It May Be “Clean” (sic) But It's Undeniably Toxic

“There is no carbon-free future without nuclear power,” federal Conservative Leader Pierre Poilievre has said. “That’s just a physical and mathematical fact.” [I don't think his marks were very high in physics and math.] It is a physical and mathematical fact that uranium and all things nuclear are toxic. Ontario Premier Doug Ford says his province’s nuclear fleet is “uniquely positioned to power the future.” Alberta Premier Danielle Smith says nuclear power is “key to providing reliable and affordable power.”

The enthusiasm doesn’t stop at Canada’s borders. Around the world, 31 countries, including Canada and the U.S, have joined a declaration — stemming from last year’s United Nations climate change conference — to triple global nuclear energy capacity by 2050. Many have cited climate change and energy security as reasons to be gung ho for nuclear.

And that combination of international factors is driving a boom in uranium exploration and mining in northern Saskatchewan, home to the world’s largest deposits of high-grade uranium, an ideal fuel for reactors.

Only two uranium mines are operating in Saskatchewan at the moment — the only active mines in Canada — but more are waiting for approvals and the level of exploration and government enthusiasm is predicted to drive more activity in the sector.

The boom will, as all booms do, go ka-booom and bust and leave us with the risks and costs associated with nuclear power and uranium mining and question whether this was worth it. Those risks are not distributed evenly, and overwhelmingly impact Indigenous communities in the north. The rewards will favour governments and industry. The appeal to government is that this technology and industry has the potential to be the lowest risk, most cost competitive, economically profitable, job creating, and quickest to market solution to address CO2 and other green house gas emissions that result from burning fossil fuels for electrical energy generation. Small modular nuclear rectors (SMRs) supplemented and complemented by uranium mining and refining are the double-speak projects governments are subsidizing. What is not highlighted is that when these Becquerel Behemoths have swallowed up all the resources they can, the industry leaves us with insolvent sacrifice zones and defunded renewable energy alternatives. The liability for the damages environmentally, economically, socially, culturally, and in terms of all plant, animal, and human health with respect to a project as a uranium mine or SMRs or any nuclear refining or generation are so great that decommissioning of these projects simply means creating sacrifice zones. From subsidized near surface or deep geological repositories to insolvent sacrifice zones there is a cradle to grave enterprise of denial, disinformation, and double-speak for the uranium mining, refining, and nuclear industry. The radioactive waste it leaves behind gives it an after life beyond the decommissioning grave. The whole enterprise is undeniably toxic.

Moreover this sunny (if only they would go solar) energy superpower outlook won’t necessarily translate into government revenue. In the 2023-24 budget year, the Saskatchewan government received approximately $90 million from uranium mining, down from its forecast of $122 million. In its annual report, the Ministry of Energy and Resources said the difference is “due primarily to lower basic and profit royalties.”In its

latest budget however, the government noted expenditures for the Ministry of Environment and Natural Resources was $76.7 million higher “primarily due to an increase in liability associated with the remediation of mine sites, including the Lorado and Gunnar uranium mines and the Anglo-Rouyn base metals mine.” Like other industrial sites, uranium mines carry costly cleanup bills, but the actual price will depend on the site in question.

The cleanup costs for the decommissioned Gunnar mine in northern Saskatchewan are currently estimated at $280 million; $13 million paid for by the federal government and the rest paid by Saskatchewan tax payers.

Developing a mine in northern Saskatchewan is a long and expensive process, with federal and provincial regulations dealing with everything from nuclear security to environmental impacts. Exploration is a lot easier, and so is staking a claim.

The provincial critical minerals strategy, which is heavily focused on potash, uranium and helium, says exploration spending for uranium increased from $75 million in 2021 to an estimated $126 million in 2022.

Saskatchewan stands alone for the purity of its deposits — the high grade of uranium ore underground. Essentially, there is more uranium in each bit of rock, meaning less waste, less work and more money per tonne of rock, but also greater toxicity.

Natural Resources Canada says the deposits contain“grades that are 10 to 100 times greater than the average grade of deposits mined elsewhere in the world.” Cameco says its McArthur River mine has uranium grades 100 times higher than the global average.

According to Cameco, estimated reserves in Saskatchewan are approximately 250 million kilograms (547 million pounds). That would be around 10 per cent of the world’s total. But to inject a bit of confusion, the Saskatchewan government has different numbers. In its critical minerals strategy, it says the province is home to 1.5 billion pounds of recoverable uranium.

The Saskatchewan government has not responded to questions asking for clarification on the discrepancy. The only factor they find toxic about uranium mining are the persons who ask questions about their data and findings.

Either way, most agree Saskatchewan has the world’s largest high-grade deposits, though overall it has the third-largest deposits in the world behind Australia and Kazakhstan. Last year, the province was the world’s second-largest uranium producer, after Kazakhstan.

Several companies are actively exploring or applying for mine approvals in Saskatchewan, including NexGen Energy Ltd. (That company was recently fined by the Canadian Nuclear Safety Commission (CNSC) for “site preparation and construction of a uranium mine and mill facility” without a licence — while it awaits approvals and an environmental impact assessment.) and Dennison Mines.

First Nations in northern Saskatchewan have complicated, ever-changing relationships with uranium mining companies and the federal and provincial government. As with much resource extraction in Canada, government decisions to allow uranium mining in Treaty 8 and Treaty 10 territories have often happened without consideration for Treaty Rights or potential impacts on Indigenous ways of life.

More toxicity regarding serious attempts for reconciliation with Indigenous peoples from uranium mining.

In 2023, when Saskatchewan released its critical mineral strategy, the Federation of Sovereign Indigenous Nations, which represents 73 nations in the province, said that without consultation and built-in benefits sharing, the strategy infringed on inherent and Treaty Rights. Last fall, the non-profit Ya' thi Néné, which represents both Athabasca Denesułiné First Nations and non-Indigenous municipalities in the region, signed an agreement with Eagle Plains Resources allowing exploration as long as its members get a fair share of revenue.

The Inter-Church Uranium Committee Educational Cooperative (ICUCEC) in conjunction with many other civil society groups and organizations in Saskatchewan, Canada, and the United States is engaged in informing the public and government about the risks and deleterious effects of pursuing the nuclear "roadmap" (Natural Resources Canada's term) in addressing carbon emissions and electrical generation. ICUCEC has presented briefs to the Canadian Nuclear Safety Commission (CNSC) and other government agencies concerning the licensing of uranium mines and SMRs. Our focus on SMRs is primarily on the GE-Hitachi BWRX-300 and the eVinci micro reactor. The BWRX-300 is selected by Ontario Power Generation for deployment at its Darlington Nuclear Generation Station and it is the model that SaskPower and the provincial government is looking to deploy at a recently named site near Estevan by 2034 (?). SaskPower, the Crown corporation that runs the provincial grid, has signed a memorandum with GE Hitachi to build a small modular reactor.

The Saskatchewan government has contracted with the Saskatchewan Research Council to engage in research and development of the eVinci micro reactor. $80 million was the start-up grant for this project.

Westinghouse claims, "The eVinci microreactor's innovative design combines new technologies with 60+ years of commercial nuclear design and engineering, creating a cost-competitive and resilient source of power with superior reliability and minimal maintenance. Its small size allows for transportability and rapid, on-site deployment in contrast to plants requiring large amounts of construction. eVinci can produce **5MWe with a 15MWth core design**. The reactor core is designed to run for **eight or more full-power years before refueling**."

In its submissions to the Nuclear Regulatory Commission (USA) Westinghouse proposes that the eVinci is:

- Fully factory-assembled and transportable in shipping containers via rail, barge, and truck.
- Above-ground installation requires minimum ground disruption with less than a 2-acre footprint.
- Minimal onsite personnel required for operation/maintenance/security.
- Seamless, reliable pairing with wind, solar, and hydro with grid forming or grid following capabilities.
- Ability to immediately load-follow and load-shed within milliseconds.
- Can provide process heat for district heating or high-grade heat for industrial applications.

- Flexible energy with scale-up and scale-down capabilities.

Westinghouse has developed and continues to advance heat pipe technology and manufacturing processes through design, analysis tools, and test capabilities, with success in manufacturing the first ever 12-foot nuclear-grade heat pipe.

- Allows for greatly simplified design and eliminates numerous components needed in active systems.
- Significantly increases reliability and eliminates failure modes and additional systems associated with active systems.
- Eliminates risk from high system pressures and loss of coolant accidents.
- Eliminates flow-induced corrosion and vibration, typical of forced flow systems.
- Enables prototypic life testing at operating temperatures.

The eVinci is designed with diverse and redundant safety features, from accident-tolerant fuel to passive heat removal.

- **Heat pipes** - Passive heat transport devices eliminating the need for reactor coolant and associated systems and cooling water. They are self-regulating technology.
- **TRISO fuel** - 19.75% enriched fuel which they claim is structurally more resistant to neutron irradiation, corrosion, oxidation, and high temperatures than traditional reactor fuels.
- **Shut Down Rods** - Inserted during transport as well as providing defense-in-depth shutdown capabilities.
- **Control Drums** - Adjust reactivity and ensure safer operation. If the reactor is shut down, the control drums passively rotate to the off position or shutdown state.
- **PHS (Passive Heat Removal System)** - Decay heat removal via natural convection and radiation heat transfer. In the eVinci unit, **decay heat is removed via natural convection through air-to-air heat exchangers**. The core transfers heat to the heat tube canister which, Westinghouse says, provides reliable heat removal to the atmosphere using natural convection and without the need for operator actions.
- **Remote Monitoring** - The Instrumentation and Control system uses the ALS v2 platform, a Westinghouse-developed, owned, and tested system.

Cameco has partnered with Brookfield Asset Management, a global investment firm headquartered in Toronto, to buy 49% of Westinghouse Electric Company, a U.S.-based producer of reactors and nuclear fuel. However, the eVinci will not be a "made in Canada" product. Ina newsrelease Westinghouse states,"We are proud to announce the selection of 51 Bridge Street in Etna, Pennsylvania, as our eVinci microreactor accelerator and standalone technology hub. 51 Bridge Street's heritage dates to its origins in 1902, when it opened its doors at the height of Pittsburgh's steel production legacy. Since then, this location has been a central pillar of the Pittsburgh community.

The accelerator hub will bring together all eVinci staff under one roof. In addition, this site has enough square footage to host all our manufacturing plus extra space to grow both on the business side and a larger facility for further manufacturing, testing, and equipment. 51 Bridge Street will be the key facility for manufacturing all heat pipes for the nuclear demonstration unit as well as commercial units in the future.

In November 2023, the Government of Saskatchewan announced $80 million CAD in funding for the Saskatchewan Research Council (SRC) to demonstrate a first-of-a-kind eVinci microreactor in the province. This project will enable SRC to support Canadian communities and industry to understand the technology and its applications for future eVinci deployment opportunities." Note the word "*deployment*." Saskatchewan will be the lab rats to test the toxicity of this project.

According to their submission to NRC, the eVinci is designed to take less than 30 days to install onsite, and while the first units are expected to cost **$90 million to $120 million**, Westinghouse believes the price could drop to about $60 million as production increases. The company has already begun submitting documents needed for approval to the NRC.

With respect to uranium mines, ICUCEC has submitted intervenor briefs to the CNSC with regard to two uranium mine proposals by the industry and the decommissioning of Beaverlodge legacy mines.

In 2023 there was the proposal by Cameco Corporation to remove 18 of its properties at the Beaverlodge Project and hand them over to the Province of Saskatchewan's Institutional Control Program. (ICP) Our concern is that remediation measures have been minimal and are inadequate to alleviate toxicity levels for the long term. The Saskatchewan Institutional Control Program practices monitoring by benign neglect. Beaverlodge is an insolvent sacrifice zone.

The Canadian Nuclear Safety Commission (CNSC) held a public hearing on January 29 2025, to consider an application from Cameco Corporation (Cameco) for the release of the final set of decommissioned Beaverlodge mine and mill site properties from CNSC licensing for acceptance into Saskatchewan's Institutional Control Program, resulting in the revocation of its waste facility operating licence for the decommissioned Beaverlodge mine and mill site. The Beaverlodge Project is a decommissioned uranium mine and mill site that consisted of 65 individual decommissioned properties. The Beaverlodge site is situated within historic Treaty 8 (1899) territory, and the Homeland of the Metis, and is within the traditional territories of the Dene, Cree, and Metis peoples.

On May 21, 2025, the Canadian Nuclear Safety Commission announced the Commission's decision to release the final set of 27 decommissioned Beaverlodge properties from licensing under the Nuclear Safety and Control Act, and to revoke the waste facility operating licence held by Cameco Corporation for the decommissioned Beaverlodge mine and mill site.

Toxicity has not been decommissioned. According to modeling performed by Cameco, the concentration of **Radium-226** in the outlet of Crawford Lake, currently between 0.5 and 0.9 Bq/L, will only show a very slight decrease over the next 270 years and **will remain far beyond the applicable Saskatchewan Environment Quality Guideline (SEQG) of 0.11 Bq/L**. Uranium concentrations in the outlet of Crawford Lake, currently between 100 and 200 μg/L, are expected to slowly decrease towards the applicable SEQG of 15 μg/L within the next 270 years.

NexGen Energy Ltd. is proposing to develop an underground uranium mine on the Patterson Lake peninsula—the Rook I uranium mine. NexGen Energy has received Saskatchewan's environmental assessment (EA) approval to proceed with the development of its 100%-owned Rook I Project. The Rook I Project, which has a total initial capex of $1.3 billion is the largest development-stage uranium project in the country. NexGen is the first company in more than two decades to receive full provincial EA approval for a greenfield uranium project in Saskatchewan.
The approval will allow the company to progress with securing other provincial and federal approvals to construct the project.

On December 12, 2024, a CNSC Designated Officer issued a Notice of Violation to NexGen, believing on reasonable grounds that NexGen performed site preparation and construction of a nuclear facility without the required CNSC licence, contrary to paragraph 26(e) of the Nuclear Safety and Control Act (NSCA). To promote compliance with the NSCA, the Designated Officer issued an Administrative Monetary Penalty (AMP) to NexGen in the amount of $29,080.

On January 9, 2025, pursuant to section 65.1 of the NSCA, NexGen requested a review of both the facts of the violation and the amount of the AMP. On May 16, 2025, the Commission determined that NexGen Energy Ltd. committed the violation set out in the Notice of Violation. The Commission also corrected the amount of the administrative monetary penalty in accordance with the AMPs Regulations. Therefore, NexGen Energy Ltd. is liable to pay $11,920.

Meanwhile, CNSC announces hearing on application for construction of Rook I uranium mine project: The Canadian Nuclear Safety Commission (CNSC) will hold a public hearings on Nov. 19, 2025, and Feb. 9-13, 2026 to consider an application from NexGen Energy Ltd. (NexGen) for a licence to prepare a site for and construct its proposed Rook 1 mine and mill project. Requests to intervene must be filed by **January 9, 2026**.

Dennison Mines is proposing to develop an *in situ* recovery mining and processing operation designated the Wheeler River Project. This is an operation that would produce up to 5,400 tonnes of uranium oxide annually for 20 years. *In situ* mining would be a new procedure for uranium mining extraction in Saskatchewan. There is only one such uranium mine currently in operation in the United States and it has had disastrous environmental effects as toxic chemicals and radiation seeps into groundwater and aquifers.

However, the Federal Indigenous Review Team (FIRT) completed a technical review of Denison Mines Corp.'s draft environmental impact statement (EIS) submission and found that the information provided does not fully address the regulatory requirements for the environmental assessment (EA). The technical review resulted in 238 information requests (IRs), as well as 49 Advice to Proponent comments. But this does not spell the end of the project. As per Section 8.3(2)(d) of the *Uranium Mines and Mills Regulations* (Uranium Mines and Mills Regulations (justice.gc.ca), UMMR), "the current federal environmental assessment review is considered to be an activity which is excluded from the 24-month timeframe. Section 8.3(2)(d) stipulates the following:

(2) The following are excluded from the 24-month time period:

(d) any period that is required to conduct, and render a decision on, an environmental assessment of the proposed preparation of the site for, and construction of, the uranium mine or mill, or its operation, decommissioning or abandonment, by any jurisdiction that is obligated by law to conduct that assessment and render a decision. "

Uranium mines never fail or fade away. They continue their toxic trek to be licensed at another day.

To overcome Indigenous objections Denison signs agreements with further communities over Wheeler River in situ leach uranium mine project. On Sept. 27, 2023, Dennison Mines announced the signing of a Shared Prosperity Agreement with English River First Nation supporting the development and operation of Denison's Wheeler River Project in northern Saskatchewan. On March 27, 2024, Denison Mines Corp. announced the signing of a Sustainable Communities Investment Agreement with the municipalities of the Northern Village of Beauval, the Northern Village of Île-à-la Crosse, the Northern Hamlet of Jans Bay, and the Northern Hamlet of Cole Bay. On July 11, 2024, Denison Mines Corp. announced the signing of a Mutual Benefits Agreement with Kineepik Métis Local #9, and a Community Benefit Agreement with the Northern Village of Pinehouse Lake, in support of the development and operation of Denison's 95%-owned Wheeler River Project.

But the toxicity has not gone away. **Proposed acid in situ leaching of high-grade Wheeler River deposit will leave exceptional high residual uranium concentrations in groundwater**: The background uranium concentration in groundwater in the ore zone is 0.011 mg/L (11 μg/L). During leaching, this will rise more than 1.3-million-fold to an exceptional high value above 15,000 mg/L (15 g/L), with an upper end concentration of 116,395 mg/L (116 g/L), due to the high ore grade of this deposit (10...21% U). After termination of the leaching process, this will be lowered by active restoration efforts to the **remediation target of 100 mg/L** (still 9000-fold background), which is still 5-10 times higher than the ore zone concentrations encountered during *active* leaching of an average low-grade deposit, before leaching is shut in. Afterwards, active restoration efforts (such as rinsing and addition of basic solution) will end, the freeze wall around the ore zone will be thawed, and natural groundwater movement will be restored. No attempt will be made to reach Canada's drinking water standard for uranium of 0.02 mg/L (20 μg/L), not to mention the background concentration of 0.011 mg/L (11 μg/L). The assertion that the environment is nevertheless protected, is based on the assumption that the contaminant concentrations of the groundwater will decrease on its path to points of interest, such as the Whitefish Lake, where the uranium concentration in groundwater is predicted to reach only up to 0.00958 mg/L (9.58 μg/L), conveniently just below its Groundwater Quality Screening Criterion of 0.015 mg/L (15 μg/L).

The submissions by NexGen and Dennison Mines do not provide a detailed plan for the decommissioning of these facilities. Something the IAEA says is required. Nor is there anything in the material or CNSC staff's recommendations that take the factors of climate change (e.g. wildfires, flooding, warming-freezing cycles) into account. All this indicates that the uranium mining industry and CNSC as a captured and incompetent regulator consider these sites to be insolvent sacrifice zones. When uranium decays, it produces radon gas which can be inhaled and is known to cause lung cancer — a causal link made clear in observations of uranium miners. The Canadian Nuclear Safety

Commission says the risk to the public and to workers in both uranium exploration and mining is low with the use of contemporary techniques and protocols. A study currently underway by the commission is looking at historical and current worker data to determine risks. But risks can also impact nearby communities if radiation escapes into the environment, posing a threat to air and water. Leaky tailings, which can remain radioactive for thousands of years, could contaminate water, air, plants, and animals.

In order for ICUCEC more fully and effectively to pursue these questions and issues and to do this monitoring ICUCEC must obtain funds to get people to carry out the research and do the testing of properly collected data, to go to conferences, to gather information and to present our findings, and to present this information and material to the public. The perennial issues of funding and personnel again haunt us but they must be addressed if we are to meet our objectives.

Turning to the other activities outside uranium mining, particularly SMRs, ICUCEC is involved in a variety of projects and groups. Dale Dewar, Karen Weingeist and I are participants in the Stop SMRs Action Group. Karen, Dale, and I are also participants in No SMRs for SK. I am a participant in the group in the U.S. called Stop Advanced Nuclear Reactors which has a major focus on SMRs. This group also keeps up to date and makes presentations to the Nuclear Regulatory Commission (the U.S. version of CNSC).This is important for us in Canada because the NRC and CNSC have a memorandum of understanding that they will cooperate on all things regarding regulation of the nuclear industry. I am on the steering committee of the Radioactive Waste Policy Review Committee, the steering committee of the Environmental Planning and Assessment Caucus of the Canadian Environmental Network. I am on the Board of Canadians Concerned for Nuclear Responsibility, on the Carbon Reduction Task Force of the Evangelical Lutheran Church in Canada, and a participant in the CNSC-ENGO Forum. I see my role in these groups to make sure the deleterious effects of uranium mining are not overlooked when it comes to nuclear and environmental issues.

ICUCEC in partnership with other civic organizations has expressed its concerns about the reprocessing of spent fuel to the Ministers of Natural Resources Canada and Environment and Climate Change. "Reprocessing is the euphemism for plutonium extraction and not only results in high-level radioactive waste, but, also, increases the possibility of nuclear weapons proliferation." Along this line Peter Prebble has composed a document that highlights how Saskatchewan/Canadian uranium exports are not in compliance with Article 6 of the Treaty on the Non-Proliferation of Nuclear Weapons. This is an issue ICUCEC will continue to work on in the coming year.

In the past nine years we have been working closely with the Committee for Future Generations. Candyce Paul is on our Board. I think much of our continuing work is finding ways to support the work of this organization and other groups of First Nations and Metis people. We need to work together to monitor the uranium exploration which is on the rise, mining, and decommissioning that is going on in the northern part of our province as well as the proposals to establish SMR sites in the "remote communities." I would encourage that we seek to have greater representation of First Nations and Metis people on our Board.

Finally, I wish to acknowledge those associated with ICUCEC and extend my appreciation to the other Board members who provide life and vitality to this organization. Linda Murphy, who serves as our secretary and treasurer and keeps us running smoothly in the day to day transactions. Candyce Paul, our eyes and ears, feet and hands in the north, who is all too familiar with the impact of the uranium mining industry on First Nations and Metis people, and who keeps us grounded on how this industry effects the daily way of life of our northern neighbours. Dale Dewar, who has so many years of accumulated expertise on the nuclear industry and its deleterious effects on health, indigenous peoples, and the endeavors for peace and justice. Bob Regnier, whose skill in organizing, strategizing, and connecting us with many resources has greatly enriched the reach of our little group. He also keeps us informed about issues concerning non-proliferation and nuclear weapons. Vicki Obedkoff who, too, has a long history with all things nuclear and provides us with perspective and insight and is also a link with other people and groups. Karen Weingeist who is always willing to host ICUCEC events and keeps us in contact with so many of the other groups and people concerned about these issues. Karen has also become our IT person and "director of communications." Karen handles all our cyberspace connections so we can all ZOOM to the meetings. Many, many thanks for your hard work and dedication to the activities of ICUCEC.

I admire the tenacity of all the members who constitute and support this activist [oops! we are just an educational cooperative] acronym known as ICUCEC. Your fortitude, energy, hope, and humour are truly what sustain an eco-community who values the integrity of life for all people and for all creation, and who values justice and peace. I thank you all for your participation in the organization and look forward to the future and to working with all of you.

Respectfully submitted,

Michael Poellet, President