Taking Stock: 2004 North American Pollutant Releases and Transfers
Commission for Environmental Cooperation
Backgrounder

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Bilateral Canada-United States Analysis

2004 Canada-United States (Chapter 4)

- Over 3 million tonnes (3.12 million tonnes) of releases and transfers in 2004, with 1.4 million tonnes accounted for by on- and off-site releases
    - Half of the releases (50%) were to the air (40% in Canada; 51% in the United States)
- Ontario had the largest total releases and transfers (largest total releases; largest off-site releases; largest transfers to recycling; ranked 9th for total on-site releases). Zalev Brothers (a metals recycling facility) in Windsor, Ontario, accounted for 19% of total NPRI releases and transfers. Without reporting by Zalev Brothers, Texas would have had the largest total releases and transfers and Ontario would have ranked second.
    - Texas had the second-largest releases and transfers and largest on-site releases
    - Ohio had largest on-site air emissions
- Primary metals (such as smelters and steel mills) had largest total releases and transfers (26% of total) and 70% of all off-site releases (transfers to disposal, mainly to landfills)
- Electric utilities had largest on-site air emissions (46% of total) mainly as hydrochloric acid

2003–2004 Canada-United States (Chapter 4)

- Total releases and transfers increased by 3%, with Canada increasing by 6% and the United States by 3%.
    - Without reporting by Zalev Brothers NPRI total releases and transfers would have shown a decrease of 14% (Zalev Brothers accounted for an increase of 80 million kg, mainly as off-site transfers to disposal and to recycling).
- Total releases on- and off-site increased by 5%, with Canada increasing by 50% and the United States decreasing by less than one percent.
    - Without reporting by Zalev Brothers, NPRI total releases would still have increased, but by 5% rather than 50%
- Total on-site air emissions decreased by 2% in both Canada and the United States

1998–2004 Canada-United States (Chapter 5)

- Total releases and transfers fell by 9% from 1998–2004, including a decrease in total releases by 15% and a decrease of 22% in on-site air releases
- Canada had an overall increase in total releases and transfers from 1998–2004 of 34% (or an increase of 7% without reporting by Zalev Brothers)
    - Transfers to recycling increased by 47% (or 31% without reporting by Zalev Brothers)
    - Air releases decreased by 5%
    - Surface water discharges increased by 41%
    - From facilities reporting in both years, total releases and transfers in Canada increased by 30% but air releases showed a decrease of 11%
- The United States had an overall decrease in total releases and transfers from 1998–2004 of 13%
    - Air releases decreased by 24%
    - Surface water discharges decreased by 8% (but increased by 10% from 2003–2004)
    - Off-site releases increased by 12%
    - From facilities reporting in both years, total releases and transfers in the United States decreased 9% and air releases decreased 19%

- Total amounts of chemicals reported tend to be dominated by a small number of facilities that report the largest releases and transfers. However, the facilities reporting smaller amounts are much more numerous and showed trends opposite to that of the larger reporters.
    - The "largest reporters" (total releases and transfers of 1,000,000 kg or more in 1998; 575 facilities) accounted for half of total releases and transfers. On-site releases decreased by 28% in the United States and 33% in Canada for this group of reporters. Total releases and transfers for this group decreased by 23% in the United States but increased by 25% in Canada.
    - The group of "smallest reporters" (total releases and transfers of 10,000 kg or less in 1998; 6,743 facilities) showed an increase in on-site releases of almost 200% in the United States and over 500% in Canada and an increase in total releases and transfers of over 800% in Canada and over 400% in the United States.
    - This analysis covers only those facilities reporting in both years 1998 and 2004.

Carcinogens and Developmental/Reproductive Toxicants (Chapter 6)

- Known or suspected carcinogens accounted for 11% of total releases in 2004.
- Known or suspected carcinogens had a decrease of 22% in total releases from 1998–2004, with on-site air releases decreasing by 31%
    - Canadian carcinogen releases increased by 6%, with air emissions increasing by 4%
    - US carcinogen releases decreased by 25%, with air emissions decreasing by 34%
- Developmental/reproductive toxicants (California Proposition 65 chemicals) accounted for 8% of total releases in 2004.
- Developmental/reproductive toxicants had a decrease of 32% in total releases from 1998–2004, with on-site air releases decreasing by 41%
    - Canadian developmental/reproductive toxicant releases increased by 11%, with air emissions decreasing by 24%
    - US developmental/reproductive toxicant releases decreased by 37%, with air emissions decreasing by 43%

Toxic Equivalency Potentials (Chapter 6)

- *Taking Stock 2004* uses a recognized methodology (toxic equivalency potentials—TEPs) to describe the relative hazard level posed by industrial chemical releases in North America. The TEPs used in this report are based on an approach developed by scientists at the University of California Berkeley and reviewed by the US EPA Science Advisory Board. A TEP is calculated by comparing the risk posed by a one-pound release of a chemical to a reference chemical.
- After applying toxicity weighting to known or suspected carcinogens,
    - carbon tetrachloride was ranked #1 for air releases and lead and its compounds ranked #2 for air releases in 2004. On a volumetric basis, carbon tetrachloride ranked 20th and lead ranked 13th.
    - Conversely, formaldehyde is ranked among the top three for both air and surface water releases by volume, but ranked lower when TEPs are applied.
- For developmental and reproductive toxicants (California Proposition 65 chemicals),
    - mercury and its compounds was ranked number #1 for both air and surface water releases in 2004 when TEPs are applied. On a volumetric basis, mercury and its compounds had the 13th largest air releases and 13th largest surface water releases.
    - Toluene and nickel and lead and their compounds had the largest surface water releases (ranking first, second and third), and ranked fifth, third and second, respectively, when TEPs are applied.

Pollution Prevention Activities (Chapter 5)

- The NPRI and TRI data show that, in general, facilities using pollution prevention measures, ranging from equipment modifications to process changes and materials substitution (but not including end-

- Canadian facilities reporting pollution prevention activities showed a 13% reduction in releases and transfers from 2002 to 2004, compared to an 8% increase for Canadian facilities not reporting pollution prevention activities.
- Facilities in the United States reporting pollution prevention had a 6% reduction, compared to a smaller reduction of less than one percent for the facilities in the United States not reporting pollution prevention.

Special Feature: Transfers to Recycling (Chapter 8)

- This year's *Taking Stock* report has a special feature on recycling. Large amounts of materials are recycled, over one million tonnes were sent for recycling in 2004. Transfers to recycling accounted for one-third of total releases and transfers reported in Canada and the United States in 2004 and over half of all transfers were sent for recycling
- Copper, zinc, lead and their compounds represented two-thirds of total transfers to recycling in 2004.
- Two industrial sectors: the primary metals (smelters and steel mills) and fabricated metals product sectors accounted for 62% of total transfers to recycling in 2004.
- A handful of facilities sent large amounts to be recycled: 25 facilities accounted for 20% in 2004.
- A small number of facilities received large amounts for recycling: 25 facilities accounted for 35% of all transfers to recycling in 2004.
    - The state of Pennsylvania received the most transfers; one facility (Horsehead Corp in Palmerton) received the largest amount (5% of the total)
    - Zinc National in Monterrey, Nuevo León, Mexico, received the second largest amount (3% of the total)
- A facility's decision to recycle is based on many factors: price of disposal or recycling options, regulatory requirements, relationship and reputation of recycler, location and process of recycler, and corporate environmental or waste reduction targets.
- Transfers to recycling increased by 3% from 2002 to 2004 (2002 is used as base year since reporting requirements for lead and its compounds changed for 2001–2002). Some of this increase was the result of increased production and increased metal prices for recycling. Competition for good quality scrap metal is becoming more common.

Trilateral Canada-Mexico-United States Analysis

Mexico-Canada-United States (Chapter 3)

- 2004 is the first year of mandatory RETC data in Mexico. It includes releases and transfers of 104 chemicals from federally-regulated industrial sectors.
- The trilateral data set is a small subset of each country's data since a limited number of chemicals and industry sectors are reported to the RETC and only a subset of these are also on both NPRI and TRI. The matched Canada-Mexico-US data include 56 chemicals and 9 industrial sectors (compared to 204 chemicals and 25 industrial sectors in the bilateral Canada-United States matched database).
- The pattern of releases and transfers reported differed in the three countries.
    - In Mexico, on-site air emissions accounted for 28% of total releases and transfers (but 11% in the United States and 6% in Canada).
    - In the United States, on-site land disposal represented 13% of total releases and transfers (but 5% for Canada and less than one percent for Mexico); TRI transfers to energy recovery, treatment and sewage accounted for 15% of the total (but 3% in Canada and Mexico).
    - In Canada, transfers to recycling accounted for 63% of total releases and transfers (but 43% in the United States and 34% in Mexico.
- Metals and their compounds were reported by the highest proportion of facilities in all three countries and accounted for the largest amounts.
    - In Canada and the United States, lead, chromium and nickel and their compounds had the largest amounts, accounting for 77% of the total in Canada and 55% in the United States.

- In Mexico, nickel and lead and their compounds had the largest amounts. Vinyl chloride ranked third, but was reported by only four facilities. These three chemicals accounted for half of the total. Chromium and its compounds ranked 11th.
    - Note that arsenic, cadmium and zinc and their compounds cannot be included in the trilateral analysis as their reporting does not match across all three countries.
- The industry sectors reporting the largest amounts in 2004 differed among the three countries.
    - In Mexico and the United States, the chemical manufacturing sector reported the largest total releases on- and off-site and the largest total releases and transfers in 2004.
    - In Canada, the primary metals sector had the largest total releases and total releases and transfers.
- This first comparison of trilateral data attests to the need to increase comparability among three PRTRs (increase the number of common chemicals and industry sectors covered, improve reporting guidance, and refine thresholds) to fully achieve the goal of providing a North American picture of releases and transfers.

Criteria Air Contaminants (Chapter 6)

- Annual facility-level data on criteria air contaminants (such as NO_x and SO_2) are also available from Canadian and Mexican databases, but not the US TRI. Data are available for the United States by industry sector for 2002 and for electric utilities only for each year.
    - For nitrogen oxides, electric utilities reported the largest air emissions in Canada and the United States, and in Mexico it was the stone/clay/glass/cement sector. Electric utilities showed a decrease of 10% in the United States and 6% in Canada, with an increase of 3% in Mexico from 2003 to 2004.
    - For sulfur dioxide, electric utilities reported the largest air emissions in Mexico and the United States, and in Canada it was the primary metals sector. Only data for electric utilities are available for the United States for 2004: electric utilities showed a 3% decrease from 2003 to 2004, while in Canada they showed an 8% decrease. In Mexico, the decrease was 23%, although there were 11% fewer facilities reporting.
    - For volatile organic compounds, the oil and gas extraction sector reported the largest amounts in Canada; in Mexico, it was the chemical manufacturing sector and in the United States it was the paper products sector and hazardous waste management facilities. In Canada, air releases of volatile organic compounds decreased by 14% from 2003 to 2004 and in Mexico, they decreased by 12%. Comparable data from the United States are not available.

Greenhouse gases (Chapter 6)

- Greenhouse gases were reported by Canadian industrial facilities for the first time for the year 2004. The Mexican COA (*Cédula de Operación Anual*) has included mandatory reporting on greenhouse gases since its inception. The United States has facility-level data for one greenhouse gas (carbon dioxide) for electric utilities only.
    - Electric utilities burning fossil fuels reported the largest amounts of CO_2-equivalent air emissions from industrial sources in both Canada and Mexico. In Canada, they accounted for 44% of the total amounts and in Mexico, for 61% of the total.
    - Over 90% of total carbon dioxide emissions from electric utilities came from the United States.

Note

As noted in the disclaimer at the beginning of this report, the national PRTR systems 'lock' their data sets on a specific date and use that 'locked' data for annual summary reports. The CEC follows a similar process: changes submitted by facilities to national PRTR data sets after the data are locked for the purposes of completing *Taking Stock,* are incorporated in the following year's report. This approach is an established means to ensure the efficient comparison of national data sets on an annual basis.

The CEC is aware that changes have occurred to the data sets for the 2004 reporting year subsequent to the cut-off date for data used in this report. We wish to draw to readers' attention a belated, but significant data correction by Zalev Brothers, a metal recycling facility in Ontario. A September 2007 correction to a unit conversion error by this facility reduces by a thousand-fold its reported off-site releases and transfers to recycling for 2004. This change affects certain rankings presented in the report's US/Canada analysis. As noted on pages 48 and 65 herein, without reporting by this one facility, Ontario would have ranked *second* in 2004 for total pollutant releases and transfers.

The CEC calls to readers' attention this revised information because of the impact of this one facility as cited above. In the absence of an analysis of the magnitude of all data revisions submitted by North American facilities after the cut-off date for 2004, any "revised" ranking in the *Taking Stock 2004* report cannot be confirmed. Please note that other key findings of the report are unaffected by this new information.