to reduce or prevent the risks of, and exposures to, chemical substances through the CEC's ongoing Sound Management of Chemicals (SMOC) program. The program focuses especially on persistent, bioaccumulative and toxic substances and those that are transported long distances through the air and water.

The SMOC program is committed to developing North American Regional Action Plans (NARAPs) for selected persistent and toxic chemicals. The first NARAPs were initiated for DDT, chlordane, PCBs and mercury. A NARAP for dioxins and furans and another on environmental monitoring and assessment are now being developed, and a decision on a plan for lindane is expected shortly. In addition, lead is under consideration as a candidate substance. NARAP goals include the phase-out and banning of the particular chemicals of concern, encouraging pollution prevention, and reducing emissions.

PRTRs are becoming an increasingly valuable tool in the SMOC program for tracking progress in reducing industrial releases of priority chemicals, particularly as the PRTR reporting thresholds are lowered for some of the persistent bioaccumulative toxics. They can also be used to identify priority areas for the SMOC program.

Documents about the program are posted on the CEC web site <www.cec.org> and are also available in a consolidated report entitled *The Sound Management of Chemicals (SMOC) Initiative of the Commission for Environmental Cooperation of North America: Overview and Update* (September 2001). For more information, contact José Carlos Tenorio, Program Manager, at (514) 350 4372, jctenorio@ccemtl.org.

Thinning of the ozone layer

Releases of certain chemicals can contribute to the thinning of the ozone layer in the upper atmosphere, which shields life on earth from the sun's harmful ultraviolet radiation. Less protection from ultraviolet light will, over time, lead to higher incidence of skin cancer and cataracts and increased crop damage.

Some of the matched chemicals, such as CFCs and HCFCs, can contribute to ozone thinning. Some CFCs and HCFCs were reported for the first time to NPRI in the 1999 reporting year, and some of these are also on the Mexico RETC list.

Climate change

The build up of such gases as carbon dioxide, nitrous oxide and methane in the atmosphere can contribute to climate change. These gases are not currently reported to NPRI or TRI and so are not included in this report. Some of the greenhouse gases, however, are included in the Mexican reporting system, and Environment Canada is considering adding greenhouse gases to NPRI. Some of the chemicals on the matched chemical list, though, can play a direct or indirect role in climate change.

THE CEC INITIATIVE

on criteria air pollutants

Responding to a suggestion from the PRTR Consultative Group and input received from the governments and scientific communities, the CEC has surveyed existing information on criteria air pollutants in the three countries. A goal of this CEC initiative is to foster further cooperation among the three countries in presenting the emissions data that they collect in a comparable and consistent manner. For more information on this initiative, contact Paul Miller, CEC Air Quality Program Manager, at (514) 350-4326, <pmiller@ccemtl.org>.

Acid rain

Acid rain occurs when emissions of sulfur dioxide and nitrogen oxides react in the atmosphere to form an acidic liquid mixture that falls as rain, snow or mist, as a gas, or as particles. Acid rain can damage forests, lakes, crops and stone buildings. Nitrogen oxides and sulfur dioxide are not currently reported to TRI or NPRI and so are not included in this report. Electric utilities and transportation are major contributors of these chemicals to acid rain. Hydrochloric and sulfuric acid emissions, chemicals that are on the TRI and NPRI lists, may enhance the acidity in clouds downwind from the facilities, contributing to the formation of acid rain. Nitrogen oxides and sulfur oxides are required to be reported to NPRI for 2002.

Endocrine disruption

Certain chemicals have the ability to disrupt the proper functioning of endocrine systems. Scientists are working hard to learn how endocrine disruptors may be linked to a number of effects, including reproductive and developmental problems. Endocrine systems can act as the body's chemical messengers and control a wide variety of cellular and developmental processes. A lost, jumbled or wrong signal during some of these development events may result in damage. While there are endocrine disruptors on the PRTR lists, there is considerable debate over just which chemicals are involved, the concentrations required to produce an effect and the significance of some of the effects.

How to find out about the effects on human health of chemicals in *Taking Stock*

The data in this report alone cannot tell you whether chemicals released or transferred in your area are posing a risk to your health. However, this report is one step toward understanding the potential health effects of releases and transfers of the matched chemicals. PRTR data need to be taken together with other information such as data on toxicity and exposure to provide a more complete understanding of the risks.

The chemicals described in this report have been listed by the national governments because of their health and/or environmental concerns. Each substance differs in its toxicity and its ability to cause environmental and health effects.

What's being done to reduce the releases and transfers of chemicals in North America?

Each country has many laws and programs to control, reduce and prevent pollution. In the US and Canada, the governments also have voluntary challenges to reduce chemical releases. For an overview of each country's legislative program, please see the CEC web site at <www.cec.org>.

For information on:

- Canadian programs, see <www.ec.gc.ca>
- Mexican programs, see < www.semarnat.gob.mx>
- US programs, see <www.epa.gov>

Many companies are also reducing chemical releases following company environmental policies, targets or programs. More information about a specific facility can be found by typing in the facility name on the government web sites and contacting the company person listed. Some industrial sectors also publish summaries of their environmental data.

Some of the chemicals can cause neurological or developmental effects that may be of particular concern to children and fetuses, or may have toxic effects to which children are particularly vulnerable. This year, the CEC has developed a special feature report on the links between pollutants and children's health (see <www.cec.org>) under the CEC's Children's Environmental Health Initiative.

Other sources of information about the health effects of chemicals are:

- US Agency for Toxic Chemicals and Disease Registry at <www.atsdr.cdc.gov/toxfaq.html>
- US EPA at < www.epa.gov/chemfact/>
- Environmental Defense Scorecard site at <www.scorecard.org>
- National Safety Council at <www.nsc.org/library/chemical/chemical.htm>
- International Agency for Research on Cancer at <www.iarc.fr/>
- Canadian Centre for Occupational Health and Safety at <www.ccohs.ca/>
- Appendix D in the Sourcebook volume of this report, which lists the health effects of the 25 chemicals with the largest reported amounts
- Toxicology books, scientific journals and other sources in your local library

QUESTIONS ON the data and methods used in *Taking Stock*

It's the year 2003—why are these data from 2000?

The CEC uses the most recent public data available at the time *Taking Stock* is developed for a given year. The facilities report their 2000 data in the summer of 2001, and the governments then review the data. The 2000 data were publicly released by the governments in 2001. The CEC then selects the common chemicals and industrial sectors from this data, performs data analyses, and then writes, edits and translates the report into three languages.

Recognizing the need for more timely delivery of data, the CEC is striving to shorten the time it takes to produce *Taking Stock* to make it available to users more quickly.

Does *Taking Stock* include all chemicals?

Taking Stock includes the 206 chemicals that are common to both NPRI and TRI for the 2000 reporting year (see Appendix A to this volume). Each system has chemicals on its list that do not match and so are not included in the *Taking Stock* report. (See Appendix A in the companion volume, *Taking Stock 2000–Sourcebook*.)

This report uses approximately 20 percent of the data reported to NPRI and 62 percent of the data reported to TRI for 2000. The lower percent of NPRI data is due to three oil and gas extraction facilities that reported on hydrogen sulfide. Both the industry sector and the particular chemical are not in TRI.

Excluding these three facilities, the amount of NPRI data captured in the matched data set rises to 66 percent. The national programs individually can provide data on the chemicals and industries that are not part of the matched data set used in this report.

It is important to realize that the matched chemicals are only a small part of the total universe of chemicals. The Chemical Abstracts Service lists more than 16 million substances and has identified more than 210,000 of these as regulated or covered by chemical inventories worldwide.

Does *Taking Stock* include all sources of chemicals?

Taking Stock presents data from industrial facilities that are required to report to both TRI and NPRI. There are many facilities that are not included in the *Taking Stock* report:

- small facilities that are below the reporting thresholds for number of employees (generally, fewer than 10);
- facilities that do not meet the reporting thresholds for quantity of chemical manufactured, processed or otherwise used;
- mobile sources such as cars, trucks, trains, and boats;
- agricultural activities; and
- metal mines.

Why does *Taking Stock* add all the chemicals together?

This report analyzes the chemicals common to both TRI and NPRI. These chemicals differ in their toxicity, ability to cause health effects, and environmental significance. During meetings to discuss *Taking Stock*, some groups have supported adding the chemicals together while others have urged that the chemicals be kept separate.

Taking Stock adds chemicals together to provide a picture of the total reported amount of chemicals from reporting facilities and sectors. The total reported amount represents the best estimate available from a PRTR of the total amount of chemicals arising from a facility's activities that require management. It is not a perfect measure but can serve as a useful indicator.

In some sections, *Taking Stock* presents analyses for chemicals with similar toxicological properties, such as carcinogens.

The data represent estimates of releases and transfers of chemicals as reported by facilities and should not be interpreted as levels of risk to human health or environmental impact.

Some organizations have developed chemical ranking systems intended to account for the differing toxicities and properties of chemicals. Each of these systems has its strengths and weaknesses. The type of information needed should guide the selection of a particular chemical ranking system.

Examples include the European Union System for the Evaluation of Chemicals, the ICI Environmental Burden Methodology, and the Environmental Defense Scorecard system, which has dozens of different criteria to rank chemicals.

Does naming a facility, jurisdiction or industry sector mean that they are not in compliance with environmental laws?

No. The mere fact that a facility, jurisdiction or industry sector is named in *Taking Stock* does not mean that it is not in compliance with environmental laws. For information on the applicable permits, regulations or programs that may apply to a facility, contact local environmental authorities, the facility or local community groups.

Why are Mexican data not included in *Taking Stock*?

Reporting to the Mexican PRTR program, the RETC, is currently voluntary. While data collected under voluntary programs can have a variety of uses, they cannot easily be compared with data collected under mandatory programs such as NPRI and TRI. Recently, Mexico has made great strides in moving toward a mandatory system, with the passage of enabling legislation, and is developing regulations for mandatory reporting.

The integrated reporting form used in Mexico, called the Annual Certificate of Operation (*Cédula de Operación Anual*–COA), contains five sections. Section V is for the voluntary reporting of releases and transfers of pollutants and is called the RETC. Over 170 facilities reported PRTR data in the optional Section V in 2000.

Because of the voluntary nature of Mexico's RETC and the limited amount of data currently available, most of the analyses presented here are based on data from the US TRI and the Canadian NPRI. The CEC strives to include trilateral data wherever possible in the report.

Why might a facility's numbers go up or down from year to year?

There are many reasons why a facility might report a decrease or increase in the amount of chemical released or transferred from one year to the next. A facility may have installed pollution control measures or taken pollution prevention actions, but it may also have changed its processes, its rate of production, the chemicals it used, or its method of estimating releases and transfers; gone out of business; or merged with another facility.

While the PRTR data are good at showing increases and decreases in amount of chemicals, it is often harder to discover the reasons behind the changes.

In the NPRI, facilities can add comments to explain changes in their releases or transfers from one year to the next. Whenever possible, this information is used in Taking Stock to provide context for facilities' numbers.

Why don't the data take into account changes in production?

Many people have commented that data on releases and transfers should take into account production changes at a facility. The increase in releases and transfers may be a result of increased production. While it would be helpful to better understand the reasons behind the numbers, there are several reasons why release and transfer data are not related to production levels in this report. One important reason is that production data for facilities are not reported to NPRI or TRI.

Reporting of a production ratio and activity index is mandatory in TRI but voluntary in NPRI, so it is not reported by all NPRI facilities or for all years. Therefore, this production measure is not used for this report. While other sources of production data outside of NPRI and TRI may be available, these often do not provide data on a facility basis or for the same reporting year.

In addition, there is often no relationship between production and releases and transfers. As production increases, releases and transfers may increase or decrease, depending on the operations at the facility.

While knowing the relationship between production and releases and transfers may be important from an eco-efficiency perspective, it may be less important from an environmental or health perspective. Environmental or health damage may result from the total loading of chemicals, and so knowing if the total quantity of chemicals are increasing or decreasing may be important. For example, a person living in a particular community may be most interested in the actual amounts of releases from a facility and less concerned with amounts released per unit of production. A facility manager looking to increase efficiency, however, may be more interested in releases per unit of production.

Background on pollutant release and transfer registers

What is a pollutant release and transfer register (PRTR)?

A pollutant release and transfer register (PRTR) provides detailed information on the types, locations and amounts of chemicals released or transferred by facilities. The US Toxics Release Inventory (TRI), the Canadian National Pollutant Release Inventory (NPRI) and the Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC) are examples of PRTRs.

The first of these national registers to be established in North America was the US TRI in 1987, followed by the Canadian NPRI in 1993. The Mexican RETC had a successful pilot project in 1996, followed by voluntary reporting for facilities under federal jurisdiction in 11 industrial sectors starting in 1997. Enabling legislation for a mandatory and publicly accessible system was passed in Mexico in December 2001.

Where do PRTR data come from?

A facility may emit chemicals into the air from smokestacks, discharge chemicals into nearby rivers or lakes, inject chemical containing wastes into underground wells or dispose of chemicals in landfills. Each year, facilities that are covered under a national PRTR report the amounts of chemicals they have released into the air, water, and land or put in underground wells.

Some facilities also send chemicals to other locations for treatment, to sewage treatment plants, or to disposal sites. Facilities may also send chemicals off site for recycling or to be burned for energy recovery. These chemicals transferred to other locations are also reported under a PRTR system.

Facilities may use estimates or actual measurements when reporting chemical amounts. The facility-reported information on releases and transfers is collected by governments in computerized databases and summarized in publicly available reports. A key strength of PRTRs is the public availability of release and transfer data from individual facilities.

PRTRs often have thresholds for reporting. For example, facilities with fewer than 10 employees may not be required to report. Or, a facility needs to process, manufacture or use more than a certain quantity of chemicals, such as 10 tonnes, to trigger reporting. Also, a PRTR has a list of specific chemicals that must be reported. So, PRTRs will capture information from certain sources for certain chemicals.

BASIC ELEMENTS of an effective PRTR

While recognizing that individual countries will design PRTRs to meet their own needs and capacities, Resolution 00-07 of the CEC Council sets forth a set of basic elements considered central to the effectiveness of PRTR systems, which include:

- reporting on individual substances;
- reporting on individual facilities;
- covering all environmental media (i.e., releases to air, water, land and underground injection and transfers off-site for further management);
- mandatory, periodic reporting (i.e., annually);
- public disclosure of reported data on a facility- and chemical-specific basis;
- standardized reporting using computerized data management;
- limited data confidentiality and indicating what is being held confidential;
- comprehensive scope; and
- a mechanism for public feedback to improve the system.

How are the PRTR data used?

PRTRs are a unique source of localized (facility-specific) data on releases and transfers of certain chemicals that have been identified by governments as being of concern to health and/or the environment. PRTRs are tools for fulfilling the public's "right to know" about chemicals released and transferred into and through their communities.

PRTR data can be used for a variety of purposes. The data track chemicals and can thereby help industry, governments and citizens identify ways to prevent pollution, reduce waste generation, decrease releases and transfers, and assess chemical use.

Many corporations use PRTR data to report on their environmental performance and to identify opportunities for reducing pollution. Governments can use PRTR data to develop or shift program priorities. Citizens use PRTR data to learn about releases and transfers from facilities in their communities.

How can I get data on chemical releases and transfers from NPRI, TRI or RETC?

A wealth of PRTR information in a variety of formats is valuable. Among the main sources of information about the programs, data and ongoing changes are the national governments' web sites (listed below).

Another source of information is the national summary reports produced by all three governments. A copy of the summary reports can be obtained from the government offices or web sites, or often viewed at libraries. Other publications include guidance manuals for reporting, regional fact sheets and background documents on future changes.

In addition to the web site queries, NPRI and TRI data on facilities, sectors, chemical and communities are also available on a data disk from national governments offices. Reports using PRTR data have been developed by industrial associations, provincial and regional governments, nongovernmental groups, and academics. A more detailed analysis of the TRI and NPRI data is available in a second volume of *Taking Stock*, the *Sourcebook*, at the CEC web site <www.cec.org> or from the CEC Secretariat at (514) 350-4300.

Public Access to Canadian National Pollutant Release Inventory Data and Information

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

Headquarters:

Tel: (819) 953-1656
Fax: (819) 994-3266

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

Pollution Watch Scorecard home page: <www.pollutionwatch.org>

Additional Information on Mexican *Registro de Emisiones y Transferencia de Contaminantes* (RETC)

Semarnat
Dirección de Gestión Ambiental
Av. Revolución 1425 – 9
Col. Tlacopac, San Angel
01040 México, D.F.

Tel: (525) 55 624–3470
Fax: (525) 55 624–3584

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

Public Access to US Toxics Release Inventory Data and Information

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

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

Online Data Access:

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

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

(202) 234-8570 for free online access to TRI data, or
(202) 234-8494 for information

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

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

What have the three governmental environment leaders from Canada, Mexico and the United States said about PRTRs?

In June 2000, the CEC Council, composed of the Environment Minister from Canada, the Administrator of the US Environmental Protection Agency, and the Secretary of Semarnat (*Secretaría del Medio Ambiente y Recursos Naturales*) in Mexico signed Council Resolution 00-07 on pollutant release and transfer registers. Through this Resolution, the Council emphasized the value of PRTRs as tools for the sound management of chemicals, for encouraging improvements in environmental performance and for providing the public with access to information on pollutants in their communities. The Resolution also identified a set of basic features considered important to the effectiveness of a PRTR (see box above).

The Resolution specifically reaffirmed the Council's commitment to CEC's analytical work on North American PRTR data (including the *Taking Stock* annual reports). The Council also noted the opportunities for North America to serve as a global leader in the development and use of PRTRs.

At the Council Session in June 2002, the Ministers stressed the importance of environmental information in the Communiqué and committed to support Mexico through capacity building, in light of Mexico's decision to seek legislation to establish a mandatory PRTR.

PRTRS worldwide

Over the past decade, there has been a growing interest worldwide in PRTRs and related issues of public access to environmental information. The OECD, of which all three North American countries are members, issued a Council Recommendation in 1996, which calls upon all member countries to establish, implement and make public national PRTRs and to promote comparability among national PRTRs and sharing of PRTR data between neighboring countries.

The Intergovernmental Forum on Chemical Safety has also focused on the topic of PRTRs, including a special session on PRTRs in October 2000. The Forum III meeting recommended that countries without PRTRs take steps to develop them, that a PRTR be established in at least two additional countries in each region by 2004, and that countries link reporting requirements under international agreements to PRTRs. For more information on IFCS, see <www.who.int/ifcs/>.

The United Nations Economic Commission for Europe has developed the Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters. Known as the Aarhus Convention, it came into force in October 2001. An international protocol on PRTRs is being developed under this Convention. More information on the Aarhus Convention can be found at <www.unece.org/env/pp>.

HOW CAN I BECOME involved in the development of *TAKING STOCK*?

Taking Stock is developed with the advice of governments, industry and nongovernmental organizations from the three North American countries. Each year, a consultative meeting is held to discuss the upcoming report and provide updates on government programs.

A public comment period follows the meeting. Based on feedback from the meeting, written comments and ongoing discussions, *Taking Stock* is developed.

For more information, including the materials prepared for the consultative meeting or to get involved in the CEC's North American pollutant release and transfer register project, please contact:

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<ephipps@ccemtl.org>

Another international mechanism, the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), has a PRTR Coordinating Group that seeks to improve coordination between international organizations, governments and other interested parties on PRTRs. For more information, see <www.who.int/iomc/>.

The G-8 environment ministers meeting in March 2001 included support for the development of PRTRs as a means to increase access to information, recognizing that communities have a right to know about chemicals in the environment (see <www.library.utoronto.ca/g7/environment/2001trieste/communique.html>). Also, the Health and Environmental Ministers of the Americas held a follow-up to the April 2001 Summit of the Americas in which they agreed to consider working toward developing PRTRs as a tool to manage exposure to chemical releases (see <www.ec.gc.ca/international/regorgs/hema_e.htm>).

Appendix: Matched chemicals—— listed in both TRI and NPRI, 2000

CAS Number	In 1995–2000 Matched Data Set		Chemical Name
50-00-0	x	c,p	Formaldehyde
55-63-0	x		Nitroglycerin
56-23-5	x	c,p,t	Carbon tetrachloride
62-53-3	x	p	Aniline
62-56-6	x	c,p	Thiourea
64-18-6			Formic acid
64-67-5	x	c,p	Diethyl sulfate
64-75-5		p	Tetracycline hydrochloride
67-56-1	x		Methanol
67-66-3	x	c,p	Chloroform
67-72-1	x	c,p	Hexachloroethane
70-30-4			Hexachlorophene
71-36-3	x		n-Butyl alcohol
71-43-2	x	c,p,t	Benzene
74-83-9	x	p,t	Bromomethane
74-85-1	x		Ethylene
74-87-3	x	p	Chloromethane
74-88-4	x	p	Methyl iodide
74-90-8	x		Hydrogen cyanide
75-00-3	x	p	Chloroethane
75-01-4	x	c,p,t	Vinyl chloride
75-05-8	x		Acetonitrile
75-07-0	x	c,p,t	Acetaldehyde
75-09-2	x	c,p,t	Dichloromethane
75-15-0	x	p	Carbon disulfide
75-21-8	x	c,p,t	Ethylene oxide
75-35-4	x	t	Vinylidene chloride
75-44-5	x		Phosgene
75-45-6		t	Chlorodifluoromethane (HCFC-22)
75-56-9	x	c,p	Propylene oxide
75-63-8		t	Bromotrifluoromethane (Halon 1301)
75-65-0	x		Tert-Butyl alcohol
75-68-3			1-Chloro-1,1-difluoroethane (HCFC-142b)
75-69-4		t	Trichlorofluoromethane (CFC-11)
75-71-8		t	Dichlorodifluoromethane (CFC-12)
75-72-9		t	Chlorotrifluoromethane (CFC-13)
76-01-7			Pentachloroethane
76-14-2		t	Dichlorotetrafluoroethane (CFC-114)
76-15-3		t	Monochloropentafluoroethane (CFC-115)
77-47-4	x		Hexachlorocyclopentadiene
77-73-6			Dicyclopentadiene
77-78-1	x	c,p	Dimethyl sulfate
78-84-2	x		Isobutyraldehyde
78-87-5	x	p	1,2-Dichloropropane
78-92-2	x		sec-Butyl alcohol
78-93-3	x		Methyl ethyl ketone
79-00-5	x	p	1,1,2-Trichloroethane
79-01-6	x	c,p,t	Trichloroethylene
79-06-1	x	c,p	Acrylamide
79-10-7	x		Acrylic acid
79-11-8	x		Chloroacetic acid
79-21-0	x		Peracetic acid
79-34-5	x	p	1,1,2,2-Tetrachloroethane
79-46-9	x	c,p	2-Nitropropane
80-05-7	x		4,4'-Isopropylidenediphenol
80-15-9	x		Cumene hydroperoxide
80-62-6	x		Methyl methacrylate
81-88-9	x	p	C.I. Food Red 15
84-74-2	x		Dibutyl phthalate
85-44-9	x		Phthalic anhydride
86-30-6	x	p	N-Nitrosodiphenylamine
90-43-7	x	p	2-Phenylphenol
90-94-8	x	c,p	Michler's ketone
91-08-7	x	c	Toluene-2,6-diisocyanate

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**** Nitric acid, nitrate ion and nitrate compounds are aggregated into one category called nitric acid and nitrate compounds in the matched data set.*

***** o-Xylene, m-xylene, p-xylene and xylene (mixed isomers) are aggregated into one category called xylenes in the matched data set.*

CAS Number	In 1995–2000 Matched Data Set		Chemical Name
91-20-3	x		Naphthalene
91-22-5	x	p	Quinoline
92-52-4	x		Biphenyl
94-36-0	x		Benzoyl peroxide
94-59-7	x	c,p	Safrole
95-48-7	x		o-Cresol
95-50-1	x		1,2-Dichlorobenzene
95-63-6	x		1,2,4-Trimethylbenzene
95-80-7	x	c,p	2,4-Diaminotoluene
96-09-3	x	c,p	Styrene oxide
96-33-3	x		Methyl acrylate
96-45-7	x	c,p	Ethylene thiourea
98-82-8	x		Cumene
98-86-2			Acetophenone
98-88-4	x		Benzoyl chloride
98-95-3	x	c,p	Nitrobenzene
100-01-6	x		p-Nitroaniline
100-02-7			4-Nitrophenol
100-41-4	x	c	Ethylbenzene
100-42-5	x	c	Styrene
100-44-7	x	c,p	Benzyl chloride
101-14-4	x	c,p	4,4'-Methylenebis(2-chloroaniline)
101-77-9	x	c,p	4,4'-Methylenedianiline
106-44-5	x	c,p	p-Cresol
106-46-7	x		1,4-Dichlorobenzene
106-50-3	x		p-Phenylenediamine
106-51-4	x	c	Quinone
106-88-7	x	c,p	1,2-Butylene oxide
106-89-8	x	c,p,t	Epichlorohydrin
106-99-0	x	t	1,3-Butadiene
107-05-1	x		Allyl chloride
107-06-2	x	c,p,t	1,2-Dichloroethane
107-13-1	x	c,p,t	Acrylonitrile
107-18-6	x		Allyl alcohol
107-19-7			Propargyl alcohol
107-21-1	x		Ethylene glycol
108-05-4	x	c	Vinyl acetate
108-10-1	x		Methyl isobutyl ketone
108-31-6	x		Maleic anhydride
108-39-4	x		m-Cresol
108-88-3	x	p	Toluene
108-90-7	x		Chlorobenzene
108-93-0			Cyclohexanol
108-95-2	x		Phenol
109-06-8	x		2-Methylpyridine
109-86-4	x	p	2-Methoxyethanol
110-54-3			n-Hexane
110-80-5		p	2-Ethoxyethanol
110-82-7	x		Cyclohexane
110-86-1	x		Pyridine
111-42-2	x		Diethanolamine
115-07-1	x		Propylene
115-28-6		c,p	Chlorendic acid
117-81-7	x	c,p,t	Di(2-ethylhexyl) phthalate
120-12-7	x		Anthracene
120-58-1	x	p	Isosafrole
120-80-9	x	c	Catechol
120-82-1	x		1,2,4-Trichlorobenzene
120-83-2	x		2,4-Dichlorophenol
121-14-2	x	c,p	2,4-Dinitrotoluene
121-44-8			Triethylamine
121-69-7	x		N,N-Dimethylaniline
122-39-4			Diphenylamine
123-31-9	x		Hydroquinone
123-38-6	x		Propionaldehyde
123-63-7			Paraldehyde
123-72-8	x		Butyraldehyde
123-91-1	x	c,p	1,4-Dioxane
124-40-3			Dimethylamine
127-18-4	x	c,p,t	Tetrachloroethylene
131-11-3	x		Dimethyl phthalate
139-13-9	x	c,p	Nitrilotriacetic acid

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CAS Number	In 1995–2000 Matched Data Set		Nom Chimique
140-88-5	x	c,p	Ethyl acrylate
141-32-2	x		Butyl acrylate
149-30-4			2-Mercaptobenzothiazole
156-62-7	x		Calcium cyanamide
302-01-2	x	c,p	Hydrazine
353-59-3		t	Bromochlorodifluoromethane (Halon 1211)
534-52-1	x		4,6-Dinitro-o-cresol
541-41-3	x		Ethyl chloroformate
542-76-7			3-Chloropropionitrile
554-13-2		p	Lithium carbonate
563-47-3		c,p	3-Chloro-2-methyl-1-propene
569-64-2	x		C.I. Basic Green 4
584-84-9	x	c	Toluene-2,4-diisocyanate
606-20-2	x	c,p	2,6-Dinitrotoluene
612-83-9	x	c,p	3,3'-Dichlorobenzidine dihydrochloride
630-20-6			1,1,1,2-Tetrachloroethane
842-07-9		p	C.I. Solvent Yellow 14
872-50-4		p	N-Methyl-2-pyrrolidone
924-42-5		p	N-Methylolacrylamide
989-38-8	x		C.I. Basic Red 1
1163-19-5	x		Decabromodiphenyl oxide
1313-27-5	x		Molybdenum trioxide
1314-20-1	x	p	Thorium dioxide
1319-77-3	x		Cresol (mixed isomers)
1332-21-4	x	c,p,t	Asbestos (friable form)
1344-28-1	x		Aluminum oxide (fibrous forms)
1634-04-4	x		Methyl tert-butyl ether
1717-00-6			1,1-Dichloro-1-fluoroethane (HCFC-141b)
2832-40-8	x		C.I. Disperse Yellow 3
3118-97-6	x		C.I. Solvent Orange 7
4170-30-3			Crotonaldehyde
4680-78-8	x		C.I. Acid Green 3
7429-90-5	x	m	Aluminum (fume or dust)
7550-45-0	x		Titanium tetrachloride
7632-00-0			Sodium nitrite
7637-07-2			Boron trifluoride
7647-01-0	x		Hydrochloric acid
7664-39-3	x	t	Hydrogen fluoride
7664-93-9	x		Sulfuric acid
7697-37-2	x		Nitric acid***
7723-14-0	x		Phosphorus (yellow or white)
7726-95-6			Bromine
7758-01-2		c,p	Potassium bromate
7782-41-4			Fluorine
7782-50-5	x		Chlorine
10049-04-4	x		Chlorine dioxide
13463-40-6			Iron pentacarbonyl
25321-14-6	x	p	Dinitrotoluene (mixed isomers)
26471-62-5	x	c,p	Toluenediisocyanate (mixed isomers)
28407-37-6		p	C.I. Direct Blue 218
34077-87-7			Dichlorotrifluoroethane (HCFC-123 and isomers)
63938-10-3			Chlorotetrafluoroethane (HCFC-124 and isomers)
	x	m	Antimony and its compounds*
	x	m,c,p,t	Arsenic and its compounds*
	x	m,c,p,t	Cadmium and its compounds*
	x	m,c,p,t	Chromium and its compounds*
	x	m,c,p	Cobalt and its compounds*
	x	m	Copper and its compounds*
	x		Cyanide compounds
	x	m,c,p,t	Lead and its compounds**
	x	m	Manganese and its compounds*
		m,p,t	Mercury and its compounds*
	x	m,c,p,t	Nickel and its compounds*
	x		Nitric acid and nitrate compounds***
		c,t	Polychlorinated alkanes (C10-C13)
	x	m	Selenium and its compounds*
	x	m	Silver and its compounds*
	x	m	Zinc and its compounds*
	x		Xylenes****

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