Date: December 12, 2017

From: Peter Baumgartner

To: Candida Cianci, Environmental Assessment Specialist
Canadian Nuclear Safety Commission

By email: cnsc.ea-ee.ccsn@canada.ca

Subject line: In Situ Decommissioning of WR-1 at the Whiteshell Laboratories Site

CEAA Reference number: 80124

Comments:

Dear Ms. Cianci,

Please find my additional attached comments to:

Environmental Impact Statement
In Situ Decommissioning of WR-1 at the Whiteshell Laboratories Site
Pinawa, Manitoba,
Rev. 1.

Best regards,

Peter Baumgartner, P.Eng.Ret.

2017 December 11

Ms. Candida Cianci
Environmental Assessment Specialist
Canadian Nuclear Safety Commission
P.O. Box 1046 Station B
280 Slater Street
Ottawa ON K1P 5S9

RE: Comments to Environmental Impact Statement
In Situ Decommissioning of WR-1 at the Whiteshell Laboratories Site Pinawa, Manitoba, Rev. 1 (Golder et al. 2017)

Dear Ms. Cianci:

Two issues are discussed here that warrant sober thought on national policies by the CNSC and CEAA:

1. the recommendation in the USA for geological disposal of Greater-Than-Class-C (GTCC) Low-Level Radioactive Waste (LLRW) rather than near-surface disposal; and
2. the potential proliferation of multiple near-surface radioactive waste disposal sites within Canada.

Note that much of the waste defined as GTCC in the USA is aligned to the International Atomic Energy Agency's (IAEA) definition of Intermediate Level Waste (ILW) (IAEA 2009).

GTCC LLRW

In the USA, the Nuclear Regulatory Commission (USNRC), as a collegial body, formulates policies, develops regulations governing civilian nuclear reactor and nuclear material safety, issues orders to licensees, and adjudicates legal matters, including LLRW disposal (USNRC 2015). LLRW is categorized as Class A, B, C or GTCC. GTCC is LLRW with concentrations of radionuclides that exceed the limits for Class C LLRW. For example, the Class C maximum concentration for Ni-59 in activated metal is 220 Curies/m^3 and for Nb-94 in activated metal is 0.2 Curies/m^3. If the concentration exceeds these values, then the waste is not generally acceptable for near-surface disposal. There are no USNRC-approved sites for the disposal of GTCC LLRW in the USA. Currently, responsibility for GTCC LLRW lies with the United States Department of Energy (USDOE), which recently identified the Waste Isolation Pilot Plant (WIPP) geologic repository as a preferred disposal alternative from a total of five alternatives (USDOE 2016). The preferred alternative does not include land disposal at DOE sites despite past burial storage of intact reactor vessels at Hanford, Washington (i.e., Shippingport and Trojan) and reactor vessels stripped of their GTCC internals at Barnwell, S.C. (i.e., Yankee Rowe, Maine Yankee and Connecticut Yankee), all nonglaciated sites. The stripped GTCC internals remain indefinitely stored with spent fuel at their respective nuclear power plant sites.

Table 1 shows the derivation of the radioactive concentration for the primary long-lived radioactive isotopes in the components of the WR-1 reactor vessel, primarily the Ni-59 in the 4 stainless-steel (SS) and 28 Ozhennite fuel channels and the calandria vessel complete with the shell, heads, support tubes and dump floor) and the Nb-94 in the 28 Ozhennite, 20 Zr-2.5%Nb and 4 SS fuel channels and the complete calandria vessel) (McIlwain 1992). Note that only the actual metal volumes are calculated, not the volume of the contained structures (i.e., not the pipe or vessel volumes) and that the concentrations are averaged over the corresponding metal volumes. Some components may have greater or lesser concentrations than the average.

Table 1

Derivation of Reactor Vessel Components as GTCC

Radionuclide/ Component	Half-life (a)	Radio-activity[1] (Bq)	Radio-activity (Ci)	Metal Volume[1] (m^3)	Concentration (Ci/m^3)	Max. Conc.[2] (Ci/m^3)	Percent of Allowable (%)
Ni-59	76,000					220	
Stainless-steel Fuel Channels		2.94×10^{12}	79.5	0.021	3765		1711%
Calandria Vessel		5.31×10^{12}	143.5	0.969	148		67%
Ozhennite Fuel Channels		5.85×10^{10}	1.6	0.148	11		5%
Nb-94	20,312					0.2	
Zr-2.5%Nb Fuel Channels		2.78×10^{12}	75.2	0.106	712		356,100%
Ozhennite Fuel Channels		1.55×10^{11}	4.2	0.148	28		14,200%
Stainless-steel Fuel Channels		1.36×10^{10}	0.4	0.021	17		8711%
Calandria Vessel		1.42×10^{10}	0.4	0.969	0.4		200%

[1] McIlwain 1992
[2] USNRC 2015

Clearly, under the terms of Section 3(iii) of US NRC 10 CFR 61.55, the WR-1 Reactor Vessel and contained Fuel Channels are GTCC and are not generally unacceptable for near-surface disposal in the USA as suggested by both the USNRC and USDOE (USNRC 2015, USDOE 2016).

Multiple Radioactive Waste Disposal Sites

Historic low-level radioactive wastes are being stored (or is it being disposed?) in engineered mounds at the Port Hope Long-Term Low-level Radioactive Waste Management Facility and at the Port Granby Long-Term Low-level Waste Management Facility. Ontario Power Generation (OPG) is well advanced in the licensing process for developing a Deep Geologic Repository (DGR) at the Bruce nuclear site that is limited to only OPG's produced LLW and ILW. The Nuclear Waste Management Organization is actively screening sites promoted by volunteer communities for the deep geologic disposal of all the used nuclear fuel produced and continuing to be produced in Canada. These are extremely expensive undertakings and the public

consultation programs and associated Environmental Impact consultations, investigations and assessments go far beyond the technical safety issues.

Atomic Energy of Canada Limited (AECL) and its wholly-owned subsidiary Canadian Nuclear Laboratories (CNL) is proposing to create three additional near-surface disposal sites for LLW and ILW at Chalk River Laboratories (NSDF), Rolphton (NPD reactor) and Whiteshell Laboratories (WR-1 reactor). On October 27, 2017, CNL announced that it has removed ILW from the inventory of the proposed NSDF. This begs the question on where will the ILW be disposed since the communities around Kincardine rejected the inclusion of AECL's LLW and ILW in OPG's DGR during their 2005 survey (Strategic Counsel 2005).

If CNL adheres to the IAEA's, USNRC's and USDOE's suggestions for geological disposal of ILW and its immense siting, environmental and social impact assessments and infrastructure costs, then would it not be cost effective to roll all of these proposals into one non-OPG facility including that for decommissioning and disposal of NRX, NRU, Gentilly 1 & 2 and Point LePreau? Or will the issues and work be repeated time after time for a separate disposal facility with each reactor core? The National Legacy Liabilities Program (NLLP) was completely devoid of any future disposal plan as is CNL's Integrated Waste Strategy (Anonymous 2017). By failing to actively plan for disposal, are we not planning to fail or at very least, drive up the costs for indefinite storage and maintenance?

If you and your colleagues have any questions regarding these comments, please feel free to contact me.

Sincerely yours,

<Signature Redacted>

Peter Baumgartner, BSc, MSc, P.Eng.(ret.)
<Address Redacted>

References

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Barrios, J.C. and I. Minenkov. 2015. Whiteshell Laboratories Detailed Decommissioning Plan: Volume 6 – Whiteshell Reactor #1 Building 100. Detailed Decommissioning Plan Canadian Nuclear Laboratories WLDP-26400-DDP-001 Rev. 3.

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McIlwain, H. 1992. WR-1 Decommissioning: Total Radioactive Inventory of the Remaining Core Components for the WR-1 Reactor. Whiteshell Systems Analysis Branch Technical Note SAB-TN-443 (SAB-002.10). Atomic Energy of Canada Limited.

The Strategic Counsel. 2005 Feb. Presentation to the Municipality of Kincardine: Consultation Methodology and Response Rates.

US DOE (United States Department of Energy). 2016. Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste. (DOE/EIS-0375). http://www.gtcceis.anl.gov/documents/index.cfm#final.

US NRC (United States Nuclear Regulatory Commission). 2015. Licensing Requirements for Land Disposal of Radioactive Waste. NRC Regulations, Title 10, Code of Federal Regulations, Part 61 (10 CFR 61). https://www.nrc.gov/reading-rm/doc-collections/cfr/part061/.