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National Pollution Release Inventory (NPRI) ENGO Working Group
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Dear members of the NPRI ENGO Working Group:

Re: Identifying gaps in publicly-available data in NPRI

I am pleased to submit this brief outlining gaps we have identified in NPRI data when it comes to tracking pollutants from the full life cycle of plastics and petrochemicals in Canada.

Environmental Defence advocates for a healthy climate, clean water and an environment free from toxic pollution. Our plastics program focuses on federal and provincial policy aimed at reducing pollution related to plastics production, use and disposal. We use National Pollutant Release Inventory (NPRI) data to assess releases of pollutants at particular sites and in particular regions from extraction, production, processing and disposal activities. In my role, I am focused particularly on the life cycle of plastics.

In the plastics program area, we engage at the provincial and federal levels of government on policies that relate to waste reduction and recycling, including forthcoming regulations on recycled content for plastic manufactured items and the so-called "circular economy for plastics" at the federal level, and regulatory changes allowing for less public oversight of so-called "advanced recycling" facilities in Ontario.

In our view, it will be necessary to reduce production, use and disposal of plastics if we are to achieve the goal of eliminating plastic pollution. However, policies that incentivize new technologies to process plastic waste will most likely encourage the production and use of more throwaway plastic items and also lead to further pollution impacts on communities that already face a significant pollution burden.

Further, we are concerned about toxic substances recirculating in the economy and the environment from activities related to plastics and chemical recycling that pose hazards to human health and the environment in each phase of plastics, including use and post-use processing. We seek to ensure the public can follow the path of substances intentionally used or incidentally produced, released and transferred through the full lifecycle of plastics materials, including feedstock and recyclate.

As a result, we seek to assess projects and facilities that purport to recycle plastics and chemicals from the perspective of pollution impacts on nearby communities and the environment, including land, air and water discharges of toxic chemicals. We also seek to understand where else toxic chemicals end up in the course of these activities. Finally, we seek to understand the net impact of a recycling facility in terms of the amount of materials it processes and the fates of these materials, including the form in which they leave the facility.

The NPRI provides valuable publicly-available information for tracking pollutants released, disposed and transferred from certain chemical manufacturing and waste disposal facilities. However, NPRI data does not provide easily accessible data to the public on all facilities involved in the full supply chain of plastics, from production to recycling to final disposal, nor on all substances involved in plastics production and processing, including those sent offsite.

With an increasing emphasis on circularity and recovery of materials in the economy, we seek to ensure toxic chemicals are not circulating and accumulating in wastes, recyclate and products. We have assessed data collected under the NPRI to determine if all pollutants involved in production and recycling of plastics are adequately captured in the NPRI reporting requirements. Based on our initial investigation, some facilities and substances are missing from the data.

Do NPRI reports tell us the net impact of a new chemical recycling process at an existing industrial facility?

Imperial Oil has announced it is evaluating whether to build an "advanced recycling" facility on its site near Sarnia, Ontario, to process waste plastics.[1] It appears that the company currently reports separately for two facilities located at the same Sarnia-area address, an oil refinery and a petrochemical plant.

For 2021, Imperial Oil's Sarnia petrochemical and refinery facilities reported significant releases to air of:

- carbon monoxide (1,450 tonnes for both facilities combined),

[1] https://www.imperialoil.ca/en-ca/sustainability/Advanced-recycling-plastics

- nitrogen oxides (1,430 tonnes),
- volatile organic compounds (889 tonnes)
- total particulate matter (821 tonnes).

The refinery by itself also released to the air:
- 2 tonnes of naphthalene,
- 12,500 tonnes of sulphur dioxides
- 11.7 tonnes of toluene

In addition, the following was transferred for off-site disposal:
- 84.4 tonnes of naphthalene,
- 20.1 tonnes of acenaphthylene,
- 10.22 tonnes of fluorene,
- 1.1 tonnes of benzene,
- 1.1 tonnes of h-hexane
- 3.1 tonnes of toluene

The reported off-site receiving facility for pollutants from Imperial Oil's two Sarnia facilities in 2021 was **Clean Harbors**, also in the Sarnia area. We can track Clean Harbors releases for 2021 but are not able to assess how much of the Clean Harbors releases are attributable to the Imperial Oil transfers. For example, how much – if any – of the 210 tonnes of sulphur dioxide or 27 tonnes of hydrochloric acid released from the Clean Harbors stacks were the result of treatment of waste[2] from the Imperial Oil sites?

Further, if Imperial Oil adds equipment or a facility to treat waste plastics at its Sarnia site, we need to confirm it will report releases, disposal and off site transfer from this new activity separately from the rest of the facility so the public is able to assess the net environmental impact of the use of this technology. It would be preferable for the new facility to report separately, even if it does not meet the existing reporting thresholds, in order to identify releases specific to it. If releases are reported as part of one of the existing facilities on the site, it will be more difficult to identify releases and transfers directly related to the new process unless the change in release profile is specified in the NPRI report.

ReVital Polymers, a plastics recycler also based in Sarnia, announced in an undated media release[3] that it was installing "microwave catalytic depolymerization" equipment from **Pyrowave Inc.** to recycle post-consumer

[2] We would also note here that Imperial Oil reports that some chemicals are "recycled" at Clean Harbours. However, it appears the waste is incinerated without energy recovery.
[3] https://revitalpolymers.com/blogs/news/revital-polymers-pyrowave-and-ineos-styrolution-partner-to-launch-closed-loop-north-american-polystyrene-recycling-consortium

polystyrene waste that it would supply to **Ineos Styrolution**, another Sarnia-based company that produces styrene. For 2021, ReVital only reported the release of a single pollutant, 0.3771 tonnes of PM2.5 to air from its stack. It is not clear whether the Pyrowave equipment is functioning and/or whether any releases from that process are being reported.

We note that Ineos is one of the biggest sources of benzene (carcinogen) releases in Sarnia (more than 17 tonnes released to air in total in 2021), and also reported releases of nearly 7 tonnes of styrene (carcinogen), 3 tonnes of toluene and 56.6 tonnes of volatile organic compounds. Thermal treatment of polystyrene waste at ReVital could produce a similar emissions profile and it's not clear from the most recent NPRI reports whether these emissions are simply not reported or the Pyrowave unit is not functioning.

Are reporting thresholds too low and requirements too weak to ensure plastics processors report their pollutant releases and transfers?

Not all facilities that process plastics and chemical waste report to the NPRI. The following plastics processors, including two of the biggest mechanical plastics recyclers in Canada, do not appear to report to the NPRI:

- **Green Mantra** in Brantford, Ontario (treats mixed plastics and reportedly produces waxes, lubricants and additives[4])
- **Merlin Plastics** in Alberta and BC
- **EFS Plastics Inc** in Ontario

Post-use plastics are known to contain chemicals that are on the NPRI substance list. It stands to reason that facilities that process these plastics release these substances. However, these facilities are not reporting to the NPRI. Is this because the chemicals they treat are not accounted for in the waste they process, and/or fall below the reporting thresholds? In any case, it is not currently possible to obtain data on those releases.

Further, some facilities that do report to the NPRI, such as the **Enerkem Biofuels** facility in Edmonton, AB, have never reported on Part 3 substances, even though their process involves thermal treatment of wastes, including mixed plastics.[5] It bears confirming that Enerkem's gasification process does not involve the release of Part 3 substances.

[4] See https://greenmantra.com/

[5] See reporting criteria in the "Guide for reporting to the National Pollutant Release Inventory 2022-2024," particularly page 52, available at https://publications.gc.ca/collections/collection_2022/eccc/En81-1-2022-eng.pdf

Add chemicals used in plastics to the NPRI substances list

All facilities that process waste plastics – in other words, whose inputs include waste plastics – should be required to report on key pollutants, including Part 3 substances, as well as toxic substances connected with plastics manufacturing (eg. phthalates, bisphenols, PFAS, brominated flame retardants), without regard for thresholds. Their reporting should take into account what pollutants are in the material they are processing and the type of processing they are using on the wastes. This includes recyclers and so-called "chemical recyclers."

A 2022 report from the Natural Resources Defense Council (NRDC) on so-called chemical recycling facilities in the U.S. examined chemicals released and sent for disposal from a polystyrene processing facility in Oregon.[6] Barium, a neurological, liver and cardiovascular toxicant, was listed in the facility's report to the Toxics Release Inventory but is not a listed substance under the NPRI.

Further, plastics manufacturing often involves hazardous additives and processing agents, including a wide range of phthalates and bisphenols. The current NPRI lists only feature six phthalates, including DEHP (CAS Number 117-81-7), but not the known substitutes, including DPHP, DINP, and DIDP. Bisphenol A is an NPRI substance, but not known substitutes Bisphenol F and Bisphenol S. PFAS are not currently listed as NPRI substances. The substance list should be expanded to include the full range of phthalates, bisphenols and PFAS currently used in manufacturing processes. We note that some PFAS are now reportable in the US Toxics Release Inventory.

Can the NPRI assist in assessing the material efficiency of "chemical recycling" of plastic?

"Chemical recycling" generally refers to processes that involve thermal treatment, such as pyrolysis or gasification, with or without chemical catalysts, as well as solvent-based processes. Thermal treatment of plastics waste, such as pyrolysis, requires more energy than it generates[7] and is a source of toxic emissions. What is not as well understood is the material efficiency of the process. What is the ratio of recycled material, which can be used to make new products, to pollutants released and/or disposed of or transferred as waste in the process?

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[6] See https://www.nrdc.org/sites/default/files/chemical-recycling-greenwashing-incineration-ib.pdf

[7] Rollingson, A, and Oladejo, J. "'Patented blunderings,' efficiency awareness and self-sustainability claims in the pyrolysis energy from waste sector," *Resources, Conservation and Recycling 141*, 2019.

Such a calculation is particularly relevant in Ontario, where a new regulation exempts some "advanced recycling" facilities from full environmental assessment based on the percentage of material slated to be recovered.[8]

The NPRI could serve as a tool for reporting on releases and disposal of pollutants, but also how these masses compare to the facility's material inputs (i.e. waste). We believe it makes sense for processors to report on the mass of pollutants that enter their system/facility, in order to be able to compare these masses with emissions and transfers from the facility so we can properly understand the role these treatment facilities play in circulating pollutants in the context of increased prioritizing of a circular economy.

Are pollutants being transferred in new products made from processed plastics waste?

The plastics and petrochemical industry[9] and governments[10],[11] are touting a "circular economy for plastics" as a solution to plastic waste and pollution. To date, the focus on innovation and government policy is on plastics recycling. Although only 8 per cent of all plastics are recycled in Canada today,[12] industry and governments are trying to increase this activity and the federal government is working on requirements for certain plastic products to include recycled content.[13]

As a result, we may well see increased plastics waste processing in Canada, including through so-called "chemical recycling" and mechanical recycling.

The International Pollution Elimination Network has sounded the alarm about toxic substances found in products that include recycled content, including clothing and toys.[14] The report findings came from independent lab testing of the products in

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[8] See https://ero.ontario.ca/notice/019-4867
[9] See https://canadianchemistry.ca/category/plastics/circular-economy/
[10] Government of Canada's Zero Plastic Waste Agenda: https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/canada-action.html
[11] Government of Alberta: https://www.alberta.ca/circular-plastics-economy-engagement.aspx
[12] Statistics Canada, see https://www150.statcan.gc.ca/n1/daily-quotidien/220323/dq220323f-eng.htm
[13] Government of Canada, "Technical Issues Paper: Recycled content for certain plastic manufactured items Regulations," available at https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/technical-issues-paper-recycled-content-plastic-manufactured-regulations.html
[14] IPEN, "Toxic Plastics: a health threat to the circular economy," 2022, available at https://ipen.org/sites/default/files/documents/ipen-toxic-plastics-global-v1_4b-en.pdf

question. This type of testing is hit and miss and should not be necessary. That is why processors of plastics should report on the amount of NPRI substances transferred in the products they sell from the processed material.

As noted above, it will be important for all facilities engaged in plastics processing to report on releases of pollutants. Further, an additional category of release should be included in NPRI reporting to track pollutants in manufactured items, including chemicals and lubricants, waxes and asphalt fillers, plastic production pellets and flake, and other plastic manufactured items.

It is essential to understand whether chemical recycling leads to the circulation and accumulation of toxic chemicals in products and the environment.

How can NPRI better inform on the environmental justice impacts of the plastics supply chain?

NPRI data can be helpful in determining potential exposure to pollutants for people living and working close to the reporting facilities. It can also help determine cumulative exposures from clusters of facilities.

It is likely that new facilities treating plastic wastes will be set up in poor or otherwise marginalized neighbourhoods. In fact, it is highly likely that communities already burdened with air and water pollution from nearby industry will be further impacted by any increases in treatment of plastic waste. These include areas with higher than average populations of Indigenous people, such as the Aamjiwnaang community[15] near Sarnia, Black people and people of colour, as well as low-income communities where refining, petrochemical and waste management facilities already exist.

Fulsome NPRI reporting should help determine the disproportionate cost that neighbouring communities pay for a "circular economy for plastics."

Summary of recommendations for improving the NPRI:

1. We urge an assessment of how the NPRI might fill data gaps related to the fate of pollutants related to plastics production and waste processing and support disclosure of releases, disposals and transfers, including in products, in order to ensure a safe circular economy framework.

[15] See, for example, https://globalnews.ca/news/4659040/toxic-emissions-spilling-into-sarnia-year-after-ontario-promised-change/

2. All facilities that process waste plastics should be required to report on key pollutants, including Part 3 substances, as well as toxic substances connected with plastics manufacturing, without regard to thresholds. Their reporting should take into account what pollutants are in the material they are processing and the type of processing they are using on the wastes.

3. Add pollutants to the NPRI substances list related to plastics manufacturing and processing, including barium, bisphenols, phthalates, and brominated flame retardants.

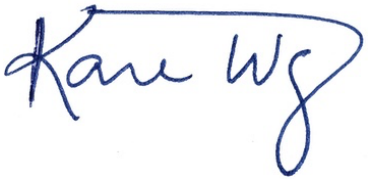
4. Explore the possibility of using the NPRI to track pollutants embedded in products, including recycled materials intended for sale to consumers, that are generated from reporting facilities.

5. Explore the possibility of requiring reporting on NPRI substances that are used as feedstocks or inputs for waste recycling processes in order to understand the amount of pollutants in the feedstock waste, the material efficiency of the process, and the fate of those pollutants as a result of processing.

6. Waste treatment or recycling facilities added to an existing NPRI reporting site should report separately from existing facilities on the site in order to assess the net impact of the added treatment process.

We thank you for the opportunity to provide this brief. We are available at your convenience if you have any questions or would like to discuss any of the foregoing information.

Sincerely,



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