Directorate of Environmental and
Radiation Assessment and Protection

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Ms. Manon Cyr
Mayor of Chibougamau
650 3rd Street
Chibougamau, Quebec G8P 1P1

Dear Mayor Cyr:

During the public hearing for the Matoush Underground Uranium Exploration Project on June 7, 2012, you asked for the opinion of Canadian Nuclear Safety Commission (CNSC) experts on the content of the document *Pourquoi un moratoire sur les mines d'uranium au Québec* [Why a moratorium on uranium mines in Quebec?] written by Isabelle Gingras, MD and presented to the CNSC as a submission. In response, the following are some facts about the nuclear industry in Canada.

CNSC mandate and the peaceful use of nuclear energy

It is important to note that the CNSC regulates the use of nuclear energy and materials to protect the health, safety and security of Canadians and the environment, and to respect Canada's international commitments on the peaceful use of nuclear energy. Canadian uranium is not used to produce nuclear weapons or military equipment, and stringent control systems are in place to ensure this.

Moratorium

With regard to the development of new uranium mines, nuclear generating stations, other forms of energy or the establishment of a moratorium, the Commission, as an independent quasi-judicial administrative tribunal, does not have the regulatory authority to consider such political matters.

Health risks of nuclear exploration and mining activities

In her submission, Dr. Gingras states: "[translation]...*there is no study proving that the exploration stage is not hazardous to health and the environment...*"

However, it must be pointed out that the typical uranium exploration methods, such as drilling small cores, pose a negligible risk, or even no risk, of exposure to radiation, including from radon.

With regard to the Matoush project, the CNSC conducted a comprehensive study environmental assessment pursuant to the *Canadian Environmental Assessment Act*, and CNSC staff, the federal Minister of the Environment and the Commission concluded in February 2012 that the carrying out of the project is not likely to cause significant adverse environmental effects, taking into account the implementation of appropriate mitigation measures. Also, since the project is located in the administrative region governed by the James Bay and Northern Quebec Agreement, it was subject to a federal and a provincial environmental and social assessment. These studies both also considered the public comments gathered in consultations and at public hearings. Following this process, the federal administrator issued an authorization, accompanied by conditions. The provincial administrator's decision has not been published yet.

With regard to public health, studies demonstrate that present-day uranium workers and the public living near a uranium mine or mill are as healthy as the general Canadian population.[1] The risk of lung cancer from working in current uranium mines is low, because the exposure to radiation now is low. Studies have shown that mining activities do not increase radon levels in the environment away from the mine site.[2] The level of radon near uranium mines is similar to natural radon levels measured in the environment. Radon exposure of members of the public from CNSC-regulated activities is virtually zero. For example, the Health Canada standard for residential radon is 200 becquerels per cubic metre, while the standard for the public in the CNSC *Radiation Protection Regulations* is 60 becquerels per cubic metre.

In addition, CNSC oversees stringent programs to control exposure to radiation and chemical agents, and it addresses any potential threat to workers' safety.[3] In Quebec, the Ministère du développement durable, de l'environnement et des parcs (MDDEP) also protects the environment and monitors the enforcement of the environmental protection acts and regulations, including through analysis of applications for authorizations and licences, inspections and investigations, and use of judicial and administrative proceedings. The Commission de la santé et de la sécurité du travail (CSST) is the body entrusted with administration of the workplace health and safety regime in Quebec and, among other things, does prevention and inspections. Elsewhere in Canada, many provincial departments and citizens' groups are also involved in prevention and regulatory compliance activities. Thanks to these combined efforts, there is no evidence of disease attributable to uranium exposure in Canada, and living near uranium mines and mills has no significant impact on people's health.

Radioactive elements

Dr. Gingras says in her submission that uranium: "[translation] *generates a long series of radioactive elements, including polonium-210, which is billions of times more toxic than hydrogen cyanide."*

It is true that polonium-210 is very toxic in high concentrations, but it is very improbable that a significant quantity of it could be ingested near a uranium mine, since it is not extracted from the ore. For example, for the Matoush project, the average dose for an Aboriginal adult is 0.02 mSv (not only from polonium-210, but also from other radionuclides, such as uranium and radium), and this is very low compared with the average dose from background radiation in Canada, which is 2.4 mSv.

[1] http://www.nuclearsafety.gc.ca/eng/readingroom/healthstudies/index.cfm
[2] http://www.nuclearsafety.gc.ca/eng/readingroom/factsheets/radon-fact-sheet.cfm
[3] http://www.nuclearsafety.gc.ca/eng/mediacentre/updates/2009/December-15-2009-Uranium-Mining-The-Facts-on-a-Well-Regulated-Industry.cfm

Furthermore, scientific studies have shown that polonium-210 accumulates in lichen and caribou (after they eat the lichen) in high concentrations in areas far from any mining activities, without affecting their health. Therefore, it can be concluded that, even at doses several orders of magnitude greater than the doses associated with the Matoush project, there is no risk for caribou or for people eating the caribou.

Tailings storage and management risks

In her submission, Dr. Gingras states: "[translation] *The main environmental risks from uranium mines are associated with the storage and management of tailings..."* and "[translation] *Saskatchewan...is struggling with a number of tailings sites that it will have to deal with in perpetuity."*

Tailings management facilities are engineered to prevent and minimize contact between groundwater and tailings over the long term. In addition, the design of mineralized waste rock and tailings management systems must minimize the reliance on active institutional controls post decommissioning.

Uranium mines and mills that are no longer operating—such as the mining and tailings facilities around Elliot Lake, Ontario—have been decommissioned, the former operators continue to monitor and maintain them, and financial guarantees are in place to cover the long-term management costs of decommissioned sites. There are also former uranium mining and milling sites in Saskatchewan, Ontario and the Northwest Territories. These inactive sites are being managed in the long term by their former owners or the federal, provincial or territorial government.

There are applications under review for the remediation of inactive legacy uranium mine and mill sites in northern Saskatchewan that were abandoned during the mid-1960s and do not meet today's environmental standards. Following the federal-provincial environmental assessments that are underway, these sites will undergo remediation work to properly close them. It is important to point out that the standards in place today for the management of mine tailings will prevent the development of situations created many decades ago.

Dr. Gingras also states: "[translation] *The surface storage of tailings exposes large areas of land to the action of the elements, increasing the risk of radon gas emissions, radioactive and toxic dust, and contamination of surface water and groundwater."*

In March 2012, CNSC published a regulatory document, *Management of Uranium Mine Waste Rock and Mill Tailings* (RD/GD-370). This document sets out the requirements for the sound management of mine waste rock and mill tailings resulting from site preparation, construction, operation and decommissioning of new uranium mine or mill projects and/or of new waste management facilities at existing uranium mines and mills in Canada, to ensure the protection of the environment and the health and safety of people. In addition, this document is consistent with the philosophy of modern national and international guides and standards for the management of mine waste, as well as techniques for containing this waste and isolating it from the environment by using natural and/or man-made barriers to prevent contact between the tailings and groundwater. Tailings are stored and monitored in tailings management facilities, such as tailing ponds or mined-out open pits that are rigorously engineered for long-term storage and stability. The design of these facilities prevents the spread of dust and minimizes radon releases.

With regard to potentially harmful contaminants and metals, CNSC ensures that licensees protect groundwater, brooks, lakes and rivers downstream from uranium mines and mills, and ensures that they are safe for people, plants, fish and other animals. Cumulative effect monitoring programs in northern Saskatchewan, where all the operating uranium mines are, have confirmed that the contaminant levels outside these sites are barely detectable and pose no risk for wildlife. Many water treatment technologies that can be used quickly and easily reduce potentially hazardous contaminants to safe levels before the effluents are released into the environment. Note also that the concentrations of radionuclides such as radium-226, lead-210 and polonium-210 in mine effluents are lower than what is required under Health Canada's criteria for drinking water quality.

With regard to drainage of acids, all discharges at the current mines and mills are controlled and monitored and do not pose any risk for water bodies. Tailings ponds are designed to minimize any potential acidification, and modern industrial techniques neutralize the acidity of tailings. In connection with the decommissioning process, former mine sites have been assessed and appropriate measures have been taken to protect the environment against potential drainage of acids.

With regard to radioactive dust, mining activities are safe for the health of people and the environment and generate only a small quantity of dust locally, which is kept to low levels by various means. Since uranium dust is heavy, it does not travel very far in air. The same is true for the radioactive particles, i.e. polonium-210 and lead-210, produced by radon decay. Also, it should be noted that the absolute quantity of particles is very small. For example, 5.55×10^{15} becquerels of radon amounts to only one gram of matter. The airborne concentrations of dust remain low and are entirely contained within the mine and mill sites. For the Matoush project, the annual dose from inhalation of radioactive dust is 3×10^{-7} mSv (less than one millionth of the public dose limit).

Conclusion

Part of the CNSC's mandate is to provide objective scientific, technical and regulatory information on nuclear-related health and safety issues for people and the environment. I wish to thank you on behalf of CNSC for giving us this opportunity to respond to some inaccurate statements regarding CNSC-regulated activities. I invite you to visit our Web site, especially the Reading Room, for a wealth of information on the nuclear sector in Canada (nuclearsafety.gc.ca). Finally, I would like to point out that CNSC staff is available to answer questions or address concerns that your community may have.

Yours truly,

Dr. Patsy Thompson
Director General

c.c.: J. LeClair, Director, Uranium Mines and Mills Division (CNSC)
M. LeBlanc, Commission Secretary, Commission Secretary's Office (CNSC)