Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 25-H9.5

Date: 2025-10-20

Written Submission from Nancy Covington

Mémoire de Nancy Covington

In the matter of

À l'égard de

Denison Mines Corporation

Denison Mines Corporation

Licence Application to Prepare Site and Construct for Denison Mines' Wheeler River Mine and Mill Project

Demande de permis pour la préparation de l'emplacement et la construction du projet de mine et d'usine de concentration d'uranium Wheeler River de Denison Mines

Commission Public Hearing

Audience publique de la Commission

December 2025

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Canada

From:	nancy covington
To:	Interventions / Interventions (CNSC/CCSN)
Subject:	Submission to CNSC re Wheeler River Proposed Uranium mine
Sent:	10/20/2025 8:29:16 AM

To whom it may concern:
Regarding: Wheeler River proposed Uranium mine
Closing date for written submissions: Oct 24, 2025

Thank you for allowing written submissions.

I submit these comments to promote genuine discussion on the actual costs of uranium mining. Before the specifics of Wheeler River mine can be addressed in detail, it is vital to look at the effects of uranium mining on people and the environment. These are the real costs of uranium mining and these effects are extremely long lasting. No mining technology is perfect and the proposed Wheeler River mine is no exception.

I write this note from Japan where I have had the privilege of attending the 24th Congress of International Physicians for the Prevention of Nuclear War at Nagasaki. At this Congress, we heard from four activists from Kazukhstan, Western USA, South Africa and Germany. These four people bore witness to the damage caused to humans and the environment by past and present uranium mines. We heard first hand how aquifers, once damaged are difficult or impossible to remediate. We heard the horror of excess cancers and other diseases in their lands and the radioactive contamination of local and traditional food. We heard about the marginalization of these people, after authorities chose to ignore their health issues created by the mines. We also heard that proper studies of these effects are extremely under funded or just not carried out.

I also write, bearing in mind the actions in my home province of Nova Scotia. NS's long standing ban on uranium mining was recently scrapped causing much concern among citizens. As a result of the threat of uranium mining, a group of medical doctors, members of Canadian Association of Physicians for the Environment, compiled some scientific studies on the health and environmental effects of uranium mining. I have attached their two summary documents. These studies are pertinent for the Wheeler River project and I submit them to you.

Note Saskatchewan and Nova Scotia are compared in this attachment. Please remember that although
Saskatchewan has a much larger area and is less densely populated than Nova Scotia, there is still no justification to expose the people who do live there to these potential long lasting dangers.

I ask you to study the known effects of uranium mining on humans and the environment. These are the real costs and apply to the Wheeler River project despite the fact that the population density is very low there.

As there are more suspected health effects than reported for uranium mining, we need properly funded studies. Also remediation in many areas rightly comes prior to more

mines. For instance, there are still wells contaminated with uranium caused by exploration for uranium done in the 1970s in NS.

In addition to the two Canadian Physicians for the Environment documents, I have also attached an interactive map, where you can find the effects of uranium on people world wide.

Please, also advise me if three links are received and can be opened as I have poor internet connection.

Many thanks,
Sincerely,

Nancy Covington MD

https://cape.ca/wp-content/uploads/2025/06/The-health-risks-of-uranium-exploration-and-mining-in-Nova-Scotia.pdf
https://cape.ca/wp-content/uploads/2025/06/Nova-Scotia-physicians-respond-to-industry-claims-of-safe-uranium-mining.pdf
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ACME Nouvelle-Écosse
Association canadienne des médecins pour l'environnement
CAPE Nova Scotia
Canadian Association of Physicians for the Environment

"Safe Uranium Mining?" Nova Scotia Physicians Respond to Industry Claims

JUNE 23, 2025

Does the uranium ban make us less safe?

Proponents of uranium mining, such as the Mining Association of Nova Scotia (MANS), would have us believe we need more uranium exploration to understand the location of uranium deposits in Nova Scotia,[1] precisely because uranium and the carcinogenic radioactive gas it emits, radon, are so dangerous—present as they are in some drinking water and in some homes in Nova Scotia.[2]

In fact, the government of Nova Scotia knows a great deal about the uranium deposits in the province, and has published numerous reports and maps in recent years detailing both uranium and radon risks. Large multinational companies did extensive exploration for uranium in Nova Scotia in the 1970s and 1980s.[3] The recent requests for proposals issued by Nova Scotia's Department of Natural Resources (DNR) for uranium exploration in East Dalhousie, Millet Brook, and Louisville,[4] and numerous DNR reports, show there is already a great deal known about uranium deposits in the province.

The ban on uranium exploration and mining was not a ban on research and data collection, as MANS would have us believe. Rather, it was a crucially important ban on activities that would disturb uranium deposits, which could very well increase the already dangerous levels of uranium in drilled wells in Nova Scotia.

Can uranium exploration and mining be done safely?

Mineral exploration and mining activities that disturb the land can change groundwater flow and cause fissures that mobilize uranium and release large amounts of radon.[5] Radon gas can travel hundreds of kilometres in the air, emitting radioactive particles as it moves. When ingested or inhaled, these can damage DNA and human cells, potentially leading to cancer.[6] The decay chain continues to produce new radioactive products that can enter water, crops, trees, soil, animals, and humans.[7]

It is not possible to take uranium out of the ground without bringing to the surface other radioactive materials, including radium, a "notorious killer."[8] Uranium mines have tended to be in remote, sparsely populated areas, often on Indigenous lands. As with other extractive industries, this has led to "sacrifice zones," with a lack of proper health monitoring of nearby populations. As a result, often the remote populations impacted by uranium mining have not been properly studied.[9] [10]

Will there be strict regulations to protect our health?

In Nova Scotia, underground mineral deposits belong to the province, not landowners. Anyone with an exploration licence can access private land to explore for minerals, including uranium. If a landowner

refuses access, the Mineral Resources Act gives the Minister of Natural Resources the authority to overrule the property owner, and grant the exploration licence-holder access.[11] If exploration leads to a mine proposal, and the landowner refuses to sell to the mining company, the Minister can order the land expropriated, as happened in 2013.[12]

Anyone who has taken out a mineral exploration licence in Nova Scotia can simply register with DNR to undertake extremely disruptive exploration activities using powerful machines. This includes drilling, test pits, trenching, and even the excavation of up to 100 tonnes of ore-bearing materials. When the exploration is for uranium, this means unearthing massive amounts of chemically toxic and radioactive material, without any environmental or health impact assessment.

DNR is solely responsible for mineral exploration. There are few regulations for this, and DNR is conflicted as a regulator because of its role working with industry to promote uranium exploration.

The federal government's impact assessment and regulatory framework for uranium mining is required only if a mine is planned. So far, no uranium mines have been proposed in Nova Scotia, but mining is the obvious goal of uranium exploration.

The Nova Scotia Registry of Claims ("NovaROC") map shows that there has been a flurry of new exploration licences granted since the province said it was lifting the ban on uranium exploration and mining. The door has been opened for widespread uranium exploration in Nova Scotia.

It's important to remember that while some of the risks to human health and the environment can be reduced through strict regulation and technologies, they cannot be eliminated.[13]

It's going okay in Saskatchewan, isn't it?

There are only two uranium mines in operation in Canada.[14] Both are in Saskatchewan. The Mining Association of Nova Scotia claims that Saskatchewan shows us uranium mining can be done "safely and environmentally responsibly."[15] Its claim is not supported by medical or scientific evidence.

There are many reasons why it's unwise to compare Nova Scotia to Saskatchewan when it comes to mining uranium. Saskatchewan is nearly 12 times the size of Nova Scotia, with a population density of just two people per square kilometre (km^2).[16] The Saskatchewan mines are located more than 600 km from any towns or cities.[17] Nova Scotia, by contrast, is the second most densely populated province in Canada, with 18.4 persons per km^2. Uranium mines in Nova Scotia would be situated much closer to towns and rural communities.

Furthermore, Nova Scotia's average annual precipitation is more than three times that of northern Saskatchewan.[18] This is especially important to know as uranium is highly soluble in water, making exploration and mining riskier in areas with high precipitation.

What is Canada's Nuclear Safety Commission (CNSC)?

Canada's Nuclear Safety Commission (CNSC) reports to Natural Resources Canada, which promotes uranium mining. It does not report to Health Canada or Environment and Climate Change Canada, both of which are far better placed to study and protect human and environmental health.[19] The Canadian Environmental Law Association has criticized the CNSC for its implicit conflict of interest and the lack of transparency and consultation in its regulatory oversight.[20] [21] Medical professionals have noted that CNSC health standards are set by physicists and those involved in the industry, "based on financial and technological convenience," and not by healthcare professionals and researchers committed to public health and safety.[22]

The Canadian Nuclear Safety Commission claims that there are no "significant impacts to the health" of people who live around uranium mines and mills.[23] CNSC provides no sources for this claim. In contrast, a detailed report from the U.S. National Research Council finds that "Uranium mining and processing are associated with a wide range of potential adverse human health risks," which can also extend to the "general population."[24]

Is Nova Scotia's uranium a valuable untapped resource?

Uranium concentration in northern Saskatchewan deposits is very high, while the concentration in Nova Scotia is very low, according to the 1995 McCleave Report.[25] This means very large amounts of

uranium-bearing ore would have to be unearthed in Nova Scotia to recover minuscule amounts of uranium, producing a great deal of radioactive waste or mine tailings that require care and maintenance in perpetuity. When uranium is extracted from the ore body, 85% of the radioactivity remains in the waste or tailings.[26] These waste sites have to be monitored and maintained "virtually forever,"[27] as uranium tailings remain radioactive for 100,000 years.[28] This is the case regardless of the method of mining involved – open pit, underground, or in situ leaching.

Is in situ leaching better for the environment?

In situ leaching is a process of injecting solvents into the earth to dissolve the uranium.[29] The solution is then pumped to the surface, where the uranium is extracted. In situ leaching leaves less waste rock and tailings than open pit or underground mining, but is very dangerous because there is a high risk that the chemical solvents will spread underground and contaminate groundwater.

Doesn't uranium save lives?

Proponents of uranium mining and nuclear energy make many claims that are either misleading or just false. One is that uranium has to be mined because it "saves lives," given that it is used in smoke detectors. The tiny amount needed for smoke detectors is retrieved from existing nuclear waste,[30] which is, unfortunately, very abundant.

Do we need uranium mining for medical isotopes?

When the Nova Scotia government announced that it had added uranium to its list of "critical minerals" and was lifting the decades-long ban on uranium exploration and mining, it claimed the heavy metal was needed for medical applications.[31] The government was repeating an industry argument that we need to mine uranium for medical isotopes used in diagnostic tests. This claim is misleading; medical isotopes are produced in research reactors that don't require uranium, and are most safely made in devices called cyclotrons.[32]

Won't it help us address climate change?

Contrary to industry claims, nuclear power is not going to be a significant contributor to addressing climate change.[33] Wind, solar, and batteries are much less expensive and faster to develop than nuclear power facilities, which take many years and immense amounts of money to build.[34] Commercial small modular nuclear reactors (SMRs) are still in the early stages of development,[35] and their technology is as of yet unproven.[36]

The push for nuclear power comes from the nuclear industry—which also involves military applications—trying to renew and revive itself, as detailed in the 2024 academic book, *Dirty Secrets of Nuclear Power in an Era of Climate Change*.[37] The International Energy Agency forecasts minimal future growth in nuclear energy, compared with massive growth in far safer renewable solar and wind energy.[38]

Is there a shortage of uranium?

No, there is no shortage of uranium in Canada, and no need for a new source in a province as small and densely populated as Nova Scotia.[39] ◆

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For more information contact:
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CAPE Nova Scotia
Canadian Association of Physicians for the Environment

CAPE is a non-partisan, physician-led organization with over 36,000 supporters across the country. It brings an evidence-based approach to issues intersecting health, the environment, and justice. CAPE Nova Scotia represents more than 100 physicians and other healthcare providers across the province.

Endnotes

1 "Take the 'no' out of Nova Scotia: End the uranium ban, Mining Association of Nova Scotia (MANS), January 2021

2 Potential for Radon in Indoor Air, Nova Scotia

3 A Background Summary for the Uranium Inquiry, Nova Scotia

4 Uranium exploration: request for proposals, Nova Scotia

5 Dr. Gordon Edwards, president and co-founder Canadian Coalition for Nuclear Responsibility

6 Bill 6 submission-Dr. Nancy Covington, CAPE NS

7 Uranium mining and health - PMC

8 Dr. Gordon Edwards

9 Dr. Dale Dewar, physician who has worked in northern Saskatchewan serving a population of Cree, Metis and Dene peoples, member CAPE and International Committee of the Society of Rural Physicians of Canada, former Executive Director of Physicians for Global Survival.

10 Uranium mining and health - PMC

11 Mineral Resources Act

12 EXPROPRIATION: VESTING ORDERS | CanLII Connects

13 Potential Human Health Effects of Uranium Mining, Processing, and Reclamation

14 Uranium in Canada

15 Take the "no" out of Nova Scotia, MANS

16 Population and dwelling counts: Canada, provinces and territories

17 Uranium mines and mills

18 Average annual precipitation, by ecoprovince, 1979 to 2016

19 Dr. Nancy Covington, retired family physician, CAPE Nova Scotia, board member International Physicians for the Prevention of Nuclear War Canada.

20 Canadian Environmental Law submission on CNSC

21 Regulation vs promotion: Small modular nuclear reactors in Canada - ScienceDirect

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23 Mythbusters, CNSC

24 Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia - NCBI Bookshelf

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26 Uranium mining and health - PMC

27 Dr. Doug Brugge, professor and chair of the Department of Public Health Sciences at the University of Connecticut, with more than three decades of professional experience working with uranium mining and contamination. Co-author of 2024 academic book, Dirty secrets of nuclear power in an era of climate change.

28 The health dangers of uranium mining and jurisdictional questions

29 Radioactive Waste From Uranium Mining and Milling | US EPA

30 Processing of Used Nuclear Fuel

31 Nova Scotia Updates Critical Minerals Strategy, Critical Minerals Strategy, Nova Scotia Natural Resources and Renewables, PDF

32 Dr. Tim Takaro

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36 Nuclear energy means climate action delay—NB Media Co-op

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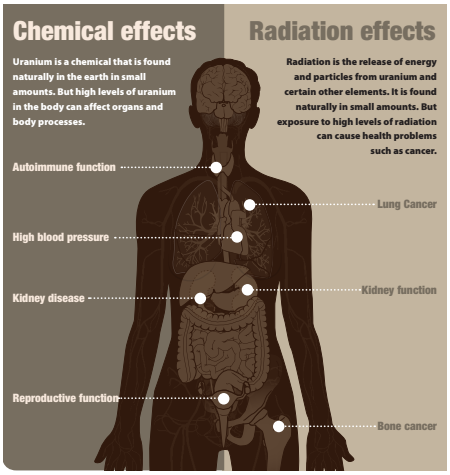
39 Uranium Mining Overview - World Nuclear Association



Your Health: Uranium and Radiation on the Navajo Nation, EPA

The Health Risks of Uranium Exploration and Mining in Nova Scotia

JUNE 23, 2025

URANIUM IS UNLIKE other minerals mined in Nova Scotia. It is a heavy metal that is both chemically toxic and radioactive, decaying over time to produce other materials that are even more toxic and radioactive. This includes the carcinogenic, but colourless, tasteless and odourless gas radon, emitted by uranium deposits. Radon gas can travel hundreds of kilometres in the air, emitting radioactive particles as it moves.

Radon can also collect in homes, and in Nova Scotia, it is responsible for more than 100 deaths a year.[1] According to Health Canada, radon is the number one cause of lung cancer in non-smokers.[2] For this reason, the Nova Scotia government has developed a radon-risk map,[3] and radon detectors can be borrowed from provincial libraries. Canada's standards for acceptable radon gas limits in homes is (200 Bq/m^3),[4] which is twice the limit recommended by the World Health Organization 100 Bq/m^3,[5] and even more lax than that of the United States (150 Bq/m^3).[6]

The radon decay chain continues to produce new radioactive products that can enter water, crops, trees, soil, animals, and humans.[7] People are exposed by drinking contaminated water, inhaling airborne uranium particles, and ingesting contaminated food, and increased levels of radiation in the environment.

Even exploration of uranium deposits can release harmful radon gas into the environment and mobilize uranium that is highly soluble, contaminating well water.

Suggesting, as industry proponents do,[8] that mining the uranium that underlies so much of Nova Scotia would reduce these risks, is inconsistent with the evidence. In fact, mining would unearth not only uranium but also many of its extremely toxic, radioactive by-products.[9]

The best way to protect Nova Scotians from uranium and radon exposure is for the provincial government to focus on, and even expand and strengthen, its existing programs of public awareness, testing, and mitigation measures.[10] [11]

The safest place for uranium is underground in undisturbed, stable deposits.[12]

The Health Risks

Physicians increasingly oppose uranium mining because of its potential to cause a wide range of adverse health effects from uranium exposure.[13] [14] These health effects include:[15]

- Kidney failure[16]
- DNA damage
- Infertility
- Damage to the brain, lungs, liver, kidneys and bones
- Damage to the immune system
- Cancers, most commonly lung cancer, but also leukaemia and tumours of the lung, breast, thyroid, bone, digestive organs, and skin, which are linked with radiation exposure [17]
- Premature aging and decreased life expectancy[18]

Higher risks for children and females

The health effects of radiation from radioactive materials—particularly cancer—need to be studied over long periods. Studies of nuclear bomb survivors show that gender and age matter greatly when it comes to survival rates.[19] Those exposed as small children were most likely to suffer cancer later in life, with girls twice as susceptible as boys. Adult women exposed to the radiation suffered 50% more cancer than adult males.

Uranium exploration and mining threaten to increase radiation exposure, which could disproportionately endanger the health of women and children.[20] Uranium and radiation exposure are particularly risky during pregnancy, linked to many health issues, including:

- Birth defects, including those of the brain and spine[21 22 23]
- Low birth weight and premature births, with complications for mothers and babies [24]
- Increased infant mortality[25]

Health risks in surrounding communities

Uranium mining can devastate surrounding communities through widespread contamination of water sources and wildlife, with Indigenous Peoples and rural populations bearing the heaviest burden. Radioactive and toxic pollutants from mines seep into groundwater and surface water, with studies showing fish in mining-affected waters containing heavy metal concentrations up to 43 times higher than normal levels.[26] The "caribou connection" represents one of the most serious threats to community health,[27] as airborne radionuclides concentrate in lichens eaten by caribou, which are then consumed by people—potentially increasing cancer risk to six cases per 1,000 individuals, far exceeding acceptable risk standards.[28]

Indigenous communities face dual threats as mining operations disrupt traditional hunting, fishing, and gathering activities while simultaneously contaminating the land and water they depend on for physical, cultural, and spiritual wellbeing.[29] Rural communities relying on local wells and water sources have little protection against the perpetual threat of contamination, as uranium tailings require monitoring "essentially forever" to prevent release of contaminants. These environmental injustices are compounded by the historical exclusion of affected communities from mining development decisions, leaving them with generations of health consequences while receiving minimal economic benefits.

In situ recovery mining, also known as in situ leaching, involves injecting a chemical solution into underground uranium deposits to dissolve the mineral, which is then pumped to the surface. While this method leaves less waste rock and tailings than open pit or underground mining, it poses serious environmental risks. Chief among them is the potential for groundwater contamination and its associated health risks, particularly for nearby populations.[30 31]

The long-term health costs

Before the government of Nova Scotia ended the legislated ban on uranium exploration and mining, it did not undertake any studies to examine the potential human health and environmental costs. The health costs—including increased healthcare burden and lost productivity—could far outweigh any economic gains.[32]

Uranium mining leaves toxic legacies of radioactive tailings and waste rock[33] and contaminated groundwater, which have to be dealt with and monitored in perpetuity, long after the mine closes. Future generations will be saddled with the inestimably high health and environmental costs of today's uranium exploration and mining. ◆

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Canadian Association of Physicians for the Environment

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Endnotes

1 Make sense of radon - Government of Nova Scotia, Canada
2 Radon: Is it in your home? Information for Health Professionals - Canada.ca
3 Potential for Radon in Indoor Air
4 Guide for radon measurements in homes - Canada.ca
5 More countries act against exposure to radon and associated cancer risks, WHO
6 What is EPA's Action Level for Radon and What Does it Mean?
7 Uranium mining and health - PMC
8 Take the 'no' out of Nova Scotia: End the uranium ban, Mining Association of Nova Scotia (MANS), January 2021
9 Dr. Gordon Edwards, president and co-founder of Canadian Coalition for Nuclear Responsibility
10 Uranium in Nova Scotia's Drinking Water, Nova Scotia Environment and Climate Change
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30 Contamination Risks Associated with In situ-Recovery Mining for Uranium – Debating Science
31 An evaluation of health risk to the public as a consequence of in situ uranium mining in Wyoming, USA - PubMed
32 Bill 6 submission-Dr. Laurette Geldenhuys, CAPE NS and Bill 6 submission-Dr. Nancy Covington, CAPE NS
33 Radioactive Waste from Uranium Mining and Milling, EPA