

## Off-site Transfers of NPRI Substances in Products or as Products<sup>1</sup>

### 1. Background

The webpage entitled 'About National Pollutant Release Inventory' (NPRI), published by Environment and Climate Change Canada (ECCC),<sup>2</sup> reads:

The information that facility owners and operators must report to the inventory:

- helps Canadians understand pollutants releases in their communities
- encourages actions to reduce pollution
- helps track progress.

However, the NPRI has an unfortunate limitation in its ability to serve these three objectives.

As shown in the diagram below (Figure 1), reporters must annually provide data regarding their on-site releases to air, surface waters, and land; on-site disposal; off-site disposal; and off-site transfers for recycling and energy recovery, or treatment prior to final disposal.



Figure 1. Diagram from the NPRI website illustrating the existing information that is reported and disseminated through the program.

<sup>1</sup> Prepared for NGO members of the NPRI Multi-Stakeholder Working Group by John Jackson, Judi Krzyanowski, & Fe de Leon.

<sup>2</sup> <https://www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/about-national-pollutant-release-inventory.html> Date Modified by ECCC 2001 – 08 - 11

This reporting does not, however, include NPRI substances that reporting facilities may regularly send off-site in the products that they manufacture and as products. To achieve the goals of the NPRI more fully, it is essential to add another category to the reporting mandate: the off-site transfer of reportable substances as products or in products. This is illustrated by the addition of such a category in a modified diagram (Figure 2).



Figure 2. A modified version of Figure 1 showing the inclusion of a new category of off-site transfer (in ochre) for the reporting of substances transferred off-site in products or as products (scale emphasis added for illustrative purposes).

The purpose of this paper is to show the importance of adding this reporting category to NPRI, and to show that it is reasonable for reporters to provide such information to the NPRI. The addition of a products and in products category to the off-site transfer arm of NPRI reporting will better inform Canadians about the pollutants potentially entering the environment because of activities at a facility.

## 2. Importance of Reporting Substances in Products and as Products

The same substances that are reported to the NPRI are contained in products and as products that are transferred off-site from production, manufacturing, and distribution facilities. These materials do not, however, exist in a permanently closed system. They are eventually released into the environment— to air, land, or water—through their use or disposal, thereby becoming pollutants within the Canadian environment.

Monitoring studies are increasingly showing the almost ubiquitous release of hazardous materials to the environment during or after use. Here are just a few examples:

- Lead is used in a range of products including in plastics, lead-based paint, ceramics, pipes and plumbing materials, solders, gasoline, batteries, ammunition, and cosmetics. During or after use of these products, lead is released to the environment. Lead exposure can contribute to a range of health effects. For example, pregnant women who are exposed to lead results in exposure of the unborn fetus. Lead can impact the nervous system and brain development of the developing fetus. Low level exposure to lead in developing children can impact behaviour, neurological development, growth and intelligence.<sup>3</sup>
- Mercury continues to be used in a range of products including batteries, fluorescent light bulbs (e.g., Compact Fluorescent Lights), thermometers and thermostats, dental amalgam, vaccines (in the form of thimerosal), and automotive switches. Use and disposal of these products results in release of mercury to the environment. Mercury exposure affects the brain, heart, kidneys, lungs, and immune system.<sup>4</sup>
- Products that contain Volatile Organic Compounds (VOCs) include: gasoline, fuels, solvents, paints, stains, strippers, finishes, cleaning products, dry cleaning products, pesticides, personal care products, aerosol sprays, glues and adhesives, furniture, carpets and wood floors. Exposure to VOCs can lead to short and long term adverse effects, with specific populations including growing children, pregnant women, people with existing respiratory conditions (e.g., asthma, chronic pulmonary disease), and workers particularly sensitive to the impacts of VOC exposure. Respiratory conditions including breathing problems and irritation of the eyes, nose and throat are a few of the impacts from VOCs exposure.<sup>5</sup>
- Children are “at risk from PFAS exposure in consumer goods. Infants, toddlers, and children have the most hand-to-mouth contact with consumer products, such as carpets, clothing, and upholstery that have been treated with PFAS.”<sup>6</sup>
- A study of 51 Canadian homes showed halogenated flame retardants in air, dust and surface wipes of electronic devices, released from electronic devices. The highest levels were found on the surface of hand-held devices, whose surfaces become an on-going source of contamination for the user.<sup>7</sup>
- Numerous studies are finding that recycled materials containing persistent organic pollutants (POPs) and other toxic substances contaminate new products, for example, children’s toys, to which these substances add no benefit. This adds to human and environmental exposure and undermines the credibility of recycling.<sup>8</sup>

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<sup>3</sup> <https://www.epa.gov/lead/learn-about-lead#effects>

<sup>4</sup> <https://www.epa.gov/mercury/basic-information-about-mercury#health>

<sup>5</sup> <https://www.canada.ca/en/health-canada/services/air-quality/indoor-air-contaminants/volatile-organic-compounds.html#a2>

<sup>6</sup> “The Threat of PFAS : The Forever Chemicals,” Canadian Environmental Law Association, p. 3. <https://cela.ca/the-threat-of-pfas-the-forever-chemicals>. Comment based on Health Canada, Second Report on Human Biomonitoring, of Environmental Chemicals in Canada, 2013.

<sup>7</sup> Congquiao Yang, et al. “Are we exposed to halogenated flame retardants from both primary and secondary sources,” Environmental Science and Technology, June 9, 2020. <https://pubs.acs.org/doi/10.1021/acs.estlett.0c00268>

<sup>8</sup> Joseph DiGangi, Jitka Stratkova, Lee Bell. “POPs Contaminate Children’s Toys with Toxic Flame Retardants,” IPEN, April 2017.

- Recycled electronics wastes are frequently used to create black products, such as single-use black food trays. As a result of the recycling, these food trays are contaminated by bromine and heavy metals.<sup>9</sup>
- According to a U.S. study, the “top 40 most toxic compounds found in landfill leachate included pesticides, fungicides, pharmaceuticals, and industrial by-products, like those from cigarettes, coolants, lubricants, and flame retardants. Of all those compounds, 21 were found to be potential or confirmed endocrine disruptors, 14 were identified as potential or confirmed human carcinogens, and 12 were found to cause neurological issues.”<sup>10</sup> Some of the landfill leachate is collected and taken to sewage treatment plants, which release it to streams or sludge that is put onto fields. The leachate not collected from landfills eventually leaks into surrounding surface and groundwater.

### **3. Growing Government Recognition of need for focus on reducing or eliminating releases from products during and after use**

Increasingly, government agreements and programs are recognizing the need to address contamination of the environment by toxic substances because of the use and after use of products, bound for household, commercial or industrial use. The following are a few examples in agreements or legislation.

- In the Great Lakes Water Quality Agreement (GLWQA), the Canadian and U.S. federal governments include a commitment to act on “products containing chemicals of mutual concern”.<sup>11</sup> The guiding principles and goals for these actions include: zero discharge, virtual elimination, prevention, precaution, and polluter pays.<sup>12</sup>
- The Canadian Environmental Protection Act 1999 contains the following guiding principles: sustainable development, pollution prevention, precautionary approach, and polluter pays principle.<sup>13</sup>
- The Stockholm Convention on Persistent Organic Pollutants (POPs), to which Canada is a signatory, calls for the reduction or elimination of intentional and/or unintentional releases. The specifics vary by the substance, but the ultimate goal is to reduce and eventually eliminate all POP releases derived from anthropogenic sources.<sup>14</sup>

All of the above emphasize the need for a reduction or elimination of toxic chemicals in products.

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<sup>9</sup> Andrew Turner, “Black plastics: Linear and circular economies, hazardous additives and marine pollution,” Environmental International, Vol. 177, August 2018, p 308 – 318.

<https://www.sciencedirect.com/science/article/pii/S0160412018302125?via%3Dihub>

<sup>10</sup> Carly Cassella, “Scientists Ranked The Most Dangerous and Toxic Pollutants in U.S. Landfill,” Environment, March 27, 2021. <https://www.sciencealert.com/scientists-ranked-the-most-dangerous-and-toxic-pollutants-in-us-landfills>

<sup>11</sup> See GLWQA 2012, Annex 3, A 4 and B 3.

<sup>12</sup> GLWQA 2012, “Principles and Approaches.”

<sup>13</sup> A Guide to Canadian Environmental Protection Act 1999, Environment Canada, March 2000.

[https://www.ec.gc.ca/lcpe-cepa/documents/archives/guides/2000/guide\\_CEPA-eng.pdf](https://www.ec.gc.ca/lcpe-cepa/documents/archives/guides/2000/guide_CEPA-eng.pdf)

<sup>14</sup> <http://www.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx>

Another commonality among programs such as these is the use of “polluter pays” and “extended producer responsibility” mechanisms as important tools to reduce or eliminate pollution. For example, it has become standard practice in recycling and waste management programs to follow the principle of manufacturer and seller responsibility that extends beyond the point of sale, to the entire product life cycle. This means that the manufacturers of the product should have as much responsibility for the toxics that they send off site in product as they have for toxics that they dispose of. It is the decisions that they make when creating products that determine the hazardous pollutants that will potentially be created. Why should those who ship toxics off site as product or in product not have to report that to government and the public? Why should they be able to pretend that this is something that they haven’t created and have no responsibility for?

Another guiding concept that governments and companies are increasingly adopting is “circular economy.” The Ellen MacArthur Foundation, a prime advocate and expert on circular economy, says: “Recycling is what you might call ‘end-of-pipe’, while a circular economy’s ‘upstream’ solution addresses potential problems right at the source.”<sup>15</sup> Acting right at the source means that a goal must be to reduce or eliminate the use of toxic substances. However, this could also mean that the use of recycled materials could result in toxic substances ending up in new products, something that could be avoided and supported with requirements for mandatory reporting at the source.

Canada participates in the Organization for Economic Co-operation and Development’s (OECD’s) Pollutant Release and Transfer Registries (PRTR) scheme. The NPRI is Canada’s PRTR. In 2021, OECD released a report on how PRTRs can be used to evaluate progress towards achieving the United Nations Sustainable Development goal 12.4 to: “By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their lifecycle ...” but the PRTR failed to find ways to cover all wastes and the entire lifecycle. In its assessment, the OECD spoke of limitations in ability to assess progress to goal 12.4 because of differences among countries in terms of substances reported and reporting thresholds. They did not, however, ask the question of whether there are changes that they could make in the PRTR reporting system that would improve their ability to assess progress.<sup>16</sup>

To be able to better assess progress on reducing toxics releases, governments must address the hole in the PRTR system, i.e., governments must add the PRTR reporting of off-site transfers as product or in products. This will be a huge step forward in helping the public, governments, and industry in assessing our progress at pollution prevention.

Reporting under NPRI transfers toxic substances off-site in product or as product will allow us to assess the extent to which we are succeeding under the prevention approach at decreasing toxic substances. The goal of zero discharge as envisioned under the Great Lakes Water Quality Agreement is effectively meaningless in leading towards zero use unless reported discharge

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<sup>15</sup> <https://ellenmacarthurfoundation.org/articles/recycling-and-the-circular-economy-whats-the-difference>

<sup>16</sup> “Using PRTR Information to Evaluate Progress Towards the Sustainable Development Goal 1. OECD, 2021. <https://www.oecd.org/chemicalsafety/pollutant-release-transfer-register/using-prtr-information-evaluate-progress-towards-sustainable-development-goal-12.pdf>

also includes substances contained in products or as products. This is particularly true with recycling and circular economy goals, where, for example, toxic substances may end up in products made with recycled materials containing toxic substances that are mixed with polymers (e.g., black plastics), eventually entering the environment with their disposal to landfills or other end of life processes (including incineration).

#### **4. Feasibility of Reporting Substances Transferred Off-Site in Products and as Products**

Domestic facilities that manufacture or otherwise produce products containing substances that must be reported under NPRI likely already report to the NPRI and are familiar with the reporting system. These facilities also keep records of the use, sale, purchase and transfer of all products entering and leaving their respective facilities. Therefore, determining whether to report on off-site transfers in products and as products would be reasonably easy.

In the process of determining whether a facility is required to report under the NPRI, general steps may be followed to determine what substances are entering, used, created and released to the environment. In 2020, the United Nations Institute for Training and Research (UNITAR), an agency focused on training, provided Guidance for Facilities on Pollutant Release and Transfer Register Data Estimation And Reporting. It outlined the following questions to guide facilities to determine whether reporting on substances is required to pollution release and transfer registries such as the NPRI. According to the UNITAR, facilities should undertake initial assessments:

*Particularly during the first reporting cycle, but also on a regular basis for each subsequent reporting year, the facility should systematically review its various processes and activities in order to identify all potentially reportable releases and transfers. Some of the key questions to be addressed in identifying reportable releases/transfers include:*

- *Do the input materials used in producing the products or brought into the facility for other reasons contain any reportable substances?*
- *Do the products produced at the facility contain any reportable substances?*
- *Do the production processes used to make the products use or produce any reportable substances?*
- *Are there any supporting activities (e.g., cleaning or maintenance, waste treatment) at the facility that use reportable substances?*<sup>17</sup>

By reviewing and assessing these questions, the facility is able to determine if reporting under NPRI is required and on what substances. Answering these questions can also make determinations that such substances can also leave the facility as off-site transfers in products and as products.

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<sup>17</sup> UNITAR. 2020. 2020 Guidance for Facilities on Pollutant Release And Transfer Register Data Estimation and Reporting.  
[https://cwm.unitar.org/cwmplatformscms/site/assets/files/1483/6\\_guidance\\_for\\_facilities\\_on\\_prtr\\_data\\_estimation\\_and\\_reporting.pdf](https://cwm.unitar.org/cwmplatformscms/site/assets/files/1483/6_guidance_for_facilities_on_prtr_data_estimation_and_reporting.pdf)

The potential reporter can then go to the step of quantifying transfers off-site in product or as product.

Much like being able to derive an emissions factor for a smokestack—of say kilograms of pollutant emitted per tonne of fuel combusted—similar factors could be derived for the off-site transfer in a product or as a product, e.g., kilograms of substance transferred off-site in product or as product per tonne of product, or grams of substance per unit produced.

Consideration will be needed to determine the thresholds necessary to quantify the data associated with toxic substances leaving facilities in products or as products. Developing thresholds and identifying the associated uncertainties will be an essential component of the process to account for these toxic substances as they have been for reporting on all release estimates. This may be particularly true for manufacturers who rely on components or ingredients that are imported, as the supply-chain may not be one of full chemical disclosure, or purity may often be questionable. And of course, from the national perspective, products imported into Canada would not be fully accounted for under the NPRI structure or mandated to report in the same way.

But other efforts in Canada to deal with these issues can be used collaboratively. For instance, the Chemical Policy Lab being spear-headed by the Government of Canada seeks to tackle issues of supply chain transparency and the labelling of chemicals in products. Combined with this initiative and similar ones at a global level,<sup>18</sup> the NPRI can be used as a database to track nationwide totals for substance releases from products, provide information on specific substances, and provide information on specific facilities who produce those products, which the NPRI already does, but on a more comprehensive basis.

## **5. Conclusion**

The idea of reporting pollutants transferred off-site as product or in products is new to neither the NPRI, nor the current workgroup members; it is an item that keeps arising in various areas of discussion.

In 1992-1993, then Minister of the Environment Jean Charest held a consultation on the report from the Multi-Stakeholder Advisory Committee (MSAC) that he had set up to develop a proposal for a Canadian NPRI. In November 1992, the NPRI Citizens' Caucus (which included the four environmental and labour representatives on the NPRI MSAC) stressed the need to have NPRI reporters include numbers on the amounts of toxic chemicals that they "transferred off-site in or as product." They gave two prime reasons for this inclusion: "First, these chemicals may be released to the environment later as the product is used or disposed. Secondly, this information is critical to assessing the effectiveness of pollution prevention programmes."<sup>19</sup>

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<sup>18</sup> For example, Global Minimum Transparency Standard. <https://www.globalchemicaltransparency.org/>

<sup>19</sup> National Pollutant Release Inventory Citizens' Caucus, Response to the Multi-Stakeholder Advisory Committee Report on The National Pollutant Release Inventory, November 11, 1992, p, 7.

Thirty years later, this sentiment has neither changed nor been addressed. Yet it is even more important now to track the release of harmful substances to the Canadian environment—via all pathways and in all forms. The government of Canada assesses roughly 500 new substances entering the Canadian marketplace each year—that is 15,000 new chemicals being used in Canada since the reporting of transfers off-site in products was first called for in 1993. That is 15,000 new chemicals finding their way into our homes, offices, schools and workplaces. Fifteen thousand new chemicals that may be released into waterways, rain from our skies, and accumulate in breast milk and wildlife populations.

Many of these chemicals find their way into our environment and our bodies as seemingly innocuous products and goods, produced, and sold by facilities that already report those same chemicals to the NPRI. Assuming facilities keep proper records of production and sales, it should not be of great difficulty for them to report the amounts of NPRI substances that are indirectly released to the Canadian environment each year as off-site transfers in the form of these commodities. The addition of off-site transfers in the form of products and goods to NPRI reporting is also crucial in devising safe waste management approaches.

Canadians have the right to know. Only with comprehensive reporting can the NPRI be used to estimate the total loading of chemicals to the Canadian environment, or the cumulative risk to Canadians. The health of Canadians and integrity of the NPRI depend on it.

## ***6. Recommendation***

The NGO members of the NPRI Multi-Stakeholder Working Group recommend that Environment and Climate Change Canada set up a working sub-group to work out the mechanisms for adding ‘transfers off-site in product or as product’ to the NPRI system.

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