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Oral Presentation

Written submission from Concerned Citizens of Renfrew County and Area

In the Matter of the

Canadian Nuclear Laboratories, Douglas Point Waste Facility

Application to amend the waste facility
decommissioning licence for the Douglas
Point Waste Facility

Commission Public Hearing

November 25-26, 2020

Exposé oral

Mémoire de Concerned Citizens of Renfrew County and Area

À l'égard de

Les Laboratoires Nucléaires Canadiens, installation de gestion des déchets de Douglas Point

Demande de modification du permis de
déclassement de l'installation de gestion des
déchets de Douglas Point

Audience publique de la Commission

25 et 26 novembre 2020

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October 26, 2020

Canadian Nuclear Safety Commission
Ottawa, Ontario K1P 5S9
via email: cns.interventions.ccsn@canada.ca

Submission from Concerned Citizens of Renfrew County and Area on a proposed licence amendment to authorize the decommissioning of the Douglas Point Waste Facility (DPWF)

Ref. 2020-H-04 Revision 4

Introduction

Concerned Citizens of Renfrew County and Area (CCRCA) wishes to present an oral submission during the November 25-26, 2020 CNSC hearing on the DPWF. CCRCA is a non-governmental, volunteer organization working to prevent radioactive pollution and encourage clean-up and responsible long-term management of nuclear industry wastes, with a focus on the Chalk River Laboratories (CRL) and other nuclear facilities in the Ottawa Valley. Our interest in this matter relates to the overall decommissioning process, costs, and federal oversight, noting that CRL is the proposed destination for the Douglas Point decommissioning wastes. CCRCA also participated in preparation of a joint submission on this matter led by the Canadian Environmental Law Association (CELA) and fully supports the CELA submission.

The CRL Environmental Stewardship Council (ESC) meets three times annually and creates “opportunities for open dialogue between various stakeholder groups [including CCRCA], local communities and Canadian Nuclear Laboratories” (CNL)¹. On October 22, 2020, CNL’s Ian Bainbridge told ESC members that low- and intermediate-level radioactive waste from DPWF would be shipped to CRL. He added that DPWF spent fuel could also be shipped to CRL if the Nuclear Waste Management Organization chooses a northern Ontario site for a spent fuel repository. CCRCA recommends that the Commission seek clarification about CNL’s plans for shipping spent fuel to CRL for interim storage, noting the health and accident risks associated with multiple handling and transport of high-level waste.

CNSC Staff CMD 20-H4 contains only a single reference to CRL:

Any contaminated soil will be removed and stored onsite or transferred to suitable waste management areas at Chalk River Laboratories in accordance with CNL’s procedure for the management of waste. (Environmental Protection Review Report, page 30 of 69)

¹ *CRL Environmental Stewardship Council*. Canadian Nuclear Laboratories.
<https://www.cnl.ca/en/home/environmental-stewardship/ESC/default.aspx#&ig0=1>

CNL's CMD 20-H4.1 confirms Mr. Bainbridge's statement that virtually all DPWF waste, will go to CRL:

CNL's strategic plan is to relocate all of the DPWF's radioactive waste (i.e. stored waste and future decommissioning waste) to CRL except the spent fuel which will transfer to Nuclear Waste Management Organization's high level waste disposal facility. (Page ii)

These proposed shipments of DPWF decommissioning wastes and their disposition at CRL are not directly addressed in CNSC Staff CMD 20-H4.

The CNSC evaluates how well licensees meet regulatory requirements and expectations based on a set of 14 safety and control areas (SCAs). The Waste Management SCA only "covers internal waste-related programs that form part of the facility's operations up to the point where the waste is removed from the facility to a separate waste management facility."² It appears that under the SCA framework, issues of off-site waste storage or disposal are *ultra vires*.

However, so as to meet its licensing duty regarding protection of the environment and health, set out in section 24(4)(b) of the *Nuclear Safety and Control Act*, the Commission has a legal obligation to consider issues that may be broader than those encompassed in the 14 SCAs. Hence, CCRC's concerns about CNL's plan to relocate all of the DPWF's radioactive waste to CRL, and the fate of the waste at CRL, are relevant to the CNSC hearing on the proposed DPWF licence amendment. One of our main concerns is detailed in the following section that addresses the *CNL Integrated Waste Strategy*.

The *CNL Integrated Waste Strategy* and decommissioning of the DPWF

The draft DPWF license has 14 conditions, requiring CNL to "implement and maintain a program" for each of the 14 SCAs. A draft DPWF Licence Conditions Handbook provides "compliance verification criteria" for each SCA. For the Waste Management SCA, one of the proposed compliance verification criteria is the *CNL Integrated Waste Strategy*.³

The *CNL Integrated Waste Strategy* shows the Near Surface Disposal Facility (NSDF) as the destination for nearly all CNL low-level waste.⁴ The NSDF, a proposed "engineered containment mound" at CRL, is undergoing environmental review and has not been approved by the Commission. Nor, to our knowledge, has the CNSC approved the *CNL Integrated Waste Strategy* itself.

The CNSC defines "licensing basis" to include "the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence."⁵

² <https://nuclearsafety.gc.ca/eng/resources/publications/reports/powerindustry/safety-and-control-areas.cfm>

³ *CNL Integrated Waste Strategy*. <https://www.cnl.ca/site/media/Parent/2019-CNL-IWS.pdf>

⁴ *Ibid*, Figure 3.1 ("Summary of CNL Waste Flow")

⁵ www.nuclearsafety.gc.ca/pubs_catalogue/uploads/INFO-0795-Licensing-Basis-Objective-and-Definition-eng.pdf

Whereas the Douglas Point Waste Facility Licence Conditions Handbook is directly referenced in the proposed DPWF licence, CCRCA submits that it is inappropriate to include an unapproved waste management plan as part of the licensing basis for the DPWF.

Inclusion of the *CNL Integrated Waste Strategy* for the as part of the licensing basis for the DPWF would appear to constitute CNSC approval of this document and the waste disposal plans it contains. If the CNSC does not consider the *CNL Integrated Waste Strategy* to be an approved document, it should be removed from the DPWF Licence Conditions Handbook.

Canada's Radioactive Waste Policy Framework and decommissioning of the DPWF

The Government of Canada's *Radioactive Waste Policy Framework* states, *inter alia*, that

The federal government has the responsibility to develop policy, to regulate, and to oversee producers and owners to ensure that they comply with legal requirements and meet their funding and operational responsibilities in accordance with approved waste disposal plans.

The waste producers and owners are responsible, in accordance with the principle of "polluter pays", for the funding, organization, management and operation of disposal and other facilities required for their wastes.⁶

With regard to the owner of the DPWF waste, CNSC Staff CMD 20-H4 says that the federal crown corporation Atomic Energy of Canada Limited (AECL) "retains ownership of the lands, assets and liabilities associated with CNL's licences;" and that "liabilities have been officially recognized by the Minister of Natural Resources in a letter dated July 31, 2015."

With regard to the "producer" of the DPWF waste, in 1984 (the year that the Douglas Point reactor was permanently shut down) the Canadian Nuclear Society said:

As the world knows by now, the Douglas Point Nuclear Generating Station is owned by AECL and operated for AECL by Ontario Hydro.⁷

Wikipedia provides additional detail on the reactor's history:

In 1958... AECL formed the Nuclear Power Plant Division at Ontario Hydro's A.W. Manby Service Centre in Toronto to manage the construction of a full-scale prototype for future CANDU commercial power plants. Ontario Hydro would operate the prototype.⁸

⁶ <https://www.nrcan.gc.ca/energy/energy-sources-distribution/uranium-nuclear-energy/radioactive-waste/radioactive-waste-policy-framework/7725>

⁷ *The Douglas Point Story*. Atomic Energy of Canada Limited CANDU Operations. Power Projections, Special Edition, June 1984. <http://www.cns-snc.ca/media/history/DouglasPoint/DouglasPoint.html>

When Ontario Hydro ceased operations on March 31, 1999 its portfolio of generating stations was transferred by provincial statute to a successor corporation, Ontario Power Generation Inc.⁹

CNSC Staff CMD 20-H4 does not acknowledge any responsibilities of the DPWF waste producer (OPG) and owner (AECL) for the “organization, management and operation of disposal and other facilities required for their wastes.”

This apparent disregard for federal waste management policy raises a number of questions:

- Noting that AECL’s Douglas Point property is completely surrounded by OPG’s Bruce site, and the long history of cooperation between AECL and OPG’s predecessor Ontario Hydro, why not coordinate decommissioning and waste management activities by CNL and OPG on the Bruce site?
- Why not share facilities for spent fuel, noting that Douglas Point property has AECL’s largest inventory of spent fuel by far (over 22,000 fuel bundles and 300 tonnes of uranium)?
- Why send low- and intermediate-level waste to Chalk River, when OPG’s Western Waste Management facility is within a few meters of the Douglas Point reactor?
- Why is CNL seeking approval for active decommissioning of the DPWF when neither OPG nor AECL has an approved long-term management waste management facility?
- What are the additional greenhouse gas emissions and safety risks associated with shipping wastes to Chalk River rather than keeping them on site until a long-term waste management plan is approved?
- What are the additional costs, worker exposures, and greenhouse gas emissions of double-handling wastes?
- Why does the CNSC consider a letter that is over five years old and was signed by a minister from a previous government to be an acceptable financial guarantee for the DPWF decommissioning costs?

The Detailed Decommissioning Plan (DDP) for the DPWF

CCRCA wishes to comment briefly on CNL’s plans for decommissioning of the DPWF. CCRCA notes that although “Decommissioning” *per se* is not one of the CNSC’s 14 Safety and Control Areas, the Waste Management SCA “also covers the planning for decommissioning.”¹⁰

In regard to the DDP Program Overview,¹¹ it is hard to avoid the impression that CNL deliberately conflates/confuses what they actually want to do under the amended licence (decommissioning Planning Envelopes A-C) with what they say they want to do (decommissioning the DPWF in its entirety).

⁸ https://en.wikipedia.org/wiki/Douglas_Point_Nuclear_Generating_Station

⁹ *Ontario Hydro Final Annual Report January 1998 — March 1999*. <https://www.oefc.on.ca/pdf/ENGFINAL.pdf>

¹⁰ <https://nuclearsafety.gc.ca/eng/resources/publications/reports/powerindustry/safety-and-control-areas.cfm>

Could the reason be that if the proposed licence amendment is approved by the Commission in its current form, it would make it easier for CNL to decommission the remaining Planning Envelopes (D and E) in terms of licencing (e.g., only a simple licence extension rather than a licence amendment would be required)?

To address this confusion, CCRCA recommends that the Commission require CNL to prepare and submit a revised licence amendment application with detailed decommissioning plans (DDPs) for Planning Envelopes A, B, and C - the three planning envelopes for which decommissioning activities are to be completed during the licence period. This will ensure that all necessary information and details are provided for CNL's proposed activities during the proposed licence period.

Waste characterization and decommissioning of the DPWF

The CNSC states that waste characterization is another of the topics "covered in depth" in the Waste Management SCA. A 1-page CNSC infographic on this topic says:

The CNSC carefully reviews the applicant's waste management process, including characterization, before providing a licence to any organization that participates in waste management activities.¹² [emphasis added]

CNSC Staff CMD 20-H4 provides information specific to the DPWF on waste characterization:

CNL will prepare characterization reports in advance of the preparation of the DDPs for each PE [Planning Envelope]. These characterization reports document the radiological, chemical and industrial condition of the relevant facilities and structures. (p. 25)

In regard to Planning Envelope B, the Purification Building, the Service Building (including Ventilation Stack, Fuel Bays, and Active Liquid Handling System), the Weld Test Shop and the Resin Storage Tanks and Vault are all nuclear structures. CCRCA's recommendation that CNL complete a DDP for this Planning Envelope and submit it with a revised licence application entails preparation of a detailed characterization report "in advance of the preparation" of this DDP. This will allow the Commission to "carefully review" CNL's waste characterization, before providing a licence for the decommissioning activities associated with this Planning Envelope.

The same consideration applies to Planning Envelope C, the Reactor Building Clear-out.

CNSC Staff CMD 20-H4 appears to contain inconsistencies with regard to quantities of low-level radioactive waste (LLW) and intermediate-level radioactive waste (ILW) predicted to be generated in Planning Envelopes B and C. This creates doubt as to whether CNL's waste characterization has been "carefully reviewed" by the CNSC.

¹¹ CNL, Douglas Point Waste Facility Detailed Decommissioning Plan Volume 1 Program Overview, 22-00960-DDP-001, Revision 1, December 2019, e-Doc 6094058.

¹² <http://nuclearsafety.gc.ca/eng/resources/infographics/rwc/index.cfm>

Table 1.3 in CNSC's Environmental Protection Review Report (contained within CMD 20-H4) shows only 22 m³ of LLW and no ILW in Planning Envelope B. Certain structures (e.g., the Resin Storage Tanks and Vault) included in this Planning Envelope might be expected to contain ILW. The concrete in the Fuel Bays alone could contain far more than the predicted 22 m³ of LLW.

Table 1.3 is also confusing in the way it shows waste amounts, as either volumes or mass. For each type of waste, total volume figures and total mass figures should be provided, and these should be added to calculate the total amount of waste (and allow calculation of its average density). For example, the Reactor Building Clear-out (Planning Envelope C) should yield a finite volume of radioactive waste that corresponds to the estimate of 214 metric tons of LLW – rather than the zero volume shown.

Proper waste characterization, needed before CNSC considers a decommissioning licence for the DPWF, should also include estimates of individual radionuclides and details on how these estimates are made.

CCRCA recalls that during the licence hearing on decommissioning of the Saskatchewan Research Council SLOWPOKE-2 Reactor, "The Commission expressed concern as to whether processes are in place to ensure that waste is adequately characterized given the presence of hard to measure radionuclides," and "During the hearing, the Commission did not receive satisfactory confirmation that the waste would be adequately characterized and anticipates that reliable data will be available upon conducting decommissioning activities."¹³

CCRCA acknowledges that the presence of difficult to measure radionuclides such as H-3, C-14, Cl-36, Ca-41, Sr-90, Pu-239, Pu-240, etc. in reactor decommissioning wastes may necessitate use of a "scaling factor" approach – estimates made using correlations between the radioactivity of difficult to measure radionuclides and the radioactivity of easy to measure gamma-emitting marker radionuclides (e.g., Co-60 and Cs-137). As suggested in the Commission's Record of Decision on decommissioning of the Saskatchewan Research Council SLOWPOKE-2 Reactor, these estimates must be confirmed using "reliable data".¹⁴

Strictly speaking, use of scaling factors is not a method of waste characterization. Actual measurements – "determination of the physical, radiological, chemical and biological properties"¹⁵ of a waste material – are required. Scaling factors can be seen as a series of hypotheses for selected pairs of radionuclides for a particular waste, e.g., the H-3 concentration is proportional to the Co-60 concentration, or the Pu-239 concentration is proportional to the Cs-137 concentration. These hypotheses must be validated for each and every radionuclide pair and each and every type of waste.¹⁶

¹³ [Record of Decision - Saskatchewan Research Council - Application to Amend the Non-Power Reactor Licence for the SLOWPOKE-2 Reactor to Authorize Decommissioning](#)

¹⁴ *ibid*

¹⁵ <http://nuclearsafety.gc.ca/eng/resources/infographics/rwc/index.cfm>

¹⁶ Frank Greening, personal communication

Dr. Hartmut Krugmann's report -- appended to CELA's submission -- documents large inconsistencies among different estimates of total DPWF decommissioning waste volumes. These appear to be related to waste characterization challenges and have troubling implications for communities in the Bruce area.

The discussion on difficult to measure radionuclides in the Saskatchewan Research Council SLOWPOKE-2 Reactor centered on residual radioactivity in the concrete floor and walls of the reactor pool. A concern was that if too few cores were extracted to measure radioactivity in the concrete accurately, a radioactive structure might still be present and subsequently abandoned in place.

Decommissioning of the DPWF will generate much larger quantities of "potentially clearable" (or "potentially radioactive") concrete than a SLOWPOKE reactor. The Detailed Decommissioning Plan Program Overview (page 7-6) refers to "38259 m³ Concrete Waste (99.1% potentially clearable and 0.9% radioactive which is 33.0% LLW and 67.0% ILW)". These figures appear suspect: How can there be less concrete LLW than concrete ILW? Why is virtually no concrete assumed to be low-level waste?

Key questions are "How it will be determined how much concrete is clearable?" and "How much of the clearable waste would go to local landfills?" A table in Ian Bainbridge's 20 October presentation to the CRL ESC showed 115,000 metric tons of clearable waste going for "recycle/reuse", and only 111 metric tonnes (0.1% of the total) going to landfill. However, the same slide stated that 10% of the clearable waste would go to landfill – a 100-fold discrepancy! Determination of clearable waste must be made using reliable measurements and verifiable estimates. Many radionuclides in irradiated concrete are "difficult to measure". Unreliable estimates could have highly problematic consequences, with a potential for large quantities of radioactive concrete to be dispersed locally.

CNL's CMD 20-H4.1 (pages 19-20) says that "The disposition of the waste will be determined, using the following list of options, in the order of decreasing preference: Reuse (off-site), Recycle (off-site), Dispose (off-site waste management facility).

According to Wikipedia, "Concrete recycling is the use of rubble from demolished concrete structures. Recycling is cheaper and more ecological than trucking rubble to a landfill. Crushed rubble can be used for road gravel, revetments, retaining walls, landscaping gravel, or raw material for new concrete."¹⁷

If CNL incorrectly deems that concrete from the Douglas Point reactor and other DPWF facilities is clearable, local municipalities may end up with radioactive concrete rubble spread around for fill, landscaping, roads, etc. There would be pressure not to put "clearable" waste in local landfills, because their capacity is limited, and DPWF waste would compete with existing waste streams.

In the absence of carefully reviewed and accurate waste characterization data, the precautionary principle must be followed. This means that all of the nuclear components of the DPWF must be treated as radioactive waste unless CNL can prove otherwise:

The proponent of a project should bear the burden of proof to establish that the licensing or commissioning of a nuclear facility or a uranium mine will not cause irreversible damages to the

¹⁷ https://en.wikipedia.org/wiki/Concrete_recycling

environment or the health of people. This would include all the related environmental issues that should be taken into consideration and managed during the lifecycle of a nuclear facility like a mine or a nuclear reactor from cradle to grave.¹⁸

“Cradle to grave” must encompass considerations related to off-site disposition of nuclear reactor decommissioning wastes. This submission only touches on a few of these considerations, such as local landfill capacity for clearable waste, future plans for long-term management of low-level radioactive waste, and risks associated with multiple handling and transport of high-level used fuel waste.

CCRCA recommends that the Commission require licensees seeking decommissioning licences to consider what happens to waste after the point where it is removed from the facility being decommissioned. The Commission should also direct CNSC Staff to address the limitations of its current “Safety and Control Areas” approach to the licensing of waste facilities and decommissioning activities.

This submission was prepared for Concerned Citizens of Renfrew County and Area by:

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¹⁸ *Implementation of the precautionary and sustainable development principles in nuclear law – A Canadian perspective*. Abstract of a dissertation presented to University of Montpellier, Montpellier, France, December 2009. Prepared by: Jacques Lavoie, Canadian Nuclear Safety Commission.
<http://www.nuclearsafety.gc.ca/eng/resources/research/technical-papers-and-articles/2009/december-2009.cfm>