

Critique re CNSC Guidance on Deep Geological Repository Site Characterization

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INTRODUCTION

This submission identifies various passages within this Canadian Nuclear Safety Commission (CNSC) draft document for *Guidance on Deep Geological Repository Site Characterization* that require more clarification and, overall, suggest that much more regulatory rigour is needed, which can be influenced by the language used by CNSC guidance. What are some ways that the CNSC could be more helpful to ensure safety and health now and in the future? See my first suggestion in the next section.

Furthermore, as a concerned citizen engaged with the regulatory processes directed to two proposed deep geologic repositories (DGRs) through the past six years, why cannot an 'ecosystem approach' be recognized? This more advanced regulatory vision is named and recognized by the International Commission for Radiological Protection (ICRP), the latter fully honest that this approach requires continuing development.

Rather than cite selected passages in this guidance draft chronologically, I instead will do so based upon my series of sub-headings below. Any referenced page numbers will refer to the bottom of each printed page of the draft document rather than PDF pages.

ONTARIO'S RECENT SETBACKS IN ENVIRONMENTAL PROTECTION

Foremost on my mind at this political moment is the ill-informed trajectory of Ontario Premier Doug Ford's reduction, even elimination, of a range of significant programs and government roles across several sectors from education to culture and the environment. We have not seen such politically – and ecologically - backward thinking in Ontario - and subsequent undermining of human and environmental well-being - since the days of former Premier Mike Harris.

For example, Premier Ford seeks to terminate the position of Ontario's Environmental Commissioner. What related environmental regulations also might be reduced or removed as well, most particularly those which pertain to nuclear energy?

Under this CNSC draft's section **1.3 Relevant legislation**, on page 2, it states:

*"The Nuclear Safety and Control Act (NSCA) applies once site preparation activities begin. Accordingly, **it is important to be aware of legislation other than the NSCA, such as provincial laws, that might apply to site characterization activity.**[my bold] ..."*

Given the role of the CNSC, in part: “to protect the health, safety and security of Canadians and the environment,” I urge the CNSC to work with both Natural Resources Canada and the Environmental and Climate Change Canada ministries to do everything necessary, using current federal legislation – and also creating new federal legislation if necessary – to ensure that neither Ontario nor any other province can reduce or remove legislation provincially for which currently existing regulations have been created specifically to ensure safety of human life and the environment, as related to any nuclear energy projects, past, present and future.

Meanwhile, regarding one example of vagueness throughout this CNSC draft, it states:

“Other regulators will have jurisdiction over activities carried out for site characterization before the site is selected and before an applicant engages in activities that would require a licence from the CNSC.”

This draft would have been much more helpful to citizens who want to participate more fully in publicly expressing their concerns if the CNSC had specifically identified each and every of the related regulators, both provincial and federal.

For more citizens to become engaged in these regulatory processes, please do not assume that everyone is equipped with knowledge about all of the political levels of players, in order for citizens, in turn, be sufficiently aware to whom they can voice their concerns as well as communicate their own special expertise.

WHY NO EXPLICIT NAMING OF `ENVIRONMENTAL IMPACT STATEMENT`?

Again, as per the lack of specific identifiers in sections of this draft, you do outline, within section **2. Overview of Siting Process**, four specific stages yet omit the original identifier which encompassed them – namely, the `Environmental Impact Statement (EIS)`. On page 3, you even point out that the International Atomic Energy Agency (IAEA) identifies four stages. But why is naming the EIS now omitted, at the same time that you identify four stages in the siting process? This CNSC draft names them as follows: Conceptual and planning stage; Survey stage; Site characterization stage; and Site confirmation stage, on page 4.

These four stages are outlined in a table titled “Figure 2. The Process of Environmental Impact Assessment for a Geological Repository,” in what probably is a 1999 paper (but the date is missing) archived online by the IAEA. The latter paper is authored by two professors in the Department of Geography at the University of Guelph, Ontario.¹

The important point is that EIS guidelines have been pertinent to guide the proponent Ontario Power Generation (OPG) for its licence application to construct a DGR for low and intermediate level radioactive waste. Yet OPG’s failure to demonstrate due

¹ www.iaea.org/inis/collection/NCL/CollectionStore/_Public/31/016/31016477.pdf

diligence in its EIS and related responses caused repeated requests from the Joint Review Panel at the two OPG DGR public hearings in 2013 and 2014, respectively. Since then requests from the Saugeen Ojibwa Nation (SON) for further information from OPG has caused delay on the final decision regarding whether what is known as ‘DGR1’ will go forward at all.

IMPORTANCE FOR MORE CLARITY IN YOUR GUIDANCE

I understand that this draft document is to provide “guidance” to create better regulations. Even so, I find the CNSC tendency to use the verb “may” instead of “ought to” or “strongly advocate” very weak and allowing too much interpretative leeway.

For example, on page 1, the bottom paragraph acknowledges that “site characterization activities will begin before CNSC’s regulatory process,” and then adds: “the methods and processes that are used and the data that are collected **may form part of future licence applications** and will be formally reviewed for quality and adequacy. For clarity to ensure due diligence by a proponent, why not stipulate “**will form**”? [my bold and my italics]

There are other similar examples of language in the draft document, when vague, and potentially interpreted to give too much lenience to proponents who could feel obliged only to comply with minimum requirements, spelled out in follow-up regulations.

One further example is confusing and I recommend that you rewrite or remove it, on page 3, in reference to baseline information:

*“The data gathered in the preliminary stages of the siting process **may** form part of the initial licence application and part of the safety case. Information gathered at this stage **may** be used as baseline information to support the demonstration of safety throughout the lifecycle of the DGR facility.”* [my bold]

The reason is that the CNSC draft does, in fact, clearly spell out the vital importance of ‘baseline information’ on pages 5 and 8, noting that such initial data does impact upon the entire trajectory of a project from site characterization through to mapping cumulative effects. Here is a quote from my 2014 OPG DGR public hearing oral presentation and power point:

*“A majority of interviewees believe that monitoring change to aquatic and landscape environments at project and watershed scales facilitates scientifically rigorous cumulative impact predictions, **but that the CEA baselines, indicators and thresholds necessary to do so are rarely available.**”²* [my bold]

² “Institutional considerations in watershed cumulative effects assessments and management,” *IAIA, Vol.31, No.1, March 2013, p.74-84*

Also reassuring in the third paragraph of the CNSC draft document, on page 5, is the statement, under section **3. Site Characterization Program**:

“Data needs [to] include relevant regional-and site-scale information.”

What would be even better, again for more clarity, is to elaborate on what the requirement of “regional scale” information actually includes. A further description in the final CNSC guidance document would demonstrate that CNSC is aware of the wider geographic impact of a future deep geological repository. This would be a substantial improvement on the very limited circumscribed boundaries for the DGR being proposed for low- and intermediate-level radioactive waste near the shore line of Lake Huron. The EIS for that project only required local and site-specific studies, considered to be one of the major flaws in OPG’s EIS. The flaw, however, originated in the regulation mandated, which influenced the liberties taken in OPG’s incomplete data.

A fuller description would indicate that the CNSC is more in step with various research published a number of years ago in several journal editions of ***Impact Assessment and Project Appraisal***, two more excerpts cited in my 2014 OPG DGR presentation:

“In Canada, there is now a collective understanding that EA must go beyond the evaluation of site-specific direct and indirect project impacts to include issues of broader regional cumulative and higher-tiered policy, plan, and program (PPP) development significance.”³

“The Auditor General’s fourth review of SEA [Strategic Environmental Assessment] practice in Canada reported the SEA directive has yet to be consistently applied across federal departments and agencies, and that SEA has not been undertaken for some proposals where significant environmental effects could result.”⁴

As for the Strategic Environmental Assessment quote, I include it here because one of the most offensive failures of the OPG DGR hearings as well as the final Joint Review Panel report was to conclude that no significant environmental effects could be identified. But the types of studies done were sorely inadequate to make any viable factual determination.

For starters, the Canadian Environmental Assessment Agency did not even provide a definition of “significant environmental effects,” which left the door wide open to ignore it and/or minimize the possibilities.

More honesty would communicate the unspeakable truth that one or more major accidents, or yet unknown climate events, or other emergency situation could enable massive radionuclide releases into watersheds, the Great Lakes system and the air far beyond the DGR location. And those possibilities are aside from eventual corrosion of containers at some unknown future date; henceforth, environmental contamination.

³ (Dube, 2003; Duinker and Grieg, 2006; Harrison and Noble, 2008) cited in *IAIA, 27 (4), December 2009, pages 258-270*

⁴ (Auditor-General of Canada 2008) cited in *IAIA, Vol.30, No.3, September 2012, pages 139-147*

THE IMPERATIVE TO KNOW RADIOACTIVE WASTE CHARACTERISTICS

At the bottom of page 4 in the CNSC guidance draft, it reads that “a final safety assessment” is required to include data on “radioactive waste characteristics,” in order “to develop the safety case that will be submitted in the initial licence application.”

I applaud this inclusion. However, again, more details about what this characterization data will tell us would clarify this statement. Is such characterization limited to naming the range of radionuclides in the fuel bundles, or does the characterization go further to reveal how various exposures could impact on humans as well as other species and environmental media (sediment, water and air)? I do read, on page 9, under **3.2.2 Aquatic and terrestrial environment**: “consideration is to be given to both radiological and non-radiological aspects of a given medium, e.g. soil quality.

Such studies are still in early years, according to the International Commission for Radiological Protection (ICRP), to determine the multiple ways that each and every radionuclide could impact different organisms and, moreover, various organs within a single species. The challenge is tremendous, and it may be humanly impossible to ever fully comprehend the effects. Nevertheless, of course, we must keep trying to do so.

The lack of this knowledge internationally, nevertheless, and the huge task of research still ahead, remains one of the foremost reasons why I do not support the pursuit of giving licences for DGRs in Canada, because I consider them still to be an experiment, regardless of how many decades the conceptual designs have existed.

The ICRP continues to develop its initiatives as per ‘radiological protection of the environment,’ most recently by integrating human and environmental protection frameworks. But this continuing project is much too complex to explain here, except to say that there are multiple layers of research to investigate through many years to come. The European Radioecology Alliance (Alliance) similarly is engaged in ongoing research. One of its papers published in 2017 ICRP Proceedings, for example, explores “Radiosensitivity and transgenerational effects in non-human species,” and points out: “Differences in radiation sensitivity across species and phyla are poorly understood” – indeed, as are a multitude of other environmental factors.

As for the CNSC draft guideline, it is encouraging to see, on page 7, this due diligence:

“Any process that can be shown to demonstrate the potential for radionuclide migration or retardation from the DGR engineered facility through the geological environment should be documented.”

THE LIMITS OF HOW TECHNICAL ASPIRATIONS CAN BE RESOLUTIONS

Meanwhile, under section **3.2 Site characteristics II: surface environment**, the CNSC draft guideline suggests, on page 8:

“Baseline environmental data is needed to ensure that the environment will be adequately protected and any potentially adverse effects mitigated.”

But, once again, this technologic focus and unjustifiable assumption about what future technological mitigation can accomplish is nothing less than human hubris. Similarly:

“The site area climate should be characterized in such a way that the effect of unexpected extreme meteorological conditions can be adequately identified and considered in the design of the DGR facility. ...”

“Climate normal data (30 years of climate data) should also be included.”

But we are no longer living in what formerly was considered to be normal and predictable seasonal patterns, and believing we can know everything important to know, for example, regarding global hydrological patterns and other natural phenomena. And who can know what may befall us in the coming years.

The planetary life support system is at a tipping point. Large percentages of species are disappearing, while the large majority of the human population mindlessly carries on business as usual, and I refer to those people who ought to know better but prefer to remain in denial because their fear of losing what is familiar blinds them to the imperative for societal transformation. The oil and gas sector, and its thousands of workers in Alberta, sadly, are a case in point.

In reference again to the subsequent sections in the CNSC draft guideline, such as **3.2.2 Aquatic and terrestrial environment** on page 9, despite the gallant effort by CNSC to try and identify environmental species and elements inclusively that potentially could be effected, our planetary dilemma at this historic moment tosses a huge wrench into how accurately we can address the dynamics of the environment even if an ecosystem approach authentically were attempted. Climate change is the wild card that transcends characterization.

For example, one aspect of site characterization is the identification of ‘Valued Ecosystem Components (VECs)’ “that will be used as environmental assessment end points.” But, climate change, most especially in far-reaching extreme weather events, can alter populations, migrations, interactions across various species, organisms and environmental media (sediment, water, air). Similarly, yet unknown alterations can happen to drainage systems, such as stream, lake, pond and wetland networks, as outlined under section **3.2.3 Topography, hydrology and flooding**.

‘Webinar on Great Lakes Coastal Wetlands: How Do We Reverse the Trends to Achieve Net Habitat Gain?’, online December 19th, 2018 - hosted by the International Joint Commission on the Great Lakes subcommittees – pointed out, even aside from climate change, given the constant flux of the natural world: “Establishing a baseline map of wetland type and extent is challenging because the wetlands are dynamic both seasonally and interannually... Each map has limitations due to types of imagery and

timing of imagery, and all are static conditions at a given point of time.” This example illustrates how our human tools such as computer models, etc. are inherently different from in their applications from the actual continual fluctuations of the natural world.

My closing here is premature due to an unidentifiable computer glitch that I cannot undo, which changed the colour of my font and added an underline which I cannot delete.

To sum up so abruptly, with apologies, given the pending deadline, I simply would like to emphasize that our human assumptions and worrisome dependability upon technology as the panacea for the planetary challenges we confront today and in the future is misguided, most specifically as related to the pursuit of deep geological repositories for radioactive waste.