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In the Matter of

À l'égard de

**Regulatory Oversight Report for Canadian  
Nuclear Power Generating Sites: 2017**

**Rapport de surveillance réglementaire des  
sites de centrales nucléaires au Canada : 2017**

Commission Meeting

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**Le 8 novembre 2018**

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# **Critique of CNSC Regulatory Oversight Report: 2017**

by Dr. Sandy Greer, submitted October 2018

## **Introduction**

This brief critique will focus on the responses from the Canadian Nuclear Safety Commission (CNSC) to OPG's activities at the Bruce Power site. More specifically, my critique relates to CNSC's responses regarding OPG's spent fuel and radioactive waste management at the Western Waste Management Facility (WWMF) as well as OPG's preparations for the proposed deep geological repository for low-and-intermediate radioactive waste (DGR1) near the shoreline of Lake Huron.

The chosen focus is based upon my continuing concern about the lack of due diligence by OPG, as witnessed initially at the two public hearings for the proposed DGR1, and since then, as documented on the Canadian Environmental Assessment Agency's website on the 'Deep Geologic Repository Project for Low and Intermediate Level Radioactive Waste.'

My conclusion is that both the CNSC and also the CEAA (federal act) regulations currently in force – as well as the first draft of the revised federal act, now named the Impact Assessment Act – are not sufficiently rigorous in regard to what is demanded from proponents in the nuclear industry, such as OPG – prior to licencing facilities whose purpose will be the long term storage of all levels of radioactive waste in diverse locations designated, respectively, as either shallow or deep repositories.

I will go further to raise the question about the value of the CNSC assertion that OPG meets international best practices, for example, the tenets of the IAEA Joint Convention for the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, when this 1997 Joint Convention itself shows limitations in what it mandates. Also, in references to the International Commission for Radiological Protection (ICRP), the latter at least acknowledges its limitations while continuously doing research through ever-improving methodologies to provide more accurate research. Doing so is a continuing work-in-progress.

## **Specific Concerns**

My perception of OPG is that it is systemically over-confident and too complacent. These attitudes are reinforced both by federal regulatory and CNSC's lack of rigour.

For example, on page 69<sup>1</sup> of its 2017 Regulatory Oversight Report, the CNSC writes: "OPG intends to dispose of low- and intermediate-level waste...in the deep geologic repository (DGR) proposed for Bruce nuclear site in Tiverton, Ontario. ..."

Regarding this "proposed" project, why does the CNSC continue to foreground the Joint Review Panel's (JRP) conclusions in its final environmental assessment report: "that OPG's DGR project is not likely to cause significant adverse environmental effects, provided the mitigation measures proposed, the commitments made by OPG during the review, and the mitigation measures recommended by the JRP are implemented," in CNSC's 2017 Regulatory Oversight Report [2017, p. 70]. The next paragraph gives cursory mention that the federal Minister of Environment and Climate Change requested additional information from the OPG.

Nowhere is it mentioned that not only were the JRP's conclusions seriously contested by a number of well-informed citizens who did extensive independent research to raise serious questions. Moreover, the CNSC does not clarify for the reader that the OPG to date has failed to provide the requested information sufficient enough to satisfy a number of concerns from both the wider public as well as Saugeen Ojibwa Nation (SON).

Furthermore, in recently reading sections of "Canada's Sixth National Report" in 2017 prepared by CNSC for the IAEA, CNSC totally omits mention about the interventions from SON – on pages 114, 120 and 121 - and, moreover, the significant position of SON as per final decisions about whether the DGR1, in fact, will be approved. Instead, CNSC's 2017 Sixth National Report to IAEA incorrectly writes: "The CEA Agency will then finalize its report and submit a decision package to the minister in the fall of 2017," which was a premature assumption for CNSC to declare to an international nuclear agency.

Therefore, how can international bodies properly oversee the imperfections and shortcomings in the processes of decision-making in respective nation state territories, to demand a higher standard, if the IAEA is not fully informed about the actual reasons

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<sup>1</sup> All page numbers identified are numbers shown on the printed page of the online document, not the PDF page number

for delays, largely based upon lack of sufficient information provided by the nuclear industry and, hence, lack of public lack of trust?

A further example of shortcomings by the OPG, and the incomplete reporting by CNSC again in its 2017 Sixth National Report to the IAEA (on page 100) is describing the public information program by the OPG that – based upon clear evidence presented by several citizen intervenors in Bruce County at the 2012 OPG DGR public hearing – misrepresents what actually happened. Enough said at this time.

Regarding the international level of nuclear conventions and standards, ARTICLE 41. AMENDMENTS TO THE CONVENTION (in reference to the IAEA Joint Convention) spells out that: “Any Contracting Party may propose an amendment to this Convention ...”. I therefore encourage the CNSC to advocate a more explicit standard for nuclear facility owners to develop a much improved availability of scientifically investigated data on the impacts of a range of radionuclides upon the environment.

The reason is, given previous public conversations at DGR public hearings, and also public forums hosted by the International Joint Commission on the Great Lakes, there is a huge failing as per properly done studies about radionuclides vis à vis the environment, by all parties who include industry, government and research bodies.

What the CNSC did not elaborate upon in its 2017 overall Regulatory Report, but which it did examine more in depth, is what OPG is either very slow, or simply unwilling, to provide better public information based upon extensive research about the largely yet unknown impacts of a wide diversity of radionuclides upon the environment.

Although the IAEA Joint Convention’s ARTICLE 32. REPORTING identifies reporting on radioactive waste management policy and practices, and also “criteria used to define and categorize radioactive waste,” IAEA next elaborates: “This inventory shall contain a description of the material and, if available, given information on its mass and its total activity.”

Consequently, yes, the OPG did gather information on “mass and total activity” in regard to release rates to the atmosphere and also to surface waters, under Appendix I: DERIVED RELEASE LIMITS AND RADIOLOGICAL RELEASES TO THE ENVIRONMENT.

But, the above homogenization of “annual” releases in no way address the huge continuing gaps about how the wider diversity of radionuclides actually impact on various organisms and various environmental media through time in ‘cumulative effects.’

Moreover, I was seriously dissatisfied by a number of references – within the CNSC 2017 Record of Decision on the OPG `Application to Renew the Waste Facility Operating Licence for the Western Waste Management Facility - that raised questions for me about how genuinely willing is OPG to improve upon its documentation of radionuclide inventories.

Although an OPG representative is cited, on the Record of Decision's page 25 that: "OPG is working on improving its environmental management program," to what degree OPG will do so could be influenced – regrettably - by what I consider to be an unacceptable position asserted by CNSC in its above Record of Decision that: "it is not feasible to track the waste by each isotope, and that the international practice is to track total volumes and total activity, which is in line with the *Joint Convention for the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management* (Joint Convention) reporting, which is monitored by Natural Resources Canada. (See my own previous Joint Convention references.)

But, a major concern here, based upon the content that I read, is the only partial recognition that environmental studies ought to be pursued in a much more rigorous standard, as per certain international research that is not cited at all in either the CNSC `Record of Decision' on the WWMF nor in the CNSC `Regulatory Oversight Report' subsequently. I refer to ongoing studies carried out by groups of scientists contributing to both the International Commission for Radiological Protection and also the International Union of Radioecology (IUR).

The only international standard identified by OPG, as cited in the CNSC `Record of Decision,' to which OPG argues that its environmental management system (EMS) complies – beyond CNSC requirements of REGDOC-2.9.1 and other related CNSC documents – is the International Organization for Standardization (ISO) standard 14001, *Environmental Management System Standard*. 2015.

CNSC, however, numbers among various global organizations affiliated with the International Commission for Radiological Protection, but does not mention this important relationship in your 2017 Regulatory Oversight Report. Nevertheless, in CNSC's Sixth National Report to the IAEA, the CNSC refers to proposed amendments to the Radiation Protection Regulations (RPR) "such as those of the International Commission on Radiological Protection" elaborated on in section E.3.2 of the Sixth National Report – which I did not have time to read for this submission deadline.

Meanwhile, the Canadian public who reads only the Regulatory Oversight Report, would not be aware of such further international liaisons which, importantly, are

carrying out due diligence in the quest to fill major information gaps for measuring impacts upon multiple levels of the environment from ecosystems to the internal organs of a wide range of individual organisms, plus their interactions with environmental media.

What is refreshing is the fuller honesty provided in the international studies related to what is not yet known, as well as identifying the limitations of the tools developed thus far to access more accurate data.

In my 2014 intervention at the second public hearing for OPG's proposed DGR, I cited the 2014 ICRP Annual titled "Protection of the Environment under Different Exposure Situations." What I appreciated was ICRP's honesty in declaring that such studies are only in the early years, and much more investigation is needed. The ICRP at that time referred to its initial steps towards an ecosystem approach, as well as to its experiment to develop a measuring tool called 'Reference Animals and Plants' based on a model equivalent to 'Reference Man.'

In recognition of the flaws in this early version of RAP, the ICRP 2017 Annual Report identifies a more recent iteration titled: "Dose Coefficients for Non-human Biota Environmentally Exposed to Radiation," in **ICRP Publication 136**, which I have not read yet. (The Abstract is available online; but the full text must be purchased unless the interested reader has access to a university library as a graduate or student.)

Independent from the ICRP, the International Union of Radioecology (IUR) has a series of publications available to read and download on its website. These articles have been published initially in journals available online through a Creative Commons licence. Here I will identify briefly three examples of articles that elaborate on the challenges to gather data on environmental impacts from radionuclides.

First of all, in the **Journal of Environmental Radioactivity**, a key article in 2016 outlines the challenges for researchers, titled "Addressing ecological effects of radiation on populations and ecosystems to improve protection of the environment against radiation: Agreed statements from a Consensus Symposium."

The series of statements composed by a diverse group of 30 scientists included these:

*"Statement 5: Strategies need to be developed to disentangle the direct and indirect effects of radiation on (populations of) biota in natural ecosystems, as well as the confounding factors that prevent clear interpretation of the results."*

*"Statement 6: Reference organism approaches represent an important step to characterize doses to biota, but they have significant limitations. More effort should be*

*placed on understanding mechanisms and processes of how radiation effects are manifested in natural ecosystems, and on quantifying dose in the field."*

A 2018 article in the ***Environmental Research*** journal elaborates on the various challenges introduced in the aforementioned 2016 article. The 2018 article is titled "When a duck is not a duck; a new interdisciplinary synthesis for environmental radiation protection," in another consensus paper. This paper describes six strategic recommendations, preceded by an introduction with this observation:

*"The problem with the current RAP approach is that the organism is considered without reference to the context of its environment. While target shape and volume, and isotope transfer routes may be considered, little attention is given to behavior, lifestyle, lifecycle or position in the ecosystem. We consider however that the whole ecosystem approach, on the other hand, is too complex to allow regulation based on dose limits to be applied.*

*"During the meeting the idea of a compromise approach was discussed at length. This 'Landscape approach' represents an attempt to hybridise the two so that selected organisms can be viewed in relation to their actual environment ...".*

My final article example also is in the ***Environmental Research*** journal, available online 26 September 2018, and is titled "The tubercular badger and the uncertain curve:- The need for a multiple stressor approach in environmental radiation protection." This article evolved from a workshop call "to examine critically the effects of low-dose ionizing radiation on the ecosphere" and, as in the 2018 article, brought together scientists from the two fields, respectively, of radiobiology and radioecology.

Participants at the 2018 workshop agreed "the tools presently available were deemed insufficient to reliably predict risk of low dose exposures in ecosystems." Their paper's conclusions read:

*"It is clear that there is a need to expand the view of ionizing radiation events leading to the effect on individual organisms to the understanding of the interactions of multiple stressors in ecosystems. A multidisciplinary strategy will, therefore, need to be developed. The participants also recognized important knowledge gap ... . Tools need to be developed to tackle the problem of scale (time, space, organization levels). This means, for example, implement tools that will allow scientists to evaluate risk in populations over generations and within a variety of environments."*

In closing, I advocate that the CNSC demand from its proponents, such as OPG, of current and future nuclear facilities, be required to demonstrate more concrete evidence that indicate willingness and practice in the pursuit of continually improved research and, in turn, more rigorous methodologies.



Indeed, until much better data ever can be gathered and more fully understood, I absolutely disagree with the oft-stated OPG assertion, as shown in a power-point presentation – titled ‘Responsible Waste Management’ - that I watched last week at a WWMF tour as a local citizen, that: “Around the world, Deep Geologic Repositories are a scientifically proven method for safe, permanent storage of nuclear wastes.”

To regain public trust, at least among those citizens who have the capacity to inform themselves in order to challenge the inadequacies witnessed in OPG’s pursuits to date, I hope that the CNSC will demonstrate more rigour in its requirements from proponents of current and proposed nuclear facilities, concerning human health and environmental protection from all levels of radioactive waste, in recognition of bioaccumulation through time, and the many unknowns to investigate and resolve.