IAAC COMPLAINT ADDITIONS

Energy Alberta Peace River Nuclear Power Project — Registry #89430

March 2026

SHOW STOPPER
17

HARM QUANTUM FRAMEWORK

SAFETY: GAS POWER GENERATION OVERTOOK NUCLEAR

The CNSC has operated for 34 years without the analytical tools its mandate requires. When those tools are built honestly, gas generation with carbon capture overtakes nuclear on every harm metric that matters to the Peace River community. The Panel cannot make a public interest determination without them.

INTRODUCTION

This submission does not oppose electricity generation. It does not ask the Panel to prefer inaction over development. It asks the Panel to require honest comparison before irreversible commitment.

Energy Alberta proposes to site four CANDU MONARK reactors 30 kilometres north of Peace River and to operate them for 60 years. That proposal rests on a comparative proposition — that nuclear is the better option for Alberta's electricity needs. The Canadian Nuclear Safety Commission has endorsed that proposition using the only analytical tools it has: dose-compliance monitoring, ALARA optimisation, and a lifecycle carbon figure. This submission demonstrates that those tools cannot answer the comparative question the Impact Assessment Act requires the Panel to answer.

The submission advances three propositions in sequence.

The first is that natural gas generation with carbon capture and storage is a genuine, technically credible, commercially available alternative to the proposed nuclear facility — not a distant aspiration. Current commercial CCS technology captures 85 to 95 percent of emissions at operational gas plants. When gas is deployed not as a baseload competitor to nuclear but as the flexible complement to Alberta's expanding renewable generation — covering peak demand for 20 to 25 percent of operating hours while wind and solar carry the remainder — the system's weighted carbon intensity approaches nuclear's lifecycle figure. The harm profile of that system is qualitatively different from nuclear in every dimension that matters to the Peace River community: no concentrated involuntary cancer risk, no tritium in the Peace and Smoky Rivers, no spent fuel requiring management across geological time, and no infrastructure that cannot be shut down and removed. The proponent has not modelled this system. The CNSC has not required it to.

The second proposition is that the comparison between nuclear and gas has never been conducted honestly, because the harm literature for the two technologies has been built on asymmetric foundations. The mortality data for gas and fossil fuel generation rests on six decades of epidemiological surveillance covering hundreds of millions of people across dozens of independent research programs. The mortality data for nuclear normal operation rests on dose-compliance monitoring that measures whether operators are within regulatory limits — not whether those limits protect community health. When independent researchers apply standard epidemiological methods to nuclear host communities, they find what the regulatory monitoring was designed not to find: elevated cancer incidence extending to 30 kilometres from facility boundaries, haematological malignancies in nuclear workers at 3 to 6 times the risk implied by the CNSC's dose-risk coefficients, and cancer mortality signals that dose-compliance models predict should not exist. The comparison routinely cited to establish nuclear's safety advantage — deaths per terawatt-hour — counts zero chronic normal-operation cancer deaths for nuclear in the entire history of commercial nuclear power, not because none have occurred, but because no tracking system has ever been built to find them. Absence of measurement is not evidence of safety.

The third proposition is the most consequential. The Canadian Nuclear Safety Commission has operated since its establishment in 1997 with an explicit statutory mandate under section 9 of the Nuclear Safety and Control Act to protect the health and safety of persons. In 34 years it has not built epidemiological surveillance of nuclear host communities. It has not developed a harm quantum framework — a methodology for expressing nuclear's total health burden per unit of energy delivered in terms that are genuinely comparable to the harm literature for alternative technologies. Every serious international regulatory body and scientific organisation that has attempted a genuine comparative harm assessment has acknowledged the gap between what their frameworks can measure and what they need to measure. The CNSC has not acknowledged the gap. It has treated the absence of a complete nuclear harm dataset as confirmation that the harm is low, and presented that treatment to this Panel as a health effects determination under section 22(1) of the Impact Assessment Act.

It is not.

The CNSC's own analytical framework, when its limitations are honestly mapped, demonstrates that a harm quantum framework is not a theoretical refinement — it is a prerequisite for the comparison the IAA requires. When that framework is built, even on the incomplete data currently available, gas generation with CCS deployed flexibly alongside Alberta's renewable capacity overtakes nuclear on the harm metrics that matter to an identifiable community bearing involuntary concentrated risk. As CCS technology continues on its demonstrated improvement trajectory across the 60-year operating life of the proposed facility, that advantage widens further and becomes irreversible.

The Panel is therefore asked to find that no public interest determination on health grounds can be made on the current evidentiary record, and to require that a harm quantum assessment meeting the criteria set out in Part 6 of this submission be placed before the Panel before the review proceeds to sections 60 to 63 of the Impact Assessment Act.

PART 1 — THE RESEARCH IS NOT COMPARABLE

Why the standard comparison between nuclear and gas is built on unequal foundations.

1.1 What We Actually Know About Gas Harm

When a gas-fired power plant operates, it releases nitrogen oxides and fine particles into the air. These pollutants cause lung disease, heart disease, stroke, and cancer in people who breathe them over many years. Scientists have been measuring this relationship for more than 60 years. They have studied hundreds of millions of people across dozens of countries, using multiple independent research methods, with results that consistently agree with each other. The World Health Organization estimates that approximately 8 million people die worldwide each year from air pollution, with fossil fuel combustion the dominant cause.

The harm figures for gas generation are derived from this enormous body of replicated, peer-reviewed, independently verified epidemiology. The uncertainty ranges are honestly disclosed. The data is current, comprehensive, and continues to be updated.

1.2 What We Actually Know About Nuclear Harm

This is where the comparison breaks down — not because nuclear is necessarily safe, but because nobody has built the systems needed to find out whether it is.

Nuclear regulatory systems around the world, including Canada's, monitor whether nuclear facilities are keeping radioactive releases within permitted limits. This is a compliance system. It measures whether operators are following the rules. It does not measure what is happening to the health of the people who live nearby.

No jurisdiction in the world requires nuclear operators to conduct epidemiological surveillance — systematic, ongoing measurement of whether cancer rates in communities near nuclear facilities are higher than they would otherwise be. When independent researchers who are not part of the nuclear regulatory system conduct this surveillance using ordinary public health methods, they consistently find health signals that the regulatory monitoring was designed not to detect.

> **The six studies the CNSC has not addressed:** *Harvard/Nature Communications (2026) found elevated cancer mortality extending to 30 kilometres from US nuclear facilities. INWORKS (2023–2025) found cancer and leukaemia risk in nuclear workers at 3 to 6 times the level the CNSC's risk coefficients predict. KiKK (2007, Germany) and its subsequent European replications found elevated childhood leukaemia near nuclear facilities. A 2025 study found epigenetic changes — alterations to how genes are expressed — in populations near nuclear facilities that appear to be heritable.*

1.3 The Deaths-Per-Terawatt-Hour Problem

The most commonly cited comparison between energy sources uses a figure called deaths per terawatt-hour — an estimate of how many people die to produce each unit of electricity. Nuclear typically comes out looking very safe in these comparisons, with figures far lower than coal, oil, or gas.

These figures are published by Our World in Data, drawing on studies by the United Nations Economic Commission for Europe and others. They are widely cited by nuclear proponents and by the CNSC itself.

What the CNSC does not tell the Panel is what Our World in Data explicitly states in its own methodology notes: the nuclear death rate counts deaths from accidents — Chernobyl and Fukushima — and zero chronic normal-operation cancer deaths. The reason the chronic death count is zero is not that no chronic deaths have occurred. It is that the counting system does not exist.

> *Our World in Data: 'The figures we reference on accidents from nuclear, solar and wind are based on the most comprehensive figures we have to date. However, they are imperfect, and no timely dataset tracking these accidents exists. This is a key gap in our understanding of the safety of energy sources.'*

The same source acknowledges that the fossil fuel death rates used in the comparison undercount by a factor of 4 to 9 — meaning the real death toll from gas may be substantially higher than the figures used. That acknowledgement applies equally to a comparison that already excludes nuclear's chronic deaths entirely.

The Panel is therefore asked to consider this: the comparison that shows nuclear as safer than gas is a comparison between a figure derived from six decades of active epidemiological surveillance on one side, and a figure derived from accident counts with zero chronic deaths recorded on the other. This is not a scientific finding. It is an artefact of asymmetric measurement investment.

> **Finding 1:** The harm literature for gas is complete. The harm literature for nuclear normal operation is structurally absent. No honest comparison can be drawn until both sides of the ledger are built on equivalent foundations.

PART 2 — THE SYSTEM COMPARISON

Why comparing nuclear against standalone gas misses the actual choice Alberta faces.

2.1 The Wrong Comparison

The proponent and the CNSC compare nuclear power against gas-fired generation as though they are direct substitutes — two baseload technologies, each running around the clock, each supplying Alberta's electricity. On that comparison, nuclear has genuine advantages on carbon emissions and on some harm metrics.

That is not the choice Alberta actually faces.

Alberta's electricity grid is changing fundamentally. Wind and solar generation are expanding rapidly because they are now cheaper to build and operate than any thermal generation. The Alberta Electric System Operator's own long-term planning scenarios project that renewables will supply the large majority of Alberta's electricity within the operating lifetime of any facility approved today. In that grid, the role for gas is not baseload — it is backup. Gas runs when the wind is not blowing and the sun is not shining, filling the gap that renewables cannot cover in that hour.

2.2 The System Nuclear Competes With

The correct comparison for this submission is not nuclear versus gas. It is nuclear versus a system that would deliver the same energy services to Alberta: renewables carrying 75 to 80 percent of generation, with gas on carbon capture and storage providing flexible backup for the remaining 20 to 25 percent of hours when renewables fall short.

The carbon mathematics of this system are straightforward. Wind and solar generation produce approximately 5 to 10 grams of carbon dioxide per kilowatt-hour over their full lifecycle — essentially zero during operation. Gas with 95 percent carbon capture produces approximately 90 grams per kilowatt-hour. If gas runs for only 20 percent of the time while renewables cover the rest, the system's weighted average carbon intensity works out to approximately 24 grams per kilowatt-hour.

Nuclear's lifecycle figure is approximately 10 to 15 grams per kilowatt-hour.

The renewables-plus-gas system and nuclear are therefore in the same carbon neighbourhood. They are not equivalent on harm.

2.3 Why Nuclear Cannot Flex

A nuclear power plant cannot turn up and down in response to grid conditions the way a gas plant can. Nuclear requires very high utilisation — running at 90 to 95 percent of its capacity almost all the time — to cover the enormous capital cost of construction over its operating life. If the plant runs at 50 percent utilisation because renewables are supplying the other half of demand, the economics collapse.

This is not a temporary problem. It is structural. The more renewables Alberta adds to the grid — which AESO expects to happen continuously — the harder it becomes for nuclear to run at the utilisation rates it requires. A nuclear plant that cannot flex with the grid is a stranded asset risk. A gas plant that runs 20 percent of the time when needed, and sits idle the rest, is exactly what a high-renewables grid requires.

The proponent has not addressed this structural incompatibility in its IAAC submission. The CNSC has not required it to.

2.4 The Harm Profile Is Qualitatively Different

Even setting carbon aside, the harm profiles of the two systems are categorically different in ways that matter profoundly to the Peace River community.

Gas harm from the backup system described above is primarily harm from climate change — the residual carbon emissions that 95 percent capture does not prevent. That harm is distributed globally, across all of humanity, in proportion to each person's share of the climate burden. It is not concentrated on Peace River.

Nuclear harm — to the extent it can be estimated honestly, given the measurement gaps in Part 1 — falls on the people who live near the facility. The Harvard/Nature Communications 2026 study found elevated cancer mortality within 30 kilometres of nuclear facilities. Peace River is within that radius. The harm is involuntary, concentrated, and falls on an identifiable community that receives no particular benefit from the electricity produced. Alberta's grid serves the whole province; Peace River bears the risk.

For gas-fired backup at Peace River specifically, the air quality concern that drives urban gas harm statistics largely disappears. Peace River is a rural community in open terrain with excellent atmospheric dispersion. Fine particles and nitrogen oxides from a gas plant operating 20 to 25 percent of the time in this environment would disperse across a large low-population airshed. The population-level air quality mortality from that scenario at this specific location is negligible.

> **Finding 2:** The relevant comparison is a renewables-plus-gas system against nuclear, not standalone gas against nuclear. On that comparison, nuclear's carbon advantage largely disappears. Its harm profile — concentrated, involuntary, borne by an identifiable community — remains fundamentally different from the diffuse global harm of residual gas emissions.

PART 3 — THE TECHNOLOGY TRAJECTORY

Why gas with carbon capture will overtake nuclear during the operating life of any facility approved today.

3.1 The Current Snapshot Is Not the Relevant Comparison

Any facility the Panel approves today will still be operating in 2085. The nuclear plant will be seeking licence renewal around that date. The gas-plus-CCS system competing with it will have had 60 years of technological development.

The proponent's submission compares 2026 technology for nuclear against 2026 technology for gas. This is not a lifecycle analysis. It is a snapshot comparison applied to a 60-year decision. The Panel should treat it accordingly.

3.2 The Carbon Capture Improvement Curve

Carbon capture technology has improved substantially since its first commercial applications. Early post-combustion capture systems in the 1990s achieved capture rates around 70 percent. Current operational systems at gas-fired power plants achieve 85 to 95 percent. Pilot-scale systems using oxyfuel combustion and second-stage capture are demonstrating 98 to 99 percent capture rates in controlled conditions.

This trajectory mirrors the technology learning curves seen in other energy technologies. Solar photovoltaic module prices fell by 99 percent over 40 years. Wind energy costs fell by 70 percent in a decade. Each of these improvements happened because engineers applied cumulative learning to a technology that governments and markets had decided to develop. Carbon capture is now receiving that level of investment and attention.

There is no known physical barrier preventing CCS from reaching 99 percent capture at commercial scale within the operating lifetime of a nuclear facility approved today. The question is not whether — it is when.

3.3 What the Trajectory Means for the Harm Comparison

If gas-plus-CCS reaches 99 percent capture within 20 to 30 years — well within the proposed facility's 60-year operating life — then the residual carbon emissions from the flexible backup system described in Part 2 become negligible. A system that produces 99 percent fewer carbon emissions than unabated gas, running for only 20 percent of total hours, has a lifecycle carbon intensity of approximately 2 to 5 grams per kilowatt-hour.

That is better than nuclear.

At that point, the case for nuclear on harm grounds collapses entirely. The proposed facility would be a 60-year commitment to a technology whose harm profile is worse than its alternative in carbon terms, worse in community concentration terms, and irreversible — you cannot decommission a CANDU reactor quickly, cheaply, or without leaving a residual waste management obligation that extends for thousands of years.

3.4 The Proponent Has Not Modelled This

A genuine public interest analysis for a 60-year infrastructure commitment requires a 60-year harm comparison. The proponent has not provided one. It has compared technologies as they exist today and presented that comparison as a lifecycle assessment.

The CNSC has not required the proponent to model the technology trajectory. It has accepted the snapshot comparison without question.

> **Finding 3:** The comparison between nuclear and gas-plus-CCS must be conducted across the full operating life of the proposed facility — 60 years. On a 60-year trajectory, CCS technology improvement is expected to eliminate gas's remaining carbon disadvantage. The proponent has not modelled this. The Panel cannot determine the long-term public interest without it.

PART 4 — HOW OTHER REGULATORS HANDLE THIS

Every serious jurisdiction that has attempted genuine harm comparison has acknowledged the gap — none has closed it.

4.1 The United Kingdom: A Hard Ceiling the CNSC Lacks

The United Kingdom developed the most carefully considered nuclear risk framework in the world following the Sizewell B Public Inquiry in the 1980s. The inquiry inspector asked the Health and Safety Executive to formulate and publish guidelines on tolerable levels of individual and societal risk from nuclear power stations. The resulting framework — the Tolerability of Risk, or TOR — set out a three-tier structure that has since been adopted by regulators in many industries beyond nuclear.

The TOR framework works as follows. At the bottom is a level of risk so low that it is broadly acceptable — regulators need not ask operators to do more.

At the top is a level of risk so high that it is intolerable under any circumstances — no amount of benefit justification permits proceeding. In the middle is a zone where risk is tolerable only if it has been reduced as low as reasonably practicable.

The critical point for this submission is the intolerable ceiling. The UK framework sets the line for members of the public who have risk imposed on them in the wider interest of society at 1 in 10,000 per year — above which no licence may be granted regardless of the economic benefits. The CNSC framework has no equivalent ceiling. ALARA, the CNSC's optimisation tool, can always be satisfied by demonstrating that further reduction would cost too much. There is no level of risk the CNSC framework defines as categorically unacceptable.

Even the UK's best framework, however, applies this structure to accident risk — the risk that something goes wrong and radioactive material escapes. It does not apply to chronic normal-operation community cancer from routine permitted releases. That gap has never been closed anywhere.

4.2 The United States: Safety Goals That Miss the Point

The US Nuclear Regulatory Commission established its Safety Goal Policy Statement in 1986. The NRC set two quantitative health objectives: the cancer risk to people living near a nuclear plant from plant operation should not exceed one-tenth of one percent of the background cancer risk from all other causes.

In theory this sounds rigorous — nuclear should not be a significant addition to the risks people already face. In practice, researchers have shown that the NRC's own safety goals would have been satisfied by Fukushima — the largest nuclear accident outside the Soviet Union — because no measurable increase in cancer rates above baseline was detected in the Japanese population.

The NRC's own researchers subsequently noted that the goals failed to capture societal risk — the disruption, displacement, property loss, and community destruction that a major nuclear event produces even when nobody dies from radiation. The NRC has also never resolved a gap identified in 1999: its safety goals use a 10-mile radius around nuclear plants, but the environmental analyses it requires use a 50-mile radius. The Harvard/Nature Communications 2026 study found harm extending to 30 kilometres — inside the 50-mile radius and outside the 10-mile one.

Like the UK framework, the NRC safety goals address accident scenarios. They do not address chronic normal-operation community health.

4.3 The European Union: The Closest Attempt — and the Acknowledged Failure

The most ambitious attempt to apply a 'do no significant harm' standard to nuclear power was conducted by the European Commission for its Taxonomy Regulation — the EU's framework for classifying economic activities as environmentally sustainable for investment purposes.

The Commission asked its Joint Research Centre to conduct a comprehensive technical assessment of whether nuclear energy meets the do-no-significant-harm criteria. The JRC concluded that no science-based evidence was found that nuclear energy does more harm to human health or the environment than other technologies already classified as sustainable.

Three separate expert bodies were asked to review that conclusion.

Two provided qualified support. The third — Germany's Federal Office for Radiation Protection, BASE — concluded that the inclusion of nuclear was not technically tenable, because the technical screening criteria presented do not prove that nuclear energy meets the DNSH criteria. An Austrian government-commissioned meta-study specifically identified the INWORKS Lancet Haematology finding — one of the six studies addressed in Show Stopper 15 — as undermining the JRC's conclusion.

The EU then included nuclear in its taxonomy anyway, on policy grounds. That is a political decision available to elected governments. It is not a decision available to a quasi-judicial Review Panel bound by section 22(1) of the Impact Assessment Act to determine likely health effects on an evidentiary basis.

4.4 The UNECE Lifecycle Assessment: Best Available — and Explicitly Incomplete

The UN Economic Commission for Europe published in 2022 the most comprehensive lifecycle assessment ever conducted for nuclear power by an international body. It assessed nuclear across 13 environmental and health impact categories including ionising radiation, human toxicity, cancer, and non-cancer health effects.

The UNECE found that nuclear had low impacts across most categories, broadly comparable to wind and solar. It also explicitly acknowledged that growing evidence of ionising radiation emissions over the lifecycle of other technologies had been published but data had not been collected for those technologies in the study. More fundamentally, the UNECE LCA used modelled dose estimates based on known emission pathways — not epidemiological surveillance of actual health outcomes in communities.

The modelled estimates embed the dose-risk coefficients that the INWORKS 2023-2025 findings have shown are 3 to 6 times too low.

4.5 The Universal Finding

Having examined every major regulatory jurisdiction and every major international comparative assessment, the finding is unambiguous: no jurisdiction in the world has built a harm quantum framework that compares nuclear against its alternatives using consistent methodology applied to both, adjusted for known underestimation in dose-risk coefficients, and including chronic normal-operation community cancer mortality measured epidemiologically rather than modelled from compliance data.

The CNSC has not built it. The UK has not built it. The US has not built it. The EU tried and acknowledged its attempt was incomplete. The UNECE tried and explicitly noted the missing data.

The Panel sits at a unique position in this global regulatory history. The Impact Assessment Act does not allow the Panel to proceed on incomplete evidence by pointing to the fact that every other jurisdiction has proceeded on equally incomplete evidence. Section 22(1) requires the Panel to consider the health effects of the proposed project.

That determination cannot be made on data that every serious analyst agrees is structurally absent.

> **Finding 4:** No jurisdiction in the world has the tools to conduct the comparison the IAA requires. The CNSC is not an outlier in lacking these tools — but it is the body that has operated for 34 years with a statutory mandate to protect community health near nuclear facilities and has chosen not to build them. That choice is the subject of Part 5.

PART 5 — THE CNSC'S 34-YEAR FAILURE

What the CNSC was required to do, what it chose not to do, and why the Panel now bears the consequence.

5.1 What the Mandate Requires

The Canadian Nuclear Safety Commission was established in 1997 under the Nuclear Safety and Control Act. Section 9 of that Act states that the purposes of the Commission include protecting the health and safety of persons and protecting the environment in relation to the development, production, and use of nuclear energy.

Protecting health is not a background aspiration. It is the primary statutory purpose for which the CNSC exists. The entire apparatus of nuclear regulation in Canada — the licensing process, the monitoring requirements, the dose limits, the ALARA framework — is supposed to be in service of that purpose.

5.2 The Choice That Was Made

In 34 years, the CNSC has built a monitoring system that measures whether nuclear operators are complying with permitted limits for radioactive releases. It has not built a system that measures whether the communities living near licensed nuclear facilities are experiencing elevated rates of cancer, cardiovascular disease, infant mortality, or any other health outcome.

This is a choice. Epidemiological surveillance of host communities is not technically difficult. Public health agencies conduct it routinely for other environmental exposures. The data required — cancer registry records cross-referenced against distance from nuclear facilities — exists in provincial health systems. The CNSC has never required nuclear operators to fund or participate in it. It has never conducted it independently. It has produced no research program to investigate whether its dose limits, derived from the linear no-threshold model with assumptions that the INWORKS findings have now challenged, are actually protecting community health.

5.3 The Evidence the CNSC Has Ignored

The CNSC was not operating in an information vacuum. Evidence of harm from chronic low-dose radiation exposure near nuclear facilities has been accumulating in the peer-reviewed literature for decades.

The KiKK study, published in 2007 in Germany, found a statistically significant increase in childhood leukaemia near nuclear power plants. Multiple subsequent European studies found similar signals.

The CNSC published a fact sheet dismissing KiKK's relevance to Canada — a document that misrepresented the study's findings in ways this submission addresses in Show Stopper 15.

The INWORKS study, the largest occupational radiation epidemiology study ever conducted covering over 300,000 nuclear workers across three countries, published findings between 2023 and 2025 showing cancer and leukaemia risk at 3 to 6 times the level the CNSC's dose-risk coefficients predict. The CNSC has not updated its dose-risk methodology in response. It has issued no health advisory. It has conducted no retrospective review of prior dose assessments at Canadian nuclear facilities.

The Harvard/Nature Communications study published in February 2026 found elevated cancer mortality in populations within 30 kilometres of nuclear facilities across the United States. Peace River is within that radius from the proposed site. The CNSC has not addressed this finding in its contribution to the IAAC process.

5.4 The Consequence: The Panel Bears the Gap

The CNSC's 34-year failure to build the analytical tools its mandate requires has produced a specific, concrete consequence for this Panel: the Panel now has before it a proposal for a 60-year, 4,800-megawatt nuclear facility that will affect the health of 30,000 people in Peace River and the surrounding region, and the Panel cannot make the health effects determination section 22(1) requires because the evidence does not exist to make it.

That evidence does not exist because the body charged with producing it — the CNSC — chose not to produce it. The Panel is not being asked to compensate for a resource constraint or an honest regulatory gap. It is being asked to approve a project whose health case rests on the product of a 34-year institutional avoidance of the question.

The CNSC's approach is additionally self-serving in a structural sense. It operates as nuclear regulator, nuclear promoter, and the primary technical advisor to the IAAC process simultaneously. When it certifies that the health evidence is sufficient to proceed, it is certifying the adequacy of its own work. The IAEA's Integrated Regulatory Review Service missions to Canada in 2019 and 2024 found the CNSC non-compliant with international standards in specific areas affecting this assessment — a finding the CNSC has not disclosed to the Panel.

> **Finding 5:** The CNSC has operated for 34 years with a statutory mandate to protect community health near nuclear facilities and has systematically chosen not to build the tools required to discharge that mandate. The analytical deficit the Panel now faces is the direct consequence of that choice. The Panel cannot remedy the CNSC's failure by proceeding on incomplete evidence.

PART 6 — WHAT THE PANEL MUST FIND

The Panel's obligation under the Impact Assessment Act and the minimum evidentiary requirements before any public interest determination.

6.1 What the Act Requires

Section 22(1) of the Impact Assessment Act requires the Review Panel to take into account the health and social conditions of the affected populations. Section 6(2) establishes the precautionary principle as a guiding consideration: where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation.

These provisions read together establish an affirmative obligation.

The Panel is not permitted to treat the absence of a complete health harm dataset as permission to proceed. Where scientific certainty is lacking and the potential harm is serious and irreversible, the precautionary principle requires the Panel to demand the evidence before approving the activity — not to approve the activity and defer evidence-gathering to later.

Nuclear cancer risk imposed on an identifiable community of 30,000 people over 60 years is serious. It is irreversible — once the facility is built and operating, the affected population cannot consent or withdraw consent on an ongoing basis. The evidence needed to assess it does not exist. These conditions precisely describe the circumstances section 6(2) is designed to address.

6.2 The Three Conditions That Cannot Be Met

Before any positive public interest determination can be made on health grounds in this proceeding, the evidentiary record must include:

- **A comparative harm quantum assessment.** The proponent must submit a methodology that quantifies harm per terawatt-hour for the proposed nuclear facility and for the counterfactual system — renewables plus gas with CCS — using consistent methodology applied to both. The assessment must use dose-risk coefficients consistent with the INWORKS 2023-2025 findings, not the CNSC's unrevised methodology. It must include cancer and non-cancer health outcomes, cardiovascular endpoints, infant mortality, and the findings of the Harvard/Nature Communications 2026 study. It must account for the Peace River cancer baseline documented in Show Stopper 15.
- **A 60-year technology trajectory analysis.** The assessment must model the harm comparison across the full operating life of the proposed facility, including the projected improvement in CCS capture rates based on the demonstrated technology learning curve, and the projected growth in Alberta's renewable generation capacity based on AESO's own long-term scenarios.
- **An independent epidemiological surveillance framework.** The assessment must specify how chronic community health outcomes near the proposed facility will be measured during operation — not by dose-compliance monitoring, but by epidemiological surveillance using provincial cancer registry data, with pre-specified statistical power, independent of the CNSC and the proponent.

6.3 The Panel's Options

The Panel has three available paths from this point.

The first is to require the proponent to commission an independent harm quantum assessment meeting the criteria above as a condition of the Panel proceeding to sections 60 to 63 of the IAA. This is the preferred outcome of this submission. It does not predetermine the project. It requires that the comparison be conducted honestly before an irreversible decision is made.

The second is to apply the precautionary principle directly and decline to make a positive public interest finding on health grounds. Where the potential harm is serious, the affected community is identifiable and non-consenting, the harm is irreversible, and the evidence required to assess it has been deliberately withheld by the regulatory body charged with generating it, the precautionary principle does not merely permit a precautionary finding — it requires one.

The third — proceeding to a public interest determination on the current evidentiary record — is not available to the Panel under section 22(1). It would require the Panel to treat the CNSC's dose-compliance monitoring as a substitute for a health effects determination. It would require the Panel to treat the absence of epidemiological surveillance as evidence of community health. It would require the Panel to approve a 60-year, irreversible commitment to a technology whose harm profile, honestly assessed against its alternative, is unknown and potentially far worse than represented. The IAA does not permit this.

6.4 Relief Sought

This submission asks the Panel to find that:

1. The CNSC's ALARA-based dose-compliance framework is structurally incapable of producing the health effects determination required by IAA section 22(1) and cannot substitute for it.
2. The standard deaths-per-terawatt-hour comparison between nuclear and gas is methodologically inadequate for the Panel's purposes because it counts zero chronic normal-operation deaths for nuclear and has been acknowledged by its own authors to be based on incomplete data.
3. The relevant comparison for this proceeding is a renewables-plus-gas-CCS system against nuclear, not standalone gas against nuclear, and the proponent has not submitted that comparison.
4. The CNSC has failed for 34 years to build the epidemiological surveillance and harm quantum framework its statutory mandate requires, and the Panel cannot remedy that failure by proceeding on the resulting incomplete evidence.
5. The Panel cannot proceed to sections 60 to 63 of the IAA until the proponent has submitted a harm quantum assessment meeting the criteria in section 6.2 of this submission, including a 60-year technology trajectory analysis and an independent epidemiological surveillance framework.

6.5 Appendices

This submission is supported with the following Appendices:

Appendix A — The Deaths/TWh Methodology and Its Limits

Appendix B — System Carbon Intensity Calculation

Appendix C — CCS Technology Learning Curve

Appendix D — International Regulatory Framework Comparison Table

Appendix E — The Six Studies and Their Regulatory Implications

REFERENCES

Here are all references relied upon across this Show Stopper and the supporting analysis, organised by category.

INWORKS Studies (The Six Studies)

1. Leuraud K et al. "Risk of haematological malignancies from low-dose radiation exposure in nuclear workers: a multinational cohort study." *Lancet Haematology*, August 2024. DOI: 10.1016/S2352-3026(24)00240-0
2. Richardson DB et al. "Temporal patterns of radiation-associated cancer risk in the INWORKS nuclear worker cohort study." *European Journal of Epidemiology*, November 2024. DOI: 10.1007/s10654-024-01178-6
3. Leuraud K et al. "Site-specific cancer risks and low-dose radiation slope in the INWORKS cohort." *American Journal of Epidemiology*, May 2025. DOI: 10.1093/aje/kwae256
4. Alwadi D, Koutrakis P et al. "Cancer incidence near nuclear power facilities in Massachusetts." *Environmental Health*, December 2025.
5. Alwadi D, Koutrakis P et al. "Nuclear facility proximity and cancer mortality: a national study." *Nature Communications*, February 23, 2026. DOI: 10.1038/s41467-026-69285-4
6. [Authors TBC from published record] "Epigenetic transgenerational effects in populations near nuclear facilities." *International Journal of Molecular Sciences*, March 4, 2025. DOI: 10.3390/ijms26052269

KiKK and Replication Studies

7. Kaatsch P et al. "Leukaemia in young children living in the vicinity of German nuclear power plants." *International Journal of Cancer*, 2008. (KiKK study)
8. Sermage-Faure C et al. (GEOCAP). "Childhood leukaemia around French nuclear power plants — the Geocap study 2002-2007." *International Journal of Cancer*, 2012.
9. Laurier D et al. (CANUPIS). Canadian nuclear proximity and childhood leukaemia analysis.
10. Committee on Medical Aspects of Radiation in the Environment (COMARE). Reports on childhood cancer near nuclear installations, UK.

INWORKS Foundation Study

11. Richardson DB et al. "Risk of cancer from occupational exposure to ionising radiation: retrospective cohort study of workers in France, the United Kingdom, and the United States." *BMJ*, 2023. DOI: 10.1136/bmj-2022-074121

Epidemiology and Radiation Risk

12. Markandya A, Wilkinson P. "Electricity generation and health." *The Lancet*, 2007. Vol 370(9591):979-990. (Primary source for deaths/TWh fossil fuel figures)
13. Sovacool BK et al. "Balancing safety with sustainability: assessing the risk of accidents for modern low-carbon energy systems." *Journal of Cleaner Production*, 2016. Vol 112:3952-3965. (Primary source for deaths/TWh nuclear and renewable figures)
14. Kharecha PA, Hansen JE. "Prevented mortality and greenhouse gas emissions from historical and projected nuclear power." *Environmental Science & Technology*, 2013. DOI: 10.1021/es3051197. (Acknowledged exclusion of chronic illness effects)
15. Bressler S et al. "Mortality risk from United States coal electricity generation." *Science*, 2021. (2.26×10^{-4} deaths per tonne CO_2 climate mortality figure)
16. Ritchie H. "What are the safest and cleanest sources of energy?" Our World in Data, 2020. (Aggregates Markandya-Wilkinson and Sovacool figures; acknowledges undercount by 4-9x and absence of chronic nuclear tracking)

Lifecycle Carbon Assessments

17. Schlömer S et al. "Annex III: Technology-specific cost and performance parameters." In: *Climate Change 2014: Mitigation of Climate Change*, IPCC AR5 Working Group III. Cambridge University Press, 2014.
18. Gibon T, Hahn Menacho Á, Guiton M. *Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources*. United Nations Economic Commission for Europe, March 2022. Available: unece.org
19. Heath G et al. *Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update*. NREL/TP-6A20-80580, National Renewable Energy Laboratory, 2021.
20. IEA. *Life Cycle Upstream Emission Factors 2024 Database*. International Energy Agency, 2024.

Nuclear Regulatory Frameworks

21. Health and Safety Executive (UK). *The Tolerability of Risk from Nuclear Power Stations (TOR)*. HMSO, 1992. (Three-tier framework; intolerable ceiling at 10^{-4}/yr for public)
22. US Nuclear Regulatory Commission. *Safety Goals for the Operation of Nuclear Power Plants: Policy Statement*. Federal Register, August 4, 1986. 51 FR 28044. (0.1% QHO)
23. Mubayi V, Bier V. "Reevaluating the current US NRC safety goals." *Nuclear Technology*, 2020. DOI: 10.1080/00295450.2020.1775452. (Documents failure of QHOs to capture societal risk)
24. Authority for Nuclear Safety and Radiation Protection (ANVS), Netherlands. *Guidelines on the Safe Design and Operation of Nuclear Reactors*. 2020.
25. European Commission. *Complementary Climate Delegated Act (CCDA) — Nuclear and Gas Activities under EU Taxonomy Regulation (EU) 2020/852*. February 2, 2022.
26. Joint Research Centre, European Commission. *Technical Assessment of Nuclear Energy with Respect to the 'Do No Significant Harm' Criteria of Regulation (EU) 2020/852*. JRC125953, April 2021.

27. German Federal Office for Radiation Protection (BASE). *Expert Response on the Delegated Act on the Classification of Nuclear Energy under Regulation (EU) 2020/852 (EU Taxonomy)*. 2022. (Concluded DNSH criteria not met)
28. Pistner C, Englert M, Wealer B. *Does Nuclear Power Comply with the DNSH Criteria of the EU Taxonomy?* Austrian Federal Ministry, 2020. (Meta-study; identified INWORKS Lancet Haematology as undermining JRC conclusion)

IAEA and International Bodies

29. IAEA. *IRRS Mission to Canada — Final Report*. 2019. (Non-compliance findings on dose constraints for Class I facilities)
30. IAEA. *IRRS Follow-Up Mission to Canada — Final Report*. 2024. (Outstanding non-compliance confirmed)
31. IAEA. *Comparative Evaluation of Nuclear Energy System Options*. IAEA-TECDOC-2027, 2023.
32. UNSCEAR. *Sources, Effects and Risks of Ionizing Radiation: Report to the General Assembly*. 2008.

CNSC Documents Relied Upon

33. CNSC. *REGDOC-2.9.2: Servicing Canada's Nuclear Industry*. (Confirms no definitionally impermissible harm level under ALARA)
34. CNSC. *KiKK Fact Sheet*. (Misrepresentation of KiKK findings — subject of Show Stopper 15)
35. CNSC. *Tritium Fact Sheet*. (Subject of Show Stopper 15)
36. CNSC. *RD-310: Safety Analysis for Nuclear Power Plants*. (Regulatory document on safety analysis requirements)
37. CNSC. *INWORKS Study Page*. Last modified 2024-04-05. cnsc-ccsn.gc.ca/eng/resources/health/inworks-study/

Legal Authorities

38. *CARN v BWXT Nuclear Energy Canada Inc*, 2022 FC 849. (CNSC stated in open court it does not apply IAEA benefits-outweigh-harm test)
39. *Mathur v Ontario*, 2024 ONCA 762; SCC leave denied May 2025. (Government bound to act Charter-compliantly once it assumes statutory obligation)
40. *Kebaowek First Nation v Canadian Nuclear Laboratories*, 2025 FC 319. (CNSC must apply UNDRIP; consultation without FPIC inadequate)
41. *Canada (Minister of Citizenship and Immigration) v Vavilov*, 2019 SCC 65. (Unreasonable to acknowledge contradicting evidence and draw no consequence)
42. *Carter v Canada (Attorney General)*, 2015 SCC 5. (Arbitrariness, overbreadth, gross disproportionality violate Charter s.7)
43. *Bedford v Canada*, 2013 SCC 72. (Same)
44. *Energy Probe v Canada (Attorney General)*, 1989 ONCA. (Nuclear risk to public establishes Charter standing without proven harm)

Statutory Provisions

45. *Impact Assessment Act*, SC 2019, c 28, s 1. Sections 6(2), 6(3)(b), 22(1), 60-63.
46. *Nuclear Safety and Control Act*, SC 1997, c 9. Section 9 (CNSC mandate).
47. *Canadian Environmental Protection Act 2023*, s 2(1)(a.2). (Statutory right to healthy environment)
48. *Canadian Charter of Rights and Freedoms*, s 7.
49. *UN Declaration on the Rights of Indigenous Peoples* (UNDRIP), as implemented in Canadian law.
50. *International Covenant on Civil and Political Rights*, Article 4(2). (Non-derogability of the right to life)

CCS and Energy Technology

51. Global CCS Institute. *Global Status of CCS 2023*. Melbourne, 2023.
52. IEA. *CCUS in Clean Energy Transitions*. 2020.
53. IEA. *Net Zero by 2050: A Roadmap for the Global Energy Sector*. 2021.
54. IPCC AR6 Working Group III. *Mitigation of Climate Change*, Chapter 6 (Energy Systems). Cambridge University Press, 2022.

Alberta Grid and Energy Market

55. AESO. *Long-term Outlook 2023*. Alberta Electric System Operator.
56. ECCC. *National Inventory Report 2025: Greenhouse Gas Sources and Sinks in Canada*. Environment and Climate Change Canada. (Alberta grid intensity: 470 gCO2eq/kWh)

APPENDIX A — TECHNICAL NOTE: THE DEATHS/TWH METHODOLOGY AND ITS LIMITS

For scientific and technical reviewers. This appendix provides the quantitative basis for the methodology critique in Part 1.

A.1 The Source Data

The deaths-per-terawatt-hour figures widely cited in nuclear comparisons derive primarily from two sources: Markandya and Wilkinson (2007) in The Lancet, and Sovacool et al. (2016) in the Journal of Cleaner Production. These figures are aggregated and presented by Our World in Data (Ritchie, 2020) and have been adopted in the UNECE 2022 Lifecycle Assessment and multiple other international comparative studies.

The gas figure (approximately 2.8 deaths per TWh) derives from Markandya and Wilkinson's analysis of European power plant mortality from air pollution — specifically PM2.5 and NOx endpoints — calibrated to European population density and health status. The nuclear figure (approximately 0.03 deaths per TWh) derives from Sovacool et al.'s accident database divided by cumulative global nuclear production from 1965 to 2021 (approximately 96,876 TWh), with a total death attribution of approximately 4,000 deaths from Chernobyl and Fukushima combined.

A.2 What the Nuclear Figure Excludes

The nuclear deaths-per-TWh figure excludes, by construction, all of the following:

- Chronic normal-operation cancer mortality from routine permitted releases — excluded because no epidemiological surveillance system has ever been built to measure this category
- Non-cancer health endpoints including cardiovascular disease, infant mortality, and developmental effects — excluded from all nuclear mortality accounting, though the ACS/Hansen/Kharecha (2013) study noted that for nuclear power such illnesses are approximately 3 times higher than the mortality factors used
- Epigenetic and transgenerational effects documented in the 2025 IJMS study (DOI: 10.3390/ijms26052269) — no regulatory framework anywhere has attempted to quantify this category
- The temporal tail of INWORKS-identified cancer risk — the EJE November 2024 study found latency effects extending decades beyond exposure, meaning cancers attributable to operational doses continue manifesting long after facility closure; no lifecycle accounting captures this

A.3 The INWORKS Correction Factor

The CNSC's dose-risk coefficients derive from the Life Span Study (LSS) of atomic bomb survivors, applying a Dose and Dose Rate Effectiveness Factor (DDREF) of 2 to extrapolate from acute high-dose exposure to chronic low-dose exposure. The implied chronic excess relative risk (ERR) per Gy under this approach is approximately 0.185.

INWORKS 2023 found a chronic ERR of 0.52 per Gy (central estimate) for all solid cancers. At the low-dose range specifically relevant to nuclear workers and host communities (0 to 100 mGy), the INWORKS ERR rises to approximately 1.04 per Gy, consistent with an empirical DDREF of approximately 0.7 rather than 2. The CNSC risk coefficients therefore underestimate chronic low-dose cancer risk by a factor of approximately 3 to 6.

Application of the corrected ERR to nuclear operations systematically increases the chronic mortality estimate. The magnitude of that increase cannot be calculated with precision because the underlying epidemiological surveillance data does not exist — precisely the gap this submission identifies.

A.4 The Fossil Fuel Undercount Acknowledgement

Our World in Data explicitly acknowledges that its gas and coal death rates undercount actual mortality by a factor of 4 to 9, based on the gap between Markandya-Wilkinson figures and WHO/IHME global burden of disease estimates. The actual global death rate from coal-fired generation may therefore be between 93 and 224 deaths per TWh. The OWID gas figure of approximately 2.8 deaths per TWh correspondingly understates actual mortality.

The direction of this correction — upward for fossil fuels — is in the opposite direction from the nuclear correction needed. Both corrections move the comparison away from the standard narrative of nuclear being dramatically safer than gas. The corrected fossil fuel figures are at least known and bounded. The corrected nuclear figures cannot be calculated because the surveillance data does not exist.

APPENDIX B — TECHNICAL NOTE: SYSTEM CARBON INTENSITY CALCULATION

For scientific and technical reviewers. This appendix provides the quantitative basis for the system comparison in Part 2.

B.1 Input Parameters

Lifecycle carbon intensity figures are drawn from the IPCC AR5 Working Group III (2014), the UNECE Lifecycle Assessment (2022), and the NREL Lifecycle GHG Emissions study (2021).

Technology	Lifecycle gCO2eq/kWh (median)	Source
Nuclear (CANDU)	10–15	UNECE 2022; IPCC AR5
Wind (onshore)	7–11	IPCC AR5; NREL 2021
Solar PV	20–50	IPCC AR5; NREL 2021
Gas CCGT unabated	410–650	UNECE 2022
Gas CCGT + 95% CCS	70–110	UNECE 2022; IEA 2024
Gas CCGT + 99% CCS (projected)	15–25	Trajectory extrapolation

B.2 System Weighted Average Calculation

For a system supplying 4,800 MW of equivalent generation (matching the proposed nuclear capacity) using 80% renewables and 20% gas-with-CCS at 95% capture rate:

$$\text{System gCO2eq/kWh} = (0.80 \times 9) + (0.20 \times 90) = 7.2 + 18 = 25.2 \text{ gCO2eq/kWh}$$

With 99% CCS capture (projected within 30 years on current trajectory):

$$\text{System gCO2eq/kWh} = (0.80 \times 9) + (0.20 \times 20) = 7.2 + 4 = 11.2 \text{ gCO2eq/kWh}$$

Nuclear lifecycle median: 12.5 gCO2eq/kWh.

The near-term system (95% CCS) produces approximately twice nuclear's carbon footprint. The projected system (99% CCS within the facility's operating life) is essentially equivalent. Neither figure accounts for the harm distribution difference — nuclear harm concentrated on Peace River versus gas harm distributed globally.

APPENDIX C — TECHNICAL NOTE: CCS TECHNOLOGY LEARNING CURVE

For scientific and technical reviewers. This appendix provides the evidentiary basis for the technology trajectory argument in Part 3.

C.1 Demonstrated CCS Performance Milestones

- Sleipner (Norway, operational 1996): geological CO2 storage in saline aquifer, 1 Mt/year, demonstrating long-term viability of storage
- Boundary Dam (Saskatchewan, 2014): first post-combustion CCS on coal-fired power; design capture 90%, reported operational average 40–60% — a cautionary case on the gap between design and operation
- Quest (Alberta, 2015): Shell oil sands CCS, 1 Mt/year CO2 captured and stored; demonstrated that large-scale capture is operationally achievable in Canadian conditions
- Sleipner and Illinois (pure CO2 streams): 95–96% capture demonstrated — noting that these process pure industrial CO2 rather than flue gas, which is more concentrated and easier to capture
- Second-generation post-combustion and oxyfuel pilot systems (2020–2025): 98–99% capture demonstrated at pilot scale

C.2 Learning Rate and Projection

Technology learning rates for CCS are documented in IEA (2020), IPCC AR6, and the Global CCS Institute (2023). Post-combustion capture costs have declined approximately 30 to 50 percent from early commercial systems to current deployments. Capture efficiency has improved from approximately 70 percent to 85 to 95 percent operational over the same period.

The proposed facility has a 60-year operating licence — approximately 2026 to 2086. The CCS technology learning curve on current trajectory projects 99 percent capture becoming commercially available within 20 to 30 years, placing it within the first half of the proposed facility's operating life. This is a projection, not a certainty. The Panel should require the proponent to model this trajectory and its sensitivity to different assumptions, using the same rigour applied to its nuclear construction cost and operational life assumptions.

C.3 Methane Leakage

The lifecycle carbon intensity of gas-plus-CCS depends on the methane leakage rate across the supply chain. Methane is a potent greenhouse gas — approximately 80 times more warming than CO2 over a 20-year timeframe. A methane leakage rate of 1 percent from wellhead to combustion increases the effective lifecycle carbon intensity of gas-fired generation by approximately 50 gCO2eq/kWh on a 20-year basis.

Canadian natural gas has among the lowest documented leakage rates globally — approximately 0.8 to 1.2 percent. Alberta's regulatory framework for methane emissions is among the most stringent in North America. The IEA (2024) Lifecycle Emission Factors database uses a Canadian-specific leakage figure of approximately 1 percent for upstream gas production. The system calculation in Appendix B uses this figure.

APPENDIX D — INTERNATIONAL REGULATORY FRAMEWORK COMPARISON

Comparative table of nuclear harm tolerance frameworks across key jurisdictions.

Jurisdiction	Hard ceiling on public risk	ALARP / ALARA zone	Chronic normal operation covered?	Comparative alternatives required?
UK (HSE/ONR)	10^{-4}/yr for public (intolerable ceiling)	ALARP between 10^{-6} and 10^{-4}	NO — applies to accident risk only	Not required
USA (NRC)	0.1% of background cancer risk (QHO)	ALARA below QHO threshold	NO — accident scenarios only	NEPA alternatives analysis required but not harm-quantified
Netherlands (ANVS)	10^{-6}/yr individual risk (intolerable above 10^{-4})	ALARA between thresholds	NO — probabilistic accident risk	Environmental assessment required
Finland (STUK)	0.1 mSv/yr government-set dose limit	ALARA standard applies	NO — dose compliance only	Not required
EU (Taxonomy DNSH)	Do No Significant Harm criteria	No equivalent ALARP structure	Partially — BASE found criteria unmet	LCA comparison required; acknowledged incomplete
Canada (CNSC)	NO hard ceiling — ALARA only	ALARA at all times	NO — dose compliance only	Not required; proponent has not provided one

The table above confirms that the CNSC is not an outlier in failing to cover chronic normal-operation community health — no jurisdiction does.

The CNSC is an outlier in having no hard intolerable ceiling for public risk and in not requiring the proponent to submit a comparative harm analysis. The CNSC's framework is the weakest of any jurisdiction examined.

APPENDIX E — THE SIX STUDIES AND THEIR REGULATORY IMPLICATIONS

Cross-reference to Show Stopper 15. Summarises the six studies and their specific implications for the harm quantum framework argument.

E.1 The Six Studies

- **Study 1 — INWORKS Haematological (Lancet Haematology, August 2024. DOI: 10.1016/S2352-3026(24)00240-0):** Strong evidence of positive associations between protracted low-dose radiation exposure and excess leukaemia in nuclear workers. Implications for harm quantum: the CNSC's leukaemia risk coefficients derived from acute-dose LSS data underestimate chronic low-dose risk. Any harm quantum model using CNSC coefficients for haematological malignancy is systematically low.
- **Study 2 — INWORKS Temporal (EJE, November 2024. DOI: 10.1007/s10654-024-01178-6):** Cancer risk persists and manifests decades after the period of radiation exposure. Implications: lifecycle nuclear harm extends beyond operational decommissioning; no existing regulatory framework captures the temporal tail of harm; 60-year operating life assessments undercount by excluding post-closure latent cancers.
- **Study 3 — INWORKS Site-Specific and Low-Dose Slope (AJE, May 2025. DOI: 10.1093/aje/kwae256):** Elevated cancer risk at very low dose ranges specifically, with ERR approximately 1.04/Gy at 0–100 mGy. This is the dose range directly relevant to Peace River community exposures from routine permitted releases. The CNSC's implied ERR of 0.185/Gy is 3 to 6 times lower.
- **Study 4 — Harvard Massachusetts Cancer Incidence (Environmental Health, December 2025, Alwadi, Koutrakis et al.):** Elevated cancer incidence in communities near nuclear facilities in Massachusetts. First direct US epidemiological confirmation of the pattern found in European studies including KiKK.
- **Study 5 — Harvard National Cancer Mortality (Nature Communications, February 2026. DOI: 10.1038/s41467-026-69285-4):** Approximately 6,400 excess cancer deaths per year attributable to proximity to nuclear facilities across the United States, with the proximity effect extending to 30 kilometres. Peace River is within the 30-kilometre radius from the proposed site. This is the most directly applicable study to the proposed facility's specific harm profile.
- **Study 6 — Epigenetic Transgenerational (IJMS, March 2025. DOI: 10.3390/ijms26052269):** Heritable epigenetic alterations found in populations near nuclear facilities. Implications: nuclear harm extends to generations not yet born; no regulatory framework anywhere has attempted to quantify or include this category; a harm quantum model that excludes transgenerational harm systematically understates nuclear's total harm burden.

E.2 The CNSC Response

The CNSC has not updated any methodology, issued any health advisory, or conducted any retrospective assessment in response to any of the six studies listed above. Its ALARA framework, its dose-risk coefficients, its monitoring requirements, and its contribution to the IAAC process all predate these findings and have not been revised to reflect them.

This is not a regulatory body that has considered the evidence and disagrees. This is a regulatory body that has not responded at all.