Summary Commentary on Government Assessment of Radionuclides as CMCs

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Part 1: Purpose of Evaluation

In 2016 and again in 2022, one hundred and ten environmental, health and other advocacy groups nominated radionuclides to be named Chemicals of Mutual Concern (CMCs) under the Great Lakes Water Quality Agreement (GLWQA).

In June 2025, the Annex 3 co-leads from the Canada Water Agency and the United States Environmental Protection Agency recommended to the Great Lakes Executive Committee (GLEC) that radionuclides **not** be passed on from the "initial screening" stage and instead should be removed from further consideration of being designated as CMCs.

Our review of the two initial reports[1] that the Annex 3 co-leads gave to GLEC indicate that there are some serious flaws in the governments' evaluations and, therefore, do not justify removing radionuclides from further consideration for CMC status.

Instead, we conclude that radionuclides should be sent to the next stage in the process, i.e., a "detailed screening and Binational Summary Report" followed by a recommendation on whether to designate radionuclides. At that point the report and recommendation would go out for "formal public consultation" before the governments make a final decision.

[1] "State of Radionuclides in the Great Lakes: A review of the findings of the criteria-based screening for radionuclides" June presentation to GLEC; and Summary of Binational Screening Criteria for Nominated Chemicals of Mutual Concern Under Annex 3 of the Great Lakes Water Quality Agreement: Radionuclides (Updated Draft May 21, 2025)

In this evaluation we report on some of our major areas of concern with the governments ' initial screening reports.

Part 2: Bases for our Evaluation[2]

Chemicals of Mutual Concern (CMCs) are instruments unique to the Great Lakes Water Quality Agreement 2012 (GLWQA). This means that the principles and commitments in the GLWQA are the ones that the Canadian and United States governments should use when determining the appropriateness of designating CMCs and when taking actions on CMCs. [for more detail, see attached paper "Chemicals of Mutual Concern and the Great Lakes Water Quality Agreement" by John Jackson.]

These are the principles and commitments in the Agreement that we have used to assess the governments' "initial screening." These include:

- The ecosystem approach
- Precaution
- Prevention ("anticipating and preventing")
- Sustainability
- And public engagement

Annex 3 of the GLWQA, which is on CMCs, says "the Parties shall mutually determine those chemicals that are **potentially harmful** to human health of the environment…[bolding added].

These forward-looking criteria are even more important because of the special nature of some radionuclides, which have very serious immediate, long-term and intergenerational effects on human and non-human health.

[2] For detail on the relevant commitments in the GLWQA related to CMCs, see attached John Jackson, "Chemicals of Mutual Concern & the GLWQA", August 31, 2025.

Also, there is no level of radionuclides below which exposure can be defined as "safe;" therefore, very low levels of exposure can be significant.

The Great Lakes have characteristics that make them particularly susceptible to persistent toxic substances. The Great Lakes have long retention times. Lake Superior has a retention time of 182 years; Lake Michigan 106 years; Lake Huron 21 years, and lakes Erie and Ontario of just over 2 years. This means that toxic substances stay within the Great Lakes for longer periods of time and accumulate in the system – especially if they are substances that are persistent, i.e., have long lives before they break down. The Canadian agency responsible for managing used fuel bundle wastes (the Nuclear Waste Management Organization) has concluded that it takes a million years for the radioactivity from nuclear power plants waste fuel bundles to become comparable to the radioactivity from a natural ore deposit.[3]

As some radionuclides persist for extremely long periods of time, this means that the protective measures will need to be different in the Great Lakes than in an ecosystem with different characteristics.

Part 3: Large gaps in our understanding of radionuclide emissions on public health: the current need for more data and greater health protection

Cindy Folkers and Mary Olson prepared our critique of the health aspects of the governments' reports. Here is the summary of their report. Read their entire attached report "Large Gaps in our understanding of radionuclides emissions on public health: the current need for more data and greater health protection" for more detail and for the sources of their information.

Adequate measures are NOT being implemented through existing radiation regulations to fully protect public health, contrary to public claims made by agency staff (Parties) and industry.

[3] Nuclear Waste Management Organization, Choosing a Way Forward: The Future Management of Canada's Used Nuclear Fuel, 2005, p. 341.

Large research **gaps** in our current understanding of radionuclide harms include:

- **Internal Exposures:** There is lack of appropriate data, and use of existing data, to determine damage from internally deposited radioisotopes (those inhaled or ingested into the body). We need proper and complete understanding of environmental pathways and proper monitoring for the purpose of assessing potential and actual internal exposures.
- **Disproportionate Impacts:** We need more complete assessment of, and accounting for, disproportionate impacts on females, children, and pregnancy.
- **Non Cancer vs Cancer:** We need more complete assessment of, and accounting for, cancer AND non cancer disease outcomes.

Our lack of understanding in these fundamental areas necessitates further research on radionuclides, and a CMC designation for radionuclides would support this need – especially acute in light of the fact that both Canada and the US have purposefully decided NOT to continue health studies that would have shed light on the lived experiences and impacts of radionuclide exposure on human health.

Despite finding increases in several diseases in the Port Hope, Ontario area (e.g. cancers, neurological, cardiovascular, and respiratory) CNSC and Health Canada concluded no further health studies were necessary. The industry continues to operate there, and is planning to locate and fast track the largest nuclear power facility in the world, on the northern shore of Lake Ontario.

The US Nuclear Regulatory Commission (NRC) had tasked the National Academy of Sciences (NAS) to conduct a study that would have examined increases of childhood cancer around NRC-licensed facilities, but then withdrew funding. The US is also trying to rewrite regulations to fast track nuclear power technology nationwide and revivify closed reactors along the Great Lakes.

In both instances, more as yet unknown and unquantified radioactive substances will be discharged into and over Lake Ontario and the Great Lakes system.

Both of these agencies appear to be ignoring data on health impacts, instead opting for reliance on their radiation exposure standards as being "safe enough". Such reliance refuses to integrate new health data that, if implemented, could increase public and environmental protection. Instead, we are left with models and regulations that only partially represent potential risks (see LNT section below).

These actions on the part of our federal agencies reveal why a designation of CMC for radionuclides is imperative and long overdue. Clearly without such designation, respective country agencies are content to leave a wide swath of public health impacts unknown and unaccounted for, even while nuclear industries remain operational.

At the same time these agencies contend that "current actions are adequate, in *Summary of Binational Screening Criteria for Nominated Chemicals of Mutual Concern under Annex 3 of the Great Lakes Water Quality Agreement: Radionuclides*, the agencies recognize gaps in knowledge, including lack of guidelines for all relevant radionuclide/matrix combinations; and ecosystem science including ecological receptors. A designation of CMC would provide resources to close these knowledge gaps, and "opportunity to improve consistency in data", which at least the Canadian agencies claim as a goal.

[End of quote from Folkers and Olson report.]

Part 4: Serious Flaws in the Nuclear Regulatory System

One of the criteria that the governments set for deciding on whether designation as CMCs was needed was how well the governments manage radionuclides. In their management evaluation, the governments pose two questions: "Are programs and management actions for the chemical substance currently in place? " Their finding: "Yes, there is significant oversight and regulation by numerous committees and government agencies."

The next question is “Are current actions adequate, and/or do gaps exist?” Here they conclude “Yes, current actions are adequate.” They do go on to say that there are some gaps, but despite that they state no need to designate radionuclides as CMCs (slide 18 in “State of Radionuclides in the Great Lakes”.]

In her attached paper “**Adequacy of the Governance Framework for Canadian Nuclear Regulatory Oversight in the Great Lakes”,** Theresa McClenaghan summarizes the situation as follows:

“The US and Canadian approach to evaluate criteria on management actions on radionuclides is extremely limited in scope and fails to take into consideration key factors that show that the government regulators are in a situation of regulatory capture by the nuclear industry. To effectively evaluate government actions on radionuclides as a criterion for screening, the following needs to be considered. Without consideration of these factors, the quality of the evaluation on radionuclides as a candidate CMC diminishes considerably as it ignores the challenges and threats associated with radionuclides and the nuclear operations across the Great Lakes Basin. “

Speaking from the Canadian experience, she goes on to say:

“Here are a few key reasons that demonstrate the evaluation of government actions on radionuclides needs to be reconsidered:

- Government departments do not work independently from the nuclear safety agencies
- Several in-depth reviews conducted on nuclear safety indicate that regulators should be separated from promotion of the industry
- The absence of separating the regulatory body from promotional activities for the industry can lead to catastrophic results
- Evidence that regulatory agencies support the needs and demands of the regulated industry, while not addressing concerns by civil society.”

She provides evidence for these statements and explains the significance of this situation in her attached paper.

Michael Keegan in his attached commentary shows examples of similar problems in the U.S.

In the governments' initial screening reports, in the U.S. section, the report states: "Continued availability of detailed information on U.S. nuclear power plants' releases and environmental monitoring assumes a lack of disruption to the existing federal regulatory framework" [Section 6.2.2 page 111].

That "disruption" is already proving to be true. In his paper, Michael Keegan describes an Executive Order signed on May 23rd 2025.

"Collectively, the four orders that focused on the nuclear sector would:

- reduce and undermine the already inadequate safety oversight authority of the US Nuclear Regulatory Commission (NRC);
- fast-track unproven new reactor projects without regard for safety, health or environmental impacts;
- curtail or possibly even end public intervention;
- weaken already insufficient radiation exposure standards; and
- reopen the pathway between the civil and military sectors."

There are strong indications of expansion of the nuclear industry in the Great Lakes basin. Canada's statement in their initial screening report says that "Releases are expected to continue to be small and well below regulatory limits. Adequate provisions have been made through existing regulatory mechanisms for the protection of Canadians from exposure to radionuclide releases, including tritium [section 2.2.1 p. 46]." The U.S. response is more cautious: "It is possible that releases will increase in the future. There is the possibility for increased interest in nuclear power use in the U.S. If new facilities are licensed and their effluents remain well below U.S. NRC dose limits, and their environmental monitoring does not show contamination, then the amount of radionuclides released during operations may remain low. However, storage of spent nuclear fuel remains a challenge for the foreseeable future, with the potential for compromised storage" [section 2.2.2 p. 48].

In her attached paper, Theresa McClenaghan is concerned about the future and states: “More substantial resources and focus are needed to examine the adequacy of the current regulatory framework associated with these current and future nuclear activities and in terms of including consideration of the impacts to the environment and health in the Great Lakes. “

Again, the governments have failed in their initial screening because of their failure to follow the GLWQA’s guidance to look to the future and to take a precautionary approach..

PART 5: What about Unexpected or Catastrophic Events?[4]

The governments do not address the potential for unexpected or catastrophic events involving radionuclides. They seem to work on the assumption that their regulatory systems and their standards are so good that they will even cover the unexpected.

Brian Ahier and Tracy Bliss dismiss the government downplaying of the potential for accidents:

> “Comprising one of the world’s largest sources of freshwater and supporting a population of over 36 million residents, the basin is unique in that it contains nearly all components of the nuclear fuel cycle, from uranium mining to radioactive waste management... As a result of the large inventories of radioactive material at these facilities, there is a potential for a significant accidental release of radionuclides into the environment. Although the probability of such an occurrence is extremely small, the health, social, and economic consequences could be significant.[5]

[4] See Barry Boyer for more detail and examples than in this summary.
[5] Brian A. Ahier & Bliss L. Tracy, “Radionuclides in the Great Lakes Basin,” Environmental Health Perspectives, Vol 103, Supplement 9, December 1995, p. 89.

Barry Boyer states in his attached paper "Unexpected and Catastrophic Events" that "it is shortsighted and self-defeating to focus only on current routine releases of radionuclides while ignoring the risks of plausible but low probability catastrophic releases." To do this is also contrary to the words in the GLWQA, which should guide the governments' actions on CMCs. The GLWQA uses words and phrases like "environmental threats", "anticipate and prevent environmental problems."

Boyer gives many examples of catastrophic events and near-catastrophic events. And he points out that the uncertainties that can lead to unexpected events may be increased because "with many vectors of change and instability in play, our nations' ability to control radionuclides for generations to come needs to be analyzed rather than assumed."

The expansion of the nuclear industry in the Great Lakes basin also increases the probability for accidents. For example, there is currently a proposal to deposit all of Canada's high-level nuclear fuel waste in northwestern Ontario near Revell. Brennain Lloyd of Northwatch and We the Nuclear Free North states that this would "involve 2-3 shipments per day for more than 50 years, with each truck hauling 35 tonnes of radioactive waste per trip. Over 90% of the shipments will come from Southern Ontario, averaging 1,700 km per trip, with most of those kilometres travelled on the poorly maintained and mostly 2-lane roads of northeastern and northwestern Ontario." See the attached "Nuclear Waste Transportation: Backgrounder."

Part 6: Transboundary Impacts

One of the criteria that the governments use in determining whether a substance should be a CMC is whether it is of mutual concern to both Canada and the U.S. In their initial screening, the governments conclude that "contamination is not lakewide or multi-lake" and that there is "no potential to cause binational transboundary impacts." Their reports justify this conclusion by saying that "there is no evidence of levels that are a concern from a

lakewide or multi-lake perspective" and in terms of potential to be a problem in the future they conclude that "there is no evidence of levels [or] that these levels have the potential to cause transboundary impacts.

There are many nuclear-related facilities around the Great Lakes Basin, usually near the shoreline, which results in continuing on-going regular discharges into the lakes as well as a high probability of accidents that release higher amounts of radionuclides. These include a range of operating and closed facilities in each case: nuclear power plants, mining and mill tailings, nuclear fuel waste storage, uranium processing and fuel fabrication facilities. These are on the Great Lakes Region Nuclear Facilities map that the governments showed in their initial screening presentation to GLEC at the beginning of June[6]. Also, this cluster of facilities near the shores of the Great Lakes means a high likelihood of radioactive materials and equipment being transported on the lakes or across the rivers that connect the Great Lakes, with the potential for spills during transportation and loading and unloading.

The long retention times of the Great Lakes make them particularly susceptible to persistent toxic substances. Even though the retention time is long, it doesn't mean that the waters aren't moving. They are constantly moving around the Great Lakes and especially near the shorelines where they travel across political boundaries. Also, there are emissions into the air which can travel long distances. This is especially true if there is an accident.

As some radionuclides persist for extremely long periods of time, this means that there is likely to be a build-up in the waters, sediments and biota. The governments initial screening says that there is "no evidence of levels of concern." The question here is whether we have set the levels of concern low enough to protect life in the Great Lakes basin for the long-term. The question also is whether we are carrying out the proper monitoring methods.

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[6] This map was prepared in 2013 by the Citizens' Clearinghouse on Waste Management and Great Lakes United.

Again, using the GLWQA principles and guidelines, the governments' conclusion that there is no "binational significance" is not valid.

Part 7: Summary

Our assessment has shown that the governments' initial screening reports do not justify dropping radionuclides from further consideration as CMCs. Their judgements reflect a failure to use the GLWQA as their guide. CMCs are instruments unique to the GLWQA. This means that the principles and commitments in the GLWQA are the ones that the Canadian and United States governments should use when determining the appropriateness of designating CMCs and when taking actions on CMCs.

The major flaw in the governments' analysis is their focus on the present situation, which they see as being taken care of adequately by government agencies and committees (despite the fact that there is strong disagreement with that in many quarters), and dismissal of the potential for differing or growing impacts in the future. Even while admitting gaps, the government reports display overwhelming and unjustified confidence.

The regulatory agencies show a lack of respect for the public, even though the GLWQA emphasizes the involvement of the public. In response to the application by 110 groups to have radionuclides designated as CMCs, the U.S. Nuclear Regulatory Commission stated the following on page 1 of their January 2017 "Recommendation that Radionuclides Not Be Listed as Chemicals of Mutual Concern Under the Great Lakes Water Quality Agreement":

> "Designating radionuclides as chemicals of mutual concern will unnecessarily increase regulatory burden without a commensurate increase in safety or environmental protection. In addition, the change in designation may unnecessarily increase public concerns by implying that current regulations are not protecting public health, safety and the environment."

Since 2012 when the CMC designation was put into the GLWQA, only 8 substances have been designated? Are there really only 8 substances that the public should be concerned about in the Great Lakes?

Is it appropriate to avoid increasing public concerns?

Isn't it worse to put the public at ease when there is evidence of problems?

Part 8: Our Recommendation:

We conclude that radionuclides should be sent to the next stage in the process, i.e., a "detailed screening and Binational Summary Report" followed by a recommendation on whether to designate radionuclides. At that point the report and recommendation would go out for "formal public consultation" before the governments make a final decision.