

NPRI Pollutants in Canada 2002

The National Pollutant Release Inventory

Canada 2002

4 530 facilities in total reported to the NPRI.

Of these, 3 191 facilities reported NPRI pollutants, and 3 048 facilities reported Criteria Air Contaminants (CAC) substances for the first time in 2002.

NPRI Pollutants

Releases on-site: 208 562 tonnes

Disposal

On site: 193 796 tonnes

Off site: 44 286 tonnes

Off-site transfers for treatment

Prior to final disposal:
37 435 tonnes

Off-site transfers for recycling and energy recovery:

1 235 268 tonnes

The National Pollutant Release Inventory (NPRI) was established in 1992 to collect data on substances of concern in Canada. Its primary purpose is to provide Canadians with access to information about releases of pollutants by facilities located in their communities. The NPRI is the only legislated, nationwide, publicly accessible inventory of its kind in Canada. The data collected are also used in a wide range of prevention and abatement activities.

This fact sheet presents a summary of NPRI data collected for 2002. The data are those that appeared in the NPRI database on December 18, 2003. Numbers reported are estimates.

Highlights

- In 2002, more NPRI substances were being recycled and used for energy recovery than were being released to air, land or water.
- In total, 3 191 facilities submitted 14 638 substance reports for 208 of the 273 NPRI pollutants, excluding criteria air contaminants (CAC).
- For the first time in 2002, a total of 3 048 facilities submitted 9 368 substance reports for seven CAC.
- Between 2001 and 2002, facilities reported increases (<15%) in the amounts of NPRI pollutants released on site, sent for final disposal or for treatment prior to final disposal, and transferred off site for recycling and energy recovery (see table below).

COMPARISON OF NPRI DATA FOR 2001 AND 2002

NPRI Pollutants	2001	2002
Number of NPRI pollutants	265	266
Number of facilities reporting NPRI pollutants (excluding CAC)	2 660	3 191
Number of pollutants reported	201	208
Number of reports	12 007	14 638
Releases (on site) in tonnes	181 116	208 562
Disposal (in tonnes)	272 999	275 517
Off-site transfers for recycling and energy recovery	1 128 050	1 235 268

CAC Substances

Number of facilities reporting CAC	3 048
Number of CAC substances	7
Number of CAC reports	9 368

Although more facilities (531 more facilities or 20%) reported NPRI pollutants for 2002, the total releases of NPRI pollutants for the year 2002 were only slightly higher (27 446 tonnes or 15%) than the 2001 reporting year. Disposal quantities, however, rose by only 2 518 tonnes (0.9%).

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2002 Releases and Disposal

ON-SITE RELEASES

Facilities reported an estimated 208 562 tonnes of NPRI pollutants released on site in 2002, an increase of 27 446 tonnes from 2001. Releases to air accounted for 129 778 tonnes (62.3%), releases to water totalled 72 969 tonnes (35%), and releases to land totalled 5 626 tonnes (2.7%).

From 2001 to 2002, releases of NPRI pollutants to air increased by 5 165 tonnes (4.1%). Releases to water increased by 21 379 tonnes (41.4%), mainly because more ammonia and nitrate ion in solution was reported from facilities classified in the Water, Sewage and Other Systems category. It should be noted that the number of facilities reporting from this sector has risen by 66 installations (69%) since the 2001 reporting year because of changes in reporting requirements. Releases to land increased by 894 tonnes (18.9%) from 2001.

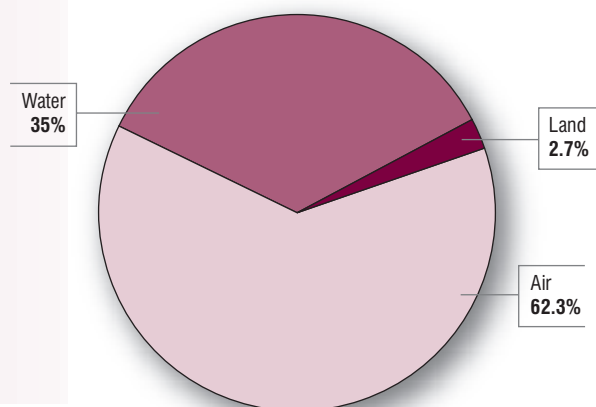
ON-SITE RELEASES – TOP FIVE NPRI POLLUTANTS

Substance	Releases (tonnes)	% of Total
Ammonia (total)	53 900	25.8
Nitrate ion in solution (at pH \geq 6.0)	31 697	15.2
Methanol	22 807	10.9
Hydrochloric acid	15 726	7.5
Sulphuric acid	13 756	6.6

TOP FIVE INDUSTRIAL SECTORS REPORTING THE LARGEST ON-SITE RELEASES OF NPRI POLLUTANTS

Industrial Sector	Releases (tonnes)	% of Total
Water, Sewage and Other Systems	59 042	28.3
Pulp, Paper and Paperboard Mills	27 288	13.1
Electricity Generation, Transmission and Distribution	18 032	8.6
Pesticide, Fertilizer and Other Agricultural Chemical Manufacturing	10 303	4.9
Oil and Gas Extraction	8 403	4.0

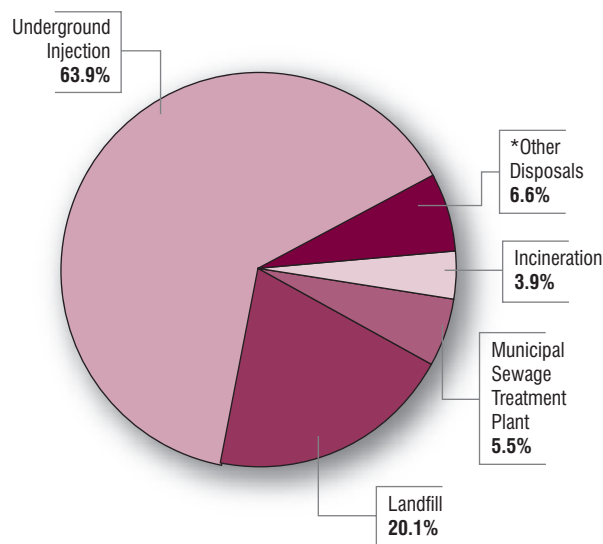
ON-SITE RELEASES OF NPRI POLLUTANTS IN 2002



On-site and Off-site Disposal

Facilities reported an estimated 275 513 tonnes of NPRI pollutants sent for disposal in 2002, an increase of 2 514 tonnes from 2001.

2002 FINAL DISPOSAL



*Other Disposals (Storage 0.7%; Physical Treatment 0.9%; Chemical Treatment 2.9%; Biological Treatment 0.3%; Land Treatment 1.7%)

FINAL DISPOSAL – TOP FIVE NPRI POLLUTANTS

Substance	Disposal (tonnes)	% of Total
Hydrogen sulphide	155 077	56.3
Zinc (and its compounds)	18 147	6.6
Calcium fluoride	15 575	5.7
Ammonia (total)	13 053	4.7
Manganese (and its compounds)	9 287	3.4

As noted above, hydrogen sulphide was disposed of in the largest quantity – an estimated 155 077 tonnes, or 56.3% of the national total. This quantity was attributed to underground injection by facilities in the Oil and Gas Extraction sector (125 984 tonnes) and the Support Activities for Mining and Oil and Gas Extraction sector (29 085 tonnes). In 2002, these sectors disposed of an estimated 147 918 tonnes of hydrogen sulphide. This resulted in an increase of 7 159 tonnes (or 4.8%) from these two sectors from 2001.

2002 Recycling and Pollution Prevention

Recycling and Energy Recovery

In 2002, an estimated 1 235 268 tonnes of NPRI-listed substances were sent for recycling and energy recovery, representing an increase of 107 218 tonnes from 2001.

OFF-SITE TRANSFERS FOR RECYCLING AND ENERGY RECOVERY – TOP FIVE NPRI POLLUTANTS

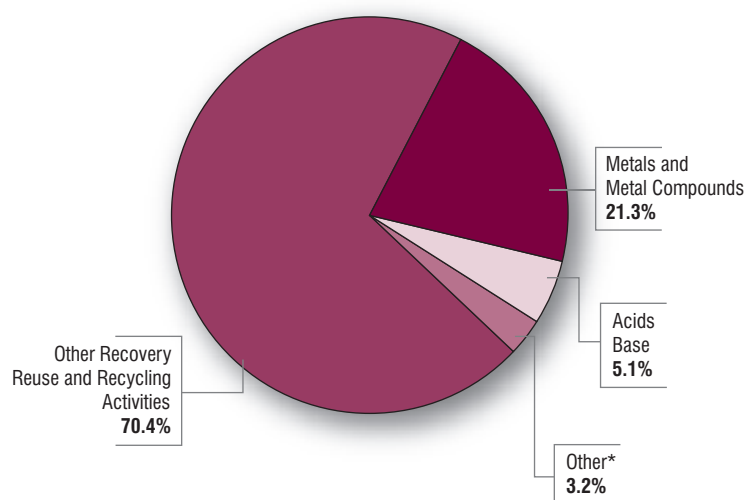
Substance	Recycled (tonnes)	% of Total
Hydrogen sulphide	864 012	69.9
Copper (and its compounds)	105 647	8.6
Sulphuric acid	75 219	6.1
Zinc (and its compounds)	58 499	4.7
Lead (and its compounds)	32 935	2.7

TOP FIVE INDUSTRIAL SECTORS REPORTING THE LARGEST DISPOSALS OF NPRI POLLUTANTS

Industrial Sector	Disposal (tonnes)	% of Total
Oil and Gas Extraction	132 637	48.1
Support Activities for Mining and Oil and Gas Extraction	29 175	11.2
Alumina and Aluminum Production and Processing	15 306	6.1
Iron and Steel Mills and Ferro-Alloy Manufacturing	13 370	5.3
Basic Chemical Manufacturing	13 332	5.1

In 2002, 70.4% of the total quantity sent for recycling and energy recovery was reported under the “other” category. Most of this (69.9% of the total) was hydrogen sulphide. The reason for this amount was the off-site transfer for recycling by facilities in the Support Activities for Mining and Oil and Gas Extraction sector. In 2001, this sector had transferred an estimated 900 794 tonnes of hydrogen sulphide off site for recycling. Thus there was a decrease in 2002 of 36 782 tonnes (4.1%).

OFF-SITE TRANSFERS FOR RECYCLING



*Other (Organic Substances 0.3%; Inorganic Materials 0.2%; Used Oil < 1%; Pollution Abatement Residues 0.1%; Solvents 1%; Catalysts 0.9%; Energy Recovery 0.7%)

TOP FIVE INDUSTRIAL SECTORS REPORTING THE LARGEST OFF-SITE TRANSFERS OF NPRI POLLUTANTS FOR RECYCLING AND ENERGY RECOVERY

Industrial Sector	Recycled (tonnes)	% of Total
Support Activities for Mining and Oil and Gas Extraction	864 087	70.4
Motor Vehicle Parts Manufacturing	67 430	5.5
Petroleum and Coal Products Manufacturing	67 177	5.4
Electricity Generation, Transmission & Distribution	55 406	4.5
Non-Ferrous (excluding Aluminum) Production and Processing	38 084	3.1

Criteria Air Contaminants (CAC) Reported to the NPRI

Environment Canada had two reasons for adding criteria air contaminants (CAC) to the NPRI substance list in 2002. One was the need for more comprehensive data for domestic and international inventories and programs. The other reason was to provide information to the public. Information about CAC emissions enables governments to monitor and assess whether risk management for various sources of CAC is resulting in lower emissions. For modelling and other purposes, emission inventories are needed for all sources of emissions – industrial, commercial, mobile, natural and household. Inventories that contain all sources of emissions are referred to as comprehensive emissions inventories.

The following table summarizes the air releases of CAC from 3 048 facilities meeting the reporting requirements for 2002. It also compares these releases with those for the 2000 comprehensive inventory.

Pollution Prevention

Pollution prevention is defined in the *Canadian Environmental Protection Act, 1999* (CEPA 1999) as “the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste, and reduce the overall risk to the environment or human health”. Pollution prevention is the cornerstone of CEPA 1999. Throughout the Act, it is recognized as the primary means of protecting the environment and human health.

Pollution prevention tries to remove the causes of pollution rather than manage pollution after it has been created (this often results in cost savings for a facility). Beginning in 1997, qualitative reporting of pollution prevention activities has been required for listed substances under the NPRI program. Facilities can also report the extent to which pollution prevention was adopted and the reductions that resulted.

Pollution prevention activities may include, but are not limited to the following:

- materials or feedstock substitution;
- product design or reformulation;
- equipment or process modification;
- prevention of spills and leaks;
- on-site reuse, recovery, or recycling;
- improved inventory management or purchasing techniques; and
- good operating practice and training.

In 2002, approximately 56% of facilities reported some form of pollution prevention. As in previous years, most pollution prevention was reported under the heading “good operating practice”.

Pollution prevention encourages changes that are likely to lead to reductions in emissions, waste, and possibly use. On the 2002 reporting form, facilities were required to report, with reasons, changes in their on-site releases, off-site transfers and off-site recycling relative to the previous year. One possible reason for such changes is that pollution prevention measures had been adopted.

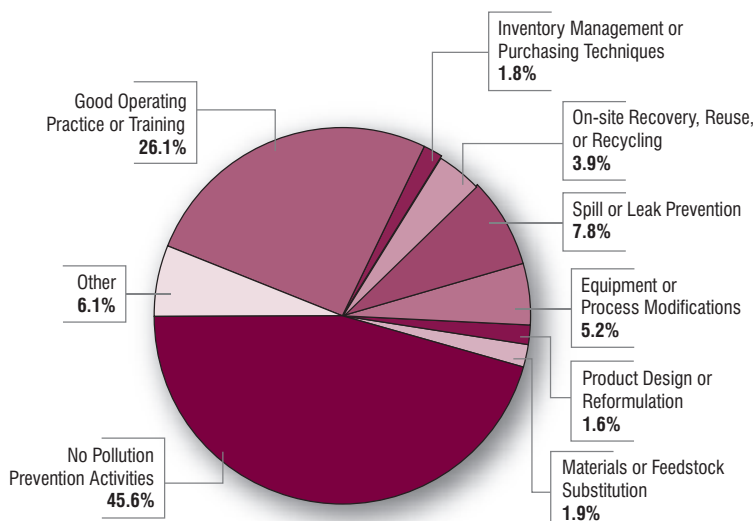
2002 CAC EMISSIONS compared with the 2000 National Comprehensive CAC Emissions

Pollutant	2002: CAC Reported to the NPRI (tonnes)	2000: CAC Emissions excluding Open Sources (tonnes)*	% of 2000 CAC Emissions
Total particulate matter (TPM)	226 454	16 372 382	1
PM ₁₀ **	108 678	5 135 494	2
PM _{2.5} **	61 058	963 305	6
Sulphur dioxide	1 977 312	2 352 424	84
Oxides of nitrogen	577 332	2 603 525	22
Volatile organic compounds (VOCs)	244 021	2 751 607	9
Carbon monoxide	974 327	11 282 385	9

* Open Sources consist of natural and other sources of emissions not caused directly by human activity.

**Year 2000 comprehensive CAC inventory includes both filterable and condensable particulate matter.

POLLUTION PREVENTION ACTIVITIES IN 2002



NPRI Substances

For the 2002 reporting year, 273 substances (including seven CAC) were listed in the NPRI; 82 of them had been determined to be toxic under CEPA 1999.

The NPRI pollutant list is divided into four parts, each with different reporting thresholds. The original threshold of ten tonnes and 1% concentration applies to 241 substances. The remaining 32 pollutants have different reporting thresholds, as follows:

- mercury (and its compounds) – manufacture, process, or otherwise use 5 kg per year;
- cadmium (and its compounds) – manufacture, process or otherwise use 5 kg per year;
- Arsenic (and its compounds), hexavalent chromium compounds, lead (and its compounds except tetraethyl lead), tetraethyl lead use 50 kg per year;
- 17 individual polycyclic aromatic hydrocarbons (PAHs) – 50 kg of releases and transfers per year; and
- dioxins/furans and hexachlorobenzene (HCB) – from selected activities, with no quantitative threshold.

The addition of CAC was a significant expansion of the NPRI. Environment Canada held extensive consultations with stakeholders to discuss the addition of CAC substances to the 2002 NPRI. Reporting criteria based on releases were developed for CAC, which consist of oxides of nitrogen, sulphur dioxide, carbon monoxide, volatile organic compounds (VOCs) and particulate matter, including total particulate matter, particulate matter with a diameter less than or equal to 10 microns, and particulate matter with a diameter less than or equal to 2.5 microns.

The NPRI

Who Reports to the NPRI?

In general, any person who owns or operates a facility in Canada was required to report to the NPRI for 2002 if the facility met or exceeded all criteria for the type of activity, the number of employees or hours worked, and, in most cases, the amount of NPRI-listed substances manufactured, processed, or otherwise used in specified amounts (referred to as “thresholds”). For CAC, any industrial or commercial facility that met the reporting threshold had to report to the NPRI for the 2002 reporting year.

NPRI reports for any calendar year must be submitted to Environment Canada by June 1 of the following year.

What Was Reported to the NPRI in 2002?

A report for any NPRI substance included an indication of whether the substance was manufactured, processed or otherwise used and the nature of such activities and uses during the year. Specifically, facilities reported:

- the quantity released on site to air, water and land;
- the quantity transferred off site for disposal and the nature of treatment, destruction or containment;
- the quantity transferred off site for recycling, differentiated into the amounts recovered for energy and various materials, such as solvents, catalysts, and metals;
- the reasons for changes in releases or transfers compared with the previous year; and
- pollution prevention measures.

CAC REPORTING THRESHOLDS FOR 2002

CAC Substance	Threshold (tonnes)
Total particulate matter (TPM)	20.0
Total particulate matter ≤ 10 microns (PM ₁₀)	0.5
Total particulate matter ≤ 2.5 microns (PM _{2.5})	0.3
Sulphur dioxide (SO ₂)	20.0
Oxides of nitrogen (expressed as NO _x)	20.0
Volatile organic compounds (VOCs)	10.0
Carbon monoxide (CO)	20.0

2002 NPRI Reports

Through work with stakeholders concerning the “reporting out” of NPRI information, the following groupings were formulated to summarize information collected by the NPRI for the 2002 reporting year:

- **On-site pollutant releases:**
 - air,
 - water, and
 - land – includes spills, leaks and other.
- **Final Disposal:**
 - on-site disposal: landfill, land treatment and underground injection;
 - off-site disposal: landfill, land treatment, underground injection and storage; and
 - off-site transfers for treatment prior to final disposal: physical treatment, chemical treatment, biological treatment, incineration or thermal treatment where energy is not recovered, and treatment at a municipal sewage treatment plant (MSTP).
- **Off-site transfers for recycling and energy recovery:**
 - recycling and energy recovery.

In 2004, Environment Canada will be publishing several documents summarizing the NPRI. These will include the 2002 National Overview series and *Informing Canadians on Pollution 2004: Highlights of the 2002 National Pollutant Release Inventory (NPRI)*.

The 2002 National Overview Series is composed of the following documents:

- 2002 National Overview – Reporting Requirements;
- 2002 National Overview – Summary of Data;
- 2002 National Overview – On-site Releases of NPRI Pollutants;
- 2002 National Overview – Final Disposal and Off-site Transfers for Treatment Prior to Final Disposal; and
- 2002 National Overview – Off-site Transfers for Recycling and Energy Recovery.

Using the Data

NPRI data represent only some of the chemicals released and transferred to the Canadian environment. Other substances, such as greenhouse gases, many pesticides, and other pollutants, are not part of the current list of NPRI substances.

Although the NPRI program collects data on the release and transfer of pollutants from a broad range of industrial and non-industrial sectors, not all sources in those sectors are obliged to report to the NPRI. Some facilities are exempt or do not meet the reporting thresholds because of their size. Other sources, such as mobile sources, commercial establishments and households may release small amounts of pollutants individually, but as a group they account for a large part of the releases of some pollutants.

Double counting is a factor that needs to be considered when using NPRI data. Although on-site releases and disposal can be reported only once, transfers may be counted more than once. For example, transfers from one facility for final disposal may be reported as both a disposal on site and a release to the environment by the receiving facility. It is possible to account for multiple reporting when adding releases and disposals on site and off site, but it requires extensive analysis of the NPRI database.

Different factors must be considered before drawing conclusions about the environmental performance of specific industrial sectors. It is important to consider the relative size of the facility, the complexity of the process and the technologies that are available. It would be wrong to assume that facilities or industrial sectors with the largest releases or transfers are less inclined than others to preventing and controlling pollution. Consideration should also be given to the fact that the NPRI list of substances and reporting criteria may change from year to year.

Risks to the environment and human health from on-site releases of pollutants cannot be determined from NPRI data alone. Risk depends on many factors, such as the toxicity of the pollutant, the extent of the exposure, the type of release or transfer and the environmental medium to which the pollutant is released.

More information on the NPRI may be obtained by contacting:

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