August 16, 2017

From: Joan Lougheed (Mayor of Deep River)

To: Nicole Frigault, Environmental Assessment Specialist
Canadian Nuclear Safety Commission

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

Final CNSC Submission - - CNL Near Surface Disposal Facility - Aug 14 - 1209 pm.pdf

CEAA Reference number: 80122

August 16, 2017

Nicole Frigault, Environmental Assessment Specialist
Canadian Nuclear Safety Commission (CNSC)
280 Slater Street
P.O. Box 1046, Station B
Ottawa, ON
K1P 5S9
By Email: cnsc.ea-ee.ccsn@canada.ca
nicole.frigault@canada.ca

Re: Canadian Nuclear Laboratories – NSDF DRAFT Environmental Impact Statement

Dear Ms. Frigault,

On behalf of Council, I am pleased to submit the Town of Deep River's comments to the CNSC consultation process regarding Canadian Nuclear Laboratories Near Surface Disposal Facility DRAFT Environmental Impact Statement.

The Town's submission is attached hereto. The Town is pleased to support Canadian Nuclear Laboratories and the evolution of the nuclear economy in this great country by providing these comprehensive, analytical and technical comments. The Town of Deep River looks forward to working with the stakeholders to achieve an outcome that facilitates the needs of all parties.

The safe storage and disposal of nuclear waste should be paramount on everyone's agenda and I applaud Canadian Nuclear Laboratories for advancing this project to address legacy waste from Canada's fledgling, yet astoundingly successful history of innovation in science and technology. Deep River is proud to be home of Canada's Nuclear Pioneers in the field of nuclear research and innovation

I look forward to the opportunity to present this information at the Public Hearing and would ask that you add the Town of Deep River to the Public Hearing Agenda.

Further to our previous discussions at the CNSC 101 presentation in Deep River, I respectfully request that the Public Hearing be held in the Town of Deep River. We would be pleased to work with you to select a suitable venue.

Please feel free to contact me should you have any additional questions and/or require any clarification.

Sincerely,

Joan Lougheed, Mayor

THE CORPORATION OF THE TOWN OF DEEP RIVER

P.O.BOX 400 • 100 DEEP RIVER ROAD • DEEP RIVER, ONTARIO K0J 1P0
Tel:(613) 584-2000 • www.deepriver.ca • Fax: (613) 584-3237

August 16th, 2017

Nicole Frigault, Environmental Assessment Specialist Canadian
Nuclear Safety Commission (CNSC)
280 Slater Street
P.O. Box 1046, Station B
Ottawa, ON K1P 5S9

By Email: nicole.frigault@canada.ca

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Sincerely,

Signature redacted

Joá n Lougheed, Mayor

Attachment - CNSC

Submission cc Council

Project Number: 1547525

THE TOWN OF DEEP RIVER
COMMENTS REGARDING
THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
SUBMITTED FOR
CANADIAN NUCLEAR LABORATORIES'
PROPOSED
NEAR SURFACE DISPOSAL FACILITY PROJECT

TO: **Nicole Frigault, Environmental Assessment Specialist**
Canadian Nuclear Safety Commission
280 Slater Street
P.O. Box 1046, Station B
Ottawa, ON
K1P 5S9
Email: cnsc.ea-ee.ccsn@canada.ca

FROM: **The Corporation of the Town of Deep River**
Mayor Joan Lougheed
100 Deep River Road
P.O. Box 400
Deep River, ON
K0J 1P0

July 14, 2017

CONTENTS

PART I

THE PURPOSE OF THIS SUBMISSION

The purpose of this submission is to provide the Canadian Nuclear Safety Commission with the Town of Deep River's comments on the draft Environmental Impact Statement prepared by Canadian Nuclear Laboratories for the proposed Near Surface Disposal Facility Project, which is to be located in Deep River, Ontario.

PART II

BRIEF OVERVIEW OF THE TOWN OF DEEP RIVER AND ITS RELATIONSHIP WITH THE CHALK RIVER LABORATORIES

The Town of Deep River (**"Deep River"**) is located in Renfrew County, Ontario.

Deep River is located adjacent to the Ottawa River, approximately 190 kilometers northwest of Ottawa, and to the east it is opposite the Laurentian Mountains in the Province of Quebec. Deep River has approximately 4,200 residents and a land area of 50 square kilometers.

Since Deep River's inception, it has been the proud home of the Chalk River Laboratories (**"CRL"**). CRL is a Canadian nuclear research facility and also makes a significant contribution to the world's supply of medical radioisotopes. CRL is now managed by a private company, Canadian Nuclear Laboratories (**"CNL"**).

CNL has been contracted by Atomic Energy of Canada Limited (**"AECL"**), a Crown corporation, to fulfill AECL's mandate of delivering on Canada's radioactive waste and decommissioning responsibilities, providing nuclear expertise to support federal responsibilities, and offering services to users of the nuclear laboratories on commercial terms. In November 2014, all licenses for the operation of CRL were transferred from AECL to CNL.

PART III

PURPOSE OF THE EIS AND BRIEF OVERVIEW OF THE NSDF PROJECT

CNL is proposing to construct a Near Surface Disposal Facility ("**NSDF**") composed of an Engineered Containment Mound (an "**ECM**") that will contain radioactive and mixed wastes; a wastewater treatment plant (the "**WWTP**") that will treat leachate, contact water and operational wastewater; various support facilities that enable operations; and site infrastructure.

The purpose of the NSDF is for the permanent disposal of radioactive waste from the following sources:

- waste now in storage that has resulted from legacy CNL operational and decommissioning activities and past commercial activities;
- waste to be generated from the ongoing decommissioning of existing CRL buildings and structures and the remediation of contaminated lands;
- waste generated from the decommissioning of Whiteshell Laboratories ("**WL**") in Manitoba, and prototype reactor sites that are not disposed on site; and
- future waste arising from continuing CNL operations, commercial activities, the decommissioning of buildings and structures that have not yet been built, and the remediation of soils from the CRL property.

CNL will also accept waste on a commercial basis (e.g. medical waste from hospitals) at the NSDF. In addition, CNL will also accept waste from the two long-term waste management facilities in the Port Hope area, if any is identified following their closure. The NSDF will enable CNL to move from its current practice of interim waste storage to direct and long-term waste disposal. CNL is proposing to carry out the NSDF project on the CRL property. When fully constructed the NSDF will cover 34 hectares and accommodate 1,000,000 m^3 of radioactive waste.

The proposed site for the NSDF within the CRL property is in the southeast corner and generally referred to as the East Mattawa Road site (the "**EMR Site**").

The NSDF is to be constructed in two stages. Construction of the first stage is proposed to commence in April 2018 and is to be completed in 2020. The first stage will have a capacity of 525,000 m^3. The second stage will be constructed between 2040 and 2045 and will expand the facility by 475,000 m^3 (total capacity will be 1,000,000 m^3).

The NSDF will be operational from 2020 to 2070 and will begin a closure phase that will occur from 2070 to 2100. An institutional control period will commence in 2100 and last for 300 years. Post-institutional control will then continue indefinitely.

The Canadian Nuclear Safety Commission (the "**CNSC**") is a federal authority established under the *Nuclear Safety and Control Act*, S.C. 1997, c. 9. The CNSC is responsible for regulating the use of nuclear energy and materials to protect health, safety, security and the environment; to implement Canada's international commitments on the peaceful use of nuclear energy; and to disseminate objective, scientific, technical and regulatory information to the public.

The CNSC is the regulatory body that is responsible for the consideration and granting of the license to CNL to operate the NSDF at CRL. The CNSC has determined that the NSDF requires a federal environmental assessment (an "**EA**") pursuant to the *Canadian Environmental Assessment Act, 2012*, S.C. 1992 c. 37 (**"CEAA"**).

As part of the EA process, CNL must prepare an Environmental Impact Statement (an "**EIS**"). The EIS is ultimately a decision making tool used by the CNSC when considering the EA. The draft EIS includes consideration of the following items:

- Project and Location Overview;
- Purpose of the Project and Alternatives;
- Project Description – including Waste Acceptance Criteria (**"WAC"**); Preparation of the Site; and Construction, Operation and Closure of the NSDF;
- Public and Aboriginal Engagement Activities;
- Environmental Effects – including effects on the Atmospheric Environment; Geological and Hydrogeological Environment; Surface Water Environment; Aquatic Environment; Terrestrial Environment; Ambient Radioactivity and

Ecological Health; Human Health; Land and Resource Use; and the Socio-economic Environment;

- Malfunctions and Accidents;
- Summary of Cumulative Effects and the Significance of Residual Effects; and
- Assessment of the Effects of the Environment on the NSDF (i.e. climate change and seismic activity).

The EIS has been prepared in draft format, circulated to interested stakeholders and published on the CNSC website. A primary purpose of producing the EIS in draft is to permit public comment thereon for 60 days. On March 17, 2017, the draft EIS was published and the 60 day public comment period began. On May 15, 2017, the public comment period was extended to at least August 16, 2017 in order to permit the draft EIS to be translated to French. On June 16, 2017, the CNSC confirmed that the revised deadline for comments was August 16, 2016.

PART IV

COMMENTS ON THE EXECUTIVE SUMMARY OF THE DRAFT EIS

The Executive Summary of the draft EIS is likely to serve as the sole or primary source of information for much of the general public. As such, it should be as informative as possible on matters such as radioactive content and speciation in units of radioactivity (i.e., Becquerel (**"Bq"**)). The Executive Summary of the draft EIS states that the proposed content of the NSDF will contain up to one percent Intermediate Level Waste (**"ILW"**) by volume. This does not provide an adequate description of the total radioactive content of ILW, nor a high-level breakdown by radionuclide and chemical speciation. Similarly, the radionuclide and chemical speciation content of Low Level Waste (**"LLW"**) is not provided. These are important descriptors that are needed to complement the measure of volume.

On page ES-i there is no specific reference of non-CRL wastes being included in the first 20 to 25 years of NSDF operation, whereas on page ES-ii, there is specific mention that "Stage 2 [2040 to 2070] will allow for the inclusion of wastes from… off-site CNL facilities". The implication is that the emplacement of off-site wastes will await the operation of the Stage 2 phase of the NSDF. Although the NSDF will accept waste from other off-site CNL sources during Stage 1, reference with respect thereto is not made in the Executive Summary. Since many interested parties may not be fully aware of the nature of CNL's other sites and their distances from CRL (and hence the long distances travelled by waste for disposal at CRL), direct reference to specific non-CRL sites as sources of waste for the NSDF should be noted in the Executive Summary, not just the main text of the draft EIS.

On Page ES-ii, it is also noted that "All waste to be disposed of at the NSDF will be required to meet the waste acceptance criteria established thus ensuring operational and long-term safety requirements." However, the WAC documentation has not been established, finalized and released, which precludes the draft EIS from being appropriately reviewed. This is a significant shortcoming of the draft EIS, generally.

On page ES-iii, it is stated that "The NSDF is required to be operational by March 2020." This schedule issue continues to be a driving theme throughout the draft EIS and in instances appears to take priority over safety and the long-term management of the facility, which should be the principle considerations.

The Executive Summary does not address disposal of wastes generated after 2070. Any post 2070 plans for disposal of LLW and ILW should be addressed in the Executive Summary, particularly if expansion of the NSDF facility is envisioned (see below).

In the body of the draft EIS, potential future expandability is mentioned (see Table 2.5.1-1). The NSDF will be a long-term and large-scale radioactive waste disposal site; Deep River and its residents should understand from the Executive Summary what plans CNL and AECL have, or are considering, with respect to the future expansion of the NSDF.

With respect to public engagement, a long list of activities is provided under the heading of "Engagement Activities". However, no meaningful engagement with Deep River is noted as to the preferred solution for dealing with wastes at CRL, especially their disposal. Modern practice is that the proponent actively engages with the community in which they reside, or are most closely associated with, to reach agreement as to what would be the preferred solution for the waste. This form of detailed two-way consultation did not take

place. The terms "social license" and "willing host community" are widely used in the discussion of developing a radioactive waste disposal facility in most public discussions and jurisdictions. This is a major shortcoming of the engagement process adopted by CNL and AECL. With respect to Deep River, the process has been less "engagement of" and more "presented to". The engagement of the Environmental Stewardship Council is a case in point - more "presented to" (a slide presentation) and less "engagement" or "two-way consultation" of options.

The Executive Summary is almost silent on the shipment of wastes to CRL and the NSDF (i.e. timing, duration, radionuclide composition and content, number of shipments). These are also poorly described throughout the draft EIS. It is important that the reader is generally informed of these matters in the Executive Summary, with greater detail provided in the body of the draft EIS. A significant number of shipments of radioactive waste will be transported through the boundaries of Deep River and received by CRL at the NSDF over some period of time (over many years or just a few, each presenting different challenges to the community). The number, manner, mode and frequency of the shipments should be clear to the reader of the Executive Summary. The reader should also be reassured that such shipments will present minimal risk to Deep River and its residents.

PART V

COMMENTS ON THE DRAFT EIS

Deep River is the proud home of CNL and wishes to continue this relationship by supporting the general objectives of the NSDF; however, at this time, Deep River, as the host and most affected community, has the following, among other comments, regarding the NSDF:

- inadequate consideration of Alternative Means and Sites;
- project schedule as a dominating consideration;
- unsupported "proven" technology;
- uncertainty regarding the WAC;
- unstated definitions of LLW and ILW;
- uncertainty of waste sourcing and origination;
- CNL's implied intentions to expand the NSDF's volume past 1,000,000 m^3, but no meaningful or fulsome discussion with respect thereto;
- lack of alternative ILW repositories;
- inadequate public and aboriginal engagement;
- incomplete and sometimes contradictory assessment of environmental effects;
- no agreement with Deep River regarding affected residents and their properties;
- no provision for long-term financial assurances for Deep River and its residents;
- improper and lacking malfunction and accident procedures; and
- failure to address future effects of the environment on the NSDF.

(a) Consideration of Alternative Means and Sites

The draft EIS gives the impression that the deciding factor for choosing the NSDF design and the EMR Site rather than the alternatives proposed (at CRL or elsewhere) is the implementation schedule, with cost being the next most important criterion. The location chosen is a site near other waste facilities and contaminated lands and therefore was already heavily characterized as opposed to the alternative sites. To choose another location, on-site or off-site, would require more thorough characterization than has been done to date, resulting in schedule delay and added cost. It is clear that schedule and then cost are the predominant factors as to why a Geologic Waste Management Facility (**"GWMF"**) was not the preferred option. The draft EIS acknowledges in Section 2.5.2 that a GWMF is superior in areas of design robustness, geological and hydrogeological environment as well as public health and safety (see pgs. 2-12 to 2-26).

With respect to actual site location, Section 2.5.4.3 notes that the selection of a non-CRL site would involve approximately 50,000 shipments of radioactive waste being transported by truck to WL or Nuclear Power Demonstration (**"NPD"**) which "may raise perceived safety concerns amongst the public" (see pg. 2-37). While the NSDF project may involve substantially less shipments to CRL from off-site sources, there will still be significant safety concerns amongst the public (see pgs. 2-35 to 2-37). Less shipments does not necessarily result in decreased public concern.

Remaining silent on the number of shipments from primary off-site sources, such as NPD and WL, is not consistent with being fully forthcoming with respect to the extent of shipments to CRL from off-site locations.

In addition, the potential environmental effects resulting from the acceptance of waste from off-site sources are not addressed in the draft EIS (i.e. vehicle and machinery emissions).

Also, the reader cannot discern the radionuclide content of wastes arriving from off-site sources. It is uncertain whether these shipments contain a higher inventory of ILW to be emplaced at the NSDF than wastes originating at CRL, therefore potentially impacting the

risk to the resident public. Deep River and its residents should be aware of whether they are accepting wastes with a greater radionuclide content at the NSDF from off-site than on-site sources.

Furthermore, in Section 2.2.2, the draft EIS states: "At Whiteshell Laboratories (WL), and the Douglas Point and Gentilly-1 prototype reactor sites, these wastes [referring to LLW and ILW] will be segregated, packaged to meet transport requirements and shipped to CRL for either disposal at the NSDF or placement in long-term storage pending availability of an ILW Repository" (see pg. 2-4). Due to this uncertain strategy regarding the permanent disposal of ILW, Deep River is concerned that CRL will become a national nuclear waste storage and disposal site, without meaningful consultation with the community. This concern is furthered in Section 2.2.2.2, where CNL informs that an ILW facility at CRL has been assessed as viable and is under consideration for the future (see pg. 2-5).

In Section 2.5 (Alternative Means for Carrying out the Project), it is noted that "Public engagement is a key aspect of the decision-making process", in relation to the alternative means assessment (see pg. 2-12). The record reveals that the public was not involved in the decision-making process carried out to complete this Alternative Means assessment. Rather, it seems that the Alternative Means were developed solely by CNL and its consultants.

Furthermore, Table 2.5-1, taken in consideration with Sections 2.2.2 and 2.5 noted above, and the fact that there is no reference to a willing host community, an Alternative scenario should have been considered whereby waste to be emplaced in the NSDF is restricted to waste generated exclusively at CRL.

Also, Table 2.5.1-1 does not consider the socio-economic value components associated with a community becoming the home of a radioactive waste disposal facility and the stigma associated therewith, as well as the socio-economic considerations that result from accepting radioactive wastes from other communities.

In Section 2.5.2.1.1, the draft EIS states: "The NSDF is expandable by design and is being developed on a Greenfield site" (see pg. 2-18). Elsewhere in the document, there is reference to the site being "associated within a brownfield area" (Section 2.5.5.4, see pg. 2-49). This contradiction must be clarified. The activities and precautions required to establish the site will be considerably different depending on the nature of the site.

With respect to the comment that "the NSDF is expandable by design", there is no process described for proceeding with expansion of waste volume beyond 1,000,000 m^3, including whether a new EA will be undertaken with the involvement of the host community.

With respect to the selection of the EMR Site as opposed to the Alternate site (see pgs. 2-46 to 2-51) as the preferred location for the NSDF, greater consideration should be given to the physical proximity of the EMR Site to the Ottawa River, which is a significant water body used by millions of people for a variety of purposes, including drinking water, recreational purposes, and many other uses. The selection of the EMR Site is apparently based, in large measure, on the very long "calculated" groundwater / surface water transit times (stated as 10 to 12 years) (see pg. 2-47). It is not clear whether these calculations have been confirmed by actual field measurements or are simply based on theoretical modeling. If the latter, evidence must be provided of how these models have been qualified for a comparable environment. Since the public, and society in general, have great concerns regarding the locating of waste disposal facilities near major water bodies (see the Kincardine Deep Geologic Repository challenges for its location adjacent to Lake Huron), direct evidence of slow migration of releases is important to reassure the public, and should be provided and thoroughly described in the draft EIS.

It is unclear why the proposed Alternate site at CRL has a faster transit time of releases to the Ottawa River than the EMR Site. Specifically, why releases to the Ottawa River from the Alternate site could be "less than three years" (see pg. 2-47), whereas similar releases are expected to take 10 to 12 years for the EMR Site (see pg. 2-47), which is much closer to the Ottawa River. The information presented is not self-evident or compelling.

A site further from the Ottawa River (closer to the CRL western-most boundary) should have been considered as part of the Alternative Means Assessment. The proposed Alternate site is still much closer to the Ottawa River than would be a site closer to the western-most boundary of CRL. Data at a more remote location has not been provided as part of CNL's groundwater sampling program at CRL. Effort should be made to obtain such data with priority.

(b) The Project Schedule

The draft EIS reveals the purpose and urgency of the NSDF Project is rooted in the requirements established by AECL, on behalf of the Government of Canada, to substantially reduce the risks associated with the CNL legacy wastes, liabilities and the cost of laboratory operations to taxpayers in the 10 year period 2016 to 2025, and to create the conditions for the revitalization of the CRL property (see pg. 2-6 and pg. 2-14). Specifically, the reviewers asked "Does the alternative meet the schedule (i.e., operational in 2020 to enable planned decommissioning and site restoration activities)?" (see pg. 2-13, Table 2.5.1-1).

Prior to an assessment of the project alternatives and the release of the draft EIS, CNL began work on the NSDF project. It is revealed that as early as 2015, CNL began working on the NSDF project in order to meet their self-imposed 2020 deadline (see pg. 2-17). Specifically, CNL concluded "given that the work on the NSDF Project was commenced in 2015, the schedule requirement to place the facility in operation by 2020 is achievable" (see pg. 2-17), and the GWMF construction schedule would delay the start of operations beyond 2020 (see pg. 2-24, Table 2.5-2).

By commencing work on the NSDF prior to completing an assessment of the project alternatives, the obvious question arises, was the outcome of the assessment predetermined, and if so, would this constitute confirmation bias?

(c) *Facility Robustness and Supporting Processes*

The draft EIS states that the "NSDF Project has been designed as a permanent disposal facility and incorporates proven technologies and best industry practices..." and that "The design life for the ECM is 500 years" (see pg. 3-1). Based on the information provided, there is no direct evidence that the technology is proven for 500 years. Indeed, since the technology incorporated into the design has not been in existence for 500 years, "proven" is incorrect terminology.

To suggest that all of the technologies comprising the design (in particular the various liners proposed for use) are "proven" is misleading. While the design may be for a 500 year lifetime, neither the design nor the technologies used within that design have been "proven". If these technologies are to be described as "proven" for a 500 year lifetime, supporting data and evidence must be provided.

There is considerable experience for much shorter periods of time, however, there is no experience (other than accelerated aging testing) for timeframes of centuries. Hence, the word "proven" is based on extrapolation to 500 years, which is an estimated and unproven projection lacking evidence based conclusions.

The more advisable approach would have been to discuss the selection of the design parameters and to inform what technologies and experts the proponent consulted. This information would have provided Deep River greater confidence that the selected materials have the requisite integrity.

The consistent references to "proven" technologies strains CNL's reliability and provides reason to question the thoroughness of the analysis undertaken to demonstrate the long-term safety of the facility. The information and arguments presented by the proponent should have been based upon facts and reasonable extrapolations.

Considerable reference is made throughout the document to the WAC and the Integrated Waste Strategy (**"IWS"**) yet neither document has been released. Without the WAC document in particular, and an understanding of the radionuclide content and speciation of the waste, it is not possible to assess the facility's robustness for containment of the

emplaced waste. The WAC, as currently summarized in the draft EIS, insufficiently describes the criteria for waste inclusion in the NSDF. A WAC document with the requisite bounding information on type of waste, radionuclide concentration / total content, and chemical characterizations / concentrations, with associated techniques to confirm as to how the WAC will be met and overall ECM inventory managed, must be issued before the EIS is finalized and in advance of the CNSC Public Hearing for consideration of the EA. This is required to demonstrate that the safety objectives can be met in an integrated manner – waste inventory, facility design and environmental / geographical characteristics.

In Section 3.2.2, it is noted that wastes above a pre-determined level of alpha and long-lived beta-radionuclides "will require special packaging and / or treatment to ensure that the radioactive wastes remain isolated" (see pgs. 3-9 and 3-10). It would be informative and reassuring for the reader if examples could be provided that illustrate the extra steps taken, including an outline of what fraction of the NSDF will be used for these special packages. With this knowledge, the robustness of the design can be better assessed.

As previously noted, reported lifetimes for selected components of the NSDF, especially the various liners, are not supported by appropriate data and testing. In Section 3.5.2.4, CNL states that "the service life of the geomembrane liner with respect to oxidative degradation is expected to be greater than 700 years and probably on the order of 1,000 years (or longer)" (see pg. 3-19). This seems to be unrealistic and lacks compelling scientific verification, notwithstanding "reported laboratory studies involving exposure of the geomembrane to accelerated oxidation conditions" (see pg. 3-19). Such claims weaken the credibility of the case overall. A detailed summary of the accelerated aging tests and the key features and limitations of the tests must be provided.

In Section 3.5.4.2.2, there is discussion of the scales that will be used to determine the weight of the wastes received, using computerized waste quantity tracking equipment (see pg. 3-33). Since the waste will be in all shapes, sizes and densities, there is no discussion as to how the weight will be converted into waste volumes and emplaced in

the ECM, nor is the equipment or methodology that is used for tracking the volumes arriving from off-site sources specified.

The overall risk to the environment and the public over the 500-year lifetime of the ECM is significantly dependent on the waste that is put into it. From the information provided (see Section 3.6.1.1, pgs. 3-35 to 3-37), it is difficult to assess whether the processes described - profiling, acceptance and verification - are adequate. More specifics should be provided as well as detailed examples of the step-by-step processes for each type of waste and its source (e.g., new operational waste, waste retrieved from storage facilities, both packaged and not packaged, and waste from the decommissioning of facilities).

The qualifications and training of the Waste Acceptance team are not described in the draft EIS. It appears that the waste generator will be responsible for the entirety of the waste profiling before the waste is brought to Waste Operations (see Section 3.6.1.1.1, pg. 3-35). Consideration should be given to having a centralized, quality assured service undertake this profiling (with the support of the waste generator) to ensure consistency in the waste profiling / characterization of the received wastes.

(i) Disposal Cell Cover

At Section 3.6.1.3, it is not clear that the disposal cell cover described is adequate to minimize water ingress into an open cell during inclement weather (i.e., thunderstorms, microbursts etc.) during the operational phase (see pgs. 3-49 and 3-50). Minimization of water ingress is required to preclude leaching of radionuclides from the waste.

(ii) Waste Water Treatment Plant

The WWTP, as described, seems adequate for the treatment of leachates from the disposal cells of the ECM. (See Section 3.6.2, Page 3-50 and onward). However, several points require clarification.

First, it is unclear from the draft EIS what the strategy and approach is for the collection and the treatment of leachate in the event of an extended outage of the WWTP.

Second, it is unclear how the entries in Table 3.6.2-1 (see pg. 3-53) were generated. A description of how the pilot-scale tests were conducted is also required.

Third, reference note (c) in Table 3.5.3-1 also states that "Tritium releases will be managed such that tritium concentrations in Perch Lake do not exceed 7,000 Bq/l" (see pg. 3-24). Tritium concentrations in Perch Lake are currently an average of approximately 3,200 Bq/l (see ASR Environmental Monitoring at CRL Report CRL-509243-ASR-2015 (released 2016 June 14)), which is below the current drinking water standard of 7,000 Bq/l. Given that the tritium level in Perch Lake has been falling for many years, the NSDF should be designed so that Bq concentrations in Perch Lake are not permitted to rise again. Otherwise, this is not an environmentally sound approach, is not based on ALARA (As Low As Reasonably Achievable) principles, and disregards the pressure being placed on regulators by third parties to reduce the level below 7,000 Bq/l.

The preferred approach would be to ensure that the releases of tritium are below the current level in Perch Lake. Improved packaging / containerization of tritium-containing wastes should provide the solution required. If not, the inventory of tritium in the NSDF should be significantly reduced. A similar approach would also be appropriate for the releases of strontium, which should be carefully controlled, based on the results summarized in Table 3.6.2-1 (see pg. 3-53).

In Section 3.10.3, it is stated that "Decommissioning of the WWTP and all associated structures will be performed after the leachate quantity no longer requires this facility for treatment and the leachate is able to be treated using a different technique or it becomes more cost-effective to send leachate to an alternate off-site facility" (see pgs. 3-63 to 3-64). Details regarding the specific parameters guiding this decision making process are required. Also, specifics regarding the lifespan of the WWTP, beyond the emplacement of the Final Cover, are required and should be based upon comparable facilities. The extended operational period of the WWTP provides assurance of minimal leachate releases to the environment.

(iii) *Management of Emissions and Effluents*

In Section 3.9, the draft EIS states: "Leachate samples will be collected three times per year from the LCS [Leachate Collection System] and once annually from the LDS [Leachate Disposal System] and be analyzed for constituents of concern" (see pg. 3-61). It is uncertain why CNL would limit the sampling regime to these minimal specifications. A more robust sampling regime should be considered.

The passive landfill gas (**"LFG"**) venting system is very briefly summarized (see pg. 3-61). Further details of this system, as well as the LFG monitoring probes that will be installed around the perimeter of the ECM, are required, as well as further details regarding the frequency of monitoring of the LFG probes.

(iv) *Final Cover*

In Section 3.10.4, it is noted that "A series of drainage control features will be installed in conjunction with placement of final cover over the ECM" (see pg. 3-64). These drainage control features should be described, including whether they are passive or active in nature.

(d) The Waste Acceptance Criteria and the Classification of LLW and ILW

The proposed NSDF will provide containment of radioactive waste for a minimum of 500 years until the waste has decayed to levels that do not present a risk to the public and the environment (see pg. 3-14). For perspective, this year, we are celebrating Canada's 150TH birthday – Deep River and its residents will host the NSDF while our nation's life-cycle, to date, repeats itself three full times, and then some. It is imperative to have a full and precise understanding of exactly what type and form of waste will be deposited at the NSDF, and to ensure that strict internal and external monitoring and enforcement procedures will be in place.

(i) The Waste Acceptance Criteria

Understanding and clearly defining the WAC is a pillar to understanding the risks associated with the NSDF, the current feasibility of the NSDF, and the affect of the NSDF on generations to come.

The WAC is essential for ensuring only wastes with acceptable physical, radiological, and chemical characteristics are disposed of at the NSDF (see pg. 3-9).

Despite the production and submission of the draft EIS, the WAC has not yet been completely defined.

A summary of what is known about the WAC is as follows (see pgs. 3-9 to 3-12):

- The NSDF will only accept solid waste with no free liquids for disposal.
- More than 50% of radioactive wastes accepted at the NSDF will be on-site building waste from decommissioning as well as soil and soil-like wastes from environmental restoration.
- Waste will be suitable if it has limited concentrations of long-lived alpha-emitters, fission and activation products, such that long-term safety objectives can be met.
- Waste will be suitable if it has limited concentrations of fissile materials, such that criticality safety can be assured during the NSDF's operations and post-closure phases.

- Waste will be suitable if it has a proven track record of successful disposal of similar waste types in near surface repositories in other jurisdictions.
- All ILW will be required to meet safety objectives and be bounded by the safety case.

The draft EIS fails to inform readers what the "long-term safety objectives" are.

The draft EIS fails to inform readers what "criticality safety" is.

The draft EIS fails to inform readers how a "proven track record" will be determined and by whom or what administrative body.

The draft EIS fails to inform what the "safety case" is.

It is difficult to provide meaningful comment on the WAC, and the draft EIS generally, without knowing the meaning of the above noted terms and phrases.

If waste does not meet the WAC, CNL informs that the waste will be further reviewed for acceptance at the NSDF through the WAC variance process (see pg. 3-13). A pivotal step in the WAC variance process is considering whether a *safety argument can be made*, and if so, the Waste Management organization will determine and approve a procedure for reviewing and accepting the waste (see pg. 3-13).

The draft EIS does not inform readers as to what a "safety argument" is or what the principal considerations are when considering a "safety argument". Nor does the draft EIS inform readers who or what administrative body is responsible for making the "safety argument" and determining if the "safety argument" is appropriate (see pg. 3-13).

Given the description of the WAC in the draft EIS, the only conclusion is that even CNL is uncertain what will constitute acceptable forms of radioactive waste for disposal at the NSDF. Greater effort should have been made in the draft EIS to provide specifics of the radionuclide content and mobility regarding the quantity and type of wastes to be emplaced in the NSDF.

In addition, the IWS is consistently referenced in the draft EIS, but is not defined; it has also not been released in its full version. The IWS should have been the subject of considerable discussion with the Town of Deep River well in advance of this project in order to gain public acceptance and to assist Deep River in potentially becoming a well-informed and eager host community.

Deep River, as the host municipality, is of the opinion that there should be no uncertainty regarding the types of radioactive waste that will actually be accepted by CNL at the NSDF for permanent disposal.

(ii) The Classification of LLW and ILW

A principle theme of the draft EIS is CNL's repeated reference to the types of waste that will be accepted for disposal at the NSDF.

Approximately 1% of waste to be accepted at the NSDF is to be ILW (see Table 3.2.1-1 on pg. 3-8) (notwithstanding reference to "a few percent" of ILW being included in the NSDF waste inventory on pg. 3-11). LLW and other acceptable waste streams will compose the remaining portion of waste disposed of at the NSDF (see pg. 2-1).

Despite the acceptance of LLW and ILW being a principle theme of the draft EIS, these terms are not defined by the draft EIS, leaving the reader with no understanding of the radionuclide content of either. The closest instance of a definition of LLW and ILW offered by CNL in the draft EIS is reference to a discussion paper on Radioactive Waste Management and Decommissioning (DIS-16-03) where the definitions are considered (see pg. 2-11 of the draft EIS and pgs. 5 and 6 of DIS-16-03). This discussion paper proposes characterizations of LLW and ILW and may play a role in the selection and development of the regulatory framework that will ultimately define these waste types. However, it is unknown when the waste type classifications will become effective and whether the recommendations in DIS-16-03 will be adopted. As such, at the time of publication of these comments, it is not clear to the public (and presumably CNL, the CNSC and the Canadian government) what the exact meanings of LLW and ILW are.

Deep River, in support of all stakeholders, requires a definitive and comprehensive definition of the types of wastes that are to be permanently stored at the NSDF.

(iii) The Monitoring and Enforcement of the Waste Acceptance Criteria

The draft EIS does not discuss the monitoring and enforcement of radioactive waste at the NSDF.

The NSDF is to be managed, operated and maintained by humans. Despite our best intentions and our desire to be optimistic, humans are susceptible to negligence and wilful misconduct. The negligent or wilful acceptance of inappropriate forms of radioactive or other waste at the NSDF could have a detrimental impact on the environment and human health.

It is critical that Deep River has a full understanding of the monitoring procedures for waste acceptance and the enforcement measures in place in order to provide comfort and assurance to its residents that environmental and human safety are being safeguarded.

Deep River recognizes that, among other topics discussed herein, monitoring procedures for the acceptance of waste and enforcement measures may be addressed more completely during the licensing process. Nonetheless, the draft EIS must provide the framework for the monitoring and enforcement procedures and permit public comment thereon, as these are critical to the protection of the near-proximity environment and human health.

Deep River, as the host municipality, requires CNL to provide sufficient detail so that Deep River can understand what waste monitoring and enforcement mechanisms will be in place to protect the environment and human health.

Furthermore, as the NSDF will contain hazardous materials for hundreds of years, the draft EIS should advise how the composition of the waste may change over time, particularly with respect to the radioactive content. This would provide important context for the assessment of the engineered barriers over time.

(e) *Uncertainty of Waste Origination and Sourcing*

CNL is proposing to construct a 1,000,000 m^3 nuclear waste disposal facility on the CRL lands. For perspective, this amounts to approximately 60 National Football League football fields, each covered ten feet high, with radioactive waste.

Due to the vast quantity of waste that the NSDF will ultimately be capable of accepting, it is important for the municipality and other stakeholders to ascertain the source and the origination of the waste to be deposited at the NSDF prior to the commencement of its construction.

Deep River is concerned that without stringent parameters regarding the sourcing and origination of waste, the NSDF could become a national repository for radioactive waste without prior consultation and acceptance of such.

The waste to be disposed of in the NSDF includes the following:

- waste now in storage that has resulted from legacy ***CNL*** operational and decommissioning activities and past commercial activities [Emphasis added];
- waste to be generated from the ongoing decommissioning of existing CRL buildings and structures and the remediation of contaminated lands;
- waste generated from the decommissioning of WL and prototype reactor sites that is not disposed in situ; and
- future waste arising from continuing CNL operations (which may include waste identified following the closure of the Port Hope long-term waste management facilities), commercial activities, the decommissioning of buildings and structures that have not yet been built, and the remediation of soils from the CRL property (see pg. 2-6).

The above description of the origination and sourcing of waste is broad and vague.

The draft EIS consistently informs that "A *few percent* of the waste volumes to be placed in the ECM will be from off-site sources" (see pg. 1-5 and pg. 3-2) [Emphasis added]; however, CNL's website contradicts this, in that it states up to *ten percent* of the

radioactive waste deposited at the NSDF will be from off-site sources (see: http://www.cnl.ca/en/home/environmental-stewardship/nsdf/default.aspx under the heading "What will go in it?").

Further, the draft EIS fails to inform of the total amount of ILW to be deposited at the NSDF from off-site locations by percentage of volume and radioactivity level.

When describing the Purpose of the Project, CNL states that it will "close the WL and the NPD prototype reactor sites and ship the waste that is not disposed of in situ with the reactors to CRL" (see pg. 2-6).

CNL also intends to accept both LLW and ILW from the Douglas Point and Gentilly-1 prototype reactor sites at the NSDF (see pg. 2-4). CNL goes on to state that it will also continue to accept waste on a commercial basis (e.g. medical waste from hospitals) (see pg. 2-6).

When describing the Purpose of the Project, CNL states that "the NSDF Project will provide a safe, permanent solution at the CRL property for the disposal of low-level waste (LLW) and other acceptable waste streams and replace the current CNL practice of placing waste in interim storage" (see pg. 2-1). However, CNL fails to identify in the EIS exactly how much waste is currently in interim storage at CRL.

This broad and vague description of waste sources will essentially permit CNL to accept waste at the CRL property at its unfettered discretion.

Without further detail, it is difficult to understand how off-site sourcing of waste will be limited to "a few percent", or even less than ten percent (as per the CNL website), given the numerous other significant sources that CNL intends to accept waste from and there being no restrictions or parameters referred to in the draft EIS that will prevent the list of waste sources from expanding.

Deep River, as the host municipality, will substantially benefit from additional comment by CNL on its waste sourcing and origination intentions.

(f) *The ILW Problem*

In Canada, ILW makes up seven percent of the total volume of radioactive waste (see pg. 5 of DIS-16-03).

The draft EIS states that "limited quantities" of ILW may be suitable for disposal in the NSDF (see Table 2.2-1 on pg. 2-2), and currently, only one percent of waste by volume is forecasted to be ILW (see Table 3.2.1-1 on pg 3-8). However, CNL has not been consistent with respect to the one percent reference. In Section 3.2.2.2, CNL states that "A few percent of containerized ILW (i.e., Type 5 waste) has been included in the NSDF Project waste inventory". The volume of ILW to be deposited at the NSDF must be clarified.

CNL intends to accept ILW from WL and the Douglas Point and Gentilly-1 prototype reactor sites either for placement in the NSDF or for long-term storage until an ILW repository is created (see pg. 2-4).

The ILW problem becomes troublesome when one considers Figure 2.2-1 (see pg 2-3). It appears from the figure that the NSDF will be the only current permanent waste disposal facility for ILW that CNL has access to. Other long-term waste management facilities operated by CNL, such as those in Port Hope and Port Granby, do not accept ILW.

The ILW problem becomes increasingly apparent as the only potential long-term solution proposed by CNL for the disposal of a significant quantity of ILW (other than in-situ entombment) is the construction of a geologic waste management facility (see pg. 2-23 and Section 2.0 in its entirety, which is a consideration of the Alternative Means for Carrying out the Project). The construction and lifecycle costs of a geologic waste management facility are nearly prohibitive (the GWMF considered by CNL in the draft EIS was estimated to cost $10,000,000,000.00) and the construction schedule is substantially longer than that required for the NSDF (see pgs. 2-20 and 2-23).

Deep River is concerned that an appropriate permanent ILW disposal facility will never be constructed, leaving the NSDF as the only ILW disposal facility operated by CNL. It will only be natural for ILW disposal at the NSDF to be continually inflated, given CNL's

need to dispose of ILW and other disposal avenues being non-existent and unachievable in the foreseeable future.

(g) *Future Site and Waste Volume 'Expandability'*

In CNL's Assessment of Alternative Means and Sites, a key criterion in evaluating the project alternatives is whether there is potential for 'future expandability' (see pg. 2-13, Table 2.5.1-1). Alternatives that accommodated 1,000,000 m^3 *and* that provided future expandability were most favourable (see pg. 2-14). The NSDF was found to be the most favourable alternative as 'further expansion would be possible if required' (see pg. 2-24, Table 2.5-2).

The draft EIS contains no meaningful or fulsome discussion regarding CNL's future expansion plans beyond the planned Stage 2 of the NSDF (which is CNL's stated plan to expand the ECM from 525,000 m^3 to 1,000,000 m^3). Deep River expects and requires the proponent to fully disclose any future expansion plans regarding site area, the NSDF structure and / or radioactive waste volumes.

(h) Public and Aboriginal Engagement

(i) Public Engagement with the Town of Deep River

From the standpoint of the Town of Deep River, public engagement is an essential element of the draft EIS and the entire EA process. Public engagement is an opportunity for nearby residents to learn about the immediate and near future impact of the NSDF, as well as an opportunity for the public and other stakeholders to participate, comment and collaborate on the NSDF project from a macro level while considering long-term effects.

CNL writes at page 4-1 of the draft EIS: "Public and Aboriginal engagement is a key component of the environmental assessment process and reflects the corporate social responsibility of Canadian Nuclear Laboratories (CNL)." CNL goes on to state that their engagement efforts have focused primarily on the neighbouring communities, landowners and residents located closest to the CRL property – for instance, the host community (see pg. 4-2).

As of the date of publication of the draft EIS, CNL had held 14 public information sessions in seven nearby communities (see pg. 4-4). Two public information sessions were held in the Town of Deep River. The first was on June 21, 2016 from 6:00 p.m. to 9:00 p.m. The second was on October 18, 2016 from 6:00 p.m. to 8:00 p.m. (see pg. 4-4). CNL did not contact Deep River officials prior to scheduling these public information sessions and no formal meeting has ever occurred between CNL and Deep River Town Council.

CNL should have contacted and collaborated with officials of the host community prior to the June 21, 2016 public information session to ensure that there were no competing or conflicting community events and to ensure that municipal officials were aware of the information session and could attend. CNL should have taken every measure to ensure that all members of the Deep River public had the opportunity to attend the public information sessions.

Directly advising local officials regarding the time, date and location of the public information sessions and ensuring they were available to attend is a critical aspect of the public engagement process. Not only does this provide local officials the opportunity to

attend and learn about the project, but it also provides a sense of confidence and comfort to the community that their elected officials are aware of the project and are actively representing the public interest.

In addition, and notwithstanding the record of contact between CNL and members of the public (see Part 4 of the draft EIS and Appendices), Deep River is of the view that there has been no meaningful, real or substantial attempt on the part of CNL to engage the public in the NSDF project. Although the NSDF project description and design is described in detail in the draft EIS, the record suggests answers to questions raised by the public have not been provided (see pg. 4-7 and Appendix 4.0-14).

Given the general public's interest in waste management (especially radioactive waste), the public information sessions and meetings with public representatives should have been more informative regarding the significant number of LLW and ILW waste shipments from non-CRL sites (WL, NPD and Gentilly-1) that will be made to CRL for disposal at the NSDF. Furthermore, no mention was made of the absolute and relative risk of these shipped wastes.

CNL informed and presented the NSDF to the public rather than meaningfully engaging and consulting the public regarding the NSDF and its alternatives. It is telling that CNL refers to the meetings it has hosted as "Public **Information** Sessions", rather than "Public **Engagement** or **Consultation** Sessions". CNL has not truly **consulted** Deep River (and other stakeholders) in developing solutions to address the need for a waste disposal facility at CRL.

The process that was used by Ontario Power Generation (at the time, Ontario Hydro) regarding the proposed Low and Intermediate Level Waste facility at Kincardine is more reflective of community engagement and should have been adopted. This process involved Ontario Hydro specifically engaging the Town of Kincardine when the Deep Geologic Repository disposal facility was first contemplated and then involving the Town in making the decision to select the type of disposal facility. In addition, agreements were struck early in the process as to how the Town would be kept informed of progress and

how it would be compensated. The Town of Deep River would have greatly appreciated a similar approach as this.

Deep River is of the opinion that the public engagement process has been inadequate to this point and that additional effort is required so that the host community is involved in a meaningful and collaborative manner.

(ii) Aboriginal Engagement

Deep River recognizes that Aboriginal communities have the opportunity to comment on the draft EIS and the consultation processes. Nonetheless, Deep River provides the following comments due to its concern that inappropriate consultation practices could stall or completely derail the NSDF. In particular, the draft EIS confirms that the NSDF project occurs within the general area of the Algonquin land claim (see pg. 5-596).

The Supreme Court of Canada held in *Haida Nation v. British Columbia (Minister of Forests)* [2004] 3 S.C.R. 511 [*Haida*] that there may be a duty to consult *and accommodate* Aboriginal communities.

One of the Algonquin communities, the Algonquins of Pikwàkanagàn, have written to CNL objecting to the NSDF (see Appendix 4.0-31).

The Algonquins of Pikwàkanagàn have been identified for engagement activities because they have a comprehensive land claim (see pg. 4-13, Table 4.3.2-1).

The duty to consult is automatically triggered when government has knowledge of real or asserted Aboriginal or treaty rights and is making a decision that may adversely impact the exercise of those rights.

While the project proponent (CNL), as a third party, is not legally responsible for fulfilling the duty to consult, government often directs the proponent to take on procedural aspects of the process. Proponents are also expected to develop accommodation mechanisms in cases where the original design of a project would cause severe or irreversible harm to Aboriginals' rights. The regulator (CNSC) will then be responsible to determine if consultation and accommodation has been appropriate, in the circumstances.

It is unknown whether CNL has responded to the Algonquins of Pikwàkanagàn's letter or if CNL intends to engage with the Algonquins of Pikwàkanagàn in any meaningful consultation, or to provide them accommodation regarding the NSDF in accordance with Canadian law.

Table 4.3.2-2 details emails, letters, voicemails, telephone calls and meetings that CNL has had with several First Nation communities; however, it is unclear from the chart whether the correspondence has been meaningful.

Deep River urges the CNSC to strongly examine whether local Aboriginal groups and First Nation communities have been appropriately consulted and accommodated with respect to the NSDF project, and if so, does the draft EIS correctly represent the outcome of those consultations and accommodations.

(i) Environmental Effects

As a precursor, Appendix 4.1, which is referred to in Section 5.1, is not included in the Appendices.

A general comment regarding these sub-sections: The Regional Study Area (the **"RSA"**) is defined as "the area within which the maximum geographical extent of potential indirect effects of the Project may interact with the effects of other existing or reasonable foreseeable projects" (see pg. 5-14). Also, it is stated that the Temporal Boundaries are inclusive of all Project Phases. It is not clear from the draft EIS, or other available supporting documents, what will be undertaken with the contaminated lands and Waste Management Areas (**"WMAs"**) within the region of the NSDF site over the institutional control period – presumably, there are some foreseeable projects over this extensive time period. The draft EIS does not address whether projects related to these other areas during the 300 year institutional control period will impact the results of this assessment or whether any projects are included in the RSA; it does not provide an overall picture with respect to the current WMAs and the NSDF and their ongoing impact on the environment and the public over the NSDF Project phases; and it does not provide an integrated profile of emissions and effluent concentrations, each of these would assist in providing a larger picture of the anticipated risks and hazards associated with the CRL site.

(i) Atmospheric Environment

At Section 5.2.1.6.1, CNL has developed its own atmospheric dispersion models that have been used historically on-site by the Canadian nuclear industry (and hence familiar to the CNSC) and Federal Departments and Agencies (see pgs. 5-46 to 47). It is advisable to provide the results of dispersion modelling by these tools in addition to those currently shown in the draft EIS. If there are significant differences, the discrepancies should be explained.

Annual Greenhouse Gas Emissions have been estimated and summarized for the construction and operations phase (see pgs. 5-75 to 76 and Tables 5.2.2-8 and 5.2.2-9). No such estimates have been provided for the closure and post-closure phases. Given

the extensive timeframes associated with these phases, Greenhouse Gas Emissions estimates should also be provided for completeness, together with the assumptions used in calculating these releases.

(ii) Geological and Hydrogeological Environment

In Table 5.3.2-6, and summarized in Section 5.3.2.6.2.2, the non-radiological constituents aluminum, barium, cadmium, iron, manganese and zinc are in exceedance of the risk benchmarks for surface water (see pgs. 5-153 and 156). Reference is then made to these contaminants having the "potential to be attenuated in the groundwater flow path between the ECM and Perch Creek". Although it is recognized that the applicable transport modelling has not yet been developed, a best-estimate of the attenuation should be provided with supporting rationale.

In Section 5.3.2.7, it is noted that four sensitivity simulations were completed with "slight changes to the goodness of fit to model calibration data, though in all cases the results were acceptable" (see pg. 5-157). The criteria for defining "acceptable" results is missing and must be provided.

In Section 5.3.2.8, it is stated that "Initial sampling frequency will likely be twice per year (Spring and Fall) consistent with the existing site groundwater monitoring program" (see pg. 5-157 and Table 5.3.2-9). Since it has already been noted above that there will be several non-radiological exceedances of the risk benchmarks for surface water, it is recommended that sampling be more frequent until evidence of attenuation is achieved.

(iii) Terrestrial Environment

In Section 5.6.3.1 and Figure 5.6.3-1 the southern portion of the RSA has been limited to the CRL boundary line with Garrison Petawawa. The rationale for excluding the extension of the southern limit into the lands of Garrison Petawawa (comparable to that done for the Aquatic Environment (Section 5.5, Figure 5.5.3-1) is not obvious. The RSA should be extended or a more thorough explanation as to why this is deemed unnecessary must be provided.

(iv) Ambient Radioactivity and Ecological Health

In Section 5.7.5.5 the third primary pathway identified is "Release of gases during disposal of radioactive waste in the post-closure phase" (see pg. 5-512). This quote implies that radioactive waste will be disposed of during the post-closure phase. It is understood that there will be no waste deposited to the NSDF during the post-closure phase. It is critical that this important discrepancy be explained.

Table 5.7.6-1 lists the bounding radionuclide inventory to be placed in the ECM (see pg. 5-513). It is unclear how this inventory is converted to a concentration in Table 5.7.6-3 at year 2400, or whether it is assumed to be over the entire 1,000,000 m^3 volume, or whether it is an average concentration, or whether is it a maximum cell concentration (see pg. 5-516). It is not clear how the volume, which is the design basis, is converted to grams. Note, these comments also apply to Table 5.8.6-4 (see pg. 5-554). These important details should be provided.

As noted earlier, the amount of tritium that the NSDF Project is designed to release to Perch Lake allows for increases in the amount of tritium to reach 7,000 Bq/l, despite the fact that tritium levels have been steadily decreasing, and are now approximately 3,200 Bq/l. Hence, the allowable tritium inventory shown in Note (a) of Table 5.7.6-1 should be revisited and decreased accordingly.

In Table 5.7.7-1 (see pg. 5-529), across from "Waste Inventory", the description under the "Uncertainty" heading indicates that the inventory in the ECM is uncertain. However, Table 5.7.6-1 lists many radionuclides at their bounding inventory (see pg. 5-513). Hence, the discussion should reconfirm that the assessment is based on the bounding inventory, which may or may not be conservative, given the acknowledged uncertainty in the actual inventory at this time.

The last parameter in Table 5.7.7-1, Cumulative Effect, states that the contaminated lands from the WMAs and the Liquid Disposal Areas (**"LDAs"**) would be removed if there is potential for exceeding safety objectives. CNL has not identified where these lands and soils will be placed (i.e. the NSDF or an alternative site).

(v) *Human Health*

Given that Section 5.8.3 deals with Human Health, the RSA should not be limited to the upper portion of Garrison Petawawa. Rather, it would be advisable to extend the RSA further south to a major down-stream community (i.e. Petawawa).

Table 5.8.6-2 lists the bounding radionuclide inventory to be placed in the ECM (see pg. 5-551). It is unclear how this inventory is converted to a concentration in Table 5.8.6-4 at year 2400, or whether it is assumed to be over the entire 1,000,000 m^3 volume, or whether it is an average concentration, or whether is it a maximum cell concentration (see pg. 5-554). It is not clear how the volume, which is the design basis, is converted to grams. These important details should be provided.

With regard to Table 5.8.6-2, the allowable tritium inventory shown in Note (a) should be decreased accordingly for the reasons noted herein regarding Perch Lake (see pg. 5-551).

At Table 5.8.7-1 under the column "Conservatisms and Assumptions" for the parameter "Source term", with respect to airborne tritium and to a lesser extent C-14 releases, it is uncertain whether the effect of water radiolysis has been included (see pg. 5-566). This could contribute to increased airborne releases. The same comments are applicable to Table 5.8.6-6, (see pg. 5-557). Under the parameter "Cumulative Effect" in Table 5.8.7-1, uncertainties arise regarding the lands and soils associated with the WMAs and LDAs, where they will be disposed of and what technology will be employed to contain these hazards (see pg. 5-567).

Table 5.8.6-13 is incomplete, in that no units are provided in this Table (see pg. 5-563).

At Section 5.8.6.2.1.1, when discussing drinking water quality guidelines and objectives, there is reference to the post-closure and post-institutional control phases being "in the far future" (see pg. 5-564). Regarding the entirety of the project, the post-closure phase is not in the "far future". Consideration must be given to future property owners drawing their potable water from these affected water bodies.

At Table 5.8.7-1, similar to comments under the Ecological Health heading regarding Table 5.7.7-1, the last parameter in Table 5.8.7-1, Cumulative Effect, states that the contaminated lands from the WMAs and the LDAs would be removed if there is potential for exceeding safety objectives (pg. 5-567). CNL has not identified where these lands and soils will be placed (i.e. the NSDF or an alternative site).

As a final comment, microbial activity on the various components of the NSDF or on the potential release of airborne or water-borne contaminants and radionuclides has not been addressed. This topic should be discussed citing scientific evidence as to the potential role of microbes during the various phases of the project, in particular during the post-closure phases, including experiences from other comparable facilities.

(vi) Socio-economic

In Section 5.10.1, reference is made to the engagement that influenced the scope of the socio-economic assessment (see pg. 5-608). The draft EIS should include a list of the specific questions and discussion lead points used to obtain input into the scope and areas of interest for socio-economic assessment. Deep River's perspective on the information currently included as appendices is that the socio-economic topic was conducted in an ad-hoc manner, rather than as a structured formal process. For example, there was no session held in the various affected communities, including Deep River, that sought input into the areas of interest addressed in this socio-economic assessment.

In Section 5.10.8.2.3 additional information is required to support the conclusions for transportation and traffic. Highway 17 is already an issue for local municipalities and residents of Renfrew County and Deep River. There will be approximately 230 truck trips per day during site preparation and construction (115-in and 115-out) (see pg. 5-637). CNL does not advise how long this will continue, nor what time of year it is expected to occur. Increased road degradation is identified as a Residual Effect, without addressing the impact this increased traffic will have on municipal roads. Furthermore, the Section regarding traffic is limited to construction materials and does not include transportation requirements and effects for the truckloads of radioactive waste planned to be delivered

from WL and other CNL sites to CRL. This assessment should include a description of how this is going to occur, along with the timing and volume of traffic.

(vii) Species at Risk

The draft EIS identifies 24 wildlife species at the CRL site as "species at risk" under the *Species At Risk Act*, S.C. 2002, c 29 (**"SARA"**). This includes: four species of turtles, four species of bats, song birds, the eastern milk snake, the eastern whip-poor-will, the western chorus frog, and the monarch butterfly (see pg. 2-36). Following an assessment of the above referenced species at risk and their environments, the draft EIS concludes, "Based on the evaluation, each of the residual adverse effects was assessed to be not significant, with the exception of bats and Blanding's turtle" (see pg. 11-1).

The changes to the bat and Blanding's turtle habitats imposed by the NSDF would appear to have a significant effect on the environment for these species.

Specifically, the draft EIS reveals the NSDF would result in a permanent loss of 25 hectares of "high quality maternal roost habitat" for bats (see pg. 8-8, Table 8.0-1), and for Blanding's turtle, a permanent loss of 22 hectares of "critical habitat" as defined in the SARA and a permanent change in movement corridors between Blanding's turtle habitat patches (see pg. 8-9, Table 8.0-1).

Notwithstanding this permanent loss of critical habitat (pursuant to a permit issued under Section 73 of the SARA), among other adverse effects that are described in the draft EIS, the draft EIS concludes for bats and the Blanding's turtle "significant adverse effects are related to the external conditions for these species and not due to the NSDF project" (see pg. 11-2, para 11.0).

In addition, the draft EIS concludes, "the NSDF project will contribute a small increment to existing significant adverse cumulative effects on these [bats and the Blanding's turtle] species" (see pg. 11-2).

Given the loss of habitat and permanent changes to the habitat distribution because of the NSDF project footprint, CNL's conclusions are not persuasive. As such,

notwithstanding the mitigation measures outlined in Table 8.0-1, Deep River encourages the CNSC to consider whether additional measures could be taken by CNL to better protect the bats and Blanding's turtles.

(j) *Property Value Protection Plan*

Traditionally, property value protection plans and agreements are implemented to provide affected property and business owners with a level of comfort regarding any perceived or real diminution in property values resulting from the proximity to or impacts and stigma associated with a waste management facility of this size and composition.

When fully constructed, the NSDF will cover 34 hectares and accommodate up to 1,000,000 m^3 of radioactive waste. The NSDF will be comprised of an ECM consisting of approximately 200,000 m^3 of various soil and granular materials, a base liner with an estimated 400,000 m^2 of geosynthetic products transported to the site, (see pg. 3-17) compacted soil and rock berms on the outer boundaries and sidewalls rising from 1m to 15m (see pg. 2-5), a waste water treatment plant, supporting facilities and other site infrastructure. (see pg. 3-21).

In addition, CNL reveals waste haul vehicles used to transport radioactive bulk debris and soils to CRL from off-site sources may range from standard tandem dump trucks with a capacity of 8 m^3 to highway semi-dump trailers with a capacity of 20 m^3 (Page 3-38).

In comparing alternatives, CNL does not specify the total waste volumes or number of truck shipments or "trips" estimated for the transfer of waste from those off-site sources to CRL. Contrast this to the estimates provided in the Project Alternatives Analysis (Facility Location) in Part 2 of the draft EIS where CNL estimates shipping 1,000,000 m^3 of waste from CRL to WL at an average of 20 m^3 per truck would result in 50,000 truck shipments (see pg. 2-35).

Deep River is of the opinion, in comparing alternatives, specifics regarding waste volumes and the number of truck trips should be detailed in order to measure the full potential impacts on the municipality, its businesses and residents.

CNL notes that construction materials (e.g. process granular materials and gravel, geosynthetic products and clay) will be transported to the NSDF site using standard highway haul vehicles. It is estimated that during site preparation and construction, 115 truckloads of material will be delivered daily, which results in 230 truck trips per day (115-

in and 115-out) (see pg. 5-637, para 5.10.6.2.2). This results in a truck arriving to, or departing from, the NSDF approximately every two minutes based on an eight hour day.

The above impacts do not include the additional 280,000 m^3 of on-site soil excavation activities (see pg. 3-17).

The haulage route is to be via public roads to the CRL property, however, to date, the designated route has not been disclosed, discussed, or reviewed with Deep River.

The presence of a permanent nuclear waste storage facility, its construction and operations along with the impacts associated with the high volume of truck trips on public roads will result in a real and perceived stigma to Deep River properties, businesses and residents within reasonable proximity of the haul route and the NSDF. Accordingly, those affected individuals should be offered a comprehensive property value protection plan.

(k) Long-Term Financial Assurances

CNL has not approached Deep River regarding the potential financial exposure, impacts, commitments and liabilities to Deep River resulting from the NSDF's near and long term operations and closure and post closure obligations. Specifically, there has been no agreement or discussion as to what would happen and who would be required to fill a void if CNL were to default on its obligations.

Consequently, Deep River submits that long term financial assurance needs to be available to compensate Deep River in the event of CNL's default, inability or failure to meet its obligations.

There has been no agreement or discussion regarding compensation to Deep River, or any third parties, who incur damages due to polluting or other activities giving rise to a claim and for any decommissioning, clean up, rehabilitation, long term monitoring and perpetual care facilities requiring Deep River or third parties to act. Accordingly, long-term financial assurances need to be in place.

The financial assurances should be in the form of cash deposits, surety bonds, negotiable securities guaranteed by the Federal Government, or irrevocable letters of credit in favour of the Town of Deep River.

In addition, there must be provision for compensating Deep River for impacts associated with having a near surface disposal facility for radioactive waste in its community.

Deep River recognizes that requisite financial assurance and compensation may be addressed during the licensing of the NSDF, nevertheless Deep River is of the opinion that this is an important matter worthy of pre-emptive discussion.

(l) Malfunction and Accident Procedures

The draft EIS considers two broad types of malfunctions and accidents that are associated with the NSDF: (1) radiological malfunctions and accidents; and (2) conventional (non-radiological) malfunctions and accidents (see pg. 6-1)

The draft EIS identifies various internal radiological and conventional hazards (hazards that are initiated within the NSDF project) and external radiological and conventional hazards (natural or man-made hazards) (see pgs. 6-1, 6-2 and 6-4).

Using a screening analysis, 13 malfunctions and accidents were considered to be "credible events". A complete description of the screening process, and rationale / results of each hazard evaluation is provided in the Performance Assessment Report for the NSDF Project (CNL 2017). The 13 credible events are as follows:

1. lightning and forest fires;
2. on-site transfer accident – fire engulfing radioactive waste packages;
3. on-site transfer accident – damage to radioactive waste package;
4. human intrusion – acute exposure from well drilling;
5. human intrusion – chronic exposure from lining in a house and farming on top of the ECM;
6. earthquake;
7. glaciation;
8. failure of cover due to erosion;
9. extreme temperature – causing erosion of soil cover;
10. failure of geomembrane in the cover – due to erosion of soil cover or burrowing animals – causing the "Bathtub Effect";
11. failure of liner;
12. geotechnical – subsidence; and
13. criticality.

CNL assesses each of these scenarios in different Sections of the draft EIS (see pg. 6-6, Table 6.4.1-1).

Generally, CNL's assessments of the credible accident scenarios in the draft EIS are insufficient and lack explanation (i.e. see assessment of the credible event, "criticality" at pg. 6-16, para 6.4.4.5). None of the scenarios consider the effects of a serious accident. For example, with respect to the "credible event" of a fire engulfing radioactive waste packages, CNL develops the following accident scenario for assessment in the draft EIS:

- a transportation vehicle carrying ten radioactive waste packages is involved in a postulated fire;
- the fire lasts for one hour; and
- the nearest public receptors are assumed to be three kilometers away from the scene, which is the distance from the proposed NSDF Project site to the closest cottage residents (see pg. 6-9).

This accident scenario is of a minor nature. While many accidents and malfunctions that occur at the NSDF may be of a minor nature, Deep River expects CNL to anticipate and prepare for serious events.

Furthermore, the fire engulfing radioactive waste packages accident scenario does not confirm that the doses calculated are bounding and it does not use the worst-case scenarios for waste packages or types, with the most restrictive radionuclide for the impact on a receptor. Also, the ten waste packages are not clearly identified (see pg. 6-9) An appropriate assessment of this accident scenario would describe the subject waste packages as well as provide a specific time in the operations phase when this maximum peak dose would occur.

The draft EIS does not give proper consideration to serious malfunction, accident prevention and response planning.

(i) The Fire Protection Program

Further evidence that CNL has not given real consideration to the disaster and accident planning issue is found in the casual manner in which the draft EIS proposes to respond to some of the accident scenarios. For example, with respect to the fire engulfing radioactive waste packages discussed above, the draft EIS states:

> CNL has a Fire Protection Program for the CRL site designed to prevent fire losses, provide responsible fire protection management, and demonstrate compliance to applicable fire protection codes and standards. Fire detection and suppression systems are also included in the NSDF Project design. Further details of this program are provided in **Section 3.13.2.9**. (see pg. 6-8) [Emphasis Added].

Section 3.13.2.9 consists of one paragraph that is four sentences in length (see pg. 3-80). There are no other portions of the draft EIS that provide substantive detail regarding the Fire Protection Program.

The description of CNL's Fire Protection Program and its application to potential accidents and disasters at the NSDF is wholly inadequate.

Moreover, CNL believes that no changes to the current Fire Protection Program that has been developed for the CRL site will be required to address any accidents or malfunctions at the 1,000,000 m^3 NSDF (see pg. 6-22). In Deep River's opinion, there is insufficient reason and explanation in the draft EIS to substantiate CNL's position with respect to whether the current Fire Protection Program is suitable for the NSDF. The NSDF is a new use of the CRL lands and an appropriate assessment as to whether the current Fire Protection Program is sufficient to protect users of the CRL lands, the local environment, and the neighbouring communities must be made. Assuming, without explanation, that the current Fire Protection Program is adequate is unacceptable.

Finally, as of the date hereof, there has been no consultation with the host municipality with respect to malfunction and disaster relief, assistance, training or planning regarding the NSDF.

(ii) Dose Acceptance Criteria for Accidents

Table 6.4.3.1 sets out the dose acceptance criteria for accidents (see pg. 6-7); however, the frequency range calculations are, in some instances, greater than the acceptable dose range. For example, for a frequency range of $3x10^{-2} – 3x10^{-1}$, this is 0.03-0.3/year x 500 years = 15-150 events that may occur during the lifetime of the facility, which is more than "a few times", as noted in the text (see pg. 6-7 in Table 6.4.3-1). Thus, it appears

that the criteria developed for the NSDF, which requires institutional control for 500 years, is inappropriate.

(iii) The Emergency Protection Plan

When considering the assessment of a credible spill accident scenario at the NSDF, CNL states: "An Emergency Protection Plan *will be developed* to provide rapid and competent response to spills that may occur from the NSDF Project" [Emphasis added] (see pg. 6-17).

CNL has not developed an Emergency Protection Plan to respond to spills at the NSDF. One of CNL's first considerations during the development of the proposal for the NSDF should have been an Emergency Protection Plan that anticipates a spill and details the measures in place to protect the environment and the community. Similar to the Fire Protection Program, the Emergency Protection Plan should be prepared and outlined in the draft EIS for review and comment by the public.

The malfunction and accident prevention strategies and analysis as they are outlined in the draft EIS are insufficient for the following reasons: Deep River has not been consulted with respect to malfunction and disaster response; CNL has not properly addressed the potential for a serious accident or disaster to occur; the apathetic manner in which accident scenarios have been addressed; the absence of an Emergency Protection Program; the lack of detail regarding the Fire Protection Program; and the unknown reasons why CNL believes that the current Fire Protection Program sufficiently addresses the new risks posed by the NSDF.

(m) Summary of Cumulative Effects

The CEAA requires that each EA of a designated project (such as the NSDF) take into account any cumulative environmental effects that are likely to result from the designated project in combination with the environmental effects of other physical activities that have been or would be carried out.

CNL intends to request expressions of interest from vendors of Small Modular Reactors (**"SMRs"**), who may wish to do site demonstrations at CRL (a Request for Expressions of Interest on SMRs, was issued by CNL on June 1, 2017). Given this CNL initiative, inclusion of SMRs in Table 7.2-1 would be appropriate with reference to this being associated with a timeframe of "Potential project post 2020". Also, the draft EIS, refers to the need for an ILW solution (see pgs. 2-5 and 2-19). The draft EIS also states that studies have concluded that the geology of the CRL site would be appropriate for an ILW repository (see pgs. 2-5 and 2-19 again). If there is any intention to construct an ILW repository on the CRL lands, same should be included in Table 7.2-1 under the heading Timeframe (see pg. 7-2).

Both of these initiatives would be major projects on-site and, hence, are sufficiently noteworthy to be included here.

(n) Assessment of the Effects of the Environment on the Project

(i) Extreme Rainfall, Snowmelts and Flooding

Section 9.1.2 discusses extreme rainfall events, snowmelts and flooding (see pgs. 9-2 and 9-3). In CNL's discussion of these events and their impact on the NSDF, they have not provided examples of existing near surface disposal facilities and how these design standards have actually "stood the test of time" during extreme rainfall or flooding. Of particular interest is the operation of the WWTP and the water management handling facilities, as well as slope stability of the ECM.

The draft EIS states that the low point of the ECM has an elevation of approximately 160 metres above sea level, while the 100-year flood elevation for the portion of the Ottawa River adjacent to the NSDF is 155 meters above sea level (see pg. 9-3). Given these figures, a 5% deviation would result in the ECM being below the Ottawa River flood level. Since a 100-year flood level is considered, there is a significant probability the Ottawa River will flood during the lifetime of the ECM. The consequences of such an event need further explanation and the impacts on the environment need to be described and mitigation approaches identified. It is imperative that the ECM is above the Ottawa River floodplain.

(ii) High Winds

There is no discussion of high winds impacting the WWTP (see pg. 9-5 and 9-6). In the event of major damage, repair may be extensive and time-consuming. Accordingly, temporary alternative means to store and process wastes, including waste leachate, should be considered and prepared for.

(iii) Forest Fire

It is unclear whether the Fire Protection Program applies throughout the post-closure phase of institutional control (see pg. 9-6). It is also unclear how in the case of a large scale forest fire, the scenario of the fire burning for only an hour is determined to be bounding. One could envisage other facilities that may be impacted by a forest fire which could be a higher priority for the fire fighters, thus the one hour limit may not be applicable.

PART VI

CONCLUSIONS

The foregoing submissions are a culmination of The Town of Deep River's considerable efforts to draw CNL's attention to Deep River's concerns regarding the draft EIS in its current form. These submissions are specific, technical, and global in scope.

The submissions summarize the manner in which CNL has conducted its public engagement functions and obligations pursuant to the CEAA. The public engagement process to date has been hindered by a "presented to" approach rather than an "engagement of" approach with regard to Deep River. This is inconsistent with approaches used for other similar projects in Canada and internationally. Major decisions such as the type of facility, and the sources of radioactive waste were made well in advance of any meaningful public engagement.

The Town of Deep River is concerned that the types of waste that are to be disposed of at the NSDF are not yet defined; it is difficult for Deep River to provide meaningful comment without knowing exactly what LLW and ILW are. Similarly, the WAC must be developed and circulated for comment.

Currently, the parameters in the draft EIS regarding waste sourcing and origination permit CNL to accept waste at its unfettered discretion from numerous sources. While the draft EIS states that only a "few percent" of the waste is to be deposited at the NSDF from off-site sources, CNL's website directly contradicts this, by informing that as much as ten percent of waste will come from off-site sources (see: http://www.cnl.ca/en/home/environmental-stewardship/nsdf/default.aspx under the heading, "What will go in it?"). It is vitally important to Deep River to understand how much and what types of radioactive waste will be traveling through its community that was not generated at CNL.

The malfunction and accident procedures discussed and proposed in the draft EIS do not consider serious accidents and hazards posed by the NSDF. It appears that CNL is not prepared for a major incident involving the NSDF. Deep River considers the safety of its

residents and the environment in the highest regard and must be assured that adequate measures to protect them are in place.

In a consideration of Alternative Means and Sites, at times it appears that the project schedule and cost were the driving forces influencing the assessment, rather than public health, safety, and the environment.

The draft EIS references the potential for future expansion of the NSDF, but it does not disclose these plans in any detail. If CNL has intentions to expand the NSDF past 1,000,000 m^3, Deep River should be consulted by CNL with respect thereto at this time, not years into the future.

Deep River is the proud home of CNL and is looking forward to its continued positive relationship with CNL and cooperating in the development of the NSDF at CRL. Accordingly, Deep River is available to work with CNL in reaching solutions to the comments noted herein.

More is required on the part of CNL to move the NSDF project forward, ideally with Deep River being a participant in the process as the willing host community.

PART VII

GLOSSARY OF DEFINED TERMS

AECL	Atomic Energy of Canada Limited
ALARA	As Low As Reasonably Achievable
Bq	Becquerel
CEAA	*Canadian Environmental Assessment Act, 2012*, S.C. 1992 c. 37
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CRL	Chalk River Laboratories
Deep River	The Corporation of the Town of Deep River
ECM	Engineered Containment Mound
EIS	Environmental Impact Statement
EMR Site	East Mattawa Road Site
GWMF	Geologic Waste Management Facility
ILW	Intermediate Level Waste
IWS	Integrated Waste Strategy
LCS	Leachate Collection System
LDAs	Liquid Disposal Areas

LDS	Leachate Disposal System
LFG	Landfill Gas
LLW	Low Level Waste
NPD	Nuclear Power Demonstration
NSDF	Near Surface Disposal Facility
RSA	Regional Study Area
SARA	*Species At Risk Act*, S.C. 2002, c 29
WAC	Waste Acceptance Criteria
WL	Whiteshell Laboratories
WMAs	Waste Management Areas
WWTP	Waste Water Treatment Plant