



# Radioactive Contaminant Reporting and the National Pollutant Release Inventory (NPRI)

Jamie Kneen, MiningWatch Canada  
on behalf of the NGO members of the NPRI Multi-Stakeholder Working Group

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## Community Right to Know

The purpose of a public pollutant release and transfer register such as the NPRI is transparency, responding to the principle of Community Right to Know, that is, the right of people to know what pollutants could potentially affect them so that they can make risk-informed decisions and take appropriate action – or demand appropriate action from facility operators and authorities – including in case of emergency. This is part of the Right to a Healthy Environment<sup>1</sup> under the *Canadian Environmental Protection Act* (CEPA). A 2024 presentation by Environment and Climate Change Canada (ECCC) staff to the NPRI multi-stakeholder working group on the Right to a Healthy Environment framed the principle as supporting people “in their ability to make informed decisions about their and their communities’ health and environment, to understand how government decisions are made, and to hold governments accountable for these decisions.”<sup>2</sup>

## Environmental Racism and Environmental Justice

The 2024 *National Strategy Respecting Environmental Racism and Environmental Justice Act* (full title *An Act respecting the development of a national strategy to assess, prevent and address environmental racism and to advance environmental justice*<sup>3</sup> requires the Minister of the Environment to “develop a national strategy to promote efforts across Canada to advance environmental justice and to assess, prevent

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<sup>1</sup> <https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/right-to-healthy-environment.html>

<sup>2</sup> Sara McPhee & Julie Thibeault, “The Draft implementation Framework for the Right to a Healthy Environment under CEPA: NPRI Multi-stakeholder working group, October 23rd, 2024, Government of Canada, Slide 6 [https://drive.google.com/file/d/1BF\\_ZEUD4Rs1x6YQHNCQuPN2BcDOV1Nh1/view](https://drive.google.com/file/d/1BF_ZEUD4Rs1x6YQHNCQuPN2BcDOV1Nh1/view)

<sup>3</sup> Parliament of Canada. The *National Strategy Respecting Environmental Racism and Environmental Justice Act*. S.C. 2024, c. 11, assented to June 20, 2024. [https://lois-laws.justice.gc.ca/eng/AnnualStatutes/2024\\_11/page-1.html](https://lois-laws.justice.gc.ca/eng/AnnualStatutes/2024_11/page-1.html)

and address environmental racism.” The distribution of exposure to toxic chemicals often follows historic and current patterns of racial, economic, and other forms of discrimination. The potential for mitigating exposure is also unevenly distributed socially and geographically. Affected communities’ potential exposure as well as public access to data and public interest useability of data therefore need to be addressed with respect to pollutant release reporting.

## **Radionuclide reporting – uranium mines and mills**

Public reporting of radionuclide releases, and transfers presents an anomalous situation with respect to the regulatory framework for other toxic materials and Community Right to Know principles, in two key respects. Firstly, radionuclides are not reported as part of the NPRI, but rather are reported by the Canadian Nuclear Safety Commission (CNSC) as raw data through the Open Government portal, without any of the accessibility features developed by Environment and Climate Change Canada (ECCC) for the NPRI. Secondly, uranium mine reporting presents an additional, distinct gap due to the fact that the transfer of radionuclides is not reported at all. Only releases to air and water are reported, based on licensing requirements under the Uranium Mines and Mills Regulations of the *Nuclear Safety and Control Act* for uranium, thorium-230, lead-210, polonium-210, and radium-226. Radium-226 is also subject to regulation under the Metal and Diamond Mining Effluent Regulations (MDMER) as a prescribed deleterious substance.

## **Data accessibility**

The fact that CNSC data on radionuclides does not align with NPRI data in accessibility (public interface and useability) presents a concrete obstacle to the Community Right to Know in different aspects. First, the simple fact of having to go to a different web page and download and interpret a different data set is an additional complication for the user. It’s not unsurmountable, but it’s also not necessary. A much more significant challenge is the fact that the Open Government portal, where the CNSC data is published, does not provide any data interpretation, manipulation, or visualization features. Users either have to struggle with interpreting raw data, or else develop their own methods to integrate and compare data sets, with no support or assistance from the responsible agencies. As a further barrier, far from being integrated, the two data sets don’t even acknowledge each other’s existence. Nothing on the CNSC’s Open Government page even points to the NPRI, and nothing in the NPRI identifies the Open Government portal as the place to look for radionuclide releases.

What can be done to resolve this? Adding radionuclides to the NPRI is perhaps the most obvious answer. Given that most if not all facilities reporting to the CNSC also report to the NPRI, it’s not much of a leap. If the designation of radionuclides under CEPA is an obstacle, and they do demonstrate both chemical and radiological toxicity, potentially complicating that designation technically, then provision could be made to allow the NPRI to report them anyway, perhaps explicitly labelled as non-CEPA data, but available through the same portal using the same data interpretation and presentation tools.

## Data scope and standard

The NPRI documents on-site and off-site disposal of toxic substances as well as releases to air, land, and water. The fact that “[t]he current scope of the CNSC’s radionuclide databases include stack emissions and direct discharges”<sup>4</sup> only, represents a serious data gap, and a significant obstacle with respect to Community Right to Know. Uranium mines and mills provide an illustration of the significance of this gap because of the immense magnitude of the amounts of toxic and radioactive material they process, transfer, and release.

Uranium-bearing rock is mined underground or from open pits and separated into ore worth processing, and waste rock with less-than-economic uranium concentrations. The ore is then milled – crushed and processed to separate the uranium – and the remaining material (tailings), containing the radioactive decay products of uranium, representing 85% of the radioactivity present in the ore, are stored on site. Chemical and radiological contaminants can leach or spill into the ground, groundwater, or surface water directly from the mine, from minewater and mill process water, from waste rock dumps, or from tailings facilities. Radon gas, emitted as a radioactive decay product of uranium, can be released into the air.

Neighbouring and downstream communities, or the public at large, can find out from the NPRI how much toxic material is transferred and stored on-site, disposed of off-site, or released to land at any given site. This information is critical for long-term risk management and decision-making at the community and regional level as well as for public education, awareness, and engagement in planning and decision-making processes.

This is broadly impossible when it comes to radionuclides, since the CNSC does not report on-site and off-site disposal, releases to land, nor even non-point source releases to air.<sup>5</sup> Admittedly, although data on transfers and disposal probably exists already and would be relatively simple to report, some data, such as non-point source releases to air and releases to land, might require additional monitoring. The public, including neighbouring and downstream communities, does not have access to data on the radiological content of uranium mine and mill waste rock and tailings, despite the magnitude of these facilities and the potential for radioactive contamination from acute containment failures – spills and accidents – as well as chronic failures, for eg., contaminants leaching into groundwater. Note that CNSC reporting of releases to air is limited to stack emissions, so while concentrations of radon gas within licenced facilities is regulated for worker safety, facility-wide emissions of radon gas – with potential implications for public health – are not regulated or reported.

There are some limited possibilities for such analysis using the available data. We undertook a case study of total lead and its radioactive isotope lead-210 (part of the radioactive decay chain of uranium) at the Key Lake uranium mine and mill in 2023, which is annexed below. The case study provides an illustration of the limitations of analysis using incomplete and to some extent

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<sup>4</sup> Government of Canada. “Accessing Radionuclide Data and Next Steps”. Canadian Nuclear Safety Commission & Environment and Climate Change Canada presentation to the NPRI Multi-stakeholder working group. April 28, 2023.

<sup>5</sup> Government of Canada. Radionuclide Release Datasets - Radionuclide Releases - Uranium Mines and Mills. <https://open.canada.ca/data/en/dataset/6ed50cd9-0d8c-471b-a5f6-26088298870e/resource/1f44948a-0a10-4d1e-87f1-f7fde016fef3>

incompatible data sets, restricted to only one radionuclide out of dozens in the uranium decay chain, only five of which the CNSC publishes data for.

## **Conclusion**

Radionuclides are not included in the NPRI, but are reported by the CNSC through the Open Government portal. The CNSC's reporting of radionuclide releases does not use the tools and interfaces that the NPRI has developed to support and facilitate public access, making the data less accessible and useful and frustrating Community Right to Know principles. This can be resolved by incorporating radionuclides directly in the NPRI; by replicating NPRI accessibility through the Open Government portal or elsewhere; or by presenting CNSC data through the NPRI portal as compatible and in the public interest even in the absence of a legal mandate or requirement to do so.

Another major challenge to Community Right to Know principles comes from the fact that CNSC reporting of radionuclide contamination excludes on-site and off-site disposal, releases to land, and non-point source releases to air, covering only stack emissions and releases to water. In order to be compatible with, and comparable to, the NPRI, and to move toward meeting Community Right to Know, radionuclide releases must be monitored and reported to the same scope and standard.

## Case Study: The Key Lake uranium mine and mill<sup>6</sup>

The Key Lake uranium mine in north-central Saskatchewan opened in 1983 and was mined out by 1997. In 1999, the Key Lake mill began processing ore from the McArthur River mine, using the mined out Dielmann open pit as a tailings management facility. The mill was temporarily closed from January 2018 to November, 2022.

To try to understand what kind of liabilities are being created at this site, we can take the example of lead-210, which, being a radioactive isotope of lead, is reported to both the CNSC under its licencing requirements and to the NPRI. Interestingly, there does not appear to be a relationship between water releases of total lead and those of lead-210, but there are a number of factors that could govern or influence those releases beyond the obvious changes in mill processing from full production in 2017 to being on care and maintenance from 2018 to 2022. One such factor would be changes in ore mixture, since the Key Lake mill has been processing ore from the McArthur River mine blended down with other ore or waste rock to provide a consistent mill feed. Changes in mill processing and effluent treatment could also play an important role. Further comparison would also require calculating the specific activity per kilogram of lead-210, which we have not done here.

However, the most significant limitation in this data is the fact that the CNSC, under its licensing requirements, reports only releases to water, not releases to land or air (important in the case of radon), and most significantly, not disposals and transfers, on or off site. It is therefore impossible to know what radiological risks might be attached to waste rock and tailings, which – given the amounts of waste being generated – are sure to be significant. With up to a million tonnes of total lead being deposited annually, even a modest proportion of lead-210 would be radiologically significant.

CNSC reporting on Key Lake Uranium Mine – Lead-210 – all years<sup>7</sup>

Year	NPRI ID	Company Name	Facility Name	Substance Name	Units	Direct Discharge
2013	1148	Cameco	Key Lake	Lead-210	MBq	97.5
2014	1148	Cameco	Key Lake	Lead-210	MBq	90.7
2015	1148	Cameco	Key Lake	Lead-210	MBq	75.2
2016	1148	Cameco	Key Lake	Lead-210	MBq	53.9
2017	1148	Cameco	Key Lake	Lead-210	MBq	23.8
2018	1148	Cameco	Key Lake	Lead-210	MBq	27.0
2019	1148	Cameco	Key Lake	Lead-210	MBq	24.5
2020	1148	Cameco	Key Lake	Lead-210	MBq	53.9
2021	1148	Cameco	Key Lake	Lead-210	MBq	27.2

NPRI reporting on Key Lake Uranium Mine – Lead (and its compounds) – all years<sup>8</sup>

<sup>6</sup> Kneen, Jamie. “Reporting of Toxic Substances Released by Mining under the NPRI (National Pollutant Release Inventory).” MiningWatch Canada, February 3, 2023. <https://miningwatch.ca/2023/2/3/reporting-toxic-substances-released-mining-under-npri-national-pollutant-release-inventory>

<sup>7</sup> Radionuclide Release Datasets - Radionuclide Releases - Uranium Mines and Mills <https://open.canada.ca/data/en/dataset/6ed50cd9-0d8c-471b-a5f6-26088298870e>

<sup>8</sup> Facility Report – Information for Key Lake Operation <https://pollution-waste.canada.ca/national-release-inventory/1997/1148>

Year	CAS number	Substance	Units	Releases				Disposals and Transfers			
				Air	Water	Land	Total	On-site disposals	Off-site disposals	Off-site treatment	Off-site recycling
2021	NA - 08	Lead (and its compounds)	kg	0.0031	0.691	-	0.6941	95.002	-	-	60.8
2020	NA - 08	Lead (and its compounds)	kg	0.0002	0.544	-	0.5442	5,820	-	-	709.272
2019	NA - 08	Lead (and its compounds)	kg	0.0004	0.771	-	0.7714	3,628	-	-	-
2018	NA - 08	Lead (and its compounds)	kg	0.0002	13.813	-	13.8132	85,964	-	-	7.44
2017	NA - 08	Lead (and its compounds)	kg	1.219	8.284	-	9.503	705,416	-	-	-
2016	NA - 08	Lead (and its compounds)	kg	1.3599	0.767	-	2.1269	905,926.383	-	-	-
2015	NA - 08	Lead (and its compounds)	kg	1.519	0.826	-	2.345	889,563.239	-	-	-
2014	NA - 08	Lead (and its compounds)	kg	1.687	1.081	-	2.768	874,565.054	-	-	-
2013	NA - 08	Lead (and its compounds)	kg	1.845	0.4872	-	2.3322	1,048,100	-	-	-
2012	NA - 08	Lead (and its compounds)	kg	0.1694	1.627	-	1.7964	1,006,659	-	-	-
2011	NA - 08	Lead (and its compounds)	kg	0.2597	1.129	-	1.3887	965,280	-	-	-
2010	NA - 08	Lead (and its compounds)	kg	0.0763	0.8595	-	0.9358	614,070	-	-	-
2009	NA - 08	Lead (and its compounds)	kg	0.1	16.073	-	16.173	540,300	-	-	-
2008	NA - 08	Lead (and its compounds)	kg	-	-	-	0	427,380	-	-	-
2007	NA - 08	Lead (and its compounds)	kg	-	-	-	0	663,790	-	-	-
2006	NA - 08	Lead (and its compounds)	kg	-	-	-	0	689,810	-	-	-