



CMD 25-H12.33

Date: 2025-01-09

**Written Submission from
Steve Lawrence**

**Mémoire de
Steve Lawrence**

In the matter of

À l'égard de

NexGen Energy Ltd.

License application to prepare a site for
and construct its Rook I uranium mine and
mill project

NexGen Energy Ltd.

Demande de permis concernant la
préparation de l'emplacement et la
construction de son projet de mine et
d'usine de concentration d'uranium Rook I

Commission Public Hearing

Audience publique de la Commission

February 2026

Février 2026

Dear Panel,

When I look at the EIS for Rook 1 there are a number of concerns that come up. NexGen is likely capable of operating a mine. It is the very long term where the evolving problems and responsibilities will be shifted to future generations, probably without the benefit of economic returns, that I want to address. I am concerned about the radon daughters that are being introduced to the food chain. I am concerned about leakage from the UGTMF and the potential acid producing WRSA long after the decommissioning is approved. I am concerned about the impacts of climate change in the longer term and erosional forces on the WRSA. And I am concerned about the people, creatures, and impacts on the ecosystems.

Radon is 7.5 times heavier than air, in particular it is being vented from the mine, the project facilities, the PAG and WRSA. There is a Radon Memo for 7A that recognizes and outlines the amount of radon likely to be vented from each area but there is no discussion on the significance of these amounts. I could not find reference to this elsewhere.

It concerns me because on a calm day, such as a cold day in the middle of the winter, this radon will likely not travel too far so there will be limited dispersion. As it settles out it is likely in pockets of fairly high concentration. The radon has a very short half life but it is the daughters that concern me. Particularly the Polonium 210 which has a half life of about 140 days and is a daughter, 2 steps away, of Lead 210, which has a half life of 22 years. ^{210}Po is a prominent contaminant in the environment, mostly affecting [seafood](#) and [tobacco](#). Its extreme [toxicity](#) is attributed to intense radioactivity, mostly due to [alpha particles](#), which easily cause radiation damage, including [cancer](#) in surrounding tissue.

Because of the findings below, I think the quantity of radon which is vented away from the mine sight is a great risk to the caribou and likely other critters. I suggest that before anything goes forward that a major

study be done around existing mine sights to verify these findings. I believe that, up til now, the mining operations have been satisfies that the radon levels monitored were below background and not a problem. I think there is very much of a problem that needs to be addressed. To not do so and allow further mining operations to go forward with no way of mitigating this problem is a recipe for disaster.

According to

<https://www.sciencedirect.com/science/article/abs/pii/S0265931X11000178>

Mosses, lichens and peat have a high efficiency in capturing ^{210}Po and ^{210}Pb from atmospheric fallout and exhibit an inventory of both ^{210}Po and ^{210}Pb in the order of $0.5\text{--}5\text{ kBq m}^{-2}$ in mosses and in lichens around 0.6 kBq m^{-2} . The activity concentrations in lichens lies around 250 Bq kg^{-1} , dry mass. Of particular concerto me are the caribou. Reindeer and caribou graze lichen which results in an activity concentration of ^{210}Po and ^{210}Pb of about $1\text{--}15\text{ Bq kg}^{-1}$ in meat from these animals. The food chain lichen-reindeer or caribou, and Man constitutes a unique model for studying the uptake and retention of ^{210}Po and ^{210}Pb in humans. The effective annual dose due to ^{210}Po and ^{210}Pb in people with high consumption of reindeer/caribou meat is estimated to be around 260 and $132\text{ }\mu\text{Sv a}^{-1}$ respectively.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC3440115/> 2012

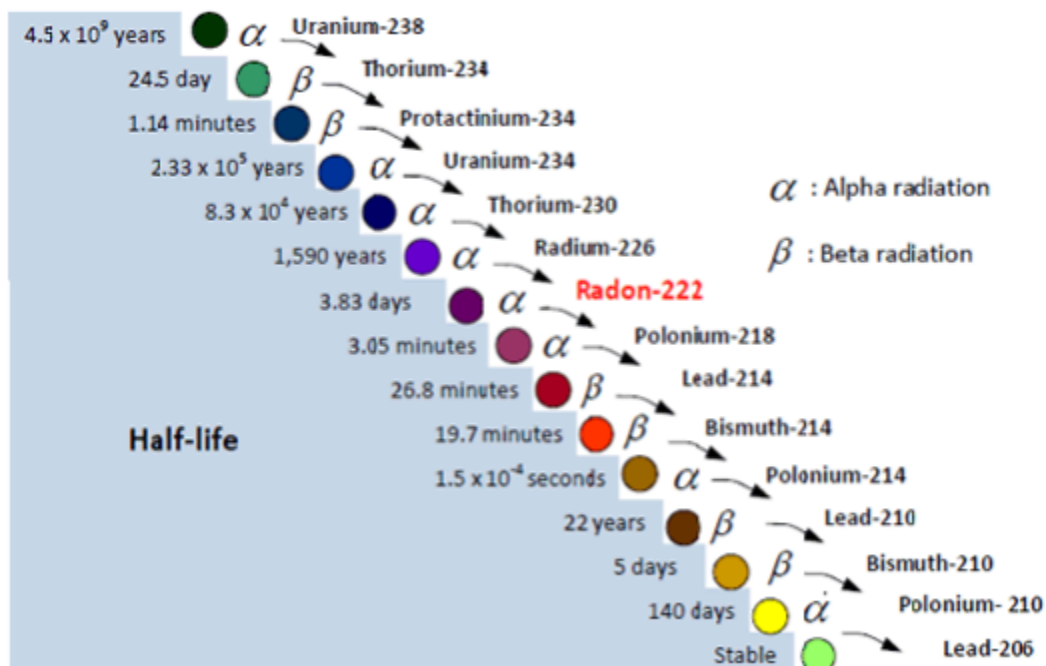
^{210}Po accumulates in the ovaries where it kills primary oocytes at low doses. Because of its radiosensitivity and tendency to concentrate ^{210}Po , the ovary may be the critical organ in determining the lowest injurious dose for ^{210}Po . ^{210}Po also accumulates in the yolk sac of the embryo and in the fetal and placental tissues. Low-level exposure to ^{210}Po may have subtle, long-term biological effects because of its tropism towards reproductive and embryonic and fetal tissues where exposure to a single alpha particle may kill or damage critical cells.

Although Polonium is a gamma emitter, this low gamma ray production rate makes it difficult to use for identification of the isotope; rather than [gamma ray spectroscopy](#),

alpha spectroscopy is the best method of measuring it. Because polonium-210 only emits alpha radiation it cannot be detected by a whole body counter. For this reason, stool or urine samples need to be analysed in order to detect the incorporation of polonium. It is easier to detect the incorporation in urine samples than in stool samples.

In soils, ^{210}Po is adsorbed to clay and organic colloids. Plants become contaminated with radioactive nuclides both by absorption from the soil (supported Po) and by deposition of radioactive fallout on the plants directly (unsupported Po). Broad leaf plants, such as tobacco, are particularly susceptible to this fallout. Lichens grab it right out of the air.

<https://www.sciencedirect.com/science/article/abs/pii/S0265931X21002691> Since lichens are ubiquitous and have been shown to integrate ambient atmospheric inputs of metals, including those of economic interest, they possess a desirable feature for accumulating contaminants over time.



In addition to the alpha or beta particles emitted as a result of the decay of a parent isotope, most of the daughter isotopes also emit gamma rays

Another problem is the effluent into the lake at roughly 10m depth. Climate change is likely going to result in more precipitation. It is also going to result in higher temperatures with the result that the rate of evaporation is going to be higher - less water available annually. There may still be weather events. In Section 13 of the EIS, the proponent has alluded to wet lowlands being impacted by this and the uplands will be drier and more susceptible to fire. In Patterson Lake the flow rate of currents is relatively low near the bottom and even more so during the winter. Under reducing conditions, uranium tends to precipitate out or sorb to nearby minerals or organic matter and is not very soluble. With reduced recharge to the fluvial systems, due to the onset of climate change, water levels in the lake will drop resulting in the possibility that sediments will be exposed to wave action, become oxygenated and very soluble and move out into the environment. The rate of effluent delivered to the diffusers is contingent on the flow rate in the lake to reach the appropriate level of dilution. Using concentration is poor practice and they should be considering total loading into the lake. Monitoring should confirm that the expected quantities of pollutants are located where they are predicted to be. If not, adaptation is required. In addition to wave action, recreational activities and motorized water craft should also be considered as possible sources of sediment disturbance, oxygenation and reintroduction to the environment. The real impacts of climate change may worsen with forest fires. Irregardless the impacts of wave action and activities on the lake will be felt well after decommissioning takes place and the mine site has been turned over to Saskatchewan Institutional Control and future generations

. This brings me to the leakage from the UGTMF and the potential acid producing WRSA long after the decommissioning is approved. The rock that contains the ore body is fractured and faulted, providing pathways to the surface for the chemically treated tailings in the UGTMF. This fracturing may have been augmented by the blasting taking place by the creation of the UGTMF and the other mine workings, activities and infrastructure. I feel that these provide pathways that will facilitate vertical movement of contaminants, including radioactive, towards the aquifers above. This is supported by the fact that, despite efforts to seal the mine shafts and workings, mine watering is still necessary. I am not confident that a full understanding is possible, as evidenced by the flooding of the Cigar Lake mine years ago. Cameco claims that this resulted from an incomplete understanding of underground conditions and not management directives. Given the volume and radioactive toxicity of the underground tailings that the confidence in their findings and methods is strictly a risk assessment of their expectations and these risks may not bear out in reality. Again, these expectations or adverse reality will not be borne out till well into the future.

The waste rock storage areas, which are permanent, but the covers and engineered containment around them are not. The covers and engineered containment will be exposed to erosion and become ineffective in 400 years (is that the expected life of the liners?). Impacts coming.

The 1977 Report from the Joint Federal Provincial Panel concluded "The tailings are going to have to be monitored into perpetuity". Looking into mine development, if this project is to go ahead, at the very least, a perpetual monitoring system should be set up to warn future generations of impending problems. This system needs to be accessible for maintenance/replacement and resources available to ensure it is working properly and data competently interpreted. Providing future generations a warning system is the very least we can do!!! Providing solutions for mitigation in the future, and details of the project and geology would also be useful, eh!

Speaking of future generations, while a feasibility study was conducted to determine if an epidemiological study could be conducted, an actual comprehensive study has not been done. Again, how can new mines go forward without a full knowledge of possible impacts to the human population, that have been ongoing. There should be a readily available data base on this so people can make educated decisions.

As for the miners themselves, a two week in/ two week out cycle is not conducive to family relationships or to the communities that workers come from - something better could be worked out if this project is to go ahead.

Again, the evolving problems, risks and responsibilities will be shifted to future generations. They will not have the benefit of royalties from a mine and they will likely be further compromised by the impacts of climate change and may not be able to shoulder the responsibilities required to mitigate, if that is possible. Some things cannot be fixed.

Thanks, steve