

Environmental Groups' Response to Environment and Climate Change Canada's and the Canadian Nuclear Safety Commission's decision to reject without consultation the ENGO Proposal to Add Radionuclides to the National Pollutant Release Inventory

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Original submitted to National Pollutant Release Inventory: January 22, 2018
Resubmitted with Supporting Environmental Organizations: Updated February 21, 2018

Acknowledgement: We acknowledge the support of the following organizations in production of this submission: Healthy Great Lakes Program, Canadian Environmental Law Association and Legal Aid Ontario.

Disclaimer: The views and recommendations presented in this report are those of the authors, the Canadian Environmental Law Association and other supporting organizations, but not necessarily those of Legal Aid Ontario.

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January 22, 2018

Summary

Environment and Climate Change Canada (ECCC) and the Canadian Nuclear Safety Commission (CNSC) have concluded that radionuclides are not a suitable candidate for addition to the National Pollutant Release Inventory (NPRI). Their conclusion is based on their view that similar information is already being reported and made publicly available on the CNSC website. Thus, ECCC and the CNSC are rejecting the ENGO proposal to add radionuclides from the nuclear sector to the NPRI.

We do not agree with their conclusion. Our analysis of the information provided through CNSC sites with respect to radionuclides has shown that this information is not in a quickly, easily accessible and neutral form, and thus, not equivalent to how it would be presented on the NPRI site.

Recommendation

In the interests of public transparency and community right-to-know, we urge ECCC to continue to pursue this matter with its stakeholders by sending out for public comment the ENGO proposal to add radionuclides (2013), the ECCC and CNSC Joint Response (2017), and the ENGO response (2018), rather than recommending an outright rejection to add radionuclides to the NPRI without having consulted with the broad community.

Background

Several times over the past years, the possibility of adding radionuclides to the NPRI has been brought to the NPRI Multi-Stakeholder Work Group. On November 13, 2013, via a presentation made by ENGOs to the NPRI Multi-stakeholder Work Group, ECCC received a more formal proposal to add radionuclides to the NPRI.¹ The proposal focused on radionuclides being released from nuclear facilities from the uranium/nuclear fuel chain, including uranium mines and mills, uranium refining and conversion facilities, nuclear power plants, radioactive waste management sites, uranium mine tailings management sites and research reactor sites.

The NPRI section of ECCC added this ENGO proposal to their work plan for 2016 and 2017. During that time ECCC jointly evaluated the proposal with the CNSC because of CNSC's major role in overseeing and approving matters related to facilities using or generating radioactive materials.

¹ ENGO PowerPoint presentation to NPRI Work Group - Anna Tilman and John Jackson November 13 2013

ECCC and CNSC concluded that “radionuclides are not a suitable candidate for addition to the NPRI, as comprehensive information on the quantities of radionuclides released, transferred, disposed and stored is already being reported to the CNSC and is made publicly available through contact with the CNSC and/or on the CNSC website. As radionuclides do not meet all of the decision factors for the addition of substances to the NPRI, it is therefore recommended that the proposal to add radionuclides to the NPRI substance list be rejected” (Joint Response October 2017, p. 3). Further ECCC decided that the proposal to add radionuclides to NPRI “will not be referred to the full stakeholder consultation process.”²

The NPRI is a valuable public right-to-know tool that currently provides pollution release and transfer data on over 360 pollutants from facilities across Canada. The benefit of the NPRI is that it offers the user the ability to search for information on a specific pollutant, a specific facility, and a specific sector. It also can provide cumulative information for a geographic area, e.g., a local community, postal code, province, territory or country-wide for a current year and previous years.

It is critical that Canadians have access to pollutants associated with many sectors in their community. Thus, it is important that all sectors, especially major sectors such as the nuclear industry, report on all major pollutants associated with that industry, in this case, including radionuclides, and that those communities in which these facilities are located are able to easily access this information.

Comments on Findings in the ECCC and CNSC Joint Response

The NPRI program has four criteria to consider when deciding whether to add a substance to the NPRI list. ECCC and CNSC concluded that two of these four criteria were not met for radionuclides. These are criterion #2 (Does inclusion of the substance support one or more of the objectives of NPRI?) and #3 (Is the substance reported elsewhere in Canada?). In both of these cases, they gave the same reason for why radionuclides don’t meet these two criteria: “Reporting to NPRI would not result in a meaningful improvement; data already collected by CNSC can be linked to from NPRI” criterion 2, and for criterion 3: “More detailed and comprehensive information is collected by the CNSC than would be collected by the NPRI.”³

Since this is their core argument against adding radionuclides to the NPRI, the issue we focus on in this brief is whether CNSC data can adequately provide for community right to know. We will then briefly address all four of the decision-factors.

Adequacy of CNSC as Method for Public to fulfill their Right-to-Know

It is important to recognize that information on pollutants is not only for the use of government and industry. Also it is not just for those who are experts at gathering and using data. Information in an inventory should be a quickly and easily accessible, and easily understandable to satisfy community right-to-know provisions of the NPRI. For example:

- What facilities are in one’s community?

² CNSC PowerPoint presentation to Work Group Oct. 24,2017 p.9

³ Ibid p. 8

- What types of substances are being released to air, land and water, and in what quantities?
- What is the trend in emissions over time?

CNSC does not, and would not, even with ECCC and CNSC’s proposals to revise the CNSC website, replace the need for having data on radionuclides on the NPRI website.

With respect to using the CNSC website and its links to access information and data on radionuclides, it has several major limitations:

- While information is publicly available through the CNSC on quantities of radionuclides released, transferred, disposed and stored, accessibility to the data is limited and not straightforward to obtain. A user would require much more effort and time to access this information than if it were on the NPRI site.

For example, CNSC’s links to Independent Environmental Monitoring Program and its Regulatory Oversight Reports cited in the ECCC and CNSC’s Joint Response contain much information on nuclear facilities, but it takes an inordinate amount of time to search through these documents posted on the site to find specific information on radionuclides for a particular facility.⁴ As a result, most users would not find what they want and would be unlikely to re-visit the website. Even a seasoned data user would find the CNSC sites difficult and unmanageable for finding very specific information. In addition, it is often necessary to request information from the Commission. This is inconsistent with the aim of providing easily and quickly accessible, publicly posted information. Also, the CNSC may not necessarily agree to a request for the release of specific documents.

- Furthermore, the context in which data is presented on the CNSC website is not necessarily neutral. Unlike the NPRI, it also includes statements, tables and graphs stating that releases of radionuclides from nuclear facilities are within limits set by the CNSC and doses to workers and members of the public are below regulatory limits.⁵ This implies that consequences of exposure to radionuclides on human health and the environment are minimal, if at all, and there is no need to be concerned

ECCC and CNSC conclude their discussion on health and environmental concerns by asserting: “Furthermore, radionuclides related to both the nuclear fuel chain and others are highly regulated by CNSC to ensure potential health and environmental concerns are mitigated”⁶ This is an irrelevant statement in terms of what should be put on the NPRI list. Many substances listed on the NPRI are regulated and usually the standards are being met.

⁴ Radioactive Release Data from Canadian Nuclear Power Plants – Annual release amounts from nuclear power plants, measured in radioactivity, compared to annual release limits

<http://www.nuclearsafety.gc.ca/eng/resources/publications/reports/rrd/index.cfm>

<http://nuclearsafety.gc.ca/eng/resources/maps-of-nuclear-facilities/iemp/pickering.cfm#table>

⁵ <http://www.nuclearsafety.gc.ca/eng/reactors/power-plants/regulatory-oversight-report-npp/index.cfm>

⁶ Joint Response p. 11

On the NPRI site, in contrast, one can find data on pollutants associated with a particular facility, without any interpretation of that data, allowing one to do their own analysis, if needed, assess progress or set-backs, and draw their own conclusions.

- Furthermore, as acknowledged by the CNSC, public availability and accessibility of their websites need to be improved. While making improvements to the CNSC site with respect to public accessibility is a worthwhile endeavor on its own and is recommended, providing CNSC links on the NPRI site is not a satisfactory solution to the need for a comprehensive, single-site pollutant national inventory. Public users should not have to visit and research various websites and links in order to find information on the range of pollutants being reported by a specific facility, whether or not they are radionuclides. Being able to find all pollutants from a facility in one spot is essential to helping people get a more complete picture of the possible implications for their community.
- Also residents in the vicinity of these facilities reported on the CNSC sites are unable to easily obtain a comprehensive cumulative picture of pollutants to which they are routinely exposed, both from nuclear facilities and other NPRI-reporting facilities in the same neighbourhood, whereas the NPRI allows for searches via postal codes.

With respect to information currently being collected from nuclear facilities and made publicly available, the Joint Response notes:⁷

- *Nuclear facilities in Canada are already required to report on their releases of NPRI-listed substances if they meet the NPRI reporting requirements. The majority of substances reported include particulate matter, criteria air contaminants, and metals, with volatile organic compounds and a few other substances making up the minority.*

Our response: The current level of reporting by the nuclear facilities industry to the NPRI gives a false impression of pollutants associated with the facility because it does not include radionuclides. By omitting radionuclides from the NPRI, this gives an erroneous impression as to range of substances that are being released, transferred, disposed and stored from these facilities. For example, Bruce Power, a major nuclear complex in Ontario with eight reactors and other related facilities, reports on four substances to the NPRI, namely, ammonia, hydrazine, lead and sulphuric acid and Criteria Air Contaminants.⁸ As a result, communities, individuals, researchers, etc., are not being given the full picture of possible impacts to their community.

- *Radium 226, as the selected indicator for radionuclides for uranium, is regulated and reported under the Metal Mining Effluent Regulations, for facilities subject to the regulations (which includes uranium mines and mills). Information on measured levels of radium 226 is available in annual reports on the performance of metal mines subject to the regulations and is published on the Government of Canada website.*

⁷ Ibid p.5

⁸ http://ec.gc.ca/inrp-npri/donnees-data/index.cfm?do=facility_substance_summary&lang=en&opt_npri_id=0000007041&opt_report_year=2016

Our response: Since radium 226 is reported through specific regulations on the Government of Canada website, that information could easily be reported to the NPRI as well.

- *The CNSC publishes a number of information sources on environment, health and safety within the Canadian nuclear sector.*

Our response: CNSC sites are not conducive to readily obtain information on pollutants, specifically radionuclides, released from nuclear facilities, especially for public users. While such links may be useful as reference for additional or more detailed comprehensive information on nuclear facilities, having these links on the NPRI site would only complicate a search for information, especially for but not only for public users.

It should not be necessary to go to other websites with different formats, frequency of reporting etc., to obtain a more comprehensive picture of the scope and amount of pollutants to which they are exposed, from facilities in their community, province or country.

For example, Greenhouse Gases (GHG) are not listed on the NPRI. Even though the NPRI provides a link to the National GHG Inventory to access data on GHGs, it is not a seamless transition to switch sites. Firstly, the GHG data lags the NPRI site by one year. This means that one cannot find GHG data for the current NPRI reporting year. In addition, the GHG inventory does not use the same definition of a facility as the NPRI uses. This can lead to confusion.

The GHG example shows problems that arise in switching between sites in trying to obtain comparable data. Likewise relying upon the CNSC site for radionuclide data is likely to result in problems.

Decision Factors - Criteria for Addition to the NPRI

Annex 3 of the Joint Report found that “as radionuclides do not meet all of the decision factors for the addition of substances to the NPRI, it is recommended that the proposal to add radionuclides to the NPRI be rejected”. Our review of the decision factors does not support this finding.

Decision Factor 1:

“Does the substance meet all of the NPRI criteria”?

- a) Is the substance manufactured, processed or otherwise used (MPO) by facilities in Canada?
- b) Is the substance of health and/or environmental concern?
- c) Is the substance released to the Canadian environment or disposed of by facilities, and do facilities contribute significant releases of the substance?
- d) Is the substance present in the Canadian environment?

According to the Notification of Rejection of the Proposal to Add Radionuclides to the NPRI, all elements of this criterion are met.⁹

However, the Joint Response elaborated on elements (b) and (c) as follows:

(b) “The Priority Substances List Assessment report considered releases, exposure levels, modes of toxicity and other factors to estimate overall risk from radionuclides released by facilities related to the nuclear fuel chain. Based on that assessment, only *uranium in effluent from uranium mines and mills* was found to be CEPA-toxic, and this conclusion was based on uranium’s chemical mode of toxicity rather than radiation toxicity. Based on that assessment, radionuclides from nuclear fuel chain facilities were found to be not toxic under CEPA.”¹⁰

(c) According to the Priority Substances List Assessment, radionuclides are being released by nuclear fuel chain facilities, however the quantities and concentrations of these releases are not considered to be toxic under CEPA.

There is an underlying assumption being made in (b) and (c) that being declared CEPA-toxic is a determining factor in being listed on the NPRI. This is definitely not the case.

We compared the substances listed as CEPA-toxic and those on the NPRI list. Our analysis, which is the appendix to this report, demonstrates that approximately 30 percent of NPRI-listed substances (approximately 80 substances) are **not** “CEPA-toxic”. The table in this appendix does a detailed comparison of the listing of CEPA-toxic substances on the NPRI. This analysis demonstrates that being CEPA-toxic is not the sole justification for putting a substance on the NPRI list.

Decision factor 2: Does inclusion of the substance support one or more of the objectives of NPRI? The following are the objectives of the NPRI:

- To improve public understanding
- To identify priorities for action
- To encourage voluntary action to reduce releases
- To allow tracking of progress in reducing releases (including successful reductions)
- To support targeted regulatory initiatives
- To support development of other pollutant release inventories, such as the Air Pollutant Emissions Inventory, and related international reporting obligations, where appropriate.

Clearly, adding radionuclides would support all of these objectives, especially public understanding, which is essential to help the public play an essential role in the other objectives listed in this decision factor

As pointed out in this Decision factor, the NPRI is a critical component in assessing progress, on determining whether regulations are adequate, in determining priorities for action, etc. However, the Joint Response finds that the inclusion of radionuclides on the NPRI would not

⁹ Environment and Climate Change Canada: Notification of Rejection of the Proposal to Add Radionuclides to the NPRI, p. 8 October 24 2017

¹⁰ Definition of CEPA toxic: *Canadian Environmental Protection Act, 1999* (CEPA 1999) Section 64
<https://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=E2144531-1&wsdoc=DEF9EA38-699F-5C10-3447-20B9C6041B91>

necessarily result in a meaningful improvement for one or more of the above NPRI objectives, in that comprehensive radionuclide release data is already reported to and made available by the CNSC. We disagree, which is why we have pursued listing radionuclides on the NPRI. Nor does the response have to be “yes” to all components of this decision factor, as the factor itself indicates by saying “one or more” of the objectives.

Decision factor 3: Is the substance reported elsewhere?

While data on radionuclides are reported on to the CNSC, we have already provided our rationale as to why they should also be listed on the NPRI. It would definitely be an improvement in terms of public access over the present status.

Decision factor 4: Is the substance already on the NPRI in some form?

ECCC and CNSC both agree that radionuclides are not on the NPRI.

Concluding Remarks

ECCC and CNSC’s conclusion that radionuclides are not a suitable candidate for addition to the NPRI is based on their shared view that similar information is already being reported and made publicly available by the CNSC on its website. Thus, ECCC and the CNSC are rejecting the proposal to add radionuclides from the nuclear sector to the NPRI.

We do not agree with their conclusion. Our analysis of the information provided through CNSC sites with respect to radionuclides has shown that this information is not in a quickly, easily accessible and neutral form, and thus, not equivalent to how it would be presented on the NPRI site. Furthermore, with respect to community right-to-know, the public should be able to access both currently listed NPRI substances and radionuclides at one location.

In that nuclear facilities already report to the NPRI on the NPRI-listed materials, adding radionuclides to the list of NPRI-materials would not be a challenge because the industry already understands how to use the NPRI reporting system. In addition, CNSC says that industry already is reporting NPRI-type data to CNSC. Therefore, it also should not be a burden for these facilities to obtain the data to put on the NPRI site because CNSC says that these industries already have that data. Therefore, it should be reasonably easy for the nuclear industry to make the transition to reporting into the NPRI system as well as continuing to report into the CNSC system.

Recommendation

In the interests of public transparency and community right-to-know, we urge ECCC to continue to pursue this matter with its stakeholders by sending out for public comment the ENGO proposal to add radionuclides (2013), the ECCC and CNSC Joint Response (2017), and the ENGO response (2018), rather than recommending an outright rejection to add radionuclides to the NPRI without having consulted with the broad community.

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Appendix: Comparability between CEPA-toxic substances and NPRI-listed substances

The table in this Appendix compares the listing of “CEPA-toxic” substances with substances listed on the NPRI.¹¹ While comparability and compatibility between these two lists is difficult in certain cases, especially for those substances listed which include multiple chemicals, the table demonstrates that approximately 30 percent of NPRI-listed substances (approximately 80 substances) are not “CEPA-toxic”.

A very brief sample of some of NPRI-listed substances not “CEPA-toxic” includes:

- Acetonitrile
- Acetophenone
- Aluminum oxide (fibrous forms only)
- Chlorine
- Chromium (and its compounds) – excludes hexavalent chromium (CEPA-toxic)
- Hydrogen sulphide
- Pyridine (and its salts)
- Tetrachloroethane
- Total reduced sulphur (expressed as hydrogen sulphide)
- Zinc (and its compounds)
- Acrylonitrile
- Cobalt (and its compounds)
- Selenium (and its compounds)
- Thallium (and its compounds)
- Carbon monoxide

Clearly, all of these substances are toxic and of concern, regardless of whether they are declared to be “CEPA-toxic”. For example, hydrogen sulphide (H₂S), well-known to be toxic to human health with effects of a release ranging from unpleasant odour to significant health consequences or death, has been found not toxic under CEPA. Nevertheless, these non-CEPA toxic substances have been added to NPRI.

With respect to radionuclides, to date, releases of uranium and uranium compounds contained in effluent from uranium mines and mills have been found “CEPA-toxic”. This is the only listing of any radionuclide on the CEPA-toxic list, but it is specific to certain facilities (uranium mines and mills).

¹¹ The Appendix is based on material received from Jody Rosenberger, Unit Head, National Pollutant Release Inventory, December 21, 2017

| CEPA No. | CEPA Name | NPRI Status ¹ [as of 2016 -2017 NPRI Notice, including NPRI Name(s) where different from CEPA Name] | No. of substances on NPRI |
|----------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------|
| 1 | Chlorobiphenyls that have the molecular formula $C_{12}H_{(10-n)}Cl_n$ in which "n" is greater than 2 | Not Listed | |
| 2 | Dodecachloropentacyclo [5.3.0.0 ^{2,6} .03,9.0 ^{4,8}]decane (Mirex) | Not Listed | |
| 3 | Polybrominated Biphenyls | Not Listed | |
| 4 | Chlorofluorocarbon: totally halogenated chlorofluorocarbons that have the molecular formula $C_nCl_xF_{(2n+2-x)}$ | Listed : CFC-11, CFC-12, CFC-13, CFC-114, CFC-115 | 5 |
| 5 | Polychlorinated Terphenyls that have a molecular formula $C_{18}H_{(14-n)}Cl_n$ in which "n" is greater than 2 | Not Listed | |
| 6 | Asbestos | Listed: Asbestos (friable form only) | 1 |
| 7 | Lead | Listed: Lead (and its compounds), Tetraethyl lead | 1 |
| 8 | Mercury and its compounds | Listed | 1 |
| 9 | Vinyl Chloride | Listed | 1 |
| 10 | Bromochlorodifluoromethane that has the molecular formula CF_2BrCl | Listed: Halon 1211 | 1 |
| 11 | Bromotrifluoromethane that has the molecular formula CF_3Br | Listed: Halon 1301 | 1 |
| 12 | Dibromotetrafluoroethane that has the molecular formula $C_2F_4Br_2$ | Not Listed | |
| 13 | Fuel containing toxic substances. | Not Listed | |
| 14 | Dibenzo-para-dioxin that has the molecular formula of $C_{12}H_8O_2$ | Not Listed | |
| 15 | Dibenzofuran that has the molecular formula $C_{12}H_8O$ | Not Listed | |
| 16 | Polychlorinated dibenzo-para-dioxins that have the molecular formula $C_{12}H_{(8-n)}O_2Cl_n$ in which "n" is greater than 2 | Listed: 7 individual polychlorinated dibenzo-para-dioxins | 7 |
| 17 | Polychlorinated dibenzofurans that have the molecular formula $C_{12}H_{(8-n)}OCl_n$ in which "n" is greater than 2 | Listed: 10 individual polychlorinated dibenzofurans | 10 |
| 18 | Tetrachloromethane (carbon tetrachloride) CCl_4 | Listed: carbon tetrachloride | 1 |
| 19 | 1,1,1-trichloroethane (methyl chloroform) CCl_3-CH_3 | Not Listed | |

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|----|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---|
| 20 | Bromofluorocarbons other than those set out in items 10 to 12 | Not Listed | |
| 21 | Hydrobromofluorocarbons that have the molecular formula $C_nH_xF_yBr_{(2n+2-x-y)}$ in which $0 < n < 3$ | Not Listed | |
| 22 | Methyl Bromide | Listed: Bromomethane | 1 |
| 23 | Bis(Chloromethyl) ether that has the molecular formula $C_2H_4Cl_2O$ | Not Listed | |
| 24 | Chloromethyl methyl ether that has the molecular formula C_2H_5ClO | Not Listed | |
| 25 | Hydrochlorofluorocarbons that have the molecular formula $C_nH_xF_yCl_{(2n+2-x-y)}$ in which $0 < n < 3$ | Listed: HCFC-22, HCFC-122 (all isomers), HCFC-123 (all isomers), HCFC-124 (all isomers), HCFC-141b, HCFC-142b | 5 |
| 26 | Benzene that has the molecular formula C_6H_6 | Listed: Benzene | 1 |
| 27 | (4-Chlorophenyl)cyclopropylmethanone,O-[(4-nitrophenyl)methyl]oxime that has the molecular formula $C_{17}H_{15}ClN_2O_3$ | Not Listed | |
| 28 | Inorganic arsenic compounds | Listed: Arsenic (and its compounds) | 1 |
| 29 | Benzidine and benzidine dihydrochloride, that have the molecular formula $C_{12}H_{12}N_2$ and $C_{12}H_{12}N_2 \cdot 2HCl$, respectively | Not Listed | |
| 30 | Bis(2-ethylhexyl)phthalate | Listed | 1 |
| 31 | Inorganic cadmium compounds | Listed: Cadmium (and its compounds) | 1 |
| 32 | Chlorinated wastewater effluents | Not Listed | |
| 33 | Hexavalent chromium compounds | Listed: Hexavalent chromium (and its compounds) | 1 |
| 34 | Creosote - impregnated waste from creosote -contaminated sites | Not Listed | |
| 35 | 3,3'-Dichlorobenzidine | Not Listed | |
| 36 | 1,2-Dichloroethane | Listed | 1 |
| 37 | Dichloromethane | Listed | 1 |
| 38 | Effluents from pulp mills using bleaching | Not Listed | |
| 39 | Hexachlorobenzene | Listed | 1 |
| 40 | Inorganic fluorides | Listed: Boron trifluoride, Calcium fluoride, Hydrogen fluoride, Sodium fluoride | 4 |
| 41 | Refractory ceramic fibre | Not Listed | |

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|----|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|----|
| 42 | Oxidic, sulphidic and soluble inorganic nickel compounds | Listed: Nickel (and its compounds) | 1 |
| 43 | Polycyclic aromatic hydrocarbons | Listed: 30 individual polycyclic aromatic hydrocarbons | 30 |
| 44 | Tetrachloroethylene | Listed | 1 |
| 45 | Trichloroethylene | Listed | 1 |
| 46 | Tributyltetradecylphosphonium chloride that has the molecular formula $C_{26}H_{56}P \cdot Cl$ | Not Listed | |
| 47 | Bromochloromethane, that has the molecular formula CH_2BrCl | Not Listed | |
| 48 | Acetaldehyde, which has the molecular formula C_2H_4O | Listed: Acetaldehyde | 1 |
| 49 | 1,3-Butadiene, which has the molecular formula C_4H_6 | Listed: 1,3-Butadiene | 1 |
| 50 | Acrylonitrile, which has the molecular formula C_3H_3N | Listed: Acrylonitrile | 1 |
| 51 | Respirable particulate matter less than or equal to 10 microns | Listed: PM10 - Particulate Matter ≤ 10 Microns, PM2.5 - Particulate Matter ≤ 2.5 microns, Total Particulate Matter | 3 |
| 52 | Acrolein, which has the molecular formula C_3H_4O | Listed: Acrolein | 1 |
| 53 | Ammonia dissolved in water | Listed: Ammonia (total) | 1 |
| 54 | Nonylphenol and its ethoxylates | Listed | |
| 55 | Effluents from textile mills that use wet processing | Not Listed | |
| 56 | Inorganic Chloramines, which have the molecular formula $NH_nCl_{(3-n)}$, where $n = 0, 1$ or 2 | Not Listed | |
| 57 | Ethylene oxide, which has the molecular formula H_2COCH_2 | Listed: Ethylene oxide | 1 |
| 58 | Formaldehyde, which has the molecular formula CH_2O | Listed: Formaldehyde | 1 |
| 59 | N-Nitrosodimethylamine, which has the molecular formula $C_2H_6N_2O$ | Not Listed | |
| 60 | Gaseous Ammonia, which has the molecular formula $NH_3(g)$ | Listed: Ammonia (total) | 1 |
| 61 | Ozone, which has the molecular formula O_3 | Not Listed | |
| 62 | Nitric oxide, which has the molecular formula NO | Listed: Nitrogen oxides (expressed as nitrogen dioxide) | 1 |
| 63 | Nitrogen dioxide, which has the molecular formula NO_2 | Listed: Nitrogen oxides (expressed as nitrogen dioxide) | 1 |
| 64 | Sulphur dioxide, which has the molecular formula SO_2 | Listed: Sulphur dioxide | 1 |

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| 65 | Volatile organic compounds that participate in atmospheric photochemical reactions, excluding [44 substances] | Listed: Included in Total Volatile Organic Compounds (NPRI Part 4); 75 species (NPRI Part 5); 94 substances (NPRI Part 1) | 125 |
| 66 | Hexachlorobutadiene, which has the molecular formula C_4Cl_6 | Not Listed | |
| 67 | Particulate matter containing metals that is released in emissions from copper smelters or refineries, or from both | Listed, included in 3 substances: Total Particulate Matter, PM2.5 - Particulate Matter \leq 2.5 Microns, PM10 - Particulate Matter \leq 10 Microns | 3 |
| 68 | Particulate matter containing metals that is released in emissions from zinc plants | Listed, included in 3 substances: Total Particulate Matter, PM2.5 - Particulate Matter \leq 2.5 Microns, PM10 - Particulate Matter \leq 10 Microns | 3 |
| 69 | Dichlorodiphenyltrichloroethane (DDT), which has the molecular formula $C_{14}H_9Cl_5$ | Not Listed | |
| 70 | 2-butoxyethanol, which has the molecular formula $C_6H_{14}O_2$ | Listed: 2-Butoxyethanol | 1 |
| 71 | 2-methoxyethanol, which has the molecular formula $C_3H_8O_2$ | Listed: 2-Methoxyethanol | 1 |
| 72 | Tetrachlorobenzenes, which have the molecular formula $C_6H_2Cl_4$ | Not Listed | |
| 73 | Pentachlorobenzene, which has the molecular formula C_6HCl_5 | Not Listed | |
| 74 | Carbon dioxide, which has the molecular formula CO_2 | Not Listed ² | |
| 75 | Methane, which has the molecular formula CH_4 | Not Listed ² | |
| 76 | Nitrous oxide, which has the molecular formula N_2O | Not Listed ² | |
| 77 | Hydrofluorocarbons that have the molecular formula $C_nH_xF_{(2n+2-x)}$ in which $0 < n < 6$ | Not Listed ² | |
| 78 | The following perfluorocarbons: (a) those that have the molecular formula C_nF_{2n+2} in which $0 < n < 7$; and (b) octafluorocyclobutane, which has the molecular formula C_4F_8 | Not Listed ² | |
| 79 | Sulphur hexafluoride, which has the molecular formula SF_6 | Not Listed ² | |
| 80 | Methanone, bis(4-(dimethylamino)phenyl) - which has the molecular formula $C_{17}H_{20}N_2O$ | Listed: Michler's ketone (and its salts) | 1 |

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|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---|
| 81 | 2-Butanone, oxime | Not Listed | |
| 82 | n-Butyl glycidyl ether, which has the molecular formula $C_7H_{14}O_2$ | Not Listed | |
| 83 | $C_{12}H_{(10-n)}Br_nO$ in which $4 \leq n \leq 10$ | Listed: Decabromodiphenyl oxide | 1 |
| 84 | Perfluorooctane sulfonate and its salts | Not Listed | |
| 85 | Compounds that contain one of the following groups: $C_8F_{17}SO_2$, $C_8F_{17}SO_3$ or $C_8F_{17}SO_2N$ | Not Listed | |
| 86 | Methyloxirane, which has the molecular formula C_3H_6O | Listed: Propylene oxide | 1 |
| 87 | Ethyloxirane, which has the molecular formula C_4H_8O | Listed: 1,2-Butylene oxide | 1 |
| 88 | Naphthalene, which has the molecular formula $C_{10}H_8$ | Listed: Naphthalene | 1 |
| 89 | Toluene diisocyanates, which have the molecular formula $C_9H_6N_2O_2$ | Listed: Toluene-2,4-diisocyanate, Toluene-2,6-diisocyanate and Toluenediisocyanate (mixed isomers) | 3 |
| 90 | 1,2-Benzenediol, which has the molecular formula $C_6H_6O_2$ | Listed: Catechol | 1 |
| 91 | 1,4-Benzenediol, which has the molecular formula $C_6H_6O_2$ | Listed: Hydroquinone (and its salts) | 1 |
| 92 | Hexane, 1,6-diisocyanato-, homopolymer, reaction products with alpha-fluoro-omega-2-hydroxyethyl-poly(difluoro- methylene), C_{16-20} -branched alcohols and 1-octadecanol | Not Listed | |
| 93 | 2-propenoic acid, 2-methyl-, hexadecyl ester, polymers with 2-hydroxyethyl methacrylate, gamma-omega-perfluoro-C10-16-alkyl acrylate and stearyl methacrylate | Not Listed | |
| 94 | 2-propenoic acid, 2-methyl-, 2-methylpropyl ester, polymer with butyl 2-propenoate and 2,5-furandione, gamma-omega-perfluoro- C_{8-14} -alkyl esters, tert-Bu benzenecarboperoxoate-initiated | Not Listed | |
| 95 | 2-propen-1-ol reaction products with pentafluoroiodoethane tetrafluoroethylene telomer, dehydroiodinated, reaction products with epichlorohydrin and triethylenetetramine | Not Listed | |
| 96 | Phenol, 4,4' -(1-methylethylidene)bis-, which has the molecular formula $C_{15}H_{16}O_2$ | Listed: Bisphenol A | 1 |
| 97 | Thiourea, which has the molecular formula CH_4N_2S | Listed: Thiourea | 1 |

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| 98 | 1,3-Butadiene, 2-methyl-, which has the molecular formula C_5H_8 | Listed: Isoprene | 1 |
| 99 | Oxirane, (chloromethyl)-, which has the molecular formula C_3H_5ClO | Listed: Epichlorohydrin | 1 |
| 100 | Colour Index Pigment Yellow 34 | Not Listed | |
| 101 | Colour Index Pigment Red 104 | Not Listed | |
| 102 | Cyclotetrasiloxane, octamethyl-, which has the molecular formula $C_8H_{24}O_4Si_4$ | Not Listed | |
| 103 | Phenol, 2,4,6-tris(1,1-dimethylethyl)-, which has the molecular formula $C_{18}H_{30}O$ | Not Listed | |
| 104 | Ethanol, 2-methoxy-, acetate, which has the molecular formula $C_5H_{10}O_3$ | Listed: 2-Methoxyethyl acetate | 1 |
| 105 | 1-Propanol, 2-methoxy-, which has the molecular formula $C_4H_{10}O_2$ | Not Listed | |
| 106 | 2-Naphthalenol, 1-[(4-methyl-2-nitrophenyl)azo]-, which has the molecular formula $C_{17}H_{13}N_3O_3$ | Not Listed | |
| 107 | Ethanol, 2-(2-methoxyethoxy)-, which has the molecular formula $C_5H_{12}O_3$ | Listed: 2-(2-Methoxy)-ethanol | 1 |
| 108 | Sulfuric acid, diethyl ester, which has the molecular formula $C_4H_{10}O_4S$ | Listed: Diethyl sulphate | 1 |
| 109 | Sulfuric acid, dimethyl ester, which has the molecular formula $C_2H_6O_4S$ | Listed: Dimethyl sulphate | 1 |
| 110 | Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene | Not Listed | |
| 111 | 2-Propenamide, which has the molecular formula C_3H_5NO | Listed: Acrylamide | 1 |
| 112 | Ethanol, 2-chloro-, phosphate (3:1), which has the molecular formula $C_6H_{12}Cl_3O_4P$ | Not Listed | |
| 113 | Tributyltins, which contain the grouping $(C_4H_9)_3S_n$ | Not Listed | |
| 114 | Tetrabutyltins, which have the molecular formula $(C_4H_9)_4S_n$ | Not Listed | |
| 115 | Benzene, (chloromethyl)-, which has the molecular formula C_7H_7Cl | Listed: Benzyl chloride | 1 |
| 116 | Propane, 2-nitro-, which has the molecular formula $C_3H_7NO_2$ | Listed: Nitropropane | 1 |

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|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|---|
| 117 | Benzene, 1-methyl-2-nitro-, which has the molecular formula $C_7H_7NO_2$ | Not Listed | |
| 118 | Phenol, 2,6-bis(1,1-dimethylethyl)-4-(1-methylpropyl)-, which has the molecular formula $C_{18}H_{30}O$ | Not Listed | |
| 119 | Methylium, [4-(dimethylamino)phenyl]bis[4-(ethylamino)3-methylphenyl]-, acetate, which has the molecular formula $C_{27}H_{34}N_3.C_2H_3O_2$ | Not Listed | |
| 120 | Chlorinated alkanes that have the molecular formula $C_nH_xCl_{(2n+2-x)}$ in which $10 \leq n \leq 20$ | Listed: Alkanes, C6-18, chloro and Alkanes, C10-13, chloro | 2 |
| 121 | Benzene, 1,2-dimethoxy-4-(2-propenyl)-, which has the molecular formula $C_{11}H_{14}O_2$ | Not Listed | |
| 122 | Vanadium pentoxide, which has the molecular formula V_2O_5 | Listed: Vanadium (and its compounds) | 1 |
| 123 | Oxirane, 2,2',2'',2'''-[1,2-ethanediylidenetetrakis (4,1-phenyleneoxymethylene)]tetrakis-, which has the molecular formula $C_{38}H_{38}O_8$ | Not Listed | |
| 124 | Bromic acid, potassium salt, which has the molecular formula $KBrO_3$ | Listed: Potassium bromate | 1 |
| 125 | Polychlorinated naphthalenes, which have the molecular formula $C_{10}H_{8-n}Cl_n$ in which "n" is greater than 1 | Not Listed | |
| 126 | Hydrazine, which has the molecular formula N_2H_4 | Listed: Hydrazine (and its salts) | 1 |
| 127 | Hexabromocyclododecane, which has the molecular formula $C_{12}H_{18}Br_6$ | Not Listed | |
| 128 | Quinoline, which has the molecular formula C_9H_7N | Listed: Quinoline | 1 |
| 129 | Perfluorooctanoic acid, which has the molecular formula $C_7F_{15}CO_2H$, and its salts | Not Listed | |
| 130 | Compounds that consist of a perfluorinated alkyl group that has the molecular formula C_nF_{2n+1} in which $n = 7$ or 8 and that is directly bonded to any chemical moiety other than a fluorine, chlorine or bromine atom | Not Listed | |

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|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------------|
| 131 | Perfluorocarboxylic acids that have the molecular formula $C_nF_{2n+1}CO_2H$ in which $8 \leq n \leq 20$ and their salts | Not Listed | |
| 132 | Compounds that consist of a perfluorinated alkyl group that has the molecular formula C_nF_{2n+1} in which $8 \leq n \leq 20$ and that is directly bonded to any chemical moiety other than a fluorine, chlorine or bromine atom | Not Listed | |
| 133 | Plastic microbeads that are ≤ 5 mm in size | Not Listed | |
| 134 | Petroleum and Refinery Gases (44 specified mixtures) | Not Listed: certain NPRI substances are part of the listed mixtures | |
| 135 | Hexanedioic acid, bis(2-ethylhexyl) ester, which has the molecular formula $C_{22}H_{42}O_4$ | Listed: Bis(2-ethylhexyl) adipate (DEHA) | 1 |
| 136 | Reaction products of 2-propanone with diphenylamine | Not Listed | |
| 137 | 2-Naphthalenol, 1-[[4-(phenylazo)phenyl]azo]-, which has the molecular formula $C_{22}H_{16}N_4O$ | Not Listed | |
| 138 | Fuel Oil No. 2 | Not Listed | |
| Total | | | 255 |

¹ The National Pollutant Release Inventory (NPRI) collects, and makes publicly available, information from industrial, commercial and institutional facilities on their releases of pollutants (to air, water, and land), disposals, and transfers for recycling. The NPRI currently lists over 300 pollutants requiring reporting on toxic substances, air pollutants that contribute to smog and acid rain, and other substances of concern. Information on the program and NPRI data are available at: <https://www.canada.ca/en/services/environment/pollution-waste-management/national-pollutant-release-inventory.html>. The NPRI has reviewed Schedule 1 of CEPA (i.e. List of Toxic Substances) up to CEPA No. 132 for addition to the NPRI Substance List. Recent additions to Schedule 1 (CEPA No.'s 133 to 138) and future additions will be reviewed to determine if they meet NPRI decision factors for listing, on an ongoing basis. Certain Schedule 1 substances are not listed on the NPRI for a variety of reasons, including if they are prohibited for import, use and manufacture, if the primary route of exposure is through consumer and personal care products, if they are not used or manufactured or released in significant quantities by Canadian facilities, or if data is already reported under another program (i.e., greenhouse gases).

The Air Pollutant Emission Inventory estimates annual emissions of 17 substances to the atmosphere since 1990, for each Canadian province and territory and for Canada as a whole. The latest edition was published in 2017, and provides emission data for up to 2015. The data and additional information are available at: <http://open.canada.ca/data/en/dataset/fa1c88a8-bf78-4fcb-9c1e-2a5534b92131>.

² These substances are not reported under the NPRI, but their emissions are reported under the Greenhouse Gas Emissions Reporting Program (GHGRP) and included in National GHG Inventory.