Comment on application from Canadian Nuclear Laboratories (CNL) for the Renewal of its Nuclear Research and Test Establishment Operating Licence for the Chalk River Laboratories

Ref. 2018-H-01

Submitted to the Canadian Nuclear Safety Commission by

Northwatch

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Contents

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION 1: The CNSC should incorporate a discussion of these fundamental principles within its regulatory approach to radioactive waste. This regulatory policy should then be incorporated by reference into the Licence Conditions Handbook as a required compliance verification document.

RECOMMENDATION 2: As the CNSC's regulatory documents informing their approach to radioactive waste lack discussion of the fundamental principles of radioactive waste management, Northwatch submits the LCH should state that the licensee shall conduct all activities in a manner which minimizes and prevents the generation of radioactive waste.

RECOMMENDATION 3: In order for the CNSC to ensure compliance with the record management practices on a site-wide basis, Northwatch recommends that CSA 292.0 *General principles for the management of radioactive waste and irradiated* be listed as a Compliance Verification Criteria and not a Guidance Document in CNL's Licence Conditions Handbook.

RECOMMENDATION 4: Including a record management requirement as a licence condition which is not time barred, will ensure the preservation of onsite knowledge and, that the licensee's approach to record keeping is applied consistently site-wide.

RECOMMENDATION 5: Northwatch recommends N292.0 *General principles for the management of radioactive waste and irradiated* be incorporated within the Compliance Verification Criteria of licence condition 11.1 Waste Management Program of the proposed licence.

RECOMMENDATION 6: Northwatch submits the proposed LCH for both waste management (11.1) and environmental protection (9.1) reference the entirely of REGDOC-2.9.1 Environmental Protection Policies, Programs and Procedure as a Compliance Verification Criteria document and not limit is application to s 4.6 of REGDOC-2.9.1.

RECOMMENDATION 7: The CNSC should endorse the proximity principle within its regulatory policy on radioactive waste management and incorporate it into the licence, to ensure CNL's waste management program is in conformity with this tenet.

RECOMMENDATION 8: The CNSC should require CNL to provide information which at minimum summarizes the volume, origin, form, quantity and name of any radioactive waste or hazardous waste that may result from the licensed activities; the proposed method for managing and disposing of that waste must be included, as per the regulatory requirements.

RECOMMENDATION 9: The CNSC should direct CNL to provide a detailed inventory of waste transfers into and out of the Chalk River Laboratory properties, including transfers from other operations in Canada, and transfers from the U.S. into Canada. The inventory should include information that allows the user to trace waste volumes from point of generation through treatment to long term storage / disposition.

RECOMMENDATION 10: The CNSC should establish a publicly accessible registry of waste transfers between operations / sites in Canada, and transfers in and out of Canada. The registry should include information that allows the user to trace waste volumes from point of generation through treatment to long term storage / disposition.

RECOMMENDATION 11: The Commission should direct the CNL, AECL and CNSC staff to jointly select an independent third party expert group to undertake a comprehensive review of progress being made on the remediation of the Chalk River site, including in the review an evaluation of progress made against previously set milestones, and identification of milestones for the next ten and twenty years against which progress is reported annually to the Commission and the public.

RECOMMENDATION 12: The CNSC must cease reliance on CSA standards as licence conditions until such a time that the public can easily access standards and have access to content which is equivalent to that provided through a paid membership. Facilitating public and transparent decision-making requires providing a level of access to the public which is equivalent in substance and ease-of-use to that enjoyed by users of CSA purchased content.

RECOMMENDATION 13: The CNSC should establish a period for consultation which is congruous with the principles of access to justice and transparency, and next-generation environmental law which includes providing accessible information and allowing sufficient time for its review.

RECOMMENDATION 14: The Commission should direct the CNSC staff to replace the current version of the IEMP presented on the CNSC web site with a report that is comprehensive and includes data for a range of radioactive and toxic contaminants associated with the nuclear materials at the Chalk River site, and presents data from a number of years, and includes sampling locations within the CNL site, and in the immediate vicinity of the CNL site, as well as locations that are more distant to the site (such as those currently included in the IEMP report).

I. INTRODUCTION

On June 9, 2017 the Canadian Nuclear Safety Commission (CNSC) issued a Notice of Public Hearing[1] that in January 2018, it would consider the Canadian Nuclear Laboratories' (CNL) application to amend its nuclear research and test establishment licence for the Chalk River Laboratories site for a proposed period of ten years. According to the notice, CNL is seeking approval to continue operation until March 31, 2028, during which it will "modernize and consolidate its CRL operations, including the shutdown of the National Research Universal reactor and various infrastructure and site improvements."[2] CNL's submission and CNSC staff's recommendations to be considered at the hearing became available on November 10, 2017. The notice invited members of the public to comment, in writing, on CNL's application, and file requests to intervene with the Commission Secretary by December 11, 2017.

Northwatch submits this report in response to the CNSC's Notice of Public Hearing dated June 9, 2017. Northwatch, with their legal counsel at the Canadian Environmental Law Association, request to intervene at the upcoming hearing for the renewal of the Chalk River operating licence, this January 24-25, 2018. By way of this report, Northwatch and CELA requests status to participate as intervenors in the public hearing of the CNL Chalk River site licence renewal.

Northwatch has undertaken a review of CNL's application,[3] their Commission Member Document (CMD) [4] and the CNCS's responding CMD reviewing the extension of the nuclear research and test establishment for a period of 10 years. Northwatch has undertaken this review with the assistance of the Canadian Environmental Law Association (CELA), who have provided legal and research assistance.

Context

Chalk River Laboratories (CRL) is located 160 kilometres northwest of Ottawa. Historically, CRL was owned and operated by Atomic Energy of Canada Limited (AECL), a federal crown corporation. On February 28, 2013, the Government of Canada announced its intention to move to an arrangement wherein AECL would provide oversight to its newly created wholly-owned subsidiary, Canadian Nuclear Laboratories Limited (CNL) which would be managed under contract by a consortium to be known as the Canadian National Energy Alliance (CNEA). The CNSC approved the transfer of the CRL operating licence to CNL from AECL in October 2014, and CNL assumed the responsibility for the day-to-day operations of CRL; in September 2015, management of CNL was contracted to Canadian National Energy Alliance (CNEA).

[1] CNSC, Ref. 2018-H-01 "Notice of Public Hearing and Participant Funding" (9 June 2017)
[2] *Ibid*
[3] Canadian Nuclear Laboratories, "Application for renewal of the nuclear research and test establishment operating licence for the Chalk River Laboratories – 2018," 30 March 2017 [**CNL Application**]
[4] Commission Member Document for the Chalk River Laboratories Site Licence Renewal for 2018, as prepared by Canadian Nuclear Laboratories. CRL-508760-134-000 [**CMD 18-H2.1]**

The CRL site contains several nuclear facilities, including the National Research Universal (NRU) reactor, Molybdenum Production Facility, waste management areas, and many other facilities and laboratories. The CRL site is occupied by 159 buildings. Outside the built-up area, there are several waste management areas for handling and storage of both nuclear and non-nuclear waste. The site includes 12 Class I nuclear facilities in an operational state and six either in extended shutdown or in storage with surveillance, including research reactors, processing facilities, fuel manufacturing facilities, and hot cells. The site also includes 13 different waste management areas, five in operation and eight in long-term monitoring, three Class II nuclear facilities such as accelerators and irradiators, and more than 50 radioisotope laboratories, support facilities and offices.

CNL has three environmental assessments underway, each of which have implications for the Chalk River Laboratory site and its operations: first, in May 2016 notice was issued that the Canadian Nuclear Safety Commission (CNSC) had received a project description from Canadian Nuclear Laboratories for the proposed Near Surface Disposal Facility Project located on the Chalk River Laboratories (CRL) site, within the boundaries of the Corporation of the Town of Deep River. Initially described by CNL as being a facility for low-level radioactive waste, the project description was then modified to include intermediate level radioactive waste. In November 2017 CNL announced that they were amending the project again, this time to exclude intermediate level wastes.[5]

Second, as noted in the CNSC staff Commission Member Document, CNL's application discusses the proposed "Near Surface Disposal Facility" in their application. CNSC staff further note that "the operation of a permanent waste disposal facility is not included in the current licensing basis" and that the "proposed NSDF and its associated licensing requests are the subjects of a separate detailed application from CNL". On that basis, CNSC staff purport that "the NSDF is out of scope of this licence consideration."[6]

Third, environmental assessments area also underway for the "in situ" decommissioning of the Nuclear Power Demonstration project prototype reactor at Rolphton, Ontario and the Whiteshell Reactor #1 reactor in Pinawa, Manitoba. Outcomes of these environmental assessment processes could potentially include approvals of projects which would include large volumes of wastes from the reactor sites in Rolphton and Pinawa being transferred to the Chalk River Nuclear Laboratory properties.

Northwatch's Interest

Northwatch is a public interest organization concerned with environmental protection and social development in northeastern Ontario. Founded in 1988 to provide a representative regional voice in environmental decision-making and to address regional concerns with respect to energy, waste, mining and forestry related activities and initiatives, we have a long term and consistent interest in the nuclear chain, and its serial effects and potential effects with respect to northeastern Ontario, including issues related to

[5] CEAR reference number: 80122
[6] Commission Member Document, CMD-18-H2, p 1 [**CMD 18-H2**]

uranium mineral exploration and mining, uranium refining and nuclear power generation, including on the Bruce region, and various nuclear waste management initiatives and proposals.

Northwatch has a longstanding interest in the management of nuclear waste, as well as other environmental and social impacts of using nuclear power for the purpose of electricity generation. Our interests are primarily with respect to the impacts and potential impacts of the nuclear chain on the lands, water, and people of northeastern Ontario. Our interest in nuclear waste was initiated by proposals dating back to the 1970's to site nuclear waste "disposal" projects in northern Ontario. There have been numerous proposals over the last several decades, including proposals for the import and burial of high level waste in the 1970s and 1980s and for low level waste in the 1990s. Currently there are five municipalities currently associated with an investigation of potential burial sites for high level waste; three of those communities are in northern Ontario.

The Chalk River Laboratory, located in Renfrew County, is outside Northwatch's geographic area of focus of the six federal districts of northeastern Ontario. However, many of the issues associated with this licensee's operations and the issues of key consideration during this license review with respect to radioactive waste management have the potential to adversely impact the lands, waters and residents of northeastern Ontario in the event that practices, policies and / or regulatory decision-making with respect to the management of radioactive wastes become precedent-setting or normative in Canada, given that numerous locations in northern Ontario are currently the subject of investigation as a potential burial site(s) for high level radioactive waste or the disposition of decommissioning and other radioactive wastes.

Canadian Environmental Law Association's Interest

CELA is a non-profit, public interest law organization. CELA is funded by Legal Aid Ontario as a speciality legal clinic to provide equitable access to justice to those otherwise unable to afford representation for their environmental problems. For nearly 50 years, CELA has used legal tools to advance the public interest, through advocacy and law reform, in order to increase environmental protection and safeguard communities across Canada. CELA has been involved in number relicensing and regulatory matters before the Commission, from the relicensing of nuclear generating stations (ie. Point Lepreau; Darlington) to annual regulatory oversight reporting hearings (ie. use of nuclear substances; uranium processing facilities).

Review Focus

The focus of Northwatch's review is on select aspects of CNL's management of radioactive wastes, as described in their application, Commission Member Documents, and publicly available documents. Northwatch has focussed on two aspects of the CNL application, in particular:

- Reviewing information provided by CNL with respect to their management of wastes generated or received at the CRL site during the most recent license period (i.e. from 2011 to 2018), including on and off-site transfers of radioactive wastes (see Part III); and

- Assembling and applying evaluation based on research into the principles and best practices which are used internationally with respect to radioactive waste management. These principles are presented as framework through which the waste management activities can be evaluated (see Part II).

In addition, Northwatch has identified a number of important procedural considerations which are outlined in Part IV of this report, and we also highlight a number of issues which remain outstanding since the CNSC's 2016 review of the Chalk River site which resulted in an eighteen-month extension of CNL's 2011 licence.

II. RADIOACTIVE WASTE MANAGEMENT: EVALUATION PRINCIPLES

The use of nuclear energy and nuclear substances is inherently accompanied by the generation of legacy and ongoing wastes and long-term risk. Thus, the protection of human health and the environment is dependent upon the waste management strategies and technologies employed by way of operating conditions on the licensee.[7]

In reviewing the CNCS's proposed licence and Licence Conditions Handbook for the Chalk River site, Northwatch has researched the principles and best practices which are used internationally, to inform radioactive waste management. These principles are presented as a framework through which the waste management activities proposed by CNL in its application and the requirements, imposed by way of the licence and LCH, can be evaluated.

This report has adopted the definition of radioactive waste management as defined by the International Atomic Energy Agency (IAEA). Waste management therefore refers to:

> All activities, administrative and operational, that are involved in the handling, pre-treatment, treatment, conditioning, transport, storage and disposal of radioactive waste.[8]

It is within this definition of waste management that our recommendations, below, have been prepared. The principles reviewed are intended as criteria, to assist the CNSC in reviewing activity and facility-specific obligations as they relate to radioactive waste management.

A. Principles 1 -3: Minimization and Prevention

The fundamental principles which are frequently considered in the context of waste management are cited as the need to minimize and prevent the generation of radioactive waste (herein, "fundamental

[7] United Nations, "Management of Radioactive Waste," online http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/consumption_production/radioactive_waste_management.pdf, p 379

[8] International Atomic Energy Agency, "Radioactive Waste Management Glossary" (2003 Edition), online: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1155_web.pdf

principles"). Neither the proposed licence nor LCH expressly cite these principles. Thus, this chapter will review if these principles are incorporated as licence conditions by way of CSA standards or CNSC regulatory policies.

CSA Standards

Section 11.1 of the proposed licence incorporates CSA N292.1 *Wet storage of irradiated fuel and other radioactive materials,* CSA N292.2 *Interim dry storage of irradiated fuel,* and CSA N292.3 *Management of low and intermediate level radioactive waste* by reference as Compliance Verification Criteria documents. The three CSA standards referenced in the proposed waste management licence condition (s 11.1), do not discuss the principles of minimization or prevention with respect to radioactive waste.

Regulatory Policies

The CNSC's website states that its approach to radioactive waste is articulated in CNSC documents *P-299 Regulatory Fundamentals, P-290 Managing Radioactive Waste*, and *G-320 Assessing the Long Term Safety of Radioactive Waste Management*. Unfortunately, none of these policies contain any discussion of the fundamental principles. The words minimize or prevent did not appear in any of these radioactive waste regulatory documents. The only exception was in the policy, *P-290 Managing Radioactive Waste.* It stated:

> The generation of radioactive waste is minimized to the extent practicable by the implementation of design measures, operating procedures and decommissioning practices.[9]

However, this statement does not, arguably, further any fundamental principle as it merely states that radioactive waste *is* minimized. This is not congruent with recommending or imposing licensees to actively *minimize* waste. Furthermore, the document does not elaborate on how to minimize waste and thus it is not clear (1) what framework is in place allowing licensees to communicate their waste minimization efforts to the Commission, and (2) upon what basis these efforts are reviewed and enforced by the CNSC staff.

RECOMMENDATION 1: The CNSC should incorporate a discussion of these fundamental principles within its regulatory approach to radioactive waste. This regulatory policy should then be incorporated by reference into the Licence Conditions Handbook as a required compliance verification document.

International Guidance

A review of these fundamental principles in an international context revealed they are oft-cited and incorporated as licence conditions. In a joint document on radioactive waste principles released by the UK Office of Nuclear Regulation and Environment Agency, Scottish Environmental Protection Agency and

[9] CNSC, "Regulatory Policy: Managing Radioactive Waste: P-290" (2004), p 2

Natural Resources, they propose that "the total quantity of radioactive waste accumulated on site should be minimised so far as is reasonably practicable." [10]

This principle is reiterated as a licence requirement for all nuclear sites by the UK's Office of Nuclear Regulation through a condition which requires:

> Adequate arrangements for minimising so far as is reasonably practicable the rate of production and total quantity of radioactive waste accumulated on the site at any time and for recording the waste so accumulated.[11]

Lastly, on the issue of prevention, the report states that "creation of waste should be prevented, or reduced at [its] source" [12] and the "generation of radioactive waste should be prevented, or where this is not reasonably practicable, minimised in terms of quantity and activity." [13]

IAEA literature also describes the principle of minimization and divides it into a number of additional, fundamental principles. As advised in *Methods for the Minimization of Radioactive Waste from Decontamination and Decommissioning of Nuclear Facilities*, the IAEA states the sub-principles of waste minimization are as follows:

- Keep the generation of radioactive waste to the minimum possible or practicable;
- Minimize the spread of radioactivity leading to the creation of radioactive waste as much as possible by containing it to the greatest extent possible; and
- Minimize the amount of radioactive waste that has been created by applying adequate treatment technology.[14]

RECOMMENDATION 2: As the CNSC's regulatory documents informing their approach to radioactive waste lack discussion of the fundamental principles of radioactive waste management, Northwatch submits the LCH should state that the licensee shall conduct all activities in a manner which minimizes and prevents the generation of radioactive waste.

B. Principle 4: Recordkeeping

There are significant changes in the proposed licence and LCH for the Chalk River facility which removes the express obligation to document waste management activities. For instance, condition 12.1 of the existing licence requires the licensee to have a waste management program "documenting handling, processing,

[10] Office for Nuclear Regulation et al, "Principles of radioactive waste management" (February 2016: Revision 2), online: http://www.onr.org.uk/wastemanage/basic-principles.pdf, p 9 [**Joint Statement – Principles**]
[11] *Ibid*
[12] *Ibid,* p 7
[13] *Ibid,* p 9
[14] International Atomic Energy Agency, "Methods for the Minimization of Radioactive Waste from Decontamination and Decommissioning of Nuclear Facilities" (2001), p 26

transportation, storage and safeguarding of nuclear wastes." An equivalent obligation does not appear in the revised condition 11.1 of the licence or LCH.

Furthermore, the text of Criterion 12.1(5) in the current LCH which requires inventory records be retained for 10 years, has been removed (see Appendix 1 which compares the existing and proposed licence and LCH for the Chalk River site).

The proposed LCH, however, includes an addition not present in the current LCH: reference to "Compliance Verification Criteria" contained in CSA standards. Therefore, the comments below evaluate the sufficiency of these CSA standards in addressing what otherwise appear to be substantive gaps. This chapter also reviews the regulations and international practice which informs our recommendations.

CSA Standards

Section 11.1 of the proposed licence incorporates by reference, CSA N292.1 *Wet storage of irradiated fuel and other radioactive materials,* CSA N292.2 *Interim dry storage of irradiated fuel,* CSA N292.3 *Management of low and intermediate level radioactive waste* as the compliance verification criteria. Northwatch provides the following comments with regards to record keeping and file management, as contained in these CSA standards.

CSA N292.1 *Wet storage of irradiated fuel and other radioactive materials* does not expressly require the licensee to make or retain records. In place of this requirement, we direct the CNSC to review the text of s 4.1.1. (**NB:** While Northwatch would have copied the provision below for the ease of readers of this report, we are prohibited from doing so because of CSA copyright rules).[15]

To paraphrase, s 4.1.1 directs the reader to incorporate the records management requirements of CSA N292.0 where applicable. We also direct the CNSC to a similarly worded clause included in N292.3 *Management of low and intermediate level radioactive waste*, s 4 which provides the requirements of CSA N292.0 must be read in, including requirements pertaining to documents and records management. (

While it may seem that record management is incorporated as a licensee requirement through reference to CSA N292.0, this CSA standard is listed in the proposed Licence Conditions Handbook as a Guidance Document. Therefore, in order for the CNSC to ensure compliance with the record management practices, Northwatch recommends that CSA 292.0 be listed in the LCH as a Compliance Verification document, not a Guidance Document. Doing so would remove this conflict of policies and also ensure a records management framework was applicable to the licensee, site-wide.

CSA N292.0 *General principles for the management of radioactive waste and irradiated fuel*, which is currently a licensee guidance document cited in the proposed LCH, provides that radioactive waste records shall be managed and maintained (s 5.7.1), in order to allow for its continued management and facilitate its

[15] CSA Member Assistance, Personal Communication, 11 December 2017

eventual decommissioning (s 5.7.2). It also stipulates the record management protocol which must inform this practice, which requires the logging information related to the origin, history, and characteristic of the waste (s 5.7.3). This CSA standard also requires that these records be maintained in duplicate (s 5.7.8), and the electronic database where the information is stored be maintained to ensure its integrity (s 5.7.9). Unlike the *Nuclear Safety and Control Act* regulations (see discussion below), this CSA standard does not impose timelines for the retention of records but rather, requires the licensee to ensure their preservation.

Lastly, unlike CSA N292.1 and N292.3, CSA N292.2 *Interim dry storage of irradiated fuel* does impose record management practices on the licensee. Per s 5.5.3, the standard requires licensees to maintain an inventory which documents the location and characteristics of the fuel. However as provided in s 1.1, this CSA standard only applies to the interim dry storage of irradiated fuel. Therefore, this standard does not impose site-wide record management obligations and does not adequately address the lack of express record management obligations in the licence.

RECOMMENDATION 3: In order for the CNSC to ensure compliance with the record management practices on a site-wide basis, Northwatch recommends that CSA 292.0 *General principles for the management of radioactive waste and irradiated* be listed as a Compliance Verification Criteria and not a Guidance Document in CNL's Licence Conditions Handbook.

Nuclear Safety and Control Act Regulations

In addition to the text of the licence, the LCH and CSA standards, there is an additional source which imposes recording-keeping requirements on the licensee. Pursuant to the *Class I Nuclear Facilities Regulations*[16] ("Class I Regulations"):

> **14 (1)** Every licensee shall keep a record of the results of the effluent and environmental monitoring programs referred to in the licence.
> **(2)** Every licensee who operates a Class I nuclear facility shall keep a record of
> **[…]**
> **(d)** the nature and amount of radiation, nuclear substances and hazardous substances within the nuclear facility; and
> **(e)** the status of each worker's qualifications, requalification and training, including the results of all tests and examinations completed in accordance with the licence.
> **(3)** Every licensee who decommissions a Class I nuclear facility shall keep a record of
> **[…]**
> **(d)** the name and quantity of any radioactive nuclear substances, hazardous substances and radiation that remain at the nuclear facility after completion of the decommissioning; and
> **(e)** the status of each worker's qualifications, requalification and training, including the results of all tests and examinations completed in accordance with the licence.

[16] SOR/2000-204

> **(4)** Every person who is required by this section to keep a record referred to in paragraph (2)(a) to (d) or (3)(a) to (d) shall retain the record for 10 years after the expiry date of the licence to abandon issued in respect of the Class I nuclear facility.

A similar provision is reiterated in *Class II Nuclear Facilities and Prescribed Equipment Regulations*[17] ("Class II Regulations) and it states:

> **21 (1)** Every licensee shall keep a record of each measurement of the radiation dose rates required by the licence and retain the record for the period ending three years after the earlier of the expiry date and the date of revocation, if any, of the licence.

However, there are numerous gaps in these regulations which make them an insufficient basis for record management. First, the Class I regulation requires retention of records for ten years while the Class II specifies three years. Secondly, the Class II Regulations do not require records be kept pertaining to quantity of inventory. In addition to these discrepancies, these two regulations would not apply to the host of facilities and activities described in the licence application. As the CNCS lists in its CMD, the site includes:

- 12 Class I nuclear facilities
- 5 Class I nuclear facilities in extended shutdown or in storage with surveillance
- 13 different waste management areas - 5 which are operating, 8 in long term monitoring
- 4 Class II nuclear facilities

Additionally, CNL carries out construction, decommissioning and remediation activities at CRL to establish new facilities, modernize infrastructure, clean up portions of the site no longer in use and address legacy waste issues.[18]

Therefore, because of the discrepancies between the regulations and certain activities at the Chalk River site not falling within their purview, Northwatch recommends that the licence expressly include a provision pertaining to record keeping.

RECOMMENDATION 4: Including a record management requirement as a licence condition which is not time barred, will ensure the preservation of onsite knowledge and, that the licensee's approach to record keeping is applied consistently site-wide.

International Guidance

Corroborating our recommendations that record management is a necessary principle of waste management, the following international precedents are provided.

In a joint report issued by the UK Office of Nuclear Regulation and Environment Agency, Scottish Environmental Protection Agency and Natural Resources Wales, they endorse the principle that

[17] SOR/2000-205
[18] CMD 18-H2, *supra* note 6, p 4

"information that might be needed for the current and future safe management of radioactive waste should be recorded and preserved."[19] The Office of Nuclear Regulation incorporates the principle of record management as a licence condition for all nuclear sites, mandating that "adequate records are kept of the amount and location of radioactive waste used, stored or accumulated on site at any time."[20]

A second collaborative report, involving the United Nations Environment Programme and the International Atomic Energy Agency (IAEA), is a document supporting the principle of record management in the context of radioactive waste management in order to achieve sustainable development.[21] In order to calculate the extent to which sustainable development has been applied to radioactive waste management, this joint agreement recommends assessing the data available "at the national level," to obtain "the volume or masses of radioactive waste arisings … from the waste accountancy records maintained by the various waste generators or, in consolidated form, from either national waste management organizations or regulatory bodies."[22] Lacking a records management framework, it is not possible to obtain quantitative information necessary to indicate progress by way of a baseline for sustainability.

C. Principle 5: Waste Characterization

A third principle which is absent in the proposed licence and LCH is the requirement that the licensee maintain an internal waste-related program which includes waste characterization. The existing licence contains this requirement (see Appendix 1 for a comparison of the existing and proposed licence). The comments below evaluate the extent to which the CSA standards listed in the proposed LCH address this change in licencing condition.

CSA Standards

Neither CSA N292.1 *Wet storage of irradiated fuel and other radioactive materials* nor CSA N292.2 *Interim dry storage of irradiated fuel* discuss the characterization of waste. While CSA N292.3 *Management of low- and intermediate-level radioactive waste* includes a discussion of radioactive waste characterization (s 7), it provides that waste characterization must be conducted in conformity with the requirements of CSA N292.0.

As previously noted, there is a discrepancy between the text of the CSA standards which form the compliance basis in the LCH and the text of the LCH. While N292.3 forms the compliance verification basis in the LCH, CSA N292.0 is listed as a guidance document. Therefore, there is a conflict between the text of the required CSA and the licencee's LCH.

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[19] *Joint Statement – Principles*, *supra* note 10, p 9
[20] *Ibid*, p 12
[21] UNEP *et al* "Sustainable Development Knowledge Platform - Management of Radioactive Waste" (2007), online: http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/consumption_production/radioactive_waste_management.pdf, p 379
[22] *Ibid,* p 381

Northwatch respectfully requests the Commission confirm whether N292.0 which is incorporated by reference into the required standard, N292.3, requires the licensee to comply with N292.0. Northwatch recommends this discrepancy be remedied by placing CSA N292.0 *General principles for the management of radioactive waste and irradiated* within the Compliance Verification Criteria of waste management program licence condition of the proposed licence.

Additionally, while N292.3 states the licensee shall conduct waste characterization, this standard does not define the classification of waste into the categories of low, intermediate or high-level (see instead, section A 1.3 of the N292.0) or, provide a classification methodology (see N292.0, s A 1.2). Therefore, CSA N292.3 cannot be applied absent a parallel reading of N292.0.

RECOMMENDATION 5: Northwatch recommends N292.0 *General principles for the management of radioactive waste and irradiated* be incorporated within the Compliance Verification Criteria of licence condition 11.1 Waste Management Program of the proposed licence.

International Guidance

The joint statement on radioactive waste by the UK Office of Nuclear Regulation and Environment Agency, Scottish Environmental Protection Agency and Natural Resources Wales endorses the principle that "radioactive waste should be characterised and segregated to facilitate subsequent safe and effective management." [23]

Waste characterization is necessary in order to prevent the mixing of radioactive substances with other substances of lesser or greater radioactivity. The joint report notes that absent effective management, there can be increased environmental impacts or risks.[24] As the UK's Department for Environment, Food and Rural Affairs (DEFRA) notes, it is particularly necessary to track the characterization of waste when the discharge profile of a facility changes, for instance, when it ceases to be operational. [25] As many of the activities proposed by CNL in its licence application include the decommissioning of facilities, it is crucial that they be required to report, track, classify and characterize the site's waste profile on an ongoing basis.

D. Principles 6 – 7: Environmental Protection and Sustainability

The following comments on environmental protection pertain to both the environmental protection and waste management safety control areas in the licence. Our recommendations stem from the CNSC's statutory obligation, per s 24(4)(b) of the *NSCA* to make adequate protection for the environment.

[23] *Joint Statement – Principles*, *supra* note 10, p 9
[24] *Ibid*
[25] DEFRA, "Environmental Permitting Guidance – Radioactive Substances Regulation," online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69503/pb13632-ep-guidance-rsr-110909.pdf, p 25

CSA Standards

The CSA standards listed as the compliance verification basis for the proposed LCH in section 11.1 include the following discussion in relation to environmental protection *within* a waste management framework.

CSA N292.1 and CSA N292.2 respectively require that safety requirements for the wet storage of irradiated fuel and other radioactive materials provide for the protection of the environment (s 5.2.1), and the safety requirements for the dry storage of irradiated fuel must also ensure the protection of the environment (s 4.2.2.1). CSA N292.3 lacks this overarching obligation.

Neither CSA N292.1 nor CSA N292.2 detail how this safety requirement should be accomplished. While N292.1 includes consideration of the environment in its definition of monitoring (s 3) - which can either include ongoing or periodic observations and recording, and provides that wet storage systems must be designed to limit radiation exposures to the environment As Low As Reasonably Achievable (ALARA) (s 5.3.2.2) - there is no further guidance provided. These provisions do not adequately incorporate environmental protection considerations into licensee activity. Furthermore, N292.2 and N292.3 do not include this minimal level of elaboration and thus detail on environmental protection is limited to one of the three CSA compliant verification standards referenced in the LCH.

Northwatch requests the Commission require the licensee to comment on how its safety requirements protect the environment within a waste management context. Absent express provisions in the CSA standards which detail environmental protection requirements, Northwatch also asks the Commission to explain how it enforces a similar level of environmental protection among licensees.

CNSC Regulatory Documents

While the proposed Environmental Protection condition in section 9.1 of the licence and LCH may in part remedy the gaps noted above, Northwatch submits that environmental protection should be explicitly included within the waste management licence condition.

Furthermore, if the environmental protection licence condition is intended to infuse environmental considerations within waste management plans, it fails to sufficiently incorporate the CNSC's RegDoc 2.91, *Environmental Protection: Environmental Principles, Assessments and Protection Measures* as the licensee, per the proposed LCH, must only consider section 4.6 (this section describes the licensing requirement to have an environmental management system).

The proposed LCH, which specifies only s 4.6 applies to the compliance basis is an amendment to the current licence condition which reads:

> 10.1 The licensee shall implement and maintain an environmental management system that conforms to the CNSC regulatory document REGDOC-2.9.1 Environmental Protection Policies, Programs and Procedure.

RECOMMENDATION 6: Northwatch submits the proposed LCH for both waste management (11.1) and environmental protection (9.1) reference the entirely of REGDOC-2.9.1 Environmental Protection Policies, Programs and Procedure as a Compliance Verification Criteria document and not limit is application to s 4.6 of REGDOC-2.9.1.

International Guidance

There are two interrelated international agreements that Canada has ratified which must be considered in the context of waste management. In 1998, Canada ratified the IAEA's *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*.[26] The preamble of this text requires the contracting parties to recall Chapter 22 of Agenda 21 by the United Nations Conference of Environment and Development in Rio de Janeiro, adopted in 1992 "which affirms the paramount importance of the safe and environmental sound management of radioactive waste."[27]

In addition to Agenda 21 being incorporated by reference into a convention to which Canada is party, Canada is also a signatory of Agenda 21. In seeking to promote the safe and environmentally sound management of radioactive waste, Agenda 21's Chapter 22 describes at length what management-related activities member states should pursue in furtherance of this objective (see Appendix 3 for the full text of Agenda 21, Chapter 22).

A stated purpose of the CNSC's enabling statute, the *NSCA* per s 3, is to provide for the limiting of risks to safety of person and the environment "in a manner that is consistent with Canada's international obligations." Thus, Northwatch requests the Commission to respond to the texts of the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management* and Agenda 21 to explain how it will consider these international obligations in its deliberations of the relicensing of Chalk River. Secondly, Northwatch requests the CNSC explain how these obligations are integrated into the licensing basis and upon what grounds CNL has demonstrated it is acting in furtherance of these principles.

E. Principle 8: Proximity

A final principle to incorporate into the review of radioactive waste management plans is the proximity principle. As reviewed below, this is a key tenet of EU and UK environmental and waste policy. It can be understood as follows:

> The Proximity Principle is a key element of EU environmental and municipal waste management policy, introduced in Article 5 of the Waste Framework Directive (75/442/EEC). Essentially the Proximity Principle requires waste to be 'disposed' of in one of the nearest appropriate installations. This limits the environmental impact of transporting waste long distances and helps to ensure that communities take responsibility for their own waste rather than imposing it on others.

[26] IAEA, "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management," online: http://www-ns.iaea.org/conventions/waste-jointconvention.asp
[27] *Ibid*

In the UK context, all forms of waste management are covered, not just disposal. In addition, a key principle is that the waste will be managed as near as possible to its place of production.[28]

CSA Standards

None of the CSA standards incorporated by reference into the proposed licence or LCH consider this principle.

International Guidance

Pursuant to the Scottish Government's policy statement on the radioactive waste,[29] they explicitly require the proximity principle to be considered when addressing long-term management options for waste. In line with this management principle, it means that long-term radioactive waste management facilities should be (1) located as near to the site where the waste is produced, as practicable, so that (2) the need to transport the waste over long distances is minimal.

RECOMMENDATION 7: The CNSC should endorse the proximity principle within its regulatory policy on radioactive waste management and incorporate it into the licence, to ensure CNL's waste management program is in conformity with this tenet.

III. MANAGEMENT OF RADIOACTIVE WASTES AT THE CHALK RIVER LABORATORIES

Radioactive waste management at the Chalk River national laboratories is a two-fold challenge, as:

1. The site hosts an estimated 70%[30] of Canada's $7 billion[31] array of nuclear liabilities, including a wide range of low, intermediate and high-level wastes (much of which dates to the early decades of nuclear research and experimentation); and
2. Operations at the Chalk River Laboratories continue to accumulate additional radioactive wastes from both on-site operations and off-site sources.

This chapter presents Northwatch's findings on select aspects of CNL's management of radioactive wastes, as described in their application, Commission Member Documents, and publicly available documents. The following three research questions, identified as being central to evaluating CNL's performance at the Chalk River Laboratory with respect to radioactive waste management, framed our review:

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[28] Scottish Government "Scotland's Higher Activity Radioactive Waste Policy 2011," online: http://www.gov.scot/Publications/2011/01/20114928/2
[29] *Ibid*
[30] Natural Resources Canada, "Evaluation of the Nuclear Legacy Liabilities Program (NLLP) of the Energy Sector" (2011)
[31] Ottawa Citizen, "Chalk River's toxic legacy" (December 2011), online: http://ottawacitizen.com/news/chalk-rivers-toxic-legacy/wcm/12a1f5e3-9b71-4448-9414-1e4416fbacfc

1. Has CNL provided adequate information about radioactive waste and its management, primarily in their application to renew their operating license, and secondarily in CNL supporting documents?
2. Is CNL making adequate progress in addressing legacy wastes and liabilities at the Chalk River Laboratory site?
3. Are CNL's practices of accepting additional radioactive wastes from external sources exacerbating the waste management challenges at the Chalk River Laboratory site?

This chapter summarizes Northwatch's findings in these three areas of investigation undertaken as part of Northwatch's contribution to the current licensing review.

A. Adequacy of Information Provided

The *General Nuclear Safety and Control Regulation Requirement* (herein "*General* Regulations") sets out in Section 3 that:

> 1) An application for a licence shall contain the following information:
> […]
> (j) the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed, or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste;[32]

In Attachment B of their application to renew the site license for the Chalk River Laboratories, CNL provides the following summary response to this legislative requirement (see Appendix 4 for a copy of the chart which compares the licensing condition and licensee response):

> Specific information on radioactive and hazardous wastes is presented in the annual and quarterly reports prepared as per the requirement of SCA "Operating Performance" Part II, Section 4.16 of the CRL LCH [B-2]. Relevant requirements for managing and disposing radioactive and hazardous waste at the CRL site are addressed as per SCA "Waste Management" Part II, Section 12 of the CRL LCH [B-2].[33]

The CNL application consists solely of a cover letter and three attachments: Attachment A, which provides very basic information about the applicant, such as name, license number, address; the above noted Attachment B with its very summary statements related to waste management which are comprised largely of references to documents to be submitted to the CNSC; and Attachment C, titled "Significant Evolutionary Initiatives Planned for the Proposed Ten Year Period of the Renewed Licence".

[32] CNL Application, *supra* note 3, Attachment B: Compliance Material for 2018 Chalk River Laboratories Site Licence Renewal
[33] *Ibid*

CNL submits in Attachment A that they have met the information requirements for license renewal application through the cursory information and references provided in Attachment B (which is presented in whole above). CNL states the following:

> Attachment B of this letter presents the information required by the Act and the Regulations made pursuant to the Act, to be included in an application for the renewal of a licence. Specifically, Attachment B provides a clause-by-clause statement for relevant excerpted clauses from the CNSC Regulations, and information is presented as to how CNL meets the requirements of the compliance verification criteria prescribed by CNSC staff in the CRL Licence Conditions Handbook [A-1].

This is a matter of dispute between Northwatch and CNL. Northwatch submits that the licence applicant is required to provide - as part of their license application - information that includes "the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed, or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste" per s 3 of the *General Regulations*. This requirement has not been met.

The regulatory requirement is <u>not</u> to provide a list of documents that <u>may</u> include that information and which the proponent has or will provide to the CNSC; the requirement is to provide the information in the license application itself.

RECOMMENDATION 8: The CNSC should require CNL to provide information which at minimum summarizes the volume, origin, form, quantity and name of any radioactive waste or hazardous waste that may result from the licensed activities; the proposed method for managing and disposing of that waste must be included, as per the regulatory requirements.

Northwatch further reviewed the Commission Member Document submitted by CNL on November 10, 2017 in support of their application for licence renewal.[34] In the CNL Commission Member Document there are numerous very general statements which reference activities related to the generation or intake of wastes that CNL anticipates will result from their activities throughout the next licence period, but no information is provided on the volume or quantity of these wastes, and no specifics are provided with respect to the origin or form of the wastes. Examples include:

- Waste processing, segregation and packaging of wastes generated from decommissioning activities related to the NRX reactor;[35]
- Decommissioning of Building 240, Building 241, Tank 240-1 and Tank 240-2;[36]

[34] CMD 18-H2.1, *supra* note 4
[35] *Ibid, s*ection 4.5 Nuclear Facilities in Storage-With-Surveillance State
[36] *Ibid*

- CNL has maintained an accurate inventory of sealed sources, both in use and in storage during the licensing period; the inventory has been provided to the CNSC upon request and as a minimum on an annual basis;[37]
- The Waste Management program provides oversight, compliance, and services for waste management, supporting all waste generators to meet strategic priorities for all phases of the waste management lifecycle, and associated business needs;[38]
- CNL will continue to provide waste processing and storage services;[39]
- CNL ensures the continued availability of waste storage facilities and capability for both ongoing routine operations and special projects related to waste handling on the CRL site;[40]
- Waste generated from off-site generators (including Whiteshell Laboratories and other CNL sites) will be managed and stored appropriately;[41]
- CNL developed CRL low-level radioactive waste forecast for period 2016 to 2046;[42] and
- The CNL strategy for D&WM is to safely accelerate decommissioning, environmental remediation, and waste management, thereby resulting in an increase in shipments under the TDG program.[43]

Northwatch's above recommendation that CNSC require CNL to provide the required information, as per the regulatory requirements, is unchanged by the findings of our review of CNL's CMD 18-H2.1.

B. Radioactive Wastes from External Sources

In CNL's licence application, the proponent states that "CNL intends to conduct the following licensed activities throughout the proposed period of the renewed licence which are identical to those in the current licence [B-1]", including:

> h) possess, store or dispose of waste received from offsite clients; and
> i) receive, repair, modify, store and return contaminated equipment from offsite clients.[44]

In contrast, the messages most prominent in the CNL CMD and even more so in the CNL "visioning" document[45] is one of site revitalization and remediation, addressing legacy wastes and liabilities, and modernizing operations at the CNL property. These documents do not describe in any detail how CNL's activities and operations will continue to accumulate radioactive wastes on the Chalk River property; even more so, they fail to provide the public with an accounting of how CNL's business practice of accepting

[37] *Ibid*, Section 4.14 Sealed Sources
[38] *Ibid*, Section 12.1 Waste Management Program
[39] *Ibid*
[40] *Ibid*
[41] *Ibid*
[42] *Ibid*, Section 12.1.1 Past Performance
[43] *Ibid*, Section 15.3 Future Plans
[44] CNL License Application, *supra* note 3, Attachment B: Compliance Material for 2018 Chalk River Laboratories Site Licence Renewal
[45] Online: http://www.cnl.ca/site/media/Parent/Long_Term_Strategy_2017April18.pdf

radioactive wastes on a commercial basis continues to add to the radiological burden born by the Chalk River Laboratory property, including the airshed, terrestrial environment, and the local and regional watersheds.

Northwatch's Concern

Northwatch has previously raised concerns with the Commission regarding the commercial trade and cross-border trafficking of radioactive wastes.

Initially, our communications were with CNSC staff[46] as we considered an application by Perma-Fix[47] to export radioactive wastes to a list of consignees which included both the CNL at the Chalk River, Whiteshell and Douglas Point sites, but also three Ontario Power Generation nuclear stations and three facilities operated by Cameco, including the Blind River uranium refinery on the North Shore of Lake Huron. It was the inclusion of the Blind River facility in northeastern Ontario – Northwatch's geographic area of interest – within the Perma-Fix application which first drew our attention, and our concerns about the lack of transparency and accountability surrounding the transit and transfers of radioactive wastes; our concerns have broadened and deepened as we consider the issue more generally.

In reviewing Perma-Fix's license application, we made inquiries with CNSC staff in respect of the existence of any permits Perma-fix currently holds which would permit it to export radioactive wastes from the U.S. to Canada (including but not limited to residuals from wastes they may have previously exported from Canada to the U.S. for treatment), and with respect to the licensing period of any such license, and whether Perma-Fix has applied for a license or a license renewal or extension which would allow the import of radioactive wastes from the U.S. to Canada (including but not limited to residuals from wastes they may have previously exported from Canada to the U.S. for treatment). We reviewed the most recent license for the Blind River uranium refinery and the related license condition handbook, given the facility's location within our region, and we found no provisions in those instruments for the receipt of radioactive wastes from Perma-Fix's U.S. operations. We also noted that Perma-fix's import/export activities were not reported in the CNSC's 2015 Regulatory Oversight Reports on waste management or on uranium processing facilities.

We inquired of CNSC staff as to whether Perma-Fix had a permit to import radioactive wastes from the U.S. to Canada (including but not limited to residuals from wastes they may have previously exported from Canada to the U.S. for treatment), and received the following response:

> Perma-fix does not have a licence issued by the CNSC pursuant to the *Nuclear Non-proliferation Import and Export Control Regulations* to import nuclear substances contained in radioactive

[46] Email Subject: Re: Import of radioactive wastes from Perma-fix's U.S. operations to Cameco's Blind River uranium refinery, received 2017-06-02 1:14 PM
[47] ADAMS Accession Nos. ML17005A377 and ML17005A373, respectively

> wastes from the USA to Canada. Perma-fix is a USA-based company and would obtain any such licence from the USA authorities, namely the US Nuclear Regulatory Commission.[48]

We then further inquired, given that – based on the CNSC staff response - it appeared that Perma-fix did not have a license to transfer any residual wastes from the U.S. back to Canada, whether CNSC staff were aware of any arrangements between Perma-Fix and another waste company operating in Canada (such as UniTech) for the transfer of these wastes, i.e. for the "return trip" for any residuals. We further questioned how the CNSC track such arrangements, i.e. arrangements related to the important and export of radioactive wastes. CNSC staff responded:

> CNSC staff do not track nor are aware of any arrangements between CNSC licensees who may operate in the US and Perma-fix. Any return of residual processed waste to Canada would need to be done under a CNSC licence.[49]

We appreciated CNSC staff responding in a relatively timely fashion to our inquiries with respect to the Perma-Fix application to the NRC, but our overall experience was that we were greatly frustrated by our inability to develop a clear understanding of the relationship between (1) the Perma-Fix application as posted by the NRC for public comment and (2) the activities of the nine Canadian consignees listed in the Perma-Fix application, including the Blind River facility which was our focus during the exchange with the CNSC staff at that time, and the Chalk River Laboratory, which is the subject of the current license application.

The degree to which a lack of common terminology on these matters between the CNSC and ourselves was a factor is something we have not come to a conclusion on. What we have concluded is that there is a very troubling lack of transparency on the Canadian side of the border with respect to imports and exports of nuclear materials between Canada and the U.S.

More recently, Northwatch expressed concerns with respect to the commercial trade and cross-border trafficking of radioactive wastes, as noted in our submission to the CNSC on the application from Ontario Power Generation Inc. (OPG) to amend Power Reactor Operating Licences for the Darlington and Pickering Nuclear Generating Stations to the import and export nuclear substances in contaminated laundry, packaging, shielding or equipment.[50]

In our submission on the OPG application we made a number of recommendations, including the following which are directly relevant to the CNL application to renew their operating license for the Chalk River Laboratory. We ask they be considered by the CNSC in its review of the CNL licence renewal:

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[48] Email Subject: Re: Import of radioactive wastes from Perma-fix's U.S. operations to Cameco's Blind River uranium refinery, received 2017-06-02 1:14 PM

[49] Email Subject: Re: Import of radioactive wastes from Perma-fix's U.S. operations to Cameco's Blind River uranium refinery, received 15 Jun 2017 14:44 PM

[50] Ref. 2017-H-109, CMD 17-H109.7 Submission from Northwatch

1. Take immediate steps to disclose the full inventory of authorizations for the import/export of radioactive wastes.

2. Prepare a discussion paper outlining recent and current practices and arrangements with respect to the import and export of nuclear materials, with an emphasis on materials that may be classified as radioactive or nuclear wastes. This discussion paper should include:

- *An outline of arrangements in Canada and the U.S. and between Canada and the U.S. with respect to the import / export of nuclear materials / wastes*
- *An outline of Canada's system of authorizations with respect to the import / export of nuclear materials / wastes*
- *A description of measures and options for the full disclosure of the full inventory of authorizations for the import/export of radioactive wastes that would be routinely maintained and publicly accessible*
- *Mechanism for establishing radiological and volume limits for the import / export of nuclear materials / wastes*
- *Rationale or criteria for circumstances under which the import / export of nuclear materials / wastes would be considered*

Information about Radioactive Wastes from Off-site Sources included in CNL Submissions

As noted above, CNL does express in their application their intent to "possess, store or dispose of waste received from offsite clients" and to "receive, repair, modify, store and return contaminated equipment from offsite clients"[51] but they do not provide information about those wastes, their quantity, source or characteristics. While indicating that CNL provides reports on radioactive and hazardous wastes, the referred-to licence condition does not contain any direction with respect to reporting waste quantities, volumes or characteristics, and particularly absent is any direction with respect to pubic reporting. While these reports may be submitted to the CNSC and they may contain information about the volume, characteristics and source of wastes that are transferred on-site by CNL, there is no actual indication of that in the application or the CMDs and the reports are not publicly available.

The CNL CMD confirms CNL's intention to continue to add radioactive wastes from off-site sources to the on-site inventory, including by the following statements:

- CNL will continue to provide waste processing and storage services [52]
- Waste generated from off-site generators (including Whiteshell Laboratories and other CNL sites) will be managed and stored appropriately [53]

[51] CNL Application, *supra* note 3, Attachment B: Compliance Material for 2018 Chalk River Laboratories Site Licence Renewal
[52] CMD 18-H2.1, *supra* note 4, Section 12.1 Waste Management Program
[53] CMD 18-H2.1, *supra* note 4, Section 12.1 Waste Management Program

- the wastes originate in part from the operation of CRL and in part from various Canadian off-site organizations such as isotope users, isotope manufacturers, hospitals, government agencies, industrial plants, and commercial radioactive waste brokerage firms [54]
- Over 1000 tons of characterized legacy metal from salvaged equipment was shipped off-site for recycling from the WMA D recoverable surface storage area [55]

No additional information is provided by CNL about the transfers of radioactive wastes on and off-site from the Chalk River National Laboratories property.

Information about Radioactive Wastes from Off-site Sources in Canada

Other than the very minimal information conveyed in the previous section, the CNL application and Commission Member Document failed to provide information about wastes which are generated off-site and dispositioned to the Chalk River Laboratories for long term management / disposal.

CNL does indicate that sources include "isotope users, isotope manufacturers, hospitals, government agencies, industrial plants, and commercial radioactive waste brokerage firms".[56]

These are operations that we would expect to be reported on through a combination of the CNSC's *Regulatory Oversight Report on Nuclear Substances* and the *Regulatory Oversight Report on Uranium and Nuclear Substances Processing*, which have been reviewed by the Canadian Environmental Law Association and by Northwatch and the Canadian Environmental Law Association respectively. As the Commission will recall, one of the shortcomings Northwatch noted in their written submission on the *Regulatory Oversight Report on Uranium and Nuclear Substances Processing* was the inadequate coverage of waste management as undertaken by the reported on facilities.[57]

In the course of Northwatch's review of the *Regulatory Oversight Report on Uranium and Nuclear Substances Processing* the following points were with respect to the disposition of wastes generated by these facilities:

- Radioactive waste from SRBT in Pembroke is shipped to CNL's Chalk River Laboratories
- Radioactive wastes from Nordion in Pembroke is shipped to CNL's Chalk River Laboratories

We have no information that indicates that Cameco sends radioactive wastes to the Chalk River Laboratories, or has an intention to do so as part of their decommissioning plan, but seemingly the manner in which several waste generating companies (including Cameco) are jointly named in export licenses issued

[54] CMD 18-H2.1, *supra* note 4, Section 17.1.10 Waste Management Areas
[55] CMD 18-H2.1, *supra* note 4, Section 17.1.10.1 Past Performance and Major Modifications or Improvements
[56] CMD 18-H2.1, *supra* note 4, Section 17.1.10 Waste Management Areas
[57] *See* Northwatch's response to the *CNSC's Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2016*

by the NRC as both sources of waste being transferred from Canada to the U.S. and as consignees for the return of the radioactive residuals, the potential is there even if the intent is not known to be.

Due to a lack of disclosure by the companies, Northwatch was unable to determine if BWXT or Best Theratronics send radioactive wastes to the Chalk River Laboratories, or have an intention to do so as part of their decommissioning plan.

Information about Radioactive Wastes from Off-site Sources in the U.S.

Given the absence of information about on and off-site transfers of radioactive wastes in the documents provided by CNL to support their application for renewal of its Nuclear Research and Test Establishment Operating Licence for the Chalk River Laboratories, Northwatch considered what other sources may provide the missing information, in all or part.

The U.S. Nuclear Regulatory Commission (NRC) operates an online information registry known as ADAMS - the Agency-wide Documents Access and Management System. ADAMS is the official recordkeeping system, through which the U.S. NRC provides access to "libraries" or collections of publicly available documents, including the Publicly Available Records System (PARS) Library which contains more than 730,000 full-text documents that the NRC has released since November 1, 1999, and the Public Legacy Library, which contains more than 2 million bibliographic citations (some with abstracts and full text) for earlier documents with the majority dating back to 1980. Several hundred new documents are added to ADAMS each day.[58]

In an effort to gather information about off-site transfers of radioactive wastes that may be originating or routing through the U.S. but have the Chalk River Laboratories as their destination, Northwatch conducted a number of different searches of the ADAMS on-line registry, using different search parameters. Over 1,000 documents were viewed on-line, and 238 documents were downloaded for more detailed review, based on their match to the search parameters that intersected documents related to export and documents that contained the words “Chalk River”.

Of the 238 documents that were reviewed in detail, all but 10 were from the mid-1990s or newer and those earlier documents had been added recently, presumably because of their relevance to current topics of regulatory or permitting interest. The majority of the documents related to the export of waste from the U.S. to Canada were dated 2007 or newer.

The largest group of documents related to the shipments of Highly Enriched Uranium (HEU), and included a variety of subjects, including export permits, but also expressions of concerns from agencies, government, non-governmental organizations and members of the public about the continued use of HEU in the production of medical isotopes, about what seemed to be perceived as a serious lack of progress on the part of Nordion and AECL to make a shift to isotope production using LEU (and so reduce the proliferation

[58] *See* online: https://www.nrc.gov/reading-rm/adams.html

concerns), and – in later years - about the shipments of liquid HEU from Chalk River to Savannah River as part of the repatriation program.

The second largest group of documents related to the export of radioactive wastes from the U.S. to Canada. These 42 documents represent a range of shipments over a number of years, with many of the export licenses covering multiple materials over a number of years, but with some of the documents overlapping, i.e. in some cases there were multiple records in the ADAMS relating to a single export license.

The following are examples of the wastes described as being destined for final disposition at Chalk River, as described in various licenses available through NRC's ADAMS registry:

- Export to Canada of 100,000 pounds of scrap zirconium tubing contaminated by 15.8 kilograms of uranium enriched to a maximum of 5 percent; transfer by Mississauga Metals and Alloys, Inc. with the residual radioactive wastes sent to Chalk River "burial site" for disposition
- Export to Canada of bulk tritium gas being returned to the original supplier (Ontario Power Generation Inc.) with consignee identified as AECL Chalk River for "long term storage" on behalf of OPG
- 5,000 kilograms of stainless steel contaminated with low enriched uranium, via PermaFix/ Diversified Scientific Services, Inc. (DSSI)
- 630 kilograms of non-conforming waste containing approximately tritium and other fission product radionuclides
- Heavy water inadvertently shipped by Ontario Power Generation to DSSI; transferred via Mississauga Metals & Alloys Inc., from PermaFix/Diversified Scientific Services Inc, (DSSI) (Kingston, Tennessee) and Framatome ANP, Inc. (Richland, WA)
- Nonconforming Class A Radioactive Mixed, not exceeding 378,000 kilograms Class A Radioactive Mixed Waste, containing a total of 1,200 curies of tritium and C-14, mixed fission product radionuclides, and other contaminants, consisting of oil, solvents, scintillation fluids, grease, paint chips, paint sludge, spent bead resins, powder resins, activated carbon and other materials.
- 420.0 kilograms in two drums containing 5.4 curies tritium and other mixed fission product radionuclides (estimated quantity of non-conforming Class A Radioactive Mixed Waste that may be found in a total of 378,000 kg of such waste that DSSI Is authorized by NRC license 1W012 to import from Canada), "DSSI to determine actual quantity of non-conforming waste which cannot be processed at Its Boiler Industrial Furnace and must be returned after examining the material"; 1W012/02 amended to increase the total tritium, C-14, mixed fission product radionuclides and other contaminants.
- From Areva in VA, 3.0 kilograms U235 contained in 60.0 kgs uranium, 60.0 kgs 5.00% 3.0 kgs, carrier is Mississauga Metals
- Enriched to 5.0 w/o maximum, in 150,000.0 kgs zirconium tubing, 25,000.0 kgs of molybdenum metal pieces, and 5,000 kgs stainless steel; For decontamination and recovery, of metals. Waste to be disposed at Chalk River.

- Imported to date are included under the specified ceilings. The licensee is authorized to import up to 378,000 kilograms of materials including oil, solvents, scintillation fluids, grease, paint chips, paint sludge, spent bead resins, powder resins, and activated carbon contaminated with Class A Radioactive Mixed Waste consisting of tritium, C-14, and other mixed fission product radionuclides, the combined total activity level of which shall not exceed 2,000 curies. For transportation purposes, the contaminated materials will be either Low Specific Activity (LSA) radioactive materials or exempt quantities
- Name of Applicant: AREVA Class A radioactive License to be amended to extend expiration date; class A waste in the form of contaminated metals, Metals to be decontaminated and remains to be disposed of at AECL Chalk River facility; Application No.: XW0O7/02 Docket No.: 11005292. Licenses originally issued to Framatome ANP, Inc.)
- Class A radioactive waste in the form of contaminated metals, Metals to be decontaminated and remains to be disposed of at AECL Chalk River facility;
- 420.0 kilograms in two drums containing 5.4 curies of tritium and other mixed fission product radionuclides (estimated quantity of non-conforming Class A Radioactive Mixed Waste that may be found in a total of 378,000.0 kilograms of such waste that DSSI is authorized by NRC license IW012 to import from Canada).
- Class A radioactive waste consisting of up to 5,500 tons of material contaminated with various radionuclides in varying combinations. The material includes: metals, wood, paper, concrete, cloth, rubber, plastic, liquids, and animal carcasses and animal-human waste from research and medical facilities. Given that there will be numerous shipments, the total combined activity levels for all of the radioactive contaminants on the materials imported under this license will not at any time exceed the licensee's domestic possession limits.
- Class A-radioactive waste consisting of material contaminated with various radionuclides in varying combinations imported from Canada from Atomic Energy of Canada Limited or Zircatec Precision Industries, Inc. with residuals to be returned to Atomic Energy of Canada Limited or Zircatec for disposition
- Forty-eight (48) DOT Empty containers to be shipped to AECL Chalk River (Canada). The containers consist of one nominal 8'x8'x20' cargo container weighing approximately 5500 kgs (12,000 pounds); thirty (30) B-25 boxes (nominal 4'X4'X8' weighing. approximately 325 kgs or 720 pounds; and seventeen (17) roll-off Approx 0.119 kgs of source containers (nominal 6'X8'X21' weighing 2500kgs or 5500 pounds). Material Incidental radioactive material is present as contamination on the interior surfaces of the containers. The contamination is < 0.002 grams of SNM (Pu) predominantly byproduct material, with traces of source and special nuclear material. All radioactive material is in the form of solid metal oxides.
- Hospital in Texas to NRC re disposal of the Cesium from the Gammacell 1000; Best Theratronics advised waste would be stored on-site by Best Theratronics in Kanata “for several years before being routed to the AECL Chalk River Waste Management facility for long term storage and eventual disposal"
- Several licenses named several points of Origin: (1. Atomic Energy of Canada Limited (AECL), Chalk River Laboratories, Plant Road, Chalk River, Ontario, Canada KOJ 1 JO 2. Atomic Energy of Canada,

Limited, Whiteshell Laboratories, Pinawa, Manitoba, Canada ROE 1 LO 3. Cameco Corporation, Cameco Fuel Manufacturing, 200 Dorset Street East, Port Hope, Ontario, Canada L 1A 3V4 4. Cameco Corporation, Port Hope Conversion Facility, 1 Eldorado Place, Port Hope, Ontario, Canada L 1A 3A1 5. Cameco Corporation, Blind River Refinery, 328 Eldorado Road, P.O. Box 1539, Blind River, Ontario, Canada POR 1BO) with generic indication that residuals would be return to same list of consignees; appears to permit waste from any of the nine sources to be returned to any of the nine as consignees, as follows:

> *"Class A radioactive waste consisting of material contaminated with various radionuclides in varying combinations imported from Canada under NRC Import License IW022 (and subsequent amendments). This includes waste which may need to be returned to the Canadian generators (Cameco Corporation and Atomic Energy of Canada, Limited) for disposition. Such waste could include material that could not be recycled for beneficial reuse, or does not conform to specification, and/or has been processed for volume reduction and is directly attributable to processing the material imported under IW022 (and subsequent amendments). The quantity of radioactive waste authorized for export shall be consistent with and not exceed that imported under IW022 (and subsequent amendments"*

The above examples are not a complete set of summaries from export (to Canada) licenses accessed via ADAMS, but were selected to provide a sample of the range of waste types and conditions. Further, it is not Northwatch's expectation that this search yielded a complete set of export licenses that might include wastes destined for the Chalk River Laboratories.
Three general observations follow from Northwatch's review of the export permits for the transfer of radioactive wastes from the U.S. to Canada:

1. In what we would estimate to be the majority of cases the radioactive wastes being exported from the U.S. to Canada are residuals of radiologically contaminated materials that have been sent from Canada to the U.S. for some form of "treatment" or "processing;"
2. It is our current understanding that the return of the residual wastes is a regulatory requirement in the U.S., i.e. for an import permit to be issued there must be a corollary export permit for the residual wastes; and
3. There appears to be no requirement that the residual radioactive wastes are returned to the same entity as generated the radiologically contaminated wastes that were sent to the U.S. for treatment, e.g. there appears to be no barrier to OPG's wastes being returned to Chalk River, or Cameco's wastes being returned to Chalk River.

Following from the observations set out above, there is no identifiable system in place for the tracking of radioactive wastes and their transfer across borders, or their transformation from private interests into public liabilities. While we hold an expectation that the CNSC has a tracking system in place, there is no evidence that this is the case. While this is detrimental to the public interest in general, it is particularly so in instances where the public has a concern about increasing radiological burdens in a particular area or location, such as the Chalk River Laboratories properties.

RECOMMENDATION 9: The CNSC should direct CNL to provide a detailed inventory of waste transfers into and out of the Chalk River Laboratory properties, including transfers from other operations in Canada, and transfers from the U.S. into Canada. The inventory should include information that allows the user to trace waste volumes from point of generation through treatment to long term storage / disposition.

RECOMMENDATION 10: The CNSC should establish a publicly accessible registry of waste transfers between operations / sites in Canada, and transfers in and out of Canada. The registry should include information that allows the user to trace waste volumes from point of generation through treatment to long term storage / disposition.

C. Progress in Addressing Legacy Wastes and Liabilities

The enormity of the nuclear legacies at the Chalk River site are indisputable; these are acknowledged by both CNSC and CNL, and even noted in the Licence Condition Handbook.

Despite this acknowledge, the Commission Member Documents submitted by the Canadian Nuclear Laboratories and staff of the Canadian Nuclear Safety Commission lack two important elements:

- Any sense of urgency in addressing these challenges
- Any clear setting out of progress to date in remediating the site, and
- Any clear timeline for meeting the next milestones in remediation

Both CMDs include discussion of both the legacies and past or intended responses to them, to various degrees. Neither do so adequately.

To illustrate this particular failing, Northwatch reviewed three well-known challenges at the Chalk River site.

Tile holes

As outlined in a 2011 report based on the 2006 Comprehensive Preliminary Decommissioning Plan, there are one hundred tile holes in Waste Management Area B containing an estimated 175 highly-radioactive old prototype fuel rods encased in aluminum which have been invaded by water, which is corroding the rod casings and old reactor fuel.

The CNSC staff CMD describes there being over 750 tile holes (below-grade vertical cylindrical concrete pipes sitting on a poured concrete base and backfilled with sand) located in the Waste Management Area B containing spent fuel rods used in research reactors and as prototypes, with approximately 100 tile holes having shown signs of degradation (e.g., fuel corrosion, production of hydrogen gas). It reports that CNL designed and built the Fuel Packaging and Storage (FPS) facility in order to retrieve the spent fuel from specific tile holes and store them in a better controlled and monitored facility and designed to current standards, and that CNSC staff reviewed the design requirements documents for the FPS and concluded it was designed to appropriate codes and standards and meets regulatory requirements. It provides no information on progress made in retrieving / transferring the wastes or the timeline going forward, or whether conditions are as anticipated.

The CNL CMD simply reports that radiological surveys of tile holes continued and that CNL will operate and maintain the Fuel Package and Storage facility and continue transfer of fuel from the tile holes

FISST

The Fissile Solution Storage Tank (FISST) is one of a number of aging tanks storing liquid radioactive waste and which have been identified as areas for priority action in addressing the CRL's nuclear legacies.

The CNSC staff CMD includes only a very brief discussion of the FISST, identifying it as an area of risk, and an "area of focus for CNSC staff". However, the CMD purports that "based on ongoing CNSC staff inspections and review, there is no safety concern on a near term basis and CNL is engaged in a long term solution of emptying the FISST via repatriation to the United States".

CNL says only that "the project to repatriate FISST materials has completed major milestones" and that they'll continue to monitor the structural integrity and chemistry control of the FISST facilities. They also report that in 2012 a new uninterruptible power supply was installed.

Plumes

There are several groundwater and surface water contaminant plumes on the Chalk River site extending from Area B. (Area B is also a "special burials" for two reactor vessels, one from NRX in 1970 and the other from the National Research Universal reactor in 1973, and other highly radioactive equipment). One is dominated by strontium-90 that has leached from the unlined sand trenches. Another plume contains tritium.

The CNSC staff CMD describes CNL's groundwater monitoring program, and includes in it a very general – not to mention euphemistic - description of the contaminated plumes: "The radioactive and non-radioactive contaminants that appear in groundwater downgradient of the CRL waste management areas (WMAs) and other sites subject to groundwater monitoring are the result of legacy waste storage practices that did not provide sufficient containment relative to the current practices at the site." The CMD goes on to state that there has been a significant decrease in tritium concentrations in groundwater immediately downgradient of WMA-C, or so they have surmised from reviewing CNL's submitted results, and CNSC staff's review also found a decrease in groundwater tritium concentrations in the NRU rod bay plume. The staff CMD also notes some gradually increasing concentration of tritium at some locations in the southern and southeastern region of WMA-B, to which they will respond by continuing to monitor CNL's results of the GWMP in this area. The CMD also briefly describes a plume of tritium and Sr-90 which discharges to the Ottawa River and that CNL completed the field work related to the NRX Rod Bay plume update in 2015 and produced a report in 2016.

The CNL CMD describes monitoring upgradient and downgradient of the permeable reactive barrier installed downgradient of WMA A in 2013 is showing marked reductions of Sr-90 in groundwater passing through the barrier, and indicated that they are involved in plume monitoring: which involves detailed evaluations of known groundwater contaminant plumes every five or ten years, with the objectives of updating known groundwater contaminant plumes

In order to assess the potential environmental impacts of these groundwater plumes, and evaluate the suitability of planned remedial actions for the plumes

None of the three above examples convey any sense of urgency or provide any sense of confidence that the remediation of the site is being given adequate resources and milestones are being met on a regular basis.

RECOMMENDATION: The Commission should direct the CNL, AECL and CNSC staff to jointly select an independent third party expert group to undertake a comprehensive review of progress being made on the remediation of the Chalk River site, including in the review an evaluation of progress made against previously set milestones, and identification of milestones for the next ten and twenty years against which progress is reported annually to the Commission and the public.

IV. PROCEDURAL CONSIDERATIONS

A. Standardization of Licences

Upon review of the CNSC's CMD 18-H2, it has come to our attention the CNSC is amending its approach to licencing in order to standardize the format of licences and Licence Conditions Handbooks (LCHs). As the CNSC notes in their CMD:

> CNSC staff have recently developed a set of standardized licence conditions for Class I facilities in order to ensure consistency of language and improve clarity of requirements for licensees. The proposed licence is aligned with this initiative and consistent with other proposed licences brought before the Commission by CNSC staff in recent licensing hearings for Class I facilities and uranium mines and mills.[59]

Therefore, CELA sought further information from the CNSC which explained the standardization of licences. As provided in an email to CELA from the CNSC, it was confirmed that:

> The Harmonized Plan (HP) for Improvement Initiatives is our corporate program that brings together all CNSC improvement initiatives under one umbrella and governance structure.
>
> One such HP improvement initiative was a project to standardize licence conditions which was completed in 2014. The purpose of this project was to produce a list of standardized licence conditions that could apply to all Class I facilities and uranium mines and mills.[60]

We were informed by the CNSC that while a public consultation has not occurred specifically on the HP initiative, our opportunity to comment on the standardizing of licences was provided by way of this public hearing. We are concerned, however, that comments made about the format or content of CNL's licence made in this report will only be considered in the context of Chalk River. To the contrary, we submit that the comments herein with respect to licence standardization should be applied not only to CNL's Chalk River proposed licence, but all licensees who will be integrated into the new licence template.

B. CSA Standards

[59] CMD 18-H2*, supra* note 6, p 13
[60] R Richardson, Personal Communication, 7 December 2017

As Northwatch noted in a recent submission to the CNSC with respect to its Regulatory Oversight Report on Uranium and Nuclear Processing Facilities, we affirm our submission that the public's ability to review licensee's application and the CNSC's proposed licence and Licence Conditions Handbook is impaired by an ongoing and heightened reliance on CSA standards.[61]

As can be noted in the proposed Licence Conditions Handbook for the Chalk River site licence, CSA standards are being incorporated through reference in place of substantive conditions. This poses a significant barrier to public review as CSA standards are (1) not available in a manner which members of the public can easily gain access to and (2) the complimentary CSA access is not equivalent to a paid membership. Each of these issues are reviewed in turn, below.

The CNSC has stated it "makes read-only access of CSA nuclear standards available to all members of the public for free."[62] However, there are number of distinguishing factors between complimentary and purchased CSA standards and thus levels of access are dichotomized:

1. Complimentary access to CSA standards only provides a document which is "an approximation of the original document." As confirmed during a phone communication with the CSA, this means that the entire standard may not be visible (despite pagination and cover and end pages illustrating an otherwise complete document).
2. Complimentary access does not provide automatic updates to users or pinpoint changes to the document. A purchased membership would inform members of changes to the standard.
3. Complimentary access is viewable online only. Downloading the standard as a PDF or printing is possible only with a paid membership.
4. **It is an infringement of copyright to publicly disseminate any content of the standard.[63]** While Northwatch has copied provisions of statutes, regulations and policy documents directly into the text of this report, we were unable to do the same for CSA standards. This severely inhibits open discussion on the merits and substance of CSA standards.

Therefore, we do not support the CNSC's position that CSA standards are available to all members of the public for free. To the contrary, complimentary access assumes a member of the public has a sufficient level of technological ability to sign-up, read and navigate the CSA online portal and, sufficient bandwidth to do so. Complimentary access is also provided with the caveat that the CSA standard is 'an approximation of the original.' Northwatch has also had to re-write comments within this report to the Commission on the basis that we would have infringed copyright by quoting sentences and provisions of the CSA standard. This has greatly constrained the extent to which we discuss, comment or review the CSA standards which now, nearly exclusively dominate licence conditions.

[61] *See* Northwatch's response to the *CNSC's Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2016*
[62] Commission Member Document CMD 17-M45.A, "Commission Meeting, December 2017", p 101
[63] CSA Member Assistance, Personal communication, 11 December 2017

As an additional matter, we are also concerned that removing substantive licence conditions and incorporating CSA standards by reference as part of the licence decreases the independence of the Commission and its oversight functions. According to the CSA standards which form the proposed licensing basis for Chalk River, the standard is "under the jurisdiction of the Technical Committee" and the standard is "formally approved by the Technical Committee."

Using CSA standard N292.1 as an example, the Chair of the Technical Committee is the Canadian Nuclear Laboratories. Therefore, as the Technical Committee approves the content of the CSA standard, and CNL chairs this Committee, they are able to determine the content of the CSA standard which will be used to enforce their conduct at the CRL site. We are also concerned that because CSA standards can be changed with minimal scrutiny, it gives the licensee the ability to control what licence conditions may be imposed on them via their incorporation by reference into the LCH.

RECOMMENDATION 11: The CNSC must cease reliance on CSA standards as licence conditions until such a time that the public can easily access standards and have access to content which is equivalent to that provided through a paid membership. Facilitating public and transparent decision-making requires providing a level of access to the public which is equivalent in substance and ease-of-use to that enjoyed by users of CSA purchased content.

C. Documentary Disclosure and Timelines

CELA noted in a letter to CNSC Commission Secretary dated November 16, 2017, that the proximity of deadlines for a number of upcoming hearings strains our capacity to provide thorough and comprehensive comments to the CNSC, its Commission Members and staff. We reaffirm that we do not support the current timelines chosen by the CNSC in respect of public participants.

By way of example, the following list illustrates the proximity of deadlines for members of the public wishing to engage in CNSC files within the months of December and January:

December 11, 2017	Intervention filing deadline for the relicensing of Chalk River Laboratories
December 13, 14	Public hearing, Regulatory oversight report for uranium mines and mills
December 19, 2017	Comments on draft environmental impact statement of the In-Situ Decommissioning of the Whiteshell Reactor
Week of January 15	Presentation materials due for Chalk River relicensing hearing
January 24 -25, 2018	Chalk River Relicensing hearing
January 29, 2018	Comments on the draft environmental impact statement of the Nuclear Power Demonstration Closure Project

CELA is aware of at least one public intervenor who would participate in additional CNSC matters but for the proximity of deadlines.

The proximity of deadlines greatly constrains the ability of public intervenors to partake in the consultation process. In deciding whether to grant extensions, firstly, the CNSC should not only consider applicants who have applied for Participant Funding Program, but consider the public consultation process in its entirety and reform the process so that it *can* achieve a higher degree of engagement and interest.[64]

Secondly, in addition to the number of complex files which share overlapping deadlines, the Commission's documentary disclosure process further delays intervenors' review and analysis. Using the Chalk River relicensing as an example, the following list illustrates the short timeframe within which documents must be reviewed and disclosure of documents requested:

November 10, 2017	CNL's CMD 18-H2.1 publicly released
November 10, 2017	CNSC's CMD 18-H2 publicly released
November 16, 2017	Document request sent by CELA based on CMDs 18-H2 and 18-H2.1
November 24, 2017	Response received from CNSC denying document request in full
November 28, 2017	*Access to Information Act* request filed for documents

The formative documents upon which our review is based are the CNSC's and CNL's Commission Member Documents. Within three business days of receiving these documents, CELA submitted a document request for over 40 documents to the Commission which included the proponent's waste management program documents and decommissioning plans. The CNSC denied our disclosure request in full, on the basis that the documents we requested formed part of the proposed Licence Conditions Handbook.

We request the CNSC reconsider its approach to disclosure as arguably, without reviewing the waste management or environmental protection planning documents which form the basis for the proposed Licence Conditions Handbook, it is not possible to analyse the sufficiency of licensee environmental protection or waste programming. Furthermore, these documents should not have to be requested but easily accessible in the CMD, as appendices or hyperlinks, so that intervenors can have ready-access to materials during the one-month window provided to review, draft and file submissions.

Therefore, the one-month public comment window provided between (1) the release of the CNSC's and licensee's CMDs and (2) the date upon which interventions must be filed is not sufficient when considered in tandem with disclosure delays and response times.

RECOMMENDATION 12: The CNSC should establish a period for consultation which is congruous with the principles of access to justice and transparency, and next-generation environmental law which includes providing accessible information and allowing sufficient time for its review.[65]

[64] Report of the Expert Panel on the Modernization of the National Energy Board, "Forward, Together: Enabling Canada's Clean, Safe, and Secure Energy Future: Volume II", online: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/pdf/NEB-Modernization-Annex-EN-WebReady.pdf, p 200
[65] *Ibid,* p 90

D. Erratum

Upon reviewing the CNL's licence renewal application (dated 30 March 2017), [66] it came to our attention that CNL's description of the Near Surface Disposal Facility (NSDF) did not concur with the description of the project currently undergoing an environmental assessment. CNL's application states:

> The Near Surface Disposal Facility (NSDF) is a proposed engineered facility, which will enable the cessation of the current CNL practice of temporary storage. The facility will be located on the property of CRL, and will provide safe and permanent solution for the disposal of low-level waste and select intermediate-level waste, the majority of which will be low-level waste [emphasis added].[67]

This information conflicts with a recent news release by Canadian Environmental Assessment Agency dated which states:

> On October 27, 2017, CNL announced the decision to include only low-level radioactive waste in the NSDF, based on its consideration of federal, provincial and public comments. CNL stated that waste intended for disposal in the NSDF will meet the International Atomic Energy Agency' guidelines for low-level radioactive waste. Intermediate-level waste will continue to be managed in interim storage at Chalk River Laboratories until a long-term disposal solution for this category of radioactive waste is developed and approved [emphasis added].[68]

During the hearing process, Northwatch requests the CNSC clarify for the record, the characterization of the waste which will be included at the NSDF. While Northwatch acknowledges the CNSC's position that the NSDF is not before it during this hearing, because of reference to it in the licensee's application, we request this discrepancy be resolved.

E. Disclaimer

Northwatch clarifies that this submission is not an endorsement of the CNSC's hearing process, its independence as a regulator, or its outcomes. To the contrary, Northwatch and CELA submit there is a need to review the CNSC, with public and expert involvement, in order to address weaknesses in the current legal framework.

V. PERSISTENT AND OUTSTANDING ISSUES

The following section highlights a number of issues which remain outstanding since the CNSC's 2016 review of the Chalk River site which resulted in an eighteen-month extension of CNL's 2011 licence.

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[66] CNL Application, *supra* note 3
[67] *Ibid*, p 76
[68] Canadian Environmental Assessment Agency, "Public Notice: Near Surface Facility – Recharacterization of Waste" (2 Nov 2017), online: http://www.ceaa.gc.ca/050/document-eng.cfm?document=120908

Environmental Monitoring and Reporting

Summary information on environmental monitoring and reporting is provided in Section 9 of CMD 18-H2, with additional data on CRL's environmental releases provided in Addendum D.5 of the CMD. The CMD also describes their Independent Environmental Monitoring Program:

> To complement ongoing compliance activities, the CNSC has implemented its Independent Environmental Monitoring Program (IEMP). IEMP sampling for the CRL site focused on both nuclear and hazardous contaminants. The IEMP results confirm that the public and the environment in the vicinity of the CRL site are safe and that there are no health impacts. The IEMP results also verify that the licensee's environmental protection program protects the health and safety of people and the environment. The IEMP report for CRL is published on the CNSC's website.

We have reviewed Addendum D.5 and the IEMP report as published on the CNSC web site, and find them to be seriously lacking. We find the airborne and liquid nuclear substance releases (2011-2014) as presented in Addendum D.5 to be overly generalized and to lack the detail and precision needed in order to actually be informative. This is equally – although differently – the case with the Independent Environmental Monitoring Program results as presented on the CNSC web site.[69]

We take exception to the CNSC's statements that "The Independent Environmental Monitoring Program (IEMP) results for 2012 confirm that the public and the environment around the CRL facilities are safe and that there are no health impacts" (emphasis added). We have similar concerns about the limited data and sweeping conclusions posted by the CNSC in the case of the IEMP for the Blind River refinery, which in both cases include:

- Very limited numbers of sample points
- Sampling results presented for only a very limited number of potential contaminants
- Sampling results for only one year are presented
- Sample point locations appear to be other than locations where the greatest level of exposure would be measured
- Closest sampling points being approximately six kilometres away from the CRL site; most are much further
- Conclusions which are not supported by sufficient sampling or data

This approach is not only not helpful to the public in terms of supporting any interest in understanding the interactions between release from the Chalk River Laboratories and the environment / human health, it is harmful to the reputation and credibility of the Canadian Nuclear Safety Commission. Even the most rudimentary review would conclude that the selection of the sampling locations is questionable, and even the most kindly inclined reviewer would question the purpose of the CNSC in presenting such limited and

[69] CNSC, "Independent Environmental Monitoring Program: Chalk River Laboratories" online: http://nuclearsafety.gc.ca/eng/resources/maps-of-nuclear-facilities/iemp/ch-river.cfm

potentially misleading information in the stead of an actual independent environmental monitoring program. Further, Northwatch's experience with the on-line "report" has been frustrated by overlapping sample sites and monitoring results identified by number which are only visible when the monitoring locations are "clicked", and the design such that only one location can be made visible at any given time.

By other accounts, much more data is being collected than is presented in the IEMP. The CNSC Staff Report on the Performance of CNL's Nuclear Sites and Projects: 2013[70] describes a "comprehensive environmental monitoring program for CRL" that includes locations at the CRL site and in the surrounding area. As reported, "the hazardous component focuses on onsite surface waters and groundwater."

According to the 2013 performance report (released in 2015), CNL monitors surface water at locations on the CRL site, as well as surface water at nine locations along the Ottawa River between Rolphton and Pembroke, and at 14 locations along streams outside the CRL boundary. The IEMP presents results from only nine locations in total. It is not clear if those are the same "nine locations along the Ottawa River between Rolphton and Pembroke".

CNL's groundwater monitoring program involves approximately 180 monitoring wells located at 32 different monitoring sites. The IEMP presented only surface water results, and only at locations distant to the CRL site. The performance report also summarized that there are legacy plumes in the waste management areas and Controlled Area 1 and in Controlled Area 2 there are two plumes that extend from the National Research Experimental (NRX) and the NRU reactor source areas to the Ottawa River. The report states that the NRX plume is dominated by strontium-90 and the NRU reactor plume is dominated by tritium. Interestingly, the IEMP report includes not even a reference to these monitoring results.

We do not assume that the 2013 performance report necessarily provides a full or comprehensive statement of the releases from the CNL site into the environment, or that it provides a reliable analysis of the risks posed to human health and the environment. We merely point out that the level of information provided in the 2013 performance report is an improvement by several degrees compared to that provided in the IEMP report on the CNSC web site.

RECOMMENDATION 13:The Commission should direct the CNSC staff to replace the current version of the IEMP presented on the CNSC web site with a report that is comprehensive and includes data for a range of radioactive and toxic contaminants associated with the nuclear materials at the Chalk River site, and presents data from a number of years, and includes sampling locations within the CNL site, and in the immediate vicinity of the CNL site, as well as locations that are more distant to the site (such as those currently included in the IEMP report).

[70] CNSC Staff Report on the Performance of CNL's Nuclear Sites and Projects: 2013, © Canadian Nuclear Safety Commission (CNSC) 2014, ISSN 2368-2914

VI. CONCLUSION AND ORDER REQUESTED

Due to the sweeping changes to the CNL's licence and Licence Conditions Handbook, and the documented lack of replacement enforceable conditions with CSA standard references, Northwatch and the Canadian Environmental Law Association seek the following order from the Canadian Nuclear Safety Commission:

1. Grant Northwatch and the Canadian Environmental Law Association the status of intervenors;
2. Grant Northwatch and the Canadian Environmental Law Association the opportunity to make an oral presentation at the January 24-25, 2018 public hearing;
3. Deny CNL's site licence renewal application;
4. In the alternative, grant a one-year operating licence on the condition that the foregoing amendments be carried out before any further licence renewals.

All of which is respectfully submitted this 11th day of December 2017:

NORTHWATCH

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Brennain Lloyd
Project Coordinator

CANADIAN ENVIRONMENTAL LAW ASSOCIATION

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Kerrie Blaise
Counsel

Appendix 1- Waste Management Licence Condition (Current v Proposed)

Existing (July 2016 to March 31, 2018)		**Proposed (April 1, 2018 to March 31, 2028)**	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
12. WASTE MANAGEMENT 12.1 Waste Management The licensee shall implement and maintain a waste management program documenting handling, processing, transportation, storage and safeguarding of nuclear wastes, including spent fuel and nuclear wastes mixed with other hazardous substance.	12. SCA – WASTE MANAGEMENT 12.1 Waste Management Preamble: The General Nuclear Safety and Control Regulations require that a licence application contain information related to the management of radioactive waste or hazardous waste resulting from the licensed activities. The Class I Nuclear Facilities Regulations require that a licence application contain the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances. The scope of this licence condition covers internal waste-related programs that form part of the CRL operations up to the point where the waste is removed from the site to an offsite waste	11. Waste Management 11.1 The licensee shall implement and maintain a waste management program.	11.1: Waste Management Program Preamble: The General Nuclear Safety and Control Regulations require that a licence application contain information related to the management of radioactive waste or hazardous waste resulting from the licensed activities. The Class I Nuclear Facilities Regulations require that a licence application contain the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances. Compliance Verification Criteria: Licensing Basis Publications CSA N292.1 Wet storage of irradiated fuel and other radioactive materials (2016, Effective date April 1, 2018)

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	management facility. Topics include waste management, waste characterization, waste minimization and waste management practices. Compliance Verification Criteria: Criterion 12.1(1): The licensee shall implement and maintain a waste management program documenting handling, processing, transportation, storage, and safeguarding of nuclear wastes, including spent fuel and nuclear wastes mixed with other hazardous substances. Guidance 12.1(1): The CNSC regulatory policy P-290 Managing Radioactive Waste describes the principles for effective waste management and the CNSC's approach to regulating the management of radioactive waste. The CNSC guidance document G-320		CSA N292.2 Interim dry storage of irradiated fuel (2013, R2015, Effective date April 1, 2018) CSA N292.3 Management of low- and intermediate-level radioactive waste (2014, Effective date April 1, 2018) The licensee shall not produce, in the course of the licensed activities, or accept from outside clients, waste for which there is no identified treatment, or storage, or disposal facility. Guidance Documents G-320 Assessing the Long term Safety of Radioactive Waste Management (2006) CSA N292.0 General principles for the management of radioactive waste and irradiated fuel (2014) CSA N292.5 Guideline for the exemption or clearance from

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	Assessing the Long Term Safety of Radioactive Waste Management describes approaches for assessing the potential long term impact that radioactive waste storage and disposal methods may have on the environment and on the health and safety of people. The CSA standard N292.2 Interim Dry Storage of Irradiated Fuel specifies requirements for site selection, design, construction, commissioning, operation, and planning for decommissioning of drystorage systems. The CSA standard N292.3 Management of Low- and Intermediate-Level Radioactive Waste provides requirements for the management of low- and intermediate-level radioactive waste in solid, liquid, or gaseous state.		regulatory control of materials that contain, or potentially contain, nuclear substances (2011, R2017)

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	The CSA standard N292.5 Guideline for the Exemption or Clearance from Regulatory Control of Materials that Contain, or Potentially Contain, Nuclear Substances provides direction for the application of exemption quantity and clearance level criteria for the release of materials containing or potentially containing, radioactive nuclear substances, and the activities necessary to demonstrate compliance with these criteria. Criterion 12.1(2): The licensee shall maintain up to date a waste management framework document identifying the characteristics of all radioactive and hazardous wastes that are produced in the course of the current licensed activities or accepted from outside clients. Guidance 12.1(2): None.		

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	Criterion 12.1(3): The licensee shall not produce, in the course of the licensed activities, or accept from outside clients, waste for which there is no identified and approved treatment, or storage, or disposal facility. Guidance 12.1(3): None. Criterion 12.1(4): The licensee shall treat, store, or dispose of all wastes identified in criteria 12.1(2) and 12.1(3) of the CRL Handbook only in accordance with an appropriate authorization. Guidance 12.1(4): None. Criterion 12.1(5): The licensee shall (a) ensure that the production, in terms of both rate and volume, of radioactive waste is minimized; and (b) maintain adequate records of inventory and throughput of radioactive wastes produced, and retain them for 10 years after		

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	the date of CNSC staff's acceptance of the end-state report. Guidance 12.1(5): None. Criterion 12.1(6): The licensee shall ensure, to the extent reasonably practicable, that (a) radioactive waste produced is accumulated in a controlled and contained manner such that it cannot escape from such control or containment; (b) no leak or escape of radioactive nuclear substances or radioactive wastes can occur without being detected. Guidance 12.1(6): None. Criterion 12.1(7): For nuclear substances other than those cited in condition 4.13 of the licence, the licensee shall keep records, and retain them for 10 years after the date of CNSC staff's acceptance of the end-state report, that describe fully and accurately (a) the		

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	amount, type and location of nuclear substances placed into or removed from each waste management area at CRL; and (b) the production, acquisition and disposition of nuclear substances in nuclear facilities at CRL. Guidance 12.1(7): None.		
12.2 Decommissioning The licensee shall maintain a comprehensive preliminary decommissioning plan for the CRL site, and shall review and revise the plan at such times as the Commission may require and in any event, no later than ten years from previous revision.	**12.2 Decommissioning** Preamble: Class I Nuclear Facilities Regulations requires that a licence application contain the proposed plan for decommissioning of the nuclear facility or of the site. The decommissioning strategy for CRL site is documented in the comprehensive preliminary decommissioning plan and the associated cost estimate. Compliance Verification Criteria: Criterion 12.2(1): The comprehensive preliminary	11.2 The licensee shall maintain a decommissioning plan	**11.2: Decommissioning Plan** Preamble: Class I Nuclear Facilities Regulations requires that a licence application contain the proposed plan for decommissioning of the nuclear facility or of the site. The decommissioning plan for CRL site is documented in the comprehensive preliminary decommissioning plan and the associated cost estimate. Compliance Verification Criteria: Licensing Basis Publications

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	decommissioning plan (CPDP) for the CRL site shall comply with the CNSC regulatory document G-219 Decommissioning Planning for Licensed Activities and CSA standard N294 Decommissioning of Facilities Containing Nuclear Substances. Guidance 12.2(1): None. Criterion 12.2(2): The licensee shall submit to the CNSC staff for information: (a) the revised CPDP for the CRL site; (b) the associated cost estimate; and (c) the basis for cost estimate. Guidance 12.2(2): None.		CSA N294 Decommissioning of facilities containing nuclear substances (2009, R2014, effective date April 1, 2018) Facilities under Decommissioning For Class I and Class II nuclear facilities at CRL, the licensee shall prepare detailed decommissioning plans (DDP) and procedures as needed, and submit the DDP to CNSC staff for review. For the decommissioning of radioisotope laboratories, storage rooms, contaminated buildings, support facilities, low-hazard nuclear structures and non-contaminated buildings, the licensee shall prepare facility/building clean-up (removal) plans, notify CNSC staff and submit the facility/building clean-up (removal) plans to CNSC staff for information. Release from Regulatory Control The licensee shall only

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
			release the decommissioned property, or any part thereof, for reuse upon the acceptance of the final end-state report by the CNSC Guidance Documents G-219 Decommissioning Planning for Licensed Activities (2000) Typical elements supporting decommissioning that may be included or referenced in the detailed decommissioning plan are: characterization survey; safety assessment; cost estimate; financial assurance; environmental impact assessment; environmental protection; radiation protection; quality assurance; waste management; emergency response; physical security; safe enclosure; site preparation; surveillance and maintenance; final

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
			survey; health and safety; personnel training; human factors.
12.3 Nuclear Legacy Liabilities The licensee shall ensure that nuclear legacy liabilities at the CRL site are addressed.	**12.3 Nuclear Legacy Liabilities** Preamble: Nuclear legacy liabilities are the result of nuclear research and development conducted in Canada since 1944. Approximately 70% of the liabilities are located at the Chalk River Laboratories. The liabilities consist of research facilities and buildings, a wide variety of buried and stored radioactive waste, and affected lands. In 2006, the Government of Canada established the nuclear legacy liabilities program (NLLP). It is a long-term 70-year strategy to deal with nuclear legacy liabilities. The objective of the program is to safely and cost-effectively reduce the nuclear legacy liabilities, and associated risks, based on sound waste management and environmental protection principles.	[*None*]	[*None*]

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	The licensee is responsible for continued care and maintenance of legacy waste areas and buildings at CRL, as well as executing remediation activities to minimize the impact of past initiatives. Compliance Verification Criteria: Criterion 12.3(1): The licensee shall ensure that nuclear legacy liabilities at CRL are addressed as soon as reasonably practicable to prevent unreasonable risks to present and future generations. Guidance 12.3(1):.None. Criterion 12.3(2): The licensee shall progress the environmental remediation, contaminations clean-up and restoration of areas and lands within CRL, prioritized on a risk-informed approach. Guidance 12.3(2): Reduction in nuclear		

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	legacy liabilities is the responsibility of the licensee. Environmental remediation, contaminations clean-up and restoration of areas and lands within CRL and associated activities/projects are discussed with CNSC staff through regular meetings, and the work is carried out under approvals as required by the CRL Handbook.		

Appendix 2 – Environmental Protection Licence Condition (Current v Proposed)

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
10.1 Environmental Management System The licensee shall implement and maintain an environmental management system, including an integrated environmental monitoring program	**10.1 Environmental Management System** Class I Nuclear Facilities Regulations requires that a licence application contain information related to environmental protection. The General Nuclear Safety and	**Licence Condition 9.1: Environmental Protection Program** The licensee shall implement and maintain an environmental protection program, which	**Licence Condition 9.1: Environmental Protection Program** The Class I Nuclear Facilities Regulations requires that a licence application contain information related to environmental protection. The General

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
that includes site-wide groundwater monitoring.	Control Regulations requires every licensee to take all reasonable precautions to protect the environment. The Radiation Protection Regulations prescribe the radiation dose limits for the general public of 1 mSv per calendar year. Compliance Verification Criteria: CVC – Environmental Management System Criterion 10.1(1): The licensee shall implement and maintain an environmental management system that conforms to the CNSC regulatory document REGDOC-2.9.1 Environmental Protection Policies, Programs and Procedure, and the requirements set by CSA standard CAN/CSA-ISO-14001 Environmental Management System – Requirements with Guidance for Use. The environmental management system	includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.	Nuclear Safety and Control Regulations requires every licensee to take all reasonable precautions to protect the environment. The Radiation Protection Regulations prescribe the radiation dose limits for the general public of 1 mSv per calendar year. Compliance Verification Criteria: RegDoc-2.9.1. Environmental Principles, Assessments and Protection Measures, version 1.1, section 4.6 (2017) N288.4, Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills N288.5 Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills N288.6 Environmental risk assessment at Class

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	shall include an integrated environmental monitoring program that includes site-wide groundwater monitoring. Guidance 10.1(1): The CNSC regulatory document REGDOC-2.9.1 requires that the licensee establish adequate provisions for the protection of the environment. This should be accomplished through an integrated set of documented activities that are typical of an Environmental Management System. Criterion 10.1(2): In addition to the environmental management system, the licensee shall have an organizational structure and resources that are sufficient to achieve compliance with the limitations and conditions of the licence and the CRL Handbook. Guidance 10.1(2): None. CVC – Environmental Monitoring Program		I nuclear facilities and uranium mines and mills N288.7 Groundwater protection programs at Class I nuclear facilities and uranium mines and mills N288.8 Establishing and implementing action levels to control releases to the environment from nuclear facilities

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	Criterion 10.1(3): The licensee shall implement and maintain an integrated environmental monitoring program that shall meet the requirements of CSA standard N288.4 Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. Guidance 10.1(3): None. Criterion 10.1(4): The integrated environmental monitoring program shall include: (a) the radiological and hazardous environmental monitoring programs; (b) radiological and hazardous effluent monitoring; and (c) the groundwater monitoring for the CRL waste management areas and the CRL controlled areas. Guidance 10.1(4): None. CVC – Effluent Monitoring Program Criterion 10.1(5): The licensee shall implement		

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	and maintain an effluent monitoring program that shall meet the requirements of CSA standard N288.5 Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. Guidance 10.1(5): None. Criterion 10.1(6): The licensee shall continue to (a) monitor, mitigate and remediate the lands that have been contaminated by radioactive or hazardous substances; and (b) monitor the underground plumes in terms of their spatial distribution and loadings of radioactive and hazardous substances. Guidance 10.1(6): CAN/CSA-N288.5, Effluent Monitoring Programs at Class 1 Nuclear Facilities and Uranium Mines and Mills, is used by CNSC staff to assess the		

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	adequacy of licensee's effluent monitoring program. CVC – Environmental Risk Assessment Criterion 10.1(7): The licensee shall base the scope and complexity of monitoring programs, including effluent and environmental monitoring programs on an environmental risk assessment performed according to the CSA standard N288.6 Environmental Risk Assessment at Class I Nuclear Facilities and Uranium Mines and Mills. Guidance 10.1(7): Environmental risk assessment of nuclear facilities is a systematic process used to identify, quantify, and characterize the risk posed by contaminants and physical stressors in the environment on biological receptors, including the magnitude and extent of the potential effects		

Existing (July 2016 to March 31, 2018)		Proposed (April 1, 2018 to March 31, 2028)	
Licence	Licence Conditions Handbook	Licence	Licence Conditions Handbook
	associated with a facility. Receptors should include humans as well as non-human biota. Human receptors are addressed through a human health risk assessment and non-human biota receptors are addressed through an ecological risk assessment.		

Appendix 3 – UNEP Agenda 21,Chapter 22

Agenda 21

Chapter 22
Safe And Environmentally Sound Management Of Radioactive Wastes

Programme Area

Promoting the safe and environmentally sound management of radioactive wastes

Basis for action

1. Radioactive wastes are generated in the nuclear fuel cycle as well as in nuclear applications (the use of radionuclides in medicine, research and industry). The radiological and safety risk from radioactive wastes varies from very low in short-lived, low-level wastes up to very large for high-

level wastes. Annually about 200,000 m3 of low-level and intermediate-level waste and 10,000 m3 of high-level waste (as well as spent nuclear fuel destined for final disposal) is generated world wide from nuclear power production. These volumes are increasing as more nuclear power units are taken into operation, nuclear facilities are decommissioned and the use of radionuclides increases. The high-level waste contains about 99 per cent of the radionuclides and thus represents the largest radiological risk. The waste volumes from nuclear applications are generally much smaller, typically some tens of cubic metres or less per year and country. However, the activity concentration, especially in sealed radiation sources, might be high, thus justifying very stringent radiological protection measures. The growth of waste volumes should continue to be kept under close review.

2. The safe and environmentally sound management of radioactive wastes, including their minimization, transportation and disposal, is important, given their characteristics. In most countries with a substantial nuclear power programme, technical and administrative measures have been taken to implement a waste management system. In many other countries still only in preparation for a national nuclear programme or having only nuclear applications, such systems are still needed.

Objective

3. The objective of this programme area is to ensure that radioactive wastes are safely managed, transported, stored and disposed of, with a view to protecting human health and the environment, within a wider framework of an interactive and integrated approach to radioactive waste management and safety.

Activities

(a) Management-related activities

4. States, in cooperation with relevant international organizations, where appropriate, should:
    a. Promote policies and practical measures to minimize and limit, where appropriate, the generation of radioactive wastes and provide for their safe processing, conditioning, transportation and disposal;
    b. Support efforts within IAEA to develop and promulgate radioactive waste safety standards or guidelines and codes of practice as an internationally accepted basis for the safe and environmentally sound management and disposal of radioactive wastes;
    c. Promote safe storage, transportation and disposal of radioactive wastes, as well as spent radiation sources and spent fuel from nuclear reactors destined for final disposal, in all countries, in particular in developing countries, by facilitating the transfer of relevant technologies to those countries and/or the return to the supplier of radiation sources after their use, in accordance with relevant international regulations or guidelines;
    d. Promote proper planning, including environmental impact assessment where appropriate, of safe and environmentally sound management of radioactive waste, including emergency procedures, storage, transportation and disposal, prior to and after activities that generate such waste.

(b) International and regional cooperation and coordination

5. States, in cooperation with relevant international organizations, where appropriate, should:
    a. Strengthen their efforts to implement the Code of Practice on the Transboundary Movements of Radioactive Waste and, under the auspices of IAEA, in cooperation with relevant international organizations dealing with different modes of transport, keep the question of such movements under active review, including the desirability of concluding a legally binding instrument;
    b. Encourage the London Dumping Convention to expedite work to complete studies on replacing the current voluntary moratorium on disposal of low-level radioactive wastes at sea by a ban, taking into account the precautionary approach, with a view to taking a well informed and timely decision on the issue;
    c. Not promote or allow the storage or disposal of high-level, intermediate-level and low-level radioactive wastes near the marine environment unless they determine that scientific evidence, consistent with the applicable internationally agreed principles and guidelines, shows that such storage or disposal poses no unacceptable risk to people and the marine environment or does not interfere with other legitimate uses of the sea, making, in the process of consideration, appropriate use of the concept of the precautionary approach;
    d. Not export radioactive wastes to countries that, individually or through international agreements, prohibit the import of such wastes, such as the contracting parties to the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement of Hazardous Wastes within Africa, the fourth Lomœ Convention or other relevant conventions, where such prohibition is provided for;
    e. Respect, in accordance with international law, the decisions, as far as applicable to them, taken by parties to other relevant regional environmental conventions dealing with other aspects of safe and environmentally sound management of radioactive wastes.

Means of implementation

(a) Financing and cost evaluation

6. The costs at the national level of managing and disposing of radioactive wastes are considerable and will vary, depending on the technology used for disposal.
7. The Conference secretariat has estimated the average total annual cost (1993-2000) to international organizations to implement the activities of this programme to be about $8 million. Actual costs and financial terms, including any that are non-concessional, will depend upon, inter alia, the specific strategies and programmes Governments decide upon for implementation.

(b) Scientific and technological means

8. States, in cooperation with international organizations, where appropriate, should:
    a. Promote research and development of methods for the safe and environmentally sound treatment, processing and disposal, including deep geological disposal, of high-level radioactive waste;

b. Conduct research and assessment programmes concerned with evaluating the health and environmental impact of radioactive waste disposal.

(c) Capacity-building, including human resource development

9. States, in cooperation with relevant international organizations, should provide, as appropriate, assistance to developing countries to establish and/or strengthen radioactive waste management infrastructures, including legislation, organizations, trained manpower and facilities for the handling, processing, storage and disposal of wastes generated from nuclear applications.

Appendix 4 – *NSCA* Requirements and Response from CNL

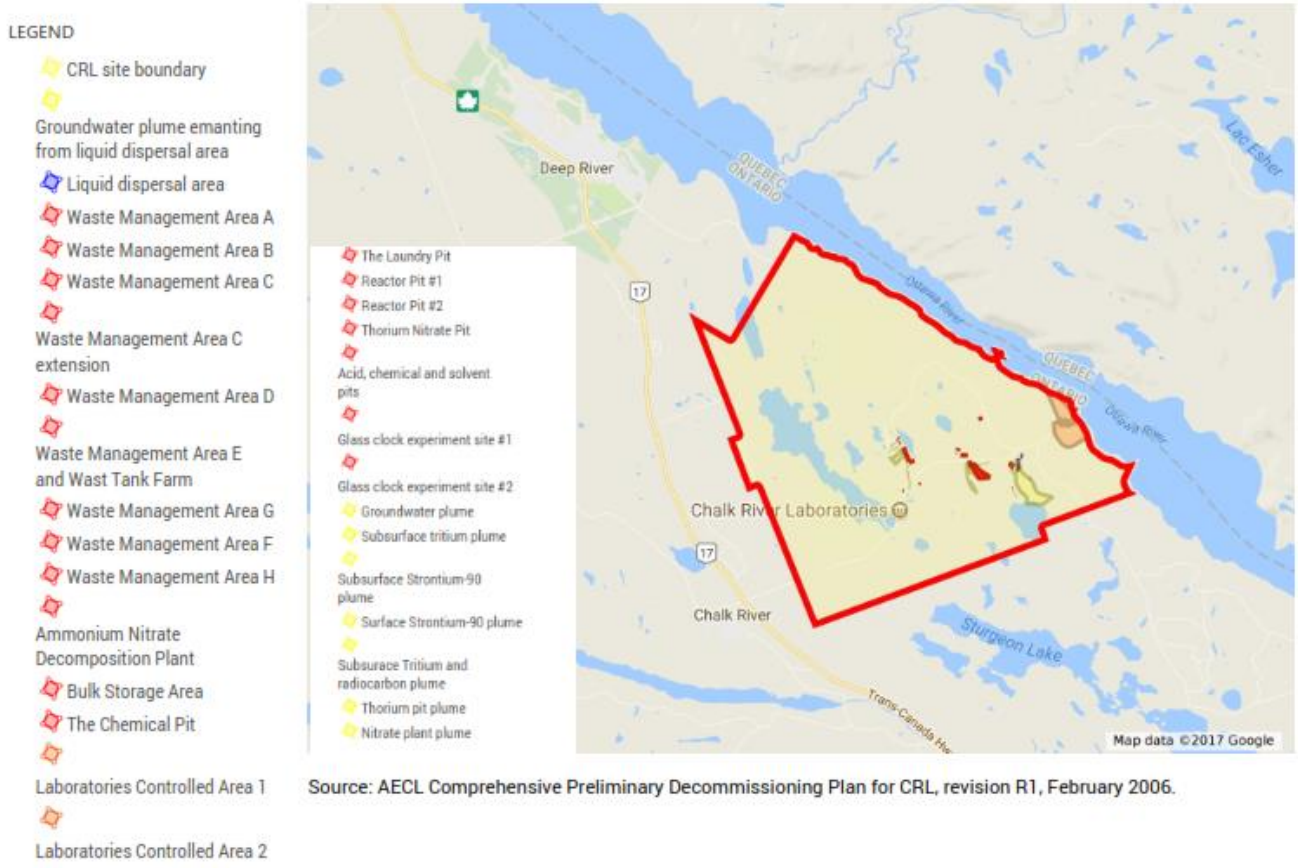
Source: Attachment B: Compliance Material for 2018 Chalk River Laboratories Site Licence Renewal, CNL License Application, 2017 March 30, CRL-CNNO-17-0005-L	
General Nuclear Safety and Control Regulation Requirement **Section 3** **1) An application for a licence shall contain the following information:**	**CNL Response**
(b) the activity to be licensed and its purpose;	CNL intends to conduct the following licensed activities throughout the proposed period of the renewed licence which are identical to those in the current licence [B-1]: a) operate, wholly or in part, any nuclear facility; b) maintain in storage with surveillance any nuclear facility, or any parts thereof; c) decommission any nuclear facility, or any parts thereof; d) construct, modify or abandon any nuclear facility;

	e) produce, possess, process, refine, transfer, use, package, manage, store, dispose or abandon nuclear substances; f) produce, possess, use, service, transfer or abandon prescribed equipment; g) possess, use transfer or abandon prescribed information; **h) possess, store or dispose of waste received from offsite clients**; and i) receive, repair, modify, store and return contaminated equipment from offsite clients.
(c) the name, maximum quantity and form of any nuclear substance to be encompassed by the licence	Nuclear substances are in use at CRL in solid, liquid and gaseous forms. Limitations on the maximum quantities of nuclear substances permitted on the CRL site are specified in the various facility safety analysis reports for nuclear facilities; in the various radioisotope laboratory protocols for the radioisotope laboratories; in the various criticality safety documents and approvals; and, in specific procedures governing the use, handling and storage of nuclear substances. Reference to these documents is presented in Appendix D, Tables D-2 and D-3 of the CRL LCH [B-2].
(j) the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed, or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste;	Specific information on radioactive and hazardous wastes is presented in the annual and quarterly reports prepared as per the requirement of SCA "Operating Performance" Part II, Section 4.16 of the CRL LCH [B-2]. Relevant requirements for managing and disposing radioactive and hazardous waste at the CRL site are addressed as per SCA "Waste Management" Part II, Section 12 of the CRL LCH [B-2].

Appendix 5 – Map of Chalk River Site

Adapted from the Ottawa Citizen

MAP - Nuclear waste at Chalk River Laboratories



Source: AECL Comprehensive Preliminary Decommissioning Plan for CRL, revision R1, February 2006.