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Oral presentation

Written submission from Carroll Chubb

Exposé oral

Mémoire de Carroll Chubb

In the Matter of the

À l'égard de

Cameco Corporation, Beaverlodge Project

Cameco Corporation, le projet de Beaverlodge

Application for the Licence Revocation and Transfer of Properties to Saskatchewan Institutional Control Program

Demande de révocation de permis et de transfert de propriétés au programme de contrôle institutionnel de la Saskatchewan

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Comments on Cameco's request to revoke the current CNSC licence and release Beaverlodge mine and mill site properties into Saskatchewan's Institutional Control Program

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Introduction

Substantial progress has been made in remediating physical aspects of the Beaverlodge properties, assessing the environmental contamination, and in consulting with people in the area. However, the current plans for the Beaverlodge properties and the areas near them will not adequately protect human health and the environment. Evidence from documents shared by CNSC indicate that very high levels of contamination of the land and water and local (country) foods with uranium, radium-226, selenium, and probably other substances remains. Under the proposed plan severe restrictions on drinking water and consuming fish from several bodies of water are recognized as necessary to protect human health.

The plan for ending CNSC licensing, if I understand it correctly, would open the whole site immediately to access by the public. It can be expected based on commonly observed behaviors and the location of toxic substances in the environment, that human and animal activity will result in spreading of toxic substances and the exposure of humans and other organisms to higher levels of toxic substances.

In the future the site should be monitored much more frequently than currently planned. The health of the local people, contamination of local country foods, and levels of toxic substances in the soil, water, and dust should be studied. It should be anticipated that in the future substantial additional measures will be needed to reduce harm to humans and the environment from the toxic materials that resulted from uranium mining.

The proposed transfer of the responsibility for managing the contamination problems of the Beaverlodge area to Saskatchewan's Institutional Control Program (ICP) should not occur. The CNSC should not be removed from analysis and decision making regarding future management of the land and waters in and near the Beaverlodge properties. Perhaps a process for scientific and technical analysis of the human and environmental health risks and ways to reduce them can be developed that brings in CNSC, ICP, Saskatchewan Research Council (SRC), and local people. This management should include a process for considering views of non-government organizations and individuals. Public access to the data and the reasoning used in assessment of environmental and human health risks is a key part of an effective management process.

As we work on truth and reconciliation, we should recognise that the mining of uranium by a federal crown corporation in the Beaverlodge area resulted in terrible contamination of the country foods and waters that are the basis of the traditional lifestyle of Indigenous peoples. The harmful effects on the environment can be expected to persist for a very long time, likely for hundreds or thousands of years. The effects of climate change are likely to increase the spread of these toxic substances in the region.

To adequately protect human health and the environment, a better plan is needed before changing the management and revoking the licence for the Beaverlodge area. This document includes some ideas for improving plans for the future of the Beaverlodge area.

Background

The Government of Canada mined uranium at the Beaverlodge properties through the federal crown corporation Eldorado Mining and Refining Ltd. from 1952 to the 1980s. The sites were decommissioned in the 1980s. More recently the Government of Canada has been funding remediation of the Beaverlodge properties by Cameco. The mining and the mining-related wastes were in the Ace Creek watershed and the Fulton Creek watersheds, which are in Saskatchewan. Water from these watersheds enters Beaverlodge Lake. Water from Beaverlodge Lake goes into Lake Athabasca.

Cameco's request for confidentiality of its environmental risk assessment document

Cameco requested confidentiality of the entire content of the report *Beaver Mine Site: Model Update and Environmental Riske Assessment, July 2020*. I accidentally missed the deadline for supplying CNSC with reasons to deny the request for confidentiality. Lack of access to this document, impairs evaluation of the risks associated with the proposed ending of the CNSC licence. The request for confidentiality was accompanied by the summary *Beaverlodge Decommissioned Properties: Environmental Risk Assessment Overview*, which does not present a documentation of risk assessment that would justify the revoking of the current licence and placing of the Beaverlodge mine and mill site properties in Saskatchewan's Institutional Control Program (ICP).

Lack of reports of adequate sampling for toxic substances

The Community-based Environmental Monitoring Program (CBEMP) brochure (CMD25-H3-REF, document 11) lists the top 10 traditional foods eaten as barren-ground caribou, woodland caribou, moose, and seven types of fish. Other traditional foods mentioned in the document are bog cranberry, lynx, porcupine, ptarmigan, ruff grouse, and water.

I did not find a comprehensive list of the country foods consumed by people in the Beaverlodge area in the information shared by CNSC, including the referenced documents (CMD25-H3-REF). In addition, foods likely to be added to their diet as the climate warms should be considered (that is country foods of regions further south in Saskatchewan, Manitoba, and Alberta). In the documents shared by CNSC, I did not find samples of caribou, and many more samples of moose should be examined. The safety of vegetables that grow in water should be

considered, since several bodies of water in the Beaverlodge area are highly contaminated. If further investigation finds animals that burrow in soil are used for food, samples of these animals from the contaminated areas should be tested for toxic substances.

The use of fish from Lake Athabasca as reference sources for background uncontaminated areas has not been justified. Beaverlodge Lake continues to be contaminated with high levels of uranium and its waters enter Lake Athabasca. Also, the potential movement of fish between Beaverlodge Lake and Lake Athabasca is a concern. Hence, more work is needed on identifying natural background levels of contamination in fish.

Ongoing sampling of soil and dust is needed along with analysis of likely human intakes of toxic substances in soil and dust. Of particular concern is the ingestion of dirt by very young children.

Also, there apparently will be public access to highly contaminated lakes, so the exposure of humans to toxic substance from activities in and near these lakes should be analyzed.

One way to get information on exposures of people to toxic substances is by examination levels of toxic materials in their urine, feces, blood, nails, and breath. Radiation from individuals also could be measured. Particular tests are appropriate for each toxic substance. Evaluation of deformity and levels of selenium in hair and nails are among the tests that have been used in studies of selenium exposure (ATSDR 2003). Measurements of radon (a breakdown product of radium) in breath have been use as an indication of radium exposure (ATSDR 1990).

The level of contamination of local (country) foods should be tracked. There is already monitoring of selenium contamination in fish by the Saskatchewan government. Other foods likely to have high levels of contaminants that are an important part of local diets should be checked periodically for toxic substances, so that warnings to limit consumption can be given when appropriate. For example, samples of caribou should be tested.

Safety of Beaverlodge properties

CMD25-H3 states that for transfer of the properties to ICP, “The CNSC must be assured that the site is safe and expected to remain so in the long-term.”

The *Final Closure Report: Beaverlodge Properties* prepared for Cameco Corporation by Kingsmere Resource Services, Nov 2023 (CMD25-H3-REF, document 1) states that in the performance objectives for the decommissioned Beaverlodge site of “safe, secure, and stable/improving”,

safe means “The site is safe for unrestricted public access. This objective is to ensure that the long- term safety is maintained.”

I interpret that statement to indicate that the public will have access to all of the Beaverlodge properties, even though there are high levels of contamination in country foods and water in the area. In the documents shared by CNSC, I did not find mention of the use of fencing or warning signs after the property is released from licensing. The Saskatchewan recommendations of

restriction of consumption of fish from some bodies of water and no drinking of water from some bodies of water seem to be the only mitigation planned, other than that associated with the monitoring of the physical aspects of the site by the Government of Saskatchewan. However, the power to make decisions regarding monitoring apparently will rest with the Saskatchewan Government. According to CMD25-H3 (page 12), the proposed release from CNSC licensing and transfer process would result in the Government of Saskatchewan maintaining "sole regulatory authority" and managing "the administrative controls over the properties as well as the monitoring and maintenance requirements."

The *Final Closure Report: Beaverlodge Properties* (CMD25-H3-REF, document 1) states that the performance objective "secure" means "There must be confidence that long term risks to public health and safety have been assessed by qualified person and are acceptable." That report also states that the 2020 Beaverlodge ERA shows that "based on reported use of the land, there are not expected to be risks to humans residing near, or consuming food from areas surrounding the Decommissioned Beaverlodge Mine Site. Therefore, living a traditional lifestyle and consuming country foods from the area, while respecting the water and fish advisories, can continue to be done safely." This "2020 Beaverlodge ERA" apparently is *the Decommissioned Beaverlodge Mine Site, Model Update and Environmental Risk Assessment Canada North Environmental Services, July 2020* for which Cameco requested confidentiality and supplied a summary document. The summary document does not provide adequate evidence that it would be safe to resume the traditional lifestyle in the Beaverlodge properties.

The Saskatchewan water and fish advisory document provided in CMD25-H3-REF (document 3) is *Health Fish Consumption Guideline*. It recommends restriction on fish consumption for Beaverlodge, Martin, and Cinch Lakes due to high levels of selenium. The document also states that fish should not be consumed from Nero, Marie, Meadow, Minewater, and Greer Lakes and from lower Ace Creek. The document reminds people not to drink water from Beaverlodge, Fookes, Greer, Marie, Martin, Meadow, Minewater, and Nero Lakes, and from lower Ace Creek.

The data and reasoning shared by CNSC do not support the conclusion that the long-term risks to the public health are acceptable, when there is unrestricted public access to the Beaverlodge area, mitigated by Saskatchewan's recommendations of restrictions on eating fish and drinking water from some bodies of water.

Water Quality criteria for transfer to ICP are: "water quality is expected to be stable and/or improve in the long term". These criteria is not adequate. Water that is highly contaminated is not appropriate for transfer from the CNSC control.

In assessing the whether the water quality is improving over the long term, CNSC has not provided adequate justification for concluding that this requirement has been met. Actual measurement of radium-226 at some sites on the property show concentrations in water increasing over the period from the 1980s to 2023. A more detailed description of this problem is in the section below, *Levels of toxic substances in the Beaverlodge area*.

CMD25-H3 (page 54) states: "'Safe' is one of the performance objectives for the site, but this performance objective is only in relation to the land and is not intended to cover any

waterbodies." If the objective is to have the site "safe for unrestricted public access," then ignoring contamination in water bodies is not appropriate. This approach could lead to remediation practices in which tailings are put in lakes or covered with water in dugouts to make the site "safe". Since humans will be exposed to the bodies of water, the safety of that exposure must be assessed and found adequate before the land is released from CNSC licencing.

In CMD25-H3 (page 54) it was noted that the Ya'thi Néné Lands and Resources Office (YNLR) and some Uranium City residents held the opinion "that due to the Healthy Fish Consumption Guideline, which restricts both fish consumption and prohibits water consumption on select waterbodies including Beaverlodge Lake and Martin Lake, the Beaverlodge site/area should not be considered safe. It was also indicated that properties shouldn't be released from CNSC licensing and transferred to the ICP without additional consultation and remediation being done to ensure the waterbodies in the region are not under an advisory."

This opinion may be informed by an understanding of likely human behavior and resulting exposures to toxic substances once local people are told the area is safe. When access to the area is unrestricted, people may assume the area is safe, and may not be aware of government recommendations that consumption of fish and water be limited or avoided.

Levels of toxic substances in the Beaverlodge area

There is considerable evidence from available documents of high levels of contamination of the site and of local (country) foods with uranium, radium 226, and probably selenium and other substances. The measurements overtime of uranium and radium 226 at some sampling sites, suggest that very high levels of these toxic substances are likely to persist.

The CMD25-H3 document of CNSC contains examples of contamination in water samples from the Beaverlodge area. Water from the outlet of Verna Lake had recent uranium concentrations about 16 times the upper limit in the Saskatchewan surface water quality guidelines for aquatic life (Figure 4.3 in CMD25-H3). Water from Beaverlodge Lake had uranium concentrations about 7 times the upper limit in Saskatchewan's surface water quality guidelines (Figure 4.19). Water from the outlet of Fookes reservoir had radium-226 concentrations about 14 times the concentration limit in Saskatchewan's drinking water guidelines for surface water; and water from the outlet of Marie Reservoir had radium-226 concentrations about 18 times the limit in those guidelines (Figures 4.5 and 4.9 in CMD25-H3) The concentrations of radium-226 at those sampling sites had increased since the 1980s.

The evidence presented for stable or declining contaminant concentrations is not adequate. In the *Final Closure Report Beaverlodge Properties* (CMD25-H3-REF, document 1), Figure 9 (page 44) shows measured radium-226 concentrations in water samples at Station TL-3 have increased from the 1980s, and in 2023 the concentration was about 1.50 Bq/L. The Saskatchewan surface drinking water guideline limit for radium-226 is 0.11 Bq/L, so the measured concentration was several times the guideline limit for radium-226 concentration. The model predicts radium-226 concentrations will rise until about 2100 and then slowly fall with concentrations in about 2290 being around 0.50 Bq/L. Since the radium-226 levels have been rising for about 30 years, and the assumptions in the model are not clear, this in **not** adequate

evidence for stable or declining radium-226 concentrations. There are similar issues with the radium-226 concentrations measured at Station TL-4 and Station TL7 (figure 14, page 60; figure 19, page 76).

The uranium concentration from Station AC-6A data do not seem to lead to the drop in uranium concentration predicted by the model (CMD25-H3-REF, document 1, page 123). Recent uranium concentrations are scattered at about 250 microg/L, which is about 17 times the Saskatchewan surface water limit for uranium. In general, the evidence presented in the documents shared by CNSC does not support the contention that levels of toxic substances are declining or stable, because the measured concentrations of toxic substances at some sites have been increasing for years and because there is not adequate evidence that the model used to predict future concentrations of toxic substances is correct.

I did not find adequate evaluation of groundwater. CNSC should exam evidence regarding groundwater contamination and the chances that contamination will extend further in the future. In studying groundwater, it is important that contamination not be made worse by the way the sampling is done.

The burial site of power line materials should be evaluated for toxic substances such as PCBs (polychlorinated biphenyls).

Studies of health of local people

To address the possibility that impaired health resulted from local people being exposed to toxic contamination of the environment from mining in the Beaverlodge area, more studies of the health of people in the Beaverlodge region should be done. A careful epidemiological study could evaluate the effects of exposure to contaminants in soil, water, traditional diets on levels of contaminants in individuals and on their health. The studies would need to control for work exposures and smoking. Choice of suitable control populations that have not been exposed to the effects of mining would be important.

An epidemiological study of the risk of cancer and other diseases among people in northern Saskatchewan associated with exposure to the toxic substances through food and other pathways should be conducted.

Better governance structure for future management of Beaverlodge area

There are reasons to fear the Government of Saskatchewan will fail to properly care for the Beaverlodge sites if they pass into the IPC. The current Saskatchewan government has a history of not enforcing Saskatchewan environmental law, such as law designed to protect wetlands and prevent flooding of neighboring properties. The Government of Saskatchewan used the "notwithstanding clause" to violate children's rights, with essentially no consultation with the public or experts. Thus, some continued oversight of the Beaverlodge properties by CNSC is needed, and normally the licensing process is key to obtaining compliance. Therefore, the current CNSC licence for the Beaverlodge properties should not be revoked until a better future governance structure can be created.

A governmental oversight structure for the future management of the Beaverlodge area should bring in the CNSC, a Saskatchewan Government institution, such as ICP or the Saskatchewan Research Council (SRC), and local people for scientific and technical analysis of the human and environmental health risks and ways to reduce them. This management should include a process for considering views of non-government organizations and individuals. Public access to the data and reasoning used for assessment of environmental and human health risks is a key part of an effective management process.

The costs of environmental remediation should remain with the Government of Canada, which was responsible for the mining and the damage to the environment that it caused. The commitment of the Government of Canada to fund at least some future monitoring of the properties makes it more likely that this monitoring will occur.

Monitoring

The monitoring requirements described in CMD25-H3 appear to be inadequate. That document states: "In addition to the long-term monitoring program, Cameco prepared the *Beaverlodge Institutional Control Inspection Field Guide* at the request of the province [7]. The field guide provides a comprehensive description of the relevant areas and a summary of the key aspects of the decommissioned Beaverlodge properties that will require future inspection as part of the Institutional Control (IC) monitoring program."

According to the *Beaverlodge Institutional Control Inspection Field Guide (ICIFG):*

"The Beaverlodge ICIFG is specific to monitoring the physical aspects of the decommissioned Beaverlodge properties. Table 1 provides the frequency of monitoring for the ICIFG. The frequency was informed by inspections completed thus far, and includes inspections conducted every 5 years until 2039, followed by inspections every 10 years thereafter, or at the discretion of SkMER." Does this mean that the Government of Saskatchewan will have the option of discontinuing monitoring of the physical aspect of the Beaverlodge properties at any time?

If the Beaverlodge properties are made accessible to the public, then for the first few years monitoring of how people behave in the area is needed. Will they dig and bring up toxic substances? Do they act as if unaware of the Saskatchewan warnings against drinking water and eating fish from some bodies of water? Do the activities of humans and other animals disturb the ground in ways that bring up toxic substances?

Hence, there should be more monitoring of the Beaverlodge properties in the future than currently planned.

Climate change

In planning for the future management of the exposure to toxic substances from the mining operations in the Beaverlodge area, more consideration of the likely effects of climate change is needed. Of particular concern is the likely changes in precipitation and resulting changes in

levels of water in lakes and other water bodies. Besides the obvious potential for spread of contamination from rising water levels and flooding, there are aspects of the chemical changes associated with changing exposure to air and water that need to be considered.

As the climate warms, types of country (traditional) foods used further south in Saskatchewan, Alberta, and Manitoba may become more available in the Beaverlodge area and become a significant part of the local diet.

Some recommendations

Most of the document *Beaver Mine Site: Model Update and Environmental Risk Assessment, July 2020* should be available to the public. This information is needed for evaluation on the environmental risk. After the document is made available to the public, there should be time for comments on it to be submitted to CNSC.

More work is needed on evaluating ground water contamination, contamination of dirt or dust, and contamination of country foods.

It is not clear whether monitoring of environmental contaminants has included a sufficient range of substances. More details on measurements in samples of levels selenium, arsenic, heavy metals, and other likely contaminants are needed.

Reference areas for background levels of contamination need more evaluation. The use of fish from Lake Athabasca as references for background levels of toxic substances does not appear to be appropriate.

Studies of the health of people in the Beaverlodge region are needed.

CNSC should improve the way it assesses safety and ensure that the Beaverlodge area has reached a state of safety, before it passes into ICP.

The Government of Canada caused the contamination of the site, and the costs of environmental clean-up and monitoring should not be transferred to Saskatchewan's provincial government.

Since there are restrictions on consumption of fish from surface waters in the area, consideration needs to be given to how future generations can be warned against consumption of animals and plants from these waters.

The CNSC should retain some responsibility for ensuring that monitoring of the area for contamination is done properly and that remediation occurs as needed.

Summary of recommendations

- CNSC should **not** revoke Waste Facility Licence WFOL-W5-2150/2025
- CNSC should **not** exempt the Government of Saskatchewan from licensing under the *Nuclear Safety and Control Act* for the 27 properties proposed for transfer into Saskatchewan's Institutional Control Program (ICP).

- Instead of simply transferring properties to ICP, develop a plan for governance of future management and remediation that includes CNSC, local Indigenous people, and an appropriate Saskatchewan government institution, possibly ICP or the Saskatchewan Research Council (SRC).

- Ensure liability for monitoring and remediation of the damage from the Beaverlodge mining remains with the federal government and is not transferred to Saskatchewan.

- Make available to the public nearly all of the risk assessment document *Decommissioned Beaverlodge Mine Site: Model Update and Environmental Risk Assessment, July 2020*.

- Improve the way CNSC assesses safety

- Take steps to recommend and support research needed to better assess the risks to human health and the environment in and near the Beaverlodge area including

  Better characterization of traditional (country foods) and the levels of toxic substances in these food
  Better evaluation of the levels of exposure of the local people to toxic substances
  Studies of how people are likely to behave if there is public access to the Beaverlodge properties
  Better evaluation of which locations are appropriate reference areas for estimating natural background levels of toxic substances
  Studies of the relation of the health of northern people and their exposures; some studies should be able to use epidemiological techniques to estimate the effects of the types of exposures associated with living in areas contaminated by uranium mining
  Studies of future changes in health of the local population over time
  More evaluation of ground water is needed, but these studies should be done without significantly increasing the risk of worsening contamination of the region

- Future monitoring of the Beaverlodge properties should be more frequent than proposed

Additional References

ATSDR (Agency for Toxic Substances and Disease Registry) 1990. Toxicological Profile for Radium. Available from:
https://www.atsdr.cdc.gov/toxprofiles/tp144.pdf

ATSDR. 2003. Toxicological Profile for Selenium. Available from:
https://www.atsdr.cdc.gov/toxprofiles/tp92.pdf

Author notes

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