Federal Department	Reference Number	Report Section	Reviewer Comment
Canadian Nuclear Safety Commission (CNSC)	FC-1	General	So far, there is no exact indication on how deep the waste will be emplaced, grade and elevation of the engineered containment mound (ECM) relative to the existing area grades and topography. **Expectation to address comment:** To better understand and support the description/characterization of the Site Study Area (SSA) and Local Study Area (LSA), and impacts of the project on the environment, Canadian Nuclear Laboratories (CNL) should provide in the final Environmental Impact Statement (EIS) document, an overall stratigraphic cross section which illustrate the ECM elevations, surface water, vadose, the water table aquifer, the surrounding lakes and swamps including the shore line of the Ottawa River.
CNSC	FC-2	General - Geology of the site and region	The sand overburden could be subject to liquefaction under earthquake loading. When liquefied, the sand could lose all of its shear strength, leading to failure of the ECM and other structures and components associated with the proposed Near Surface Disposal Facility (NSDF). **Expectation to address comment:** CNL should assess the liquefaction potential of the sand overburden. That assessment should be done using a Design Basis Earthquake (DBE) which is commensurate with the design life time and the risk associated with each structure or component of the NDSF.
CNSC	FC-3	General - Seismicity of the site and region	It is mentioned that the CNL DBE has a recurrence frequency of one in 1000 years. It is not clear whether CNL intends to use the same DBE to design the structures and components of the NDSF. **Expectation to address comment:** CNL should clarify which DBE would be used for each structure and component of the NDSF. The choice of a DBE should be commensurate with the design life time and the risk associated with each structure or component of the NDSF. The probability of exceedance of the DBE during the design life of a structure or component must be evaluated, and should an event stronger than the DBE occurs, the consequences must be assessed.
Environment and Climate Change Canada (ECCC)	FC-4	1.0, 1.1 Project Overview	It is indicated that the ECM would consist of a base liner system, a surface water management system, a final cover system and environmental monitoring systems. It is indicated that the primary liner will contain a leachate collection system and that the second liner system will contain a leak detection system. Additional information about how the leak detection system will be used to prevent and manage releases of untreated leachate should be provided as well as any other spill prevention measures to be implemented at the NSDF. **Action Required:** Provide additional information about the leak detection system including how it will be used to prevent and manage releases of untreated leachate from the NSDF and any additional spill prevention measures to be implemented at the facility. Specifically, ECCC recommends that additional information on the measures to be employed if a leak is detected in the system be included.
ECCC	FC-5	1.0, 2.2.2.1 and 3.2.2	It is indicated that all the waste to be disposed of at the NSDF will be required to meet the Waste Acceptance Criteria (WAC). Some information is provided in section 3.2.2 about the principles and guidelines that will guide the development of the WAC, including the following: "[to] *identify relevant parameters that will influence the facility design and safety case for radioactive waste to be emplaced in the engineered containment mound (ECM) so that each criterion is considered and accounted for."* It is also indicated that relevant regulations, International Atomic Energy Association (IAEA) guidelines and Canadian Standards Association (CSA) standards would be followed but no details as to which regulations, IAEA guidelines and CSA standards are provided in the EIS. Due to their relevance for environmental protection, ECCC is of the view that the WAC criteria should be developed and evaluated during the Environmental Assessment (EA) process in order to understand their potential to contribute to avoiding or minimizing environmental effects.

Federal Department	Reference Number	Report Section	Reviewer Comment
			Action Required: Develop and incorporate the WAC into the EA process so they can be evaluated for their potential contribution to environmental effects. A list of the relevant regulatory criteria, environmental protection guidelines, IAEA guidelines, CSA standards and any other guidelines to be used for the development of the WAC should be provided as well. Further, the WAC should be developed in consideration of the Waste Water Treatment Plant (WWTP) that is proposed for the NSDF to ensure it is capable of treating the contaminants in the leachate at the concentrations expected from the waste.
CNSC	FC-6	2.5 Alternative means for carrying out the project	The objective of the NSDF project is to reduce substantively the risks associated with interim storage of radioactive waste at the CNL site. In the alternative assessment, the chemical pit, reactor pit and waste management area A are the only sources of contamination considered. Seepage from the nitrate pit, the ACS pit, the thorium pit, the bulk storage, and the waste management areas (WMAs), B to H are not included. Therefore, it is difficult to clearly compare how the ECM will significantly reduce the environmental risks at the CNL site compared to implementing engineering covers on each WMAs to limit the releases to the environment. **Expectation to address comment:** Please discuss how the construction of an ECM and transfer of the waste from all areas at the CNL site into the mound will substantively reduce the long-term environmental risks to the CNL site and the Ottawa River compared to decommissioning each waste areas *in situ*.
ECCC	FC-7	2.5.2.1, 2.5.2.2 and 2.5.2.4	**Comment:** The Port Hope and Port Granby projects are listed as Canadian examples of safe, long-term management options for low level waste (LLW). No examples for intermediate level waste (ILW) waste management options are provided for Canada even though there have been other projects proposed for the management of ILW, such as Ontario Power Generation (OPG)'s Deep Geological Repository (DGR). Further, the following two statements are made: • "Near surface disposal facilities have been demonstrated globally as an effective disposal solution for the volume and nature of wastes proposed for this project." • "Geologic waste management facilities are most typically proposed for high level waste (HLW) and ILW, and the increased protection to the environment is marginal relative to the nature of the wastes (i.e., >95% by volume LLW) and protection offered through a NSDF." **Action Required:** Provide justification for an ECM as the most suitable storage option for Chalk River Laboratories (CRL)'s ILW in light of the fact that other projects in Canada have proposed geological repositories as the most suitable option for ILW. Further, additional information should be provided about the projects mentioned above to support the conclusion of this portion of the alternatives assessment that the NSDF is the most suitable option to contain the waste and prevent environmental effects including impacts to water quality.
ECCC	FC-8	2.5.3.4	Table 2.5-3 provides an evaluation of various aspects of two alternatives being assessed. Under *Environmental Effects*, the criteria *Air Quality and Greenhouse Gases* is evaluated for the two options. It is indicated that surface concrete vaults would require additional construction activities, thus resulting in additional air emissions. This comparison of alternatives needs to take into consideration that for an engineered containment mound, "*at the end of each working day, the surface of the waste will be temporarily covered with a soil layer* […] *to control the release of fugitive dust from the surface of the waste"*. This practice may result in substantial air emissions from the heavy machinery that would be used to cover and uncover the waste in the cells. **Action Required:** If not already done, consider in the assessment of alternatives the additional greenhouse gas emissions to the atmosphere that may result for the engineered containment mound option from daily covering and uncovering of waste in order to minimize the amount of fugitive dust emissions.

Federal Department	Reference Number	Report Section	Reviewer Comment
Health Canada (HC)	FC-9	2.5.4.3 Environmental Effects, p.85 Table 2.5-4, p.89	The section states "The nearest population center to the CRL site is the Village of Chalk River, approximately 6 km west" and then provides both population centers and nearest residents for the two alternative sites, without specifying the closest individual receptor to the CRL site for comparison. Additionally, the distance to the Village of Chalk River is inconsistent throughout the report (i.e., at times it is 7 km instead of 6 km). The table states "Closest local resident [to the CRL site] is approximately 6 km way from the site." However, this contradicts the proponent's response to comment HC-1 (Group 2 documents): "The nearest residents are cottagers on the Quebec side of the Ottawa River, and are approximately 4 km from the NSDF site." This is also inconsistent with distances to potential critical groups in section 5.8.6.1.1.1 (i.e., 3km). The inconsistency of information leads to a lack of confidence in the identification of receptors, and the subsequent assessment of effects on health. **Expectation to address comment**: Verify consistency of information provided on receptors.
CNSC	FC-10	2.5.6.1	**Action Required:** Provide detail on whether or not other discharge points have been considered for the treated leachate?
CNSC	FC-11	Groundwater Flow Modelling of the Near Surface Disposal Facility (E-doc#5262572)	As shown in figure 2.7 (GROUNDWATER TABLE ELEVATION MAP), there is no borehole outside of the NSDF boundary, esp. in the east part of the groundwater flow modeling domain. The groundwater table shown in the east part of the domain is very subjective as a result of lack of measurements, thus the groundwater flow model calibration using the limited data points may contain a great level of uncertainty. Depending on the groundwater table distribution, part of the groundwater originating from the proposed waste site may flow toward the east side of the Perch Creek directly, thus creating a short groundwater flow path towards the recipient. **Expectation to address comment**: CNL needs to address the groundwater flow model uncertainty due to lack of groundwater monitoring data in the east part of the domain.
Natural Resources Canada (NRCan)	FC-12	3.0 Project Description	There is no mention of the *Explosives Act* or a need for a licence under the *Explosives Act* in the EIS (only mention of the *Provincial Act*). Will there be a need for a licence under the *Explosives Act* (manufacturing or magazine/storage)? **Expectation to address comment:** Please clarify in the EIS, if there will be a need for a licence under the *Explosives Act*.
NRCan	FC-13	3.0 Project Description; 3.4 Preparation of the site, Page 12	The Project Description indicates**:** "Blasting activities may be required to complete site preparation." **Action Required:** Should explosives be stored overnight, a Magazine Licence issued by NRCan will be required.
NRCan	FC-14	3.0 Project Description; 5.0 Environmental Effects	Will a magazine(s) to store explosives be required at or near the site? Please describe location (quantity-distance), footprint, type of storage structure, site access, and other ancillary works.

Federal Department	Reference Number	Report Section	Reviewer Comment
CNSC	FC-15	3.2.2 Waste Acceptance Criteria	It is unclear what the other four criteria were and why, specifically, were they excluded from the development of the WAC? **Expectation to Address Comment:** Details on the excluded criteria and why they were excluded should be provided.
CNSC	FC-16	3.2.2.2	Section 3.2.2.2 provides maximum dose rate limits of waste packages for contact-handleable and for remote handling waste. These are as follows: The dose rate limits of Type 5 waste packages for contact-handleable waste are as follows: • the maximum gamma-radiation level of each waste package, measured on contact, must be less than 2 millisieverts per hour (mSv/h) • the maximum gamma-radiation level of each waste package, measured at 1 m, must be less than 0.1 mSv/h • the maximum beta-particle radiation field of each waste package, measured on contact, must be less than 10 Sv/h The dose rate limits of waste packages are as follows for remote handling: • the maximum gamma-radiation level of each waste package, measured on contact, must be less than 50 mSv/h • the maximum gamma-radiation level of each waste package, measured at 1 m, must be less than 1 mSv/h • the maximum beta-particle radiation field of each waste package, measured on contact, must be less than 200 mSv/h The maximum beta-particle radiation field of each waste package, measured on contact, for contact-handleable waste is considerably higher than the maximum dose rate for remote handling. Technically, there should be an insignificant beta dose rate measured outside of any waste packages since the majority, if not all, of the beta emissions are usually blocked by the waste packages (e.g., by high integrity containers). Also, the rationale for not using dose rate limits for the other types of waste, e.g., the Type 4, Decommissioning and Demolition Waste and the Type 6, Miscellaneous Waste is not provided. **Expectation to address comment:** Please revise and justify the selected maximum beta-particle dose rates for contact-handleable and for remote handling wastes. Also, an explanation for not having maximum dose rates in place for the other types of waste, to be handled by workers, has to be provided.
CNSC	FC-17	3.2.2.2	This section provides maximum dose rate limits of waste packages for contact handleable waste and for remote handling as follows: The dose rate limits of waste packages are as follows for **contact handleable waste**: • the maximum gamma-radiation level of each waste package, measured on contact, must be less than 2 millisieverts per hour (mSv/h) • the maximum gamma-radiation level of each waste package, measured at 1 m, must be less than 0.1 mSv/h • the maximum gamma-particle radiation field of each waste package, measured on contact, must be less than 10 Sv/h The dose rate limits of waste packages are as follows for **remote handling**: • the maximum gamma-radiation level of each waste package, measured on contact, must be less than 50 mSv/h • the maximum gamma-radiation level of each waste package, measured at 1 m, must be less than 1 mSv/h • the maximum gamma-particle radiation field of each waste package, measured on contact, must be less than 200 mSv/h

Federal Department	Reference Number	Report Section	Reviewer Comment
			The maximum dose rates values of waste packages are inappropriate and ambiguous. In fact, the maximum gamma - particle dose rate, measured on contact, for contact handleable waste is considerably higher than the maximum dose rate for remote handling. Also, technically, the gamma -radiation level and the gamma-particle radiation field have the same meaning, therefore; the dose rates should be the same. Finally, the maximum dose rates for contact handleable waste appear to be non-conservative for low-level and/or intermediate level wastes. **Action Required:** Please revise and justify the selected maximum dose rates for contact handleable waste and for remote handling.
CNSC	FC-18	3.2.2.2 Waste Acceptance Criteria – Radiological Characteristics	By volume ILW will constitute 1% of the NSDF; however, it is unclear what percentage of the total activity of the NSDF ILW will represent throughout operations and during post-closure. **Expectation to Address Comment:** Please provide data on the proportion of total activity that ILW will account for in the NSDF during operations and by 2400.
ECCC	FC-19	3.2.2.3	It is indicated that amongst the "mixed waste" that may be placed at the NSDF there may be materials contaminated with small quantities of Polychlorinated Biphenyls (PCBs). The following clarification is provided as a note in section 3.2.2.3: "*PCB waste as defined by the Canadian PCB Regulations, the Ontario Environmental Protection Act, Regulation 347, General Waste Management and Regulation 362, Waste Management shall not be accepted for disposal in the NSDF. However, small quantities of PCB containing materials shall be accepted for disposal in the NSDF, i.e., PCB containing materials* ***having a total PCB concentration of up to 50 ppm."*** Please note that the federal PCB Regulations developed under the *Canadian Environmental Protection Act* allow the storage of PCB-containing materials having a total PCB concentration **below** 50 ppm. In addition, should liquid containing PCBs be released into the environment at concentrations above 2 ppm, it would be considered to be in non-compliance with section 5 of the *Federal PCB Regulations*. **Action Required:** Provide clarification about the acceptable concentration of PCBs present in waste to be placed at the NSDF in light of the requirements under the federal PCB Regulations. Provide information about the environmental protection measures that will be implemented in order to ensure compliance with the federal PCB Regulations.
CNSC	FC-20	p.3-13	In the event that a radioactive waste package does not meet the WAC, the waste generator will prepare an exemption request and submit it to the waste management organisation. In the early years of the project, the waste generator and the NSDF operator will be under the same corporate entity (CNL) and so a conflict of interest is apparent. **Expectation to address comment:** CNSC staff are of the opinion that if packages do not meet the WAC, they should not be accepted. However, in some instances, where there are few packages considered, an exemption might be possible if CNL can demonstrate that placement of few packages would not affect the overall source term or waste inventory on which the post-closure predictions are based (i.e., dose predictions to the public and the environment remain essentially unchanged from the predictions made in the Environmental Impact Statement). In such situation, the exemption request should be submitted to the NSDF operator, and reviewed and approved by CNSC staff to avoid any conflict of interest and comply with regulatory expectations.
HC	FC-21	3.5.1 Construction Materials, p.122	The section states "The haulage route for transportation of NSDF Project site preparation and construction equipment, and construction materials will be via public roads to the CRL property (e.g., Highway 17) and will be scheduled to reduce noise and traffic volumes, and limit inconvenience to local residents."

Federal Department	Reference Number	Report Section	Reviewer Comment
			Expectation to address comment: Clarify whether the haulage route passes through the Village of Chalk River. Receptors in close proximity to roadways with increased vehicle traffic (but not necessarily close to the project site itself) should be identified as they could be impacted by traffic noise. Traffic volumes provided in section 5.10.5.2.2 and scheduling measures identified in section 5.10.6.3.2 would also be useful to include here for clarity and consistency.
NRCan	FC-22	3.5.2.3 Base Contours	NRCan was not able to locate a map of the intended base contours in the documents provided. The intended base contours in conjunction with figure 5.3.1-5 would indicate the amount of blasting that will be required. The volume of rock to be blasted is not provided (even as an approximate amount). **Expectation to address comment:** Please provide map, including volume of rock to be blasted.
CNSC	FC-23	3.5.2.4 Base Liner, Fig 3.5.2-1	In figure 3.5.2-1 that illustrates the cross-section of the base liner, it's not clear what the "subgrade" stands for. There is no cross section showing where the base liner will be located? Is all the base liner on basement rock or partially on bedrock and partially on overburden? **Expectation to address comment:** Provide a cross section to illustrate the location of the base liner and discuss the implication of the base liner sitting partially on bedrock and overburden.
ECCC	FC-24	3.5.3.1	Table 3.5.3-1 provides a list of the wastewater treatment plant effluent treatment criteria. The following are observations of the information that was presented: 1. A list of all likely radionuclide and non-radionuclide contaminants that will be present in the leachate was not provided. 2. The WWTP effluent treatment criteria for trivalent and hexavalent chromium should be provided rather than for total chromium. 3. No rationale for the proposed temperature criteria of 40ºC is provided. Such elevated temperatures could be potentially deleterious to aquatic biota. Refer to Wismer and Christie (1987) for information on temperature criteria that may be protective of freshwater fish should the effluent be discharged into fish bearing waters (available at: http://www.glfc.org/pubs/SpecialPubs/Sp87_3.pdf). 4. No discharge criteria for the following water quality parameters were provided: pH, DO, and conductivity. 5. No discharge criteria for nitrate, nitrite and ammonia were provided. 6. The WWTP effluent treatment criteria for some parameters are noted to be based on *CNL's Guideline for Effluent*. This guideline is not available for ECCC to refer to. A 2nd document is mentioned in the notes section that is also not available to ECCC for review: *"Appendix B of the CRL Acceptability Criteria for Routine and Non-Routine Discharge of Liquids to Stormwater for MAC values for individual radionuclides"*. 7. It is indicated that the condensate from the evaporator will be discharged to the final discharge tank for release to the environment. It is not clear if measures will be implemented to ensure that the evaporator condensate will meet environmental protection criteria prior to release into the environment. With respect to any potential discharges of effluent into fish frequented waters, such as Perch Creek, they must be in compliance with subsection 36 (3) of the *Fisheries Act*, which prohibits the discharge of deleterious substances of any type into waters frequented by fish. **References:** Wisner, D.A. and A.E. Christie. 1987. Temperature Relationships of Great Lakes Fishes: A Data Compilation. Great Lakes Fish. Comm. Spec. Pub. 87-3. 165 p. **Actions Required:** ECCC recommends the following information be provided and assessed in the EIS to improve the understanding of potential environmental effects from the project: 1. A complete list of all radionuclide and non-radionuclide contaminants that will be treated by the WWTP. 2. Trivalent and hexavalent chromium WWTP effluent discharge criteria.

Federal Department	Reference Number	Report Section	Reviewer Comment
			3. A rationale for the proposed WWTP effluent discharge criteria for temperature and evaluate whether this criteria would be protective of freshwater aquatic life present in the most immediate waterbody present downstream from the final discharge point. If found to be non-protective, find a more suitable discharge criteria for temperature. 4. WWTP effluent discharge criteria for the following water quality parameters: pH, conductivity. 5. WWTP effluent discharge criteria for nitrate, nitrite and ammonia. Provide detailed rationale for those discharge criteria th at are based on *CNL's Guideline for Effluents*. 6. The following references that are mentioned in the report to support a review of the proposed WWTP effluent discharge criteria: a) *CNL's Guideline for Effluents*; b) *CRL Acceptability Criteria for Routine and Non-Routine Discharge of Liquids to Stormwaters*. 7. Additional information about the expected quality of the evaporator's condensate and whether it would require treatment prior to release to the environment.
ECCC	FC-25	3.6.1.3.1	The report states that "When possible, a coarser grained soil is used as daily cover to promote hydraulic connection between waste lifts and allow leachate to more readily infiltrate to the base of the engineered containment mound." **Expectation to address comment:** Please provide rationale for using courser grained soil as one of the potential types of daily covers. While this type of cov er may allow the compaction of soil in each cell, it may increase the amount of leachate that would be produced and that would require treatment.
ECCC	FC-26	3.6.2	It is indicated that there are two possible discharge points for the treated effluent from the WWTP. It is not clear what is meant by option 1 "*discharge to an infiltration area*." Clarification as to whether this would represent a discharge to a waterbody that is considered Canadian fisheries waters should be provided. It is also indicated that "*the discharged treated wastewater quality will meet CNL's Acceptability Criteria for Routine and Non- routine Discharge of Liquids on the CRL property."* It is not clear what the previous statement entails. **Action Required:** Provide clarification as to the type of receiving environment where discharge option #1 (i.e., discharge to an infiltration a rea) would discharge. Provide information to describe the requirements of *CNL's Acceptability Criteria for Routine and Non-routine Discharge of Liquids on the CRL property*.
CNSC	FC-27	3.7 Management of Surface Water	CNL uses a 100 year design storm for the surface water management facility The design storm design frequency should be commensurate with the operation duration as well as the severity of failure. Considering the fact that the probability of a storm greater than the 100 year design storm will occur at least once within the operational period of 50 years is about 40%, a bigger than the 100 year storms should be considered for the design. **Expectation to address comment:** CNL should consider using a bigger than the 100 year storm as the design storm.
CNSC	FC-28	3.7.1 Surface Water Management Pond, p.3-57	CNL used basic target surface water quality objectives of 60% total suspended solids provided by the Ministry of Environment and Climate Change (MOECC) instead of normal or enhanced water quality objectives because the stormwater ponds will discharge through a contaminated wetland that has a sediment trapping function that will provide additional treatment and further protect Perch Lake and Perch creek. The filtration capacity of wetlands is not infinite and therefore, CNSC staff question why enhanced treatment was not chosen instead considering that the operations will last 50 years and the wetland could infill by then. **Expectation to address comment:** Please provide a justification for not using enhanced water quality objectives when designing the stormwater management ponds.
CNSC	FC-29	4.2 Communication s objectives and	CNL states that they "regularly review their public information program to….adapt to changing business needs or circumstances, to accommodate new information, or in response to other factors". This in incorrect. CNL has not modified or updated their program in years and cannot make this claim.

Federal Department	Reference Number	Report Section	Reviewer Comment
		strategic alignment	**Expectation to address comment:** This statement should be removed from the final EIS.
CNSC	FC-30	4.3.1.1.1 Public Information Sessions	CNL mentions having staff and technical experts available for public information sessions. CNSC would like a list of the areas of specialization and/or the fields of expertise that were available to the public during these sessions. **Expectation to address comment:** The final EIS should contain a list of the areas of specialization and/or the fields of expertise that were available to the public during the information sessions.
CNSC	FC-31	4.3.1.1.10 Other Stakeholder Engagement	CNL mentions having hosted a Renfrew County Council meeting, and a meeting with the Pontiac MP. The CSNC would like to see a record of questions/concerns raised at those meetings. **Expectation to address comment:** The final EIS should include documentation related to questions/concerns discussed during the Renfrew County and Pontiac MP meetings.
CNSC	FC-32	4.3.1.1.10 Other Stakeholder Engagement	CNL included a response that was sent to the Old Fort William Cottagers' Association as an appendix to the EIS. In the response, CNL commits to posting a set of questions and answers on the NSDF on their website. The CNSC would like to see evidence of those questions being posted on the CNL site. **Expectation to address comment:** The final EIS should include evidence that the Qs and As document has been added to the CNL website.
CNSC	FC-33	4.3.1.1.2 Environmental Stewardship Council Meetings	CNL has listed the agendas for the Environmental Stewardship Council (ESC) meetings, as well as the presentations. CNSC would like to see a record of the meetings minutes to know what was discussed. **Expectation to address comment:** The final EIS should contain meeting minutes for all ESC meetings referenced.
CNSC	FC-34	4.3.1.1.6 Media Coverage	CNL mentions a technical meeting was held in January 2017. The CSNC would like to see a record of who participated and what was discussed **Expectation to address comment:** The final EIS should include documentation related to questions/concerns discussed during the technical meeting
CNSC	FC-35	4.3.1.2.1 Public Feedback	CNL has listed some of the questions that have been received from the public on this project. However, there is a significant amount of these questions that have gone unanswered by CNL; some of them date back over 9 months. There is also no record of recent questions received (the last question listed was from July 2016). **Expectation to address comment:** The final EIS should demonstrate that timely responses have been given to all questions. The EIS must also include a matrix to demonstrate a more complete list of all questions received up to the submission date of the EIS, and how they were dispositio ned by CNL.
CNSC	FC-36	4.3.2	There is an expectation that in the final EIS submission CNL will provide an updated list and description of First Nation and Métis engagement activities, including any discussions CNL has had with identified First Nation and Métis groups regarding potential impacts to Aboriginal or/treaty rights.

Federal Department	Reference Number	Report Section	Reviewer Comment
NRCan	FC-37	5.0 Environmental Effects	There is reference to the use of ammonium nitrate/fuel oil (ANFO) and bulk emulsion. Will a factory (permanent or temporary) licence be required? **Expectation to address comment:** Please explain.
CNSC	FC-38	5.1.1	The section indicates that community engagement and feedback helped in the development of the scope of the EIS, please clarify if this also included feedback from First Nation and Métis groups? If so, please mention in this section. Also, please clarify if the selection of valued components (VCs) for the EIS was influenced by engagement with First Nation and Métis communities.
CNSC	FC-39	5.1.2	It is unclear why soil quality has not been selected as a VC for the purpose of the NSDF project effect assessment as opposed to air quality, groundwater quality, sediment quality etc. It should be taken in consideration that soil organisms (e.g., soil invertebrates) would be directly exposed to contaminated soil and therefore should be selected for the effect assessment. **Action Required:** CNL should explain why soil quality and soil invertebrates have not been selected as VC for the purpose of the NSDF project effects assessment.
CNSC	FC-40	5.1.2 Valued Components, Table 5.1.2-1, Page 5-9	Indigenous groups were not included as a human health VC. Indigenous persons may consume higher amounts of local and country foods and may spend time in closer proximity to the site. Were Indigenous groups consulted when choosing human health VCs? It is stated that Potential Critical Groups were selected based on lifestyle and proximity to the CRL site and are those that are likely to receive the highest radiation doses as a result of CRL operations. **Expectation to address comment:** The proponent is requested to describe the consultation carried out with Indigenous groups when choosing human health VCs. The proponent is also requested to justify not including Indigenous groups as human health VCs.
ECCC	FC-41	5.2 Atmospheric Environment. Section 5.2.1.6.2 Application Case Results (page 23). and table 5.2.1-13: Emissions not included in the Assessment (page 27)	Emissions from WWTP activities and Natural Gas (NG) combustion for comfort heating: According to the EIS the emissions from the WWTP and NG combustion (for both WWTP and heating) are expected to have a negligible effect on the overall air quality. Details of the WWTP equipment and ancillaries were not included in the EIS therefore it was not possible to evaluate whether the proponent's emission estimation is correct. **Expectation to address comment:** Please provide a rationale why emissions from WWTP and NG combustion for comfort heating are considered negligible (emissions from these sources should be quantified). Provide details for equipment type and design of these activities.
HC	FC-42	5.2 Atmospheric Emissions, p.233	The section states "A quantitative noise and vibrations assessment has not been completed for inclusion in this EIS as there are not sensitive human receptors in the vicinity of the NSDF Project that would experience nuisance effects from the construction and operations phases of the NSDF Project." This is inconsistent with the statements in Section 2.5.4.3 that "Potential effects to the atmospheric environment for both alternatives are related nuisance noise from construction activities (…)." and "Nuisance noise effects are anticipated to be related to the construction phase of the project and occur intermittently."

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			Additionally, "sensitive human receptors" were not previously defined, and the statement is inconsistent with section 5.8.6.1.1.1 which identifies "potential critical groups" located 3 km away from the CRL site, as well as receptors along the transportation route. **Expectation to address comment:** Revise the statement and include a reference to section 5.10.5.2.2 where the potential nuisance noise effects, including along the transportation route, have been qualitatively assessed.
ECCC	FC-43	5.2.1.1 Scope of the Assessment (page 1) Table 5.2.1-1 Summary of Issues Raised During Engagement and Consultation Activities that Influenced the Air Quality Assessment (page 2)	The Dust Management Plan was not provided with the EIS and therefore the mitigation measures and practices that will be used to control dust generated by the NSDF project could not be evaluated. **Expectation to address comment:** Please provide a copy of the Dust Management Plan as part of the EIS.
CNSC	FC-44	5.2.1.2 Baseline Air Quality	It is stated that ozone (O_3) was included in the air quality baseline assessment as it will be used to calculate the Nitrogen dioxide (NO_2) in the effects assessment. However, ozone was not included in table 5.2.1-7 which provides a summary of the background air quality values. Table 9 of appendix 5.2.2 Air Quality Baseline Report which provides the same summary does include ozone in the table. If ozone was added as an indicator species for the air quality assessment, the background air quality values should be included in table 5.2.1-7. **Expectation to address comment:** The background air quality should be added to table 5.2.1-7 Background Air Quality Values for completeness.
CNSC	FC-45	5.2.1.4 Baseline Air Quality	The timeframe of the background data and the meteorological data should be included in the main EIS document. In the Baseline Air Quality Data section, there is no mention over which period the data was used. Similarly there is no time frame provided in the main EIS for which the meteorological data was obtained. One has to search in the appendices to find this information. This information should also be included in the main EIS to provide clarity regarding the appropriateness and completeness of the data used in the air quality assessment. **Expectation to address comment:** CNSC recommend that text be added to the Baseline Air Quality Data section and the Dispersion Modelling section to clearly outline the dates over which the data were obtained.

Federal Department	Reference Number	Report Section	Reviewer Comment
CNSC	FC-46	Table 5.2.1-5	Table 5.2.1-5 summarizes the 2014 air emission totals for industries within 25 km of the local study area. The emissions (in tonnes) of SPM, PM_{10}, and $PM_{2.5}$ for the Canadian Nuclear Laboratories are not consistent with the values in table 2 of appendix 5.2-2 Air Quality Baseline Report. **Expectation to address comment:** The discrepancy between table 5.2.1-5 in the main EIS and table 2 of appendix 5.2-2 should be reconciled. Additionally, any calculations or estimations based on these values should be verified to ensure that the correct values were used.
ECCC	FC-47	5.2.1.5.2, Table 5.2.1-8 (Atmospheric Environment)	It is discussed in the Atmospheric Environment section of the report that there will be a truck tire wash station for vehicles leaving the NSDF project site. There was no discussion in the Surface Water environment section (i.e., section 5.4) as to how the effluent from the vehicle wash station would be managed. **Expectation to address comment:** Please provide a description of how the effluent from the truck tire wash station will be managed. There should be a discussion on how the effluent would be collected and whether it would be treated prior to its discharge into the receiving environment.
CNSC	FC-48	5.2.1.6.2 Application Case Results	Significance was determined for residual effects from the NSDF project. For the Application Case – Construction Phase, the EIS states no emissions were predicted for Sulfur dioxide (SO_2), Vinyl chloride (C_2H_3Cl) and odour. However, the significance assessment provided in table 5.2.1-16 is not consistent with the emission data in table 5.2.1-9. • If there are no emissions predicted for mercury (Hg), lead (Pb), Hydrogen Sulfide (H_2S), C_2H_3Cl why was the direction of the significance assessment determined negative and not neutral? Table 5.2.1-15 states that Neutral = no change in concentrations of an indicator compound relative to the base case. • Emissions of SO2 are predicted for vehicle exhaust due to ECM construction. Therefore the text in this section should be corrected. • Similarly, if there are no emissions of Hg during the construction period why was any further assessment carried out? Shouldn't the other assessment criteria have been identified as N/A? **Expectation to address comment:** CNSC staff request clarification regarding the significance determination for SO2, Hg, Pb, H2S, C2H3Cl as outlined by the questions above.
CNSC	FC-49	5.2.2.3.2 Temporal Boundaries	The greenhouse gas (GHG) emissions from operations include the first year after closure which was identified to be the year when emissions from the decomposition of the waste are expected to be at their highest. How was it determined that the period of decomposition would not extend beyond the first year of closure and last several years? Was there any conservatism built into the assessment regarding the timeframe for the decomposition of waste and GHG emission generation? **Expectation to address comment:** Justification should be provided regarding how it was determined that the first year after closure would be the year in which the emissions from the decomposition of waste within the ECM are expected to be at their highest. An explanation should be provided for why it was determined that this would not extend over a longer time frame and therefore why a GHG assessment was not performed for the closure phase of the project.
CNSC	FC-50	5.2.2.5.2 (Table 5.2.2-5)	Please ensure that a copy of the "Landfill Gas Monitoring Program" developed for the NSDF project is submitted as part of the final EIS document.

Federal Department	Reference Number	Report Section	Reviewer Comment
ECCC	FC-51	5.21.4.1 – Atmospheric Environment	Canadian Ambient Air Quality Standards for Sulphur Dioxide have been recently released and come into effect in 2020. The new limits should be incorporated into the air quality assessment table 5.2.1-4 as they are lower than the *National Ambient Air Quality Objectives* and *Ontario Ambient Air Quality Guidelines* used in the draft EIS. For additional information on the new SO2 standards, visit: http://www.ccme.ca/en/resources/air/air/sulphur-dioxide.html
ECCC	FC-52	5.3	Several monitoring and mitigation plans are mentioned in the EIS but have not been provided. • Blasting Plan (section 5.3.1.5.2.2 and page 35 and section 5.5.5.4) • Surface Water Management Plan (section 5.3.1.5.2.2 and page 35, section 5.5.5.4) • Long-term Monitoring Program of Groundwater (table 5.3.2-1 on Page 38) • Leachate Sampling and Analysis Plan (section 5.3.2.8 on page 53 and 56) • Groundwater Detection Monitoring Program (section 5.3.2.8 on page 53) • Groundwater Operational Control Monitoring Program (section 5.3.2.8 on page 53) **Expectation to address comment:** Provide all plans referenced in the EIS including but not limited to the ones listed above.
HC	FC-53	5.3	According to section 5.3 on Geology, there is a bedrock ridge on the northern area of the NSDF, separating it from the Ottawa River. It is unclear whether blasting will be required during project construction Blasting may have impacts on nearby human receptors. **Expectation to address comment:** Please include an evaluation of noise from all project-related activities at the nearest locations where people are expected to be present.
CNSC	FC-54	5.3.1.4.2.2 Local and NSDF Project Site Geological Conditions	The results provided in the assessment of geology include a description of bedrock geology and stratigraphy of the LSA. Within these categories there is information on the rock type, bedrock topography, and hydraulic properties of the rock and sediments. Most of this information was collected from existing references as opposed to new characterization. However, no baseline information or discussion is given to the geotechnical aspects of the geologic units, sediments, or the regional existing seismic background. Also there appears to be little mention of erosion in the SSA and the risks or mitigation approaches needed to counteract this. Furthermore, the creation of cross sections for both bedrock geology and stratigraphy would be a useful addition to the baseline characterization of the LSA. There is also no discussion of background soil quality despite its mention as a measurement indicator. **Expectation to address comment:** CNL should provide a more complete assessment of regional geology.
CNSC	FC-55	Figures 5.3.1-6 and 5.3.1-7, Stratigraphic Cross-Sections For The Near	The grey colored unit above the bedrock is not defined in the legend. **Expectation to address comment:** provide the grey colored unit in figures 5.3.1-6 and 5.3.1-7.

Federal Department	Reference Number	Report Section	Reviewer Comment
		Surface Disposal Facility Project Site	
CNSC	FC-56	5.3.2.2 Valued Components	Groundwater quality is not considered a VC for the hydrogeology assessment while groundwater quantity is. **Expectation to address comment:** CNL should explain why groundwater quality is only considered as an assessment endpoint and indictor as opposed to a VC.
CNSC	FC-57	5.3.2.3.2	CNL indicates "….. *decommissioning of the wastewater treatment plant and all associated structures will be performed after the leachate quality and quantity has stabilized and no longer requires this facility"* In other sections, we can read that decommissioning of the WWTP and support facilities will be completed during post-closure phase (2070- 2100). CNL established that decommissioning of the WWTP will be performed after the leachate quality and quantity has stabilized and states that this should take place during the post-closure by 2100 (start of the ICP (Institutional Control period)). **Expectation to address comment** - Considering the fact that the WWTP has a given design life, CNL should expect and consider the case where the WWTP operation is needed for a longer period of time (beyond its design life), where leachate quality and quality hasn't not stabilized yet. In such case, can the WWTP still perform as required? CNL should consider such a condition and identify adequate arrangements and plans to address the issue accordingly.
CNSC	FC-58	5.3.2.4.2.1 Groundwater Flow	Hydrographs for all wells should be included in the EIS to allow the reader to visualize the temporal variability in water levels at the site. **Expectation to address comment:** An appendix containing hydrograph data for wells used in the hydrogeological characterization should be included in the EIS.
CNSC	FC-59	5.3.2.4.2.2 Groundwater Quality	Groundwater quality results have not been reported for overburden aquifers. **Expectation to address comment:** Groundwater quality data for major ions, metals and radionuclides should be reported for wells screened in the overburden.
CNSC	FC-60	5.3.2.5.2.1	CNL mentioned that "*The ECM will be comprised of four waste cells*" **Expectation to address comment:** CNL is expected to provide the exact number of cells based on the 90/100 % design in the final EIS document.
ECCC	FC-61	5.3.2.6.1.1	Appendix 5.3-1 (Golder 2016b) was not provided with the Draft EIS. The information contained in the appendix describes the conceptual model development, modelling approach, model extent and discretization, boundary conditions, hydrostratigraphy and parameterization and model calibration. **Expectation to address comment:** Provide a copy of appendix 5.3-1 with the Final EIS.
CNSC	FC-62	Table 5.3.2-6	The derivation of radioisotope concentrations in leachate is not explained and does not appear to be consistent with expectations for long-lived radioisotopes. It appears that the concentrations of long-lived isotopes in waste are dropping drastically in only ~300 years between the operations period and 2400. This decrease

Federal Department	Reference Number	Report Section	Reviewer Comment
			cannot be due to decay as many of these isotopes have half-lives orders of magnitude longer. **Expectation to address comment:** The method used to obtain leachate concentrations during operation and in 2400 should be clarified and the cause of the observed decrease should be explained.
CNSC	FC-63	5.3.2.7 Prediction Confidence and Uncertainty	Sensitivity analysis results for the simulations should be presented or a reference where they may be found provided. Furthermore, it is not clear what criteria were used to determine model acceptability relative to the calibration data. **Expectation to address comment:** CNL should provide sensitivity analysis results and the criteria and results used to determine the model was acceptable.
CNSC	FC-64	5.3.2.8 Monitoring and Follow-Up	It is stated in the EIS that preferential flow paths will be monitored. However, it is unclear if the influence of these flowpaths on radionuclide transport has been assessed. Preferential flow has been shown to enhance contaminant mobility in natural systems. Therefore, they represent an " end-member" scenario for contaminant transport and must be considered as part of the model sensitivity analysis. **Expectation to address comment:** Details on how preferential flow paths have been assessed with respect to contaminant transport at the NSDF site should be provided. In addition, details of the proposed monitoring of these preferential flow paths should be provided as well. The monitoring data obtained should be incorporated into the groundwater model.
CNSC	FC-65	5.4.: Non-Radiological Effects Assessment on Water Quality	CNL provides water quality modeling results for cadmium (Cd), copper (Cu), iron (Fe), lead (Pb), zinc (Zn), mercury (Hg), aluminum (Al), barium (Ba), manganese (Mn) (tables 5.4.2-8 to 17) in East swamp, Perch Lake, Perch creek and Perch creek outlet during the first operational phase from 2020 to 2025 (Scenario 1), then later from 2065 to 70 (Scenario 2), after 2100 when the WWTP is decommissioned and the cover is fully functional (Scenario 3), and post-institutional control after 2400 when the cover fails (Scenario 4). In general, the EIS indicates some exceedances of benchmark values for Cd, Hg, Ba, Cu and Al depending on the scenarios. Regardless of the exceedances, CNL concludes that the Ottawa River is expected to adequately and rapidly assimilate any discharge from the Perch Lake Watershed. CNSC staff cannot adequately verify these predictions because the EIS does not provide the concentrations and leaching rates of non-radiological contaminants from the low and intermediate level waste. While CNL indicated that there is uncertainty in the inventory data for non-radionuclides, it concludes that the waste characterisation program will ensure that the inventory envelope is not exceeded. CNL also indicated the reference inventory is considered conservative, and therefore, leachate concentrations are expected to be lower. **Expectation to address comment:** Please explain how the predictions of Cd, Cu, Fe, Pb, Zn, Hg, Al, Ba, Mn in the leachate are related to the Waste Acceptance Criteria for these metals. Are the WAC for these metals based on a maximum, 95th percentile, or mean inventory level and what are the assumptions that are used to derive the leaching rates from the current understanding of the waste inventory? CNL should also provide examples of detailed calculations underlying their predicted non-radiological contaminant levels in the receiving environment for the post-closure scenarios (Scenarios 3 and 4).
CNSC	FC-66	5.4.1.3	This section indicates that the Ottawa River is not included in the RSA, however, figure. 5.9.3-1 demonstrates that the Ottawa River, close to the shore of the CRL property at the outlet of Perch creek, is included in the RSA. Please clarify, or correct in the EIS.

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ECCC	FC-67	5.4.1.5.2.2., 5.4.2.5.2.2	Clarification is required on this statement: "*Treated effluent is to be discharged at a rate of 11.36 m^3/hr as surface flow into the wetlands with ultimate discharge to Perch Creek*". There is also no discussion about the potential impact of the discharge on the flow rate of the receiving wetlands, and whether any measures would be put into place to prevent the possible erosion and scouring of the wetlands. **Expectation to address comment:** As details of the project are further developed, provide information on how the rate of discharge of the treated effluent onto the wetland would be managed, and what measures would be put in place to prevent erosion and scouring to the receiving wetlands.
ECCC	FC-68	5.4.1.5.2.2., 5.4.2.5.2.2	The report states, "*The maximum average annual wastewater volume is expected to be produced during the operating scenario where engineered containment mound cells 1 through 3 are filled and closed, and Cell 4 is active. Under this operating scenario, the total average annual volume of contact surface water to be treated is 10,730 m^3.*" There is no discussion on how this volume is derived or reference provided for more information. In addition, there is no justification as to why this particular operating scenario would produce the largest amount of contact surface water, compared to the volumes that other operating scenarios would produce. **Expectation to address comment:** Explain how the total average annual volume of contact surface water to be treated was derived. In addition, provide a justification as to why the operating scenario above would produce the largest amount of contact surface water.
CNSC	FC-69	5.4.1.6.2 Application Case Results	Selection of design storm duration needs to take into account the drainage basin size. The design storm duration of 24 hrs appears too long for such a small drainage basin. In addition, details of the design storms and modeling process are not provided for review. **Expectation to address comment:** Proponent needs to provide justification of the selection of design storm duration. Modeling details should be provided for review, which hopefully would help explain, e.g., why the 4 hr 1:100 Year Storm Event produces a smaller peak runoff rate than the 24 hr 1:100 Year Storm Event in table 5.4.1-9.
ECCC	FC-70	Table 5.4.1-7, 5.4.1.5.2.2, (Section 5.4 Surface Water); 5.5.4.3 (Section 5.5 Aquatic Environment)	It is stated in the report, "Final treated effluent will be stored in tanks so that effluent is **discharged to the wetland in a controlled manner that will prevent erosion and scouring**" and "Any changes to downstream discharge, water levels and channel/bank stability resulting from operational discharges of water from the WWTP will be **localized to the wetland**". If fish are present in the receiving wetlands, then these wetlands could be considered "water frequented by fish" under the *Fisheries Act*. In this case, ss *substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water*." During the teleconference call on February 15, 2017 with the proponent, it was clarified that there would be an "infiltration pit" excavated which would contain boulders and would contain the treated effluent which would be absorbed into the surrounding soil. It was mentioned during the call th at the banks of the infiltration pit may overflow due to high precipitation and water would flow over the adjacent ground surface. **Expectation to address comment:** Provide clarification regarding the potential that the overland flow of treated effluent may reach the East Swamp Creek and t he adjacent wetland. Additional sampling should be conducted to confirm if fish are present in the East Swamp creek and wetland adjacent to the NSDF.

Federal Department	Reference Number	Report Section	Reviewer Comment
CNSC	FC-71	5.4.2.4 Description of the Environment	Physical characteristics of Perch Lake, such as the wetted area and water volume, were from an old report (Robertson and Barry 1985). There have been likely changes in the physical characteristics of Perch lake over the past 30 years. These data are essential to the effect assessment. **Expectation to address comment:** More recent data should be used.
ECCC	FC-72	Table 5.4.2-4, Table 5.4.2-14	It is stated, "*The effluent requirement for treated wastewater is the CRL Acceptability Criteria for Routine and Non-Routine Discharge of Liquids to Stormwaters*". These criteria were not provided for review in Group 3 documents. In order to assess whether these criteria are protective of the receiving aquatic environment, a review is necessary. **Expectation to address comment:** Provide the CRL Acceptability Criteria for Routine and Non-Routine Discharge of Liquids to Stormwaters with the submission of the final EA report.
ECCC	FC-73	5.4.2.4.2	The report states, "*In 2015, the benchmark values for pH, copper, aluminum and iron were exceeded in several instances in the Perch Creek Basin. In most cases however, these elements are present at concentrations similar to those seen at reference (i.e., unaffected) monitoring locations in the Perch Creek Basin.*" The reference (i.e., unaffected) locations described are No Name Lake and Perch Lake Inlet 4. No monitoring information is provided for the No Name Lake location, nor is a report cited for this data. Additionally, no justification is provided as to why No Name Lake and Perch Lake Inlet 4 were considered suitable reference locations. This is important since the reference locations could be affected by historic CRL operations. For example, the Perch Lake Inlet 4 monitoring location is connected to Perch Lake, which is known to have been impacted by the upstream Liquid Dispersal Area and discharges from some WMAs. **Expectation to address comment:** Provide the surface water monitoring information and sampling location for the No Name Lake reference site. Also, provide a justification for the selection of the No Name Lake and Perch Lake Inlet 4 as reference (i.e., unaffected) locations.
ECCC	FC-74	5.4.2.5.2.2 (5.4. Surface Water), Section 5.7.6.1.1.2 (5.7 Ambient Radioactivity and Ecological Health)	In section 5.4 (Surface Water), the report states that treated effluent would be discharged as surface flow into the wetlands with ultimate discharge to Perch Creek. In section 5.7 (Ambient Radioactivity), the report states that treated effluent would be discharged from the WWTP to an infiltration area (for discharge to groundwater) ultimately leading to the East Swamp wetland. These two statements seem to contradict each other. Clarification is required on how the treated effluent would be managed and discharged into the receiving environment. There is also no information on the location and size of the infiltration area described in section 5.7. **Expectation to address comment:** As details of the project are further developed, provide a clear discussion of the treated effluent discharge pathway to assess potential impacts to downstream surface water bodies. Some details that should be provided include: • Location of the WWTP discharge point into the infiltration area • Location and size of the infiltration area • If discharging to an infiltration area, the expected groundwater path that the treated effluent would take to reach the wetlands, and potential points of discharge at the wetlands • Information on monitoring programs to measure the quality of the treated effluent being released.

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ECCC	FC-75	Table 5.4.2-5	For table 5.4.2-5 - Surface Water Parameters of Concern, some of the benchmarks depend on physical parameters such as water hardness and pH. For example, the aluminum benchmark depends on pH, and the copper benchmark depends on water hardness. It would therefore be beneficial to examine these supporting water quality parameters in the surface water quality model along with the chemical parameters. Some physical parameters that would be helpful include: total dissolved solids, pH, and water hardness ($CaCO_3$). **Expectation to address comment:** Consider examining physical parameters in the surface water quality model as there are benchmark values for certain chemical parameters which are dependent on these, or provide a justification as why these will not be considered.
ECCC	FC-76	5.4.2.6.1.1	The following reference documents described in the surface water quality model were not provided: • CNL 2016, CRL-509243-ASR-2015 • AECOM 2016, 30 % design deliverable These documents were used in the model to input 1) the average non-radioactive contaminant background concentrations at surface water nodes and 2) the projected leachate and wastewater concentrations from the NSDF site. **Expectation to address comment:** Provide the above documents for review with the final EA report.
ECCC	FC-77	5.4.2.6.2	In the surface water quality model methodology, the report states, "*No background concentration information was available for Perch Lake itself and thus the lake was assigned a starting concertation of zero for each model run. Similarly, PLO adopted starting background concentration of zero as this weir is considered to be the lake outlet.*" The report also notes that the Perch Lake basin is the most affected region of the CRL Supervised Area. It contains many of the site's operating WMAs, in particular the WMAs of the earliest vintage in the evolution in the waste storage practices at CRL, including the Liquid Dispersal Areas (LDAs). In addition, Perch Lake receives surface water from East Swamp stream, South Swamp Stream and Main Stream at the Perch Lake Inlet 2, which is downstream to the CRL Liquid Dispersal Area, Laundry Pit, Reactor Pit 2 and Chemical Pit. With this in mind, it is important to include background concentration information for Perch Lake and Perch Lake Outlet (PLO) in the surface water quality model, since it is likely that they are both impacted by historic CRL operations. **Expectation to address comment:** Provide a justification as to why background concentrations for Perch Lake and PLO were not included in the surface water quality model. If this information was unavailable, explain why monitoring was not conducted to obtain the information, and why concentrations of zero were assigned regardless of the potential for Perch Lake and PLO to be impacted by historic CRL operations.
ECCC	FC-78	5.4.2.6.2	In the surface water quality model parameters of concern, the toxic elements: beryllium, cobalt, fluorine, and thallium, were omitted due to the lack of benchmark values. However, there are some available provincial and federal guidelines that could potentially be used as benchmarks in the model: 1. For beryllium, there are PWQO of 11 µg/L (for water hardness ($CaCO_3$) <75 mg/L) and 1100 µg/L (for water hardness ($CaCO_3$) > 75 mg/L) (MOEE, 1994).

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			2. For cobalt, there is an interim PWQO 0.9 µg/L (MOEE, 1994), and also a more recent *Federal Environmental Quality Guideline protective of aquatic life* of 2.5 µg/L (Environment Canada, 2013). 3. For thallium, there is a *Canadian Water Quality Guideline* (CWQG) of 0.8 µg/L (CCME, 1999). 4. For fluorine, there is an interim CWQG for the protection of aquatic life for inorganic fluorides of 120 µg/L (CCME, 2002). **References:** CCME. 1999a. *Canadian Water Quality Guidelines for the Protection of Aquatic Life: Thallium*. CCME. 2002. *Canadian Water Quality Guidelines for the Protection of Aquatic Life: Inorganic Fluorides*. MOEE. 1994. *Water management: policies, guidelines, provincial water quality objectives*. July 1994. Environment Canada. 2013. *Federal Environmental Quality Guidelines: Cobalt*. *Canadian Environmental Protection Act, 1999*. February 2013. **Expectation to address comment:** Provide a justification for the exclusion of the above toxic elements in the surface water quality parameters of concern, and reconsider their inclusion into the surface water quality model based on the benchmarks listed above.
CNSC	FC-79	5.4.2.6.3.1 tracer model results	The continuous tracer release of 100 mg/L at the WWTP is expected to be reduced by a 300 dilution power to 0.3 mg/L at the outlet of Perch Creek for Scenario 1 while dilution powers of approximately 150 and 40 apply for scenarios 2 & 3. CNL does not provide a rationale or calculations that support such dilution power values and CNSC staff could not link these values to the yearly annual volume of treated effluent of 10 000 m^3 versus total volume discharge out of Perch Lake mentioned in section 5.3.2.6.2. **Expectation to address comment:** Please provide the rationale and the calculation supporting the dilution power values.
CNSC	FC-80	Table 5.4.2-8 to 17	None of the water quality modelling result tables provide which scenario is associated with the mean, median, 95th percentile and maximum predictions. **Expectation to address comment:** Please indicate in these tables what statistical measures are used for the considered scenarios.
ECCC	FC-81	5.5.4.3	The statement at the bottom of page 11 states "*there is no evidence to suggest that current CRL operations are negatively affecting the aquatic environment;"* however, the Proponent acknowledges throughout the report that past operations of the WMAs continue to affect the surface waters of the Perch Lake basin. Additionally, no evidence was provided within section 5.5.4.3 to support the Proponent's claim that current CRL operations are not affecting the aquatic environment. Based on the presence of legacy contaminant plumes that are present throughout the CRL site, the statement: "*there is no evidence to suggest that current CRL operations are negatively affecting the aquatic environment"* is misleading as the aquatic environment is likely being impacted at the present moment by the existing legacy contamination. **Expectation to address comment:** Revise the statement or provide the evidence that was used to support the statement as the data that was provided was collected over twenty years ago.
ECCC	FC-82	5.5.4.3	The data used to describe the fish populations within the local study area were collected over twenty years ago in 1980 and 1997. No current information on fish in the aquatic habitats downstream of the NSDF was provided. Baseline information from 1980 and 1997 indicates the presence of thirteen species of fish but no population estimates are provided.

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			Expectation to address comment: The Proponent should consider collecting updated fish community data for the receiving environment in order to monitor the effects on the aquatic ecosystem as a result of the NSDF.
ECCC	FC-83	5.5.5.2	In order to support the Proponent's prediction that the use of explosives would not measurably impact fish survival or reproductive success of fish species in the local study area, updated baseline information about fish diversity and population information is required. **Expectation to address comment:** information of current fish species and population should be collected in 2017 to monitor potential impacts of the project on the aquatic environment.
CNSC	FC-84	5.5.6	This section indicates that fish will not be part of the monitoring program for the NSDF. It is strongly recommended that fish species of importance to First Nation and Métis communities be included in the NSDF monitoring program. Fishing resources are of high value to local Indigenous peoples. Please clarify if CNL will consider including monitoring fish as part of the NSDF specific monitoring program. If not, please provide sufficient rationale.
ECCC	FC-85	5.5.6	No monitoring or follow-up programs have been proposed in the EIS to monitor for impacts from the Project on the aquatic ecosystem. **Expectation to address comment:** ollow-up monitoring on the aquatic ecosystem should be conducted throughout the various phases of the project in order to confirm CNL's conclusion that "measurable residual effects on aquatic biodiversity are not predicted as a result of the NSDF Project".
ECCC	FC-86	5.6.1	Issues raised during engagement and consultation process have been summarized in table 5.6.1-1, however, the table does not address all environmental concerns. Although this table describes issues raised during the consultation process, the EIS should focus on all *Species at Risk Act* (SARA) listed species found in the LSA and directly affected by the proposed project, not only those identified during engagement and consultation. **Expectation to address comment:** Ensure EIS analyzes all potential impacts to SARA-listed species in the LSA, not just those identified during engagement and consultation.
ECCC	FC-87	5.6.2	According to the Environmental Impact Statement (EIS), twenty species at risk are known to be from the project area. Table 5.6.2-1, which identifies the "valued components", only lists a few of these species at risk. All SARA listed species which occur on the property should be addressed so it is clear which are known to occur on or near the proposed construction site and which other species at risk could occur there but have not been detected. **Expectation to address comment:** Include and discuss all known species at risk found at the CNL Chalk River facility. Clarify which species occur on the property and identify which species are known to be on or near the proposed site of the NSDF.
ECCC	FC-88	5.6.2	Valued Components for the Terrestrial Biodiversity Assessment, table 5.6.2-1, indicates there is a potential loss of bird eggs or nests during tree clearing. The *Migratory Bird Regulations* prohibit the disturbing, destroying or taking of a nest or egg. Tree clearing should therefore be planned in a manner that ensures nests and eggs are not disturbed, destroyed or taken.

Federal Department	Reference Number	Report Section	Reviewer Comment
			Table 5.6.2-1 indicates there is a potential loss of bat species at risk residences. SARA prohibits the damage and destruction of bat residences. Permits may only be granted for activities that would damage or destroy such residences if the preconditions laid out in subsection 73(3) of SARA are met. See our comments #90, #98, #108 and #111 below also on impacts to SARA listed bat species. **Expectation to address comment:** Consult ECCC's Avoidance Guidelines for migratory birds for information on how to reduce the risk of incidental take of migratory birds, nests and eggs (http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=1B16EAFB-1).
ECCC	FC-89	5.6.2	Other mortality factors that can impact blanding's turtles should be listed in table 5.6.2-1, the Valued Components. **Expectation to address comment:** Include examples of other sources of mortality (e.g., construction vehicle strikes on worksite and access roads, overwinter mortality from changes in hydrology in wetlands) in the EIS.
ECCC	FC-90	5.6.2	In table 5.6.2-1, the Valued Components for the Terrestrial Biodiversity Assessment, states that "Critical habitat has only partially been defined for hibernacula, as the largest threat to these species [bats] is associated with that habitat". While it is true that the largest threat at the time of the recovery strategy facing these bats was White Nose Syndrome, and it is thought that threat is largely related to hibernaculum, the recovery strategy for the little brown myotis, northern myotis, and tri-colored bat also identifies destruction or degradation of roosts as a threat of high concern. Maternity roosts have not been identified as critical habitat because of a lack of knowledge about roost habitat, but the recovery strategy indicates that at least some maternity roosts will likely be considered critical habitat when more information has been collected. See also comment #98 below. **Expectation to address comment:** Include "the destruction of maternity roosts is a potential significant threat to bat populations" in the EIS.
ECCC	FC-91	5.6.2	The definition of ecosystem condition in this section includes species diversity, but does not mention "appropriate" or native species. Some of the terms used to characterize how changes to ecosystem condition are affected are questionable. For example, why does a change in structural stage affect its condition? **Expectation to address comment:** Clarify that the definition of ecosystem condition refers only to native species and explain how an ecosystem condition is affected by a change in structural stage.
ECCC	FC-92	5.6.2	The EIS describes twenty federally listed species at risk in the Regional Study Area (RSA) but common nighthawk, chimney swift, olive-sided flycatcher, and western chorus frog were excluded from the analysis and mitigation tables because they were deemed unlikely to be present in the LSA. It is unclear how much survey effort for these species was completed in the LSA. Although chimney swifts typically nest in chimneys, which are not present in the LSA, if there are suitable hollow trees present these could be used by the chimney swift. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) report for common nighthawk indicates that some individuals "probably continue to nest in hollow trees in isolated wooded areas". Common nighthawks could nest around the wetlands or possibly in edge habitat along the power line corridors. It is not clear when surveys were conducted for the western chorus frog in the LSA during the early spring calling period. This species is often missed if surveys were not conducted early enough in the amphibian breeding season. **Expectation to address comment**: Provide more details regarding status and survey effort for common nighthawk, chimney swift, olive-sided flycatcher and western chorus frog and provide a more robust explanation as to why they were excluded from the report. Additional surveys may need to be carried out to confirm whether western chorus frogs are present in the LSA. The proponent is encouraged to discuss survey procedures with ECCC.

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ECCC	FC-93	5.6.4.1.1	The Forest Resource Inventory (FRI) data used to characterize plant communities are thirty years old. Given this, the FRI data used to describe the current composition and distribution of forest communities in the study area may not be accurate. Current remotely sensed imagery may provide a more relevant understanding of current terrestrial ecosystem distribution and composition. **Expectation to address comment**: Explain how relevant the thirty year old FRI data are when compared to current forest ecosystems in the LSA. Describe the level of significance of the FRI data and how it were applied to determine the amount of suitable habitat available for the various species at risk in the LSA and the RSA. Explain why current imagery was not considered to characterize the current terrestrial ecosystem composition and distribution.
ECCC	FC-94	5.6.4.1.3	While seral stage and age of forest stands contribute to ecosystem condition, emphasizing community age (as is done in this section) is not a typical way to characterize ecosystem condition. Good condition early-, mid- and late-seral stands exist and all can provide important habitats and functions. Young and old forests both provide quality habitat if they are in good condition. For example, the EIS mentions that there is a plantation of the exotic Norway Spruce in the footprint of the construction site (sec 5.6.4.1.1) and may provide habitat for species at risk. **Expectation to address comment**: De-emphasize the amount that stand age contributes to ecosystem condition and consider other factors such as the presence of various plantations and their value (or lack of value) as species at risk habitat.
ECCC	FC-95	5.6.4.1.3	According to table 5.6.4-2, Structural Stages of Forested Vegetation Communities, 31% of the LSA is made up of mature forest. The EIS states that in the LSA "there is a relatively older assemblage of forest stands compared to the RSA". Efforts should be made to minimize the effect of the project on mature forest habitat, which is a key habitat for the Canada warbler and the three endangered bat species. It is a concern that an area with so much mature forest will be affected by the proposed NSDF project. **Expectation to address comment**: Explain what factors were considered in selecting this site on the property and how impacts to species at risk were considered in site selection. Specifically, explain why other areas with less mature forest or less suitable habitat for species at risk could not be selected.
ECCC	FC-96	5.6.4.1.3	According to the EIS, butternut is the only plant species at risk detected on the property and it is only present at an old homestead. It is unclear how much survey effort there has been for plant species at risk or if any surveys were undertaken in the proposed construction site. Section 5.6.4 (Description of the Environment) in the EIS lists surveys conducted for various fauna (birds, bats, amphibians) but does not describe the plant surveys conducted. **Expectation to address comment**: Add details of methods and results of rare plant surveys to section 5.6.4. Further surveys may need to be required. The proponent is encouraged to discuss this matter with ECCC.
ECCC	FC-97	5.6.4.2.3	Cerulean warbler (listed as Special Concern under SARA, but assessed by COSEWIC as Endangered) was reported as being in the top four most commonly observed bird species. This is surprising since the study site is well outside of the primary range of this species and the habitat is generally not suitable. In addition, appendix 5.6-1, the list of species, indicates that the cerulean warbler has not been reported from the property. It is possible that this species has been confused with the cedar waxwing in the data reporting from field surveys if short form codes were used (i.e., CEWA which could apply to either species). **Expectation to address comment**: Confirm whether the cerulean warbler was detected on the property and if not, revise text to reflect which species were actually the most common bird species found.

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ECCC	FC-98	5.6.4.6.1	This section states that "Availability of maternity roosting habitat is not likely a limiting factor for bats in the Base Case, within the RSA." It is not clear whether field surveys quantifying the location, number and use of suitable, unoccupied/occupied maternity roosts in the RSA have been completed. Surveys for potential maternity roost trees could be undertaken to identify if the proposed construction site contains potential maternity roost trees. **Expectation to address comment:** Provide better evidence to support the statement "Availability of maternity roosting habitat is not likely a limiting factor for bats in the Base Case, within the RSA." If not already completed, the proponent may need to conduct surveys for potential maternity roost trees using established protocols. This will be important to future permitting decisions under SARA. As such, the proponent is encouraged to discuss this issue with ECCC.
ECCC	FC-99	5.6.4.7.2	This section states that there are no known blanding's turtle occurrences (individuals or nests) in the footprint of the construction area but provides no indication of the level of survey effort or the locations of surveys. If surveys have not been conducted in the area of the proposed construction site then the lack of observations is not particularly meaningful. **Expectation to address comment:** Provide a description of the survey effort and locations in the area of the proposed construction site that were completed for blanding's turtle. Further surveys may need to be carried out. The proponent is encouraged to discuss this issue further with ECCC.
ECCC	FC-100	5.6.5.2	The EIS discusses effluent discharges from the project site to adjacent wetlands (e.g., "discharge to the East Swamp"). Blanding's turtles are known from these wetlands according to the maps in the EIS and these wetlands could be used for hibernation sites. Any changes to the hydrology or water quality of the wetlands could affect over-wintering mortality of those turtles. The draft recovery strategy for the blanding's turtle identifies hydrological alteration as an activity that can destroy critical habitat. **Expectation to address comment:** Describe potential water quality and quantity impacts to East Swamp and other wetlands impacted by the proposed project, and how such impacts could affect sensitive species such as blanding's turtle.
ECCC	FC-101	5.6.5.2 (table)	Table 5.6.5-1, Pathways Analysis, indicates that vegetation clearing in small areas with simple habitat may occur within the migratory bird nesting season or bat roosting season. The proponent has proposed that searches for nests and roosts, and their subsequent protection would occur prior to tree felling. ECCC disagrees with the use of the term "simple habitat" to describe this area, as the term is usually used to describe urban parks consisting mainly of lawns, or a vacant lot with few possible nest sites (see http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=8D910CAC-1#_02). ECCC does not recommend searching for nests during migratory bird nesting season due to risk of damage and a low likelihood of locating all nests. Likewise, bat roosts are also difficult to locate and unlikely to be detected. **Expectation to address comment**: Vegetation removal during migratory bird nesting periods and bat roosting season should be avoided.
ECCC	FC-102	5.6.5.2 (table)	The EIS indicates that blasting may be required during the construction phase of the proposed project. Blasting best management practices are proposed, but it is unclear what constitutes the best practices. **Expectation to address comment**: Provide a copy of the best management practices and the blasting plan that will be followed during the construction phase of the NSDF project. This information would be needed to support potential SARA permitting.

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ECCC	FC-103	5.6.5.2 (table)	The timing of daily construction work is provided in this table. Work shifts are proposed to be "standard 12 hour shifts to minimize working at night" yet the actual times are not specified. Avoiding night work will likely be beneficial to some species at risk, but how will day work affect species at risk? **Expectation to address comment**: Provide actual work times, by season, or at least approximate stopping times (e.g., at least one hour before sunset). Explain how daytime activities during the construction phase will affect species at risk, such as bats in maternity roosts. This information would be needed to support potential SARA permitting.
ECCC	FC-104	5.6.5.2 (table)	A road mitigation plan is to be developed primarily to address risks of road mortality to the blanding's turtles. ECCC requires a copy of the plan which will be reviewed prior to issuing a SARA permit. The mitigation plan should be implemented prior to construction traffic commencing and prior to the blanding's turtle active season. The mitigation plan should specify the fencing parameters to be followed as well as the type of any additional crossing structures. Consult the recent Ontario Ministry of Natural Resources and Forestry's guide to road mitigation for amphibians and reptiles. The EIS did not include procedures for dealing with species at risk (e.g., blanding's turtle, snapping turtle, eastern whip-poor-will, common nighthawk, etc.) if found injured on roads, or risk of illegal collection of turtles. An integrated pest management (i.e., weed management) plan is also proposed, but not provided. **Expectation to address comment**: Provide a road mitigation plan for effects on species at risk for ECCC to review, which includes mitigation details, procedures for dealing with injured species at risk and illegal collecting. Provide an integrated pest management plan, which includes measures for dealing with noxious/invasive species if they do become established and potential impacts on, and mitigation for, species at risk from herbicide application. These would be needed to support potential SARA permitting.
ECCC	FC-105	5.6.7.2 (Canada warbler)	The Canada warbler recovery strategy states that land conversion, forest harvesting and silviculture, and removal of shrubs are primary threats to this species. This project will exacerbate all of these threats (an estimated 25 hectares of suitable breeding habitat will be destroyed). It is stated that potentially suitable Canada warbler breeding habitat is broadly available in the RSA, but it is not reported if this habitat is currently unoccupied and available to displaced birds. This section refers to the "resilience and adaptability limits" of this species, which are undefined. The number of individual Canada warblers impacted by the project has not been estimated. Noise levels are mentioned as a potential source of disturbance but the spatial and temporal distribution of noise or an adequate analysis of how noise might impact Canada warbler in the LSA and RSA was not provided. **Expectation to address comment**: Examine means to avoid destruction of suitable breeding habitat for Canada warbler or explain why this is not possible. If not possible, propose mitigation (e.g., habitat enhancement or creation) to compensate for the loss of breeding habitat. Attempt to define resilience and adaptability limits for Canada warbler and explain why the destruction of 25 hectares of suitable breeding habitat for this species is within these limits. Provide an estimate of the number of individual Canada warblers that could be impacted by project construction. Provide an analysis of the impact of noise on Canada warbler habitat and individuals, including isopleth mapping. In addition to the 25 hectares of suitable habitat that will be lost through clearing, identify the amount of Canada warbler habitat that will be lost as a result of disturbance levels and edge effects from the proposed development. Describe potential mitigation measures to address this effect on this species.
ECCC	FC-106	5.6.7.3 (Eastern whip-poor-will)	This section states that ~1 hectare of suitable eastern whip-poor-will habitat would be destroyed, but the confidence in eastern whip-poor-will habitat mapping was characterized as only moderate. The habitat analysis for the eastern whip-poor-will appears to only include areas within 50 m of wetlands, excluding all other forested areas as being too mature (figure 5.6.4-7). The recovery strategy for the eastern whip-poor-will indicates that nesting habitat can include "edges of forest with a dense tree cover" and "sparse conifer plantations" (section 3.3, Needs of the eastern whip-poor-will). Given that there are a number of linear disturbances that create forest

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			edges in the proposed construction site (e.g., access roads, power line corridors) these areas should be considered as potential nesting habitat. In addition, the plantation in the proposed construction site should be evaluated as potential nesting habitat, as it was described as an "immature coniferous forest" (section 5.6.4.1.1). Noise levels are mentioned as a potential source of disturbance but an analysis of the spatial and temporal distribution of noise and how noise might impact eastern whip-poor-will in the LSA and RSA was not provided. Eastern whip-poor-will may nest in areas that have been cleared of vegetation from the construction, yet no analysis or mitigation is presented. **Expectation to address comment**: Provide a fuller analysis of suitable habitat for eastern whip-poor-will in the LSA. Provide estimates of how many individual eastern whip-poor-will might be impacted by project construction and the impact of noise on eastern whip-poor-will, including isopleth mapping. In addition to the 1 ha of suitable habitat that will be lost through clearing, describe the amount of eastern whip-poor-will habitat that will be lost as a result of disturbance levels and edge effects from the proposed development? Provide analysis and, if necessary, mitigation for the possibility of eastern whip-poor-will nesting in areas that have been cleared of vegetation. Define resilience and adaptability limits for eastern whip-poor-will and explain why the destruction of 1 hectare eastern whip-poor-will habitat is within these limits.
ECCC	FC-107	5.6.7.4 (Golden-winged warbler)	The golden-winged warbler recovery strategy states that breeding habitat loss or degradation due to human activities is one of the primary threats to this species and this project will exacerbate this threat (an estimated 24 ha of suitable breeding habitat destroyed). It is stated that there is an overall abundance of suitable golden-winged warbler habitat in the RSA, but it is not reported if this habitat is unoccupied and available to potentially displaced birds. It is not mentioned whether the 24 ha of lost habitat is potential critical habitat. The recovery strategy for this species identifies a focal area that includes the Chalk River property. Critical habitat is identified using 10x10 kilometer grid squares; although no grid squares appear to overlap the Chalk River property. This section refers to the "resilience and adaptability limits" of this species, which are undefined. The number of individual golden-winged warblers impacted by the project has not been estimated. Noise levels are mentioned as a potential source of disturbance but the spatial and temporal distribution of noise or an adequate analysis of how noise might impact golden-winged warbler in the LSA and RSA was not provided. **Expectation to address comment:** Examine means to avoid destruction of suitable breeding habitat for golden-winged warbler or explain why this is not possible. If not possible, propose mitigation (e.g., habitat enhancement or creation using management tools like prescribed burning) to compensate for the loss of breeding habitat. Provide an analysis of critical habitat for golden-winged warbler in the LSA. Define resilience and adaptability limits for golden-winged warbler and explain why the destruction of 24 ha of suitable breeding habitat for this species is within these limits. Provide an estimate of the number of individual golden-winged warblers that could be impacted by project construction. Provide an analysis of the impact of noise on golden-winged warbler habitat and individuals, including isopleth mapping. In addition to the 24 ha of suitable habitat that will be lost through clearing, describe what amount of golden-winged warbler habitat will be lost as a result of disturbance levels and edge effects from the proposed development. Describe potential mitigation measures to address this effect on this species.
ECCC	FC-108	5.6.7.5 (Bats – little brown myotis, northern myotis and tri-colored bat)	The bat species at risk recovery strategy identifies the following threats to little brown myotis, northern myotis and tri-coloured bat: habitat loss and degradation (e.g., destruction or degradation of hibernacula, maternity roosts, and foraging areas), and disturbance or harm (e.g., industrial disturbance). This project will exacerbate these threats (an estimated 25 ha of suitable habitat destroyed). The EIS indicated no SARA permit would be required to destroy bat maternity roosts when not occupied. Although roost sites will not likely be occupied during vegetation clearing, they are considered residences under SARA and are protected on federal Crown land. As such, a permit is required for their destruction. Noise levels are mentioned as a potential source of disturbance but the spatial and temporal distribution of noise or an adequate analysis of how noise might impact species at risk bats in the LSA and RSA was not provided.

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			The EIS indicates the project is "compliant" with the long-term distribution objective for these species. The evidence presented does not support this conclusion. It is also possible that the project may not support the population objective for these species. The EIS states there will be no direct mortality of bat species at risk caused by the project, but it should be noted there is potential for destruction of residences and individuals during blasting. For example, bats can roost under rocks on the ground and be killed during construction or blasting. This section refers to the "resilience and adaptability limits" of these bat species, but these limits are undefined. **Expectation to address comment**: Examine means to avoid destruction of bat maternity roosts or explain why this is not possible. If not possible, propose mitigation (e.g., habitat enhancement or creation) to compensate for the loss of potential roost (maternity and other) sites. Provide an estimate of the number of individual species at risk bats (by species) and species at risk bat residences that could be impacted by project construction. Provide evidence that alternative roost sites are actually present and unoccupied outside of the project area and that such habitat is not limiting. Remove the reference that a SARA permit is not required to destroy bat species at risk maternity roosts that are not active. Provide an analysis of the impact of noise on bat species at risk residences and individuals, including isopleth mapping. Remove statements concluding that the NSDF project would be compliant with population/distribution objectives of the bat species at risk recovery strategies or provide further evidence supporting this statement. Remove statements that no direct bat mortality will be caused by the proposed project, identify what components of the project may lead to bat mortality and propose measures to mitigate those effects. Define resilience and adaptability limits for bat species at risk and explain why the destruction of 24 ha of potential maternity roost habitat for these species is within these limits.
ECCC	FC-109	5.6.7.6 (Blanding's turtle)	Critical habitat is that habitat deemed necessary for the survival or recovery of species at risk. The blanding's turtle recovery strategy lists the main threats to this turtle as land conversion for development, road networks, human-subsidized predators, and illegal collection. Other threats identified include invasive species, water management, and heavy machinery. This project will exacerbate all of these threats and 22 ha of proposed critical habitat would be destroyed. The EIS states that the effects on critical habitat distribution and connectivity will have minor effects, yet no evidence is provided to support this assertion. The increased noise and light are not expected to have measureable effects on the behaviour of blanding's turtle and that Blanding's turtle under water (or otherwise) will be 'protected' from vibrations caused by blasting. No evidence is provided to support any of these statements. Blanding's turtle are suspected of using vocalizations underwater to communicate with potential mates, but impacts of noise/vibrations are unstudied (J. Congdon, pers. comm. 2016). The EIS states that the main blanding's turtle migration corridors through the wetlands will remain intact within the LSA but data are lacking on known movement patterns. blanding's turtle can overwinter terrestrially as hatchlings, thus potentially be harmed or killed during vegetation clearing and blasting. It is stated that a comprehensive road mitigation plan will be developed for the NSDF project, but it has not been provided. ECCC cannot fully assess the impacts of this project, without reviewing the road mitigation plan. It is stated that the effects from road mortality are anticipated to be infrequent and "reversed at the end of operations (long term)". Should road mortality occur over the operational life of the project, it is unlikely that these effects would be reversed at the end of the project. Halting road kill does not reverse the effects that have already occurred. Given that blanding's turtles have been observed at locations on all sides of the LSA and there are large wetlands within the LSA it is likely that some blanding's turtle hibernate in some of these wetlands. The EIS states that effluent discharges from the project site will enter these adjacent wetlands and that this may change downstream discharge and water levels (table 5.6.5-1 Pathways Analysis). Anything which alters water levels of wetlands used for hibernation could potentially cause mortality of blanding's turtle. Given that blanding's turtle nesting habitat has not been identified to date in the LSA it is uncertain if the construction will destroy nesting habitat. This is a significant risk as the proposed site is 30 m from occupied wetlands. Blanding's turtles can nest >400 m from the nearest wetland (blanding's turtle COSEWIC report) so areas along the power line corridors, the East Mattawa Road, or other open areas could be permanently lost as nesting habitat.

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			Expectation to address comment: Examine means to avoid loss of blanding's turtle proposed critical habitat or explain why this is not possible. If not possible, propose mitigation (e.g., habitat enhancement or creation) to compensate for the loss of critical habitat. Provide evidence that effects on critical habitat distribution and connectivity will have minor effects on Blanding's Turtle (especially in light of the statement on page 158 that "The use of the habitat within the SSA [proposed construction site] by Blanding's turtles is not known"). This may require further survey data to support. The proponent is encouraged to discuss this matter further with ECCC. Provide evidence that noise, light and blasting will have minimal effects on blanding's turtle. If available, provide data on the main blanding's turtle movement routes, and if not, provide evidence that they will remain intact and functional. Provide an analysis of the potential impacts on terrestrially overwintering blanding's turtle. Provide a comprehensive road mitigation plan for blanding's turtle. Remove the statement that effects of road mortality are anticipated to be reversed at the end of the project. Provide analysis of known blanding's turtle nest and hibernation sites in the LSA and RSA. Provide an analysis of any changes in wetland water levels and their potential effect on hibernating blanding's turtle and how this can be mitigated.
ECCC	FC-110	5.6.8 Bats	The proposed monitoring and follow-up for bats is to install and monitor bat boxes. It is unclear what baseline data on bats are available for the study area and hence how comparisons from bat box surveys can be made. The statement "Offsetting the removal of unoccupied bat maternity roost trees is not required under SARA" is not accurate. Bat species at risk maternity roost trees are residences as defined by SARA and residences (occupied or not) are protected under the Act. Offsets may be required, but avoidance of removal is the first priority of protection. It is difficult to know if the proposed installation of 16 bat boxes is sufficient to offset the loss of 30 ha of forest for three different SARA-listed bat species. Tri-colored bats in particular are known to roost alone or in small numbers (recovery strategy) suggesting that 16 bat boxes would not provide room for very many bats. **Expectation to address comment:** Provide baseline data for bats and explain how monitoring of bat boxes can be compared to baseline. Remove the statement regarding SARA requirements and offsets of removing bat maternity roosts. Consider inventorying for potential maternity roost trees in the proposed construction site. Surveying for potential maternity roost trees in the proposed construction site would help determine how many such trees would be lost during construction and would provide guidance for how many bat boxes would be required to compensate for this loss. The proponent is encouraged to discuss this matter further with ECCC.
ECCC	FC-111	5.6.8 Birds	It is suggested that the Monitoring Avian Productivity and Survivorship (MAPS) Program be used to 'collect data on relative abundance and other key demographic parameters of bird species at risk. The MAPS program involves mist nesting and banding of birds and is expected to be run every year. In addition, it is a diurnal program that would not be appropriate to monitor the largely crepuscular/nocturnal eastern whip-poor-will. It has not been stated whether other MAPS stations (i.e., benchmarks) are already established in the RSA. It is unclear what baseline data available for the study areas. If no MAPS stations are currently present, it is not clear how monitoring data from new MAPS stations can be compared to the pre-disturbance condition. **Expectation to address comment:** Explain why the MAPS protocol was suggested to monitor relative abundance and how many proposed/existing MAPS stations there are. Propose a more appropriate monitoring method for eastern whip-poor-will.
ECCC	FC-112	5.6.8 Blanding's turtle	The blanding's turtle monitoring/follow-up plan lacks details. Table 5.6.8-1, on Monitoring, indicates that the proponent will track road mortality and use adaptive management. A more detailed monitoring plan is required, that describes how often surveys will be conducted. If road surveys are not conducted frequently during the nesting period then road mortality can be overlooked. Reducing road mortality across the entire property may help compensate for the loss of 22 ha of proposed critical habitat; this matter should be discussed further with ECCC. Consider a habitat creation plan to help compensate for the loss of proposed critical habitat (e.g.,

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			creating additional nesting habitat). Consider options for introducing other threat reduction strategies (e.g., caging of nests). Nest cages have been proven to increase hatching success of eggs by reducing nest predation. An increased production of juveniles can lead to an increase in the adult population over time. **Expectation to address comment**: Provide more details on the blanding's turtle monitoring and follow-up in terms of road mortality surveys and possible road mitigation plans across the property. Consider developing a habitat creation plan and/or threat reduction plan to provide an overall benefit to the species.
ECCC	FC-113	5.7 (5.7.4.6, 5.7.4.7, 5.7.4.8, 5.7.4.9) (Ambient Radioactivity)	Throughout this draft chapter, information about the existing environmental monitoring programs at the CRL site was presented for environmental parameters that are relevant to the assessment of ecological risk from the project. While the information from existing environmental monitoring programs is valuable in providing an overview of the existing conditions throughout the CRL site, it is not specific to the preferred location of the NSDF. In order to better inform what the baseline conditions are at the preferred location for the NSDF, it expected that additional baseline information for air, surface water, sediment quality, groundwater, soil quality, fish, terrestrial plants and animals, to the extent possible, should be collected in the immediate vicinity of the preferred NSDF site. This would apply to both radiological and non-radiological parameters. **Expectation to address comment**: As the details of the project are further developed, it is requested that site-specific baseline data be collected at relevant stations in the preferred NSDF site in order to inform the evaluation of the risk from the project onto the environment. This includes the sampling of air, surface water, groundwater, soil, sediment, terrestrial plants, terrestrial animals and fish, to the extent possible, for both radiological and non-radiological parameters. Should data from existing monitoring stations be used in the assessment of ecological risk, justification for using the data from these stations in the ecological risk assessment should be provided.
ECCC	FC-114	5.7.4.10.2	Terrestrial vegetation monitoring is not indicated to be conducted at the NSDF site. The report presents data from terrestrial vegetation monitoring conducted in the East Swamp wetland, located directly west of the NSDF site. It is known that contamination exists in the East Swamp wetland due to groundwater plumes from the Chemical Pit and Reactor Pit 2. Although the data from the East Swamp wetland are valuable in examining the local site study area, site-specific sampling would provide site specific baseline data that would be more relevant to the NSDF project. **Expectation to address comment**: Provide a justification as to why terrestrial vegetation monitoring would not be conducted at the NSDF site and consider its monitoring ahead of the project starting.
ECCC	FC-115	5.7.4.2	The liquid radiological effluent verification monitoring program described in this section was not provided. This monitoring program is useful to provide information on existing liquid effluent monitoring locations (and their distances to the NSDF site), monitoring frequencies, parameters measured, and reference points for the baseline characterization of radioactivity. **Expectation to address comment:** Provide the liquid radiological effluent verification monitoring program described in this section as part of the EIS.
CNSC	FC-116	5.7.4.7	CNL provided radionuclides concentrations in Bq/g and sometimes in Bq/kg. **Expectation to address comment:** Please ensure that all radionuclides concentration are in Bq/kg for consistency with other sections and ease of comparison purpose.

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ECCC	FC-117	5.7.4.7	The report states, "*No data are available for radioactivity in soil within the NSDF site*". In order to accurately understand baseline radioactivity conditions, site-specific soil monitoring should be conducted, especially considering the legacy contamination that is present throughout the site. **Expectation to address comment:** Provide a justification as to why on-site soil quality monitoring was not conducted as part of the EA and consider collecting baseline soil quality data within the project area.
ECCC	FC-118	5.7.4.9	Clarification is required regarding the baseline radioactivity information in fish sampled at Perch Lake. The information provided only shows fish sampled for tritium oxide (HTO) and organically bound tritium (OBT). Fish sampled in Chalk Lake (Maskinonge Basin) were examined for multiple radionuclides including carbon-14, cesium-134, cesium-137, tritium, organically bound tritium, gross alpha, gross beta, and potassium-40. According to figure 5.4.1-2 in section 5.4 (Draft Version 2.3) the Maskinonge Basin does not drain into the Perch Lake drainage basin where the NSDF site is located and therefore does not represent the current contamination of fish in Perch Lake. The EA should provide detailed results of the monitoring conducted for fish in Perch Lake, as this data will provide important baseline information before the onset of NSDF operations. The fish sampling program in Perch Lake was referenced to document: CNL ETB 2016 – Recent Perch Lake Radiological Data. However, this document was not provided. **Expectation to address comment:** Explain why more data on the radionuclides measured in Perch Lake were not reported in the EA report. Provide the reference document "Recent Perch Lake Radiological Data" CNL ETB 2016, with the Final EIS for review. Fish from Perch Lake Basin should be tested for the same radionuclides as the fish from Maskinonge Basin to assess current levels of contamination in fish in Perch Lake.
CNSC	FC-119	5.7.6.1.1	CNL indicates "*Dose to non-human biota from waterborne emissions is calculated during the operations phase, as well as during the post-Institutional Control (i.e., after 2400) period for the NSDF Project.*" **Expectation to address comment -** CNL is requested to clarify why (if this scenario has not been considered) dose to non-human biota from waterborne emissions is not considered (calculated) during the ICP (i.e., 2100 to 2400) with the assumption that the final cover will not perform as required (breached) and/or the ECM liner can fail and leachate will seep through it. It is expected that a quantitative assessment of the radiological impact under expected conditions of evolution of the site and disposal facility and under unlikely and extreme conditions to be completed.
CNSC	FC-120	5.7.6.1.1	CNL indicates "*Dose to non-human biota from airborne emissions is calculated only for the operations phase of the NSDF. This represents the bounding case, since it is expected that doses to non-human biota during the post-closure would be less than the operations phase with the installation of the final cover*". **Expectation to address comment -** While the last statement above could be true and reasonable, CNL should not solely rely on an "expectation" but to justify and support their statement/judgement with qualitative or quantitative facts (estimation, etc.).
CNSC	FC-121	Table 5.7.6-1 & 3 (EIS) and WAC report table 6.1	Table 6.1 in the WAC report provides activity criteria for alpha, long-live beta/gamma and short-live beta/gamma radionuclide for all waste streams. It is unclear how the criteria in table 6.1 relate to waste inventory used in the EIS (tables 5.7.5-1&3) and in the Post-closure safety assessment (table 4.2 and 4.3). **Expectation to address comment:** Please clearly explain how the activity criteria in table 6.1 of the WAC report relate to radionuclide inventories used in the EIS, PA and SAR.

Federal Department	Reference Number	Report Section	Reviewer Comment
CNSC	FC-122	5.7.6.1.1.2, Page 68 (and other sections)	CNL indicated that the "*effluent is discharged from the WWTP to an infiltration area ultimately leading to the East Swamp wetland*". **Expectation to address comment -** CNL should provide justification and rationale as to why the treated effluent is discharged to an infiltration area ultimately leading to the East Swamp wetland rather than discharging for example directly to the Ottawa River or any other discharge point?
ECCC	FC-123	5.7.6.1.3	In the discussion of guideline selection for cobalt, it is stated that the screening value for cobalt was adopted from the recently derived *Federal Environmental Quality Guideline* of 5.2 µg/L (Environment Canada, 2013). According to this reference, the *Federal Water Quality Guideline for protection of aquatic life* is 2.5 µg/L, not 5.2 µg/L as listed in the report. **References:** Environment Canada. 2013. *Federal Environmental Quality Guidelines: Cobalt*. *Canadian Environmental Protection Act, 1999*. February 2013. **Expectation to address comment:** Revise report or provide clarification on value reported (5.2 µg/L).
CNSC	FC-124	5.7.6.1.3 Exposure assessment	CNL provides the methodology to calculate total dose rates to non-human biota. However, CNL does not provide the input values used in these radiological exposure assessments so it is not possible for CNSC staff to verify the total doses predicted for the 4 scenarios. **Expectation to address comments:** Please provide calculation examples and input values for each variables in the exposure equations so that CNSC staff can verify the adequacy of the calculations.
ECCC	FC-125	5.7.6.1.3, Table 5.7.6-9	There are several chemicals in table 5.7.6-9 for which guidelines are not listed (for example, calcium, lithium, magnesium, manganese, potassium, etc.). For these chemicals, there is no discussion on the benchmarks that will be used in the assessment, or information on potential aquatic toxicity values available in literature. This information is especially important since the report states "*it is expected that effluent concentrations will meet the applicable Canadian Water Quality Guidelines for the Protection of Aquatic Life during the operations phase".* **Expectation to address comment:** Please provide clarification on the lack of guidelines for such chemicals and information on the alternatives that will be employed in cases where guidelines are unavailable.
CNSC	FC-126	Table 5.7.6-3 Note 2, related to H-3	Tritium indicated total activity "*does not include sealed packages that may contain high tritium inventory*" Does this mean that CNL will revisit the initial total inventory to factor the sealed packages? How this will be reflected in case a decision is made to design the sealed packages in a way to prevent tritium leaching? **Expectation to address comment:** CNL should provide additional information in regards of the two options (decay-storage, packages leak-proof design) and how these will be implemented during facility operation.
CNSC	FC-127	Table 5.7.6-3, Performance Assessment Report (e-doc:	CNL uses radionuclides activities at 2400 (300 years after closure) instead of activities at 2100 to predict radiological doses to humans and non-human biota during the post-closure period (Scenario 3) and for the bathtub effect (Scenario 4). In doing so, CNL assumes that the integrity of the engineered cover will be actively maintained for 300 years until 2400. 197

Federal Department	Reference Number	Report Section	Reviewer Comment
		5224431), 1.7 Near Surface Disposal Facility Lifecycle	It is not clear how significant a role the assumed institutional control plays in the safety case. Both G-320 and SSR-5 say that institutional control, especially active institutional control, should not be solely relied upon as a means to ensure safety. It needs to be demonstrated whether/to what degree the NSDF design relies on the 300 years of institutional control to meet with dose requirements As an example, the OPG DGR in their original EIS assumed the same 300 year institutional control, but the Panel requested OPG to conduct dose calculations assuming that the institutional control period varied from 0-300years. **Expectation to address comment:** CNL should conduct an assessment to demonstrate whether the NSDF design relies on the 300 years of institutional control to meet with dose requirements, i.e., use the radiological inventory at 2100 and provide predicted concentrations and dose to humans and non-human biota in the Perch Lake watershed and into the Ottawa River for the normal evolution scenarios.,. In the event that predicted concentrations in the Perch Lake watershed and doses to humans are unacceptably high, CNL should provide predictions to indicate how many years of institutional control are required to keep risk to an acceptable level.
CNSC	FC-128	Table 5.7.6-4	CNL provided the predicted maximum concentrations of radionuclides in the Treated Effluent, but nothing about the concentrations of the radionuclides before treatment/processing at the WWTP. **Expectation to address comment:** CNL should provide the concentrations of radionuclides/contaminants in the ECM Leachate before treatment and information on how these concentrations were determined.
CNSC	FC-129	Table 5.7.6-5 (and other sections)	CNL provided the concentrations of radionuclides in the ECM at year 2400. **Expectation to address comment:** To better reflect consideration and implementation of the "Design Optimization" principle as illustrated in G-320 and international standards requirements and guidance "*The design of a nuclear facility should be optimized to exceed all applicable requirements. In particular, a radioactive waste management facility should more than meet the regulatory limits, remaining below those limits by a margin that provides assurance of safety for the long term.*", CNL should consider the groundwater transport scenario assessment during the ICP (i.e., year 2100 and beyond). Assuming the assessment assumptions are conservative, obtained results will show whether the design is adequate and meet the requirements. As such, CNL may improve and optimize the selected design including the minimization of operational and post-operational impacts.
ECCC	FC-130	Table 5.7.6-9	A review and revision of table 5.7.6-9 is required as there are some areas of error and missing information. A few examples below: • For cadmium, the CCME guideline is depended on water hardness, however; there is no footnote to indicate this. • For aluminum, the CCME guideline used (5 µg/L) is for pH < 6.5, however; there is no footnote to indicate this • pH and water hardness guidelines are missing, although some chemical guidelines are dependent on them • Carbon tetrachloride shows no CCME acute benchmark, although there is an existing interim benchmark of 13.3 ug/L (CCME, 1999) **Reference:** CCME. 1999. *Canadian Water Quality Guidelines for the Protection of Aquatic Life* – Halogenated Methanes - tetrachloromethane (carbon tetrachloride) **Expectation to address comment:** Review table 5.7.6-9 for accuracy and completeness, and provide footnote information where applicable in the final EA report.

Federal Department	Reference Number	Report Section	Reviewer Comment
CNSC	FC-131	Table 5.7.7-1	The section number to which it is referred is missing in the last column "conservatism and assumptions" in the "Leaching and Transport Parameters" section. **Expectation to address comment:** Please revise to include the section number.
CNSC	FC-132	Table 5.8.2-2 (Page 5-535) Assessment Endpoints and Measurement Indicators for the Human Health Assessment	Changes to sediment quality, and changes to food quality (fish, meat, milk, etc.) were left out of the list of measurement indicators. **Expectation to address comment:** CNL is requested to acknowledge these measurement indicators.
CNSC	FC-133	5.8.5.1.1	CNL indicate that "*Radiological dose to members of the public may result from waterborne or airborne emissions from the NSDF Project. Dose to members of the public from waterborne emissions is calculated during the operations phase, as well as during the post-Institutional Control period (i.e., after year 2400) for the NSDF Project. It is assumed that during the Institutional Control period (year 2100 to year 2400), the ECM liner and cover will be functional and no leachate will seep through the ECM liner*." G-320 states that "*Normal evolution scenarios should also take into account the failure modes of the containment and isolation systems. These failures can result not only from natural degradation of barriers, but from unpredictable disruptive events that might be expected to occur once or more during the assessment period, including penetration of the barriers by intrusion*." **Expectation to address comment:** CNL should consider assessment of dose to members of the public during the operation, closure/post-closure, Institutional Control and post-Institutional Control periods. CNL should provide further justification when an assessment is not carried out for a specific phase and not only rely on own judgement or expectation/assumption.
CNSC	FC-134	5.8.5.1.1.3	CNL indicates "*For the operations phase modelling, it is conservatively assumed that no dilution occurs prior to the East Swamp wetland."* **Expectation to address comment:** CNL should elaborate and explain what is meant by "no dilution occurs prior to the ESW" and confirm the discharge control/monitoring location of the treated leachate.
CNSC	FC-135	5.8.5.1.1.3	CNL indicates that "*The tritium inventory in bulk waste emplaced in the ECM, and hence releases from the ECM, will be controlled such that tritium concentrations in Perch Creek do not exceed the Drinking Water Limit."* **Expectation to address comment:** CNL should document in the NSDF Licensing documentation, and summarize in the EIS, the process/procedure how the tritium inventory in bulk waste emplaced in the ECM will be controlled such that its concentration in Perch Creek (or any other water body) will not exceed the drinking water limit.

Federal Department	Reference Number	Report Section	Reviewer Comment
CNSC	FC-136	5.8.5.1.1.3	Inconsistencies regarding the post ICP groundwater transport scenario assumptions. **Expectation to address comment:** With respect to the post-ICP groundwater transport scenario assumptions, CNL is expected to elaborate and clarify their statement as indicated in the fifth bullet "*No credit is taken for the loss of the inventory due to the release occurring prior to the end of institutional control. This is a conservative approach, maximizing the inventory available for leaching*"…while table 5.8.5-3 shows concentrations of radionuclides in the ECM at year 2400?
CNSC	FC-137	5.8.5.1.2 Radiological Dose Assessment Results, page 19	In order to understand which pathways are the larger dose contributors a breakdown of doses by exposure pathway is needed. **Expectation to address comment:** CNL is requested to provide a breakdown of doses by exposure pathways.
CNSC	FC-138	5.8.6.1.1, Page 5-548 Application Case Methods	Releases to air from the WWTP were considered to be negligible compared to estimated releases from ECM and therefore, were not included in the assessment. **Expectation to address comment**: CNL is request to provide estimated releases to air from the WWTP and compare them to estimated releases from the ECM in order to better justify not including releases to air from the WWTP in the assessment.
CNSC	FC-139	Table 5.8.6-12 Doses to Potential Critical Groups due to Exposure to Waterborne Emissions for the Post-Institutional Control "Bathtub" Scenario Page 5-561	CNSC staff noted typos for the dose to one year old infant in table 5.8.6-12.
CNSC	FC-140	Table 5.8.6-13, Human Health Risk Assessment	In the non-radiological HHRA, table 5.8.6-13 lists the health-based guidelines for non-radiological parameters in surface water, but there are no units provided. Furthermore, it is unclear why, for many parameters, the most conservative available guideline was not used in the assessment. For example, the PWQO for cadmium was listed as 0.5 (units unknown but assumed to be µg/L), yet the value used in the assessment was U.S. EPA's guideline of 1.8 (units unknown but assumed to be µg/L). Furthermore, the guideline value for cadmium is also dependent on the hardness of water (e.g., 0.1 µg/L Cd for < 100 mg/L $CaCO_3$) and this was not considered in the assessment. Uranium, a chemically toxic COPC, was also not included in the non-radiological HHRA. The HHRA, therefore, may be less robust than would be desirable.

Federal Department	Reference Number	Report Section	Reviewer Comment
			Expectation to address comment: The proponent is requested to revise the subject table, and provide justification on the choice of less conservative guideline for certain parameters taking into account the comments provided above. It is recommended that the most conservative available guideline be applied to the HHRA. Uncertainties associated with these guideline values should also be fully discussed in the appropriate section.
CNSC	FC-141	5.8.6.1.1.2, Page 5-550, Receptor Characterization	Not enough detail was provided in the EIS on receptor characterization. For example, it is not clear which receptors are farmers. Although references were made to the DRL document, life style survey and Performance Assessment, the EIS should be able to stand alone as a publically available document. All assumptions used to estimate doses to receptors should be provided in the EIS. **Expectation to address comment**: CNL is requested to provide detailed descriptions of potential and hypothetical critical groups. CNL is also requested to provide all detailed receptor characteristics assumed for the dose estimates in the EIS including: all intake rates, indoor/outdoor occupancy factors, and any other assumptions.
CNSC	FC-142	5.8.6.1.1.3, Page 5-557, Contaminants	It is stated that, "(t)he contribution from fugitive emissions is considered to be negligible in comparison to ECM releases". **Expectation to address comment**: CNL is requested to provide an estimate for the contribution from fugitive emissions from the ECM to demonstrate that they are negligible.
CNSC	FC-143	5.8.6.1.2, Page 5-558-561, Application Case Results	CNL should provide doses from each radionuclide and pathway. There should also be some discussion on which radionuclides and pathways contribute the most to the total estimated dose. This information is important to verify CNL's estimated doses. **Expectation to address comment:** CNL is requested to provide doses as a result of each radionuclide and pathway and comment on which radionuclides and pathways contribute the most to the total estimated dose.
CNSC	FC-144	5.8.6.1.2, Page 5-560, Table 5.8.6-10 Total Doses to Hypothetical Groups Using Water from the Perch Creek Outfall during Operations	The estimated doses provided in table 5.8.6-10 are inconsistent with the doses provided in the text by four orders of magnitude. **Expectation to address comment:** CNL is requested to explain how the doses of 190 µSv/year to 270 µSv/year to the hypothetical groups were determined. CNL is also requested to explain the discrepancy between these numbers and those provided in table 5.8.6-10.
CNSC	FC-145	Table 5.8.7-1: Uncertainties in the Human	It is stated in the EIS that any issues identified with ECM during the period of institutional control can be mitigated. However, no detail was provided on mitigation measures.

Federal Department	Reference Number	Report Section	Reviewer Comment
		Health Assessment, Page 5-566	**Expectation to address comment:** CNL is requested to provide specific examples of mitigation measures that would be carried out for various ECM failures.
CNSC	FC-146	Figure 5.9.3-1	The RSA only covers the CRL property. As the regional study area only includes the CRL property, which is not accessible to the general public, it appears to limit the scope of the assessment of potential interactions of the project with traditional land use that may occur beyond the CRL property line in publicly accessible areas, where traditional activities are more likely to occur. **Expectation to address comment:** Please provide rationale for why the regional study area does not include an assessment beyond the CRL property line.
HC	FC-147	5.9.4.1.3.5 Non-consumptive Tourism and Recreation, p.797	The section states "While tourism and recreation opportunities exist in Renfrew County, there are no tourism and recreation features in the RSA. There are also no access points, boat caches (private or commercial), boathouses, club houses, designated camping sites, recreation camps, tourism establishment areas, potential tourism establishment areas, beaches, picnic sites, golf courses, resting areas, trailheads or Ontario Trail Network (OTN) trails in the RSA (MNRF 2016a)." However, the RSA selected for Land and Resource Use does not include the transportation route, therefore, effects of noise from increased truck traffic during construction may be underestimated. **Expectation to address comment:** Supplement the statement with a reference to the qualitative noise assessment in section 5.10.5.2.2, which does include the transportation route and would address effects from noise due to increased traffic on recreational users of adjacent lands.
ECCC	FC-148	Table 5.9.1-1	For the first area of interest (potential fish contamination in Ottawa River), the document states that "CNL has been monitoring the environment extensively, specifically Perch Creek" this statement appears to contradict the information provided in the Aquatic Habitat section (5.5) that used data that was over twenty years old. **Expectation to address comment:** Provide recent data of fish analysis and other related fish studies conducted in the various study areas and include in the Aquatic Habitat section.
CNSC	FC-149	Table 5.9.1-1 and section 5.9.4.3	The EIS states *"As the proposed undertaking occurs within the general area of the Algonquins of Ontario Settlement Boundary…"* The proposed NSDF is also within the known traditional territory of the Métis Nation of Ontario, the Algonquin of Quebec and is also within the boundaries of the Williams Treaties. **Expectation to address comment:** The rationale for identifying traditional land use as an area of interest should be updated accordingly in the final EIS.
CNSC	FC-150	Figure 5.9.4-1 and	There are two trap lines adjacent to the Chalk River property PE025 and PE002. The EIS states that *"it is possible but unconfirmed whether there is any trapping occurring on the adjacent Garrison Petawawa"* Has CNL had contact with those who have trapping rights/licence for trap lines PE025 and PE002?

Federal Department	Reference Number	Report Section	Reviewer Comment
		5.9.4.3.2.1-Trapping	**Expectation to address comment:** It will be important for CNL to clarify in the final EIS if there is any active hunting or trapping in the adjacent PE025 and PE002 trap lines, as well as on adjacent private (patent) lands, specifically if they are being used by any of the identified Aboriginal groups.
CNSC	FC-151	5.9.4.2	The EIS states that "*A literature review and a review of the oral history of the Algonquin people were completed…"* As the proposed NSDF project site is also located within the known traditional territory of the Métis Nation of Ontario, was any researched conducted on historical Métis use of the region and the potential for Métis related artifacts? **Expectation to address comment:** It is recommend that CNL review the MNO's research on the Métis' traditional land use in and around the Mattawa and Ottawa rivers: http://www.Métisnation.org/news-media/news/historic-research-report-on-métis-community-in-mattawanipissing-region-released/ This report was previously provided by CNSC staff to CNL on June 2, 2016.
CNSC	FC-152	5.9.4.2.2.2 Value to a Community	Missing information. The final EIS submission should include an update on the level of community interest expressed with regards to any of the archaeological sites and artifacts identified on the NSDF project site. CNL should indicate how they have engaged with identified First Nation and Métis groups, the level of interest they have expressed with regards to the archaeological finds and how CNL will work with any interested groups and communities on p reserving, and managing the archaeological resources identified in the study.
CNSC	FC-153	5.9.4.3.2	This section, which describes the potential interactions of the NSDF project with trapping, hunting, gathering and fishing activities, does not provide any evidence that CNL has gathered any details regarding traditional land use activities in close proximity to the CRL property directly from identified First Nation and Métis groups. It is recommended that in the final EIS CNL describe how they have or will be validating the assumptions currently described in this section. For example, in S. 5.9.4.3.2.3-Fishing, the section concludes "it is **likely** that there is fishing by First Nation and Métis communities on the Ottawa River in the vicinity of the CRL property. This fishing is **likely** a combination of both sport and subsistence fishing." As per the requirements/guidance in REGDOC-3.2.2 CNL should demonstrate that through its engagement activities that it has asked identified First Nation and Métis groups regarding traditional land use activities in proximity to the CRL and project location and determine if the proposed project could have any potential impacts on those practices as per the requirements of CEAA 2012. Therefore, CNL must demonstrate how it has or will be validating the conclusions and assumptions made in S.5.9.4.3.2 with identified First Nation and Métis groups and organizations.
CNSC	FC-154	5.9.4.3.2.5	The EIS states that *"According to historical record this sandy spit (Pointe au Bapteme) was where the voyageurs baptized new members…"* Has CNL discussed the cultural, heritage and spiritual importance of Pointe au Bapteme with the Métis Nation of Ontario? **Expectation to address comment:** Please provide clarification in the final EIS.
CNSC	FC-155	5.9.5.1.2	Under the section regarding potential impacts to archaeological resources there is no mention of CNL informing or engaging with interested Indigenous groups regarding the discovery of unanticipated archaeological resources or human remains.

Federal Department	Reference Number	Report Section	Reviewer Comment
			Please clarify if engagement with interested Indigenous groups will form part of CNL's procedures, as a number of Indigenous groups have expressed an interest in being informed regarding the discovery of archaeological resources and human remains including the Algonquins of Ontario, Curve Lake First Nation and the Métis Nation of Ontario.
CNSC	FC-156	Table 5.9.5-1	There is currently no linkage between project activities and hunting, trapping, and fishing by Aboriginal peoples as the RSA is restricted access. If the RSA was to be expanded beyond the CRL property line to include adjacent lands and waterways (Ottawa River), would the conclusions in the pathways analysis for the land and resource use valued components remain the same, or need to be adjusted (i.e., would there be any predicted interactions between project activities and the environment/land and resource use beyond the CRL site boundary?). **Expectation to address comment:** This rationale needs to be more clearly articulated in table 5.9.5-1 and throughout this chapter of the EIS.
CNSC	FC-157	Table 5.9.5-1	This table indicates that there is no potential interaction of the project with fishing resources as the RSA is restricted, however, as demonstrated in figure 5.9.3-1 demonstrates that the Ottawa River close to the shore of the CRL property at the outlet of Perch creek is included in the RSA. Please clarify, or correct in the EIS.
CNSC	FC-158	5.9.6	A number of Indigenous groups, including the Algonquins of Ontario, Kitigan Zibi Anishinabeg Nation and the Algonquin Anishinabeg Nation Tribal Council, have expressed an interest in being engaged in on-going monitoring activities for the NSDF project and CRL site in general, especially as it relates to their traditional land use activities (e.g., fishing). Will CNL consider the possibility of collaborating and engaging with interested Indigenous communities on environmental monitoring activities specific to the NSDF project and the CRL site more generally?
CNSC	FC-159	5.10.3.3	Reasonably Foreseeable Development (RFD) Case: **Expectation to address comment:** Please clarify why only NPD is considered as there are other potential projects that may be constructed at the CRL site
CNSC	FC-160	5.10.4.2	CNL used diverse data in a number of section of the EIS, these data were based on surveys, censuses, information gathering at different eras (2010, 2011, …., 2016). **Expectation to address comment:** Please confirm that the data referenced are the most recent and current data available.
HC	FC-161	5.10.4.2.10 Quality of Life, p.835	The section states "Baseline data on existing ambient noise was not collected as the NSDF Project will be constructed on CNL's existing CRL property, located 7 km away from the nearest community, the Village of Chalk River."

Federal Department	Reference Number	Report Section	Reviewer Comment
			Expectation to address comment: As there are receptors closer than 7 km from the site, as well as receptors along the transportation route, a brief qualitative description of the acoustic environment should be provided in the absence of baseline data. Refer to table 6.1 in Health Canada's guidance document on assessing noise effects on human health1.
HC	FC-162	5.10.4.2.9	There appear to be human receptors closer than the 7 km reported in this section. Also, clarify if there are traditional land uses in the vicinity of the project site. References were made to sections 5.8 Land Use and 5.9 Aboriginal Land Use however these were not available for HC's review. **Expectation to address comment:** Please provide a description/characterization of potential human receptors (i.e., Aboriginal reserves, local residents, recreational users, cabins, hunting, fishing and country foods collection areas, etc.) and their distances to Project site and related activity. Maps indicating locations of all identified receptors and their precise locations with respect to the Project would be useful as well.
HC	FC-163	5.10.4.2.9	It is stated that "(t)he haulage route for transportation of site preparation and construction equipment, and construction material will be via public roads to the CRL property…" **Expectation to address comment:** Please ensure that all major sources of noise are evaluated for all phases of the project, including receptors that may be in close proximity to roadways with increased vehicle traffic (but not necessarily close to the project site itself), otherwise, noise emissions could be underestimated and potentially affected receptors could be omitted from evaluation. Evaluate vehicle traffic on all relevant roadways near areas of human receptor locations as a potential noise source in order to ensure that noise from the increased vehicle traffic does not result in increased public annoyance. This is particularly important in the event that these vehicles are travelling on these roads at night. Any modelling of road traffic noise should capture all project-related vehicles, type of road coverage, and night-time traffic activity. Predicted noise levels can be compared to the World Health Organization's *Night-Time Noise Guidelines* (2009)[2] and *Guidelines for Community Noise* (1999)[3]. These guidelines suggest that outdoor noise thresholds in quiet rural areas should be 40 dBA (annual average) for long-term exposure (2009). In addition, for construction noise of more than one year, for operational noise, and where noise levels are in the range of 45 to 75 dBA at specific receptor locations, Health Canada advises that health impact endpoints be evaluated on the change in the percentage of the population who become highly annoyed (%HA). Health Canada suggests that mitigation be proposed if the predicted change in %HA at a specific receptor is greater than 6.5% between project and baseline noise environments, or when the baseline-plus-project-related noise is in excess of 75 dBA.
CNSC	FC-164	5.10.4.2.9 (Emergency and Protective	CNL indicated that "Chalk River Laboratories has a minimum….and respond to site emergencies within four minutes…." **Expectation to address comment:** CNL to verify and confirm the stated four minutes fire fighter response time.

[1] Health Canada. 2016. Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise. Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. July 2016.

[2] World Health Organization (WHO). 2009. *Night Noise Guidelines for Europe*. Hurtley, C. (Ed). Available online at: **http://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2009/night-noise-guidelines-for-europe**

[3] World Health Organization (WHO). 1999. *Guidelines for Community Noise*. Berglund, B., Lindvall, T. & Schwela, D.H (Eds.). Available online at: **http://www.who.int/docstore/peh/noise/guidelines2.html**

Federal Department	Reference Number	Report Section	Reviewer Comment
		Services/Fire Services)	
HC	FC-165	5.10.5.2.2 Secondary Pathways, p.842	The section states "Communities in the vicinity of the NSDF site are shown on figure 5.10.3-1, which includes the nearest cottages on the Quebec side of the Ottawa River, approximately 4 km from the NSDF site." **Expectation to address comment:** The cottages mentioned on pg. 842 do not appear in figure 5.10.3-1. Please add the cottages to this figure.
HC	FC-166	5.10.5.2.2 Secondary Pathways, p.843 5.10.6.2.2 Service and Infrastructure, p.845	Truck traffic estimates appear inconsistent between section 5.10.5.2.2 and section 5.10.6.2.2: "It is estimated that there will be 14 trucks per day during construction and 10 trucks per day during operations. This results in less than 2 trucks per hour during construction and less than 1 truck per hour during operations for the daytime period." "It is estimated that during site preparation and construction, 115 truckloads of material will be delivered per day. In addition, it is assumed that construction workers will travel to the NSDF Project site from the local commercial accommodations using their own personal vehicles (i.e., 50 vehicles)." **Expectation to address comment:** Clarify the number of trucks estimated per day during all phases of the project and provide a justification as to how those numbers were chosen. Should the number of trucks per day be 115 as stated, this would be equivalent to more than 16 trucks per hour. In this case, the effects of noise from increased truck traffic may be underestimated, and the assessment may need revision.
HC	FC-167	5.10.5.2.2 Secondary Pathways, p.843	The proponent committed to providing a discussion on blasting in their response to comment HC-2 (Group 2 documents). A discussion was not found within the documents provided. **Expectation to address comment:** Please provide a discussion on blasting as per CNL's original response to HC-2 from the Group 2 comments.
HC	FC-168	5.10.5.2.2 Secondary Pathways, p.843 5.10.6.3.2 Services and Infrastructure, p.846	The mitigation measures related to increased truck traffic during construction is presented inconsistently between these two sections: "Transportation of site preparation and construction equipment, and construction materials will be scheduled to reduce noise and traffic volumes, and limit inconvenience to local residents." "Canadian Nuclear Laboratories will also aim to schedule the delivery of vehicles travelling to and from site with construction and decommissioning materials at a time that does not interact with high traffic such as the morning and evening commutes." **Expectation to address comment:** Indicate hours of operation (specifically truck traffic generation) and whether the mitigation measure of avoiding high traffic periods is what is being referenced in section 5.10.5.2.2. Indicate whether traffic or noise management plans will be developed or currently exist.
HC	FC-169	5.10.5.2.2 Secondary Pathways, p.843	The proponent committed in their response to comment HC-4 (Group 2 documents) to include notification of residents before construction commences and complaint resolution mechanisms as mitigation measures. This was not clearly indicated in the documents provided.

Federal Department	Reference Number	Report Section	Reviewer Comment
			Expectation to address comment: Include a reference to the public/aboriginal engagement programs, and traffic or noise management plans if they exist. This could also be added to section 4.3.3 and cross-referenced here and in section 5.10.9.
CNSC	FC-170	5.10.7	CNL stated that one of the assumptions of future conditions is "Most workers at the NSDF Project during the operation phase will be the same individuals currently employed at CRL". **Expectation to address comment:** CNL to clarify and elaborate on the basis for this assumption taking into account that operations will last about 50 years?
CNSC	FC-171	Table 6.4.3-1: Dose Acceptance Criteria for Accidents, Page 6-7	Dose ranges were not provided for beyond design basis accidents. **Expectation to address comment:** CNL is requested to provide dose ranges for beyond design basis accidents.
CNSC	FC-172	6.4.4.4	In the Human Intrusion scenario assessment, CNL made the assumption that intrusion occurs immediately following the end of active institutional control period (to limit the effect of radioactive decay). **Expectation to address comment:** G-320 states "*Intrusion by burrowing animals or plant roots may be considered part of the normal evolution of some types of waste management systems. While thicker covers, rip-rap armouring, and other barriers can be designed to prevent such intrusion, human intrusion cannot be easily prevented by barrier design. Institutional controls may be placed on some facilities as a safety feature to prevent human intrusion. In such cases, assessment of the impact of human intrusion may have to assume scenarios in which institutional controls fail*." In addition, to SSR-5, paragraph 2.15 (c), (d), (e) and (f) requirements and what has been discussed and conveyed previously, CNL is expected further to proposed intrusion scenario, to consider assessment of human intrusion during the ICP (at the beginning: to limit the effect of radioactive decay) since the institutional controls may fail (low probability but cannot be discounted). Such human actions can be used to demonstrate the robustness of the design and in considering possible improvements of the disposal system design. CNL is expected to include this information and resulting actions (if any) in their PA.
CNSC	FC-173	6.4.4.4.2 Chronic Exposure from Living in a House and Farming on Top of the Engineered Containment Mound, Page 6-15	It is stated in the EIS that the NSDF Project will be designed to decrease the chance of inadvertent human intrusion. The range of protective measures include: site recognition, waste recognition, markers and placards, and passive barriers. **Expectation to address comment:** CNL is requested to provide more specific details on the protective measures that would be built into the NSDF design to decrease the chance of inadvertent human intrusion given that estimated doses to the farm resident living on top of the ECM exceed 1 mSv/yr.

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CNSC	FC-174	Table 6.4.4.4-5, 6.4.4.4-6	The tables showed doses farm resident from chronic exposure and following glaciation. **Expectation to address comment:** While the doses (different at different extensive times) appear to be trivial and obvious for CNL and CNSC staff, it could not be straight forward to the members of the public, therefore CNL is expected to provide further explanation and discuss the obtained doses as to why they change a little compared to the time they're evaluated.
NRCan	FC-175	9.3 Seismic Events	The Project intends to use values from the National Building Code of Canada (NBCC) 2015 for the structures, but use NBCC 2015 adjusted in some way to represent 0.5% probability of exceedance in 50 years (10,000-year frequency of occurrence) for the ECM. No indication of how the lower probability is derived (or indeed its value) is given. Note AECOM (2016b) references NBCC 2010 not NBCC 2015. For Chalk River Nuclear Laboratories (CRNL), the 2015 values at short periods are lower than the 2010 values, and the long period values are similar (see http://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/index-en.php). Therefore a design to 2010 values will be conservative (safer) than a design performed in 2017. However, any existing design could be retained (if not overly costly) to reduce the safety concerns that might arise should future (2020, 2025, …) NBCC assessments increase from the 2015 values. **Expectation to address comment:** Please provide additional information on the lower probability calculations.
NRCan	FC-176	9.3 Seismic Events	The EIS states: "An analysis of liquefaction potential has been conducted and mitigation measures will be implemented into the design of the ECM", but the response to POH Sheenboro (appendix 4.0-22 Formal Public Feedback) states: "..studies conducted to date …concluded that the soils are of adequate stability and integrity and are not subject to liquefaction in the event of an earthquake". **Expectation to address comment:** Please clarify which of these statements is correct, including what are the studies that have been conducted to date?
NRCan	FC-177	9.3 Seismic Events	The following two statements appear unsupported: • "Based on the conclusions of a seismic analysis completed on the NSDF Project design, the ECM is expected to remain functional under the 10,000-year design seismic event scenario (AECOM 2016c)." • And repeated in table 9.6-1 "To support the design of the NSDF Project, a Probabilistic Seismic Hazard Assessment (PSHA) was prepared and an analysis of liquefaction potential was conducted; mitigation measures will be implemented into the design of the ECM. Based on the conclusions of the seismic analysis, the ECM is expected to remain functional under the 10,000-year design seismic event scenario." The cited document (AECOM 2016c; should be AECOM 2017 - see below) covers only the design of NSDF structures (which are steel-frame structures and relatively simple to design against seismic forces), not the ECM as a whole (including design of the berms etc.). There are multiple mentions of a "slope stability analysis" that should cover berm design, but it does not appear in the references. **References:**

Federal Department	Reference Number	Report Section	Reviewer Comment
			AECOM (AECOM Canada Limited). 2016c. Canadian Nuclear Laboratories Near Surface Disposal Facility Design and Consulting Services: Seismic Analysis. AECOM Project Number: 60512856 (Document number not provided) The above reference may actually refer to: AECOM (AECOM Canada Limited). 2017. Seismic Analysis & Structural Calculations, Chalk River Site (includes NLBU Administrative Records) 232-503212-DK-003 Revision 0 dated 2017 03 28. **Expectation to address comment:** Please verify and provide clarification on this.
NRCan	FC-178	9.5 Glaciation	The EIS may be correct in presuming that the onset of the next glacial advance in the region will be delayed by global warming. However it focusses on what happens after the next ice sheet retreats, considering that the retreat will disperse the waste and expose the site to returning humans. This neglects that the preceding glacial advance might carry the entire NSDF away, through ice-shove and basal erosion (the NSDF's granular composition lacks the resistance of bedrock as for example, a Deep Geologic Repository). If so, all of the NSDF material might end up concentrated near a small part of the ice front (such behaviour is implied by geochemical glacial tails used to locate ore deposits from drift samples). **Expectation to address comment:** The EIS should consider the effects of the first glacial advance.
CNSC	FC-179	10.2	CNL indicated that "a fire buffer zone (5 m minimum) between forest stands and equipment will be established to further reduce the probability of neighbouring forest fire…". **Expectation to address comment:** Please provide a reference/source for the 5 m minimum buffer zone value.
NRCan	FC-180	10.3 Seismic Events	Historic earthquakes are mentioned, however, what is not mentioned, is that according to earthquake recurrence models, similar-sized events could happen closer than those mentioned, and indeed are very likely to happen during the 300-year post-closure phase. "Worker safety" and "productivity" are the listed concerns. However, the key concern is the integrity of the liners (especially given that these will be buried / hidden) during construction and post-closure. NRCan could not locate in the draft EIS any demonstration that the expected earthquake shaking will be insufficient to cause displacements large enough to rupture the membranes. The design uses NBCC2010, but the probability level is not discussed. NRCan requests the responses to the following questions: How are the long-term (300-year post-closure window) effects considered? A 2% in 50 year probability (as used in NBCC 2010) approximates to a 12% in 300 year probability for the facility. Is a greater than 10% chance of exceedance during the lifetime considered appropriate? What would happen if the design ground motions were exceeded that one time in ten? NBCC2015 is now available. For Deep River (nearby community) the 2015 hazard is lower than 2010 at short periods. It would not be necessary to re-do the analysis for NSDF, if this is shown. It would be sufficient to state that the design is safer than was considered in the design document. **Expectation to address comment:** Please provide the requested information and clearly identify how the NSDF will retain its integrity after strong earthquake shaking. Please provide a reference to your contingency plan if monitoring indicates a leak in the liners.

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NRCan	FC-181	10.3 Seismic Events	The design guides mentioned in section 10.3 appear to be AECL safety design guides (SDG), not CNSC's approved regulations. These are not listed in the references, and it is not apparent where they are available (one is available from the U.S. at www.nrc.gov/docs/ML0410/ML041000174.pdf). The accessed SDG is for a nuclear power plant, which does not appear to be appropriate for the NSDF. Given the nature of the NSDF, please confirm whether there are seismic design guidelines for landfills (for example in California) that would be more appropriate and could be adapted to higher-consequence (radioactive) materials on a lower-hazard site. **Expectation to address comment:** Please provide a copy of the other design guide ("Design for Earthquakes (Seismic Qualifications at CRL)"), together with explicit mention as to which parts of each SDG are being applied to the NSDF.
NRCan	FC-182	10.3 Seismic Events	The AECOM 2006 report is mentioned in section 10.3 but is not listed in the references. **Expectation to address comment:** Please ensure this report is referenced, and a copy appended, to the revised EIS.
CNSC	FC-183	Appendix 5.4-2 Table 3 : Surface water benchmark values	CWQG were adopted for Ni and U but not for As, Se, Al, Cd, Cr, Zn or Hg. **Expectation to address comment:** Please justify not adopting CWQG for all contaminants.
CNSC	FC-184	Appendix 5.4-2 Table 6	Values for uranium in Perch Lake inlet 1 were 0.7 and 0.76 mg/L in the spring and fall of 2015 respectively, Perch Lake inlet 2 were 2.2 and 6.8 mg/L in the spring and fall of 2015 respectively; 0.63 mg/L in the main stream above the Plant road. These values are above the CWQG of 0.015 mg U/L. The chemical pit, the reactor pit or waste management area A could likely be sources of this uranium. Therefore, when the waste is transferred into the ECM , leachate could contain high levels of U. It is generally understood that U is more chemically rather than radiologically toxic because of its low specific activity and long half-life. The non-radiological assessment does not consider chemical toxicity of U as a COPC despite the high U levels. **Expectation to address comment:** Please include the chemical toxicity of U as COPC in the non-radiological assessment performance of the NDSF or provide a justification for not including the chemical U toxicity.
ECCC	FC-185	Appendix 5.6-1	A number of species listed as special concern by SARA are also known or suspected to occur in the LSA. These species include the snapping turtle, eastern milksnake, and monarch. The proposed development could reduce nesting habitat for the snapping turtle, potentially destroy hibernation sites for the milksnake, and clear patches of milkweed plants that are essential for monarchs. The monarch was recently assessed by COSEWIC as endangered and should be given some consideration in the EIS. Note that the CNSC is obliged, under section 79 of SARA to notify the Minister of the Environment if the project is likely to affect a listed wildlife species (including species of Special Concern) or its critical habitat. The CNSC is further obligated to identify the adverse effects of the project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be taken in a way that is consistent with any applicable recovery strategy and action plans. To ensure the CNSC can carry out this responsibility, the EIS should adequately identify the impact of the project on all listed species, including those of Special Concern and demonstrate how those affects will be avoided, lessened and monitored in a way that is consistent with SARA recovery strategies, action plans and management plans.

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			Expectations to address comment: Include impacts to these Special Concern species in the detailed species assessments. This may involve, for example, that if Monarch habitat will be lost in the proposed construction site, offsets may be required.
ECCC	FC-186	Appendix 5.6-1	Two species, the eastern wood-pewee and the wood thrush, have been assessed by COSEWIC as Special Concern and Threatened, respectively, but have not yet been assigned a SARA status. The effect of the development on the wood thrush should also be considered in the EIS. **Expectation to address comment:** Estimate the amount of wood thrush habitat that will be lost from the proposed project and describe how it would impact this species and appropriate mitigation if needed.
CNSC	FC-187	Table A-1	CNL provided in this table the description and rationale for the hazard scenario and the screening assessment conclusion. **Expectation to address comment:** A number of other are discussed in other sections of the report, it is expected that CNL follow the CRL Operating Licence and its associated LCH requirements specifically criteria 5.1 & 6.1 and respective guidance in their analysis of the normal operation /evolution, anticipated operational occurrences design basis accident and beyond design basis accidents. Those assessments should be part of the safety analysis/assessment and included in the NSDF SAR. Fire related scenario should also be assessed as part of the facility Fire Hazard Assessment.
CNSC	FC-188	NSDF Waste Acceptance Criteria report	Section 9.1.1 provides waste characterisation expectations for waste generators. Although CNL provides details about the required information to be provided by the waste characterisation program, it does not provide details regarding the number of samples required to sufficiently characterise the mean and upper bound activities and concentrations of nuclear and hazardous substances. Although the IAEA (2007) provides guidance on the use of scaling factors and techniques to measure difficult to measure radionuclides, it does not include extensively on minimum number of sample required. **Expectation to address comment:** Since the appendix of the ISO 21238 provides information on minimum number of samples, CNSC staff recommend that CNL use this document along with the IAEA 2007 document for minimum number of samples. ISO Standard 21238:2007 Nuclear energy – Nuclear Fuel technology – Scaling factor methods to determine the radioactivity of low- and intermediate-level radioactive waste packages generated at Nuclear Power Plants. https://www.iso.org/standard/40081.html
CNSC	FC-189	NSDF Waste Forecast Analysis Report	CNL predicts a baseline waste volume of 836513 m^3 which is within the 1 000 000m^3 volume considered in table 3.2.1-1 of the EIS. However, the NSDF waste forecast report predicted a conservative volume of 1,720,058 in table 1, which almost twice as much waste currently considered in the EIS. In the event that more than 1 000 000m^3 of waste was generated or sent to the NSDF, an amendment to the licence would likely be required (e.g., since this would be outside the prediction envelope of this EIS). **Expectation to address comment:** Considering the long-term operation of the NSDF, please justify not using the most conservative volume of 1,720,058 m3 to predict environmental impacts and associated mitigation measures for the proposed NSDF project.
CNSC	FC-190	Performance Assessment Report (e-doc: 5224431)	Many conclusions of the EIS, in particular with respect to post-closure safety, are based on the results of the performance assessment (PA). The PA report should be developed in a clear, transparent and traceable manner, so that the reviewer can verify the assumptions, methodology and conclusions of the report, or if necessary independently reproduce the results. The current PA report should be improved in order to meet the above expectations. In particular the following points should be addressed:

Federal Department	Reference Number	Report Section	Reviewer Comment
			1. The assessment of post-closure safety of the proposed NSDF was performed for a time frame that is not clearly defined. The selection of the assessment time frame is important in presenting the long-term safety case of the proposal, and the rationale must be given, based on the hazards posed by the waste as a function of time. **Expectation to address comment:** clearly define the assessment time frame and provide a rationale based as the time evolution of the hazards posed by the wastes. 2. In the PA report, it seems that the selected assessment time was 100,000 years, although that was not explicitly stated, nor justified. If that is the case, the normal evolution scenario: - should include future glaciation since the next glaciation cycle would likely occur in that time frame. - should include the effect a beyond DBE, since the current DBE is defined for a 10,000 year return period. In the current PA, those two events are considered in disruptive scenarios. Since they are expected to occur during the 100,000 years assessment, if that is the defined assessment time, they are to be included in normal evolution scenario as recommended in CNSC's G-320 and IAEA's SSG-23. **Expectation to address comment:** CNL should clearly justify the normal evolution scenario for post-closure safety. Once an assessment time frame is clearly defined and justified, events that are expected to occur during that time frame should be part of the normal evolution scenarios. 3. If the assessment time is 100,000 years as implied in the PA report, breach of containment from glaciation is likely to occur, resulting in waste dispersion. This is inconsistent with CNSC's and international guidance for long-term waste management principles. **Expectation to address comment:** CNL should design the facility in such a manner that in a normal evolution scenario waste containment with no dispersion is provided by the disposal system. 4. The EIS, which is based on the results of the PA, shows the long-term impact for an infant located in Pembroke. The impact to receptors who live on site consuming local products and water sources should instead be shown and discussed in order to provide arguments on long-term post-closure safety. **Expectation to address comment:** For the post-closure period, CNL should consider a critical receptor group living on site and use that group as the main reference group for demonstration of post-closure safety. 5. The hydrogeological model in support of the performance assessment does not take into account the future site evolution. **Expectation to address comment:** A geosynthesis report should be prepared to describe both current geological, geomorphological and hydrogeological conditions of the site and their future evolution during the assessment time frame. The hydrogeological model in support of the PA and SAR should take both current site conditions and their future evolution into account. 6. There is no evidence that the design of the proposed facility has been optimized. Optimization of the design should be performed iteratively using the long-term safety case as a tool. As an example, although it is stated that only 1% by volume of ILW is included in the proposed waste streams, the net volume of ILW is not negligible. CNL should consider the alternatives of separate disposal of ILW and LLW and/or disposal at greater depths into the rock. In that optimization process, the resulting impact on humans and the environment, the robustness of the overall disposal system and individual barriers, the risk of human intrusion should be compared between the different alternatives, and the uncertainties related to the evolution of the site and the facility should be compared.

Federal Department	Reference Number	Report Section	Reviewer Comment
			Expectation to address comment: CNL should provide evidence that the currently proposed design has been optimized in terms of protection of humans and the environment, and robustness of the disposal system to withstand external perturbations either natural or human-induced.
CNSC	FC-191	Performance Assessment Report (e-doc: 5224431), 2. Bathtub Effect Overflow Scenario.	The Bathtub Effect Overflow Scenario is an important scenario as its dose caps other scenarios. CNSC staff question some of the assumptions for the Bathtub Effect Overflow Scenario dose calculation: (a) The net infiltration rate through the ECM is 0.3 m/y. (b) Effective porosity of the saturated zone is 0.3 with the hydraulic conductivity of 5360 m/y and hydraulic gradient of 0.007 m. (c) The flow rate in the Perch Creek is 1.77E6 m3/y (five-year average) (d) 300 years of institutional control. The effect of climate change on precipitation and surface infiltration, the groundwater flow regime, as well as the Perch Creek flow rate is not reflected in the assumption.
CNSC	FC-192	Performance Assessment Report (e-doc: 5224431), 8.3.2.3 Bathtub Effect Overflow Scenario	In the Bathtub Effect Overflow Scenario, "it was conservatively assumed that the contaminated water flowing out of the ECM due to the "Bathtub" effect will discharge directly into Perch Creek without any reduction in concentrations due to decay or dispersion in the groundwater." Yet in the equation shown to calculate the flux of radionuclides a retardation factor is assumed. **Expectation to address comment:** CNL needs to explain the discrepancy between the assumption and the use of the retardation factor.
CNSC	FC-193	Performance Assessment Report (e-doc: 5224431), Table 7-8: Events with Potential Radiological Consequences - Internal Events	The Flooding of ECM due to Underdrain clogging event has been screened out. CNL states that "Clogging of the underdrain would lead to a rise of the groundwater table, which, although unlikely, could in turn lead to failure of the base liner due to hydrostatic pressure and uplift and flooding of the ECM cells. This scenario will be addressed by ensuring that the ECM will be designed as such that separation from the groundwater can be assured during post-closure without reliance on the underdrain." CNSC staff agree with the potential consequences of Flooding of ECM due to Underdrain clogging, but it's not clear how this can be addressed through the design. **Expectation to address comment:** CNL needs to justify the screening out Flooding of ECM due to Underdrain clogging event, by providing more details on how the ECM will be designed as such that separation from the groundwater can be assured during post-closure without reliance on the underdrain.
CNSC	FC-194	Waste Characterisation Report 232-	The EIS, performance assessment and safety analysis reports all rely on the conservatism of the estimated radioactivity in all 6 waste streams. The waste characterisation report indicates that the activities of all radionuclides considered were estimated from photon/gamma measurements using the software Microshield. It is not described how Microshield estimates alpha and beta emitter activities. Does it use scaling factors and are these scaling factors derived following international

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		508600-REPT-002	guidance by the IAEA and the ISO? In addition, the document did not indicate on how many gamma measurements were used to estimate radioactivity of n uclides nor did the report indicate if the radioactivity values were means, or upper bound activities. The waste characterisation d ocument does not provide an uncertainty analysis of the estimated inventory. **Expectation to address comment:** Please provide an explanation on how Microshield estimates activities of difficult to measure alpha and beta radionuclides. If using scaling factors, please demonstrate how it meets IAEA and ISO standard on the use of scaling factors. Please indicate the number of measu rements supporting the activities of nuclides and provide the mean, upper confidence intervals for each radionuclide. Please provid e a summary in the EIS. ISO Standard 21238:2007 Nuclear energy – Nuclear Fuel technology – Scaling factor methods to determine the radioactivity of low- and intermediate-level radioactive waste packages generated at Nuclear Power Plants. https://www.iso.org/standard/40081.html IAEA 2009. Determination and Use of Scaling Factors for Waste Characterization in Nuclear Power Plants. www.pub.iaea.org/MTCD/Publications/PDF/Pub1363_web.pdf
ECCC	FC-195	5.4.2.10	The Proponent indicates that treated effluent will be sampled and confirmed that it meets treatment criteria before its relea se into the East Swamp Wetland (see Table 5.4.2-19). However, the pilot studies conducted in order to assess wastewater treatment removal efficiencies for each COPC (see Table 5.4.2-7: *WWTP Removal Efficiencies for Constituent of Potential Concern*) indicated that the WWTP may not be able to treat certain parameters (e.g. barium, cadmium and mercury). **Expectation to address comment:** The Proponent should indicate how it will ensure that all treated effluent will meet discharge criteria prior to its discharge into the receiving environment considering that the wastewater treatment plant as designed has not been proved capable of removing all COPCs to the Proponent's treatment target.
ECCC	FC-196	General	During review of the draft EIS, there were cases where the original text or responses to some of ECCC's information requests included references to existing documents. These documents were provided as standalone items after the draft EIS was received. Examples include: • Surface Water Management Plan (207 pages) • Groundwater Flow Modelling (294 pages) • Annual Safety Report – Environmental Monitoring 2016 (307 pages) It was not always clear which portions of a document were relevant to the project. It is difficult to determine how the documents – individually or as a package – may change text presented in the EIS chapters or how that would carry through to the overall assessment of effects. **Expectation to address comment:** As required in Section 3.2, paragraph 4 of the *Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to CEAA 2012* (CEA A, May 2016) please ensure that conclusions are substantiated within the EIS text. This may includereferences to existing documents. To comply with Section 3.3.3 of the Generic Guidelines (CEA A, 2016) when existing documents are referenced, please: • Specify which portion of the information or data in the document applies to the NSDF project • Explain how it applies, and any assumptions, limitations or differences • Distinguish factual evidence from inference

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			• Note any limitations on inferences or conclusions that can be made Situations should be reviewed on a case-by-case basis and various approaches should be considered that would satisfy this expectation, for example the use of summaries or appendices.
ECCC	FC-197	Section 3.5.1 Version 0 of Project Description dated 2016/03/30	**Comment:** Approximately 155,000 m^3 of soil will require excavation for the initial design fill capacity of the NSDF. Section 3.6 of the initial Project Description (Version 0 - dated 2016/03/30) indicated that contaminated soil encountered during excavation will be managed as contaminated waste and may be stockpiled onsite and used as fill for the facility. The same language does not appear in the version 2.0 of the Project Description. As such, it is unclear if and how contaminated soils encountered during excavation of the facility would be identified, segregated and used in order to prevent or mitigate environmental effects. **Action Required:** Revise the latest version of the project description to describe how contaminated soils will be monitored for and identified if encountered during excavation of the NSDF. If found, also describe how they will be segregated and used in a manner that prevents or mitigates environmental effects, including impacts to water quality.
CNSC	FC-198	General	The final EIS should indicate if any of the identified First Nation and Metis groups have requested for any additional studies to be conducted by CNL in relation to the EIS including traditional land use or traditional knowledge studies as per the guidance of REGDOC 3.2.2.
MDDELCC	FC-199	EA Process – Study Areas and Spatial Boundaries	None of the study areas (site, local or regional) include areas in the Quebec province for the assessment of the components associated with surface water and sediment quality of the Ottawa River, air quality, human health, land and resource use and the socio-economic environment. The MDDELCC is of the opinion that CNL must review the study areas beyond the provincial border, in order to fully assess the potential impacts of the project.
MDDELCC	FC-200	2.3 Purpose of the Project	CNL's main justification for the choice of its site, directly on the banks of the Ottawa River, is that the majority of the waste to be buried is already on the CRL site. For more precision on the origin and characteristics of the waste and that 10% of 1 000 000 m3 is equivalent to 100 000 m3, it appears necessary that CNL: a) Provide justification for why wastes from other CRL sites and of commercial activities will be transported to the NSDF b) Estimate, in cubic meters, the wastes that will come from the CRL site in comparison to the wastes that will come from other sites or commercial activities c) Confirm whether waste from the former reactor 2 sites will be buried in the NSDF and, if applicable, whether the waste is of low or intermediate level d) Specify, on an annual basis, the increase in the volume of waste from other CRL business and commercial activities in relation to the current situation e) Specify the exact nature of the waste (volume, mass, activity for all radionuclides and packaging) that will be transported from Gentilly-I to the CRL site and the planned schedule for that transfer f) Confirms the origin of the waste that will be buried in the four cells (475 000 m3) during the second phase of operation g) Describe explicitly and disaggregated, particularly for the intermediate-level waste, the precise nature of the material to be buried: volume, mass, level of activity for all radionuclides, their half-life and dose factor (mSv / kBq by inhalation and ingestion) h) Specify whether wastes that have a sufficient radionuclide content to require the use of heavy-duty containers (including concrete shielding), in order to ensure a higher level of confinement, could contain high-level waste, and in particular, specify the consequence of the failure of a container on the quality of the leachate over time, if the radionuclide content could be dissolved and migrate into water, which would make it possible to reach a subcritical or critical mass (or emitting neutrons), and the consequence of such a situation on the emission of heat.

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MDDELCC	FC-201	2.5 Alternative Means of Carrying out the Project	The MDDELCC request that CNL explain in more detail why the option of the Geological Waste Management Facility (GWMF) or the above ground concrete vault (AGCV), which would ensure better construction reliability, better protection of human health and long-term safety, was not adopted, especially by: a) Clarifying whether a weighting has been allocated to the seven criteria used to assess different alternatives studied; b) Providing the additional report entitled "Site Selection Report 232-10300-TN-001 "cited in Figure 1.5-1 of the draft EIS; c) Explaining whether the examples of the NSDF sites in operation cited on page 2-18 of the draft EIS were located in a semi-continental climate zone and close to a water system, as is the current proposed project; d) Describing how the climate and proximity of the water system are likely to influence the effectiveness of the NSDF; e) Specifying whether it complies with the recommendation of the International Energy Agency (Technical Considerations in the Design of Near Surface Disposal Radioactive Waste, 2001), which indicates that wastes containing short-lived radionuclides can be buried in an NSDF, while waste containing more than the specified amount of alpha-long-emitting nuclides require a phase-out in GWMFs, in particular considering that 1% of the total volume of waste would be ILW; f) Explaining why ILW is not buried in an AGCV or in another structure providing an additional barrier of protection.
MDDELCC	FC-202	2.5.4 Site selection	In the opinion of the MDDELCC, the location proposed by the proponent is less advantageous with respect to hydrogeological components and surface water due to the proximity of the hydrographic network (30-meters from a wetland, 1 kilometre from the Ottawa River). Taking into consideration the concerns raised, the MDDELCC indicate that CNL should: a) Evaluate the possibility of moving the project location away from the water system of the Ottawa River b) Present other sites outside of the CRL site within a radius that would allow for the economic and technical feasibility of the project, but which would also offer better environmental characteristics (distance from the water system, hydrogeological characteristics, site slope, population density in the catchment area, etc.) and greater social acceptability. CNL should not restrict its research to CNL properties c) Discuss the possibility of reviewing the technical solution chosen, taking into account the site and its environmental sensitivity, in order to increase the quality of the isolation of the waste in relation to the water environment, so as to ensure the health and long-term safety of the public.
MDDELCC	FC-203	3 Project description Page 3.21	As the impermeability of the site depends greatly on the integrity of the geomembrane, the MDDELCC indicate that CNL should: a) Further document the potential effect of radiation from waste and heat on the long-term membrane integrity; b) Evaluate its resistance to seismic shocks; c) Evaluate the life of the geomembrane and specify options for repair, replacement or recovery if a defect is detected in its integrity; d) Evaluate, using recognized leakage rates, leaks across membranes, acceptable fluxes and criteria for intervention; e) Discuss the uncertainty associated with estimating the service life of the geomembrane estimated at 500 years, considering that in situ tests have not yet been carried out for such a long period; f) Specify whether a final overlay of geosynthetic clay, compacted clay or concrete is also included in the design of the ECM to integrate multiple barriers as recommended in the IAEA documentation; and g) Explain how the collapse of waste and waste containers will be controlled over time, in order not to compromise the integrity of the waterproof cover.
MDDELCC	FC-204	3 Project description	The MDDELCC ask that CNL assess the possibility of placing a temporary roof on the active NSDF cells in order to limit the infiltration of water into the site. This measure, which aims to limit contact, is not planned in the proposed project, whereas it has been carried out for similar sites. CNL should explain why this measure is not foreseen.

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MDDELCC	FC-205	3.5.3	In Table 3.5.3-1, the list of radionuclides potentially present in the waste of the IGDPS is presented. It is explained that the radionuclide concentrations were calculated from a partitioning model, but the different calculations that led to these estimates are not described. The MDDELCC request that CNL complete the information presented, by: a) Justifying the use of a partitioning model for the estimates of concentrations of radionuclides in leachates and providing more details on the modalities for the application of the model; b) Providing the report "AECOM (2016a). Leachate and Wastewater Characterization (Quantity and Quality) Canadian Nuclear Laboratories, Near Surface Disposal Facilities Design and Consulting Services. B1551-508600-REPT-001" to better describe the calculations that led to the development of Table 3.5.3-1; c) Presenting an estimate of the leaching potential of radionuclides, metals and organic compounds for the NSDF wastes, in order to obtain more representative data of the elements that could be found in leachates.
MDDELCC	FC-206	3.5.3	The non-radiological COPCs for which treatment will be required (Table 3.5.3-2) are not all shown in Table 3.6.2-1, which indicates the rate of elimination for concentrations of non-radiological COPCs in waste water, without any explanation being given regarding their withdrawal. In addition, the majority of radionuclides for which treatment will be required (Table 3.5.3-1) are not shown in this Table (3.6.2-1), while their elimination rates should also be detailed. In order to understand the selection of COPCs, the MDDELCC is of the view that CNL should: a) Determine what the triage limits for COPCs are and make available the document entitled "Environmental Background Limits and Benchmarks for Monitoring Program, Risk Assessment and Risk Management Decisions-Chalk River Laboratories (LNC, 2017)" b) Provide details of the pilot test used to determine treatment targets; c) Provide for all COPCs (non-radiological and radiological) presented in Tables 3.5.3-1 and 3.5.3-2 as well as for TSS and nitrogen, the rate of elimination expected, the treatment target chosen (and its reference) for the design of the WWTP, as well as the effluent discharge limit. In addition, CNL should describe how the treatment targets have been defined and their origin d) Adding, to the COPCs, the decay products from the decay chains of the parent molecules such as 230Th, 210Po, 210Pb for uranium or 60Ni for 60Co, given that studies have shown radionuclides with a half-life greater than ten days should be used in a radiotoxic risk assessment e) Specify the origin of the limit value (7 000 Bq / l) which CNL undertakes to respect for tritium and justify its choice in relation to other existing criteria or in relation to the risk to the environment and health. CNL should also describe the possible methods of reduction of tritium at the source (e.g., additional containment measures which could be implemented for waste with a high concentration of tritium) as well as existing treatment methods, where applicable f) Take into account the toxicity of contaminants, in addition to considering applicable criteria or standards for the development of treatment targets
MDDELCC	FC-207	3.6.2	The following details are requested by the MDDELCC regarding the wastewater treatment process: a) For more precision on the role of the selected reagents (ferric chloride, sulphide sodium, sodium hydroxide and sulfuric acid) and over the retention period determined during chemical precipitation, CNL should present the details of the pilot test. It should also confirm whether it plans to use barium chloride for the precipitation of radium. b) CNL should specify the characteristics of the selected desalination membrane and present the tests carried out in order to evaluate the effects of the leachate on the membrane, in particular the level of contamination and the response of the membranes during filtration. c) CNL should clearly specify the parameters to be analyzed, the sampling frequency and the limits to be respected prior to discharge during normal operation or during heavy rains.

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			d) CNL should present a map which indicates the exact location of effluent discharge from the WWTP and the discharge point from stormwater management ponds of uncontaminated surface water, as Figure 3.1.1-1 is not sufficiently precise. e) The MDDELCC is of the opinion that due to the presence of numerous wetlands in the project area, the infiltration of the discharge into the soil would be difficult. On page 137, one can read that this sector can be a zone of resurgence of groundwater, which prevents infiltration. More details would be needed to assess impacts at the discharge point. MDDELCC also recommend that CNL evaluate other options than infiltration or other options of discharge points and justifies their choice of variant according to the associated environmental effect. f) CNL should specify whether the estimate of the amount of leachate to be produced (6 556 m3) represents an average or maximum annual volume.
MDDELCC	FC-208	3 Project description	The proponent explained that, according to a "conservative" hypothesis, a leak or a scenario of overflow of the ACM are possible immediately after the end of the institutional control which should take place in 2400. The MDDELCC wants the proponent to: a) Describe the long-term evolution of radionuclide content, by specifying the number of years required to ensure that each of the radionuclides anticipated to be put in the NSDF achieve a level of radioactivity that is safe for the environment and health and comparing this number of years with the life of the project (500 years) b) Confirm that, at the end of institutional control, the radioactivity of the waste and leachate will meet the 10^{15} Bq criterion of the *Class I Nuclear Facilities Regulations* c) Describe the mitigation measures that would be applicable if there were to be infiltration or overflow at the end of the institutional control and if the radioactivity of the waste and leachate was not comparable to natural radioactivity.
MDDELCC	FC-209	4 Public and Indigenous Engagement Activities	Considering that the NSDF project raises many concerns among the Quebec population, the MDDELCC seek further information on all the steps taken or planned in Québec. Thus, the MDDELCC request the following: a) Provide the twelve comments received during the public information sessions held in Rapides-des-Joachims, Quebec, and indicate the response provided to these comments, as well as how CNL intends to consider them in the context of the project b) Indicate why CNL did not hold other public information sessions in the province of Quebec, downstream of the project, particularly in the l'Ile-aux-Allumettes, a municipality with 1,335 residents c) Confirm whether the third round of information sessions scheduled in the months of April and May 2017 took place in the province of Quebec. If so, please provide the results of these sessions: place, date, time, number of participants, questions asked and comments made, answers given and how they will be considered in the context of the project. If no public information sessions were held in Québec, please justify this decision d) Specify the nature of the public information and engagement activities with municipalities which are foreseen for the later phases of the project e) Evaluate the possibility of conducting a study of the residents in the principal areas of the Regional Municipality of the Pontiac County (e.g., Ile-aux-Allumettes) regarding the perception of risks and possible social and psychological impacts associated with residing near the proposed project. The results of such a survey could in particular inform the mechanisms for future engagement and consultation with the population of Quebec f) The Sous-comité de l'Organisation régionale de sécurité civile de l'Outaouais (ORSCO) is a key platform for informing and consulting government departments and agencies in the Outaouais region. CNL should plan to take advantage of this platform, of which they are a member, in order to share information on the project, including at biannual meetings of the subcommittee.
MDDELCC	FC-210	5 Environmental Effects	The location selected for the project raises several questions about the geology, hydrogeology and the proximity of wetlands and water. For clarification, the MDDELCC requests that CNL: a) Present cross-sections of current and post-construction geology which clearly indicate the level of the surface and deep water table;

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			b) Explain how it is possible that a groundwater migration time varying from 12 to 35 years is estimated in order to reach the nearest watercourse, since the NSDF is located 30 meters from a wetland; c) Review its assessment of the adequacy of the site, in particular taking into consideration the proximity of the water system.
MDDELCC	FC-211	5 Environmental Effects	The MDDELCC considers that it is essential to include the portion of the Ottawa River downstream of Perch Creek in the assessment in order to assess the potential transboundary impacts of the project associated with non-radioactive and radioactive elements. The MDDELCC are also of the opinion that a new baseline characterization of the surface water quality be carried out in the Ottawa River prior to implementation of the project. This new baseline characterization is recommended to focus on COPCs and should be conducted at the mouth of Perch Creek as well as in the downstream area that could be under the influence of the project.
MDDELCC	FC-212	5 Environmental Effects	Table 5.7.6-1 presents an inventory of the maximum estimated concentrations of radionuclides in the waste to be placed in the ACM. According to the recommendations of "Radionuclides recommended for the analysis of radioactivity in matrices" in the presence of uranium and thorium, their daughters (e.g. 230Th, 210Po and 210Pb) must be quantified in the different environmental matrices taking into account the presence or absence of secular equilibrium between the radionuclides in the decay chains. The MDDELCC requests that CNL consider assessing the fate of the daughters in the uranium and radium decay chains with a half-life greater than 10 days in surface water; in particular for surface water quality and the preservation of the uses of the Ottawa River. The MDDELCC also ask that CNL justify the reason why the decay products of certain radionuclides present at the beginning of the operation of the NSDF will not be taken into account for the year 2400 (Table 5.7.6-3 and 5-524). This is for example Ni-60, descendent of Co-60.
MDDELCC	FC-213	5 Environmental Effects	In order to assess the atmospheric dispersion of radionuclides and the need for ambient air monitoring stations in the province of Quebec, the MDDELCC request that CNL present a modeling of the atmospheric dispersion of radionuclides during the operational phase of the NSDF. This modeling will make it possible to assess whether air quality criteria in Quebec will be respected in the areas of the province that may potentially be affected by the project, as appropriate. According to the results of the modeling, CNL should also evaluate the other potential risks associated with the dispersal of these contaminants, including, for example, the potential impact on users of the Ottawa River, vacationers and Quebec forest workers who may be exposed to contamination. In addition, depending on the more detailed characterization of the waste requested in other comments, CNL should justify its selection of volatile organic compounds as indicators, in order to assess the dispersion of this category of contaminants. According to section 5.2.1.1, only chloroethylene and acrolein are used.
MDDELCC	FC-214	5 Environmental Effects	MDDELCC is of the view that CNL should reassess the effects of the NSDF on surface water and sediment quality in the Ottawa River, in particular: a) Assessing the fate of the daughters in the uranium and radium decay chains with a half-life greater than 10 days in surface water b) Comparing the estimated concentrations at the mouth of Perch Creek, in the Ottawa River, with the air quality criteria in force in Quebec c) Confirming that the ambient concentrations that are higher than the benchmark values of aluminum, copper and iron in the hydrographic systems of Perch Lake and Perch Creek as well as the mouth of Perch Creek in the Ottawa River are linked to the geological context of the site and not because of a continuous contamination of the site undetected to date d) Ensuring the frequent monitoring of concentrations at the swamp well and the mouth of Perch Creek to confirm that the mitigation measures will be effective, although the treatment of leachates should limit the risks exceeding the benchmark value for cadmium, mercury, barium and manganese during the period of operation of the NSDF

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			e) Assessing the potential impacts of the project on sediment quality for all radioactive and non-radioactive COPCs, for sites identified as sediment accumulation areas in the Ottawa River under the influence of the waters flowing from Perch Creek.
MDDELCC	FC-215	5 Environmental Effects	Although the EIS identifies the potential effects to aquatic biota from non-radiological contaminant releases into Perch Lake basin and the Ottawa River, these potential effects were not considered for benthic and pelagic invertebrates. The MDDELCC therefore request that CNL clarify whether sediment accumulation areas of metal and radionuclides in the Ottawa River are identified. Where appropriate, CNL should: a) Compare the measured concentrations with the sediment quality criteria in force in Québec b) Evaluate the bioaccumulation of contaminants in these organisms; c) Estimate the maximum concentrations of these radionuclides likely to be released to the mouth of Perch Creek d) Estimates the total radiotoxic risk, in µGy / h, for aquatic organisms likely to be exposed to these contaminants in the Ottawa River. This risk should be compared with the criteria in force in Quebec, rather than only benchmarks of CSA Standard N288.6-14 (2014) e) Determine, in the event of a radiotoxic risk, the mitigation measures that will be put in place to minimize the risk to ecological receptors exposed in the Ottawa River f) Describe the effects of alpha and beta radiation that may also be emitted by certain radionuclides g) Propose a follow-up of the evolution over time of the biodiversity of the benthic invertebrate populations h) Characterize radionuclides and metals likely to be emitted in fish taken from the Ottawa River.
MDDELCC	FC-216	5 Environmental Effects	In sections 5.7.4.6 and 5.7.4.7 of the EIS, characterization of the contaminated plume below the Perch Lake wetland is identified. Because the NSDF site is located 30 meters from the Perch Lake wetland and that there is already contamination at this location, CNL should specify how it will be possible to assess the actual contribution of a contamination originating from the NSDF.
MDDELCC	FC-217	5 Environmental Effects	Given the geographical proximity of the project to the provincial boundary, the EIS should describe the potential residual effects of the NSDF on the accessibility and quality of resources for tourism and recreation, archaeological sites and the traditional use of land and resources of Quebec First Nations and Métis communities as well as the quality of life and public safety for Quebec municipalities.
MDDELCC	FC-218	5 Environmental Effects	Considering the geographical proximity of the project with Quebec's borders, the proponent should describe the potential residual effects of the NSDF on quality of life and public safety in Quebec (and not only in Ontario).
MDDELCC	FC-219	5 Environmental Effects	The MDDELCC identified gaps in the human health assessment of the EIS with respect to the temporal boundary of the assessment, the model scenario, the identification of the contaminants and the exposure pathways. To complete the missing information, the MDDELCC request that CNL: a) Include the construction, closure and post-closure phases in the human health risk assessment b) Specify the type of cover that was used in the modeled scenario for the operation phase taking into account the fact that the final cover will only be installed after a fifteen year period c) Enhance the identification of the relevant contaminants in the identification of human health risks: • Considering non-radiological contaminants with chronic effects on human health

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			• Justifying the choice not to include any organic contaminants; • Including polonium-210 and lead-210 (radiological progeny of radium-226) to the exposure scenario or justify why they were excluded d) Provide the toxicological properties of the relevant non-radiological contaminants, an essential step in the assessment of the human health risks; e) Justify why dust inhalation has not been identified as an exposure pathway for radiological contaminants f) Use toxicological reference values in the human health risk assessment at the toxicological characterization step g) Re-evaluate the occupancy rate of the land estimated at 8% for receivers located in the cottages nearby when assessing the exposure. This rate is low and not sufficiently "conservative" to be used for risk assessment purposes h) Include age groups in the exposure assessment, where the assessment of risks for non-radiological contaminants with dose thresholds will be achieved; i) Carry out a dose calculation for non-radiological contaminants, which is necessary to the exposure assessment, where the risk characterization has been carried out on the basis of the toxicological properties of the contaminants j) Provide radiation doses associated with the exposure of children and infants, since the dose limit of 1 mSV/yr does not apply to these age groups
MDDELCC	FC-220	6 Accidents and Malfunctions	[English] CNL refers to several technical reports in order to support the choice of criteria and parameters used as well as the scenarios considered. However, they are not available. In order to complete his analysis, the MDDELCC requests that CNL: a) Provide the Performance Assessment document as well as the modeling used in the development of the accident and malfunction scenarios, taking into account the identification of potential impacts in the province of Quebec; b) Clarify whether the assessment has considered all reasonable accident and malfunction scenarios of technological or natural origin with the potential for significant effects on human health, on-site or off-site, and where appropriate, on the basis of which criteria. It would also be necessary to identify if mitigation measures as well as radiological and non-radiological risks were considered and to determine the exposure pathways and exposure doses; c) Clarify the potential effects of these accident and malfunction scenarios on human health; d) Indicate the planned mitigation measures that will reduce or eliminate risks to human health; e) Indicate whether the proposed prevention, preparedness, response and recovery measures in the Emergency Protection Program take into account these scenarios; f) Clarify whether the accident scenarios considered a failure or accident at the wastewater treatment plant; g) Indicate why some scenarios (e.g., earthquake) are not considered for the operation and closure phases of the project.
MDDELCC	FC-221	6 Accidents and Malfunctions	In order to complete the information presented, the proponent should describe the alert scheme and the procedures for disseminating and updating these procedures for transboundary populations, including those of the MRC Pontiac and municipalities that could be concerned. It should also: a) Invite stakeholders involved in the deployment of emergency measures in Quebec to participate in the emergency planning and periodic emergency exercises mentioned on page 6-26 of the draft study. impact; b) Clarify whether financial assistance is provided by the NCBs to assist municipalities in deploying their contingency plan in the event of a spill or emergency. (e.g. purchase of equipment, supply of drinking water, etc.); c) Provide programs for environmental protection, emergency measures and fire protection.
MDDELCC	FC-222	7 Cumulative Effects	The MDDELCC would like the proponent to demonstrate whether the proposed project will result in an improvement or deterioration of the water quality of the Ottawa River in the medium and long term compared to the status quo (historical waste stored on the CRL site).) and if it poses risks of accidents. It should also

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			assess whether the importation of waste from other CNL sites and whether commercial waste will have a significant negative impact on th ewater quality of the Ottawa River.
MDDELCC	FC-223	7 Cumulative Effects	Since the waste that will be buried in the NSDF will come mainly from the operation and decommissioning of the CRL site, including the radioactive waste that is currently stored there, the proponent should specify: a) whether the proposed decommissioning of infrastructure at the CRL site will be authorized separately; b) how legacy waste will be sorted; and c) whether contaminated soils will also be excavated and placed in the NSDF.
MDDELCC	FC-224	9 Effects of the environment on the project	MDDELCC request that CNL present the potential impacts of extreme weather events on its project, including the integrity of the NSDF design, and in particular, assess the potential for contamination of the Ottawa River in the case of flooding.
MDDELCC	FC-225	5 Environmental Effects 10 Monitoring	According to the draft EIS, the monitoring carried out during the post-closure stage of the NSDF project will confirm the proper functioning of the cover and the absence of surface water quality degradation. Specifically, the MDDELCC request clarification regarding: a) The proposed measures in the event of a failure of the cover to limit contamination of the surrounding waters; b) If tree growth will be controlled beyond the post-closure phase; c) Passive access control plans at the site (e.g., physical barriers, additional layer of soil, signage, etc.) ensuring that the site will remain, even in the absence of any active monitoring after the operating phase. The MDDELCC also requests CNL to consider the following additions to the proposed environmental monitoring program for the op erational phase of the NSDF: a. Identification of the Ottawa River beaches that are areas of sediment accumulation under the influ ence of the waters of Perch Creek and the addition of sedimentation stations in these areas for the initial characterization of the environment and for continuous monitoring during the operation phase. Concentrations of all CPCs should be quantified; b. Identification of the parameters that should be included in this environmental monitoring program, with at a minimum the parameters for which exceedances have been modeled, as well as the radionuclides that may be released into the receiving waters (e .g. cadmium, copper, iron, mercury, aluminum, barium, manganese and uranium).
Ontario Ministry of the Environmen t and Climate Change (MOECC)	FC-226 CNL-ND86	2.5.3 Facility Design – Site Location	The site location and physical setting consists of exposed bedrock and permeable overburden materials. This setting does not provide natural protections and the site will rely on engineered controls to contain the contamination.

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MOECC	FC-227 CNL-ND105	Facility Design – Wastewater Treatment Plant	Policy status of receiving waters – Based on the data presented in Appendix 5.4-2, Perch Creek (at the Perch Creek Weir, midway between the outlet of Perch Lake and the Ottawa River) may be considered a Policy 2 receiver for total phosphorus, iron, aluminum and copper (existing water quality may not meet the PWQO / CWQG). Provincial policy would be to prevent further deterioration of water quality with respect to these parameters, except under specific circumstances. The existing concentrations of lead, barium and manganese (identified as COPC) are unknown or are not well defined. While there is no APV or PWQO exist for manganese, barium has an APV of 2.3 mg/L. Lead has an interim hardness-dependent PWQO of 1, 3 or 5 µg/L. Based on available hardness data, an Objective of 1 µg/L likely applies. Treatment Targets and BV, as they compare to water quality guidelines, are summarized above.
MOECC	FC-228 CNL-ND106	Facility Design – Wastewater Treatment Plant	Golder reports that 'anticipated effluent concentrations' were used to model the expected influence of effluent discharge under scenarios 1 and 2 (as opposed to the higher concentrations listed as Treatment Targets, or effluent limits, which are not provided). Anticipated effluent concentrations are based on treatment system performance on a pilot scale (i.e. high effluent quality under ideal conditions). It is unlikely that the model results reflect the "worst case scenario" for the effects of discharge. Modelling of discharge at the full effluent strength being proposed (i.e. effluent limits or Treatment Targets, equivalent to the worst quality that could be expected under conditions that would be considered acceptable based on the proposed project) is not an unreasonable expectation.
MOECC	FC-229 CNL-ND107	Facility Design – Wastewater Treatment Plant	Seasonal / annual variability in flows may not be adequately captured by the model. It is my understanding that modelling work was undertaken using average annual flows (1969-1980) (with the exception of monthly flow data for a limited number of locations). Low flows have the potential to limit the ability of receiving waterbodies to assimilate contaminants by affecting dilution rates. Modelling of the effects of effluent discharge under low flow conditions (i.e. lowest annual flow from data record or, preferably, seasonal low flows or 7Q20)) would provide a higher level of confidence with respect to the potential for adverse effects. In addition, as noted with respect to the radiological assessment, higher than average precipitation may result in increased leachate generation and larger volumes of effluent discharged. Conditions deviating from the averages should be considered.
MOECC	FC-230 CNL-ND108	Facility Design – Wastewater Treatment Plant	The commenter indicates that toxic metals such as beryllium, cobalt, fluorine and thallium were omitted from the study due to lack of projected effluent concentrations. Organic compounds were also excluded on the basis that the model is unable to capture processes of decay and/or bioaccumulation. The possible concentrations of most of these parameters in both effluent and in receiving waters are unknown. This data gap is a concern due to potential toxicity and/or cumulative effects not captured within this impact assessment.
MOECC	FC-231 CNL-ND109	Section 5.4.2.7.2.1	Model results are summarized in section 5.4.2.7.2.1 of the report. In some cases, model outputs are not logical. These results should be more adequately qualified within the report. The reviewer's observations are summarized below: • Cadmium: Golder reports background concentrations exceeding the CWQG for ESW (0.107 µg/L) and Perch Lake (0.126 µg/L, estimate) and expected treated effluent concentration of 0.273 µg/L. Under Scenarios 1 and 2, concentrations of Cd at ESW are increased. A smaller increase is noted downstream from ESW at PL2. In Perch Lake; however, the model appears to indicate that water quality is improved by discharge conditions (from 0.126 to 0.036 - 0.038 µg/L), despite the relatively higher effluent concentration.

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			• Copper: as above, model outputs for Perch Lake are not logical. The background value cited for Perch Lake (13.9 µg/L (exceeding PWQO/CWQG and APV)) seems very high compared to upstream (PL2) and downstream (PCW) background values. • Total phosphorus (TP): The BV cited (5 mg/L) reflects the apparent unit error described elsewhere in this memo. The predicted concentrations are extremely high compared to the PWQO for phosphorus (0.03 mg/L) and the guidance framework forming the CWQG (0.01-0.1 mg/L for meso- through eutrophic lakes). Based on the model results reported, I disagree with Golder's assessment that the potential for increased algal blooms and eutrophication is negligible under the modelled scenarios. As with Cu and Cd, the values assumed for TP in Perch Lake are not reasonable to the reviewer (concentrations of TP within Perch Lake are reported to improve from a background of 0.19 mg/L to 0.04 – 0.05 mg/L following discharge of effluent with a TP concentration of 1.7 mg/L under Scenarios 1 and 2). No data is available for concentrations of Barium or Manganese in receiving waters. It is unclear what assumptions were made in deriving receiving water concentrations for modelling the effect of effluent / leachate.
MOECC	FC-232 CNL-ND422	5. 3 Environmental Effects – Geological and Hydrological Environment	The presented conceptual model of groundwater flow and leachate migration is dependent on the NSDF being located entirely within the Perch Lake Basin. It is reported that the location of the groundwater divide to the east of the ECM along the escarpment boundary is not well understood. Additional investigation should be conducted to confirm the location of the current and future groundwater divide.
MOECC	FC-233 CNL-ND 423	5.3 Environmental Effects – Geological and Hydrological Environment	It is my understanding that groundwater monitoring conducted to date in the vicinity of the proposed ECM is very limited, with two data points collected over less than a one year period in many areas. This level of groundwater data is significantly deficient in assessing the groundwater conditions. Longer term monitoring in the area of the ECM is strongly recommended to better understand groundwater conditions in this area. Data loggers allow for the continuous measurement of groundwater elevations and would provide considerably more detail than manual water level measurements. An essential component of the proposed design is that the ECM be constructed above the current and future groundwater elevation. As built drawings and cross sections have not been provided and I cannot confirm that the proposed design will be above the long-term groundwater table.
MOECC	FC-234 CNL-ND424	5.3 Environmental Effects – Geological and Hydrological Environment	Groundwater and contaminant migration times and discharge concentrations have been determined using numerical modeling; however, the details of this modeling have not been provided, and I cannot confirm the validity of the methods and outputs. I cannot confirm the validity of the reported 10 to 12 year travel time from the ECM to Perch Creek, as inadequate information has been provided.
MOECC	FC-235 CNL-ND425	5.3 Environmental Effects – Geological and	Leachate quality has been estimated based on leachate quality at other similar sites. This approach is reasonable; however, I cannot confirm if the provided values are realistic and conservative. The constituents and concentrations of leachate parameters are site specific and are subject to significant uncertainty. I note that not all hazardous compounds listed as acceptable components of mixed waste (i.e. insecticides, herbicides, pesticides) appear in the leachate parameter list. The list of leachate parameters assessed by the monitoring program should include all contaminants of concern contained in wastes deposited at the site.

Federal Department	Reference Number	Report Section	Reviewer Comment
		Hydrological Environment	
MOECC	FC-236 CNL-ND434	Section 5.7	Anticipated flow during construction and operational periods are not specifically addressed in the report. It is the experience in this region that, during construction that requires the clearing of large areas of land, runoff rates may increase relative to predevelopment levels. This increases the risk of sediment laden water overwhelming E&SC measures / SWMP and being released to downstream areas. The resulting increased flow to downstream areas may also result in scouring and/or erosion in the receiving watercourse. In the case of SWMP 1, the receiving area is known to be contaminated by other site operations, as described in the report (e.g., Section 5.7, Figure 5.7.4-11). If disturbed (erosion or scouring of stream banks and wetland areas) as a result of excessive flows, there is potential for contaminated soils and sediments to be mobilized from the East Swamp Wetland and stream corridor, and transported to downstream areas. It should be confirmed that flows from each SWMP will be controlled to pre-development levels through all phases of the project.
MOECC	FC-237 CNL-ND435	5.4.1.7.2 Environmental Effects – Surface Water Environment	Table 5.4.1-10 shows that, while flow from SWMP 2 and 3 does appear to be controlled to below pre-development levels in the post-closure period, modelled flow from SWMP 1 is three to four times pre-development levels under various model scenarios. Total run off from the site is also increased, driven by the predicted increase in runoff from the catchment of SWMP 1. While Golder reports a 1 ha increase in drainage area for SWPM 1, the relative change in drainage area pre- and post-development is not clear. The apparent discrepancy in the discussion of pre- and post-development flows and reported model results should be addressed. It is notable that SWMP 1 includes areas designated for Site and Worker Parking, Vehicle Decontamination Area (fully enclosed), Operations Centre, Admin Building, WWTP and WWTP outfall (Figure 3.7.1-1). These impervious surfaces likely contribute to increased runoff to SWMP 1. Additional measures may be required to control post development (i.e., operational phase) flows from the catchment area of SWMP 1.
MOECC	FC-238 CNL-ND436	5.4 Environmental Effects – Surface Water Environment	The MOECC encourages enhanced level treatment for new developments (80% TSS removal). Given the potential for sediment-bound contaminants to be transported off-site with suspended solids (i.e. chlorinated organic compounds (PCBs), metals (iron, arsenic, etc.), and nutrients (total phosphorus)), the reviewer encourages consideration of enhanced level treatment, as opposed to the basic level treatment (60% TSS removal) proposed. The provision of higher levels of treatment for TSS may be prudent given the water quality considerations discussed herein (i.e. known elevated concentrations of chlorinated organic compounds (PCBs), metals (iron, arsenic, etc.), and nutrients (total phosphorus) on CRL property, which may be transported with sediments).
MOECC	FC-239 CNL-ND437	5.4 Environmental Effects – Surface Water Environment	Should the project proceed, a stormwater management system should be established prior to any substantial clearing of the site. This is to protect against increased runoff and sedimentation during construction.
MOECC	FC-240 CNL-ND438	5.4.1.6.1.2	The assessment of anticipated effects of effluent discharge on site hydrology appears limited to average annual precipitation levels. Consideration of the range of conditions likely to be encountered would be more informative.

Federal Department	Reference Number	Report Section	Reviewer Comment
		Environmental Effects – Surface Water Environment	
MOECC	FC-241 CNL-ND439	5.4 Environmental Effects – Surface Water Environment	Possible leakage of leachate and or discharge of inadequately treated effluent during the operational and institutional control phases (up to 2400) were not considered in the potential effects surface water quality. The report states that this is based on the redundancy incorporated into the engineering of the containment mound. Is this an oversight?
MOECC	FC-242 CNL-ND440	5.4 Environmental Effects – Surface Water Environment	Sampling provisions are expected to be provided at the discharge point. Golder reports that leachate will be sampled to confirm compliance with effluent requirements prior to discharge. It is not clear what contingencies may be implemented in instances where water does not meet effluent requirements.
MOECC	FC-243 CNL-ND441	5.4 Environmental Effects – Surface Water Environment	The Treatment Target identified for cadmium, copper, lead, and zinc exceed the Province of Ontario's Aquatic Protection Values (APV), sometimes by a significant margin (i.e. the Treatment target given for cadmium is 1.5 mg/L, compared to the APV of 0.00021 mg/L). No treatment target is listed for mercury (as discussed by Golder within the report). The anticipated concentration of mercury in leachate exceeds the APV. Ontario's APVs are considered to provide a reasonably conservative level of protection for most aquatic organisms from the migration of contaminated groundwater to surface water resources. Concentrations in excess of APVs may indicate potential for impacts to surface water features and aquatic life. Furthermore, some of these contaminants have the potential to accumulate in sediments through various processes, and/or bioaccumulate in aquatic biota. This is not addressed in the report.
MOECC	FC-244 CNL-ND442	5.4 Environmental Effects – Surface Water Environment	The Treatment Targets for cadmium, copper, lead, zinc, iron and total phosphorus exceed PWQO and/or CWQG. These are considered conservative values, intended to be protective of the aquatic organisms, through all life phases and with indefinite exposure. In wetland-rich environments, these guidelines should be used with caution.
MOECC	FC-245 CNL-ND443	5.4 Environmental Effects – Surface Water Environment	Golder makes multiple references to site-specific effluent limits and effluent requirements (as being criteria different from Treatment Targets), but those limits do not appear to be provided within the report. The site-specific effluent limits are reportedly based on the CRL Acceptability Criteria for Routine and Non-Routine Discharge of Liquids to Stormwaters, however, that report is not provided and has not been reviewed by this office.
MOECC	FC-246 CNL-ND444	5.4	Benchmark Values (BV), which the reviewer understands to represent acceptable water quality for the CRL site, exceed PWQO and/or CWQG in some cases (e.g. aluminum, lead, mercury, and zinc). Please provide justification.

Federal Department	Reference Number	Report Section	Reviewer Comment
		Environmental Effects – Surface Water Environment	
MOECC	FC-247 CNL-ND445	5.4 Environmental Effects – Surface Water Environment	Some BV have been established through independent study (i.e. Ecological Effect Review and Ecological Risk Assessment). While these values are generally similar to or less than the Province's APV, there are some notable differences (e.g. BV for Boron, Lead, and Polychlorinated Biphenyls (PCB) exceed Ontario's APV). Please provide justification.
MOECC	FC-248 CNL-ND446	5.4.2.7.1.4 Environmental Effects – Surface Water Environment	There appears to be a unit error in the BV listed for total phosphorus. The listed value 4-100 mg/L is cited as being based on the CWQG. The CWQG for total phosphorus is 4-100 µg/L. This apparent error is carried throughout the report, water quality modelling and appendices. This may affect the interpretations provided within the water quality assessment (discussed in comment below).
MOECC	FC-249 CNL-ND447	5.4 Environmental Effects – Surface Water Environment	The manner in which existing water quality is presented within Appendix 5.4-2 does not permit detailed review (summary data only). It appears that only annual maximum values are presented, as opposed to ranges, means or nth percentile values. These tables also appear to contain multiple unit errors, transcription errors, errors in calculated 5-year average, or in some cases lack of calculated 5-year average, which further complicates any meaningful review.
MOECC	FC-250 CNL-ND448	5.4 Environmental Effects – Surface Water Environment	Within Tables 4 through 11 of Appendix 5.4-2, where a parameter is below the detection limit, the detection limit is often not indicated. Without knowledge of detection limits it is unknown if "<SRI" indicates good water quality. It is not uncommon for detection limits to exceed relevant water quality guidelines, even within this dataset.
MOECC	FC-251 CNL-ND449	5.4 Environmental Effects – Surface Water Environment	The parameter list is not consistent between stations (Tables 4 through 11 of Appendix 5.4-2). In most cases, no data are provided for Barium or Manganese. Data are also lacking for Arsenic (at Perch Creek Weir), Uranium (at East Swamp Weir), PCBs (MAR, MSC, Perch Lake Input 4, SSW (South Swamp Weir)). Barium, manganese, and arsenic are considered COPC.
MOECC	FC-252 CNL-ND450	5.4 Environmental Effects –	Golder reports that no background data is available for the body of Perch Lake. The concentration of COPC in Perch Lake has been estimated based on cumulative inputs to the Lake (PL-1 through PL5); however, no data are presented within the appendix for PL-3 or PL-5. Several possible issues with the predicted parameter concentrations in Perch Lake are noted in the discussion below. It is my understanding that the outlet of Perch Lake (PLO) is monitored, but water quality data for this location are also lacking in Appendix 5.4-2.

Federal Department	Reference Number	Report Section	Reviewer Comment
		Surface Water Environment	
MOECC	FC-253 CNL-ND451	5.4 Environmental Effects – Surface Water Environment	Golder has determined the potential concentration of radionuclides in the East Swamp Stream expected as a result from discharge from the WWTP based on predicted effluent volumes (based on average annual precipitation), treatment targets for radionuclides (Table 3.5.3-1) and dilution a dilution factor of 12.5 within the East Swamp Stream (based on flow in the stream of 72000 m3/year). It is not clear if the flow value for the East Swamp Stream represents average annual flow or low flow conditions. Conservative analysis would include consideration of low flow conditions (i.e., 7Q20 or other suitable low flow statistic) to assess the reasonably foreseeable 'worst case scenario' (i.e., concentrations of radiological parameters which may occur within the swamp under lower flow / lower dilution conditions). Conversely, higher than average precipitation may result in higher than average leachate generation and larger volumes of effluent discharged. Conditions deviating from the average should be considered.
MOECC	FC-254 CNL-ND452	5.4 Environmental Effects – Surface Water Environment	Under current conditions, the concentration of PCBs in surface water appears to exceed the PWQO and APV at the Perch Creek Weir, as well as at PL2 (inflow to Perch Creek, downstream of proposed discharge), and East Swamp Stream. Data from other monitoring locations are often lacking (Appendix 5.4-2), and may not be available. While PCBs are not identified as a constituent of potential concern by Golder and the Treatment Target for PCBs is equal to the PWQO (0.001 µg/L) (in most cases, this is equal to laboratory detection limits), the potential for discharge of PCBs and/or remobilization of PCBs from existing deposits is a concern (as noted above, effluent limits are not provided and may differ from Treatment Targets). PCB's are considered a hazardous substance by the Province of Ontario. Provincial policy is to prevent the release of PCBs. It should be confirmed that the effluent limit for PCBs will be less than or equal to the laboratory detection limit (i.e. non-detect) for effluent from the WWTP. Given the factors that may exacerbate the release and/or re-suspension of PCBs from contaminated areas within the receiving waterbodies (discussed above), the BV of 189 µg/L (>10,000-times the APV for PCBs) is a concern.
MOECC	FC-255 CNL-ND453	Section 5.4.2.5 Environmental Effects – Surface Water Environment	Uranium is known to occur at high concentration both within receiving waterbodies (East Swamp Weir and PL2) and elsewhere on the CRL property, associated with contaminant plumes from legacy sources (discussed above). As with Mercury, it does not appear that Uranium (as a non-radiological parameter) has been assessed with respect to the anticipated concentration in wastewater, nor is a Treatment Target for Uranium provided. Clarification should be provided with respect to the anticipated concentrations of parameters in wastewater that are known to occur at high concentrations on the CRL site, as reported by Golder (Section 5.4.2.5).
MOECC	FC-256 CNL-ND454	5.4 Environmental Effects – Surface Water Environment	The potential for thermal impacts is not addressed within the Environmental Impact Statement. Thermal impacts may occur through the discharge of relatively warmer water (i.e. water stored in SWMP) to cold water streams. The nature of receiving streams with respect to thermal habitat should be confirmed, given that groundwater discharge to the streams/creeks on site is known to occur.

Federal Department	Reference Number	Report Section	Reviewer Comment
MOECC	FC-257 CNL-ND582	Section 5.5.6 Monitoring and Follow up program	Limited details have been provided regarding the proposed groundwater monitoring program. A suitable groundwater monitoring program should contain monitoring locations in upgradient and downgradient areas in all relevant geological sequences, and should include the analysis of all relevant radiological and non-radiological leachate parameters.