A Citizen's Feedback on Selected Comments for CNSC REGDOC-2.11.1-Vol. III, Ver.2

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PREAMBLE

The following feedback refers to selected comments primarily from the Nuclear Waste Management Organization (NWMO) industry template comments. Therefore, whenever I refer to the NWMO template/comments, I refer to all of the nuclear industry players in Canada who submitted the same template. My feedback also provides brief references to comments from Northwatch and Dr. J.R. Walker.

Interesting to note, and troubling to an already concerned citizen, is the blistering criticism from the nuclear industry in regard to REGDOC-2.11.1, Volume III, version 2. A citizen would assume that it is the Canadian Nuclear Safety Commission (CNSC), in its role as Canada's nuclear regulator, who ought to be giving guidance to the nuclear industry, rather than witnessing the opposite happening. Indeed, the litany of criticism by industry directed at this specific draft document is over and above the usual suggestions from the nuclear industry to limit rather than expand the requirements incrementally updated by CNSC.

The NWMO template's pattern of criticism directed at REGDOC-2.11.1, Vol. III, ver. 2, repeatedly identifies lack of clarification, inconsistencies, and various passages characterized as confusing. As one "Impact on Industry" identifies, on the first of 22 pages of industry critique: "Unclear expectations could challenge compliance verification."

To sum up the tone and content of criticisms in all submitted comments for this draft document, I will quote from what Bruce Power stated in its

introductory letter: “The editorial quality of this document is below the CNSC’s usual standards for drafts issued for industry or public review.”

Speaking as a citizen, my overall criticism of this draft document is that it is trying to embrace too much material in a single document, on a number of levels, such as the widely diverse types of facilities included, multiple time frames, as well as communicate gross assumptions that do *not* demonstrate scientific evidence.

Last, but not least, the CNSC seems to offer industry too much leeway in choosing how to proceed, rather than provide much more clear direction. Ultimately, I feel that the CNSC is pushing forward too many documents too quickly, without suitable research, to expedite regulations for what basically are several types of nothing more than experimental facilities at this time (still unproven as safe through time), such as near surface repositories, small modular reactors, and deep geological repositories.

The following sections will focus on a few specific points of criticism, which regrettably are not all-inclusive, given the limited timeline to respond constructively during an intense period of transition in my own life.

WHAT IS FATE OF ‘REGULATORY POLICY P-290?

An astute comment by Dr. J.R. Walker identified several points of concern, one of them being the potential disappearance of a longstanding ‘Regulatory Policy P-290.

Regarding examples of carelessness in REGDOC-2.11.1, Vol.III, ver. 2, I cannot overlook the incorrect spelling of Dr. J.R. Walker’s name in the list of Comments, where he is identified as “Dr. J.R. Waker.” More important to note, as per paying attention to his valid criticisms, is the fact that he is a former Director of Safety, Engineering and Licensing at AECL. Below is an excerpt why he believes P-290 must not be discarded:

"Regulatory Policy P-290 is part of the defence-in-depth that prevents the management of radioactive waste causing an unreasonable risk to the health and safety of persons and the protection of the environment."

In his own comment, Dr. J.R. Walker provides a descriptive page of text regarding *P-290*. He mentions that the latter is identified within the draft document as being included in Appendix A, but, in fact, is not included.

My investigation discovered that *Regulatory Policy P-290* is supposed to be superseded - according to the 'Summary' section on the web page here: cnsc-ccsn.gc.ca/eng/acts-and-regulations/regulatory-documents/history/regdoc2-11-1-v3.cfm.

A FULLER GLOSSARY WOULD IMPROVE CLARITY

Phrases, such as "unreasonable risk," if included in the Glossary, would provide much more clarity to language that obfuscates important distinctions between what the safety assessments and safety analyses can, and cannot, include.

The NWMO template names a number of terms that it suggests ought to be listed and described in the Glossary, if not within pertinent document sections. For example, on page 3, `Suggested changes' for Comment #5, doc section 1.1, it reads:
"Clearly define 'long-term waste management' and 'facility' and apply them consistently."

But, the NWMO demonstrates its own lack of due diligence in a couple of sentences preceding the above quote, in which it requests an exemption for interim or short-term radioactive waste management facilities, suggesting that those particular facilities - yet not specifically identified - should only have to implement *REGDOC-2.4.4, Safety Analysis for Class 1B Nuclear Facilities*.

But, the status of *REGDOC-2.4.4.* is "Not yet developed." See web page: cnsc-ccsn.gc.ca/eng/acts-and-regulations/regulatory-documents/index.cfm#R19

The NWMO template, which several times criticizes the CNSC for referring to merely draft, rather than finalized and approved, regulatory documents, therefore, illustrates a similar shortcoming in reference to *REGDOC-2.4.4*, when the latter does not yet exist.

Among several terms that the NWMO template identifies as too ambiguous and vague, hence needing clear definition, it also points out the lack of conventional insertion of acronyms - which is conventional practice in academia and journalism as well - to insert the acronym following the first use of the fully written reference.

Two acronyms that confused me, because the acronyms were used without originally seen attached to their fuller respective references, included: FEPs, which refers to "features, events and processes," and SSC, referring to "structure, systems, and components."

A final example, again, in the spirit of improving clarity in the document, is to define "defence in depth" in the Glossary section, because that phrase is used to justify the construction of deep geological repositories (DGRs). The NWMO template even advocates in Comment #24, for CNSC doc section 6.2, under the column "Industry Issue" (designated as a MAJOR comment):

"Additional clarity is also sought as to how defence in depth is achieved and maintained and what is meant by passive barriers and controls."

CLARIFICATION NEEDED FOR "GRADED APPROACH"

In at least three different NWMO template comments - 3, 19, and 28 - the nuclear industry expresses dissatisfaction with the lack of information

in this draft document for “graded approach,” asking, for example, whether it refers to one single graded approach or, alternatively, do several graded approaches exist for various types of facilities.

Careful reading of this web page for REGDDOC-2.11.1, Vol. III, ver. 2: https://www.cnsc-ccsn.gc.ca/eng/acts-and-regulations/consultation/comment/regdoc2-11-1-vol3-ver2.cfm, in the ‘Preface’ section states, however:

“For information on the implementation of regulatory documents and on the graded approach, see REGDOC-3.5.3, *Regulatory Fundamentals*.”

Nevertheless, given the fraught, ubiquitous issue regarding lack of clarity throughout the draft document for REGDOC-2.11.1, Vol. III, ver. 2, I do agree with the nuclear industry criticism that appropriate information directly pertaining to safety issue of facilities ought to be properly explained in this current draft -namely, explain ‘graded approach.’

WHETHER URANIUM MINES AND MILLS BE INCLUDED

Not only the nuclear industry, but also Northwatch, contested the apparent inclusion of uranium mills and mines fitting within the wide range of facilities covered by this draft of REGDOC-2.11.1, Vol. III, ver. 2.

The NWMO template comment #6, for doc section 1.2, says: “Licensees strongly disagree that the scope of this REGDOC should apply to radioactive waste management at uranium mines and mills.” The reasons given are two-fold:

“As recognized in *CSA N292.0-14, General Principles for the Management of Radioactive Waste and Irradiated Fuel* Section 1.4 and A.8, the nature of the wastes generated and the facilities appropriate for the long-term storage of wastes at uranium mines and miles requires specific safety assessments for which sufficient guidance is provided in *REGDOC-2.11.1,*

Waste Management, Volume II: Management of Uranium Mine Waste Rock and Mill Tailings (Volume II).”

But I have a few problems with the two aforementioned references. First of all, I do not recall *REGDOC-2.11.1, Volume II* having a public consultation period prior to its publication in November 2018. Perhaps I missed a public notification. Nevertheless, conceding that I have not yet read *Volume II*, the question remains open whether “sufficient guidance is provided.”

What concerns me more - as I previously indicated in my own submitted comment - I dislike the lack of accessibility to CSA standards for public citizens to study, in order to be given the same level of transparency to all evidence provided for the decision-making of the nuclear industry. As a result, the playing field for fuller understanding remains unequal between the industry and the public, treating the public input as less valuable. The obstacle is the financial expense to access CSA documents. I advocate again for that dilemma to be addressed, to facilitate full access for citizens to participate fairly in public reviews.

INDUSTRY COMMENTS RE. COMPUTER MODELS

The NWMO template, in comment #48, challenges the CNSC’s apparent more recent restriction in the use of “commercially available software packages,” suggesting that a wider range of available models could enhance the development of models “used in analysis by the licensee or applicant.”

NWMO template comment #39, however, seems to argue the opposite, in challenging the CNSC statement: “A licensee or applicant should use multiple risk-informed approaches to estimate the release.” Industry asks:

“Is the idea to use the correct model for the scenario? Or asking for multiple methods to model the same thing? Industry has a major concern

with the 1st paragraph [within the CNSC draft] *under "identification of human and environmental receptors."*

Under 'Suggested Change' for the above identified 'Industry Issue,' the NWMO template states:

"Where applicable, human and environmental receptor selection should be consistent with receptors identified following CSA N288.6-12 Environmental Risk Assessments at Class 1 nuclear facilities and uranium mines and mills."

Above is a clear example of public citizens being shut out of the fuller aspects for decision-making by the Canadian nuclear industry, when we cannot access, and be given full transparency, on the content of CSA standards and, moreover, be able to verify that CSA standards abide by international standards.

The fact is, through the past several years I have had to resort to research published in international science journals, often focused on European research, because of the lack of in depth research - whether accessible or even being done at all - in North America.

What bothers me, as well, in what appears to be industry interrogating the choice between a (so-called) "correct model" versus "multiple methods to model the same thing" is being left with the impression, namely, that the Canadian nuclear industry is not up-to-date with the international literature that reveals problems in computer modelling that call for ongoing exploration, as well as being aware of interdisciplinary activities.

CHALLENGING ICRP PUBLICATION 108

I can only conclude that the Canadian nuclear industry is not keeping abreast of the wealth of international research when it advocates in two

different comments, both #38 and also its closing comment #53, to add ICRP Publication 108 to the [CNSC draft document's follow up] list of references.

ICRP Publication 108 discusses Derived Consideration Reference Levels, and introduced the concept of Reference Animals and Plants (RAP) based upon Reference Man. But since its introduction in 2014 - when I actually cited it in my oral presentation at the second public hearing for the OPG DGR proposed for low-and-intermediate level radioactive waste - other radiological studies point out its deficiencies, and discuss other approaches.

The ***Journal of Environmental Radioactivity*** keeps up-to-date on the latest international research. An article in 2016 illustrated one of the first published criticisms of ICRP's RAP, titled **Addressing ecological effects of radiation on populations and ecosystems to improve protection of the environment against radiation: Agreed statements from a Consensus Symposium.** One excerpt reads:

"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."

Another critique of RAP was published in 2018 in the ***Environmental Research*** journal, titled **When a duck is not a duck; a new interdisciplinary synthesis for environmental radiation protection** (another consensus paper). Here is an excerpt:

"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…".

A third sample article, also published in ***Environmental Research***, on September 26, 2018, titled **The tubercular badger and the uncertain curve:-The need for a multiple stressor approach in environmental radiation protection**, included this passage:

"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."

To sum up the three above excerpts, I believe it is clear that they all recognize the need to pursue ongoing investigative studies in the field, as an essential accompaniment to computer models, the latter ever-evolving for various purposes as well.

MY SUMMARY FEEDBACK

Despite the many legitimate criticisms by the nuclear industry in regard to the draft document REGDOC-2.11.1, Vol. III, ver.2, certain comments do not reassure me that industry has sufficient humility, and willingness, to

recognize how little is authentically known in these early years of environmental protection research, in regard to the range of impacts of various radionuclides upon multiple levels of the environment, especially through time. The reality is, the learning curve is relentless to replace assumptions with much better evidence, as certain passages within this CNSC draft acknowledge.

I distrust an industry attitude that communicates an apparent reluctance to the continual need to improve. For example, comment #38 for CNSC doc section 7.1.1.1, regarding bullet 7 complains: "Without this [benchmarks] being defined, analyses may be subject to a moving yardstick, resulting in potential rework each time that a new potential contaminant is identified."

Well, yes, actually. I have yet to see a proper list of radionuclides, and the evidence is not yet available scientifically about the multiple ways that various radionuclides - once released into watersheds, after containers have eroded and/or other potential mishaps - will impact the environment.

Ironically, the 'Suggested Change' in comment #35, for CNSC doc section 6.11, gives perhaps the most revelatory insight into the industry mindset:

"Replace the last bullet on page 13 identifying things the licensee/applicant should do as part of the integration to read,
[and the NWMO template shows the following passage in red]
"Acknowledge their limitations on the understanding of waste management system, its evolution, and its potential impact on people and the environment."

To conclude, the above limitations are precisely why I am against the licencing of proposed DGRs, the latter my particular battlefield through six years, given the huge gaps in knowledge, hence basic lack of scientific justification to distribute licences vis à vis the range of potential risks and dangers, known and unknown.