Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 26-M7.8

Date: 2026-01-28

Written Submission from Northwatch

Mémoire de Northwatch

In the matter of the

À l'égard du

Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2024

Rapport de surveillance réglementaire des installations de traitement de l'uranium et des substances nucléaires au Canada : 2024

Commission Meeting

Réunion de la Commission

March 2026

Mars 2026

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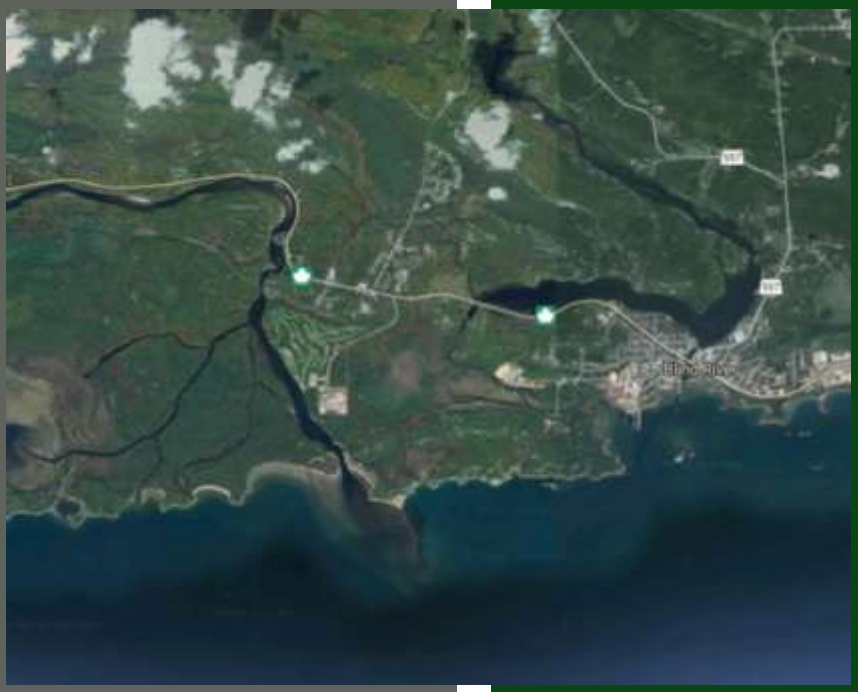
Canada



REGULATORY OVERSIGHT REPORT FOR URANIUM AND NUCLEAR SUBSTANCE PROCESSING FACILITIES IN CANADA: 2024

Northwatch's Written Submission January 2026

CMD 26-M7

1. Review and Comment on Regulatory Oversight Reports: 2024

On July 9, 2025, the Canadian Nuclear Safety Commission issued a notice[1] of an "upcoming public meeting to be held in the week of March23, 2026 on the 2024 regulatory oversight reports. Unlike the CNSC practice to date, the notice indicated that the public meeting would consider all five of regulatory oversight reports (RORs) for the 2024 calendar year (Regulatory Oversight Reports for Canadian Nuclear Power Generating Sites, Uranium and Nuclear Substance Processing Facilities in Canada, Uranium Mines and Mills in Canada, the Use of Nuclear Substances in Canada, and on Canadian Nuclear Laboratories Sites) at the same meeting. There was no Regulatory Oversight Report on waste management facilities for 2024, and historic and closed mines were not included in the ROR on uranium mines and mills.

Further, the notice identified that the Commission is making a number of changes to their procedures and to the public opportunity to comment, notably that intervenors are to make a single written submission covering any/all of the 2024 RORs and that participant funding would be available only through a single application for any and all of the RORs to be commented on.

Northwatch does not support this new approach and regards it as a deterrent to commenting on more than one regulatory oversight report per annum. We see no advantage or gained efficiency for the Commission, and it is a disincentive or disadvantage for intervenors who may have reason to comment on more than one of the RORs but whose audiences are different for each of the RORs on which they are commenting.

The notice also indicated that CNSC staff will not make formal presentations to the Commission on the 2024 RORs and that the Commission will ask questions during the public Commission meeting. The notice did not clarify that questions would be asked only of CNSC staff, and not to public intervenors (whose participation is limited to making a single submission in writing).

According to the notice the 2024 RORs were to be available for review on the CNSC website or on request to the Registry, after November 28, 2025. CMD 26-M7, the Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2024 was posted as a meeting document[2] on December 1, 2025.

As Northwatch has commented in the past, we continue to be concerned about the limited accessibility and availability of the Regulatory Oversight Reports. The meeting notice indicates that the RORs are to be available on the CNSC web site. The reasonable expectation is that these reports would be easily located using the search function on the web site; this search function

[1] Ref. 2026-M-03 to 07, as posted at https://api.cnsc-ccsn.gc.ca/dms/digital-medias/26-M03-07-notice-of-participation-and-participation-funding-week-of-march-23-2026-commission-meeting-eng.pdf/object?utm_source=dialoginsight&utm_medium=email&utm_campaign=M166-20250709

[2] As posted at https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD26-M7-ENG.pdf/object

does in fact produce a link to a page for Regulatory Oversight Reports, but the 2024 reports are not included in the linked reports for various years.

In the case of the RORs on uranium processing the most recent report posted is from 2023 (so one year prior to those reports to which the pubic has been invited to comment). For the Regulatory Oversight Report on Uranium Mines and Mills the most recent report posted is 2021, and there is no indication that this report includes historic mines only on a triennial basis. The page also does not include links to previous RORs on waste management facilities.

The reports are available on the CNSC web site, but only as linked documents to public meetings. To access the reports a user must, after arriving at the home page of the CNSC web site, scroll down to "Commission Activities" and then scroll down to "Meeting documents" then select the correct date of the meeting when the RORs are to be on the agenda, then select the link to access a particular document, and then scroll down to the link for the various Regulatory Oversight Report.

This requires "insider knowledge" and does not provide reasonable or ready access to the notice and invitation to comment or to the documents themselves for the great majority of Canadians who are not familiar with the intricacies of the CNSC's web site structure. Even entering "CMD 26-M7" in the search function did not generate a link to the document; rather it linked to **Download Meeting Documents** which was two important steps closer than the search for "Regulatory Oversight Reports" but still required the user to know the meeting date to access the list of documents. And the 2024 notice did not indicated CMD identifiers for the individual Regulatory Oversight Reports.

As we have requested in the past, Northwatch again requests that the draft regulatory oversight reports be linked from the CNSC web page on Regulatory Oversight reports. The links can be to the meeting document, which satisfies the argument that they cannot be posted because they are not final and/or translated. Alternatively – but not preferably – the CNSC web page on Regulatory Oversight Reports could include multi-step instructions on how to access the RORs where they are located in the document listings for Commission meetings.

2. Northwatch's Interest

Northwatch is a public interest organization concerned with environmental protection and social development in northeastern Ontario. Founded in 1988 to provide a representative regional voice in environmental decision-making and to address regional concerns with respect to energy, waste, mining and forestry related activities and initiatives, we have a long term and consistent interest in the nuclear chain, and its serial effects and potential effects with respect to northeastern Ontario, including issues related to uranium mining, refining, nuclear power generation, and various nuclear waste management initiatives and proposals as they may relate or have the potential to affect the lands, waters and/or people of northern Ontario.

Northwatch's issues and concerns relate primarily to the performance of the refinery and the potential related adverse effects on workers and residents and on the natural environment in the vicinity of the refinery, including the North Shore of Lake Huron, the North Channel and – potentially – the islands in the North Channel of Lake Huron.

Since the beginning of operations there has been an accumulation of uranium in the soil and vegetation in the area, which is one indicator of releases as a result of the refinery's operations. During previous licensing exercises, Northwatch has noted that there were a number of performance issues which are of concern, particularly with respect to radiation protection, including those related to whole body and skin dose results, and exceedances of action levels.

Northwatch has previously intervened in license reviews for the Blind River facility, most recently in 2011. Northwatch has also commented on a number of related Regulatory Oversight Reports, including in 2016, 2017 and 2018.

Northwatch's comments on the CMD 26-M7, the Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2024, will focus on those parts of the report pertaining to Cameco's uranium refinery in Blind River.

3. CMD 26-M7, the Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2024

The Regulatory Oversight Report's "chapter" on the Blind River refinery was extremely brief – only 186 words – and provided no actual information about the performance of the facility with the exception of a brief statement that in 2024 CNSC staff conducted 5 inspections at the BRR facility that covered 11 SCAs resulting in 21 Notices of Non-Compliance (NNCs).

Regardless, CNSC staff concluded that they are "satisfied that Cameco's BRR operated safely in 2024 and in accordance with its licensing basis."

In other sections the report provided a link to CNSC's Independent Environmental Monitoring Program for the Blind River Refinery,[3] referenced two reportable events (glycol leak, fire in a plastic pail),[4] a line to the 2021 Environmental Protection report for the Blind River Refinery,[5] a link to Appendix K with Environmental Data for the various faclitlies including Blind River, and various extremely summary tables including Table K-2: Liquid effluent monitoring results, Blind River Refinery, 2024, Table K-3: Surface water monitoring results at outfall diffuser in Lake Huron, Blind River Refinery, 2024 and Table K-4: Soil monitoring results (0–5 cm depth), Blind River Refinery[6] and tables summarizing Effective dose statistics, Equivalent (skin) dose statistics and Equivalent (extremity) dose statistics for Nuclear Energy Workers.[7]

3.1 Uranium Concentrations in Soil

In October 2016 Northwatch reviewed the matter of uranium concentrations in soil in the vicinity of the Blind River refinery in commenting on CNSC's "Regulatory Oversight Report for Nuclear Processing, Small Research Reactor and Class IB Accelerator Facilities: 2015".

That regulatory oversight report[8] included a single brief paragraph about the monitoring of uranium concentrations in soils in the vicinity of the Blind River refinery. In that single paragraph, the report conveyed a very small amount of information about the monitoring results, and made a fairly large assertion about why Cameco collects soil samples on an annual basis. Allegedly, it is to "*demonstrate that there are no long-term effects of air emissions since there is no accumulation of uranium in soil in the vicinity of the BRR facility*." The report further asserted that "*the results in 2015 remained consistent with the uranium soil concentrations detected in previous years*".

[3] Page 29
[4] Page 35
[5] Page 44
[6] Pages 64-66
[7] Pages 82-84
[8] Regulatory Oversight Report for Nuclear Processing, Small Research Reactor and Class IB Accelerator Facilities: 2015

A comparison was possible based on CNSC-provided information, of maximum uranium concentrations over a ten-year period, using Table 13 from CMD 11-H18 and Table F-3 from the 2015 Regulatory oversight report.

The 2006 to 2010 annual averages showed values that varied a great deal, and not in a manner that showed an overall trend (although Northwatch's review in 2011[9] found that there were upward trends with specific sample stations). However, the values for 2006 to 2010 (8.4, 8.7, 5.4, 3.0 and 4.0 respectively) were significantly different – and lower – than the values for 2011 to 2015 (18.0, 12.1, 16.4, 7.2 and 9.7). While the lowest maximum concentrations from 2011 to 2015 were generally similar to the highest maximum concentrations from 2006 to 2010, the increase from 4.0 in 2010 to 18.0 in 2011 is noteworthy.

While these are averaged annual values and so of only limited value in understanding site conditions, they are helpful in evaluating a statement in the 2015 Regulatory Oversight Report, ie. that "*Essentially, uranium soil concentrations do not appear to increase in the area surrounding the facility. This confirms that current BRR operations have no effects on soil quality*." In brief, that statement has no basis.

Table 13: Soil Sampling Results[1]

Parameter	2006	2007	2008	2009	2010
Minimum Uranium Concentration (µgU/g)	0.8	0.2	0.4	0.2	0.2
Maximum Uranium Concentration (µgU/g)	8.4	8.7	5.4	3.0	4.0

1. The results for 2011 will be available in early 2012.

Table F-3: Blind River Refinery-soil monitoring results

Parameter	2011	2012	2013	2014	2015	CCME Guidelines (µg/g)*
Minimum uranium concentration (µg/g)	0.2	0.1	0.1	0.1	0.1	23
Average uranium concentration (µg/g) (within 1000 m, 0-5 cm depth)	4.8	3.3	4.3	2.7	3.8	
Maximum uranium concentration (µg/g)	18.0	12.1	16.4	7.2	9.7	

*Canadian Council of Ministers on the Environment (CCME) Soil Quality Guidelines for the Protection of Environment and Human Health (for residential/parkland land use).

[9] 11-H18.37 Written Submission from Northwatch, 11-H18.37a and 11-H18.37b, supplementary submission

Cameco's 2015 monitoring report provided much of the same information as included in the CNSC regulatory oversight report. However, we were astounded by the statement in the Cameco monitoring report that as a result of the construction of a berm "*some historic Cameco soil sampling locations in the vicinity of the fence line were compromised. This means a few new sampling locations will need to be selected in 2016. The locations selected will preferably be in open areas, not under tree canopies, and in areas where the soil has been undisturbed by human activity*."

This showed what we consider to be a reckless disregard for the long term monitoring program. We note that Cameco did not indicate which sampling locations were lost, only saying that they were in the vicinity of the fence line. We further note that three of the four sampling locations with the highest concentration of uranium in the soil in the Ministry of the Environment's 2007 report (Sites 1, 2 and 4) were also in the vicinity of the fence line, and the two sites that showed the highest concentration of uranium in the soil in the sampling done for Northwatch by the Elliot Lake Field Station in late 2011 (Sites 2 and 4) were also in the vicinity of the fence line. Those two sampling sites had shown increases of 149% and 96% concentrations between 2007 and 2011.

> *It is a challenge to ensure that long-term soil monitoring plots are not disturbed or otherwise compromised.*
> *Soil and Tree Foliage Survey in the Vicinity of Cameco's Blind River Refinery, Blind River, Ontario (2012)" 2012 Report, MOE*

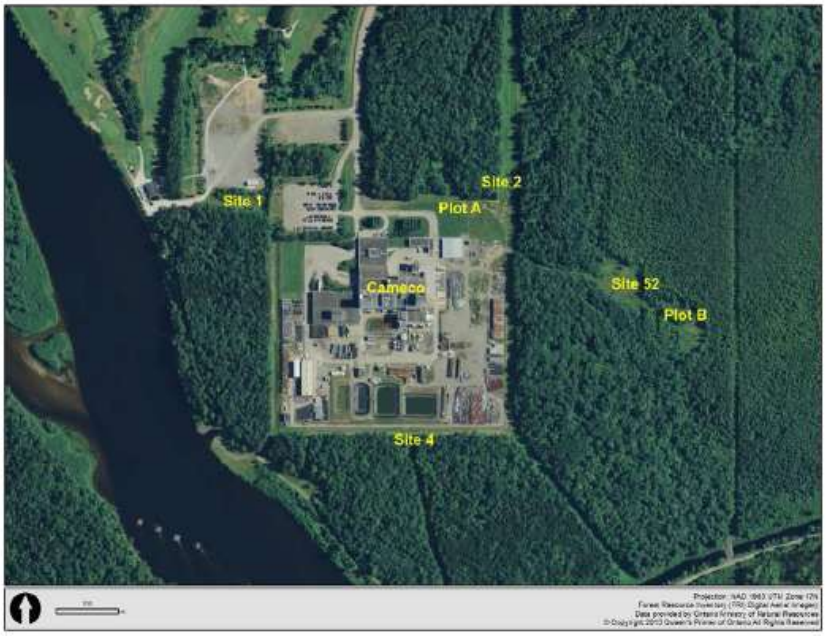
In December 2013 the Ontario Ministry of the Environment released a Technical Memorandum titled "*Soil and Tree Foliage Survey in the Vicinity of Cameco's Blind River Refinery, Blind River, Ontario (2012)*" which set out the results of the Ministry's 2012 soil and vegetation monitoring at the Blind River refinery.

The MOE report in 2007 stated:

> *Despite the fact that Sites 2 and 4 are within forested areas and exhibit variable year-to-year concentrations, there are strong indications that uranium concentrations have increased during the operating period of the Cameco facility. These sites are located at the fence line surrounding Cameco's process area. At Site 3, which is more distant, uranium concentrations have remained constant over time.*

As with the Ministry's 2007 report and Northwatch's 2011 report, in the Ministry of the Environment's 2012 report a small number of the sampling sites showed increased concentrations; others remained relatively constant and a few showed decreases.

The MOE 2012 report indicated that the highest soil uranium concentrations in 2012 were reported at sites within 500 m of BRR (Sites 4, 2, 1, 52, and 8), consistent with MOE soil uranium data since 2000. As in the Northwatch 2011 report, Sites 2 and 4 results show the highest concentration of uranium, and MOE noted that in 2012 soil uranium concentrations were much higher at Site 2 than in previous years.



Map 2: Aerial photograph of BRR with the long-term monitoring plots (Plot A and B) and adjacent soil and vegetation sites (Sites 1, 2, 4, and 52) superimposed on the image.

Figure 2 from the MOE 2012 report is reproduced below; the entire report was included as Appendix 2 to Northwatch's 2016 review of the 2015 Regulatory Oversight Report.

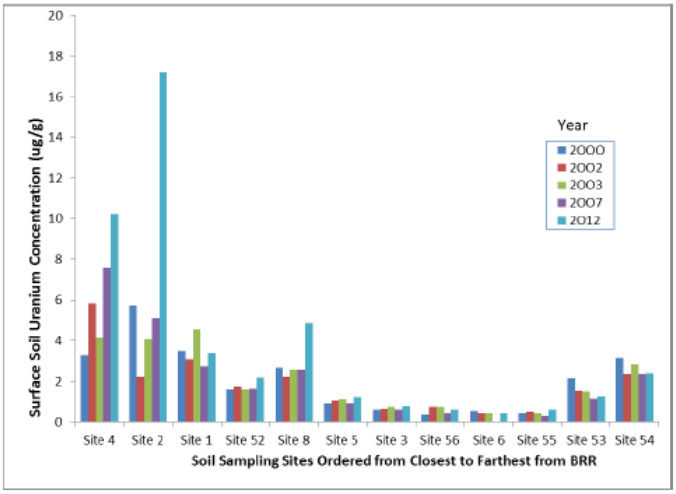


Figure 2: Uranium concentrations in surface soil (0-5 cm) collected in 2000, 2002, 2003, 2007, and 2012 from 12 sampling sites located in the vicinity of BRR

While the Ministry of the Environment does not, in their 2012 report, identify that the increased concentrations of uranium in the soil are having a measureable and adverse environmental effect, the sampling results do quite clearly show that the uranium refinery was to that point in time continuing to have a measurable impact in the form of increasing uranium concentrations in a majority of the sampling locations, as depicted in MOE's Figure 2.

2021 License Review

For the 2021 review of Cameco's application to extend its licence for an additional ten years, CNSC staff and Cameco presented minimal information about uranium concentrations in the soil and monitoring results for the second half of the licencing period.

Most notably:

- Neither the CNSC CMD nor the Cameco application nor the Cameco CMD included a map showing the monitoring locations
- The CNSC CMD's Table 13 presented only annual averages; the CNSC Environmental Protection Report's Table 3.4 presented both average and maximum uranium concentrations
- Actual monitoring results were not included in the CMDs, application, Environmental Risk Assessment or Environmental Protection Report

Northwatch directly requested that Cameco share actual monitoring results, but the request was denied. Cameco responded as follows:

> *Blind River collects soil samples at designated locations on an annual basis. The program currently includes 7 locations within 1 km of the refinery and 2 locations further than 1 km from the refinery. Ten cores are taken at each location and the ten core segments are combined in the laboratory to create a composite sample. This is a standard sample collection practice. As there is natural variability in soil structure and composition, the composites are used to ensure that the soil collected adequately represents the soil present at the location. The only reporting that is done with this data is the annual compliance reports I provided last week, where we present the number of samples, the average and the range of uranium concentration. The most restrictive applicable regulatory criteria is the Canadian Council of Ministers of the Environment (CCME) guideline of 23 µg U/g for residential or parkland use. The summary data is screened against this criteria. All samples collected during the licence period were well below this criteria.*
>
> *It's important to point out that in consultation with the CNSC, the soil program did change over the licensing period to focus on the shallow depth (0-2 inches) as this is where any uranium deposition from air emissions would be. For this reason, the only way to compare the data year over year, is through the summary data provided in the annual reports, which is the format the data is provided to the CNSC and MECP. There are no standalone soil reports issued as the annual reports provided to you meets our regulatory requirements.*[10]

We found the absence of actual monitoring data to be problematic, and CNSC staff interpretation provided of the limited information they present in CMD 21-H-09 to be equally so.

CMD 21-H-09 briefly described the monitoring program, references Table 13 as showing the average uranium in soil results, and states that "*the 2020 soil monitoring data are in the background range for Ontario (up to 2.5 µg/g) and below the respective concentrations detected in previous years. This means that uranium soil concentrations did not increase in the area surrounding the facility*". [11]

[10] Email dated 12 October 2021
[11] 2021- H-09 p 55

Table 13: Average uranium in soil results, 2012 –20

Parameter	Uranium (µg/g)	
Location	Sampling sites within 1000 m	Sampling sites outside 1000 m
Depth	0 – 5 cm	0 – 5 cm
2012	3.3	0.7
2013	4.3	0.4
2014	2.7	0.6
2015	3.8	1.4
2016	1.5	0.5
2017	1.6	0.6
2018	2.0	0.7
2019	2.1	1.0
2020	1.4	0.7
Guideline	23[1]	

[1] Reference: Canadian Council of Ministers of the Environment, *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*, 1999.

Table 13: 21-H-09, p 56[12]

In Northwatch's assessment, CNSC was overstating their case. For one, consideration of the average concentrations – as presented by CNSC – over a ten-year period show year-to-year variability. A decrease from 2019 to 2020 does not constitute a trend. And while the information CNSC staff presents in the CMD 21-H-09 indicated an overall decrease in average concentrations – which would be very welcome news – a comparison to the range of concentrations presented in Table 3.4 in the Environmental Protection Report shows that the maximum concentrations are considerably higher.

Table 3.4: Soil monitoring results of uranium concentrations (µg/g) at the BRR facility (0–5 cm depth) [2-6]

Parameter	2015	2016	2017	2018	2019	CCME guidelines [41]
Average uranium concentration within 1,000 m	3.8	1.5	1.6	2.0	2.1	23
Average uranium concentration outside 1,000 m	1.4	0.5	0.6	0.7	1.0	
Maximum uranium concentration	9.7	2.9	2.8	3.7	3.8	

CNSC staff CMD 21-H-09 also stated that "Overall, the soil monitoring data demonstrate that the current BRR operations do not contribute to accumulation of uranium in surrounding soil, and that no adverse effects to relevant human and environmental receptors are expected." This is a statement that they have not supported with sufficient data, or with actual studies of human health and/ or localized environmental effects of the uranium concentrations.[13]

Soil Monitoring Results as presented in CMD 26-M7, the Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2024

[12] Table 13: 21-H-09, p 56

[13] 21-H-09 p 55

CNSC staff's CMD 26-M7 reports that Cameco collects soil samples at a depth of 0 to 5 cm each year and 5 to 15 cm every 5 years to monitor uranium concentrations in surface soil and states tat "the 2024 soil monitoring results remained consistent with the respective concentrations measured in previous years, as shown in table K-4".[14]

Table K-4: Soil monitoring results (0–5 cm depth), Blind River Refinery, µg/g, 2024

Parameter	Average Concentration	CCME Guideline*
Uranium (within 1,000 m)	1.4	**23**
Uranium (outside 1,000 m)	0.7	**23**

cm = centimetre; m = metre; µg/g = microgram per gram;
*CCME = Canadian Council of Ministers of the Environment *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*

The report describes average concentrations of uranium in soil measured "near" the BRR facility as being below Ontario's natural background levels (2.5 µg/g) and well below 23 µg/g, which is the most restrictive soil quality guideline set by the CCME for uranium (for residential and parkland land use) and claims that "this data demonstrates that the current BRR operations do not contribute to the accumulation of uranium in the surrounding soil and no adverse consequences to human and environmental receptors are expected."

Northwatch's assessment is different. Northwatch's assessment is as follows:

- CMD 26-M7 fails to provide sufficient information on soil monitoring and soil monitoring results
- CMD 26-M7 presents only "average" concentrations, and provides no information about the number of samples being averaged, the sampling locations, or the sampling results
- The sampling results presented in Table K-4 do indicated that the average of an unspecified number of soil samples further away from the refinery (outside 1,000 metres) were half the average concentration of soil samples closer to the refinery (inside 1,000 metres); while limited and very generalized this comparison does strongly suggest that the refinery continues to affect uranium concentrations in the soil

Since 2011 Northwatch has been tracking and comparing uranium concentrations in the soil in the vicinity of the Blind River refinery. Over those fifteen years the quality and specificity of monitoring information has steadily declined. There have been a variety of causes, including the destruction of established monitoring locations by Cameco. Most recently, as evidenced by this Regulatory Oversight report and the paucity of information provided on soil monitoring results, the cause appears to be either obfuscation or indifference on the part of the CNSC staff.

[14] CMD 26-M7, pages 65-66

3.2 Environmental Performance

A key area of concern for Northwatch in the last two license reviews has been the environmental performance at the Blind River refinery, and the potential adverse consequences of poor performance on human health and the environment.

Given these concerns, Northwatch retained expert assistance from Hutchinson Environmental Sciences Ltd to support our review of the 2022 -2032 license application and again for our review of CMD 26-M7.

Overall, Hutchinson's technical review identified that longstanding concerns remain unaddressed, particularly relating to effects-based surface water monitoring, the groundwater monitoring program, and reporting.

A full copy of the Hutchinson Environmental Science Ltd's letter of advice with respect to their review of CMD 26-M7 is attached as Appendix A, but a summary of the key findings and data gaps identified in this technical review, and subsequent recommendations, are provided in the table below.

Document	Concern	Recommendation
CSNC (2025). Regulatory Oversight Report.	Insufficient detail in the ROR regarding notices of non-compliance, including limited detail on circumstances, context, and timelines for resolving incidents.	Provide more detailed descriptions of notices of non-compliance, including context, timing, and corrective actions, for increased confidence in environmental compliance.
	Insufficient detail on environmental monitoring, and "average" contaminant concentrations were reported without statistical context.	The ROR should include monitoring descriptions (i.e., sampling locations, frequency, trends, and comparisons to reference conditions) and statistical summaries, to contextualize environmental data and clearly describe potential environmental risk.
	Insufficient rationale to support Safety Control Area (SCA) ratings in Appendix H.	The ROR should include clear justification for SCA ratings, by referencing specific inspection results and comparing them to acceptability thresholds.
	No licence limits for nitrate and radium-226, which are measurable emissions from the BRR, which limits a reviewer's ability to evaluate compliance.	The ROR should include descriptions of how concentrations of nitrate and radium-226 in environmental samples were determined to be acceptable or not.
Cameco Corporation (2023-2025). Annual Compliance Monitoring and Operational	Environmental monitoring results and spatial/temporal trends in CoPC concentrations for surface water, soil, and groundwater were not sufficiently	Cameco should provide a more fulsome discussion of results in compliance reporting, including proper contextualization of data

Document	Concern	Recommendation
Performance Reporting from 2022 to 2024.	discussed to understand potential effects and all possible receiving areas had been monitored.	(sampling locations, site plans, analyses of trends, sampling dates).
	Nitrate concentrations related to effluent continued to exceed Canadian Council of Ministers of the Environment (CCME) long-term guidelines for the protection of aquatic life.	Surface water monitoring in Lake Huron for nitrate around the BRR effluent diffuser should be completed to confirm if the results of a Plume Dispersion Study represent actual dispersion. A nitrate monitoring program should be developed and included as a condition of the license.
	Surface water monitoring is limited to the Lake Huron outfall diffuser, with no additional downstream or upstream monitoring, and no monitoring of ditch drainage is conducted.	Surface water monitoring should be completed upstream and downstream of the facility to evaluate effects pathways and changes in natural conditions (if any). A monitoring program for the ditch outfall should be developed and included as a condition of the license. Monitoring should include radionuclides and typical industrial runoff parameters.
	Limited details regarding groundwater monitoring methodology and parameters were provided.	A detailed description of groundwater monitoring and hydrogeological interpretations should be provided, including parameters sampled and locations, physical hydrogeology and interpreted groundwater migration pathways.
	Groundwater quality reporting was too general to identify possible concerns. Data was presented as a single average/maximum value without statistical context or individual well results, sampling locations were not specified, and spatial/temporal trends and CoPCs other than uranium were not discussed. It was unclear how data was used to understand potential facility impacts.	Complete monitoring data for all individual wells should be provided (including statistical summaries, spatial and temporal trend analysis/discussion, individual monitoring well results and locations). All CoPC concentrations should be reported and discussed.
CNSC (2025). Independent Environmental Monitoring Program: Blind River Refinery	It was unclear if the monitoring program was sufficient to detect effects from the BRR. The program remains based on local community areas of concern rather than on	The independent monitoring program should be expanded to include monitoring in deposition areas identified by air dispersion,

Document	Concern	Recommendation
	dispersion/transport and fate modelling.	groundwater pathways, and aquatic transport and fate modelling.
	Surface water sampling appeared to be inconsistent over time: no sampling in 2024, and 2019, 2021 and 2022 monitoring was absent without explanation.	Consistent sampling design (including seasonal monitoring and same parameter lists between years) should be implemented to maintain a usable long-term record and detect concerns if they occur. Alternatively, if there are reasons monitoring years were 'skipped', CNSC should explain why this occurred.
	Food source monitoring introduced in 2024 included limited fish sampling (one sturgeon sampling event upstream), and crop sampling, although soil sampling was not included.	Food sampling should include collection of soil samples, and consistent/downstream fish sampling, to properly evaluate whether food sources are impacted by the BRR.
	Independent monitoring did not include spatial/temporal trend analysis for CoPC concentrations in environmental samples. Comparisons of CoPC concentrations to reference/baseline or upstream conditions were not conducted.	Spatial/temporal trend analysis for CoPCs should be conducted and discussed, and CNSC should implement upstream/reference monitoring, to properly evaluate effects from the facility.
	Limited soil sampling was conducted near the BRR. No monitoring of downgradient wetlands that could potentially receive surface runoff/shallow groundwater from the facility, was completed.	Additional on-site soil sampling should be completed to evaluate potential runoff/shallow groundwater pathways from the facility to downgradient wetlands, to determine if they may be adversely affected.
	Independent monitoring does not include groundwater monitoring, that could address gaps in Cameco's groundwater monitoring.	Groundwater monitoring should be included in the Independent Program, to test Cameco's results and fill gaps.

3.3 Waste Management

One of Northwatch's particular areas of concern with Cameco's operations in Blind River is the generation of waste and its management. We have raised these concerns during the last three license reviews, commenting that the discussion of waste generation, waste volumes and characteristics and of waste disposition in both the Cameco and CNSC staff licensing CMDs are overly generalized and fail to provide adequate information about the waste management approach and program and its outcomes.

CMD 26-M7 discussion of waste management at the Blind River refinery was limited to a single bullet:

- *BRR – 2 NNCs related to ensuring that there is alignment between the implemented practice and documented requirement for annual waste container and storage areas condition inspection; and that storage areas are inspected in accordance with BRR's Waste Management Plan.*[15]

4. Conclusions

In closing, Northwatch is requesting that the Commission direct CNSC staff to carry out a review of the Regulatory Oversight Report program, engaging with the Commission, the public and Indigenous people at each step of the review process. We further recommend that the review process should include an initial survey, and a combination of discussion papers and engagement sessions. The review process should include a mid-point and late-stage Commission meeting.

[15] CMD 26-M7, page 23

Appendices

Hutchinson
Environmental Sciences Ltd.

93 Kimberley Ave, Bracebridge, ON P1L 1Z8 | 705-645-0021
www.environmentalsciences.ca

January 23, 2026 Project No. 250171

Brennain Lloyd
Northwatch
Box 282
North Bay, ON P1B 8H2

Dear Ms. Lloyd,

Re: Review of CNSC's Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities, and Documents Associated with Cameco Corporation's Blind River Refinery

INTRODUCTION AND SUMMARY OF FINDINGS

Hutchinson Environmental Sciences Ltd. (HESL) completed a technical review of information related to the Canadian Nuclear Safety Commission's (CNSC) Regulatory Oversight Report (ROR) for Uranium and Nuclear Substance Processing Facilities (2024), with a particular focus on Cameco Corporation's Blind River Uranium Refinery (the BRR refinery), and associated annual environmental monitoring and independent monitoring for the refinery. Northwatch requested HESL to review performance-related technical information on uranium processing, and assess whether BRR's environmental performance and associated monitoring programs were sufficient to reasonably protect human health and the environment in surrounding areas, and if the measures were adequate to detect potential environmental effects.

Overall, the technical review identified that longstanding concerns remain unaddressed, particularly relating to effects-based surface water monitoring, the groundwater monitoring program, and reporting. A summary of the key findings and data gaps identified in this technical review, and subsequent recommendations, are provided in the table below.

Document	Concern	Recommendation
CSNC (2025). Regulatory Oversight Report.	Insufficient detail in the ROR regarding notices of non-compliance, including limited detail on circumstances, context, and timelines for resolving incidents.	Provide more detailed descriptions of notices of non-compliance, including context, timing, and corrective actions, for increased confidence in environmental compliance.
	Insufficient detail on environmental monitoring, and "average" contaminant concentrations were reported without statistical context.	The ROR should include monitoring descriptions (i.e., sampling locations, frequency, trends, and comparisons to reference conditions) and statistical summaries, to contextualize environmental data and clearly describe potential environmental risk.

Document	Concern	Recommendation
	Insufficient rationale to support Safety Control Area (SCA) ratings in Appendix H.	The ROR should include clear justification for SCA ratings, by referencing specific inspection results and comparing them to acceptability thresholds.
	No licence limits for nitrate and radium-226, which are measurable emissions from the BRR, which limits a reviewer's ability to evaluate compliance.	The ROR should include descriptions of how concentrations of nitrate and radium-226 in environmental samples were determined to be acceptable or not.
Cameco Corporation (2023-2025). Annual Compliance Monitoring and Operational Performance Reporting from 2022 to 2024.	Environmental monitoring results and spatial/temporal trends in CoPC concentrations for surface water, soil, and groundwater were not sufficiently discussed to understand potential effects and all possible receiving areas had been monitored.	Cameco should provide a more fulsome discussion of results in compliance reporting, including proper contextualization of data (sampling locations, site plans, analyses of trends, sampling dates).
	Nitrate concentrations related to effluent continued to exceed Canadian Council of Ministers of the Environment (CCME) long-term guidelines for the protection of aquatic life.	Surface water monitoring in Lake Huron for nitrate around the BRR effluent diffuser should be completed to confirm if the results of a Plume Dispersion Study represent actual dispersion. A nitrate monitoring program should be developed and included as a condition of the license.
	Surface water monitoring is limited to the Lake Huron outfall diffuser, with no additional downstream or upstream monitoring, and no monitoring of ditch drainage is conducted.	Surface water monitoring should be completed upstream and downstream of the facility to evaluate effects pathways and changes in natural conditions (if any). A monitoring program for the ditch outfall should be developed and included as a condition of the license. Monitoring should include radionuclides and typical industrial runoff parameters.
	Limited details regarding groundwater monitoring methodology and parameters were provided.	A detailed description of groundwater monitoring and hydrogeological interpretations should be provided, including parameters sampled and locations, physical hydrogeology and interpreted groundwater migration pathways.
	Groundwater quality reporting was too general to identify possible concerns. Data was presented as a single average/maximum value without statistical context or individual well results, sampling locations were not specified,	Complete monitoring data for all individual wells should be provided (including statistical summaries, spatial and temporal trend analysis/discussion, individual monitoring well results and locations). All

Document	Concern	Recommendation
	and spatial/temporal trends and CoPCs other than uranium were not discussed. It was unclear how data was used to understand potential facility impacts.	CoPC concentrations should be reported and discussed.
CNSC (2025). Independent Environmental Monitoring Program: Blind River Refinery.	It was unclear if the monitoring program was sufficient to detect effects from the BRR. The program remains based on local community areas of concern rather than on dispersion/transport and fate modelling.	The independent monitoring program should be expanded to include monitoring in deposition areas identified by air dispersion, groundwater pathways, and aquatic transport and fate modelling.
	Surface water sampling appeared to be inconsistent over time: no sampling in 2024, and 2019, 2021 and 2022 monitoring was absent without explanation.	Consistent sampling design (including seasonal monitoring and same parameter lists between years) should be implemented to maintain a usable long-term record and detect concerns if they occur. Alternatively, if there are reasons monitoring years were 'skipped', CNSC should explain why this occurred.
	Food source monitoring introduced in 2024 included limited fish sampling (one sturgeon sampling event upstream), and crop sampling, although soil sampling was not included.	Food sampling should include collection of soil samples, and consistent/downstream fish sampling, to properly evaluate whether food sources are impacted by the BRR.
	Independent monitoring did not include spatial/temporal trend analysis for CoPC concentrations in environmental samples. Comparisons of CoPC concentrations to reference/baseline or upstream conditions were not conducted.	Spatial/temporal trend analysis for CoPCs should be conducted and discussed, and CNSC should implement upstream/reference monitoring, to properly evaluate effects from the facility.
	Limited soil sampling was conducted near the BRR. No monitoring of downgradient wetlands that could potentially receive surface runoff/shallow groundwater from the facility, was completed.	Additional on-site soil sampling should be completed to evaluate potential runoff/shallow groundwater pathways from the facility to downgradient wetlands, to determine if they may be adversely affected.
	Independent monitoring does not include groundwater monitoring, that could address gaps in Cameco's groundwater monitoring.	Groundwater monitoring should be included in the Independent Program, to test Cameco's results and fill gaps.

The technical review was limited by the project timeline, and potential effects to human health and the environment may exist that were not identified. Detailed discussion of review comments and recommendations are provided below.

INFORMATION REVIEWED

The information provided by Northwatch (below) was reviewed. HESL primarily reviewed the CNSC Regulatory Oversight Report (2024). Due to time constraints, the review focussed on information pertaining solely to the Blind River Refinery, which was a priority for Northwatch. HESL reviewed the following documents:

- Canadian Nuclear Safety Commission (2024). CMD 26-M7. Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2024.
- Cameco Corporation (2023). 2022 Annual Compliance Monitoring and Operational Performance Report. Reporting Period January 1 – December 31, 2022. Blind River Refinery. March 31, 2023.
- Cameco Corporation (2024). 2023 Annual Compliance Monitoring and Operational Performance Report. Reporting Period January 1-December 31, 2023. Blind River Refinery. April 12, 2024. (Cursory review.)
- Cameco Corporation (2025). 2024 Annual Compliance Monitoring and Operational Performance Report. Reporting Period January 1 – December 31, 2024. Blind River Refinery. April 4, 2025. (Cursory review.)
- Cameco Corporation (2025). Environment and Safety - Environmental Incident Reports Available online: Environment & Safety | Cameco (last accessed January 14, 2026).
- Canadian Nuclear Safety Commission (2025). Independent Environmental Monitoring Program: Blind River Refinery.
- Canadian Nuclear Safety Commission (2021). Environmental Protection Review Report: Blind River Refinery.
- Government of Canada (2019). Radionuclide Release Datasets – Radionuclide Releases – Nuclear Processing Facilities. Last updated July 24, 2025.

The review conducted by HESL of Cameco's previous licence applications for Blind River (2012, 2021), provided a reference of past concerns:

- Hutchinson Environmental Sciences Ltd. (2011). Submission to the Canadian Nuclear Safety Commission, Serpent River First Nation Comments on the Cameco Corporation Uranium Refinery 2012 License Renewal, Blind River, Ontario. December 19, 2011.
- Hutchinson Environmental Sciences Ltd. (2021). Review of Cameco's Corporation, Application to Renew the Licence for the Blind River Refinery. October 25, 2021.

BACKGROUND

Summary of the Refinery

The BRR is located 5 km west of Blind River in Algoma District, Ontario. The property that the refinery is located on is owned by Cameco and is approximately 253 hectares (ha) in size with the refinery's licensed

operating area covering approximately 11 ha. Cameco has leased an additional 195 ha of land east of its owned property. The nearest residence is approximately 1 km northeast of the refinery. The Mississagi River is 50 m west of the refinery and Lake Huron is approximately 800 m south of the refinery.

The refinery was built on a greenfield site in the early 1980s. The uranium trioxide (UO_3) plant, plant services and administration are located in a central building with a number of smaller auxiliary buildings on the which support refinery operations. The licensed Refinery is surrounded by a shallow ditch to divert rainwater and runoff around the outside of the Refinery to the Mississagi River.

The Refinery processes natural uranium ore into UO_3. The ore is received from mines world-wide, and Cameco also receives small quantities of scrap natural uranium-bearing materials such as uranium dioxide (UO_2), uranium-containing metals and wet filter cake, which are processed periodically.

In the refining process, nitric acid is added to uranium ore concentrate to produce uranyl nitrate solution. Impurities are removed from the solution using a solvent extraction process with tributyl phosphate (TBP) in a kerosene diluent as the solvent. Purified uranyl nitrate is then heated and concentrated, producing a nuclear-grade uranyl nitrate hexahydrate (UNH) liquid. The UNH is thermally decomposed to form UO_3 powder which is stored and shipped to Cameco's Port Hope Refinery in specially designed bulk containers which hold approximately 9.5 tonnes of powder each. Powder is also shipped to other regulated customers, in much smaller quantities. Shipping is licensed and regulated by the Nuclear Safety and Control Act, and Transportation of Dangerous Goods regulations. HESL did not review shipping of material from the Refinery for environmental concerns in this review.

The refinery recovers oxides of nitrogen generated in the refining process in a nitric acid recovery circuit. The TBP and kerosene solvent is also recovered and recycled in the refinery.

The refining process produces two products which can be recycled: regeneration product, which is produced in the solvent treatment circuit; and calcined product, produced in the denitrated raffinate. Both contain recoverable uranium and can be re-milled for uranium recovery at a licensed refinery, or disposed via incineration in the BRR's incinerator.

Bulk chemicals stored at the Refinery include nitric acid, phosphoric acid and kerosene. Other chemicals used at the Refinery include laboratory reagents, water treatment chemicals and lubricants.

Discharges to the environment from the Refinery include:

- Treated wastewater from the on-site treatment plant to Lake Huron via the effluent pipe and a diffuser located approximately 500 m offshore;
- Surface runoff via the ditch to the Mississagi River and runoff infiltration to the sub-surface;
- Air emissions from the refinery process stacks and heating ventilation air-conditioning system (HVAC); and,
- Air emissions from the incinerator.

DOCUMENT REVIEW FINDINGS

Canadian Nuclear Safety Commission (2024). *CMD 26-M7. Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2024.*

CNSC (2024) is the Regulatory Oversight Report for Canadian uranium and nuclear substance processing facilities. Uranium processing facilities included the Blind River Refinery (BRR), Port Hope Conversion Facility, Cameco Fuel Manufacturing Inc., and BWXT Nuclear Energy Canada Inc. Nuclear Substance Processing Facilities included in the ROR included SRB Technologies, Nordion Inc, Best Theratronics Ltd., and BWXT Medical Ltd.

The ROR contained summaries of the uranium processing and nuclear substance processing facilities, a summary of regulatory oversight activities performed by CNSC including compliance inspections, CNSC-assigned performance ratings to licensees based on 14 safety and control areas (SCAs) from the results of CNSC's compliance evaluation activities (inspections, technical assessments, reviews of licensee reports, review of events and incidents, and ongoing exchanges of information with licensees). The ROR stated that particular attention in the SCA ratings was given to radiation protection, environmental protection, and health and safety. CNSC outlined all notices of non-compliance incurred against each licensee.

CSNC stated that "*in 2024, CNSC staff conducted 5 inspections at the BRR facility that covered 11 SCAs*." (P. 15), and that these inspections resulted in 21 notices of non-compliance. CNSC did not specify which SCAs were included in the inspections. CNSC stated that staff were satisfied with the BRR's operation in 2024 and in accordance with its licensing. Notices of non-compliance at the BRR pertained to:

- Ensuring records accurately captured planned changes at the facility (1 NNC);
- Maintaining training documentation and following corrective action plans in a timely manner, and ensuring that workers attend scheduled training and maintain qualifications (3 NNCs);
- Ensuring required information is displayed/maintained as current on the ALARA (as low as reasonably achievable) bulletin board (1 NNC);
- Ensuring that annual PPE inspections are completed, that BRR review its Health and Safety Committee inspection follow-up program, that emergency stations are not obstructed/impaired, and ensuring that inspection findings are addressed appropriately and in a timely manner (3 NNCs);
- Fire protection (i.e., ensuring exits are free of obstructions, fire doors are maintained, ensuring combustible materials do not accumulate and will not cause a fire hazard, compressed gases are capped, fire alarms are visible/accessible, and fire documentation are revised as appropriate) (7 NNCs);
- Emergency management (i.e., approval documentation is readily available, appropriate use of Emergency Response Plan, effective communication is maintained, establishment of control zones) (4 NNCs);
- Waste management (i.e., ensuring compliance with documentation required for waste container and storage condition inspection, ensuring storage areas are inspected per the Waste Management Plan (2 NNCs);

CNSC stated that corrective actions to address NNCs were either undertaken by Cameco, or that Cameco had committed to implementing corrective actions. It was noted that the NNCs and associated findings at the BRR facility were generally of "*low safety significance and did not affect health and safety of workers, people or the environment*." (P. 31).

Five action levels for radiological exposure were reached at the BRR in 2024. CNSC stated that an inspection in May 2025 revealed that the radiological exceedances had not been reported by Cameco to CNSC. Cameco corrected this, and the reporting error resulted in Cameco updating their internal procedures for reporting action levels, which was accepted by CNSC. The five action level exceedances were investigated by Cameco, who identified that the exceedances were due to the worker's dosimeters receiving radiation while not worn by the workers. The following exceedance events occurred:

- September 2024: A radiation skin dose of 16.1 mSv and a lens eye dose of 7.4 mSv were recorded by a worker's dosimeter for the month of September, exceeding the 15 mSv/month and 6 mSv/month maximum dose for skin and eye lens (respectively). Cameco determined that the worker had lost their dosimeter for some time, and had recorded radiation doses while the worker was not wearing it.
- November 2024: A worker's dosimeter recorded a whole-body radiation dose of 21.4 mSv, a skin dose of 24.2 mSv, and an eye lens dose of 23.4 mSv, exceeding maximum monthly doses. Cameco's investigations determined that the worker had lost their dosimeter for some time and it had received radiation doses in the work area while the worker was not wearing it.

These incidents resulted in Cameco submitted a request to revise the posted doses, which CNSC approved in both cases. Two additional reportable events occurred at BRR in 2024 (Section 7.1.1):

- June 26, 2024: A glycol release to Lake Huron (~70 L) occurred due to a mechanical failure of the glycol heating system, which was reported to CNSC and Ontario Spills Action Centre. Corrective actions included revising start-up instructions for the glycol heat system, and plans to replace the facilities' 3 glycol heaters in 2025.
- November 27, 2024: A small fire occurred in a 5-gallon plastic pail in the plant, which was extinguished immediately. Corrective actions included obtaining stainless steel waste receptacles for combustible materials, and ensuring that any organic materials that could potentially ignite are kept away from combustible materials. BRR also committed to having a safety meeting to address the serious risks of the occurrence.

CNSC stated that there were no results of concern identified in the independent environmental monitoring conducted by CSNC in 2024 for any of the facilities, including BRR (see HESL's evaluation of the independent monitoring program below), and that CNSC's results were consistent with reported results by each facility. CNSC reiterated that independent environmental monitoring results supported their assessment that environmental and human health were sufficiently protected by the licensees' environmental protection programs. The CNSC inspections only monitored environmental protection during two of the site inspections (January 24 to 25 and June 5 to 6, 2024).

The ROR provided an overview of low-risk compliance concerns identified at the BRR facility in 2024. Specifics regarding the notices of non-compliance (i.e., the specific instance/occurrence and timeline, and how it was resolved) were not fully communicated. Although not integral to CNSC reporting, more specifics regarding the context surrounding the notices of non-compliance would improve clarity and provide assurance that the concerns were appropriately addressed, and could highlight Cameco's changes to prevent similar non-compliances in the future.

CNSC's evaluation of Cameco's environmental monitoring and the extent of CNSC's independent environmental monitoring were vague, and it was unclear if the monitoring was sufficient to detect effects (i.e., sampling locations and frequency were not identified, spatial or temporal trends were not discussed, and conclusions regarding environmental protection were not substantiated by comparing to reference data). CNSC provided a summary of results from Cameco annual reporting, including annual public dosing (2020 to 2024) and concentrations of CoPCs in dust, effluent, groundwater, surface water and soil in 2024, the data was not contextualized (e.g., sampling locations and frequency were not discussed). The "average" concentrations of CoPCs (based on unknown number of sampling events without accounting for seasonal variability, and without a statistical presentation of the data to properly contextualize average values) did not exceed applicable guidelines and license limits for environmental media, but an effects-based evaluation comparing reference data to the 2024 environmental monitoring results was not conducted. This is of particular concern for surface water monitoring at BRR's outfall diffuser to Lake Huron: water quality from the downstream (effects) station was not compared to an upstream reference to identify facility-related change. Reporting concentrations of CoPCs should include a statistical presentation of the data, including identifying 95th percentile occurrences, to properly contextualize averages and peak concentrations, and communicate possible risk. License limits were not provided for nitrate or radium-226 concentrations, to evaluate acceptability of effluent effects (including how CNSC interpreted acceptability).

Each of the 14 SCAs was rated as "satisfactory" or "below expectations" for each facility in Appendix H of the ROR (P. 75). BRR was rated as satisfactory for all SCAs, however, no descriptions of how these evaluations were determined by CNSC, were provided in Appendix H (e.g., by referencing specific observations from inspections, particularly regarding environmental performance). CNSC should include rationale for why the ratings were assigned.

Cameco Corporation (2023). *2022 Annual Compliance Monitoring and Operational Performance Report. Reporting Period January 1 – December 31, 2022. Blind River Refinery. March 31, 2023.*

HESL reviewed Cameco's annual reports (2022 to 2024), including annual environmental/compliance monitoring and operational/performance monitoring, and health and safety/radiation protection reporting. The 2022 Annual Report was reviewed in detail. Note: the structure and scope of the environmental monitoring program did not change substantially in 2023 or 2024 and a cursory review of the data alone was completed for these reports.

Cameco determined that the public gamma emission doses in 2022 were <0.00001 mSv (from air emissions) and <0.00001 mSv (for water emissions), below the public dose limit of 0.009 mSv. Cameco concluded that emission to water remained consistent with previous years, but did not discuss increasing/decreasing trends in uranium, nitrate and radium-226 loading to liquid effluent over the

monitoring history (besides commenting that 2021 loading had decreased compared to 2020). Cameco found the program was effective in 2022, as BRR did not exceed CNSC regulatory limits, public radiation exposures were well below dose limits, and environmental emissions continued to be controlled to levels well below regulatory limits.

Cameco's compliance reporting included several summary tables for CoPC monitoring in air, liquid effluent, soil, surface water (Lake Huron, at the outfall diffuser), groundwater, radiation doses, alpha contamination, and gamma radiation levels at the facility's fence line. However, discussion of the environmental monitoring results was limited, and evaluations/discussions of spatial and temporal trends in CoPC concentrations were not included (or lacked detail). These gaps were highlighted in HESL's previous Blind River review in 2021[1]. While Ra-226 and uranium concentrations in effluent did not exceed Ontario Provincial Water Quality Objectives (PWQO) from 2018 to 2022, nitrate concentrations monthly average (and maximum) in effluent continued to exceed the CCME long-term guideline for protection of aquatic life (13 mg/L) in all years (2018 to 2022). Site plans or maps indicating locations where environmental media were sampled were not provided.

Surface water quality monitoring appeared to continue to be conducted solely at the outfall diffuser location in Lake Huron; no additional monitoring of surface water (or discharge to ditches) in the Mississagi River downstream of the facility appeared to have been conducted (as previously recommended by HESL, 2021). Although Cameco stated that water quality at the outfall diffuser was similar to previous years, there was limited discussion of temporal trends. CoPC transport pathways from the facility were not presented, monitoring methods were not described, and no effects-based evaluation of water quality data was conducted. Concerns with the lack of uranium, radium-226, and nitrate monitoring downstream of the facility, remain.

Groundwater monitoring at and around the BRR facility included 35 groundwater monitoring wells (14 inside the fence, 21 outside) which Cameco stated were monitored 1 to 3 times per year. 2022 reporting provided limited detail on methodology (e.g., sampling locations and dates, well depths and screened intervals), and the parameters monitored. Interpretations of hydraulic gradients or potential groundwater migration pathways from the facility were not provided. Uranium concentrations from a single well (BH22) with no indication of its location or depth, were reported, while uranium concentration in groundwater from all samples (Table 38 and Figure 19) were presented only as a single average/maximum value for 2022. This lacked proper statistical and spatial presentation, and did not discuss possible concerns at individual wells, which should be discussed to identify possible groundwater concerns and for review transparency. Other CoPCs (nitrates, radium-226) and specific concentrations from the other 34 wells were absent, and it was not clear if both shallow and deep groundwater had been monitored. Cameco did not discuss spatial or temporal groundwater quality trends, groundwater monitoring objectives, or how the data was used to understand potential facility impacts. These major concerns were previously identified by HESL (2021) and remain.

[1] *Hutchinson Environmental Sciences Ltd. (2021). Review of Cameco's Corporation, Application to Renew the Licence for the Blind River Refinery. October 25, 2021.*

Cameco should provide clear documentation of groundwater monitoring locations and methods, include analysis and discussion of spatial and temporal trends, and present CoPC concentrations to meaningfully evaluate the potential effects from the BRR facility.

Additional concerns with Cameco's 2022 Report included how monitoring results were derived and presented. Given that CoPCs concentrations were reported as average and maximum concentrations for each monitoring year, it was not always unclear how many sampling events the "average" represented, or when maximum concentrations had occurred, masking possible seasonal trends. Additionally, as there were no CNSC licensing limits for nitrate and Ra-226, it was unclear how acceptable concentrations were evaluated. Methods for calculating uranium and Ra-226 loading to effluent were also not provided (Table 34, P. 62), nor were trends in annual loading commented on or discussed. 2022 soil sampling at the BRR facility indicated that uranium concentrations in surface soils were well below the CCME guideline of 23 µg/g. However, Cameco did not comment on uranium concentrations exceeding the Ontario provincial background concentration (2.5 µg/g). As soil analytical data was presented as a range of values rather than concentrations from individual sampling events, the frequency of background concentration exceedances could not be determined.

Cursory reviews of Cameco's 2023 and 2024 reporting did not identify any material differences in environmental monitoring or reporting. Although monthly average and maximum concentrations of uranium and Ra-226 in effluent in 2023 and 2024 remained below PWQO, monthly maximum nitrate concentrations continued to exceed CCME long-term guidelines for the protection of aquatic life. Concerns regarding reporting and data deficiencies, groundwater monitoring, and monitoring scope in the 2022 report, also occurred in the 2023 and 2024 reporting.

Cameco Corporation (2025). *Environment and Safety - Environmental Incident Reports Available online: Environment & Safety | Cameco (last accessed January 14, 2026).*

HESL conducted a cursory review of Cameco's environmental incident reports posted on their website. The posted incidents matched the incidents summarized by CNSC in the ROR. No additional concerns were identified.

CNSC (2025). *Independent Environmental Monitoring Program: Blind River Refinery.*

CNSC's Independent Environmental Monitoring Program for the BRR facility consisted of monitoring of air, surface soils, surface water, and food sources. CNSC stated that "*As part of every licensee's environmental protection program, concentrations of contaminants in the environment must be determined and the potential exposure pathways to the public must be assessed and mitigated*." CNSC concluded that the Independent Environmental Monitoring Program results were consistent with Cameco's submitted results, that Cameco's environmental protection program is effective, and that environmental and human health in the vicinity of the BRR facility were sufficiently protected.

HESL (2021) identified significant concerns with the Independent Monitoring Program, including poor or absent substantiation of conclusions and recommendations. The monitoring continued to focus on areas of local community interest, rather than possible receptor areas based on scientific design to comprehensively monitor air dispersion and CoPC transport, fate and effects in groundwater and the

aquatic environment. There did not appear to be substantial changes to the structure or function of the Independent Monitoring Program. CNSC acknowledged that data has not been properly contextualized in the report, stating that "*since the IEMP [Independent Environmental Monitoring Program] results represent a snapshot in time, the small differences between sample results can be attributed to slight differences in the sampling locations, seasonal variations, facility operations, meteorological conditions, and/or natural variations in background radiation*," but data was not sufficient for year-over-year comparisons nor was it robust enough to quantify and minimize related environmental effects. This undermines confidence in the data and does not demonstrate that possible effects have been mitigated.

A positive addition in 2024 was food source sampling, which was requested by the Mississauga First Nation, including sampling of fish (sturgeon), tobacco, and various crops (kale, carrots, tomatoes, green peppers, and cabbage). Uranium was analyzed in the media (mg/kg fresh weight). However, it was unclear how impacts to the food sources were evaluated. For example, soil samples from the crop harvesting locations did not appear to have been collected to understand uranium sources/pathways and sturgeon sampling occurred solely upstream of the facility in the Mississagi River. Sampling methods or the acceptable thresholds in the endpoint were not specified. It appeared that only one sturgeon sample had been collected (quantified in mg/kg fresh weight), and only uranium had been analyzed.

CNSC provided brief summaries of the results from 2013, 2014, 2017, 2018, 2020, 2023, and 2024 monitoring; sampling in 2019, 2021 and 2022 was either not conducted or not reported, but CNSC did not describe why. No water samples were collected in 2024, and air samples could not be collected in 2023 due to "*poor weather conditions*." It was unclear why water samples were not collected in 2024.

Analyses of trends at each sampling location were limited, or were not provided, and a limited interpretation of results was presented. For example, CNSC concluded based on 2013, 2014, and 2017 results that there were no environmental or human health impacts, but did not justify the conclusion with specific results or an environmental effects evaluation. CNSC compared CoPC concentrations (uranium, radium-226, nitrate) to relevant environmental quality guidelines, and found that concentrations remained below applicable guidelines over the monitoring history, but concentrations were not compared to reference/baseline or upstream/upgradient concentrations. Comparisons of downstream concentrations to upstream/reference concentrations should be conducted to properly evaluate whether impacts are caused by the facility itself, and are not due to upstream influences.

Additional specific concerns with the Independent Environmental Monitoring Program included:

- Inconsistencies in temporal scope of surface water sampling: sampling locations appeared to be monitored once per year (exact dates unknown), and did not appear to be consistently monitored on an annual basis (reasons for data gaps were not known).
- Lack of seasonal monitoring: the program therefore does not account for seasonal variation.
- Inconsistencies in parameters monitored at stations: for example, at surface water station B404-W03 (downstream of the facility, at the mouth of Lake Huron), Ra-226 is only monitored in 2020 and 2023.
- Inconsistent/limited nearfield surface soil monitoring: the only nearfield soil monitoring location (BR03-S01) was not monitored on an annual basis, nor is any monitoring of soil on the BRR site itself conducted. Monitoring of surface soil on the site itself would strengthen effects-based

assessments, including helping to identify on-site CoPCs accumulating in soils, which could runoff and be a downgradient risk to surface water or groundwater.

- No monitoring appeared to have been conducted in the wetlands downgradient and to the east of the site. Conceptually, runoff could drain to these wetlands, given their proximity to the site and based on a cursory review of topography. It was unclear whether CNSC (or Cameco) had evaluated whether the wetland could be impacted by surface water runoff or shallow groundwater.
- No groundwater monitoring: significant gaps have been present in Cameco's groundwater monitoring program since at least 2020; CNSC has not conducted independent groundwater monitoring, to corroborate Cameco's results and conclusions or check data gaps.

CNSC should more thoroughly describe (and update) the monitoring program structure, sampling methods, evaluations of spatial and temporal trends, and evaluation of effects (besides comparisons of data to relevant guidelines and license limits), to correctly evaluate and identify possible effects from the BRR facility. This is required to increase confidence in the program and the data is necessary to inform CNSC's conclusions about the protection of human health and the environment.

CNSC (2021). *Environmental Protection Review Report: Blind River Refinery.*

The Environmental Protection Review (EPR) Report from CNSC was reviewed by HESL in 2021[2], and was reviewed again to determine if any updates had been made or if any of HESL's recommendations had been implemented (The last EPR revision date was noted to be March 14, 2022). The EBR appeared unchanged and previous recommendations remain to be addressed, including:

- Lack of substantiating information: More fulsome descriptions of rationale for approaches or conclusions/recommendations would increase document usefulness, transparency and rigour;
- Absence of groundwater monitoring spatial-temporal trend analyses: These analyses should be included in the report, to identify concerning trends before an environmental effect occurs (if any);
- Absence of surface water quality ambient monitoring results, and gaps in surface water quality monitoring study design should be addressed by improving result presentation and surface water monitoring study design; and,
- Continued concerns with the study design of CNSC's independent monitoring program (as summarized above).

Government of Canada (2019). *Radionuclide Release Datasets – Radionuclide Releases – Nuclear Processing Facilities. Last updated July 24, 2025.*

The Government of Canada radionuclide release datasets provide a summary of concentrations of radionuclides (i.e., Ra-226) released from the BRR facility in 2024. The results appeared to be consistent with Cameco's and CNSC's reporting. No additional concerns were identified.

CLOSING

[2] *Hutchinson Environmental Sciences Ltd. (2021). Review of Cameco's Corporation, Application to Renew the Licence for the Blind River Refinery. October 25, 2021.*

Thank you for the opportunity to conduct this review for Northwatch. If you have any questions or concerns, please contact Emily Ham or David Leeder at your earliest convenience.

Sincerely,
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