National Pollutant Release Inventory

About the NPRI 1998

Canadian Environmental Protection Act

Canada

Environment Canada | Environnement Canada

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What is the National Pollutant Release Inventory?

The National Pollutant Release Inventory (NPRI) was created in 1992 to provide Canadians with information on pollutants released to the environment and transferred for disposal. Since then, its role has expanded to collect data on recycling and pollution-prevention activities. The program is delivered by Environment Canada.

Under the authority of the *Canadian Environmental Protection Act* (CEPA), owners or operators of facilities that manufacture, process or otherwise use one or more of the NPRI-listed substances under prescribed conditions are required to report. The first year for which companies were required to report to the NPRI was 1993.

The CEPA 1988 was in force when the notices of NPRI reporting requirements for 1998-2000 were published in the *Canada Gazette Part I*. The CEPA 1999 came into force in April 2000, and will be the authority for future NPRI reporting requirements.

The NPRI is the only legislated, nation-wide, publicly-accessible inventory of its type in Canada. One of the fundamental objectives of the NPRI is to provide Canadians with access to pollutant release information for facilities located in their communities. In addition, the NPRI supports a number of environmental initiatives by providing information that assists governments and others in identifying priorities for action, encourages industry to take voluntary measures to reduce releases, allows for tracking of progress in the reduction of releases, and supports a number of regulatory initiatives across Canada.

Who Reports to the NPRI?

In general, any person in Canada who owns or operates a facility is required to submit a report to the NPRI, if they meet all three of the following criteria:

- employees worked a total of 20 000 hours or more (equivalent to 10 full-time employees) during the calendar year, and
- the facility manufactured, processed or otherwise used 10 tonnes (10 000 kg) or more of an NPRI substance in the calendar year, and
- the NPRI substance was manufactured, processed or otherwise used at a concentration greater than or equal to 1% by weight, with the exception of NPRI substances considered to be by-products. The total weight of by-products, regardless of their concentration, must be included in the calculation of the 10-tonne threshold for each NPRI substance.

All facilities, from all economic sectors, meeting the reporting criteria are required to report, unless specifically exempt under the notice published in the *Canada Gazette Part I*. Therefore, reporting may be triggered in commercial and government services sectors such as electrical power generation utilities, airports and municipal water- and sewage-treatment plants. Exempt facilities include those (or any part thereof) used exclusively for:

- education and training of students (universities, colleges and schools),
- research or testing,
- the maintenance and repair of transportation vehicles,
- the distribution, storage or retail sale of fuels,
- the wholesale or retail sale of articles or products which contain listed substances, but which were not released during normal use at the facility,
- the retail sale of listed substances,
- growing, harvesting and management of renewable resources (forestry, fisheries and agriculture), but not those facilities which process or otherwise use their products,
- mining, but not those facilities engaged in the further processing of mined materials, and
- the drilling or operating of oil and gas wells, but not those facilities which process or otherwise use their products.

The number of facilities reporting to the NPRI can be expected to fluctuate from year to year because of:

- new facilities opening or existing facilities shutting down (either temporarily or permanently),
- facilities on the verge of meeting the 10-tonne reporting threshold which may trigger reporting in some years, but not others,
- facilities that have expanded their operations and, as a result, are meeting the reporting requirements for the first time,
- facilities that were previously required to report but have only recently come forward to declare themselves as reporters, or that have been identified as being required to report through Environment Canada's compliance promotion and enforcement efforts, and
- facilities that are reducing or eliminating the use of substances listed on the NPRI.

What is Reported to the NPRI?

All facilities in Canada meeting the NPRI reporting criteria are legally required to submit a report to Environment Canada if they manufacture, process or otherwise use one or more of the NPRI-listed substances under prescribed conditions. A facility must file one report for each pollutant that meets the NPRI reporting requirements. The deadline for reporting and other requirements are published annually in the *Canada Gazette Part I.*

Reporting facilities must indicate whether the NPRI substance is manufactured, processed or otherwise used, and the nature of such activities and uses at the facility during the calendar year. They must report on-site releases and off-site transfers of pollutants, as well as facility and company information.

Facilities are required to provide information to which they can reasonably be expected to have access. In some instances, information is readily available from existing monitoring for provincial permits or licences. In other cases, a variety of estimation methodologies are used, depending on the information available and the type of industry. The lowest reportable unit is 0.001 tonne or one kilogram. In declining order of expected accuracy, estimates can be based on direct measurements, mass balances, emission factors or engineering estimates. It is expected that improvements in estimation methods, increased familiarity of facilities with the NPRI reporting requirements, and Environment Canada's compliance promotion and enforcement activities will continue to increase data accuracy.

NPRI List of Substances

The NPRI substance list, developed through public consultation, was derived from the 1990 United States Toxic Release Inventory, after deleting substances or classes of substances that were either not used in Canada at all, or were used in quantities smaller than one tonne per year. There were 178 substances on the first NPRI list in 1993.

Changes may be made to this list from year to year after consultations with Canadian stakeholders. Minor adjustments have been made to the list since the program's inception in 1993. For the 1998 reporting year, the total number of reportable substances was 176, while this number increased to 245 for the 1999 reporting year.

The list of NPRI substances is published in the *Canada Gazette Part I* for each reporting year.

Each chemical substance is identified by a Chemical Abstract Service (CAS) registry number – a unique number assigned by the Chemical Abstracts Service, a division of the American Chemical Society. A chemical may be known by several different names, but it has only one CAS number. Some of the reportable NPRI substances represent groups or classes of substances such as "copper (and its compounds)". For these groups, no specific CAS number exists.

CEPA-toxic and Carcinogenic Pollutants

Some substances on the NPRI list may be of particular interest because they have been determined to be "CEPA-toxic", "carcinogenic" or "probably carcinogenic".

Part II of the CEPA 1988 focuses on reducing the risks posed by new and existing substances. Schedule I is the List of Toxic Substances, which are or may be regulated under Part II. The NPRI identifies all substances on Schedule I of CEPA 1988 as "CEPA-toxic" substances.

Part II of the CEPA 1988 also requires the establishment of the Priority Substances List (PSL) – substances considered the most important for assessment in Canada. The first Priority Substances List (PSL 1) was published in February 1989, by the Ministers of the Environment and Health. All 44 substances on this list – including individual substances, groups of compounds, effluents and wastes – were assessed by Environment Canada and Health Canada. The assessment of these substances to determine whether or not they were toxic or capable of becoming toxic, as defined under Section 11 of the CEPA 1988, was completed within the five-year time frame. Twenty-five substances were found to be "toxic" and appropriate management strategies have been or are being developed. Those pollutants that meet the toxicity criteria are generally referred to as "CEPA-toxic", and this designation is also used to identify NPRI substances.

A substance is defined as "toxic" under Section 11 of the CEPA 1988 if:

> "… it is entering or may enter the environment in a quantity or concentration or under conditions
>
> (a) having or that may have an immediate or long-term harmful effect on the environment;
>
> (b) constituting or that may constitute a danger to the environment on which human life depends; or
>
> (c) constituting or that may constitute a danger in Canada to human life or health."

Twenty-five additional substances were selected in December 1995, for the second Priority Substances List (PSL 2) and are currently being assessed for toxicity under the CEPA. Final assessments for two PSL 2 substances had been published in the *Canada Gazette* as of March 29, 2000, and neither were found to be CEPA-toxic. The remaining PSL 2 substances will be assessed by the end of 2000.

The classification of carcinogens used by the NPRI program is that of the International Agency for Research on Cancer (IARC). In 1969, the IARC initiated a program to evaluate the carcinogenic risk of chemicals to humans and to produce monographs on individual chemicals. The Monographs Program has since been expanded to include consideration of exposures to complex mixtures of chemicals and to other agents, such as radiation and viruses. The monographs represent the first step in carcinogenic risk assessment, which involves examination of all relevant information to assess the strength of the available evidence that certain exposures could alter the incidence of cancer in humans. The second step is the quantitative risk estimation method.

The term "carcinogen" is used in these IARC monographs to denote an exposure that is capable of increasing the incidence of malignant neoplasm or tumour; the induction of benign neoplasm may, in some circumstances, contribute to the judgment that the exposure is carcinogenic. The IARC monographs are recognized as an authoritative source of information on the carcinogenicity of a wide range of human exposures.

IARC-1 grouped substances have been defined as agents (mixtures) which are carcinogenic to humans. The term “agent” is defined by the IARC to include individual chemical compounds, groups of related chemical compounds, physical agents (such as radiation) and biological factors (such as viruses). IARC-2A grouped substances are defined as probably carcinogenic to humans. This category is used when there is limited evidence of carcinogenicity in humans, but sufficient evidence of carcinogenicity in experimental animals.* The NPRI-listed carcinogenic substances include only those designated by IARC as 1 or 2A.

Industrial Classification Codes and Industrial Sectors

Industrial classifications are a means of identifying different types of businesses and industries. The NPRI has adopted the North American Industry Classification System (NAICS) as the standard for identifying industrial sectors to enable better comparisons of NPRI data with similar inventories in the U.S. and Mexico. The NPRI continues to collect Canadian and American Standard Industrial Classification (SIC) data to retain continuity with its historical data.

The NPRI requires facilities to report the SIC and NAICS codes that best represent the primary industrial activity of the facility. This allows the NPRI to identify trends in releases from specific industrial sectors.

On-site Releases

An on-site release is an on-site discharge of a pollutant to the environment. This includes emissions to air, discharges to surface waters, on-site releases to land and deep-well underground injection, within the boundaries of the facility.

On-site releases are further subdivided as releases to:

- Air
  - stack/point
  - storage/handling
  - fugitive
  - spills
  - other non-point
- Surface water
  - discharges
  - spills
  - leaks
- Land
  - landfill
  - land treatment
  - spills
  - leaks
  - other
- Underground injection.

* Information regarding the International Agency for Research on Cancer (IARC) was obtained from the IARC Web site at <www.iarc.fr/>. This site provides information on the IARC's mission and publications (including the *IARC Monographs Evaluations* and IARC epidemiology data).

Fugitive releases are the total of all releases to air that are not released through confined process streams, such as fugitive equipment leaks from valves.

Landfills are sites in which wastes containing NPRI pollutants are buried. Most landfills found in Canada are provincially-approved, waste-disposal sites. Some landfills are classified as hazardous-waste-approved, but more typically they are disposal sites for non-hazardous waste only. Regardless of classification, all landfills are required to have appropriate permits and be specifically designed under strict guidelines for use as a final disposal site for waste. For the purposes of the NPRI, on-site landfilling is reported as an on-site release. If an NPRI substance is transferred to an off-site landfill, it is reported as an off-site transfer for disposal.

The materials released to landfill are wastes from production or are generated as a result of pollution-control measures. These materials are put in a landfill to minimize the risk to health and the environment. While landfilling is an accepted waste-management practice, a preferred option is recycling. The best approach is to prevent the generation of wastes or pollutants using pollution-prevention techniques.

Land treatment, also called application farming, is a disposal method by which a waste containing a listed pollutant is applied or incorporated into soil for biological degradation. This type of disposal method is usually approved under provincial jurisdiction. For the purposes of the NPRI, on-site land treatment is reported as an on-site release. If an NPRI substance is transferred off site for land treatment, it is reported as an off-site transfer for disposal.

A leak differs from a spill in terms of the time required for an event. Spills normally occur over a period of hours or days, whereas leaks occur over a period of days or months.

Underground injection is another method of waste disposal. Subject to provincial regulation, liquid wastes are injected into known geological formations, generally at great depths.

Off-site Transfers

An off-site transfer is a shipment of an NPRI-listed substance to an off-site location for disposal or for recycling. Facilities must provide the name and location of the off-site facility receiving the shipment.

Off-site Transfers for Disposal

“Disposal” is final disposal of the material (e.g., landfill) or storage and treatment (e.g., stabilization) prior to final disposal.

Information on off-site transfers for disposal includes treatment and disposal methods. Off-site treatments do not necessarily constitute an environmental release because the pollutant may be altered chemically or physically, and may not be ultimately released in its original form. Therefore, disposal methods represent environmental releases with different environmental impacts, depending on the site and the pollutant.

Eight major off-site disposal methods are identified:

- physical treatment, such as drying, evaporation, encapsulation or vitrification,
- chemical treatment, such as precipitation, stabilization and neutralization,
- biological treatment, such as bio-oxidation,
- incineration or thermal treatment where energy is not recovered,
- containment, either in a landfill or other storage,
- municipal sewage treatment plant (MSTP),
- underground injection at an off-site location, and
- land treatment, for the purpose of land application or land farming.

Off-site transfers for disposal are reported separately from on-site releases because:

- off-site transfers represent a movement of the pollutant to a different geographical location than that of the facility,
- off-site transfers do not always represent entry of the pollutant into the environment, e.g., when off-site transfers are sent for treatment and the pollutants are transformed into other chemicals,
- management of the pollutant becomes the responsibility of another owner or operator,
- reporting of off-site transfers provides complete information on the fate of the pollutant, and
- wastes may be transferred a number of times, which may lead to double-counting of those materials.

The NPRI is improving the way in which facilities identify the off-site facilities to which they transfer their wastes. This should allow the NPRI to better identify instances of double-counting of transfers in the future.

Off-site Transfers for Recycling

“Recycling” refers to activities that keep a material or a component of the material from becoming a waste destined for final disposal.

As a result of public consultations in 1996, the reporting of recycling activities to the NPRI became mandatory, beginning in the 1998 reporting year.

Generally, materials transferred off site for recycling include those sold to recyclers, such as metal shavings or turnings, material sent off site for processing, cleaning or reclamation and returned to the facility, and those materials sent back to suppliers for credit or payment. The recyclable material may be used in the manufacture of another product. Components may be recovered or reclaimed from the recyclable material or the material may be used as a fuel for energy recovery. Energy recovery is applicable only when the energy recovered from combustion is used as an alternative to fossil fuels or other forms of energy.

Substances and materials transferred off site for recycling activities are not normally released to an environmental medium. Once transferred off site to another facility, the handling and further processing of those substances may result in releases, which may be reportable by that off-site facility if it meets the NPRI reporting criteria.

Ten types of recycling operations are identified, based on those set out in the *Canadian Export and Import of Hazardous Waste Regulations* and the International Waste Identification Code developed by the Organization for Economic Cooperation and Development. These activities include:

- energy recovery,
- recovery of solvents,
- recovery of organic substances (not solvents),
- recovery of metals and metal compounds,
- recovery of inorganic materials (not metals),
- recovery of acids or bases,
- recovery of catalysts,
- recovery of pollution-abatement residues,
- refining or reuse of used oil, and
- other recovery, reuse and recycling activities.

With the exception of energy recovery, the recycling activities are related to the nature of the substance being recycled (solvents, organic substances, metals, acids or bases, etc.). However, the energy recovery activity is distinct because it is based on the energy content (BTU value) of the NPRI substance and its ability to be used as a fuel for energy recovery. The NPRI publishes recycling data under two categories – off-site transfers for recycling (excluding energy recovery) and off-site transfers for energy recovery.

Pollution-Prevention Activities

Reporting of pollution-prevention (P2) activities became a mandatory requirement beginning in the 1997 reporting year. It was introduced to help the federal government and others track progress in pollution prevention and to provide companies undertaking P2 activities with an additional means of demonstrating these activities to the public.

Pollution prevention is an environmental protection approach that seeks to eliminate the causes of pollution rather than managing it after it has been created. Pollution prevention is defined as:

> "the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and reduce the overall risk to human health or the environment". (*Pollution Prevention: A Federal Strategy for Action*, Environment Canada, June 1995)

Pollution prevention encourages the kinds of changes that are likely to lead to lower production costs, resource conservation and increased efficiencies.

Generally speaking, pollution-prevention techniques and practices focus on areas such as:

- materials or feedstock substitution (e.g., using aqueous-based rather than solvent-based cleaners),
- product design or reformulation (e.g., changing product specifications to reduce or eliminate the use of toxic substances, modifying product design or composition to make them more environmentally friendly),
- equipment or process modifications (e.g., instituting recycling within a process, switching from the use of solvents to mechanical paint-stripping devices),

- spill and leak prevention (e.g., taking measures to prevent releases such as installing splash guards and drip trays around equipment),
- on-site reuse, recycling or recovery (e.g., using a small distillation unit to reclaim solvents on site),
- improved inventory management or purchasing techniques (e.g., avoiding the unnecessary generation of waste by ensuring that materials do not stay in inventory beyond shelf life, instituting a clearinghouse to exchange materials that would otherwise be discarded), and
- good operating practices or training (e.g., changing production schedules to minimize equipment and feedstock changeovers, training staff to recognize and implement P2 opportunities).

Other environmental protection approaches focus on waste management. These include pollution-control and waste-treatment activities as well as off-site recycling and disposal activities. These approaches also reduce environmental and health risks by ensuring that pollution or waste that is not prevented is well managed.

Reporting Pollution-Prevention Activities in the NPRI

Facilities that have taken measures to prevent the generation of NPRI pollutants and wastes are asked to indicate, from the list of pollution-prevention techniques and practices provided, what type of P2 activities they have implemented, on a substance-by-substance basis. They are asked to provide qualitative data only, but are encouraged to provide further details on the nature of their P2 activities if they so desire (including environmental and economic benefits).

Facilities are required to report on their P2 activities for NPRI-listed substances only. However, they are also encouraged to provide information on other P2 initiatives (e.g., P2 activities for non-NPRI substances, water and energy conservation initiatives, etc.).

Qualitative reporting provides limited basic information on P2 activity. Qualitative data, such as the information provided by facilities reporting to the NPRI, indicate if P2 activity has occurred in reporting facilities, but do not indicate either the extent of these activities (frequency, comprehensiveness) or their effect on the generation of pollutants and waste.

How to Obtain NPRI Information

There are many ways to obtain information on releases and transfers of NPRI pollutants nationally, provincially and at the local community level.

Each year, Environment Canada publishes a national overview of NPRI data reported by Canadian facilities. This overview includes information on the NPRI-listed substances and their releases on site to the environment and off-site transfers for disposal or recycling. Information is presented on a national basis, summarizing releases by environmental medium, by pollutant and by industrial sector, with comparisons to the previous year's data. Supplementary tables that complement the national overview are available electronically on the NPRI Web site at <www.ec.gc.ca/pdb/npri/>. These tables provide detailed information reported to the NPRI, such as the complete listing of reporting facilities and reported on-site releases and off-site transfers of pollutants for the reporting year.

Other reports and analyses are developed and made available to the public throughout the year on the NPRI Web site. These reports include multi-year trend analyses, provincial and regional summaries, additional supplementary tables such as those summarizing releases by industrial sectors and other special features.

All non-confidential NPRI information and data are also accessible on the NPRI Web site. The Web site includes background information on the NPRI, provides news on upcoming events, highlights stakeholder consultation activities and provides links to similar Web sites in North America and around the globe. It provides access to current and previous NPRI reporting requirements, guidance documents and downloadable data products. Electronic versions of previously-published annual summary reports, and databases, are also available.

In addition, the NPRI Web site allows the user to query the NPRI database on specific facilities in each of the reporting years. This interactive querying feature allows the user to select a specific facility reporting to the NPRI, geographic area or release for any NPRI-listed pollutant. Searches can also be performed by industrial sectors, based on SIC codes.

Factors to Consider when Using NPRI Data

NPRI data provide a publicly-available annual record of releases and transfers of listed pollutants from facilities operating in Canada. However, NPRI data represent only a portion of all chemical releases and transfers to the Canadian environment.

Other substances, such as greenhouse gases (e.g., carbon dioxide and methane), ozone-depleting substances, many pesticides and other pollutants are not part of the current list of NPRI substances and may be reported to other inventories or managed under other programs.

While the NPRI program currently collects pollutant release and transfer data from a broad range of industrial and non-industrial sectors, not all sources are captured by the NPRI. For example, industrial and stationary fuel combustion sources and mobile sources (e.g., automobiles and trucks), are known to be major contributors of hazardous air pollutants (e.g., benzene and 1,3-butadiene are both considered toxic under the *Canadian Environmental Protection Act* (CEPA-toxic)). Long-range transboundary air pollution (LRTAP) from other countries may be a contributor of persistent organic pollutants (POPs) and heavy metals (HM) such as cadmium and mercury.

Facilities that do not meet the reporting thresholds because of their size (either the number of employees or the quantity of substances used), such as dry cleaners, or because they are exempt, such as gas stations, do not report to the NPRI. Collectively, however, releases from these sources may account for the majority of releases of some pollutants.

Releases of a particular pollutant by a facility reporting to the NPRI should be considered in the overall context of these other pollutants, other sources and smaller-sized facilities.

Different factors must be considered before drawing conclusions on the environmental performance of specific facilities or industrial sectors. In examining the amount of total releases of any one facility or sector, it is important to consider more than just their magnitude. One should also consider the amount being released relative to the size of the facility or sector, the complexity of the process and the best available technologies. It would be incorrect to assume that facilities or industrial sectors with the largest releases or transfers are less inclined than others toward pollution prevention and control.

Risk to human health and the environment from on-site releases of pollutants cannot be determined from NPRI data alone. Although the data are useful as a starting point in identifying potential risks, other information is required before such assessments can be made.

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 receiving the pollutant. The amount of releases of some pollutants may not necessarily be commensurate with their environmental or health impacts. Conversely, smaller releases of specific pollutants may have significant impacts.

Additional information can be obtained from sources listed on the following page.

Confidential Information

Any person who provides information to the Minister of the Environment, under the provisions of Part II of the CEPA, may submit a written request that the information be treated as confidential. The request for confidentiality must accompany the NPRI report submitted to Environment Canada, and must meet criteria set out in the *Access to Information Act*. A request for confidentiality will be denied if the data are already in the public domain.

The NPRI does not include confidential data in any public documents. It does, however, report in its annual summary the number of facilities granted confidential status and their overall contribution to releases and transfers.

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Fax: (613) 941-8632
Web site: www.hc-sc.gc.ca/ehd/catalogue/index.htm

Canadian Centre for Occupational Health and Safety
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Tel.: (905) 570-8094
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