CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

Number	Source	**Comment Summary** (all original submissions can be found on the Canadian Environmental Assessment Registry, reference #80122) **Synthèse des commentaires** (toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)	**Response (to be completed by CNL)** **Réponse (à remplir par la LNC)**
Note: The following comments and questions have been summarized, and in some cases consolidated. CNL will respond in this same language chosen by the commenter. *Note: Les commentaires et questions suivant ont été résumés, et dans certain cas, consolidés. LNC répondra dans la même langue que l'intervenant.*			
		Executive Summary	
CNL-ND1	Joan Lougheed and Town of Deep River (August 16, 2017)	The Executive Summary does not address disposal of wastes generated after 2070. Any post 2071 plans for disposal of LLW and ILW should be addressed in the Executive Summary, particularly if expansion of the Near Surface Disposal Facility (NSDF) envisioned. In the body of the draft EIS, potential future expandability is mentioned (see Table 2.5.1-1). The NSDF will be a long-term and large-scale radioactive waste disposal site; Deep River and its residents should understand from the Executive Summary what plans CNL and AECL have, or are considering, with respect to the future expansion of the NSDF.	Canadian Nuclear Laboratories (CNL) will responsibly manage the Near Surface Disposal Facility (NSDF) and consider all waste diversion options to ensure optimization and efficient use of the NSDF. The NSDF is currently the only disposal facility planned for low-level waste (LLW) at the Chalk River Laboratories (CRL) site. The operations phase of this project is anticipated to last approximately 50 years, based on the volume of 1,000,000 m^3 of low-level waste (LLW). When this capacity is met, other options for disposal of LLW will be evaluated at that time. Note that CNL has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only LLW. This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The placement of wastes into the Engineered Containment Mound (ECM) will be completed in two phases – Phase 1 to accommodate wastes currently in storage and to be generated over next 20 to 25 years and Phase 2 for waste generated following Phase 1. The Phase 2 work is not based on an expansion of the NSDF, but as part of the design of the ECM for 1,000,000 m^3 of low-level waste. In Table 2.5.1-1 of the final EIS, expandability has been removed as part of the criteria for technical feasibility, and the criteria is based on storage capacity. Alternatives that accommodated 1,000,000 m^3 were most favourable. Alternatives that did not accommodate 1,000,000 m^3 of waste were assessed as not technically feasible. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND2	Joan Lougheed and Town of Deep River (August 16, 2017)	The Executive Summary of the draft EIS states that the proposed content of the NSDF will contain up to one percent ILW by volume. This does not provide an adequate description of the total radioactive content of ILW, nor a high-level breakdown by radionuclide and chemical speciation. Similarly, the radionuclide and chemical speciation content of LLW is not provided. These are important descriptors that are needed to complement the measure of volume.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The Executive Summary of the final EIS describes low-level waste as part of waste inventory. However, technical discussions of the reference radionuclide inventory and breakdown by individual radionuclides for low-level waste at time of emplacement is provided in Section 3.3.1.3 of the final EIS. The NSDF Reference Inventory Report [3] provides additional technical details on the radionuclide inventory and is briefly summarized below. The chemical characteristics of the waste are provided in Section 3.3.3.3 of the final EIS. Waste placed in the ECM will meet the intent of land disposal and leachate requirements specified in Ontario's Regulation 347, *General – Waste Management* [2]. This will ensure that quantities and concentrations of metals, organics, and chemical compounds are acceptable and will limit the leaching potential of the facility.

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			The NSDF Reference Inventory [3] has been updated to provide an estimation of the total radiological inventory and is required to inform the safety assessments where the inventory is tested against selected scenarios to determine the long-term consequences of the proposed facility. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [3]. The reference inventory (Table 3.3.1-2 of EIS) establishes a representative radionuclide inventory by considering waste already in storage and waste forecasts from environmental remediation and decommissioning projects data to predict an assumed total volume of waste at the NSDF at time of closure. All LLW that is expected to be generated has been meticulously described, or "characterized", before its generation to ensure the cumulative total inventory of the NSDF Project is tracked against the final Licenced Inventory, as outlined in Section 3.3.1.3 of the EIS. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Ontario Regulation 347 - *GENERAL - WASTE MANAGEMENT*, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347 [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND3	Joan Lougheed and Town of Deep River (August 16, 2017)	On page ES-I there is no specific reference of non-CRL wastes being included in the first 20-25 years of NSDF operation, whereas on page ES-ii, there is specific mention that "Stage 2 [2040 to 2070] will allow for the inclusion of wastes from… off-site CNL facilities". The implication is that the emplacement of off-site wastes will await the operation of the Stage 2 phase of the NSDF. Although the NSDF will accept waste from other off-site CNL sources during Stage 1, reference with respect thereto is not made in the Executive Summary. Since many interested parties may not be fully aware of the nature of CNL's other sites and their distances from CRL (and hence the long distances travelled by waste for disposal at CRL), direct reference to specific non-CRL sites as sources of waste for the NSDF should be noted in the Executive Summary, not just the main text of the draft EIS.	The Executive Summary for the final Environmental Impact Statement (EIS) indicates that the purpose of the Near Surface Disposal Facility (NSDF) Project is to provide the permanent disposal of current and future low-level waste at the Chalk River Laboratories (CRL) site, as well as (that is, at the same time) a small percentage of waste volume from off-site (that is, non-CRL) locations, in a manner that is protective of both the public and the environment. The organization of the NSDF Project timeline is based on the period of construction phase, operations phase (wherein waste will be emplaced into the engineered containment mound (ECM) from both CRL and non-CRL sites simultaneously), closure phase, and post-closure phase. Section 1.0 of the final EIS provides more detail on the waste. The majority of low-level waste (LLW) proposed for the NSDF is currently located on the CRL site, with a small percentage of the waste volume coming from offsite locations (i.e., approximately 10% by volume). The sources of waste proposed for the NSDF by percentage are as follows: • 90 percent (%) waste from CRL – past, present and future (waste owned by Atomic Energy Canada Limited (AECL)); • 5% from commercial waste Canadian sources such as universities and hospitals; and • 5% waste from decommissioning at Whiteshell Laboratories in Manitoba and other AECL nuclear liabilities. Canadian Nuclear Laboratories (CNL) has been receiving commercial waste from Canadian sources such as universities and hospitals (i.e., non-CRL) for decades. Canadian Nuclear Laboratories is obligated under the Government owned Contractor operated (GoCo) contract that is in place to continue to provide this service. As indicated in Section 1.1 of the final EIS, the placement of waste is expected to be completed in two phases. During Phase 1 of Operations, the majority of wastes that are planned to be emplaced in the NSDF will be from wastes currently in storage and wastes generated in the next 25 years. Wastes generated would include the small percentage of off-site waste CRL receives (similar to current operations) and these would be emplaced in NSDF (not put in storage) provided they meet the Waste Acceptance Criteria [1]. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.

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CNL-ND4	Joan Lougheed and Town of Deep River (August 16, 2017)	The Executive Summary is almost silent on the shipment of wastes to CRL and the NSDF. These matters are also poorly described throughout the draft EIS. It is important that the reader is generally informed of these matters in the Executive Summary, with greater detail provided in the body of the draft EIS. A significant number of shipments of radioactive waste will be transported through the boundaries of Deep River and Received by CRL at the NSDF over some period of time (over many years or just a few, each presenting different challenges to the community). The number, manner, mode and frequency of the shipments should be clear to the reader of the Executive Summary. The reader should also be reassured that such shipments will present minimal risk to Deep River and its residents.	Approximately 90% of the low-level waste (LLW) planned to be placed in the Near Surface Disposal Facility (NSDF) is currently located on the Chalk River Laboratories (CRL) site and will not be transported on public roads. Transportation of waste from off-site waste generators is not within the scope of the Environmental Assessment for the NSDF Project. At present, waste transported to CRL from off-site generators is incorporated into the existing Integrated Waste Strategy [1] and is part of routine operations at the CRL site; transportation of waste from off-site locations is not specific to the NSDF Project. However, Atomic Energy Canada Limited (AECL), and now Canadian Nuclear Laboratories (CNL), has been transporting wastes safely and without incident for over 50 years. Transportation has been demonstrated to be safe and this activity will be carried out in order to consolidate AECL/CNL's radioactive wastes at CRL. Canadian Nuclear Laboratories maintains a Transportation of Dangerous Goods Program to ensure that all shipments are carried out in accordance with all Canadian regulatory requirements and best practice. This will ensure that all transportation activities will not result in negative consequences to Canadians and the residents of Deep River. This transportation program will continue to be implemented for transporting waste into the proposed NSDF Project's operations. Canadian Nuclear Laboratories does engage with the public on a regular basis to explain status of work underway to consolidate wastes at CRL and how this work reduces Canada's nuclear liability and long-term risk. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND5	Dr. David J. Winfield (May 3, 2017)	**From the Executive Summary** The concluding statement "Overall, it is CNL's conclusion that with the identified mitigation measures, the implementation of the NSDF Project is not likely to result…" does not appear to be appropriate in a report by Golder Associates, particularly as I could find no reference to justify this in the EIS text. It should presumably be Golder Associates stating their own conclusions and providing the appropriate references in the text to justify. The report cover, last page and the Golder logo throughout clearly indicates the report is prepared by GA. The CNL logo also being on the first page but with no acceptance by, review by, or approval by, it is not at all clear of the official status of the report with regard to CNL.	While Golder was contracted to conduct the environmental assessment (EA) and prepare the EIS for the NSDF Project on behalf of Canadian Nuclear Laboratories (CNL), CNL remains the proponent of this project and is responsible for accepting the results and findings of the EA. On the very first page at the top of the document, the document is accepted and signed by CNL Environmental Services Director. The purpose of the Executive Summary is to provide a concise but sufficiently detailed summary of the EA results, further details of which are included in the rest of the EIS. Chapter 5 discusses the EA approach taken to justify the overarching conclusion that, where mitigation actions are implemented, the NSDF is not expected to cause any residual adverse effect on the surrounding environment. Thus the concluding statement "Overall, it is CNL's conclusion that with the identified mitigation, the implementation of the Near Surface Disposal Facility (NSDF) Project is not likely to result in significant residual adverse effects" is appropriate and supported by the details within the EIS.
		Purpose of the Project	
CNL-ND6	Greg Csullog (May 1, 2017)	**2.3 Purpose of the Project – 2-6:** To ensure that the NSDF is implemented in the desired time frame (2020), I believe the scope of operations should be limited to include characterized, radioactive wastes arising from decommissioning and remediation activities and, where applicable, characterized wastes from "radioactive waste stores". These "radioactive waste stores" (what are the "legacy waste management areas") likely could be limited in the near-term to bunkers and storage buildings and to wastes that have not only been characterized but properly tracked from point-of-origin to their storage facilities with their waste tracking labels still attached and legible. If the NSDF really MUST be "operational by March 2020" and if that is to ensure that decommissioning and remediation activities have a disposal option available (and won't be delayed because there is no	The 2017 draft EIS did include optimistic timelines. In response to comments received from the public on the 2017 draft Environmental Impact Statement (EIS), Canadian Nuclear Laboratories (CNL) has conducted several additional studies and analyses, including an operational safety analysis, comprehensive post-closure safety assessment and ecological risk assessment, the results of which are included in the final EIS. The revised timelines for the project, pending regulatory approval, are outlined in Section 1.1 of the final EIS. The construction phase, which includes site preparation, is anticipated to start in 2021 or as soon as the relevant regulatory permits and approvals are in place. The operations phase is anticipated to begin in 2024 and will end in approximately 2070 (i.e., approximately 50 years). It is more appropriate to ensure the NSDF Project is comprehensively scoped and planned in accordance with CNL's Integrated Waste Strategy [1], rather than limiting the scope at the onset of the project to near term objectives. All waste

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		disposal), then the NSDF proponents should initially limit NSDF operations to the proverbial "low hanging fruit".	intended to be emplaced in the Near Surface Disposal Facility (NSDF), including legacy waste, shall have sufficient characterization data to ensure compliance with the Waste Acceptance Criteria [2]. Canadian Nuclear Laboratories waste characterization process ensures characterization plans are developed for waste streams according to the specific data objectives. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND7	David Thompson (April 11, 2017)	**Section 2.3, Purpose of the Project:** More effort is required to accurately describe the risks of not proactively dealing with the legacy wastes on the Canadian Nuclear Laboratories site.	The Near Surface Disposal Facility (NSDF) is designed to be a permanent solution which will reduce the risk associated with temporary waste storage at the Chalk River Laboratories (CRL) site because the facility has the appropriate design life to contain and isolate the inventory until it is sufficiently decayed to levels that do not present a risk to the public and environment. The facility has been designed so that the wastes will be safely managed long term without a need for retrieval. Section 2.3 of the final Environmental Impact Statement (EIS) has been updated to provide a more accurate description of the overall purpose of the project as it relates to environmental remediation of the Chalk River site and site revitalization. Atomic Energy of Canada Limited (AECL) and now Canadian Nuclear Laboratories (CNL) have been instrumental in the development of Canada's nuclear industry. For more than 70 years, nuclear technology has evolved to meet the needs of the world for clean, reliable energy; sustainable economic growth; and public health, safety and security. Today, CNL operates multiple sites across Canada, and manages AECL's waste liabilities. This proud history has created nuclear liabilities in the form of waste. Furthermore, past waste management practices, which met the standards of the day, are no longer acceptable now. Specifically, the historic waste management areas lack robust containment, which has led to impacts to the surrounding environment. In accordance with *Canada's Radioactive Waste Policy Framework* that waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. The current storage of legacy waste in Waste Management Areas (WMAs) in interim storage is not a permanent or sustainable disposal plan. For example, the integrity of current storage of waste in the WMAs (i.e. stored and stacked in metal shipping containers) may not withstand environmental exposure before radioactive contaminants have sufficiently decayed to levels that do not present a risk to the public and environment. Metal shipping containers used to store waste at the CRL site (where 90% of the waste by volume proposed to be stored in the NSDF will come from) are susceptible to weather-induced corrosion and subsequent contaminant release thus representing a liability and requiring resources for repackaging and handling until a purpose built disposal facility is available. To add to the current legacy waste present at CRL and other AECL-owned sites, the anticipated production of future waste from decommissioning and site revitalization will also need to be disposed of in a permanent and purpose built facility as CNL continues to further develop innovative applications of nuclear science, research, and technology. The purpose of the NSDF Project is to provide the permanent disposal of current and future low-level waste at the CRL site, as well as a small percentage of waste volume from off-site locations, in a manner that is protective of both the public and the environment. The practice of continuing to build additional temporary storage systems at the CRL site for low-level waste is not consistent with modern nuclear waste management principles. Further, the NSDF Project would enable the remediation of historically contaminated lands and legacy waste management areas, as well as the decommissioning of outdated infrastructure to facilitate the CRL site revitalization. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety

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			Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS.
CNL-ND8	David Thompson (April 11, 2017) Ole Hendrickson (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* **Section 2.3:** Purpose of the Project should address and examine the "do nothing" scenario, including a comparison of worker radiation doses between this scenario and the proposed project.	In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. The waste liabilities are not retired until final and permanent disposal is completed. The purpose of the Near Surface Disposal Facility (NSDF) Project is to provide the permanent disposal of current and future low-level waste (LLW) at the Chalk River Laboratories (CRL) site in a manner that is protective of both the public and the environment. The NSDF Project would enable the remediation of historically contaminated lands and legacy waste management areas, as well as the decommissioning of outdated infrastructure to facilitate the CRL site revitalization. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. On-going waste storage ("do nothing") as an alternative option has been included in the final EIS (Section 2.5.2.1). This option could involve the existing configuration of the CRL waste management areas which includes the use of bunkers and storage buildings as well as rolling stewardship or monitored retrievable storage for continued storage. However, the historic WMAs have minimal to no engineered barriers to contain their inventory. As such, these legacy wastes are exposed to weathering and erosion (rain, snow, corrosion, etc.), resulting in the release of contaminants into the environment. Although the releases and groundwater impact from these WMAs is currently being managed, the risk of future releases and environmental impacts the inventory poses could be substantially reduced through engineered containment and isolation of the source term. Leaving the historic WMAs in their current configuration as an alternative to LLW disposal is not technically feasible as it is unlikely to satisfy regulatory and licensing requirements for long-term waste management, specifically those specified within REGDOC-2.11.1 Volume III (*Assessing the Long-Term Safety of Radioactive Waste Management)* [1]. Further, as noted in Section 2.3 of the EIS, continuing to build additional temporary storage systems at the CRL site for LLW is not consistent with modern waste management principles. In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal facilities required for their wastes. As such CNL does not consider the on-going waste storage as technically feasible as it is not aligned with national policies. Therefore, the practice of continuing to build additional temporary storage systems at the CRL site for LLW is not sustainable. It will not reduce the risks associated with waste release or the cost of laboratory operations. Furthermore, "doing nothing" will not help to create the conditions for the revitalization of the CRL site. Reference: [1] CNSC, Waste Management, Volume III: Assessing the Long-term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May.

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CNL-ND9	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017)	The EIS does not clearly and precisely specify the problems or opportunities that the NSDF project is intended to satisfy. If the proponent is aware of decommissioning and remediation waste that may not be suitable for landfilling in a mound, then the purpose of the project should be revised and clarified accordingly.	The Near Surface Disposal Facility (NSDF) is designed to be a permanent solution which will reduce the risk associated with temporary waste storage at the Chalk River Laboratories (CRL) site because the facility has the appropriate design life to contain and isolate the inventory until it is sufficiently decayed to levels that do not present a risk to the public and environment. Section 2.3 of the final Environmental Impact Statement (EIS) has been updated to provide a more accurate description of the overall purpose of the project as it relates to environmental remediation of the Chalk River site and site revitalization. The NSDF Project Waste Acceptance Criteria (WAC) [1] ensures Canadian Nuclear Laboratories (CNL) meets its responsibility as the licensee; that all waste received for disposal is in compliance with the design and licensing basis for the facility (Section 3.3.3 of the final EIS). Waste shall comply with all of the criteria in the WAC to be considered acceptable for disposal in the ECM. Waste that does not meet the WAC will not be placed in the NSDF and will be placed in safe storage. Canadian Nuclear Laboratories (CNL) and Atomic Energy of Canada Limited (AECL) are working actively at strategic and operational levels to identify strategies and solutions for management of the entire life cycle of all radioactive waste classifications including low-level waste, intermediate level waste and high level waste. These strategies are documented in the CNL Integrated Waste Strategy [2]. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND10	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore, a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français* [Français] L'étude d'impact environnemental (ÉIE) ne fait pas le moindre effort pour démontrer que les déchets radioactifs seront plus en sécurité dans le nouveau dépotoir, que leur impact environnemental à court terme ou à long terme sera moindre, ni que leur transfert dans le nouveau dépotoir va réellement améliorer la sécurité sanitaire du public et de l'environnement. Aucun effort non plus pour démontrer que l'environnement et la sécurité publique seront mieux servis si le nouveau dépotoir devient la « solution par défaut » pour l'élimination de tous les futurs déchets radioactifs. L'intervenant demande que le promoteur documente et démontre : 1. dans quelle mesure le dépotoir proposé réduit les dangers actuels et futurs des aires historiques de gestion des déchets et des matières radioactives qui en ont fui et qui ont contaminé les sols et les sédiments de Chalk River et dans quelle mesure il prévoit réduire leur volume. 2. dans quelle mesure le dépotoir proposé réduit les dangers actuels et futurs des matières radioactives qui ont contaminé les édifices de Chalk River et dans quelle mesure il prévoit réduire leur volume.	Le site des Laboratoires de Chalk River (LCR) comprend des zones de gestion de déchets (ZGD) remontant aussi loin qu'aux années 1940 et 1950, dont le contenu n'est que peu ou pas protégé par une barrière artificielle. Ces déchets hérités du passé sont donc exposés aux intempéries et aux effets de l'érosion (pluie, neige, corrosion, etc.), ce qui entraîne la libération de contaminants dans l'environnement. Bien que les émissions de ces zones et leurs répercussions sur les eaux souterraines fassent actuellement l'objet de mesures de contrôle, le risque que posent les émissions ultérieures de ces déchets et leurs répercussions environnementales pourrait être considérablement réduit si l'on supprimait le terme source et si l'on confinait et isolait mieux les déchets. Il est écologiquement irresponsable de laisser ces ZGD dans leur configuration actuelle. Le mode d'entreposage actuel des déchets hérités dans les ZGD ne constitue pas non plus un plan de gestion permanent ou durable. Par exemple, l'intégrité de ce mode d'entreposage (dépôt et empilement dans des conteneurs d'expédition en métal) pourrait ne pas être garantie contre l'exposition aux effets de l'environnement avant que les contaminants radioactifs aient diminués à des niveaux de radioactivité qui ne présentent plus de risques pour la population et pour l'environnement. Les conteneurs d'expédition en métal qui servent à entreposer les déchets sur le site des LCR (d'où viendront 90 % des déchets destinées à l'IGDPS) sont exposés à la corrosion due aux conditions météorologiques et risquent de ce fait de libérer des contaminants, de sorte qu'ils représentent un risque et exigent des ressources pour réemballer et manutentionner les déchets en attendant la disponibilité d'une installation dédiée. Outre les déchets hérités actuellement entreposés sur le site des LCR et sur d'autres sites appartenant à EACL, il faudra éliminer les déchets qui seront produits par le déclassement et la revitalisation du site dans une installation permanente et sûre à mesure que les LCN continuent d'élaborer des applications novatrices dans le cadre de la science, de la recherche et de la technologie nucléaires. Le projet d'IGDPS permettrait de stocker de façon permanente les déchets de faible activité actuels et à venir sur le site des

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		3. dans quelle mesure le dépotoir proposé réduit les dangers actuels et futurs des matières radioactives (médicales, universitaires, industrielles, etc.) qui sont déjà en stockage réglementé et approuvé, tant à Chalk River qu'à Whiteshell, Rolphton et Gentilly.	LCR, ainsi qu'un petit pourcentage de déchets provenant de sites extérieurs, en garantissant la protection de la population et de l'environnement. Les systèmes d'entreposage temporaire que l'on continue d'élaborer sur le site des LCR ne sont pas conformes aux principes modernes de gestion des déchets. Le projet permettrait par ailleurs d'assainir des terres et des zones de gestion de déchets (ZGD) contaminées depuis longtemps et de déclasser des infrastructures obsolètes pour faciliter la revitalisation du site des LCR. Il convient de noter que l'assainissement des ZGD ferait l'objet d'un examen environnemental distinct et nécessiterait également un examen et une approbation de la Commission canadienne de sûreté nucléaire (CCSN) avant tout travail, de sorte que la discussion des options d'assainissement n'a pas été incluse dans de l'EIE definitive. Dans l'ensemble, l'IGDPS permettra de réduire les risques associés à l'entreposage temporaire de déchets sur le site des Laboratoires de Chalk River (LCR) parce que l'installation aurait une durée de vie suffisante pour garantir le confinement et l'isolement des déchets jusqu'à ce qu'ils soient désintégrés à des niveaux tels qu'ils ne menaceraient plus la population ou l'environnement. Cette perspective est conforme à la Politique-cadre du Canada en matière de déchets radioactifs et à la norme SSR 5 de l'Agence internationale de l'énergie atomique (Stockage définitif des déchets radioactifs) [1]. L'installation est conçue de telle sorte que les déchets feront l'objet d'une gestion à long terme sûre sans qu'il soit nécessaire de les récupérer. La section 2.3 de l'étude d'impact environnemental (EIE) définitive a été mise à jour pour fournir une description plus exacte de l'objet global du projet du point de vue de l'assainissement et de la revitalisation du site de Chalk River. Référence [1] AIEA, Stockage définitif des déchets radioactifs, Prescriptions de sûreté particulières, norme de sûreté SSR 5, STI/PUB/1449, avril 2011.
CNL-ND11	William Turner (May 31, 2017)	2.5.1.1, Para 1, "Project Purpose - The purpose of the NSDF Project is to substantially reduce the risks associated with the CNL legacy wastes, liabilities and the cost of laboratory operations to taxpayers in the 10-year period 2016 to 2025, inclusive" Reducing costs over a 10-year period cannot be a justification for a disposal project whose timeline extends way past several hundred to possibly thousands of years. This is especially true since CNL have provided no evidence to support this assertion. CNL must provide a quantitative (or semi-quantitative) estimate of the current risks associated with the legacy wastes, and an estimate of the reduction to that risk resulting from the implementation of each identified alternative means. CNL must provide a definition of CNL legacy wastes that includes a quantitative estimate sub-divided into the five IAEA waste classes. CNL must provide an estimated of the "cost of laboratory operations" over the 10-year period, and compare it to the estimated costs of each alternative over their projected life-time, including operations, closure, post-closure, institutional control period, etc.	Section 2.3 (Purpose of the Project) has been updated to remove reference to 'reducing costs over a 10 year period'. Section 2.3 of the final EIS has been updated to provide a more accurate description of the overall purpose of the project as it relates to environmental remediation of the Chalk River Laboratories (CRL) site and site revitalization. Presently, wastes at the Canadian Nuclear Laboratories (CNL) sites are temporarily contained in waste storage systems in accordance with current licence conditions that protect workers, the public and the environment. However, the practice of continuing to build additional temporary storage systems at the CRL site for LLW is not consistent with modern waste management principles. In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. On-going operations, compliance processes and other surveillance for low-level waste in storage, will incur a much higher long-run cost, thus, these costs are difficult to quantify. More importantly, continued safe storage and monitoring does not address environmental concerns and the liabilities are not retired until disposal is completed. The NSDF Project will provide the permanent disposal of low-level waste, mainly from the CRL site, in a manner that is protective of the public and environment and enables the transformation of the CRL into a world class centre for science and technology. On-going waste storage (e.g., "do nothing" which includes deferred clean up) as an alternative option has been included in the EIS (Section 2.5.2.1). This option could involve the existing configuration of the CRL waste management areas (WMAs) which includes the use of bunkers and storage buildings as well as rolling stewardship or monitored retrievable storage for

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			continued storage. However, the historic WMAs have minimal to no engineered barriers to contain their inventory. As such these legacy wastes are exposed to weathering and erosion (rain, snow, corrosion, etc. resulting in the release of contaminants into the environment. Although the releases and groundwater impact from these WMAs is currently being managed, the risk of future releases and environmental impacts the inventory poses could be substantially reduced through improved containment and isolation of the source term. Leaving the historic WMAs in their current configuration as an alternative to LLW disposal is not technically feasible as it is unlikely to satisfy regulatory and licensing requirements for long-term waste management, specifically those specified within REGDOC-2.11.1 Volume III (*Assessing the Long-Term Safety of Radioactive Waste Management*) [1]. Further, as noted in Section 2.3 of the EIS, continuing to build additional temporary storage systems at the CRL site for LLW is not consistent with modern waste management principles. In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal facilities required for their wastes. As such CNL does not consider the on-going waste storage as technically feasible as it is not aligned with national policies. Each alternative was evaluated first for its technical feasibility. For those alternatives deemed technically feasible, a comparison of economic feasibility (i.e., cost) and the likely environmental effects was completed. As noted above, as on-going waste storage was determined to be not technically feasible, the options analysis did not proceed to an economic comparison for this option (see Section 2.5.2.1 of the final EIS). Canadian Nuclear Laboratories (CNL) will continue to eliminate buildings and remediate grounds at various sites in conjunction with regulatory and safety requirements that align with Atomic Energy of Canada Limited's (AECL) mandate to manage nuclear liabilities which are the responsibility of the Government of Canada. Canadian Nuclear Laboratories plans for clean-up mission continue to be executed in a manner that delivers legacy clean-up that is risk-based and cost effective. This critical cleanup work is necessary to address the environment, public and human health, and, to finally retire nuclear liabilities through disposal in the NSDF. Therefore, the practice of continuing to build additional temporary storage systems at the CRL site for LLW is not sustainable. It will not reduce the risks associated with waste release or the cost of laboratory operations. Furthermore, "doing nothing" will not help to create the conditions for the revitalization of the CRL property. Section 3.3.1 of the EIS states that the NSDF will contain only LLW as defined in CSA N292.0-19 (General principles for the management of radioactive waste and irradiated fuel) [2] and the International Atomic Energy Agency (IAEA) General Safety Guide-1 (Classification of Radioactive Waste) [3]. The other waste types as defined by the IAEA are not relevant to this Environmental Assessment. References: [1] CNSC, Waste Management, Volume III: Assessing the Long-term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste.
CNL-ND12	Provincial Council of Women of Ontario (PCWO)	Where does this project fit into the overall plan for disposal of low and intermediate level nuclear waste, as part of the management of Canada's nuclear "legacy" liabilities? For example, where do Ontario Power Generation's Low and Intermediate nuclear waste disposal plans at the Bruce Power site fit in.	In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. For Intermediate and Low Level Waste, nuclear waste owners are responsible for developing strategies and plans to

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	(August 16, 2017)		effectively manage the wastes that are generated as a consequence of producing energy, advancing science and medicine for the benefit of Canadians. As such, while CNL cannot comment directly on Ontario Power Generation's plans for nuclear waste disposal; it and other waste owners are responsible for their own nuclear waste management and disposal as per *Canada's Radioactive Waste Policy Framework.* In the interest of effectively managing Atomic Energy of Canada Limited's (AECL) nuclear liabilities, Canadian Nuclear Laboratories (CNL) and AECL are working actively at strategic and operational levels to identify strategies and solutions for management of the entire life cycle of all radioactive waste classifications including low-level waste (LLW), intermediate level waste (ILW), high level waste (HLW), hazardous waste and clean (non-radiological) waste. Aligned to this, CNL has developed an Integrated Waste Strategy [1] that concisely details a cradle to grave approach for all CNL-managed radioactive wastes, from generation to disposal. The Integrated Waste Strategy is based on the inventory of AECL waste and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
		Alternative Means of Carrying Out the Project	
CNL-ND13	Old Fort Williams Cottagers' Association (OFWCA) (Johanna Echlin) (May 8, 2017) Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017) Gordon and Karen Lorimer (August 16, 2017) OFWCA (August 15, 2017) Angela Bischoff (August 16, 2017) Ralliement contre la pollution radioactive	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The commenters have expressed the concern that CNL has not adequately explored the potential alternatives for this project given CNL did not consider options outside CNL owned and operated locations. Some commenters indicated that alternative disposal and storage options must be investigated (Shallow cavern, as recommended by the IAEA, or Monitored Retrievable Storage / Rolling Stewardship, which provides long-term monitoring, waste is retrievable, leaks can be detected and repaired, and more.) Safer and more responsible alternatives to dispose of our nuclear waste do exist. Rolling Stewardship is one in which all wastes are carefully packaged and labelled and each generation passes knowledge and necessary resources for next generations to prevent nuclear wastes from ever being placed beyond human control. This way, we actively control waste until a real solution which can incapacitate nuclear wastes is implemented. Further, alternate sites that are isolated from the Ottawa River should be carefully considered and assessed.	As outlined in Section 2.5.4 of the final Environmental Impact Statement (EIS), Atomic Energy of Canada Limited (AECL) and Canadian Nuclear Laboratories' (CNL) preference for siting a low-level waste (LLW) disposal was: a technically feasible site, on lands currently under AECL ownership and CNL control, ideally close to the location of generation and/or storage of the waste and in an area that is already covered by a nuclear licence. Previous endeavours by AECL in planning and siting for radioactive waste disposal had already deemed the Chalk River Laboratories (CRL) site technically sufficient. Canadian Nuclear Laboratories (CNL) has considered alternatives for Facility Type, Facility Design, Facility Location, and Site Selection. Evaluation Criteria included environmental, technical and economic factors (see Section 2.5 of the EIS). As part of the Alternative Means assessment in Section 2.5 of the final EIS, CNL evaluated the Facility Type of Geological Waste Management Facility (GWMF) and the Above-Ground Concrete Vault (AGCV) as a facility design. Section 2.5.3.3 was added to the final EIS to discuss why Shallow Cavern disposal was not considered technically feasible. Based on comments received on the 2017 draft EIS, intermediate level waste has been removed from the waste inventory and will not be disposed in the Near Surface Disposal Facility (NSDF). NSDF will only contain solid low-level waste (LLW). The engineered containment mound is designed to contain and isolate the wastes from the environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW and most of the radioactivity; thus, the hazard, decays in the first 100 years after closure, the design of the NSDF Project is commensurate with the hazard. On-going waste storage (e.g., rolling stewardship) as an alternative option has been included in the EIS (Section 2.5.2.1). This option could involve the existing configuration of the CRL waste management areas (WMAs) which includes the use of bunkers and storage buildings as well as rolling stewardship or monitored retrievable storage for continued storage. However, the historic WMAs have minimal to no engineered barriers to contain their inventory. As such these legacy wastes are exposed to weathering and erosion (rain, snow, corrosion, etc. resulting in the release of contaminants into the environment. Although the releases and groundwater impact from these WMAs is currently being managed, the risk of future releases and environmental impacts the inventory poses could be substantially reduced through engineered containment and isolation of the source term. Leaving the historic WMAs in their current configuration as an alternative to

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	(August 3, 2017) Algonquin Anishinabeg Nation Tribal Council (AANTC) (August 14, 2017) STOP Oléoduc Outaouais (August 15, 2017) Mario Gervais (August 16, 2017) Elssa Martinez (August 15, 2017) Martine Ouellet (Bloc Québécois) (August 14, 2017) R. Donald Maracle (Mohawks of the Bay of Quinte) (August 16, 2017) Judith Lacroix (August 16, 2017) Lynn Jones (August 16, 2017) Emma March (August 15, 2017) Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) OFWCA	Other commenters recommend that the EIS include an examination of potential alternative sites on federal lands, such as those owned by the Department of National Defence (the CRL property is part of a 378 square kilometer tract of federal land mainly controlled by the Department of National Defence), near the Chalk River property that would be 10 to 25 km from the Ottawa River – a site that would also have more stable geological properties. Some commenters indicated that other than the two locations on the CRL site, a site further from the Ottawa River (closer to the CRL western-most boundary) should have been considered as part of the Alternative Means Assessment. The proposed alternate site is still much closer to the Ottawa River than would be a site closer to the western-most boundary of CRL. Data at a more remote location has not been provided as part of CNL's groundwater sampling program at CRL. Effort should be made to obtain such data with priority. Lastly, some commenters indicated that alternate technologies that reduce contact of the radioactive waste with water/precipitation should be carefully considered and assessed. Some suggested alternative means are proposed as follows: • Processes for waste volume reduction - there is nothing that addresses reducing the volume of wastes that require disposal. Volume reduction will significantly reduce the potential environmental impact of any repository including the ECM. • Segregation of VLLW from the other wastes identified for emplacement in the ECM. CNL has ignored the VLLW waste class, which would include most of the wastes to be emplaced in the proposed ECM. • The ECM is not suitable for the disposal of LLW and some ILW. As discussed in the IAEA document Classification of Radioactive Wastes, GSG-1, the only wastes suitable for a mound facility are wastes classified as VLLW. This begs the question, what are the alternatives for the LLW and some of the ILW that CNL has considered? The list in table 2.5-1does not distinguish among these three waste classes as to which waste class is most suitable for which "means". A combined program that addresses waste diversion and segregation, and volume reduction will likely to reduce the volumes by 50 to 75%. Therefore, the requirement to accommodate 1 million m^3 does not really address the overall waste problem at CRL. Identification of "alternative means" that truly address waste diversion, segregation and volume reduction will likely demonstrate that the current choice of the ECM is not the optimal solution. The commenters request that CNL: • Identify other credible alternative means such that the outcome of the analysis is not predetermined. • Provide the appropriate evidence to support their conclusion stated in section 2.6, that the recommended alternative for the disposal of low-level waste based on the Alternative Means analysis is to build a NSDF at the CRL property on the ERM site. [Français]	LLW disposal is not technically feasible as it is unlikely to satisfy regulatory and licensing requirements for long-term waste management, specifically those specified within REGDOC-2.11.1 Volume III (*Assessing the Long-Term Safety of Radioactive Waste Management*) [1]. Further, as noted in Section 2.3 of the EIS, continuing to build additional temporary storage systems at the CRL site for LLW is not consistent with modern nuclear waste management principles. In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal facilities required for their wastes. As such CNL does not consider the on-going waste storage as technically feasible as it is not aligned with national policies - that waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. Atomic Energy of Canada Limited has contracted CNL to find solutions for the disposal of its LLW as a means to reduce its legacy liabilities and to enable the remediation and revitalization of the CRL site. Through the Environmental Assessment (EA) summarized in the final EIS, CNL has proposed a technically, environmentally, and economically feasible solution to permanently dispose of AECL's LLW. The possibility of moving the project location further away from the Ottawa River, was considered in the site selection process and is discussed in Section 2.5.5 of the final EIS. Section 2.5.5 has been expanded to include all fifteen sites considered as part of the site selection process. The lower Perch Lake basin, the proposed location of the NSDF is the site of CNL's first Waste Management Area (WMA). The hydrogeology of this basin is well understood and has been studied for over six decades. Groundwater transit times to the Ottawa River are longer for the selected site than the Alternative Site located further inland. This is because the chain of lakes on the western perimeter of the CRL site are connected to the Ottawa River. During waste placement operations, all efforts are made to minimize the contact of precipitation with the contaminated waste in an effort to lessen leachate production. The operation of NSDF is limited to one cell at a time in order to limit the surface area of waste that is exposed to the environment (i.e., precipitation) at any given time. As a cell is constructed, interim covers are placed over waste to limit infiltration of precipitation and promote surface water run-off. As each disposal cell is completed the final cover system is installed over the filled disposal cell. Other operational practices to limit contact with precipitation include grading and compaction of the waste fill to promote surface water run-off. Furthermore, any water that makes contact with (or is suspect of contacting) the contaminated waste will be collected by the leachate collection system and treated to remove contaminants in the wastewater treatment plant (WWTP) prior to controlled release into the environment. Treated effluent discharge targets are established to be protective of human and non-human biota health. As well, the proposed inventory for NSDF has been significantly reduced since the 2017 draft EIS through the removal of any intermediate level waste streams. The revised inventory proposed for the NSDF is LLW which will be controlled through the Waste Acceptance Criteria (WAC) [2]. Additionally, the WAC applies a graded approach to control leachate radionuclide concentrations during placement of waste. There will be a small portion of waste which will be required to utilize robust packaging to prevent the spread of contamination. Specifically leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. As outlined in Section 2.5.7.6.1, weather cover designs are being evaluated for compatibility with the NSDF configuration and if feasible, could be implemented as a mitigation measure and operational optimization.

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	(August 15, 2017) Evelyn Gigantes (May 17, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) William Turner (May 31, 2017)	Les commentateurs se sont dits préoccupés par le fait que les LNC n'ont pas exploré adéquatement les solutions de rechange possibles pour réaliser ce projet, étant donné que les LNC n'ont pas envisagé d'options à l'extérieur des emplacements appartenant aux LNC et exploités par les LNC. Certains commentateurs ont indiqué que d'autres solutions en matière d'élimination et de stockage doivent être étudiées (caverne peu profonde, comme le recommande l'AIEA, ou stockage surveillé récupérable/intendance permanente, qui assure une surveillance à long terme, les déchets peuvent être récupérés, les fuites peuvent être détectées et réparées, et plus encore) Il existe des solutions de rechange plus sûres et plus responsables pour la gestion de nos déchets nucléaires. L'intendance permanente est une intendance dans laquelle tous les déchets sont soigneusement emballés et étiquetés et chaque génération transmet les connaissances et les ressources nécessaires aux générations suivantes afin d'éviter que les déchets nucléaires ne se retrouvent jamais hors du contrôle de l'homme. De cette façon, nous contrôlons activement les déchets jusqu'à ce qu'une véritable solution qui puisse neutraliser les déchets nucléaires soit mise en œuvre. De plus, des sites de rechange isolés de la rivière des Outaouais devraient être examinés et évalués avec soin. D'autres commentateurs recommandent que l'EIE comprenne l'examen d'autres sites possibles sur les terres fédérales, comme celles qui appartiennent au ministère de la Défense nationale (la propriété des LCR fait partie d'une parcelle de terrain fédéral de 378 kilomètres carrés contrôlée principalement par le ministère de la Défense nationale), près de la propriété de Chalk River qui serait située entre 10 et 25 km de la rivière des Outaouais – un site qui aurait aussi des propriétés géologiques plus stables. Certains commentateurs ont indiqué qu'à l'exception des deux emplacements sur le site des LCR, un site plus éloigné de la rivière des Outaouais (plus près de la limite ouest des LCR) aurait dû être considéré comme faisant partie de l'évaluation des Autres solutions de réalisation du projet. Le second site proposé demeure beaucoup plus près de la rivière des Outaouais que le serait un site plus près de la limite ouest des LCR. Les données provenant d'un site plus éloigné n'ont pas été fournies dans le cadre du programme d'échantillonnage des eaux souterraines aux LCR réalisé par les LNC. Il faudrait s'efforcer d'obtenir ces données en priorité. Enfin, certains commentateurs ont indiqué que les technologies de rechange qui réduisent le contact des déchets radioactifs avec l'eau et les précipitations devraient être examinées et évaluées avec soin. Certaines autres solutions suggérées sont proposées comme suit : • Processus de réduction du volume des déchets – il n'y a rien qui traite de la réduction du volume des déchets qui doivent être gérés. La réduction du volume diminuera de manière importante l'impact environnemental potentiel de tout dépôt, y compris le monticule de confinement artificiel (MCA). • La séparation des DRTFA des autres déchets identifiés pour la mise en place dans le MCA. Les LNC n'ont pas tenu compte de la catégorie de déchets DRTFA, qui comprendrait la plupart des déchets à placer dans le MCA proposé.	With regards to the suggested alternative means proposed by the reviewers: • CNL's Integrated Waste Strategy [3] is based on CNL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. The NSDF is expected to be operational for approximately 50 years and will receive up to 1,000,000 cubic metres (m^3) of LLW over its operational lifetime. • Very-low-level waste is a considered a subcategory of LLW as per Canadian Standards Association (CSA) standard for the nuclear industry N292.0-19 *General Principles for the Management of Radioactive Waste and Irradiated Fuel* [4]. Section 3.3.1 recognizes that only low-level waste as defined in the CSA N292.0-19 and the International Atomic Energy Agency (IAEA) general guide GSG-1 *Classification of Radioactive Waste* [5], will be accepted for disposal in NSDF. • Section 2.2 (4) of GSG-1 states such waste (LLW) requires robust isolation and containment for periods of up to a few hundred years and is suitable for disposal in engineered near surface facilities. International Atomic Energy Agency (IAEA) SSR-5 *Disposal of Radioactive Waste* [6] defines near surface disposal as disposal in a facility consisting of engineered trenches or vaults constructed on the ground surface or up to a few tens of metres below ground level. Such a facility may be designated as a disposal facility for LLW. As outlined in Section 2.2 of the final EIS, CNL has developed an Integrated Waste Strategy [3] that concisely details a cradle to grave approach for all CNL-managed waste classifications, from generation to disposal. The Integrated Waste Strategy is based on CNL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. References: [1] CNSC, Waste Management, Volume III: Assessing the Long-term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [5] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [6] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011 April. [Français] Comme l'indique la section 2.5.4 de l'Étude d'impact environnemental (EIE) définitive, Énergie atomique Canada Ltée (EACL) et les Laboratoires nucléaires canadiens (LNC) privilégiaient, pour la construction d'une installation de gestion des déchets de faible activité (DFA), un site techniquement valable sur des terres appartenant à EACL et placées sous le contrôle des LNC, de préférence à proximité d'une zone de production et/ou d'entreposage de déchets et dans un secteur déjà couvert par un permis nucléaire. Les tentatives antérieures d'EACL pour planifier et construire une installation de gestion de déchets radioactifs s'étaient déjà soldées par la conclusion que le site des Laboratoires de Chalk River (LCR) était techniquement suffisant. Les Laboratoires nucléaires canadiens (LNC) ont envisagé des alternatives en ce qui a trait au type d'installation, à sa conception, à sa localisation et au choix du site. Les critères d'évaluation étaient d'ordre environnemental, technique et économique (voir la section 2.5 de l'EIE). Dans le cadre de l'évaluation des solutions de rechange (section 2.5 de l'EIE

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		• Le MCA ne convient pas pour la gestion des DRFA et de certains DRMA. Comme indiqué dans le document de l'AIEA intitulé Classification des déchets radioactifs, GSG-1, les seuls déchets qui conviennent à une installation en monticule sont les déchets classés comme DRTFA. Cela soulève la question suivante : quelles sont les solutions de rechange pour les DRFA et certains DRMA que les LNC ont examinées? La liste du tableau 2.5-1 ne fait pas de distinction entre ces trois catégories de déchets quant à la catégorie de déchets la plus appropriée pour chaque « solution ». Un programme combiné qui traite du réacheminement et du tri des déchets et de la réduction du volume permettra probablement de réduire les volumes de 50 à 75 %. Par conséquent, l'obligation d'accueillir 1 million de m^3 ne règle pas vraiment le problème global des déchets aux LCR. L'identification d'« autres solutions » qui traitent réellement du réacheminement, du tri et de la réduction du volume des déchets démontrera probablement que le choix actuel du MCA n'est pas la solution optimale. Les commentateurs demandent que les LNC : • Identifient d'autres solutions de rechange crédibles de sorte que le résultat de l'analyse ne soit pas prédéterminé. • Fournissent les preuves appropriées à l'appui de la conclusion énoncée à la section 2.6, à savoir que l'autre solution recommandée pour la gestion des déchets radioactifs de faible activité, d'après l'analyse des Autres solutions, consiste à construire une IGDPS sur la propriété des LCR sur le site du MCA.	définitive), les LNC ont évalué les concepts d'installation de gestion des déchets en formation géologique (IGDFG) et de voûte en béton hors terre (VBHT). La section 2.5.3.3 a été ajoutée à l'EIE définitive pour expliquer pourquoi on n'a pas jugé techniquement valable la solution de la cavité à faible profondeur. Compte tenu des commentaires obtenus au sujet de la version provisoire de l'EIE de 2017, les déchets de moyenne activité ont été supprimés de l'inventaire et ne seront pas placés dans l'installation de gestion des déchets près de la surface (IGDPS). L'IGDPS ne pourra contenir que des déchets solides de faible activité (DFA). Le monticule de confinement artificiel est conçu pour contenir les déchets et les isoler de l'environnement pendant 550 ans, après quoi leur radioactivité aura diminué pour atteindre des niveaux proches des concentrations naturelles de fond. Comme il n'y aura que des DFA dans l'IGDPS et que la radioactivité, donc le risque, diminue au cours des 100 premières années suivant la fermeture, la conception de l'installation est adaptée au risque. L'entreposage permanent de déchets (gestion environnementale continue) a été prévu comme solution de rechange dans l'EIE (section 2.5.2.1). Cette solution pourrait s'appuyer sur la configuration actuelle des zones de gestion des déchets (ZGD) des LCR, composées de fosses et de bâtiments d'entreposage faisant l'objet d'une gestion continue ou d'un contrôle des dépôts de déchets récupérables. Cependant, les ZGD hérités du passé ne sont pas ou sont peu isolés par des barrières artificielles. Ces déchets sont donc exposés aux intempéries et à l'érosion (pluie, neige, corrosion, etc.), de sorte que des contaminants sont libérés dans l'environnement. Les émissions de contaminants de ces ZGD et leurs impacts sur les eaux souterraines sont actuellement contrôlées, mais les risques associés aux émissions ultérieures et leurs conséquences pour l'environnement pourraient être considérablement réduits grâce au confinement artificiel et à l'isolement du terme source. La solution de laisser les ZGD hérités du passé dans leur configuration actuelle n'est pas une alternative techniquement valable au stockage des DFA dans l'IGDPS, car il est peu probable qu'elle soit conforme aux normes de réglementation et d'autorisation applicables à la gestion à long terme des déchets, et notamment aux normes énoncées dans le REGDOC-2.11.1 Tome III (*Évaluation de la sûreté à long terme de la gestion des déchets radioactifs*) [1]. Par ailleurs, comme l'indique la section 2.3 de l'EIE, il n'est pas conforme aux principes modernes de gestion des déchets nucléaires de continuer à construire d'autres systèmes d'entreposage temporaire de DFA sur le site des LCR. Selon la *Politique-cadre en matière de déchets radioactifs* du Canada, les établissements qui produisent des déchets et les propriétaires de déchets radioactifs doivent financer, organiser, gérer et faire fonctionner les installations nécessaires au stockage de leurs déchets. À cet égard, les LNC estiment que continuer l'entreposage actuel des déchets n'est ni techniquement valable ni conforme aux politiques nationales, qui prévoient que les établissements qui produisent des déchets et les propriétaires de déchets radioactifs doivent financer, organiser, gérer et faire fonctionner les installations nécessaires au stockage de leurs déchets et autres. La gestion responsable des déchets nucléaires passe par la gestion de l'ensemble du cycle de vie, depuis la production des déchets jusqu'à leur stockage permanent. Énergie atomique du Canada limitée a chargé les LNC de trouver des solutions permettant d'éliminer ses DFA pour réduire son passif nucléaire et permettre d'assainir et de revitaliser le site des LCR. Dans le cadre de l'évaluation environnementale résumée dans l'EIE définitive, les LNC proposent une solution valable sur les plans technique, environnemental et économique pour stocker de façon permanente les DFA d'EACL. L'éventualité d'éloigner le site du projet de la rivière des Outaouais a été envisagée dans le cadre du processus de sélection du site : voir la section 2.5.5 de l'EIE définitive. Cette section a été enrichie pour inclure les quinze sites envisagés dans le cadre de ce processus. Le bassin inférieur du lac Perch, qui est l'endroit proposé pour l'IGDPS, est le site de la première zone de gestion des déchets (ZGD) des LNC. Les caractéristiques hydrogéologiques de ce bassin sont bien connues et sont étudiées depuis plus de soixante ans. Le délai de transit des eaux souterraines vers la rivière des Outaouais est plus long pour le site retenu que pour l'autre site envisagé, situé plus à l'intérieur des terres. La raison en est que la série de lacs longeant le côté ouest du site des LCR est reliée à la rivière des Outaouais.

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			Au cours des activités de placement des déchets, tout est fait pour réduire au minimum le contact entre les eaux de pluie et les déchets contaminés et réduire ainsi la production de lixiviat. Le fonctionnement de l'IGDPS est limité à une cellule à la fois pour circonscrire la superficie de déchets exposés à l'environnement (précipitations) en tout temps. Pendant la construction d'une cellule, les déchets sont recouverts pour limiter les infiltrations d'eau et favoriser le ruissellement en surface. Lorsqu'une nouvelle cellule est terminée, une couverture définitive est placée sur la cellule qui vient d'être remplie. D'autres moyens techniques permettent de limiter le contact avec les eaux de pluie, par exemple le nivellement et le compactage des déchets enfouis pour favoriser le ruissellement en surface. Par ailleurs, les eaux qui entrent en contact (ou dont on soupçonne qu'elles entrent en contact) avec les déchets contaminés seront recueillies grâce à un système de collecte du lixiviat et traitées dans une usine de traitement des eaux usées (UTEU) pour en enlever les contaminants avant d'être libérées de façon contrôlée dans l'environnement. Les objectifs de rejet d'effluents traités permettent de protéger la santé du biote humain et du biote non humain. De plus, l'inventaire proposé pour l'IGDPS a été considérablement réduit depuis la version provisoire de l'EIE de 2017, puisqu'on y a supprimé les déchets de moyenne activité. Le nouvel inventaire proposé est composé de DFA et sera assujetti aux critères d'acceptation des déchets (CAD) [2]. Ces critères permettent d'adopter une approche graduée du contrôle des concentrations de radionucléides lixiviés durant le placement des déchets. Un faible volume de déchets devra être placé dans des emballages solides pour éviter la propagation de contaminants. Plus précisément, les emballages de déchets à lixiviation contrôlée serviront de barrières à court terme pour les déchets à plus fortes concentrations de radionucléides tant que la cellule de stockage ne sera pas recouverte par la couverture définitive (délai approximatif de 5 à 10 ans). Autrement dit, les radionucléides plus mobiles, comme le tritium, sont isolés de l'environnement pour réduire au minimum les émissions d'effluents liquides pendant la phase d'exploitation. Comme l'indique la section 2.5.7.6.1, les moyens de protection contre les intempéries sont en cours d'évaluation pour vérifier si elles sont compatibles avec la configuration de l'IGDPS et, dans ce cas, si elles pourraient servir de mesures d'atténuation et d'optimisation opérationnelle. Concernant les autres moyens proposés par les commentateurs : • La Stratégie de gestion intégrée des déchets des LNC [3] est fonction de l'inventaire de déchets des LNC et de données prévisionnelles et s'appuie sur les principes fondamentaux d'évitement, de réduction et de recyclage des déchets. L'IGDPS devrait être opérationnelle pendant une cinquantaine d'années et permettra de stocker un maximum de 1 000 000 mètres cubes (m^3) de DFA au cours de sa durée d'exploitation. • Les déchets de très faible activité sont une sous-catégorie des DFA selon la norme N292.0-19 du groupe CSA : *Principes généraux pour la gestion des déchets radioactifs et du combustible irradié* [4]. La section 3.3.1 atteste que seuls les déchets de faible activité définis dans la norme CSA N292.0-19 et dans les lignes directrices de l'Agence internationale de l'énergie atomique (AIEA) sur la classification des déchets radioactifs (GSG-1) [5] seront sotckés dans l'IGDPS. • La section 2.2(4) des lignes directrices GSG-1 précise que ces déchets (DFA) doivent faire l'objet d'un confinement et d'un isolement solides pendant des périodes pouvant aller jusqu'à quelques centaines d'années et qu'ils peuvent être stockés dans des installations de gestion des déchets près de la surface. Selon la norme SSR-5 de l'Agence internationale de l'énergie atomique (AIEA) (*Stockage définitif des déchets radioactifs)* [6], le stockage des déchets près de la surface consiste en leur stockage dans une installation composée de tranchées ou de voûtes artificielles construites à la surface du sol ou à quelques dizaines de mètres sous la surface. Ce genre d'installation peut être considérée comme une installation de stockage des DFA.

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			Comme l'indique la section 2.2 de l'EIE définitive, les LNC ont élaboré une stratégie de gestion intégrée des déchets [3] qui décrit brièvement le traitement de tous les déchets classés par les LNC, de la production au stockage permanent. Cette stratégie est fonction de l'inventaire des déchets des LNC et de données prévisionnelles et s'appuie sur les principes fondamentaux d'évitement, de réduction et de recyclage des déchets. Références [1] CCSN, Gestion des déchets, Tome III : Évaluation de la sûreté à long terme de la gestion des déchets radioactifs, REGDOC-2.11.1, mai 2018. [2] Critères d'acceptation des déchets de l'installation de gestion des déchets près de la surface, 232-508600-WAC-003. [3] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [4] Groupe CSA, norme N292.0-19 : Principes généraux pour la gestion des déchets radioactifs et du combustible irradié, 2019. [5] AIEA, General Safety Guide – 1, Classification of Radioactive Waste. [6] AIEA, Stockage définitif des déchets radioactifs, Prescriptions de sûreté particulières, norme de sûreté SSR-5, avril 2011.
CNL-ND14	Dr. J.R. Walker (May 9, 2017) Simon Bullivant (May 13, 2017) Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The proposal does not discuss alternative means in sufficient detail to allow a comparison with the effects of the project. For example, there is no comparison of the expected radiation doses to members of the public as a function of time. Hence, it is impossible to ascertain the value of any dose to members of the public that may be averted by choosing one alternative means over another. The EIS fails to provide criteria used to identify alternative means for carrying out the project. What criteria have alternative sites been measured against for suitability purposes?	The method followed to assess Alternative Means for carrying out the Near Surface Disposal Facility (NSDF) Project is found in Section 2.5 of the final Environmental Impact Statement (EIS). The assessment of alternatives for the NSDF Project is consistent with the Canadian Nuclear Safety Commission (CNSC) *Generic Guidelines for the Preparation of an EIS* [1] and the Canadian Environmental Assessment Agency Operational Policy Statement: Addressing the "purpose of" and "Alternative Means" under *Canadian Environmental Assessment Act* (*CEAA)*, 2012 (2015). For the NSDF Project, The consideration of alternatives is presented for each category in three steps: • identification of technical and economically feasible alternative means; • identification of effects on Valued Components (VCs); and • application of criteria and completion of a comparative evaluation to identify the preferred option. Each alternative is assessed and the most preferable option is selected after a systematic consideration of technical feasibility, economic feasibility and environmental effects. Public and Indigenous engagement is a key aspect of the decision-making process. Canadian Nuclear Laboratories (CNL) has considered alternatives for Facility Type, Facility Design, Facility Location, and Site Selection. Evaluation Criteria included environmental, technical and economic factors (see Section 2.5.1 of the EIS). To determine the preferred or most favourable means of developing a disposal facility, each alternative is evaluated first for its technical feasibility. For those alternatives deemed technically feasible, a comparison of economic feasibility (i.e., cost) and the likely environmental effects is completed. Criteria for evaluating each of the alternatives are summarized in Table 2.5.1-1, with further rationale provided in the following sections. As outlined in Section 2.5.5 of the final EIS, the selection process for the siting of the NSDF at Chalk River Laboratories (CRL) began with the establishment of mandatory criteria that must be satisfied by candidate locations; mandatory criteria included minimum area of 14 ha, minimum site width of 200 m, access to water for sanitary and process requirements, access to electrical power, and access to gas or other heating fuel. Exclusion criteria was then applied to remove any locations that were constrained by project requirements or by pre-defined factors; exclusion criteria are physical, cultural and biological features that will eliminate a location from the list of potential sites because development is either not

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			permitted or poses a risk for the intended use/project. The site remaining were evaluated in terms of rated comparison criteria, and included considered feedback received during engagement activities. Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND15	Greg Csullog (May 1, 2017) Denise Anne Walker (May 8, 2017 Anna Tilman (June 22, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) David Raman (August 3, 2017) Michael Stephens (August 14, 2017) Canadian Coalition for Nuclear Responsibility (CCNR) (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **2.5 Alternative Means for Carrying out the Project:** Some commenters inquired, how does the design of the proposed NSDF compare with CNL's Long Term Waste Disposal Facility (LTWMF) at Port Hope, which is also a NSDF for LLW? Does it take into account the differences in waste characteristics and the constituents of the wastes? The proposed NSDF would contain ILW and waste from facilities such as Whiteshell and prototype reactors. Does the facility at Port Hope contain ILW, and if so, how much? Some commenters expressed concern with the comparison for Port Hope and Port Granby, for the following reasons: • Regarding, "The safety of the NSDF post-closure is provided by means of passive features (e.g., ECM cover system) that will end the need for active management". This is the same cover system as Port Hope's proposed facility, which, if designated as long term storage instead of disposal, will need active management in perpetuity ("The safety of long term storage requires the maintenance of the industrial, regulatory and security infrastructure as described in previous sections" - extracted from the position paper cited below). Port Hope is cited as a similar design with different objectives, which cannot be rationalized. • If the Port Hope and NSDF facilities are truly comparable in design and function, then they have to be truly comparable in purpose – disposal. It would not be appropriate for the CNSC to allow 500+ years storage for Port Hope wastes (next to highway 401), which have long-lived radionuclides at low concentration and NSDF disposal of shorter lived LLW (in a remote location) for seemingly similar concepts. • Port Hope and Port Granby are not "gold standard" examples for long-term management of radioactive waste given their legacy issues of contamination.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The designs of Port Hope Long-Term Waste Management Facility (LTWMF) and NSDF sites are similar, however the LTWMF is a long-term waste management facility and the NSDF will be a disposal facility. Both facilities accept only LLW – no ILW was is being placed in the Port Hope LTWMFs, nor will ILW be placed in the NSDF. The nature of the waste in Port Hope is more uniform due to the origin (radium and uranium refining) than radiological waste streams proposed for NSDF which is more varied due to the variety of research and operations over the last 65 years as well as historical contamination events at the CRL site. The design of the engineered containment mound of the proposed NSDF is slightly different to the design of the Port Hope LTWMF, primarily due to differences in site characteristics and waste inventories. The design of the wastewater treatment plants at Port Hope and the NSDF are also different in order to target the removal of contaminants specific to the waste inventory of each facility. The NSDF will be licensed as a Class IB nuclear facility included as part of the Chalk River Laboratories site operating licence, and therefore, has been designed to meet the requirements for a disposal facility as outlined by the Canadian Nuclear Safety Commission (CNSC) draft Regulatory Document 2.11.1, Waste Management, Volume I: *Management of Radioactive Waste* (currently under development) [2] and follows International Atomic Energy Agency (IAEA) guidance for a radioactive waste disposal facility including *Disposal of Radioactive Waste* (SSR-5) [3] and *Near Surface Disposal Facilities for Radioactive Waste* (SSG-29) [4]. The long-term safety of the NSDF is provided by passive means and passive engineered features including the perimeter berm, final cover system and base liner system. The passive means of the NSDF are in alignment with Requirement 5, passive means for safety of the disposal facility, of the IAEA's SSR-5 [3] and CNSC's REGDOC-2.11.1 *Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management* [5]. A Post-Closure Safety assessment (PostSA) [6] for the NSDF has been prepared and utilizes the reference inventory [7] at closure (i.e., 2070) to predict radiological dose to humans and contaminant concentrations in the environmental media. The approach to the PostSA ensures the assessment is performed to demonstrate that the NSDF long-term safety is not reliant on institutional controls in order to meet the dose requirements. The PostSA considers human intrusion scenarios including borehole drilling (acute exposures) and a house with basement (chronic exposures). Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control, a variant of this scenario is presented with the doses calculated from 100 years, to see how they would change with a shorter period of institutional control. In all these scenarios, the calculated dose is below the regulatory dose limit for a member of the public of 1 mSv/yr. Thus, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that

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			inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with IAEA SSR-5 [3] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. The radioactive decay from the time of closure of the engineered containment mound (ECM) is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. Canadian Nuclear Safety Commission's regulation of the Port Hope LTWMF is outside the scope of this environmental assessment. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] CNSC, Waste Management, Volume I: Management of Radioactive Waste, REGDOC-2.11.1, Draft, 2019 March. [3] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements, Safety Standards Series No. SSR-5, STI/PUB/1449, 2011 April. [4] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [5] CNSC, Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management, REGDOC-2.11.1, Volume III, 2018 May. [6] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [7] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND16	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) David Prentice (August 16, 2017) Michael Nogas (August 15, 2017) Virginia MacLatchy (August 16, 2017) Ralliement contre la pollution radioactive (August 3, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The EIS fails to adequately consider the alternative of constructing a Geological Waste Management Facility (GWMF). It only includes a pre-chosen set of alternative means. It does not document the rationale for the alternative means retained for consideration in the environmental assessment of the project. CNL has indicated in its EIS that: • The GWMF has substantially higher lifecycle costs, potentially an order of magnitude higher than for an NSDF. In addition, the environmental studies required to confirm site suitability, licencing, and construction schedule would take a substantially longer period than that required for the NSDF alternative, which would result in a construction start date later than 2020, delaying planned decommissioning of facilities at CRL.	Canadian Nuclear Laboratories (CNL) has considered alternatives for Facility Type, Facility Design, Facility Location, and Site Selection. Evaluation Criteria included environmental, technical and economic factors (see Section 2.5 of the Environmental Impact Statement (EIS)). As part of the Alternative Means assessment, Section 2.5.2.3 of the final EIS details the evaluation of the Geological Waste Management Facility (GWMF) as a technically and economically feasible alternative facility type. The comparison of the environmental effects of the Near Surface Disposal Facility (NSDF) compared to the GWMF was discussed in Section 2.5.2.3 of the final EIS. The criteria and rational used for evaluating the environmental effects of alternative means (which applies to the GWMF as an alternative facility type) is summarized is detailed in Table 2.5.1-1 and detailed in Section 2.5.1.3. Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). An important waste management principle is that the facility design must be commensurate with the hazard posed by the waste. Low-level radioactive waste contains material with radionuclide content above established clearance levels and exemption quantities (set out in the Nuclear Substances and Radiation Devices Regulations), but generally has limited amounts of long-lived activity. Low-level waste requires isolation and containment for periods of up to a few hundred years. Canadian Nuclear Safety Commission (CNSC) REGDOC 2.11.1 *Waste Management, Volume I: Management of Radioactive Waste* (currently under development) [2] notes that an engineered near surface disposal facility is typically appropriate for LLW [2]. The engineered containment mound is designed to contain and isolate LLW waste from the environment for 550 years after which the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW and most of the radioactive constituents in LLW decay in the first 100 years after closure, the design of the NSDF Project is an appropriate facility type commensurate with the hazard as

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	Métis Nation of Ontario (MNO) (August 16, 2017) Coalition Eau Secours! (August 15, 2017) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017) William Turner (May 31, 2017)	• A GWMF would provide increased barriers for potential releases to the environment in the long-term, but would also require additional waste handling for emplacement may result in increased exposure to workers. [EIS 2.5.2.4] Thus, CNL concludes that GWMFs are most typically proposed for HLW and ILW, and the increased protection to the environment is marginal relative to the nature of the wastes (i.e., approximately 99% by volume LLW) and protection offered through a NSDF. Therefore, a NSDF is the most feasible and most favourable alternative. [Table 2.5.2 Evaluation of Alternatives]. A GWMF away from the river would be far preferable to the NSDF and would coincide with the IAEA safety standards. The EIS evaluates the suitability of a Geologic Waste Management Facility. It states that this type of facility is more robust and provides additional barriers to increase its level of safety. But CNL did not consider this a viable option because it would have a start date later than 2020 and much higher costs. Would it not make more sense to take the more permanent route of a GWMF to ensure risk and liability are fully mitigated? CNL has failed to present an objective and fulsome study of alternatives. Instead, it has argued for cheaper costs and faster time (the year 2020) as the drivers for an NSDF over one option, so that it can prepare to begin its 10 year strategic plan rapidly. One commenter suggests temporary storage of ILW with subsequent burial at an adequate depth, as the preferred option, for retrievability and safety. [Français] L'EIE ne tient pas suffisamment compte de la possibilité de construire une installation géologique de gestion des déchets (IGGD). Elle ne comprend qu'un ensemble d'autres solutions présélectionnées. Elle ne documente pas la justification des autres solutions retenues pour l'évaluation environnementale du projet. Les LNC ont indiqué dans leur EIE que : • L'IGGD a des coûts beaucoup plus élevés pour son cycle de vie, potentiellement d'un ordre de grandeur supérieur à celui d'une IGDPS. De plus, les études environnementales requises pour confirmer la pertinence du site, l'obtention du permis et le calendrier de construction prendraient beaucoup plus longtemps que ce qui est requis pour la solution de l'IGDPS, ce qui entraînerait une date de début des travaux de construction plus tard qu'en 2020, ce qui retarderait le déclassement prévu des installations des LCR. • Une IGGD augmenterait les obstacles aux rejets potentiels dans l'environnement à long terme, mais nécessiterait également une manipulation supplémentaire des déchets pour leur mise en place, ce qui pourrait entraîner une exposition accrue des travailleurs. [EIE 2.5.2.2.4] Les IGGD sont la plupart du temps proposées pour les DRHA et les DRMA, et la protection accrue de l'environnement est marginale par rapport à la nature des déchets (c.-à-d. plus de 99 % par volume de	required by the aforementioned CNSC REGDOC 2.11.1. The commenter is correct in that a GWMF would provide increased barriers for potential releases to the environment in the long-term. However, based on International Atomic Energy Agency (IAEA) safety standards SSR-5 *Disposal of Radioactive Waste* [3], robust GWMFs are designed to accommodate high level waste (HLW) and ILW whereas a NSDF is typically appropriate for LLW. Low level waste requires isolation and containment for periods of time up to a few hundred years. The nature of the waste which needs disposal by Atomic Energy of Canada Limited (AECL) (i.e., LLW), the majority of which is impacted soils and demolition waste at Chalk River Laboratories (CRL), does not warrant the additional barriers provided by the GWMF. Additional waste handling for waste placement into a GWMF will also be required increasing the safety risk associated with disposal operations. Typically, LLW does not require shielding during handling or interim storage in the NSDF. As an example of the best available technology, near surface disposal facilities, as proposed by CNL, have been demonstrated globally to be an effective disposal solution for LLW. From an economic standpoint, the GWMF does have substantially higher life cycle costs, which are potentially an order of magnitude higher than for an NSDF. Canadian Nuclear Laboratories was also sensitive to the schedule and timely implementation of an adequate and robust disposal facility to enable remediation of contaminated lands on the CRL site. The longer it takes to implement a permanent disposal solution, the greater the impact of cumulative effects from these historical contamination events will have on the surrounding environment. With all these considerations, as summarized in Table 2.5.2-2 of the final EIS, a NSDF is the most feasible and most favourable alternative for this proposed Project. Section 2.3 (Purpose of the Project) has been updated to remove reference to 'reducing costs over a 10 year period'. Section 2.3 of the final EIS has been updated to provide a more accurate description of the overall purpose of the project as it relates to environmental remediation of the Chalk River site and site revitalization. The Site Selection Report is a Technical Supporting Document [4] to this EIS and is available upon request. The Site Selection Report has been submitted to the CNSC as the responsible authority to coordinate the Federal and Provincial agency review of the NSDF Project EIS. Attributes of NSDF sites in operation including climate and proximity to water are provided in Table 2.5.2-1 of the final EIS. Several of the NSDF sites in operation are in wet climates and in close proximity to surface water bodies. With regard to climate and proximity of the water system, the NSDF has been designed to withstand climatic conditions and optimizing the siting of the facility. For example, the WWTP design includes provision for managing water volumes from two back to back 1 in 100 year storms. The NSDF site is positioned well above Ottawa River flood elevations and dam break scenarios have been considered (See Section 10 of the final EIS). References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002 [2] CNSC, Waste Management, Volume I: Management of Radioactive Waste, REGDOC-2.11.1, Draft, 2019 March. [3] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements, Safety Standards Series No. SSR-5, 2011. [4] Near Surface Disposal Facility Site Selection Report, 232-10300-TN-001. [Français] Les Laboratoires nucléaires canadiens (LNC) ont envisagé des alternatives en ce qui a trait au type d'installation, à sa conception, à sa localisation et au choix du site. Les critères d'évaluation étaient d'ordre environnemental, technique et économique (voir la section 2.5 de l'Étude d'impact environnemental (EIE)). Dans le cadre de l'évaluation des solutions de rechange, la section 2.5.2.2 de l'EIE définitive indique qu'une installation de gestion des déchets en formation géologique

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		DRFA) et à la protection offerte par une IGDPS. Par conséquent, une IGDPS est l'alternative la plus faisable et la plus favorable. [Tableau 2.5-2 Évaluation des solutions]. Une IGGD éloignée de la rivière serait de loin préférable à l'IGDPS et coïnciderait avec les normes de sûreté de l'AIEA. L'EIE évalue la pertinence d'une installation géologique de gestion des déchets. Elle indique que ce type d'installation est plus robuste et fournit des barrières supplémentaires pour accroître son niveau de sûreté. Mais les LNC n'ont pas considéré cette option viable parce qu'elle aurait une date d'entrée en vigueur plus tard qu'en 2020 et des coûts beaucoup plus élevés. Ne serait-il pas plus logique d'emprunter la voie plus permanente d'une IGGD pour s'assurer que les risques et la responsabilité sont entièrement atténués? Les LNC n'ont pas réussi à présenter une étude objective et complète des solutions de rechange. Au lieu de cela, ils ont plaidé en faveur d'une réduction des coûts et d'une accélération des délais (l'année 2020) en tant que moteurs d'une IGDPS par rapport à une option, afin qu'ils puissent se préparer à mettre en œuvre rapidement leur plan stratégique décennal. Un commentateur suggère l'entreposage temporaire des DRMA avec enfouissement subséquent à une profondeur suffisante, comme option privilégiée, aux fins de récupération et de sûreté.	(IGDFG) est une alternative valable sur les plans technique et économique. Les effets environnementaux comparés d'une installation de gestion des déchets près de la surface (IGDPS) et d'une installation de gestion des déchets en formation géologique (IGDFG) sont analysés à la section 2.5.2.3 de l'EIE définitive. Les critères et la logique d'évaluation des effets environnementaux des solutions de rechange (appliqués à l'IGDFG comme alternative) sont résumés au tableau 2.5.1-1 et explicités à la section 2.5.1.3. Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire de déchets destinés à l'IGDPS et y ont apporté des modifications. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été [officiellement annoncée](#) par les LNC le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage définitif des DMA (section 2.2.2.1 de l'EIE définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [1]). La proportionnalité de l'installation prévue au regard des risques associés aux déchets est un principe important de la gestion des déchets. Les déchets radioactifs de faible activité contiennent des radionucléides à des concentrations supérieures aux niveaux autorisés et aux quantités exemptées (énoncés dans le Règlement sur les substances nucléaires et les appareils à rayonnement), mais généralement avec une quantité limitée de radionucléides à longue durée. Les déchets de faible activité doivent être isolés et confinés pendant des périodes pouvant aller jusqu'à quelques centaines d'années. Le document d'application de la règlementation de la Commission Canadienne de sûreté nucléaire (CCSN) REGDOC 2.11.1, intitulé *Gestion des déchets, Tome I : Évaluation de la sûreté à long terme de la gestion des déchets radioactifs* (en cours d'élaboration) [2], rappelle qu'une installation de gestion des déchets près de la surface convient généralement aux DFA [2]. Le monticule de confinement artificiel est conçu pour confiner les DFA et les isoler de l'environnement pendant 550 ans, après quoi leur radioactivité diminue à des niveaux proches des concentrations naturelles de fond. Comme l'IGDPS ne traitera que des DFA et que la plupart de leurs éléments radioactifs se désintégreront au cours des 100 ans suivant la fermeture, l'IGDPS est un type d'installation proportionnel aux risques selon les exigences du document de la CCSN précité (REGDOC 2.11.1). Le commentateur a raison de dire qu'une IGDFG offrirait des barrières plus solides aux émissions éventuelles dans l'environnement à plus long terme. Mais, selon la norme SSR-5 de l'Agence internationale de l'énergie atomique (*Stockage définitif des déchets radioactifs)* [3], les IGDFG sont des installations robustes destinées à traiter les déchets de haute activité (DHA) et les DMA, alors qu'une IGDPS convient généralement aux DFA. Les déchets de faible activité doivent être confinés et isolés pendant des périodes pouvant aller jusqu'à quelques centaines d'années. La nature des déchets qu'il convient d'éliminer selon l'Agence internationale de l'énergie atomique (AIEA), à savoir ici des DFA, dont la majorité est composée de terre contaminée et de débris de démolition sur le site des Laboratoires de Chalk River (LCR), ne justifie pas les barrières supplémentaires fournies par une IGDFG. La manutention supplémentaire de déchets associée à leur placement dans une IGDFG exigerait un relèvement des mesures de sûreté compte tenu des risques associés aux activités de gestion des déchets. En général, les DFA n'exigent pas de matériel de protection ni d'entreposage provisoire dans une IGDPS. Exemple de meilleure technologie disponible, le modèle d'installation de gestion des déchets près de la surface proposé par les LNC a fait, à l'échelle globale, la preuve de son efficacité pour la gestion des DFA. Du point de vue économique, l'IGDFG entraîne des coûts considérablement plus élevés tout au long de son cycle de vie et probablement d'un ordre de grandeur supérieur à ceux d'une IGDPS. Les Laboratoires nucléaires canadiens ont également tenu compte du calendrier et de l'opportunité de la mise en œuvre d'une installation suffisamment solide pour permettre l'assainissement des terres contaminées du site des LCR. Plus il faut de temps pour concrétiser une solution permanente, plus les effets cumulatifs de ces sources de contamination successives auront un impact important sur l'environnement immédiat. Toutes considérations ayant été

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			analysées (résumées au tableau 2.5.2-2 de l'EIE définitive), l'IGDPS est la solution la plus réaliste et la plus favorable dans le cadre de ce projet. La section 2.3 (Objet du projet) de l'EIE définitive a été mise à jour pour y supprimer la référence à la réduction des coûts dans un délai de 10 ans et pour y décrire de façon plus précise l'objet global du projet du point de vue de l'assainissement et de la revitalisation du site des LCR. Le rapport sur la sélection du site est le document technique [4] afférent à l'EIE, que l'on peut obtenir sur demande. Il a été présenté à la CCSN, qui est l'autorité chargée de coordonner l'examen de l'EIE du projet d'IGDPS par les autorités fédérales et provinciales. Les caractéristiques de différents sites d'IGDPS en exploitation, notamment en matière climatique et de proximité de l'eau, sont fournies au tableau 2.5.2-1 de l'EIE définitive. Plusieurs de ces installations se trouvent dans des zones au climat humide et à proximité de masses d'eau de surface. Quant aux conditions météorologiques et hydrologiques, les IGDPS sont conçues pour résister aux intempéries et pour tirer le meilleur parti du site retenu. Par exemple, la conception de l'UTEU prévoit la possibilité de gérer les volumes d'eau produits par deux tempêtes centennales successives. Le site proposé se trouve bien au-dessus du niveau de la rivière des Outaouais, et l'on a envisagé divers scénarios de bris de barrage (voir la section 10 de l'EIE définitive). Références [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [2] CCSN, Gestion des déchets, Tome I : Gestion des déchets radioactifs, REGDOC-2.11.1, version provisoire, mars 2019. [3] AIEA, Stockage définitif des déchets radioactifs, Prescriptions de sûreté particulières, norme de sûreté SSR-5, 2011. [4] Near Surface Disposal Facility Site Selection Report, 232-10300-TN-001.
CNL-ND17	Joan Lougheed and Town of Deep River (August 16, 2017) Northwatch (August 16, 2017)	In CNL's Assessment of Alternative Means and Sites, a key criterion in evaluating the project alternatives is whether there is potential for 'future expandability' (see pg. 2-13, Table 2.5.1-1). Alternatives that accommodated 1,000,000 m3 and that provided future expandability were most favourable (see pg.2-14). The NSDF was found to be the most favourable alternative as 'further expansion would be possible if required' (see pg. 2-24, Table 2.5-2). The commenters raise that the draft EIS contains no meaningful or fulsome discussion regarding CNL's future expansion plans beyond the planned Stage 2 of the NSDF (which is CNL's stated plan to expand the ECM from 525,000 m^3 to 1,000,000 m^3). The commenters highlight that there is no process described for proceeding with expansion of waste volume beyond 1,000,000 m3, including whether a new EA will be undertaken with the involvement of the host community. The commenters request that CNL clearly set out any future expansion plans regarding site area, the NSDF structure, and/or radioactive waste volumes, or provide any evidentiary record of how those plans were developed in general and more specifically, how the public and Indigenous peoples were engaged in the development of those plans.	Canadian Nuclear Laboratories (CNL) will responsibly manage the NSDF and consider all waste diversion options to ensure optimization and efficient use of the NSDF. Ideally, the NSDF will be the only disposal facility for low-level waste at the Chalk River Laboratories (CRL) site. In Table 2.5.1-1 of final Environmental Impact Statement (EIS), expandability has been removed as part of the criteria for technical feasibility, and the criteria is based on storage capacity. Alternatives that accommodated 1,000,000 m^3 were most favourable. Alternatives that did not accommodate 1,000,000 m^3 of waste were assessed as not technically feasible. The NSDF site cannot be easily expanded. The maximum amount of waste material that can disposed of on the NSDF site is 1,000,000 m^3. If there is more low-level waste (LLW) than can fit into NSDF, a different disposal solution will be required. With that said, it is in Canadian Nuclear Laboratories' (CNL's) best interest to treat the capacity of the NSDF as an asset and to use it efficiently including the application of waste diversion principles. For example detailed waste characterization and the use of exemption/clearance levels will be utilized to improve the NSDF's capacity for LLW. The placement of wastes into the Engineered Containment Mound (ECM) will be completed in two phases – Phase 1 to accommodate wastes currently in storage and to be generated over next 20 to 25 years and Phase 2 for wastes generated following Phase 1. The Phase 2 work is not based on an expansion of the NSDF, but as part of the design of the ECM for 1,000,000 m^3 of low-level waste. This 1,000,000 m^3 of low-level waste volume, the majority of which is impacted soils and demolition waste, is based on waste forecasting from future facility decommissioning and environmental remediation activities as well as takes into consideration approaches to waste management (Section 2.5.1.1 of final EIS).

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			Canadian Nuclear Laboratories current waste forecast indicates that waste generation after NSDF closure will decrease significantly. The remaining volume will be evaluated against available options at the time, such as use of service suppliers and/or the use of other facilities. Future waste storage or disposal options will be in accordance with the future licensing and environmental assessment processes if required and consistent with the CNL Integrated Waste Strategy [1]. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND18	Evelyn Gigantes (May 17, 2017)	There is an implicit judgement in the EIS that there will be less problem/cost involved in transporting Whiteshell waste to a Chalk River NSDF than in transporting Chalk River/Rolphton waste to a Whiteshell NSDF. How can this be considered an adequate reflection of the requirement to assess alternatives that is outlined in the *Canadian Environmental Assessment Act, 2012* (CEAA 2012)?	The assessment of alternatives is consistent with the Canadian Nuclear Safety Commission's (CNSC) *Generic Guidelines for the Preparation of an Environmental Impact Statement (EIS*) [1] and the Canadian Environmental Assessment Agency Operational Policy Statement: Addressing the "purpose of" and "Alternative Means" under *Canadian Environmental Assessment Act (CEAA)*, 2012. In addition, the evaluation criteria selected considered the Environmental and Social Sustainability Performance Standards developed by the International Finance Corporation, as outlined in Section 2.5.1 of the final EIS. As outlined in Section 2.5.4 of the final EIS, facility location was assessed as part of the alternative means. Atomic Energy of Canada Limited (AECL) and Canadian Nuclear Laboratories' (CNL) preference for siting a low-level waste (LLW) disposal was a technically feasible site on lands currently under AECL ownership and CNL control, ideally close to the location of generation and/or storage of the waste and in an area that is already covered by a nuclear licence. Canadian Nuclear Laboratories did consider locating the facility at alternative sites owned by AECL and operated by CNL, specifically Whiteshell Laboratories (WL) in Pinawa, Manitoba, and the Nuclear Power Demonstration (NPD) prototype reactor site in Rolphton, Ontario. Overall, the land at these sites is controlled by CNL and are likely to have suitable technical characteristics to safely manage the waste. The non- Chalk River Laboratories (CRL) options are more likely to raise public concerns related to transportation safety of larger volumes of LLW radioactive wastes, as approximately 90% of the waste proposed for the NSDF is currently located at CRL. Also, both WL and NPD are scheduled to be closed within the next decade, and therefore, will not have the services and management infrastructure required to safely and securely operate the NSDF. Thus, the assessment of facility location concluded that both WL and NPD are less favourable alternatives than CRL. Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND19	Greg Csullog (May 1, 2017) Denise Anne Walker (May 8, 2017) Janey Bullivant (May 13, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **2.5 Alternative Means for Carrying out the Project – 2-16:** Regarding, "Facility Type", the selection of only the NSDF and GWMF as alternatives was too limited. Why was a VLLW facility not considered for decommissioning wastes and trace contaminated soils from remediation? Why was an intermediate-depth (cavern) concept not considered? Away from surface does not imply only deep geological. CNL did not examine other possible sites in Ontario or the rest of Canada. a) Why not?	As part of the Alternative Means assessment in Section 2.5 of the final Environmental Impact Statement (EIS), Canadian Nuclear Laboratories (CNL) evaluated the Facility Type of Geological Waste Management Facility (GWMF) as well as the Facility Design of an above ground concrete vault (AGCV) versus other alternatives. Canadian Nuclear Laboratories has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]).

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		b) Is it not a requirement that the siting process be broad and examine possible options for the most suitable geographic, geologic, and sustainable site? c) How has the proponent demonstrated compliance with Section A.3.2 of CNSC REGDOC-2.9.1, Environmental Principles, Assessments and Protection Measures, re options for locations? d) How will the lack of process be addressed? **Note from Janey Bullivant re potential alternatives**: construction of a deep geological repository within stable rock and below the water table is an appropriate solution for medium and low-level waste as well as high level waste. Such a repository was approved in May 2015 at the Western Waste Management Facility at Bruce.	The NSDF will only contain solid low-level waste. The engineered containment mound is designed to contain and isolate the wastes from the environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW and most of the radioactivity; thus, the hazard, decays in the first 100 years after closure, the design of the NSDF Project is commensurate with the hazard. A very low-level waste (VLLW) facility was considered as part of the alternative means assessment (Section 2.5.2.4). Very low-level waste is a subcategory of LLW. Canadian Nuclear Laboratories had previously considered development of a VLLW disposal facility at the Chalk River Laboratories (CRL) Site. Canadian Nuclear Laboratories implemented a trial to demonstrate the viability of segregation and storage of VLLW. The trial demonstrated that the fraction of the total LLW that could be segregated as VLLW was disproportionate to the time, effort, storage requirements that were expended to realize any net benefit from the work. In addition, the LLW with higher activity that is segregated from the VLLW will still require a separate LLW disposal facility. Therefore, the development of a VLLW disposal facility does not meet the Project purpose which recognizes the need for a LLW disposal facility and a VLLW disposal facility is not considered technically feasible, nor was it considered economically feasible (duplication of effort). A shallow cavern was also considered as part of the alternative means assessment (Section 2.5.3.3). The International Atomic Energy Agency (IAEA) guidance [2] recognizes that in the siting process of a near surface disposal facility, the facility design considers the hydrogeological characteristics of the siting location. The groundwater table at the host site should be deep, well below the base of the cavern, to ensure that the cavern does not flood and release radionuclides to the environment. As such shallow caverns were eliminated from consideration for CNL's LLW facility design primary due to the CRL site characteristics. In the NSDF Site Study Area, average groundwater depths range from 0.06 meters below ground surface (mbgs) to 15.95 mbgs, with an average of 4.81 mbgs under normal conditions, and 3.61 mbgs during seasonal high conditions (see Section 5.3.2.4.2.1 of the final EIS). Near-surface caverns constructed in, or near the water table, are at a very high risk of immediate flooding, and are therefore not appropriate or technically feasible for the disposal of radioactive waste. Furthermore, no single cavern could be excavated to meet the volume of 1,000,000 m^3, resulting in multiple caverns and multiple designs to suit the localized hydrogeology. As outlined in Section 2.5.4 of the final EIS, facility location was assessed as part of the alternative means. Atomic Energy of Canada Limited (AECL) and CNL's preference for sitting a LLW disposal facility was a technically feasible on lands currently under AECL ownership and CNL control, ideally close to the location of generation and/or storage of the waste and in an area that is already covered by a nuclear licence. Canadian Nuclear Laboratories did consider locating the facility at alternative sites owned by AECL and operated by CNL, specifically Whiteshell Laboratories (WL) in Pinawa, Manitoba, and the Nuclear Power Demonstration (NPD) prototype reactor site in Rolphton, Ontario. The rationale supporting building the NSDF at CRL site and bringing WL waste to CRL site, is that the vast majority (90%) of the waste to be managed in the NSDF is located at CRL. The land at these sites is controlled by CNL and are likely to have suitable technical characteristics to safely manage the waste. However, given that the majority of the waste destined for the proposed NSDF is already located at CRL, locating the NSDF elsewhere in the province or country would require significant increases in the transportation of nuclear waste which is not viewed as favourably by the public. Also, both WL and NPD are scheduled to be closed within the next decade, and therefore, will not have the services and management infrastructure required to safely and securely operate the NSDF. Thus, the assessment of facility location concluded that both WL and NPD are less favourable alternatives than CRL.

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			The assessment of alternatives is consistent with the Canadian Nuclear Safety Commission's (CNSC) *Generic Guidelines for the Preparation of an EIS* [3], and the Canadian Environmental Assessment Agency Operational Policy Statement: Addressing the "purpose of" and "Alternative Means" under *Canadian Environmental Assessment Act (CEAA)*, 2012. Canadian Nuclear Laboratories has considered alternatives for Facility Type, Facility Design, Facility Location, and Site Selection. Evaluation Criteria included environmental, technical and economic factors. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002 [2] IAEA. 2014. Near Surface Disposal Facilities for Radioactive Waste. Specific Safety Guide SSG-29. [3] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND20	Canadian Environmental Law Association (CELA) (May 19, 2017)	1. CNL defined and used three criteria (technical feasibility, economic feasibility, and environmental effects) to evaluate the alternative means and the preferred NSDF option. CNL, however, did not discuss the relative contributions of the alternative means and the preferred NSDF option to sustainability. Nor, did CNL explain the process by which it incorporated sustainability concerns in its evaluations. Describe how sustainability-based criteria were used to evaluate and compare the alternative means as well as the effects of the preferred NSDF option. 2. CNL set out other principles (CNL design principles, INPO nuclear safety culture principles, IAEA safety principles) and CNSC licensing requirements, asserting that these provided the context for its evaluation. It did not, however, show how these principles and requirements influenced the analysis and conclusions. Describe how CNL design principles, INPO nuclear safety culture principles, IAEA safety principles, and CNSC licensing requirements constitute relevant sustainability considerations; and how they were integrated in a comparative evaluation of the alternative means leading up to the selection of the preferred option.	Canadian Nuclear Laboratories' (CNL) Environmental Policy has recently been amended to include a clear commitment to sustainability. This change supports CNL's alignment to standards set by the Government of Canada, specifically the 2016 to 2019 *Federal Sustainable Development Strategy*. The assessment of alternatives is consistent with the Canadian Nuclear Safety Commission's (CNSC) *Generic Guidelines for the Preparation of an EIS* [1] and the Canadian Environmental Assessment Agency Operational Policy Statement: Addressing the "purpose of" and "Alternative Means" under *Canadian Environmental Assessment Act (CEAA)*, 2012. In addition, the evaluation criteria selected considered the Environmental and Social Sustainability Performance Standards developed by the International Finance Corporation, as outlined in Section 2.5.1 of the final EIS. Section 2.4 of the final EIS "Project Design Principles" states that any nuclear facility designed, constructed and operated at the Chalk River Laboratories site is required to satisfy the Chalk River Laboratories (CRL) licence requirements and CNL Management Systems thus are not carried into the alternative means assessment. Canadian Nuclear Laboratories has utilized CNSC and International Atomic Energy Agency (IAEA) design principles which ensure the safety of long-term radioactive waste management or disposal facilities. These principles are essential elements in the design and development of a disposal facility and were used to inform the definition of evaluation criteria in Section 2.5.1 (alternative means assessment). The alternative selected as the preferred or most favourable means of developing a disposal facility must meet the design principles and requirements discussed in Sections 2.4.1 (CNSC) and 2.4.2 (IAEA). Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND21	CELA (May 19, 2017)	CNL's comparative evaluation of alternative means clearly did not capture the complexities in the decisions that must be made in alternative means assessment. Critical questions remain about the trade-offs among the options with respect to their respective contributions to sustainability. These unaddressed trade-offs are especially evident in CNL's 'Evaluation of Alternatives' summary tables for facility type, facility design, facility location, and site selection. Describe and demonstrate how trade-offs were considered among the options in the comparative evaluation of alternative means	The assessment of alternatives is consistent with the Canadian Nuclear Safety Commission (CNSC) Generic Guidelines for the Preparation of an Environmental Impact Statement (EIS) and the Canadian Environmental Assessment Agency Operational Policy Statement: Addressing the "purpose of" and "Alternative Means" under Canadian Environmental Assessment Act (CEAA), 2012. The evaluation criteria used in the assessment of the NSDF considered the Environmental and Social Sustainability Performance Standards developed by the International Finance Corporation [1]. The complexities of the evaluation process is managed through the application of these guidelines and best practices. Canadian Nuclear Laboratories (CNL) assessed alternatives for Facility Type, Facility Design, Facility Location, and Site Selection using evaluation criteria which consider environmental, technical, and economic factors (see Section 2.5 of the EIS). The most preferable options for each aspect of the NSDF is selected after a systematic consideration of technical feasibility, economic feasibility and environmental effect. Each of the criterion (technical, economic, environmental) are

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			weighted equally. The complexity of selecting the alternative options to carry out the NSDF Project were assessed using more specific criteria to fine-tune the overarching evaluation criteria categories as summarized in Table 2.5.1-1 in the EIS. For example, in evaluating the technical feasibility of the facility design selected (the engineered containment mound (ECM)), CNL had to address whether the design incorporate compatible construction materials for the radioactive wastes planned for disposal to provide sufficient design robustness to protect the environment. In addition, the environmental effects criteria of this same alternative must consider whether it can be constructed, operated, and decommissioned in a manner that provides long-term protection of ecological health. Indeed, as was deliberated in Section 2.5.3.1.1, the ECM's design will incorporate an high density polyethylene (HDPE) geomembrane into its double baseliner and final cover systems and this, along with the incorporation of geologically stable construction materials into the perimeter berm, will ensure a sufficiently robust ECM that will be protective of the environment by creating impermeable barriers to isolate the waste over the required regulatory period. These same considerations were applied to the other alternative design, Above-Ground Concrete Vaults (AGCVs) (Section 2.5.3.2 in the EIS). The environmental effects of each of the NSDF and AGCV designs are discussed together in Section 2.5.3.3, paying particular attention to the ease of implementation of mitigation measures to minimize residual environmental effects (as supplemented later in Sections 5.2 through 5.10). CNL recognized during the alternative assessment that the ECM requires a Wastewater Treatment Plant (WWTP) in order to manage and address the potential generation of leachate which may arise in the event of interaction of surface water (e.g., rain, snow) with waste in the ECM during its operation. To its credit, such problems would not be encountered in the AGCV design. However, the results of other evaluation criteria (e.g., long-term environmental sustainability) drive the conclusion that the NSDF remains the best alternative Project facility design. As such, the alternative means evaluation of the NSDF, with respect to its environmental effects criteria, required the examination of possible leachate management systems as elaborated in Section 2.5.6. The leachate management alternatives included options for the treating leachate using an existing wastewater treatment facility onsite, constructing a new Wastewater Treatment Plant (WWTP), or using a leachate evaporation pond. Ultimately, the construction of a new WWTP for the NSDF is the most technically feasible option since the existing wastewater treatment center at the CRL site is expected to reach the end of its operation life in the next decade (i.e., it will not be available for the duration of the Project expected operation) whereas leachate ponds are more practical for hot dry climates where evaporation rates are higher and not in mid-continental climates in central Canada which has no distinct dry seasons (Section 2.5.6.4). Public and Indigenous engagement is an important aspect of the decision-making process in the alternative assessment. A social acceptability criterion part of the alternative means analysis to provide weight to any concerns and preferences expressed by the public and Indigenous peoples (Section 2.5.1). Social acceptability is a recognized complexity to the alternative means evaluation as the noted concerns are often based on perception rather than actual risks. In this regard, under the environmental criteria category of environmental effects, public and Indigenous engagement helped address how the public and Indigenous groups perceive the alternative means and whether one is preferred over another. To provide insight, acknowledgement of public concerns in the alternative means assessment process must be balanced by CNL through dissemination of the technical basis of the preferred selections. An example of this concept is evident in the selected NSDF site, the East Mattawa Road (EMR) site as summarized in Section 2.5.5, which may be perceive by the public to confer a greater risk compared to the Alternate site because it is located closer to the Ottawa River (Figure 2.5.5-2). It was therefore critical that CNL clarify the rationale for why the Ottawa River will remain protected from a hydrological perspective; this became more important during in-person project engagements (e.g., open house events). Specifically, the groundwater transit time from the EMR site to the nearest surface waterbody is estimated to be 5 to 15 years with an average transit time of approximately 7 years compared to approximately two years for the Alternate site.

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			These are only a few examples of the nuance of complexities applied into the assessment of alternative means that is detailed throughout Section 2.5 in the EIS. Reference: [1] IFC (International Finance Corporation). 2012. Policy on Environmental and Social Sustainability. Available at: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_policy_sustainability-2012
CNL-ND22	CELA (May 19, 2017)	CNL considered adaptive management in the design of its monitoring program. It is unclear, however, how the notion of adaptive management capacity influenced CNL's evaluation of alternative means as well as its assessment of the proposed NSDF. Describe how reversibility, retrievability, diversity, and redundancy were incorporated in (a) the comparative evaluation of alternative means and (b) the design and assessment of the preferred NSDF option.	As outlined in Section 2.5.2.2.1, the Near Surface Disposal Facility (NSDF) has been designed as a permanent disposal facility, incorporating best available technologies and industry practices, including documented experience from the International Atomic Energy Agency (IAEA) and other similar national and international facilities (as described above). As such, retrievability and reversibility have not been incorporated into the alternative means assessment or the design. In accordance with Requirement 5 of IAEA Safety Standards for *Disposal of Radioactive Waste* (SSR-5) [1], the NSDF has been sited, designed and operated to provide features that are aimed at the isolation of the radioactive waste from the public and the environment. The NSDF technology features a multilayer, base-liner and cover system to contain the waste, a wastewater treatment plant (WWTP) with dual process trains to treat the leachate generated, and robust safety monitoring systems such as leak detection, radiation monitoring and environmental monitoring to ensure the safety of workers and the public and the protection of the environment during the operations and post-closure periods. The safety of the NSDF during post-closure is provided by means of passive features (e.g., berm, final base-liner and cover systems) that will end the need for active management, which is in alignment with Requirement 5 of the IAEA SSR-5. The features of the selected site and the performance of the combined natural and engineered barriers assure safety following the closure of the engineered containment mound (ECM). Adaptive management is a means by which uncertainties in outcomes can be reduced through monitoring. The role of adaptive management is to evaluate the results of monitoring programs in order to develop appropriate responses on an on-going basis. As such, the potential for applying adaptive management to the NSDF Project has been implicitly incorporated into project design thus facilitating future modifications should monitoring indicate that changes are necessary. Reference: [1] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011 April.
CNL-ND23	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017) Michael Stephens (August 14, 2017) Dr Éric Notebaert, Association canadienne des médecins pour	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The EIS for the proposed NSDF completely ignores the Comprehensive Preliminary Decommissioning Plan (CPDP) (CPDP-508300-PDP-001 Revision 2, March 2014) for the Chalk River Laboratories (CRL). The NSDF project departs in very significant ways from the preferred decommissioning strategy	The Comprehensive Preliminary Decommissioning Plan (CPDP) (CPDP-508300-PDP-001 Revision 2, March 2014) cited in the comment for the Chalk River Laboratories (CRL) has been revised as part of an iterative and strategic process. The CRL Site CPDP [1] was revised in 2018 March to align AECL's strategy to reduce nuclear liabilities through the decommissioning of outdated buildings at the Chalk River site implemented under the Government owned Contractor operated (GoCo) objectives. As outlined in Section 2.1 of the CPDP, the 10 year plan for the period 2016-2026 provides the accelerated timeframes for the CRL site cleanup. The key change that allows large-scale site remediation and hazard reduction to occur is the advancement of a low-level waste disposal facility (proposed Near Surface Disposal Facility (NSDF)) from the previous timeframe of 2035. Specifically, the changes to the waste disposal strategy have a corresponding effect on the timing of decommissioning and environmental remediation activities. Large-scale remediation projects have been brought forward to align with the proposed initiation of NSDF operations. Many decommissioning activities have also been brought forward, not only as a result of planned disposal facilities, but also because of the renewed Science and Technology mission for the site. The approach to nuclear waste management at Atomic Energy of Canada Limited (AECL) and Canadian Nuclear

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	l'environnement (ACME) (August 11, 2017) Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) Ralliement contre la pollution radioactive (August 3, 2017)	described in the CPDP. By ignoring the CPDP in its EIS for the NSDF, CNL disregards many years of accumulated knowledge about CRL facilities and hazards. As a result, the NSDF project may not represent a "technically feasible, safe and environmentally acceptable approach," and may well present a number of design, operational problems and adverse environmental effects that are not addressed in the EIS. Just two years before this EIS, AECL said it had eliminated the idea of bringing together the two categories of radioactive waste that are now referred to as low-activity and intermediate-activity waste. Instead, they chose to bury them both in the rock, but at different depths: one near the surface and the other at a greater depth. Why was this solution not adopted at the time? The commenters express the view that the project is driven instead by the objective of greatly accelerating decommissioning activities at the AECL sites. Future expensive intervention may well be required if and when the NSDF containment fails, so the project will therefore not reliably reduce the nuclear liabilities. The timelines that were presented in AECL's 2014 Comprehensive Decommissioning Plan for Chalk River are very different and recommend a slower, more thorough approach that involves extensive public consultation. The discrepancies between the 2014 plan and the 2017 plan are curious. The commenters request that the EIS explain how this waste management strategy is different and better than the one submitted by AECL in 2014 for the same site and the same wastes. [Français] L'EIE pour l'IGDPS proposée ignore complètement le Plan préliminaire complet de déclassement (PPCD) (CPDP-508300-PDP-001 Révision 2, mars 2014) pour les Laboratoires de Chalk River (LCR). Le projet de l'IGDPS s'écarte de façon très importante de la stratégie de déclassement préférée décrite dans le PPCD. En ne tenant pas compte du PPCD dans l'EIE de l'installation de gestion des déchets près de la surface, les LNC ne tiennent pas compte des nombreuses années de connaissances accumulées sur les installations et les dangers des LCR. Par conséquent, le projet de l'IGDPS pourrait ne pas représenter une « approche techniquement réalisable, sûre et acceptable sur le plan environnemental » et pourrait bien présenter un certain nombre de problèmes de conception, d'exploitation et d'effets environnementaux négatifs qui ne sont pas abordés dans l'EIE. Deux ans à peine avant cette EIE, EACL a déclaré qu'elle avait éliminé l'idée de regrouper les deux catégories de déchets radioactifs que l'on appelle maintenant les déchets radioactifs de faible activité et les déchets radioactifs de moyenne activité. Au lieu de cela, elle a choisi de les enterrer tous les deux dans la roche, mais à des profondeurs différentes : l'une près de la surface et l'autre à une plus grande profondeur. Pourquoi cette solution n'a-t-elle pas été adoptée à l'époque? Les commentateurs sont d'avis que le projet est plutôt motivé par l'objectif d'accélérer considérablement les activités de déclassement sur les sites d'EACL. Une intervention future coûteuse pourrait bien être nécessaire si et quand le confinement de l'IGDPS échouera, de sorte que le projet ne réduira pas de façon fiable les responsabilités nucléaires.	Laboratories (CNL) has evolved since 2015. With the implementation of a GoCo model, AECL was given a mandate to accelerate decommissioning and waste management activities in order to reduce risks and protect the environment. As a result, it has brought in the expertise of CNL and its parent companies to bring forward solutions to waste management that are aligned with international best practices. Canadian National Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes since 2017. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [2]). As part of the Alternative Means assessment in Section 2.5 of the final EIS, CNL evaluated the Facility Type of Geological Waste Management Facility (GWMF). The GWMF does have substantially higher life cycle costs, which are potentially an order of magnitude higher than for an NSDF. Although a GWMF would provide increased barriers for potential releases to the environment in the long-term, the nature of the waste (i.e., LLW), the majority of which is impacted soils and demolition waste, does not warrant the need for these barriers. Near surface disposal facilities, as proposed for the NSDF Project, have been demonstrated globally to be an effective disposal solution for LLW. The NSDF Project is not driven by the objective of greatly accelerating decommissioning activities at AECL sites. The key drivers for this project are AECL's priority to protect the environment and its obligation to responsibly address its radioactive wastes. In some cases, temporary waste storage areas and facilities dating back to the 1940s, 50s and 60s has led to the contamination of the surrounding soil. While this contamination is contained at the Chalk River site, it needs to be remediated in order to protect the environment. Nuclear science and technology activities have also led to buildings becoming contaminated. Some of them are now well beyond their useful life and need to be decontaminated and demolished in order to ensure safety and pave the way for site revitalization. Overall, the facility will help protect the environment by moving: radioactive materials currently in temporary storage, waste from decommissioning of contaminated buildings which are located close to the Ottawa River, and contaminated soils, into a safe and highly-engineered facility, designed to contain the contaminants. Section 2.2 of the final EIS summarizes AECL and CNL's strategies and solutions for waste management of the entire life cycle of all waste classifications including LLW, ILW, high level waste (HLW), hazardous waste and clean (non-radiological) waste, consistent with the CNL Integrated Waste Strategy [2]. The Integrated Waste Strategy [2] concisely details a cradle to grave approach for all CNL-managed waste classifications, from generation to disposal. At CNL, the waste hierarchy (a framework for waste management decision making to enable an effective balance of priorities, with a focus on waste prevention) provides a key input to decisions regarding the management of all waste. Prevention and reduction is the preferred approach but, where waste is generated, reuse and recycle are preferred to disposal. The Integrated Waste Strategy is based on CNL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. The Integrated Waste Strategy is based on CNL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. Canadian Nuclear Safety Commission's (CNSC's) REGDOC-2.11, *Framework for Radioactive Waste Management and Decommissioning in Canada* [3] provides the framework for radioactive waste management and decommissioning in Canada states "Management of waste is commensurate with the hazard: The management of radioactive waste is commensurate with its radiological, chemical and biological hazard to the health and safety of persons and the environment, and to national security." The engineered containment mound (ECM) is designed to contain and isolate the wastes from the

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		Les échéanciers qui ont été présentés dans le plan complet de déclassement de 2014 d'EACL pour Chalk River sont très différents et recommandent une approche plus lente et plus approfondie qui comprend une vaste consultation publique. Les écarts entre le plan 2014 et le plan 2017 sont curieux. Les commentateurs demandent que l'EIE explique en quoi cette stratégie de gestion des déchets est différente et meilleure que celle soumise par EACL en 2014 pour le même site et les mêmes déchets.	environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW and most of the radioactivity; thus, the hazard, decays in the first 100 years after closure, the design of the NSDF Project is commensurate with the hazard. References: [1] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001. [2] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [3] CNSC, REGDOC 2.11, Framework for Radioactive Waste and Decommissioning in Canada, 2018 December. [Français] Le Plan de déclassement préliminaire complet (PDPC) (CPDP-508300-PDP-001, révision 2, mars 2014) cité dans le commentaire concernant les Laboratoires de Chalk River (LCR) a été révisé dans le cadre d'un processus itératif et stratégique. Le PDPC du site des LCR [1] a été révisé en mars 2018 pour l'aligner sur la stratégie d'EACL visant à réduire le passif nucléaire grâce au déclassement de bâtiments obsolètes sur le site des LCR dans le cadre des objectifs de l'OGEE (organisme gouvernemental exploité par des entrepreneurs). Comme l'indique la section 2.1 du PDPC, le plan décennal portant sur la période de 2016 à 2026 prévoit un calendrier accéléré de nettoyage du site des LCR. Le nouvel élément important d'un prochain assainissement à grande échelle du site et d'une réduction des risques est le devancement du délai de 2035 pour la construction d'une installation de gestion des déchets de faible activité (le projet d'installation de gestion des déchets près de la surface (IGDPS)). Plus précisément, les changements apportés à la stratégie de gestion des déchets se répercutent sur le calendrier de déclassement et d'assainissement du site. Beaucoup de projets de déclassement ont également été proposés non seulement en raison des installations prévues, mais aussi de la mission renouvelée du site en matière de science et de technologie. Le point de vue d'Énergie atomique du Canada Ltée (EACL) et des Laboratoires nucléaires canadiens sur la gestion des déchets nucléaires a évolué depuis 2015. Depuis la mise en œuvre du modèle OGEE, EACL a reçu pour mission d'accélérer le déclassement et la gestion des déchets pour réduire les risques et protéger l'environnement. L'organisme a donc sollicité l'expertise des LNC et de ses sociétés mères pour obtenir des solutions de gestion des déchets conformes aux meilleures pratiques internationales. Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire de déchets destinés à l'IGDPS et y ont apporté des modifications. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été officiellement annoncée par les LNC le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage définitif des DMA (section 2.2.2.1 de l'EIE définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [2]). Dans le cadre de l'évaluation des solutions de rechange (section 2.5 de l'EIE définitive), les LNC ont évalué la conception d'une installation de gestion des déchets en formation géologique (IGDFG). La section 2.5.3.3 a été ajoutée à l'EIE définitive pour expliquer pourquoi on n'a pas jugé techniquement valable la solution de la cavité à faible profondeur. La solution de l'IGDFG comporte des coûts importants tout au long du cycle de vie, lesquels sont probablement d'un ordre de grandeur supérieur à ceux d'une IGDPS. Cette solution permettrait d'augmenter les barrières contre les émissions potentielles à long terme dans l'environnement, mais la nature des déchets (des DFA), dont la majorité est composée de terre contaminée et de débris de

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			démolition, ne justifie pas ces barrières. La solution des installations de gestion près de la surface, comme le projet d'IGDPS, est considérée globalement comme une solution efficace pour la gestion des DFA. Le projet d'IGDPS n'a pas pour objectif d'accélérer beaucoup le déclassement des sites d'EACL. Ses principaux objectifs sont, conformément à la priorité d'EACL, de protéger l'environnement et de gérer de façon responsable ses déchets radioactifs. Dans certains cas, des zones et des installations d'entreposage temporaire datant des années 1940, 1950 et 1960 ont entraîné la contamination des sols voisins. Cette contamination se limite au site de Chalk River, mais le site doit être assaini pour protéger l'environnement. Les activités de recherche en science et en technologie nucléaires ont également donné lieu à une contamination des bâtiments. Certains de ces bâtiments ont largement dépassé leur durée de vie utile et doivent être décontaminés et détruits pour garantir la sûreté du site et ouvrir la voie à sa revitalisation. Dans l'ensemble, l'installation permettra de protéger l'environnement grâce au transport des matières radioactives actuellement conservées dans des zones d'entreposage temporaire, des déchets du déclassement des bâtiments contaminés situés aux abords de la rivière des Outaouais, et de la terre contaminée dans une installation à la fois sûre et hautement technologique conçue pour confiner les contaminants. La section 2.2 de l'EIE définitive résume les stratégies et les solutions adoptées par EACL et les LNC pour prendre en charge la gestion de l'ensemble du cycle de vie de tous les types de déchets, à savoir les DFA, les DMA, les déchets de haute activité (DHA), les déchets dangereux et les déchets non contaminés (non radiologique), conformément à la Stratégie de gestion intégrée des déchets des LNC [2]. Cette stratégie [2] décrit brièvement le traitement de tous les types de déchets placés sous la responsabilité des LNC, de la production au stockage définitif. Aux LNC, la hiérarchisation des déchets (cadre décisionnel permettant d'équilibrer les priorités en mettant l'accent sur la prévention) est un élément décisionnel essentiel de la gestion de tous les déchets. La prévention et la réduction sont primordiales, mais, lorsque des déchets sont produits, la réutilisation et le recyclage passent avant le stockage. La Stratégie de gestion intégrée des déchets est fonction de l'inventaire des déchets des LNC et de données prévisionnelles et s'appuie sur les principes fondamentaux d'évitement, de réduction et de recyclage des déchets. Le REGDOC-2.11 (*Cadre de gestion des déchets radioactifs et du déclassement au Canada* [3]) de la Commission canadienne de sûreté nucléaire (CCSN), qui constitue le cadre de gestion des déchets radioactifs et du déclassement au Canada, prévoit ce qui suit : « Les déchets radioactifs sont gérés en fonction des risques de nature radiologique, chimique et biologique pour la santé et la sécurité des personnes, pour l'environnement et pour la sécurité nationale. » Le monticule de confinement artificiel (MCA) est conçu pour confiner les déchets et les isoler de l'environnement pendant 550 ans, après quoi la radioactivité diminue jusqu'à se rapprocher des niveaux de concentrations naturelles de fond. Comme l'IGDPS envisagée ne traitera que des DFA et que la plupart de leurs éléments radioactifs se désintégreront au cours des 100 ans suivant la fermeture, l'IGDPS est un type d'installation proportionnel aux risques. Références [1] Plan de déclassement préliminaire complet, CPDP-508300-PDP-001. [2] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [3] CCSN, REGDOC 2.11, Cadre de gestion des déchets radioactifs et du déclassement au Canada, décembre 2018

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CNL-ND24	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* Une autre grande lacune de cet examen des solutions de rechange : l'absence de méthodologie pour pondérer des critères de choix contradictoires. Lors de l'analyse des solutions de rechange, l'étude d'impact fait semblant d'évaluer toutes sortes de critères, mais elle élimine en fin de compte toute solution qu'on ne peut mettre en service dès 2021 ou qui coûterait plus cher que le dépotoir proposé. De toute évidence, le seul critère éliminatoire a été l'application littérale des exigences emporelles et fiscales du Gouvernement duCanada, énoncées au 2e paragraphe de l'alinéa 2.3 : « L'urgence et l'objectif du projet d'installation de gestion des déchets près de la surface sont ancrés dans les exigences établies par Énergie Atomique du Canada limitée (EACL), au nom du Gouvernement du Canada. Ces exigences visent à réduire considérablement les risques associés aux déchets historiques, aux obligations et aux coûts de l'exploitation des laboratoires des LNC transférés aux contribuables au cours de la décennie de 2016 à 2025. Elles visent aussi à créer des conditions propices à la revitalisation de la propriété des Laboratoires de Chalk River. »	L'évaluation de solutions de rechange est conforme aux Lignes directrices génériques pour la préparation d'un énoncé des incidences environnementales [1] de la Commission canadienne de sûreté nucléaire et à l'énoncé de politique opérationnelle visant la « raison d'être » et les « solutions de rechange » en vertu de la Loi canadienne sur l'évaluation environnementale (LCEE) de 2012 (2015). L'évaluation d'autres solutions a été effectuée de façon impartiale par l'examen d'un certain nombre de critères, dont des facteurs d'ordre environnemental, technique et économique. Les critères d'évaluation des solutions de rechange sont indiqués à la section 2.5.1 de l'EIE définitive. Chaque solution a été évaluée du point de vue de sa faisabilité technique. Les solutions jugées techniquement valables ont fait l'objet d'une évaluation de leur faisabilité économique (coûts) et de leurs effets environnementaux probables. Les résultats d'évaluation de chacune de ces solutions sont résumés au tableau 2.5.1-1 de l'EIE définitive et explicités dans les sections suivantes. Les solutions sont décrites en fonction des critères ci¬ dessus (le cas échéant) et sont résumées dans une matrice illustrant le classement relatif de chacune d'elles (voir plus bas). Si une solution est tout à fait propre à remplir un certain critère, elle est considérée comme la plus favorable. De même, si une solution peut raisonnablement remplir un certain critère, elle est considérée comme favorable, et si elle a peu de chances de remplir ce critère ou comporte un risque inacceptable à cet égard, elle est considérée comme la moins favorable. Du côté des critères techniques, un classement « le moins favorable » était généralement considéré comme le seuil pour lequel une solution n'était pas jugée valable sur le plan technique. La version provisoire de l'EIE de 2017 comportait des échéances optimistes. Compte tenu des commentaires communiqués par la population au sujet de cette version, les Laboratoires nucléaires canadiens (LNC) ont procédé à plusieurs autres études et analyses, dont une analyse de la sûreté opérationnelle, une étude exhaustive de la sûreté après fermeture et une évaluation des risques écologiques, dont les résultats sont inclus dans l'EIE définitive. L'EIE définitive précise que l'objet du projet d'installation de gestion des déchets près de la surface (IGDPS) est de garantir le stockage permanent des déchets de faible activité (DFA) actuels et à venir sur le site des Laboratoires de Chalk River (LCR) tout en protégeant la population et l'environnement. Par ailleurs, ce projet permettrait d'assainir des terres contaminées et des zones de gestion de déchets (ZGD) hérités du passé, et de déclasser des infrastructures obsolètes afin de faciliter la revitalisation du site des LCR. Il convient de noter que l'assainissement des ZGD ferait l'objet d'un examen environnemental distinct et nécessiterait également un examen et une approbation de la Commission canadienne de sûreté nucléaire (CCSN) avant tout travail, de sorte que la discussion des options d'assainissement n'a pas été incluse dans de l'EIE définitive. Référence [1] CCSN, Lignes directrices génériques pour la préparation d'un énoncé des incidences environnementales en vertu de la Loi canadienne sur l'évaluation environnementale, 2012, mai 2016.
CNL-ND25	William Turner (May 31, 2017) 33. 36.	The commenter indicates that none of the evaluation criteria for evaluating alternatives are quantitative or semi-quantitative. The comparisons are "qualitative" and each of the criteria are given the same weighting. In an evaluation of alternatives for radioactive waste disposal, this is not acceptable. To ensure that this evaluation is credible, CNL must select appropriate alternatives, and select quantitative (or semi-quantitative) evaluation criteria that truly assess the potential impacts to the environment. CNL must ensure their evaluation criteria are quantitative. This will ensure that the potential environmental impacts are given the appropriate priority weighting. CNL must provide a sensitivity analysis to determine which of these criteria contribute the most to the selection of the best option. Otherwise, this assessment must be considered biased towards the selection of the ECM.	The assessment of alternatives is consistent with the Canadian Nuclear Safety Commissions' (CNSC) *Generic Guidelines for the Preparation of an Environmental Impact Statement* (EIS) [1] and the Canadian Environmental Assessment Agency Operational Policy Statement: Addressing the "purpose of" and "Alternative Means" under *Canadian Environmental Assessment Act* (CEAA), 2012 (2015). The evaluation criteria for the alternative means are outlined in Section 2.5.1 of the final EIS. Each alternative was evaluated first for its technical feasibility. For those alternatives deemed technically feasible, a comparison of economic feasibility (i.e., cost) and the likely environmental effects is completed. Criteria for evaluating each of the alternatives are summarized in Table 2.5.1-1 of the final EIS, with further rationale provided in the following sections. The alternatives are described using the above criteria (where applicable) and are summarized in a matrix illustrating the relative preference of each alternative. If the alternative has a high chance of successfully addressing a

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		In particular, CNL must describe the infrastructure required to support each "alternative means" to meet this schedule. For example, each "alternative means" will likely require different support activities. Thus, it is unlikely that physical organisation necessary will be the same for each alternative and their respective schedules will differ. Each "alternative means" must address the five IAEA waste classes appropriately. As such each "alternative means" will have its own WAC, such that the "rejected" wastes will differ for each: Thus, how these rejected wastes are managed will also differ. Any description of an "alternative means" must also address the management of those rejected wastes. In addition, the commenter notes that of the two alternatives presented, there are several omissions in the criteria, such as: • The proposed footprint of the ECM is given as about 30 ha. I cannot find any estimate of the footprint for the GWMF. Since the GWMF is mostly underground, I would expect the footprint to be less than 1 or 2 ha. Since clearing a 30 ha site will have a significantly larger impact that clearing a 2 ha site, I would expect comparing the environmental impact from just clearing the site would significantly favour the GWMF over the ECM. • The mound is to be covered and lined with impenetrable membranes. As such, the surface water drainage patterns for the 30 ha site will be severely impacted. (in fact, CNL admit this in their design and the groundwater flow modelling (see also reference, Golder (Golder Associates Ltd.). 2017. Groundwater Flow Modelling of the NSDF). It is somewhat disturbing that a similar assessment has not been conducted for the other alternative identified (that Is, the GWMF) • For the following criteria CNL state there is "No difference between alternatives": ○ Atmospheric Environment ○ Surface Water Environment ○ Aquatic Biodiversity ○ Ecological Health ○ Land and Resource Use Except that assertion is impossible if one compares the footprint of the two alternatives, the ECM with a footprint of 30 ha, and the GWMF with a footprint of 2 ha. If CNL decides to ignore other alternative means, then CNL must revise their evaluation to address the difference in the footprints of the two alternatives.	particular criterion, it is rated as most favourable. Similarly, if the alternative has a moderate likelihood of addressing a criterion, it is rated as favourable, while if the alternative is assessed as having a low likelihood of success or having unacceptable risk with a particular criterion, a least favourable rating is used. For the technical criteria, a rating of "least favourable" was also generally considered to be the threshold for an alternative to not be technically feasible. The alternative means assessment was for a disposal facility for 1,000,000 m^3 low-level waste only, as that is the waste class acceptable for disposal in the Near Surface Disposal Facility (NSDF). A NSDF specific Waste Acceptance Criteria (WAC) [2] has been developed and only wastes that meet the WAC will be placed in the NSDF. Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [3]). NSDF will only contain solid low-level waste (LLW). The engineered containment mound (ECM) is designed to contain and isolate the wastes from the environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW and most of the radioactivity; thus, the hazard, decays in the first 100 years after closure, the design of the NSDF Project is commensurate with the hazard. In response to specific comments: • As described in Section 2.5.2.3, the disturbance footprint for a NSDF facility large enough to accommodate 1,000,000 m^3 of LLW alternative is approximately 37 hectares (ha). The surface footprint required for a geological waste management facility (GWMF) is dependent on the size of the underground repository and the volume of waste rock to be managed at surface. As a comparison, the surface footprint required for the Deep Geological Repository (DGR Project – Ontario Power Generation) is approximately 30 ha for management of 200,000 m^3 of waste. Thus CNL extrapolated a larger footprint would be required to manage excavation spoils of a geologic facility required to manage 1,000,000 m^3 of LLW. • As described in Section 2.5.2.3, both facility types may affect existing availability of the spatial and temporal distribution of water quantity for aquatic and terrestrial ecosystems. For both the NSDF and GWMF facility types, surface water drainage would be managed within the project footprint. Proposed design features would be based on proven surface water management practices controlling erosion, capturing sediment, and for safely conveying flows associated with a 1:100-year or regional storm event. Because the GWMF design would not be prone to infiltration of precipitation through the waste during emplacement, only the NSDF alternative would require some form of water treatment to mitigate potential effects to surface water quality associated with the seepage of leachate from the facility (i.e., changes to groundwater quality). The NSDF's water treatment facility would be designed to meet site-specific risk-based effluent quality criteria to be protective of the environment and humans. • Section 2.5.2.6 summarizes the facility type alternative means assessment. Both the NSDF and GWMF alternatives meet CNL's overall need and are environmentally feasible options. However, the GWMF does have substantially higher life cycle costs, which are potentially an order of magnitude higher than for an NSDF. Although a GWMF would provide increased barriers for potential releases to the environment in the long-term, the nature of the waste (i.e., LLW), the majority of which is impacted soils and demolition waste, does not warrant the need for these barriers. Low level waste requires isolation and containment for periods of

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			time up to a few hundred years. A GWMF also requires additional waste handling for waste placement whereas LLW does not require shielding during handing or interim storage. GWMFs are most typically proposed for high level waste (HLW) and ILW, which are not within the scope of the NSDF Project. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012. 2016 May. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND26	William Turner (May 31, 2017) 50. 51.	As per Section 19(1) of CEAA 2012, any alternative means selected for evaluation must be "technical and economically feasible". The commenter requests that CNL demonstrate how this has been met.	The assessment of alternatives is consistent with the Canadian Nuclear Safety Commissions' (CNSC) *Generic Guidelines for the Preparation of an Environmental Impact Statement (EIS)* [1] and the Canadian Environmental Assessment Agency Operational Policy Statement: Addressing the "Purpose of" and "alternative means" under *Canadian Environmental Assessment Act (CEAA)*, 2012 (2015). Section 2.5 provides an assessment of the alternatives, and includes technical and economic criteria. The evaluation criteria for the alternative means are outlined in Section 2.5.1 of the final EIS. Each alternative was evaluated first for its technical feasibility. For those alternatives deemed technically feasible, a comparison of economic feasibility (i.e., cost) and the likely environmental effects is completed. Criteria for evaluating each of the alternatives are summarized in Table 2.5.1-1 of the final EIS, with further rationale provided in the following sections. The alternatives are described using the above criteria (where applicable) and are summarized in a matrix illustrating the relative preference of each alternative. If the alternative has a high chance of successfully addressing a particular criterion, it is rated as most favourable. Similarly, if the alternative has a moderate likelihood of addressing a criterion, it is rated as favourable, while if the alternative is assessed as having a low likelihood of success or having unacceptable risk with a particular criterion, a least favourable rating is used. For the technical criteria, a rating of "least favourable" was also generally considered to be the threshold for an alternative to not be technically feasible. An evaluation of the technical and economic criteria is provided in Section 2.5.2 Facility Type, Section 2.5.3 Facility Design, Section 2.5.4 Facility Location, Section 2.5.5 Site Selection, Section 2.5.6 Leachate Management and 2.5.7 Effluent Management. Results of the evaluation are illustrated in the summary tables for each of the aforementioned sections, using the evaluation criteria. Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012. 2016 May.
CNL-ND27	William Turner (May 31, 2017) 47.	The commenter raises the concern that there is inconsistency, in section 2.5.2.3 of the EIS, with respect to whether or not engineered barriers are considered as mitigation measures. As such, the commenter requests that CNL explicitly identify each mitigation measure associated with a specific potentially adverse environmental effect. If no mitigation is required, (that is, the engineered barriers are sufficient to address the potentially adverse effect), then CNL must explicitly identify those situations.	The statement in Section 2.5.2.5 of the final Environmental Impact Statement (EIS) "Regardless of whether the facility is a Near Surface Disposal Facility (NSDF) or a geological waste management facility (GWMF), engineered barriers and mitigation measures would be implemented to prevent or delay the migration of contaminants, protect human and ecological health, and limit effects to the aquatic and terrestrial environments." is meant to be a general statement that either facility type – NSDF or GWMF – would require mitigation measures and be designed and constructed to protect workers, the public and the environment. As summarized in Section 2.5.2.6 of the final EIS, although a GWMF would provide increased barriers for potential releases to the environment in the long-term, the nature of the waste (i.e., low-level waste (LLW)), the majority of which is impacted soils and demolition waste, does not warrant the need for these barriers. Low-level waste requires isolation and containment

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			for periods of time up to a few hundred years. A GWMF also requires additional waste handling for waste placement whereas LLW does not require shielding during handing or interim storage. GWMFs are most typically proposed for high level waste (HLW) and intermediate level waste (ILW), which are not within the scope of the NSDF Project.
CNL-ND28	William Turner (May 31, 2017) 54. 55.	Section 2.5.4 - Facility Location cannot be seen as an alternative means. This is especially true since the three alternatives identified by CNL could be sited anywhere, since (except for the Chalk River site) they have chosen not to provide any geotechnical assessments. Without the geotechnical information, one cannot make any assessment as to whether the NPD or Pinawa sites are better locations. Further, of the three alternatives, CNL specifically address the siting of mound only. 2.5.5 As noted in above paragraph – the same holds true for Site Selection.	The alternative means sections 2.5.4 (Facility Location) and 2.5.5 (Site Selection) have been expanded in the final EIS to provide more transparency on the assessment. In the final Environmental Impact Statement (EIS), Table 2.5.4-1, the geological and hydrogeological alternative was considered equal (most favourable) for both On-Site at Chalk River Laboratories (CRL) and Off-site non-CRL site. Although a geotechnical assessment for a Near Surface Disposal Facility (NSDF) at Nuclear Power Demonstration (NPD) or Whiteshell Laboratories (WL) was not completed, the recent work at these two sites to support in-situ disposal indicate they would be suitable for an NSDF type facility. For the site selection, fifteen potential sites within the CRL site were included in the selection process. As outlined in Table 2.5.5-1, none of the sites were excluded based on geotechnical characteristics. The evaluation did exclude sites for other reasons (size, presence of species at risk, proximity to CRL site boundary) resulting in two candidate sites moving forward in the analysis. Geotechnical surveys of both alternative sites were completed. The Alternate site was considered favourable in the geological and hydrogeological assessment due to the groundwater transit time to the nearest surface water body, whereas, the East Mattawa Road site was considered most favourable in the geological and hydrogeological assessment.
CNL-ND29	William Turner (May 31, 2017) 57.	Section 2.5.6 - It is not clear how Leachate Treatment is an alternative means. It does not address the actual disposal of wastes. Further, it is only relevant to the mound facility, not a GWMF or an above ground concrete vault. Please clarify.	As defined by the Canadian Environmental Assessment Agency (CEAA) "the alternative means include options for locations, development and/or implementation methods, routes, designs, technologies, mitigation measures, etc. Alternative means may also relate to the construction, operation, expansion, decommissioning, and abandonment of a physical work." In the alternative means process, each alternative is assessed and the most preferable option is selected after a systematic consideration of technical feasibility, economic feasibility and environmental effects. The assessment started with facility type. As outlined in the summary (Section 2.5.2.6 of the final Environmental Impact Statement (EIS)), the Near Surface Disposal Facility (NSDF) was considered the favourable alternative, thus moved forward in the assessment. Facility design for a NSDF was assessed next – engineered containment mound or above ground concrete vault. As summarized in Section 2.5.3.5, the engineered containment mound (ECM) was the most favourable alternative so moved forward in the assessment. As such, leachate management alternatives were assessed only for the engineered containment mound as the geological waste management facility and above ground concrete vaults were not carried forward in the assessment. The leachate management alternatives assessed options for the treatment of leachate generated by infiltration of water through the wastes in the ECM. The alternatives assessed were the use of an existing wastewater treatment facility onsite, construction of a new Wastewater Treatment Plant or the use of a leachate evaporation pond.
CNL-ND30	David Thompson (April 11, 2017) Pravin Shah (April 8, 2017) Anna Tilman	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **Section 2.5.5 Site Selection:** Reference is made to mandatory, exclusionary and rated evaluation criteria. While some examples were provided, why is a table of ALL the criteria and how the two sites compared not been provided? What was used to verify the efficacy of the site? How was the site suitability criteria met? Are the criteria being used appropriate?	The alternative means Section 2.5.5 (Site Selection) has been expanded in the final Environmental Impact Statement (EIS) to provide more transparency on the assessment. The Chalk River Laboratories (CRL) siting process includes three sets of criteria: mandatory, exclusion and comparison. The mandatory criteria are those attributes that sites must have. By contrast, the exclusion criteria are those attributes that make the site unsuitable for hosting the Near Surface Disposal Facility (NSDF).

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<tr><td></td><td>(June 22, 2017)</td><td></td><td>Table 2.5.5-1 in the EIS summarizes how 15 potential sites were compared based on mandatory and exclusionary criteria (all criteria). This table outlines the suitability of the sites and how they meet appropriate criteria for the purpose of the project. The mandatory criteria used during the site selection included:
• minimum area of 14 ha;
• site must be at least 200 m wide;
• access to Class IV electricity for power;
• access to water for sanitary and process requirements; and
• access to gas or other heating source.

Exclusion criteria were developed by considering physical, cultural and biological features which may be at risk during the intended development of the NSDF Project. The exclusion criteria applied during the site selection included:
<u>Ottawa River Floodplain</u>
• Areas which are below the 1 in 100 year Ottawa River flood elevation of 115 m ASL.
• Areas that are below the flood elevation of 130 m above sea level (ASL) which would result from a hypothetical failure of the Des Joachims Main Dam and McConnell Lake Control Dam.
<u>Areas with a slope in excess of 25%. Areas with a slope of less than 10% are desirable.</u>
<u>Areas within 50 m of Plant Road. The three key reasons for this setback are:</u>
• Protection of CRL workers in transit on Plant Road during waste emplacement.
• Limiting visibility of structures from Plant Road.
<u>Geotechnical Characteristics</u>
• Areas with outcrops and organics >20% of the proposed siting area.
• Areas with liquefaction potential and active fault lines.
<u>Species at Risk</u>
• Areas of nationally or provincially significant plant or tree species, in small groups or stands, in accordance with the Federal Species at Risk Act (SARA) and habitat of those threatened or endangered species as per the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listing. Research plantations at CRL may contain these species.
• Known or likely habitats of national or provincially significant wildlife species in accordance with the Federal SARA or COSEWIC listing as per guidance by the CNL Environmental Protection Program.
<u>Wetlands</u>
• Areas that are seasonally or permanently inundated with water.
• Areas within 30 m from a water courses wetlands.
<u>Located adjacent to provincially registered archaeological sites.</u>
<u>Areas within 100 m from existing CRL site boundaries.</u>
<u>Sites of existing or previously sited facilities.</u>
<u>Areas protected for low background purposes.</u></td></tr>
<tr><td></td><td></td><td>Project Description</td><td></td></tr>
<tr><td>CNL-ND31</td><td>MNO
(August 16, 2017)</td><td>1.1 Project Overview, Page 1-5
"The final cover system (i.e., cap for the mound) will be designed to eliminate exposure due to direct contact with waste, and provide gamma radiation shielding."</td><td>Canadian Nuclear Laboratories (CNL) has completed a Near Surface Disposal Facility (NSDF) Safety Analysis Report (SAR) [1] that identifies hazards, describes how hazards are controlled and or mitigated, and describes the management system in place to ensure the controls are effectively and consistently applied. The SAR assesses the safety of on-site and off-site human receptors and the environment for normal operations and accident conditions.</td></tr>
</table>

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

Number	Source	**Comment Summary** (all original submissions can be found on the Canadian Environmental Assessment Registry, reference #80122) **Synthèse des commentaires** (toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)	**Response (to be completed by CNL)** **Réponse (à remplir par la LNC)**
		It is unclear from this section how gamma radiation shielding will be completed in the interim. Please provide additional details.	Section 11 of the SAR outlines the NSDF radiation protection (RP) requirements, which are consistent with the CNL Radiation Protection Program, which are in compliance with the *Nuclear Safety Control Act* and associated Regulations. The NSDF will have various controls in place, which act to prevent, detect or mitigate the radiation hazards. The NSDF staff use several methods of protection against the radiological hazards (including gamma radiation), including radiation surveys, work control, personal protective equipment and clothing (PPE&C), personnel dosimetry, and contamination monitoring. During operations with potential for contamination hazards, operating personnel wear appropriate PPE&C as directed by RP to minimize internal and external doses. Application of RP procedures and As Low As Reasonably Achievable (ALARA) practices minimize doses to the operational personnel. Dose control points are assigned to the workers and confirmed to be appropriate by the worker's manager. These dose control points can be adjusted by the manager and/or Group 1 qualified Health Physicist as necessary during the year. A fundamental principle is the ALARA requirements to ensure that any exposure is minimised. Reference: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND32	MNO (August 16, 2017)	**1.2 Project Location, Page 1-7** The description of the MNO's presence in the Project area is cursory and incomplete. There should be more detail provided, including identification of the Regional Councils and a description of those interested in the Project. The description does not take into account the exercise of Métis rights in the vicinity of the CRL property. As these rights have the potential to be affected by the Project, despite not occurring directly on the property. For example, visual quality and aesthetics could be affected by the development of the Project, without requiring direct access to the Project site; and intangible Métis issues such as perceived effects of radiation on Métis harvesters could lead to avoidance behaviors. Further, there should be a description of the Mattawa Research that clearly identifies the Project as being located within the rights-bearing Mattawa/Lake Nipissing Traditional Territory of the MNO.	The final Environmental Impact Statement (EIS) contains a new Section 6 – Indigenous Interests that consolidates and summarizes the major areas of assessment relevant to Indigenous peoples into one single section. A proposed list of Indigenous communities and groups with a potential interest in the Near Surface Disposal Facility (NSDF) Project was identified by Canadian Nuclear Laboratories (CNL) and included in the Indigenous Engagement Report (IER) Technical Supporting Document [1]. Identification of communities was based on consultation with the Canadian Nuclear Safety Commission (CNSC) and through the use of publicly available sources of information including: • Indigenous community and organization websites; • the Aboriginal and Treaty Rights Information System (Government of Canada and Indigenous and Northern Affairs Canada (INAC) 2016); and • Crown-Indigenous Relations and Northern Affairs Canada First Nation community profiles. The proposed list was based on the identified potential or established Indigenous or treaty rights of Indigenous communities in the vicinity of the Project and is provided in Table 6.2.2-1 along with a brief rationale for inclusion. With regards to the Métis, this includes the Métis Nation of Ontario (MNO), MNO North Bay, MNO Mattawa Métis, and MNO Sudbury via the Mattawa/Lake Nipissing Traditional Territory Consultation Committee. The MNO and CNL have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. Section 6.4.3.4.2 outlines that the Métis Nation of Ontario recently completed a Traditional Land Use and Knowledge Study (TKLUS) that was undertaken specifically for the NSDF and Nuclear Power Demonstration (NPD) projects. The TKLUS has identified Valued Components (VCs) of particular interest to them. Through this engagement process, Indigenous interests have been incorporated into the selection of final VCs for the NSDF Project.

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			Reference: [1] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND33	MNO (August 16, 2017)	**1.2 Project Location, Page 1-7** "The Ottawa River is an important recreational resource for swimming, sport fishing and boating; there is little commercial fishing opportunity." This statement does not consider subsistence fishing completed by Métis harvesters in the vicinity of the CRL property. Please amend assessment to consider this critical component.	The final Environmental Impact Statement (EIS) contains a new section – Section 6.0 Indigenous Interests – that consolidates and summarizes the major areas of assessment relevant to Indigenous peoples into one single section. Section 6.4.3.4.2.3 of the final EIS includes information on Fishing as part of Indigenous Land and Resource Use. This section states fishing is a traditional and modern-day land and resource activity practised by Indigenous peoples in the Ottawa Valley. The Ottawa River was and is still used for sport and subsistence fishing. Eight of the 11 participants in the Métis Nation of Ontario (MNO) Traditional Land Use and Knowledge Study (TKLUS) have fished in the 50 km study area identified in the Know History study. This included fishing on the Ottawa River north of Rolphton. There was also other MNO fishing in the study in waterbodies to the west of Ottawa River towards Algonquin Park. Fish species harvested in the MNO study included Walleye, trout, bass, Northern Pike and sturgeon. It was also noted that 3 of the 11 participants participated in a commercial sturgeon fishery as children. It is unclear based on the mapping on Figure 5 of the Know History study where that fishing occurred, but again there is no fishing reported within 10 km of the Chalk River Laboratories (CRL) site. It should be noted that there is no longer a commercial sturgeon fishery on the Ottawa River. The Near Surface Disposal Facility (NSDF) Project is not predicted to have any terrestrial effects beyond the CRL site, and results of the aquatic environment assessment identify that measurable residual effects on aquatic biodiversity Valued Components (VCs) are not predicted as a result of the NSDF Project. Therefore, no effects on terrestrial or aquatic species defined as traditional land and resource use VCs are expected.
CNL-ND34	MNO (August 16, 2017)	**3.5.1 Construction Materials, Page 3-18** "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." This section should also specify that transportation will be scheduled to reduce noise and traffic volumes and limit inconvenience to Métis harvesters who may be exercising their rights in the vicinity. Further, CNL should conduct a traditional land use study with the MNO to identify areas of importance to allow for better planning of transportation activities.	The final Environmental Impact Statement (EIS) contains a new Section 6.0 – Indigenous Interests that consolidates and summarizes the major areas of assessment relevant to Indigenous peoples into one single section. Eight of the 11 participants in the Métis Nation of Ontario (MNO) Traditional Land Use and Knowledge Study (TKLUS) have fished in the 50 km study area identified in the Know History study. This included fishing on the Ottawa River north of Rolphton. There was also other MNO fishing in the study in waterbodies to the west of Ottawa River towards Algonquin Park. There was no fishing reported within 10 km of the Chalk River Laboratories (CRL) site. The results of the socio-economic environment assessment are described in Section 5.10.5.2.2 in the final EIS and includes the results of an effects pathways analysis of the aspects of the NSDF Project that could affect ambient noise levels due to construction traffic. The haulage route for transportation of site preparation and construction equipment and construction materials will be via public roads to the CRL site (e.g., Highway 17). The hours of operation for truck transport is typically six days per week, 16 hours per day, but may vary between 12 and 18 hours per day depending on Project activities. Noise modelling of the potential impacts of Project traffic noise on receptors along Plant Road was updated based on the assumption that Project-related truck traffic can occur at night (i.e., 10 pm to 7 am). It was assumed that up to 80 one-way truck trips could occur during the nighttime period. As the total number of Project truck trips is expected to be 400 per day (i.e., 200 one-way Project shipments), the remaining 320 truck trips were modelled during the daytime period. Project employee-related traffic volumes were updated based on new information to 225 one-way trips per day. Overall, the increase in transport vehicles is considered negligible in comparison to current traffic levels on the roads (personal vehicle traffic for over 2,000 employees and transport vehicles) to support operation of the CRL site. The change in long-term high annoyance (HA) is between 6.2% at 15 m and 3% at 60 m along Plant Road and 4.7% at 20 m and 2.7% at 60 m along Highway 17.

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			The effect of increased traffic on noise levels at receptors along Highway 17 and Plant Road is considered to result in a small but noticeable change when compared to existing levels of traffic from current employees and operations at CRL. The predicted change in %HA is less than 6.5% and as such, this potential project-environment interaction is considered to have a negligible residual effect on quality of life. Noise transmission will be mitigated by the topography as the Near Surface Disposal Facility (NSDF) Project is situated on the lower side of the hill adjacent to East Mattawa Road (Figure 3.1.1-1). Changes in ambient noise levels are not expected to be detected in the Local Study Area (LSA) communities, due to the distance from the NSDF Project site.
CNL-ND35	MNO (August 16, 2017)	**3.5.4.1.9 Utilities, Page 3-32** "The following site utilities will be required … • electricity for site facilities for lighting; venting and air conditioning; and other power uses…" Are there currently existing electricity services on the site which this Project will be tied in to or will there be a requirement for additional transmission services to bring service in to the site? Figure 3.6.1-1 indicates a 115-kV power line. Is this line existing or planned?	The electricity services required for the Near Surface Disposal Facility (NSDF) will tie into the existing power supply, through a 13.8 kV line currently at Plant Road. The 115-kV lines shown on the figures are existing Hydro One transmission lines. These lines will not be expanded with substations for electricity to the NSDF. Off-site power and power at the NSDF site are discussed in Section 8.1 of the NSDF Safety Analysis Report [1]. Reference [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND36	MNO (August 16, 2017)	**3.5.4.2 Support Facilities, Page 3-33** Please provide additional detail on the permanent structures proposed for support facilities, including their location, capacity and utility needs.	Additional information on support facilities for the Near Surface Disposal Facility (NSDF) Project is given below. Please refer to Fig. 3.1.1-1 of the final Environmental Impact Statement (EIS). <u>Wastewater Treatment Plant (WWTP) Building</u> The WWTP is a two story building with a size of 2,500 m^2. The main entrance to the administration section of the building is environmentally separated from the exterior by means of a vestibule. The ground floor includes the following spaces: A WWTP control room, Communications HUB room, testing lab, offices, Radiation Protection (RP) office, mechanical and electrical rooms, decontamination space, and coffee/break room. <u>Vehicle Decontamination Facility (VDF)</u> The VDF is a two story, 484 m^2 building that can be accessed by three roads. The VDF is an enclosed facility that provides the equipment and the facilities required for appropriate decontamination of on-site and off-site vehicles and is sized to accommodate highway-legal vehicles. It includes a vehicle maintenance shop, office, decontamination area, mechanical room, office area and washroom. It will house light site vehicle maintenance activities, including oil/hydraulic fluid replacement, filter changes and tire changes. <u>Operations Support Center</u> The Operations Support Centre (OSC) building is a two story, 203 m^2 building which is accessible by two roads. The OSC building shall act as a personnel entry and exit portal separating the movements of people between the NSDF Controlled Area and Supervised Area. It is to house the necessary spaces required for the decontamination of the personnel working on site and shower facilities after work. <u>Administration Office</u> The Administration Building is a one story 195 m^2 building. The Administration Office is designed to include space for offices, a meeting room, a records room, a lunchroom and washroom. The general office area consists of spaces for two work stations and copy/ printing machines.

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			North and South Entrance Kiosk The Kiosks are single-story 144 m^2 buildings that will house security personnel, and weigh scale operator. The Kiosks are elevated to provide an appropriate line of sight and sits on a platform parallel to the entrance road. The main scale operator room of the North Kiosk has a 270-degree window providing line of sight to the exterior and Radiation Protection (RP) office. The Kiosks also have washrooms and RP offices. NSDF Utilities NSDF will have Class IV as the main power supply. A Class III standby natural gas generator is connected to switch gear located inside the electrical room of the WWTP. The total installed power capacity of the NSDF including 15% contingency is 1392 kVA. The water distribution system for the NSDF will interface with the Chalk River Laboratories (CRL) site water distribution system in the southeast quadrant of the Plant Road and East Mattawa Road (EMR) intersection. Water will be delivered to the NSDF site via a 50 mm diameter water main. The 50 mm diameter water main is to supply water to a potable water storage system that will include a day-use storage tank. The average and maximum daily flows of the NSDF are approximately 7,000 and 15,000 Liters/Day, respectively. The NSDF will rely on a private sewage disposal system which will consist of two leach fields, the larger leach field will be located near the north end of the site and will service the WWTP, Vehicle Decontamination Facility, Operation Support Center, Admin Office and north kiosk. A smaller field at the south end of the site and will service the south kiosk. Natural gas will be the primary source of heating for the WWTP and support facilities. The NSDF gas pipe will be hooked to the gas main running along Plant Road. The total natural gas demand of the NSDF Project is 6660 MBH. Fire Protection System The fire protection system will include a network of fire hydrants servicing the NSDF site. Water is supplied to the hydrants via a 150 mm diameter watermain. The water for fire protection is supplied from a fire water storage tank located near the WWTP building which are in turn supplied by the potable water line to maintain the required design water level inside the tanks.
CNL-ND37	MNO (August 16, 2017)	**3.5.4.2.5 Vehicle Decontamination Facility, Page 3-34** "The fueling area will be designed to protect the natural environment from fuel related spills." The MNO request more information about the fueling area. Including the location and what specific measures will be taken to protect the natural environment from fuel-related spills.	As outlined in Section 3.4.3.5 of the final Environmental Impact Statement (EIS), the site vehicle refueling station that will store bulk diesel for use in ECM construction equipment will be located next to the northern engineered containment mound (ECM) perimeter road at the wastewater treatment plant (WWTP) Access Road. It will be an unattended station with an automated fuel pump capable of metering fuel and logging consumption. The fueling area has been designed to protect the natural environment from fuel-related spills. The planned location of the Vehicle Decontamination Facility is shown in Figure 3.1.1-1 in the EIS. A more precise location of bulk fuel storage is not yet known at this stage of the NSDF Project since exact construction dates and layout have yet to be developed following completion of the CNSC review. Canadian Nuclear Laboratories (CNL) has a company-wide standard on the management of petroleum storage tanks that formalizes practices regarding the management of petroleum storage tanks such that applicable procedures and responsibilities are clearly established and compliant with federal and/or provincial requirements, and are consistently applied [1]. This standard includes the use of spill containment during fuel transfers. A NSDF Project specific Environmental Protection Plan (EPP) will be implemented, which will be consistent with CNL standards and federal regulation SOR/2008-197 *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*. This includes fuels and lubricants management. Canadian Nuclear Laboratories (CNL) will be able to mitigate spills or leaks and to confirm chemicals, fuels, and lubricants are stored and handled appropriately. A Spill Control Response Plan will

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			describe detailed procedures for detecting and responding to a spill of fuel or related materials, including spill prevention and detection and spill response. Reference: [1] Management of Petroleum Storage Tanks, 900-509200-STD-002.
CNL-ND38	MNO (August 16, 2017)	**3.6.1.2.6 Waste Placement Procedures, Dust Control during Waste Placement, Page 3-46** "Dust control is conducted to support waste placement operations in accordance with the Dust Management Plan during loading, transportation, placement and compaction operations." The MNO request consultation on and input into the Dust Management Plan to ensure dust does not extend beyond the CNL footprint.	Canadian Nuclear Laboratories (CNL) is committed to follow best management practices to reduce fugitive dust generation. As outlined in the final Environmental Impact Statement (EIS) (Table 5.2.1-8 Pathway Analysis for Air Quality Valued Component), the Dust Management Plan to be implemented for the Near Surface Disposal Facility (NSDF) Project will provide information on dust mitigation, including: • Use of water spraying or misting techniques (e.g., water trucks) as the primary dust control method. • Use of fixatives (e.g., chemical suppressant) for dust control. • Covering stockpiles and exposed areas prior to high wind or dry conditions where standard dust suppressants may be inadequate in preventing dust generation caused by wind erosion. • Minimizing the size of the exposed working areas containing contaminated materials to the extent practicable using a phased excavation approach. • Revegetating affected areas or adding mulch to completed cells and excavated areas as soon as practicable. • Dampening soil in dry areas prior to commencing truck/machinery activities in the area. • Reducing activities to avoid unnecessary dust generation. • Using wind fencing around work areas. • Postponing work activities likely to cause dust if sustained wind speeds are predicted to exceed 40 km/hr, unless it can be shown that the work site is sufficiently protected that wind will not generate unacceptable amounts of dust.
CNL-ND39	MNO (August 16, 2017)	**3.6.1.2.6 Waste Placement Procedures, Dust Control during Waste Placement, Page 3-46** "Air quality is monitored for dust that may contain radiological and hazardous constituents to support worker and environmental protection as described in the Environmental Protection Plan (Section 3.13.2.2). Waste placement activities may be restricted or suspended if unacceptable amounts of dust are generated due to winds or other site conditions. All excavating, loading, hauling and dumping operations are suspended when wind speeds exceed the specified criterion." Please provide additional detail on what level is considered 'unacceptable amounts' of dust; and whether this dust could extend beyond the CNL project footprint.	The applicable criteria for air quality, including dust, is outlined in Section 5.2.1.4.2.1 of the final Environmental Impact Statement (EIS). The relevant air quality criteria used for screening air quality in the region include the Ontario criteria, and federal standards and objectives where provincial guidelines are not available. The Ministry of the Environment, Conservation and Parks (MECP) has set guidelines related to ambient air concentrations and are summarized in Ontario's Ambient Air Quality Criteria (AAQC) document. The Ontario AAQCs are characterized as desirable ambient air concentrations and have been set at levels that are protective of human health and the environment. Where provincial criteria were not available, the National Ambient Air Quality Objectives (NAAQOs) and the Canadian Ambient Air Quality Standards (CAAQSs; formerly National Ambient Air Quality Standards) were used. A summary of the applicable Ontario and federal objectives and criteria are listed in Table 5.2.1-4 of the final EIS. The implementation of the Dust Management Plan and Canadian Nuclear Laboratories' (CNL) procedure for Management and Monitoring of Emissions, which includes operational control monitoring and air verification monitoring, will ensure no unacceptable amounts of dust are generated during construction or operation of the Near Surface Disposal Facility (NSDF). None of the indicator compounds meet all of these requirements and consequently, the residual effects from the NSDF Project on air quality was predicted to be not significant.
CNL-ND40	MNO (August 16, 2017)	**3.10 Closure Plan, 3.10.1 End-state Objective, Page 3-62** "Periodic revisions of the CPDP are completed as necessary to reflect changes in the proposed plan, including the decommissioning of facilities associated with the NSDF Project." Will the Comprehensive Preliminary Decommissioning Plan ("CPDP") be updated as part of the regulatory process for the NSDF? If so, the MNO should review the CPDP to ensure Métis rights and	The Chalk River Laboratories (CRL) Site Comprehensive Preliminary Decommissioning Plan (CPDP) [1] was revised in 2018 March. In accordance with the CRL site operating licence granted by the Canadian Nuclear Safety Commission, this document is reviewed and revised at such times as the Commission may require, no later than ten years from the previous revision.

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		interests are adequately reflected. Further, if the CPDP is not updated as part of the regulatory process for the NSDF, please provide additional details on when this plan will be updated and how the MNO will be involved.	This document is a site wide document and not updated specifically for the Near Surface Disposal Facility (NSDF) Project. However, a key change to the CPDP is that the planning allows large-scale site remediation and hazard reduction to occur is the advancement of a low-level waste disposal facility (proposed NSDF) from the previous timeframe of 2035 to 2021-22. The CNL Land Use Program is being established to ensure that all CNL sites across Canada are taking the necessary steps in determining and reaching next land uses and end states. One of these important steps is to engage with Indigenous peoples and stakeholders in the development of next land uses and end states. Chalk River Laboratories is putting together an Overview Decommissioning and Cleanup Plan (ODCP) for the site as a whole, and engagement on the next land uses portion of this plan is paramount to the success of the environmental cleanup of CRL. The focus for Chalk River Laboratories is not one of closure, as the nearer term cleanup at the site (i.e., the main objective of which includes the NSDF) is focused on remediation of legacy waste to enable a clean and sustainable future for the on-going operation of the laboratories. Engagement with Indigenous communities and groups and stakeholders will be planned as the ODCP is developed. Reference: [1] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001.
CNL-ND41	MNO (August 16, 2017)	**3.13.2.2 Environmental Protection Program, Page(s) 3-77 and 3-78** There is no explicit mention of Aboriginal peoples, specifically Métis in this section. Particularly in terms of the Environmental Policy, Planning, Checking and Corrective Action which are areas where the MNO has particular interest.	Section 3.5.2 (Existing Health, Safety, Security and Environmental Programs) provides a description of Canadian Nuclear Laboratories' (CNL) existing compliance programs. Canadian Nuclear Laboratories continues to collaborate and engage with interested Indigenous communities/groups on environmental monitoring activities specific to the Near Surface Disposal Facility (NSDF) Project and the Chalk River Laboratories (CRL) site more generally. An Environmental Assessment Follow-up Monitoring program (EAFMP) is under development for the NSDF Project. Input from the public and Indigenous groups will be sought after and incorporated into the EAFMP. In addition to existing environmental monitoring at the CRL site, the EAFMP will specifically monitor NSDF Project elements during its construction, operations, and closure phases. The EAFMP will include environmental, effluent verification, and groundwater monitoring to ensure that releases and subsequent environmental concentrations of potential contaminants are below the relevant guidelines. Section 11.0 of the EIS presents a framework for the EAFMP aligned with the requirements of the *Generic Guidelines for the Preparation of an EIS* [1]. The EAFMP will follow the systematic informed planning process outlined in Canadian Standards Association (CSA) Standards for environmental (N288.4-10) [2], effluent (N288.5-11) [3], and groundwater monitoring (N288.7-15) [4]. It is expected that regulatory oversight of the EAFMP and its results will be maintained as it becomes pertinent for the duration of the institutional control period of the NSDF Project. The EAFMP will be continuously reviewed and its elements may change in accordance with the normal evolution of the NSDF Project (i.e. through its progression from construction to operations to closure and post-closure phases). Canadian Nuclear Laboratories (CNL) will continue to offer opportunities for the general public and Indigenous groups to provide feedback as the EAFMP is developed and reviewed by the Canadian Nuclear Safety Commission (CNSC). References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CSA N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [3] CSA N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [4] CSA N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015.

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Réponse (à remplir par la LNC)</th></tr>
<tr><td>CNL-ND42</td><td>William Turner
(May 31, 2017)

10.</td><td>The lack of detailed descriptions of the physical activities of the project makes the review of the EIS document very difficult since details of the operations and activities associated with the mound and the supporting facilities such as the WWTP is lacking.

The EIS should include all relevant details of all physical activities associated with the project in accordance with the CEAA 2012.</td><td>Section 3 of the final Environmental Impact Statement (EIS) has been updated to provide a more fulsome description of the main features of the Near Surface Disposal Facility (NSDF) for the disposal of solid low-level radioactive waste (LLW) at Chalk River Laboratories (CRL) (the 'NSDF Project'), and identifies the components (e.g., physical infrastructure such as the disposal facility and roads) and activities (e.g., placement of waste) related to the site preparation and construction, operations, closure, and post-closure phases. The NSDF Project is based on current engineering practice and precedents, and the experience of the engineering and environmental teams.

A concordance table is provided in Appendix 1.0-1 to help demonstrate compliance with the Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012 (Generic EIS Guidelines) [1] and with REGDOC-2.9.1 Environmental Protection: Environmental Principles, Assessments and Protection Measures [2]. The concordance table lists the requirements detailed in the Generic EIS Guidelines and in REGDOC-2.9.1, and the location of the corresponding information in the EIS.

References:
[1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
[2] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September.</td></tr>
<tr><td>CNL-ND43</td><td>William Turner
(May 31, 2017)

60.</td><td>Section 3.1 Introduction - CNL must discuss the uncertainties around the design, assumptions and options and the potential risks resulting from those uncertainties to the health and safety of persons, to the environment, and all the other factors under section 19(1) of the CEAA, 2012.

CNL must include a summary of their contingency plans that will address scenarios in which their current design, assumptions and/or options prove to be wrong.</td><td>The management of uncertainties is an important aspect of the design and safety assessments of the NSDF. The EIS includes sections describing the uncertainties identified for each major component of study (i.e., Section 5.2.1.7, 5.2.2.7, 5.3.2.7, 5.4.1.7, 5.4.2.7, 5.7.7, 5.8.7, 5.10.7, and 8.3).

The management of uncertainties in the design and safety assessments are further documented in Section 6 of the Safety Case [1]. A summary of selected information is presented below.

Uncertainties in the design process are managed through good engineering practices, the use of conservative inputs and assumptions with respect to material specifications, the use of qualified personnel, and the use of lessons learned from similar facilities. Confidence in the cover system is enhanced by studying the Waste Management Area C cover, which has successfully mitigated the water infiltration since installed in 2013. The Wastewater Treatment Plant is based on Best Available Technology Economically Achievable, and is supported by a wastewater treatment plant pilot testing program. The Post-Closure Safety Assessment (PostSA) [2] includes a range of scenarios designed to address uncertainties in different aspects of the facility design, inputs/assumptions, and future environmental conditions. The results of these scenarios demonstrate that even if some assumptions and inputs were inaccurate, that the facility continues to meet dose acceptance criteria and environmental concentration guidelines. Examples of the scenarios studied in the PostSA to examine uncertainties are included in the table below.

<table>
<tr><th>Scenario/aspect studied</th><th>Brief Description</th><th>Uncertainty(s) Addressed</th></tr>
<tr><td>Inventory</td><td>The radioactivity in the Reference Inventory is increased by a factor of 10</td><td>Addresses uncertainties related to the actual emplaced inventory due to operator error or human error during waste characterization.</td></tr>
<tr><td>Institutional</td><td>The Institutional Control</td><td>Addresses the uncertainty in the</td></tr>
</table>
</td></tr>
</table>

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control period	Period is reduced to 100 years (from 300 years)	effectiveness of land-use restrictions placed on the ECM footprint, and Federal government oversight into the future.
Sorption Coefficient	The sorption parameters are reduced by a factor of 10	Addresses uncertainties related to the composition of the waste, biosphere, and geosphere resulting in greater mobility and therefore, release of contaminants.
Transit time	The groundwater transit time from the ECM to Perch Creek is reduced to 5 years (from 7 years in the Normal Evolution Scenario (NES))	Addresses uncertainties in the surface water and groundwater modelling.
Degradation of cover and liner	The engineered barriers degrade much faster than the design life (includes enhanced erosion)	Addresses uncertainty in the manufacture, installation, and quality of the engineered barriers.
Reduced Hydrologically Effective Rainfall	Increased rainfall, higher temperatures, changes in evapotranspiration	Addresses uncertainty in the climate change assumptions of the NES.
Receptors of Public Interest	Inclusion of additional public receptors	Addresses uncertainty in the location and behaviors of the public (off-site) receptors.
Self-Sufficient Indigenous Receptor	Receptor analyzed lives traditional lifestyle, most food and drink harvested on or near the NSDF site	Addresses uncertainty in human behaviors and land use in the future.
Key Parameters	Key parameters were investigated to bound potential scenarios by co-varying multiple input parameters.	Twelve key parameters were identified as having significant uncertainties, which could affect the calculated peak dose or peak environmental concentrations of non-radiological contaminants.
Human Intrusion (Borehole)	An exploratory borehole is dug into the waste. Exhumed material used in garden	Addresses uncertainty in type of intrusion, specifically intruding directly into higher activity packaged wastes.
Human intrusion (house with basement)	The resident/farmer's house has a basement. Exhumed waste used in garden	Addresses uncertainty in type of intrusion, specifically intruding directly into the top layer of wastes
Enhanced Erosion	Faster erosion rate of the cover materials, resulting in wastes	Addresses uncertainty in the cover system's ability to resist erosion,

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	exposed and transported to the swamp	and the overall assumed erosion rate.
Localized Cover Failure	A tear or hole in the cover exists, in a location that would maximize water infiltration	Addresses uncertainty in the construction quality assurance of the geomembrane and cover system.
Localized Liner Failure	A tear or hole in the liner exists, allowing more leachate to exit the Facility into the groundwater	Addresses uncertainty in the construction quality assurance of the liner system.
Damage to the Berm	A portion of the berm erodes, and allows increased flow of water out of the ECM	Addresses the uncertainty in the construction quality assurance of the berm.
Role of Geosphere	No sorption or retardation of contaminants in the environment is credited	Addresses uncertainty in the role that the geosphere plays in the overall confinement of contaminants.
Role of Cover	The cover system is assumed to perform very poorly, resulting in bathtubbing immediately at 300 year post closure	Addresses the uncertainty in the importance of the cover system in overall dose and risk mitigation.
Role of Base Liner	The base liner system is assumed to not act as an effective barrier, represented instead as a sand barrier	Addresses the uncertainty in the importance of the base liner in the post-closure phase.
Role of Berm	A series of landslides removes much of the berm material. Some of the material is deposited into the swamp area.	Addresses the uncertainty in the importance of the berm.
Mass Excavation	The entire Facility (waste and barrier material), is excavated and the material is dispersed	Addresses a bounding, worst case scenario, where containment is completely lost and the material fully exposed to the environment and receptors.
Shallow Well	The resident receptor receives all of their drinking water from a shallow well directly in the path of the contaminant plume	Addresses uncertainty in predicting human behavior and well-digging preferences of the future.
Permanent Bathtub	The liner does not ever degrade significantly, resulting in permanent bathtubbing	Addresses the uncertainty in the engineered barriers' hydrological properties.

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			As the project continues through the construction and operations phases, more information will become available about the as-built condition of the facility. In addition, more environmental monitoring data for the NSDF site will have been collected through the Project phases (construction, operation, closure), which can be used to further understand if the assumptions made in the initial modelling were accurate or conservative (i.e., confirm pathways and outcomes of contaminant transport). As more information is obtained, the PostSA [2] will be updated to reflect the most up-to-date design and environmental data. References: [1] Near Surface Disposal Facility Safety Case. 232-03610-SAR-001. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
		Project Schedule and Timelines	
CNL-ND44	Greg Csullog (May 1, 2017)	**3.3.2 Strategic Requirements – 3-14:** If the 2020 target is crucial to ensure no delays in decommissioning/remediation activities, then it seems logical and prudent that the NSDF should focus on getting operational approval for the wastes from these activities and put other, higher impact wastes, on a later timetable.	Section 3.3.2 – Strategic Requirements is no longer in the final Environmental Impact Statement (EIS). Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). The 2017 draft EIS did include optimistic timelines. In response to comments received from the public on the 2017 draft Environmental Impact Statement (EIS), Canadian Nuclear Laboratories (CNL) has conducted several additional studies and analyses, including an operational safety analysis, comprehensive post-closure safety assessment and ecological risk assessment, the results of which are included in the final EIS. The revised timelines for the project, pending regulatory approval, are outlined in Section 1.1 of the final EIS. The construction phase, which includes site preparation, is anticipated to start in 2021 or as soon as the relevant regulatory permits and approvals are in place. The operations phase is anticipated to begin in 2024 and will end in approximately 2070 (i.e., approximately 50 years). It is more appropriate to ensure the NSDF Project is comprehensively scoped and planned in accordance with CNL's Integrated Waste Strategy [1], rather than limiting the scope at the onset of the project to near term objectives. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND45	Thomas Ringland (April 30, 2017) Brian Eichstaedt (June 22, 2017) David Thompson (April 11, 2017) Greg Csullog (May 1, 2017) Anna Tilman (June 22, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The commenters expressed concern with the short timelines. In particular, several commenters have asked why is there such urgency to have such a facility in operation by 2020, as opposed to taking time to select a more appropriate location? CNL has set March 2020 for a "ready to accept waste" date for the proposed waste mound at Chalk River but have provided only a very vague statement of urgency in support of this extremely short timeline; CNL has not provided any substantive rationale for this very compressed amount of time for the project development, and provides only a general statement that the Port Hope	The *Canadian Environmental Assessment Act* (CEAA) 2012 had a specific purpose added that the environmental assessment process be completed in a timely manner. Under the previous CEAA (1992), other federal departments were not allowed to issue licences and permits until any required environmental assessment was complete. Under the new Act, certain other departments, specifically the Canadian Nuclear Safety Commission (CNSC), permit the concurrent review of environmental and licensing documents. Canadian Nuclear Laboratories (CNL) is pursuing concurrent environmental and licensing decision for the Near Surface Disposal Facility (NSDF) which generally shortens the timeline. Canadian Nuclear Laboratories (CNL) notes that CNSC staff have confirmed that the NSDF Project will remain under CEAA 2012 (Letter to Canadian Nuclear Laboratories Ltd. Regarding Changes to Federal Legislation and Implications for the Near Surface Disposal Facility Project).

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	Melinda Tan (June 14, 2017) Julie McCann (May 17, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) Emma March (August 15, 2017) Jeff Kelly (August 15, 2017) Angela Solar (August 14, 2017) Dennis Higgison (August 14, 2017) Douglas Nichols (August 14, 2017) James Hooper (August 15, 2017) Andrew Harper (August 16, 2017) Sharon Thorne (August 16, 2017) Greenspace Alliance of Canada's Capital (August 17, 2017) MNO (August 16, 2017) William Turner (May 31, 2017) Northwatch (August 16, 2017)	facility can be developed in 4-5 years to support their notion that the NSDF can be ready for service in less than 2.5 years Other commenters have inquired regarding the timelines, who is this required by and what regulatory repercussions are presented by this requirement? In addition, some have expressed the view that the schedule was a driving theme throughout the draft EIS and in instances appears to take priority over safety and the long-term management of the facility, which should be the principal considerations.	There is urgency to have an operational NSDF in order to address existing environmental impacts at the CRL site. The NSDF Project will enable the remediation of historically contaminated lands and legacy waste management areas, as well as the decommissioning of outdated infrastructure to facilitate the Chalk River Laboratories (CRL) site revitalization. Remediation will involve progressively reducing the risk and liability through prudent management and cleanup of contaminated and affected sites at the CRL site. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the CNSC prior to any work taking place, thus discussion of the remediation options have not been included in the final NSDF EIS. In response to comments received from the Public on the 2017 draft Environmental Impact Statement (EIS), CNL has conducted several additional studies and analyses, including an operational safety analysis, comprehensive post-closure safety assessment and ecological risk assessment, the results of which are included in the final EIS. The Environmental Assessment and licensing process are structured so that any proposed nuclear facility ensures safety of the public and the environment. The current timelines for the project, pending regulatory approval, are outlined in Section 1.1 of the final EIS. The construction phase, which includes site preparation, is anticipated to start in 2021 or as soon as the relevant regulatory permits and approvals are in place. The operations phase is anticipated to begin in 2024 and will end in approximately 2070 (i.e., approximately 50 years). The operations phase will be completed in two phases as described above. The closure phase primarily includes activities needed to complete the installation of the final cover of the engineered containment mound (ECM), continued treatment of residual leachate and continued environmental monitoring. Closure activities are expected to start in 2070 and continue through to 2100, after which the NSDF Project will transfer into the post-closure phase.
CNL-ND46	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017) Janey Bullivant (May 13, 2017) Ralliement contre la pollution radioactive	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.*	Section 2.3 of the final Environmental Impact Statement (EIS) has been updated to provide a more accurate description of the overall purpose of the project as it relates to environmental remediation of the Chalk River Laboratories (CRL) site and site revitalization. There is urgency to have an operational NSDF in order to address existing environmental impacts at the CRL site. The NSDF Project will enable the remediation of historically contaminated lands and legacy waste management areas (WMAs), as well as the decommissioning of outdated infrastructure to facilitate the CRL site revitalization. Remediation will involve progressively reducing the risk and liability through prudent management and cleanup of contaminated and affected sites at the CRL site. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking

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	(August 3, 2017) Coalition Eau Secours! (August 15, 2017) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) Douglas Nichols (August 14, 2017) James Hooper (August 15, 2017) Sharon Thorne (August 16, 2017) Greenspace Alliance of Canada's Capital (August 17, 2017) MNO (August 16, 2017) Ken Sproule (August 16, 2017) David Prentice (August 16, 2017) Michael Nogas (August 15, 2017) Virginia MacLatchy (August 16, 2017) Martine Ouellet (Bloc Québécois) (August 14, 2017)	[English] Many commenters had concerns the proponent has a mandate to find a quick solution for nuclear waste disposal at Chalk River Nuclear Facilities, and that a fast and cheap solution was of primary concern. The draft EIS gives the impression that the deciding factor for choosing the NSDF design and the EMR Site rather than the alternatives proposed (at CRL or elsewhere) is the implementation schedule, with cost being the next most important criterion. To choose another location, on-site or off-site, would require more thorough characterization than has been done to date, resulting in schedule delay and added cost. The project proponent has eliminated safer alternatives on the basis that other facility types would be more expensive and would not be operational by 2020. Safety of the human populations should take precedence over economics. [Français] De nombreux commentateurs étaient préoccupés par le fait que le promoteur a le mandat de trouver une solution rapide pour l'évacuation des déchets nucléaires aux installations nucléaires de Chalk River, et qu'une solution rapide et peu coûteuse était la principale préoccupation. L'ébauche de l'EIE donne l'impression que le facteur décisif pour choisir la conception de l'IGDPS et le site du MCA plutôt que les solutions de rechange proposées (aux LCR ou ailleurs) est le calendrier de mise en œuvre, le coût étant le deuxième critère le plus important. Le choix d'un autre emplacement, sur le site ou hors site, nécessiterait une caractérisation plus approfondie que ce qui a été fait jusqu'à présent, ce qui entraînerait des retards dans l'échéancier et des coûts supplémentaires. Le promoteur du projet semble avoir éliminé toutes les options d'enfouissement plus sécuritaires sous prétexte qu'elles coûteraient plus chères et qu'elles ne pourraient pas être opérationnelles dès 2020. La sécurité de la population doit primer sur le rendement économique d'un consortium privé.	place, thus discussion of the remediation options have not been included in the final EIS. The deciding factor that drove selection of the NSDF design and the East Mattawa Road (EMR) site is that the waste stream, low-level radioactive waste comprising primarily of impacted soils and demolition debris is mostly at the CRL site. The siting of the NSDF at the CRL site is consistent with other nuclear industry clean-up missions where an engineered containment mound is constructed on the site to facilitate the site remediation. The assessment of alternatives is consistent with the *Canadian Nuclear Safety Commission (CNSC) Generic Guidelines for the Preparation of an EIS* and the *Canadian Environmental Assessment Act* (CEAA) Operational Policy Statement: *Addressing the "Purpose of" and "alternative means" under CEAA, 2012*. Section 2.5 provides an assessment of the alternatives, and includes technical and economic criteria. The evaluation criteria for the alternative means are outlined in Section 2.5.1 of the final EIS. Each alternative was evaluated first for its technical feasibility. For those alternatives deemed technically feasible, a comparison of economic feasibility (i.e., cost) and the likely environmental effects is completed. Criteria for evaluating each of the alternatives are summarized in Table 2.5.1-1 of the final EIS, with further rationale provided in the following sections. The alternatives are described using the above criteria (where applicable) and are summarized in a matrix illustrating the relative preference of each alternative. If the alternative has a high chance of successfully addressing a particular criterion, it is rated as most favourable. Similarly, if the alternative has a moderate likelihood of addressing a criterion, it is rated as favourable, while if the alternative is assessed as having a low likelihood of success or having unacceptable risk with a particular criterion, a least favourable rating is used. For the technical criteria, a rating of "least favourable" was also generally considered to be the threshold for an alternative to not be technically feasible. An evaluation of the technical and economic criteria is provided in Section 2.5.2 Facility Type, Section 2.5.3 Facility Design, Section 2.5.4 Facility Location, Section 2.5.5 Site Selection, Section 2.5.6 Leachate Management and 2.5.7 Effluent Management. Results of the evaluation are illustrated in the summary tables for each of the aforementioned sections, using the evaluation criteria. The alternative means Section 2.5.5 (Site Selection) has been expanded in the final EIS to provide more transparency on the assessment. The CRL siting process includes three sets of criteria: mandatory, exclusion and comparison. The mandatory criteria are those attributes that sites must have. By contrast, the exclusion criteria are those attributes that make the site unsuitable for hosting the NSDF. Table 2.5.5-1 in the EIS summarizes how 15 potential sites were compared based on mandatory and exclusionary criteria (ALL criteria). This table outlines the suitability of the sites and how they meet appropriate criteria for the purpose of the project. The mandatory criteria used during the site selection included: • minimum area of 14 ha; • site must be at least 200 m wide; • access to Class IV electricity for power; • access to water for sanitary and process requirements; and • access to gas or other heating source. Exclusion criteria were developed by considering physical, cultural and biological features which may be at risk during the

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			intended development of the NSDF Project. The exclusion criteria applied during the site selection included: Ottawa River Floodplain Areas which are below the 1 in 100 year Ottawa River flood elevation of 115 m ASL. Areas that are below the flood elevation of 130 m above sea level (ASL) which would result from a hypothetical failure of the Des Joachims Main Dam and McConnell Lake Control Dam. Areas with a slope in excess of 25%. Areas with a slope of less than 10% are desirable. Areas within 50 m of Plant Road. The three key reasons for this setback are: Protection of CRL workers in transit on Plant Road during waste emplacement. Limiting visibility of structures from Plant Road. Geotechnical Characteristics Areas with outcrops and organics >20% of the proposed siting area. Areas with liquefaction potential and active fault lines. Species at Risk Areas of nationally or provincially significant plant or tree species, in small groups or stands, in accordance with the *Federal Species at Risk Act* (SARA) and habitat of those threatened or endangered species as per the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listing. Research plantations at CRL may contain these species. Known or likely habitats of national or provincially significant wildlife species in accordance with the Federal SARA or COSEWIC listing as per guidance by CNL Environmental Protection. Wetlands Areas that are seasonally or permanently inundated with water. Areas within 30 m from a water courses wetlands. Located adjacent to provincially registered archaeological sites. Areas within 100 m from existing CRL site boundaries. Sites of existing or previously sited facilities. Areas protected for low background purposes. [Français] La section 2.3 de l'Étude d'impact environnemental (EIE) a été mise à jour pour fournir une description plus exacte de l'objet global du projet en lien avec l'assainissement et la revitalisation du site des Laboratoires de Chalk River (LCR). Il y a urgence à disposer d'une IGDPS opérationnelle pour atténuer les effets environnementaux sur le site des LCR. Le projet d'IGDPS permettra d'assainir les terres contaminées et les zones de gestion des déchets hérités du passé, et de déclasser les infrastructures obsolètes pour faciliter la revitalisation du site. Pour assainir le site, il faudra progressivement réduire les risques et le passif nucléaire au moyen d'une gestion prudente et du nettoyage des zones contaminées du site des LCR.

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			Le facteur décisif ayant présidé au choix de la solution d'une IGDPS et du site de la route Mattawa Est (RME) est que la plupart des déchets radioactifs de faible activité, qui comprennent surtout de la terre contaminée et des débris de démolition, se trouvent sur le site des LCR. L'implantation de l'IGDPS sur ce site est conforme aux autres missions de nettoyage du secteur nucléaire s'appuyant sur la construction d'un monticule de confinement artificiel (MCA) pour faciliter l'assainissement du site. L'évaluation de solutions de rechange est conforme aux *Lignes directrices génériques pour la préparation d'un énoncé des incidences environnementales* [1] de la Commission canadienne de sûreté nucléaire et à l'énoncé de politique opérationnelle visant la « raison d'être » et les « solutions de rechange » en vertu de la *Loi canadienne sur l'évaluation environnementale* (LCEE) de 2012. La section 2.5 fournit une description de l'évaluation des solutions de rechange et indique les critères techniques et économiques. Les critères d'évaluation des solutions de rechange sont indiqués à la section 2.5.1 de l'EIE définitive. Chaque solution a été évaluée du point de vue de sa faisabilité technique. Les solutions jugées techniquement valables ont fait l'objet d'une évaluation de leur faisabilité économique (coûts) et de leurs effets environnementaux probables. Les résultats d'évaluation de chacune de ces solutions sont résumés au tableau 2.5.1-1 de l'EIE définitive et explicités dans les sections suivantes. Les solutions sont décrites en fonction des critères ci-dessus (le cas échéant) et sont résumées dans une matrice illustrant le classement relatif de chacune d'elles. Si une solution est tout à fait propre à remplir un certain critère, elle est considérée comme la plus favorable. De même, si une solution peut raisonnablement remplir un certain critère, elle est considérée comme favorable, et si elle a peu de chances de remplir ce critère ou comporte un risque inacceptable à cet égard, elle est considérée comme la moins favorable. Du côté des critères techniques, un classement « le moins favorable » était généralement considéré comme le seuil pour lequel une solution n'était pas jugée valable sur le plan technique. Une évaluation des critères techniques et économiques est fournie aux sections 2.5.2 (Type d'installation), 2.5.3 (Conception de l'installation), 2.5.4 (Emplacement de l'installation), 2.5.5 (Choix du site), 2.5.6 (Gestion du lixiviat) et 2.5.7 (Solutions de rejet d'effluents). Les résultats de l'évaluation sont illustrés dans les tableaux récapitulatifs de chacune des sections ci-dessus, en fonction des critères d'évaluation. La section 2.5.5 (Choix du site) a donc été enrichie dans l'EIE définitive pour améliorer la transparence de l'évaluation. La sélection du site des LCR comporte trois séries de critères : les critères obligatoires, les critères d'exclusion et les critères de comparaison. Les critères obligatoires renvoient aux attributs que le site doit obligatoirement présenter. De l'autre côté, les critères d'exclusion renvoient aux caractéristiques rendant le site inapte à accueillir l'IGDPS. Le tableau 2.5.5-1 de l'EIE définitive résume les comparaisons effectuées entre les 15 sites potentiels en fonction des critères obligatoires et des critères d'exclusion (TOUS les critères). Il indique la pertinence relative de chaque site et son degré de correspondance aux critères applicables à l'objet du projet. Les critères obligatoires déterminant le choix du site étaient les suivants : • Superficie minimale de 14 ha. • Largeur minimale de 200 m. • Accès à une source d'alimentation en électricité de catégorie IV. • Accès à de l'eau sanitaire et à de l'eau de traitement. • Accès à une source d'alimentation en gaz ou à d'autres sources de chauffage. Les critères d'exclusion ont été élaborés en fonction des caractéristiques physiques, culturelles et biologiques susceptibles

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			d'être compromises par le projet d'IGPDPS. Les critères d'exclusion appliqués au choix du site étaient les suivants : Plaine d'inondation de la rivière des Outaouais Zones situées au-dessous du niveau d'inondation centennale de la rivière des Outaouais, soit 115 mANM. Zones situées au-dessous du niveau d'inondation de 130 mANM (mètres au-dessus du niveau de la mer), lequel résulterait d'une défaillance hypothétique du barrage principal de Rapides-des-Joachims et du barrage de régulation du lac McConnell. Zones aux inclinaisons supérieures à 25 %, Zones privilégiées ayant une inclinaison de moins de 10 %. Zones situées à moins de 50 m de la route Plant. Les principales raisons de ces exclusions sont les suivantes : Protéger les travailleurs des LCR en transit sur la route Plant pendant la mise en place des déchets. Limiter la visibilité des structures depuis la route Plant. Caractéristiques géotechniques Il doit y avoir moins de 20 % de cultures et de matières organiques dans la zone de l'emplacement proposé. Zones à liquéfaction potentielle et lignes de faille actives. Espèces en péril Zones de plantes ou d'arbres d'importance nationale ou provinciale, en petits groupes ou en peuplements, selon la *Loi fédérale sur les espèces en péril* (LEP) et zones d'habitat d'espèces menacées ou en voie de disparition selon la liste du Comité sur la situation des espèces en péril au Canada (COSEPAC). Les forêts expérimentales situées sur le site des LCR peuvent contenir ces espèces. Habitats connus ou probables d'espèce sauvages d'importance nationale ou provinciale selon la LEP ou selon la liste du COSEPAC, comme le prévoit le plan de protection de l'environnement des LNC. Terres humides Zones inondées en permanence ou de façon saisonnière. Zones situées à moins de 30 m de cours d'eau ou de terres humides. Zones situées à proximité de sites archéologiques enregistrés auprès de l'administration provinciale. Zones situées à moins de 100 m des limites actuelles du site des LCR. Sites d'installations antérieures ou actuelles. Zones protégées en raison d'un très faible rayonnement de fond.
CNL-ND47	Joan Lougheed and Town of Deep River (August 16, 2017)	Prior to an assessment of the project alternatives and the release of the draft EIS, CNL began work on the NSDF project. It is revealed that as early as 2015, CNL began working on the NSDF project in order to meet their self-imposed 2020 deadline (see pg. 2-17}. Specifically, CNL concluded "given that the work on the NSDF Project was commenced in 2015, the schedule requirement to place the facility in operation by 2020 is achievable" (see pg. 2-17), and the GWMF construction schedule would delay the start of operations beyond 2020 (see pg. 2-24, Table 2.5-2). By commencing work on the NSDF prior to completing an assessment of the project alternatives, the obvious question arises, was the outcome of the assessment predetermined, and if so, would this constitute confirmation bias?	The purpose and timeline of the Near Surface Disposal Facility (NSDF) Project is rooted in the requirements established by Atomic Energy of Canada Limited (AECL), a federal Crown corporation and owner of the waste, to substantially reduce the risks associated with its legacy wastes, to protect the environment, and to create the conditions for the revitalization of the Chalk River Laboratories (CRL) property. The NSDF Project would also enable the remediation of historically contaminated lands and legacy waste management areas (WMAs). It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. The assessment of alternatives is consistent with the Canadian Nuclear Safety Commission (CNSC) *Generic Guidelines for the Preparation of an Environmental Impact Statement (EIS)* [1] and the Canadian Environmental Assessment Agency

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			Operational Policy Statement: *Addressing the "Purpose of" and "alternative means" under Canadian Environmental Assessment Act (CEAA), 2012*. Section 2.5 provides the assessment of the alternatives, and includes technical and economic criteria. The environmental assessment for the NSDF Project was conducted in accordance with the *Generic Guidelines for the preparation of an Environmental Impact Statement* [1] and CNSC REGDOC 2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [2]. Section 5.1 of the final EIS outlines the Environmental Assessment Approach applied to disciplines to determine significance of effects (if any). Thus, a systematic process was followed to complete the assessment. Since the submission of the 2017 draft EIS, a number of technical studies were completed, to provide further scientific evidence/inputs for the NSDF Project. The overall conclusion of the final EIS is that the NSDF Project is not likely to cause significant residual adverse effects, which could not have been predetermined. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September.
		EA Process	
		EA Process – EA Approach	
CNL-ND48	MNO (August 16, 2017)	5.1 Environmental Assessment Approach, Page 5-1 The approach described is contrary to typical assessment methodology. It is insufficient to complete a pathway screening as this step is generally completed for selection of the Valued Components themselves. Once they have been selected, a full assessment must be completed prior to the application of mitigation measures. Not after. These steps in the Environmental Assessment Approach must be reversed in order for the assessment to be sufficiently rigorous. The contrary nature of these steps is highlighted when reviewing The Canadian Environmental Assessment Agency Operational Policy Statement for *Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012.* Appendix 1 of this document outlines the Environmental Assessment Framework and explicitly outlines the steps for executing an assessment as: "Step 1: Scoping: Identification of the initial focus of an environmental assessment including: the identification of VCs, potential environmental effects, and spatial and temporal boundaries; and the examination of other physical activities that may contribute to cumulative environmental effects. Step 2: Analysis: Data collection or generation through means such as surveys, literature reviews, on-site testing, community knowledge and Aboriginal traditional knowledge, and a clear description of methods used to predict environmental effects.	The environmental assessment (EA) approach listed in Section 5.1 has been organized into a step format in the final EIS. Nevertheless, this EA approach remains in accordance with the Environmental Assessment Framework outlined in Appendix I of the Canadian Environmental Assessment Agency Operational Policy Statement for *Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under Canadian Environmental Assessment Act (CEAA) 2012.* The assessment steps are consistently applied to the different disciplines considered in this EIS (i.e., atmospheric environment, hydrogeology, terrestrial biodiversity, human health, and socio-economic environment). As an example, with respect to the air quality aspect of the atmospheric environment (addressed in Section 5.2 in final EIS): • The scope (Step 1) of the environmental assessment was explained in Section 5.2.1.1, valued components were then selected based on their importance as identified by the proponent, government agencies, indigenous people, the scientific and the public communities. • This is followed by a thorough assessment (or analysis, as the commenter insists must be Step 2) of the spatial and temporal boundaries, baseline study including the methods, data and results of existing air quality conditions (Section 5.2.1.3 to 5.2.1.4). This analysis (Step 2) was used to describe and evaluate the process by which interactions between the Near Surface Disposal Facility (NSDF) project components and activities and air quality in Section 5.2.1.5 (Step 2). • Within this same Section 5.2.1.5, environmental design features and mitigation that have been or could be incorporated into the NSDF Project to eliminate and/or reduce adverse effects to air quality were considered (Step 3). Residual effects are defined by the CEAA Practitioners Glossary (2015) as "environmental effects of a designated project that remains, or is predicted to remain, after mitigation measures have been implemented as those effects remaining after the incorporation of mitigation", were identified and analyzed and, where necessary, mitigation measures were applied as part of the project design process. Using air quality as an example, this was demonstrated in Section 5.2.1.6. Thus, although it may appear that mitigation has preceded a thorough impact assessment, this is only because some potential environmental effects that are known and can be anticipated are

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		Step 3: Mitigation: Identification of technically and economically feasible measures to mitigate any significant adverse effects by reduction, elimination or control or, when those forms of mitigation are not possible, restitution measures such as replacement, restoration or compensation. Step 4: Significance: Development of conclusions about whether a project is likely to result in significant adverse effects, taking into account the implementation of any mitigation measures. Step 5: Follow-up: Development of a program to verify the accuracy of the EA of a designated project and/or the effectiveness of mitigation measures." As this demonstrates, mitigation development follows analysis – not the other way around. It is extremely problematic for CNL to develop mitigation prior to the conduct of assessment of effects. This must be remedied as it renders the environmental assessment process largely meaningless. Additionally, the approach taken by CNL doesn't conform the EIS content and structure for effects assessment as listed in the CNSC's Generic Guidelines for the Preparation of an environmental Impacts Statement which, again, requires the effects assessment be conducted prior to the identification of mitigation measures.	dealt with by implementing mitigation measures during the project design process. Furthermore, this identify-analyze-mitigate approach is an iterative practice throughout the development of design features as new unanticipated potential environmental impacts arise. • Step 4: as noted by the Framework steps listed by the commenter, the significance of adverse effects of the NSDF on air quality, taking into account the implementation of any mitigation measures, is described in Section 5.2.1.8. • Step 5: Finally, continuous monitoring, verification, and comparison of critical parameters which determine air quality are discussed in Section 5.2.1.9, Monitoring and Follow up. The part of the EA process which analyzed data collected from literature review and baseline studies was always conducted in order to predict environmental effects after the Valued Components (VCs) have been identified. It is important to note that the development of mitigation measures do not only occur in one "step" of the EA process or framework, but is continuously implemented as part of an iterative process from engineered or design aspects of the NSDF to the practice of follow-up and monitoring in order to verify the effectiveness of mitigation measures. It must be re-emphasized that as part of Canadian Nuclear Laboratories' (CNL) operational requirements, the EA approach for the NSDF complies with all applicable federal legislation including the CEAA 2012; supporting Operational Policy Statements such as the Canadian Environmental Assessment Agency *Determining Whether a Designated Project is Likely to Cause Significant Adverse environmental effect under CEAA 2012*; as well as mandatory guidelines such as the Canadian Nuclear Safety Commission's (CNSC) *Generic Guidelines for the Preparation of an Environmental Impact Statement* [1]. Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND49	MNO (August 16, 2017)	**5.1 Environmental Assessment Approach, Page 5-1** "The goal of the environmental assessment process is: • to promote sustainable development; • to engage First Nations and Métis communities, the public and government agencies; and, • Identify appropriate mitigation to reduce the overall biophysical, economic, social, heritage and health effects of the Near Surface Disposal Facility (NSDF) Project." The goal of the environmental assessment process, as stated in the Project EIS is not correct. The Government of Canada explains that an "Environmental assessment is a process to predict environmental effects of proposed initiatives before they are carried out. An environmental assessment: • identifies potential adverse environmental effects; • proposes measures to mitigate adverse environmental effects; • predicts whether there will be significant adverse environmental effects, after mitigation measures are implemented; and • Includes a follow-up program to verify the accuracy of the environmental assessment and the effectiveness of the mitigation measures." Further, the purpose of an environmental assessment is listed as a planning and decision-making tool – not a tool to promote development.	The first three bullet points listed as the goals of the environmental assessment (EA) process in Section 5.1 are the overarching goals of the EA with respect to the impact of the Near Surface Disposal Facility (NSDF) project as a whole on the environment, human health and society, and economic prosperity. However, these are not the only nor are they the exclusive goals of the EA. As mentioned in the final Environmental Impact Statement (EIS), the specific and technically-driven goals of an EA are outlined in the same section and are in accordance with *Canadian Environmental Assessment Act* (CEAA) 2012 requirements. All of the statements and points quoted by the commenter are included in the 2019 EIS draft in the appropriate section, 5.1 Environmental Assessment Approach. The NSDF final EIS does utilize the EA process as a planning and decision-making tool. Canadian Nuclear Laboratories (CNL) does not claim to change or replace the EA to become a "tool to promote development". However, the broad sense of sustainable development (for example, with respect to the maintenance of environmental safety for future generations) is inherently reflected in the conduct and completion of a technically rigorous EA process.

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		EA Process – Study Areas and Spatial Boundaries	
CNL-ND50	Dr. J.R. Walker (May 9, 2017)	The Local and RSA are insufficiently large to encompass the areas where there would be measurable changes to the environment from the project, or the potential for cumulative effects, respectively, either from normal activities, or from possible accidents or malfunctions. For example, a) downstream communities using the Ottawa River as a source of drinking water are not included in either the Local or RSA and b) the transport of waste from other sites in Ontario, Quebec, and Manitoba, to Chalk River Laboratories are not assessed in the Draft EIS.	The spatial boundaries encompass the areas within which the Near Surface Disposal Facility (NSDF) Project, and in combination with previous, existing, and reasonably foreseeable developments, are expected to interact with the Valued Components (VCs). The spatial boundaries selected are considered appropriate for their respective disciplines (e.g., hydrogeology, surface water environment, terrestrial biodiversity and socio-economic) based on the following criteria: • Physical extent of the NSDF Project; • Physical extent of Project-related effects; • Physical extent of key environmental systems (e.g., watershed boundary of potentially affected stream). The Environmental Assessment (EA) has adopted a multiscale approach for describing baseline conditions (existing environment) and predicting effects from the NSDF Project on VCs because the responses of physical, biological, cultural, and economic properties to natural and human-induced disturbances will be unique and will occur across different scales. As such, the Local Study Area (LSA) and Regional Study Area (RSA) are described below: • The LSA is selected in consideration of the NSDF Project footprint and the spatial extent of potential direct effects of the Project on the VCs. The LSA is selected to represent an area that is likely to be directly affected by the Project, helping to identify Project-specific effects (rather than cumulative effects of the Project in combination with other projects in the region). • The RSA is the area within which the maximum geographical extent of potential indirect effects of the Project may interact with the effects of other existing or reasonably foreseeable developments. With regard to the "downstream communities using the Ottawa River as a source of drinking water", Canadian Nuclear Laboratories (CNL) has increased the RSA for surface water, aquatic environment, land and resource use, ecological health, and human health to extend 8 km downstream of the Chalk River Laboratories (CRL) site. This represents a significant expansion from the RSA used in the 2017 Environmental Impact Statement (EIS) draft which was limited to the mouth of Perch Creek relative to the Ottawa River. Canadian Nuclear Laboratories (CNL) has further characterized surface water and sediment in Perch Lake watershed (e.g., Perch Lake) for radiological and non-radiological constituents expected to present in the engineered containment mound (ECM). This information is provided in Section 5.4.2 and Surface Water Quality Assessment (technical supporting document). Chalk River Laboratories' site-wide Environmental Monitoring Program provides routine monitoring of Ottawa River water quality for a suite of radiological constituents upstream and downstream of the Chalk River Laboratories site. This information is provided in the Annual Environmental Monitoring Report submitted to the Canadian Nuclear Safety Commission (CNSC) and can be viewed on the CNL web page: Performance Reporting web page. (www.cnl.ca) With regard to "the transport of waste from other sites in Ontario, Quebec, and Manitoba, to Chalk River Laboratories", waste transported to CRL from off-site generators is incorporated into the existing Integrated Waste Strategy and is part of routine operations at the CRL site thus transportation of waste from off-site locations is not specific to the NSDF Project. At present, CNL has existing procedures for safely transporting waste from off-site locations to the CRL site which is coordinated in the Radioactive Material Transportation program which meets the federal requirements outlined in the Transportation of Dangerous Goods Regulations and the CNSC Packaging and Transport of Nuclear Substances Regulations. Atomic Energy of Canada Limited (AECL), and now CNL, has been transporting waste safely and without incident for over 50 years. Transportation has been demonstrated to be safe and this activity will be carried out in accordance with all Canadian regulatory requirements and best practice to minimize risk to humans and the environment. It

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			is expected that the waste transport procedures practiced through the Transportation of Dangerous Goods (TDG) Program will continue and be applicable for the NSDF since the NSDF will be within the boundaries of the CRL site.
CNL-ND51	Joan Lougheed and Town of Deep River (August 16, 2017)	A general comment regarding sub-sections: The Regional Study Area (the "RSA") is defined as "the area within which the maximum geographical extent of potential indirect effects of the Project may interact with the effects of other existing or reasonable foreseeable projects" (see pg. 5-14). Also, it is stated that the Temporal Boundaries are inclusive of all Project Phases. It is not clear from the draft EIS, or other available supporting documents, what will be undertaken with the contaminated lands and Waste Management Areas C'WMAs") within the region of the NSDF site over the institutional control period -presumably, there are some foreseeable projects over this extensive time period. The draft EIS does not address whether projects related to these other areas during the 300 year institutional control period will impact the results of this assessment or whether any projects are included in the RSA; it does not provide an overall picture with respect to the current WMAs and the NSDF and their ongoing impact on the environment and the public over the NSDF Project phases; and it does not provide an integrated profile of emissions and effluent concentrations, each of these would assist in providing a larger picture of the anticipated risks and hazards associated with the CRL Site.	Currently, large-scale environmental remediation of Chalk River Laboratories (CRL) Waste Management Areas (WMAs) are deferred until the proposed Near Surface Disposal Facility (NSDF) is available to mitigate the need for additional storage capability. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. With the regards to WMAs that are in proximity the NSDF site (i.e., WMA A and Liquid Dispersal Areas) that have impacted surrounding soils and groundwater with the Perch Lake Basin. Although appropriate risk management actions have taken place (i.e., interception and treatment of strontium-90 groundwater plumes), large scale remediation of the contamination sources will be necessary to ensure appropriate long-term management of this legacy waste. The NSDF Project design is based on containment and isolation of the low-level waste (LLW) inventory from the environment including engineered barriers such as the base liner system which mitigates impacts to the surrounding groundwater. Therefore, decommissioning and environmental remediation activities, which will generate waste for disposal in the engineered containment mound (ECM), are anticipated to positively affect soil and groundwater quality outside of the NSDF site. Section 5.3.2.4.2.2 (Groundwater Quality) of the final Environmental Impact Statement (EIS) summarizes impacts on groundwater quality from legacy waste management areas nearest to the NSDF site. These impacts are part of the baseline conditions. As part of the environmental assessment approach, three discipline-specific assessment cases (scenarios) were identified for the assessment. These consisted of the Base Case, which represents existing conditions (e.g., past and existing disturbances or land uses); the Application Case, which represents the predictions of the effects of the Base Case combined with the effects that may result from the NSDF Project; and the Reasonably Foreseeable Developments Case, which represents predictions of the cumulative effects of the Application Case, plus projects that are currently under application review or that have officially entered a regulatory application process. The next step was to describe the existing conditions. A description of the environment subsection was developed for each discipline and includes a description of the baseline conditions used to prepare a discipline specific Base Case. Using the Base Case, interactions were then evaluated by conducting a pathway analysis. The first part of the analysis was to identify all pathways by which a Project component or activity could cause a potential effect. For an effect to occur, there has to be a Project component or activity that could result in a detectable change to the measurement indicators and a correspondent effect on a valued components. Reasonably foreseeable developments considered in the assessment are summarized in Table 8.2-1 of the revised, which identifies new/upgraded Research & Development Facilities (e.g., Small Modular Reactors), new support infrastructure, infrastructure decommissioning and environmental remediation as developments to occur at CRL.
CNL-ND52	MNO (August 16, 2017)	**5.1.3.1 Spatial Boundaries, Page 5-13** The RSA is defined as: "…the area within which the maximum geographical extent…" [emphasis added] of potential effects are defined. This is contrary to the CRL property being identified as the RSA for the land and resource use assessment. This would more accurately be characterized as the Site Study Area or, where effects could not be characterized outside of the CRL property, the Local Study Area. How could interactions with other existing or reasonably foreseeable projects be identified within the CRL property, as no Projects beyond the CNL works would be completed therein?	Section 5.1.3.1 Spatial Boundaries in the final Environmental Impact Statement (EIS) draft defines the Regional Study Area (RSA) as the area within which the maximum geographical extent of potential indirect effects of the project may interact with the effects of other existing or reasonably foreseeable projects. In Section 5.9.3.1 Spatial Boundaries, the land and resource use RSA is the combined area of the air quality, terrestrial and aquatics RSAs, which have been used for the assessment of the air quality, groundwater, and surface water, aquatic and terrestrial environments (Figure 5.9.3-1). This RSA captures effects on the terrestrial and aquatic environments as a result of the Near Surface Disposal Facility (NSDF) Project (e.g., habitat loss, sensory disturbance for wildlife and changes to habitat form air quality and surface water quality, changes in groundwater and surface water quality, habitat loss and changes in

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			abundance, distribution and disturbances to wildlife and fish), as these effects have the potential to result in subsequent effects on land and resource use. Therefore, the RSA for land and resource use is a combination of the air quality and aquatic environment RSAs as this is the largest extent of potential cumulative effects on land and resource use. The air quality RSA is defined as an approximate 7.4 km circular radius surrounding the Local Study Area (LSA), and the aquatic RSA includes the outlet of Perch Creek to the Ottawa River and extends roughly 8 km downstream in the Ottawa River to Harrington Bay. While there are no land and resource use tenures, or outdoor tourism or recreation activities occurring within the Chalk River Laboratories (CRL) site boundary, there may be some trapping occurring in Garrison Petawawa and in the RSA. The Ottawa River where it overlaps with the RSA boundaries would also most likely be used for some outdoor tourism and recreation. As explained in Section 5.9.3.3 Assessment Cases, the Reasonably Foreseeable Development (RFD) Case scenario represents the effects of residual adverse effects of the Application Case (which considers the effects of existing conditions as well as predicted effects from the NSDF Project from construction through to post-closure) combined with other reasonably foreseeable projects in the land and resource use RSA. Because RFDs will not have any spatial overlap or are likely to positively affect land and resource use, and RFD Case is not presented as part of this assessment. No cumulative effects with RFDs were identified in Section 5.5 Aquatic Environment and 5.6 Terrestrial Environment that could potentially introduce indirect effects to land and resource use. Additionally, of the RFDs identified (see Section 8.2 of the final EIS), none will result in change in broad land use or access to land outside of the CRL site. As such, potential effects from RFDs are not expected to spatially overlap with potential effects to land and resource use from the NSDF Project.
CNL-ND53	MNO (August 16, 2017)	**5.1.3.1 Spatial Boundaries, Page 5-13** "For this EIS, data collected at the NSDF Project Site and within the CRL property were used to provide measures of baseline environmental conditions and predict the direct and indirect changes from the NSDF Project on VCs … Data collected at larger scales (i.e., outside of the CRL property were used to measure broader-scale baseline environmental conditions, and provide regional context for the maximum predicted geographic extent of combined direct and indirect effects from the NSDF Project on VCs…" The approach described is problematic. Based on this description, it appears that data was collected and the spatial boundaries were identified to conform to this data rather than the spatial boundaries being defined and then data being collected for those boundaries. This approach is contrary to the information outlined in the *Generic Guidelines for the Preparation of an Environmental Impact Statement (CNSC 2016)* and appear ad hoc and limiting of the scope.	Canadian Nuclear Laboratories' (CNL's) Environmental Protection Program, which uphold CNL's Environment Policy for all operations that may affect the environment in and around CNL sites, maintains a comprehensive effluent and environmental monitoring program with on-site analyses performed each year at the Chalk River Laboratories (CRL) site. For at least the last 15 years, more than 5,000 effluent samples while more than 20,000 analyses are performed annually on groundwater samples. This practice is routine and has been on-going prior to the proposition of the NSDF. Additionally, monitoring of the environment as it relates to the operations at CRL has been on-going for at least 60 years and have evolved over time into the present formal "Environmental Monitoring Program (EMP)". The results of these routine monitoring and verification procedures are published as part of annual compliance reports submitted to and reviewed by the Canadian Nuclear Safety Commission (CNSC). These reports as well as frequent updates on environmental performance are provided to management and to external interested parties and the public. Data collected at the NSDF Project site and within the CRL site were used to provide measures of baseline environmental conditions and predict the direct and indirect changes from the NSDF Project on Valued Components (VCs). Data collected at larger scales (i.e., outside of the CRL site) were used to characterize broader-scale baseline environmental conditions. These data also provide regional context for the maximum predicted geographic extent of combined direct and indirect effects from the NSDF Project on VCs (e.g., changes to downstream water quality, or changes to regional employment and incomes). Spatial boundaries were determined for the assessment based on the potential for direct and indirect effects, not where baseline data or sampling sites previously existed. Potential direct and indirect effects were derived from the results of previous environmental risk assessments that have been conducted at CRL. Additional baseline data was collected, where required, to sufficiently assess potential effects to VC. With all these considerations, CNL has ensured that baseline conditions within the relevant spatial boundaries assessed specifically for the NSDF EA is consistent with the *Generic Guidelines for the Preparation of an Environmental Impact Statement* [1]. Reference:

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			[1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND54	MNO (August 16, 2017) William Turner (May 31, 2017) 110. 111.	**5.1.3.1 Spatial Boundaries, Page 5-13** "The LSA is selected in consideration of the Project footprint, and the spatial extent of potential direct effects of the Project on the VCs. The LSA was selected to represent an area that is likely to be directly affected by the Project, helping to identify Project-specific (rather than cumulative effects of the project in combination with other projects in the region)." This definition does not conform with the *Generic Guidelines for the Preparation of an Environmental Impact Statement (CNSC 2016)* which state: **Local study area:** The local study area (LSA) is defined as that area existing outside the site study area boundary, where measurable changes to the environment resulting from the proposed activities from any phase of the project, either through normal activities, or from possible accidents or malfunctions, may be anticipated. The boundaries must change if appropriate following an assessment of the spatial extent of potential effects. The geographic boundary will depend on the factor being considered…" The key difference lies in the wording of 'potential direct effect' whereas the *Guidelines* just specify a measurable change. Further, the EIS specifies that the LSA is selected in consideration of the Project Footprint, whereas the *Guidelines* specify that it is an "…area existing <u>outside</u> the site study area boundary, specifically. In particular, the MNO is concerned that the LSA conforms to the CRL property where particulate matter and combustion gases could occur outside of the property on roads that feed the property. The assessment boundary must be amended to include all roads where construction vehicles have entry into the CRL property in order to accurately represent Project effects (e.g., plant road, miller road, blamer bay road) [5.2.1.3.1 Spatial Boundaries, page 5-29].	Section 5.1.3.1 Spatial Boundary of the final Environmental Impact Statement (EIS) assessment clearly describes three different spatial scales designate as study areas: Study Site Area (SSA), Local Study Area (LSA), and Regional Study Area (RSA). Canadian Nuclear Laboratories (CNL) has carefully specified that the SSA is the Near Surface Disposal Facility (NSDF) Project Footprint, whereas the LSA is selected in consideration of the NSDF footprint. The LSA is not the same as the SSA but is the "area existing outside the study site area boundary, specifically" as noted by the commenter. The selection of the LSA, therefore, complies with the *Generic Guidelines for the Preparation of an Environmental Impact Statement* [1] and falls within the definition quoted by the commenter. It is also important to note that the spatial boundary for the study areas considered by each discipline and the rationale for their selection are identified in Section 5.2 through 5.10 under their respective "Assessment Boundaries" heading. The study areas are illustrated on maps of appropriate scales that are also included in Sections 5.2 through 5.10 of the final EIS. The approach for defining spatial boundaries is consistent with the *Generic Guidelines for the Preparation of an EIS* [1]. The EIS uses the wording "potential direct effect" which, although not the exact same wording as "measurable change", does not preclude compliance with the *Generic Guidelines* [1]. While the NSDF Project is still under regulatory approvals, no normal activities (i.e., construction or operation) have yet occurred (although possible accidents or malfunctions which may occur have been assessed). This means that no "measurable change to the environment" resulting from the NSDF Project's proposed activities have yet been detected. It is possible that the LSA boundaries will change should a follow-up assessment of the spatial extent of potential effects deem it necessary. In response to the roads used by construction vehicles to enter the Chalk River Laboratories (CRL) property specifically related to NSDF activities, Section 5.2.1.3.1 Spatial Boundaries and Figure 5.2.1-1 of the final EIS very clearly indicate that the LSA encompasses activities and sources of emissions associated with the Project and includes the SSA as well as the CRL site boundary. Relevant roads for these vehicles (e.g., Plant Road, Miller Road, and Balmer Bay Road) are very clearly encompassed within the approximately 7.4 km radius of the RSA. Note that incorporation of these roads within the RSA does not make them less important than features incorporated into the LSA boundaries. The spatial boundaries are divided to communicate the potential direct and indirect effects of the NSDF Project on the environment over varying spatial scales and does not imply regional potential impacts are less important than local impacts. The impact of site preparation and all activities associated with the construction of the NSDF Project is discussed in Section 5.2.1.3.2 Temporal Boundaries of the final EIS. The temporal boundaries for the air quality assessment include consideration of the effects of the NSDF Project during the construction and operations phase, as the emissions from these phases will be higher than those during the closure and post-closure phases. The Air Quality Assessment technical supporting document (TSD) [2] comprises four elements for a comprehensive assessment of air quality: Meteorology Assessment, Air Quality Baseline, Emissions Estimates, and Dispersion Modelling. The Air Quality Baseline section of this TSD summarizes the available non-radiological (particulate matter, combustion gases) ambient air quality monitoring data for stations located outside of the air quality assessment RSA for the NSDF Project. The Emissions Estimates section of the Air Quality Assessment TSD includes the calculation methods followed to estimate emissions for the NSDF Project including the rationale for the assessment of compounds that are expected to be release for the construction and operations phases. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.

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			[2] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008.
CNL-ND55	William Turner (May 31, 2017) 114.	Figure 2.2-1, Overview of Canadian Nuclear Laboratories Integrated Waste Strategy depicts several "Disposition Routes" for the various "Waste Types". In this figure, CNL specifically identifies an ILW Repository (Although I suggest that the Integrated Waste Strategy (IWS) depicted in this figure is inadequate, (See Comments 17, 18, and 21 to 24 above), for this section and all sections that refer to the Reasonable Foreseeable Developments, I will take this figure as a given.) Therefore, the Intermediate Level Waste Repository must be considered as one of the "Reasonably Foreseeable Developments." However, in reviewing these RFD sections, CNL make no mention of this repository. Since CNL never refer to an ILW repository as a RFD, any assessment of "cumulative effects" must be considered incomplete, inadequate and deliberately misleading. CNL need to revise their assessment of "cumulative effects" to include, as a minimum, the ILW repository.	The Integrated Waste Strategy (IWS) was developed to enable the integration of waste management across CNL to ensure activities are carried out in a way that protects people and the environment in compliance with government and regulatory policies [1]. The IWS represents a strategic level plan and further strategy development is necessary. The summary of waste stream flows has been revised in the final EIS (Figure 2.2-1) to summarize a brief overview of the existing and anticipated storage and disposal routes of CNL wastes within which CNL proposes to integrate the NSDF. While the IWS represents a strategic plan, no such project as an "Intermediate Level Waste Repository" has yet been proposed by CNL through an application review. As outlined in Section 5.1.7.1 of the final EIS, developments and activities that are currently under application review or have officially entered a regulatory application process were considered reasonably foreseeable. For this reason, an ILW repository is not considered reasonably foreseeable; thus, the EIS does not discuss it under cumulative effects. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND56	MNO (August 16, 2017)	**5.5.3 Assessment Boundaries, Spatial Boundaries, Page 5-236** The usage of the surface water quality RSA is inappropriate as it does not conform to fish species patterns of use or fish habitat. The RSA should be identified based on identified fish species patterns of use for migration and reproduction as well as potential habitat for those species rather than Perch Lake and Perch Creek with adjacent wetlands and swamps. The LSA should be identified based on identified fish species patterns of use for migration and reproduction as well as potential habitat for those species rather than Perch Lake and Perch Creek with adjacent wetlands and swamps. At minimum, tributaries of Perch Lake and Perch Creek should have been included in both the RSA and LSA.	In the final Environmental Impact Statement (EIS) Section 5.5.3.1 Spatial Boundaries describes the Regional Study Area (RSA) applied for the aquatic biodiversity assessment which includes an assessment of the cumulative effects of the Near Surface Disposal Facility (NSDF) Project on aquatic biodiversity valued components (VCs). The RSA is defined as the area within which the potential effects of the NSDF Project may interact with the effects of other existing or reasonably foreseeable developments. This RSA is determined by the spatial extent of the Perch Creek and Perch Lake Watershed, which does includes Perch Lake and its tributaries and Perch Creek. The RSA has been extended to include a portion of the Ottawa River roughly 8 km downstream towards Harrington Bay. Canadian Nuclear Laboratories (CNL) has conducted fish surveys to evaluate potential for fish habitat in the East Swamp wetland. East Swamp Stream, a small stream which drains the East Swamp wetland, along with other surface water bodies in the perch Lake basin were surveyed for fish habitat in 2017. East Swamp stream provides fish habitat for a variety of fish species described in Section 5.5.4.2.2 of the revised 2019 Environmental Impact Statement (EIS). Additionally, Main Stream to the southwest of the proposed NSDF site serve as key habitats for fish. The spatial distribution of potential effects of the activities related to the NSDF Project on the surface water environment (e.g., lakes, streams, rivers) encompasses the aquatic environment where fish habitats are maintained. This is why the spatial boundaries (the RSA) used for the assessment of Hydrology (Section 5.4.1), Surface Water Quality (Section 5.4.2), and the Aquatic Environment (Section 5.5) are similar. It is well understood that the sustainability and health of the aquatic environments which host integral fish habitat is highly dependent on and connected with the hydrology of the surrounding features such as Perch Creek (where seven species of fish were found exclusively), Perch Lake (a key habitat of Northern Pike since the mid-to-late 1980s), and the Ottawa River as well as their respective tributaries, wetlands, and swamps. Overall, the selection of the Local Study Area (LSA) and RSA with regard to the connectivity of surface water bodies is based on fundamentals of watershed ecohydrology. Therefore, in order to ensure the health of fish species, their habitats, and migratory pathways, we must include key physical hydrology features (e.g., Perch Creek, Perch Lake) as part of the RSA. For a detailed discussion of the selection of ecological receptors incorporated into an Ecological Risk Assessment (Eco RA) based on the VCs identified in the EIS and relevant Canadian Standards Association criteria, see Section 2.2 of the Ecological Risk Assessment technical supporting document [1]. Section 5.5.4.2.2 presents the results of the baseline description of the aquatic environment as it relates to the Perch Creek and Perch Lake Watershed fish community. These baseline descriptions are based on the findings of previous monitoring

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			programs and investigations/studies at the CRL site (i.e., the conditions that exist in the Watershed at CRL prior to NSDF proposal). Fish productivity and community structure are common ecological measurement indicators that characterize the ecological health of fish communities in Perch Creek and Perch Lake; if they change, then this will prompt further investigation of what would cause them to change. Therefore, because they did not change (i.e., there is no significant change in productivity of community structure), then it can be expected that these fish communities are not impacted by past of current activities at the CRL site. All fish in all aquatic environments experience aging and changes in their physical conditions (e.g., length and weight); in most cases, the changes in physical conditions are predicted by age (i.e., fish get bigger the older they get). It can therefore be expected that fish have indeed aged and changed their physical conditions in the Perch Lake basin but these would be independent of CNL activities. Diseases have not been reported in the Ecological Risk Assessment (EcoRA) [1] for the NSDF. This is because tracing the patterns of disease in animals in the natural environment are rarely unambiguously attributed to one or several elements or causes. The occurrence of disease in animals are not an indicator of contamination; generally, an extreme amount of contamination is required to manifest as disease in the surrounding exposed organisms. This is why measuring the concentrations of radionuclide and non-radionuclide contaminants and comparing them against ecological risk benchmarks are used during routine environmental monitoring at the CRL site and as part of the baseline characterization of the aquatic environment. Reference: [1] Ecological Risk Assessment (EcoRA) for the NSDF Project, 232-121240-ASD-001.
CNL-ND57	MNO (August 16, 2017)	**5.6.3 Assessment Boundaries, 5.6.3.1 Spatial Boundaries, Page 5-273** The LSA does not include any provision for the migratory birds which are being assessed. How were their habitats considered in the selection of the LSA? Further, as there was no consideration of typically Metis hunted or trapped species4, there was no consideration of these species in the selection of a LSA. The selection of the CRL property as the RSA boundary is a prime example of how the narrow scoping for this EIS has allowed for abbreviated assessment. If items such as noise, as a VC, and visual quality were considered, the RSA could have been extended beyond the CRL property line to encompass a broader area. Additionally, if the air quality LSA and RSA were expanded to include a variety of roads feeding the site for consideration of diesel and dust – the RSA boundary for this VC may also have been expanded. Finally, if typically Metis hunted or trapped species were considered, the RSA most certainly would have been expanded to accommodate the habitat requirements for these species. These limiting factors, which were entirely self-imposed, have led to the assessment being scoped so narrowly as to miss critical aspects of the environment.	Protected taxa (migratory birds, typically hunted and trapped animals) in Local Study Area (LSA): The spatial boundaries (Site Study Area (SSA), LSA, Regional Study Area (RSA)) of the terrestrial biodiversity assessment described in Section 5.6.3.1 of the final Environmental Impact Statement (EIS) includes all upland vegetation communities and wetlands, as well as terrestrial wildlife taxa (e.g., mammals, birds) and wildlife taxa with terrestrial and aquatic life history requirements (e.g., reptiles) that occupy and rely on habitat and food sources within the terrestrial environment. The health of migratory birds constitute as an important Valued Component (VC) because of their ecological importance and because they are protected by federal legislation (*Migratory Bird Convention Act (MBCA), 1994* [MBCA]) which prohibit the disturbance, destruction or removal of a nest or related shelter, or egg of a migratory bird, possession of a live migratory bird, or a carcass, nest or egg of a migratory bird. Section 5.6.4.2 in the final EIS includes a thorough description of the habitat availability, habitat distribution, survival, and reproduction of migratory birds within the RSA. As a result of mitigation, the migratory bird VC will not be affected by any mortality-related pathways. Because several other VCs are migratory birds and changes in habitat availability and distribution will be addressed for these VCs, migratory birds as a group were not carried forward for further assessment. The residual effects of the interactions between Near Surface Disposal Facility (NSDF) and terrestrial biodiversity, including migratory birds, are summarized in Table 5.6.5-2 of the final EIS along with applicable mitigation measures. Selection of RSA**:** As described in Section 5.6.3.1 of the final EIS, the terrestrial biodiversity RSA (Figure 5.6.3-1) is the Chalk River Laboratories (CRL) site boundary and has an area of approximately 4,000 ha and represents a comprehensive scope wherein residual effects from the NSDF Project have been evaluated in the final EIS. The RSA encompasses the LSA and the SSA, the site of the NSDF Project. Because the RSA contains Canadian Nuclear Laboratories (CNL) nuclear facilities, it is managed differently from the surrounding landscape, which is provincial Crown land, or private land. The RSA was used as the scale at which cumulative effects to terrestrial biodiversity VCs were assessed. Beyond regional disturbance factors (e.g., forestry and climate change) were considered if they were likely to affect vegetation communities or populations of wildlife VCs that overlap with the RSA. This approach is consistent with Canadian Nuclear Safety

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			Commission's (CNSC's) *Guidelines for the Preparation of an EIS* and the Canadian Environmental Assessment Act (CEAA) *Technical Guidance for Assessing Cumulative Environmental Effects.* <u>Noise and visual disturbance in RSA:</u> The evaluation of noise from all project-related activities (blasting and construction) on human receptors is provided in Section 5.10.5 of the final EIS. The nearest resident is 3 km from the NSDF site. Given the 3 km distance from the site, noise and vibrations from blasting activities are not expected to be noticeable to these residents. The increased level of traffic during the construction and operational phase of the NSDF Project is not expected to significantly impact noise levels. There are no sensitive receptors (as defined by O.Reg. 419/05 *Air Pollution – Local Air Quality*) in the vicinity of the NSDF Project that would experience nuisance effects (e.g., noise and vibration) from the construction and operations of the NSDF Project. A discussion of potential indirect effects from noise and vibrations and supporting information is also provided in Sections 5.5 Aquatic Environment and Section 5.6 Terrestrial Environment of the final EIS. The hours of operation for truck transport is typically 6 days per week, with 16-hour days but may vary between 12 and 18 hours per day depending on Project activities. The construction period is expected to be 24 months. Altogether with noise disturbance considerations, the overall increase in transport vehicles is considered negligible in comparison to current traffic levels on the roads (personal vehicle traffic for over 2,000 employees and transport vehicles) to support the operations of the CRL site. <u>GHG and dust in RSA:</u> The RSA for the air quality assessment, as described in Section 5.2.1.3.1 of the final EIS takes into consideration the sources of combustion emissions and fugitive dust from NSDF activities during the construction and operations phases when residual effects on these aspects of air quality are likely to occur. Residual effects on air quality from combustion emissions (greenhouse gas emissions (GHG)) as a result of NSDF activities have been assessed as described in Section 5.2.2.6 of the final EIS. Table 5.2.2-10 in the final EIS summarizes the annual overall emissions in tonnes of CO_2 equivalent for the NSDF Project construction and operations phases. The GHG emissions from both construction and operations phases represent less than 0.02% of the provincial total and less than 0.005% of the Canada-wide total. This is considered a negligible fraction of global GHG emissions as contributed by the NSDF Project. Dust emissions are represented by indicator compounds in the air quality assessment of the NSDF Project. Section 5.2.1.1 in the final EIS describes particulate emission as fugitive dust which can be a nuisance issue of concern to the public. <u>Hunting and trapping within the RSA</u>**:** The RSA for Traditional Land and Resource Use (Section 6.4.3.1 of the final EIS) was selected as the combined area of the air quality, terrestrial, and aquatic assessments' RSAs (Figure 6.4.3-1). The RSA is defined to capture and evaluate residual environmental effects as a result of the NSDF Project because these may, in turn, affect traditional land and resource use (e.g., habitat loss, sensory disturbance for wildlife and changes to habitat from air quality and surface water quality, changes in groundwater and surface water quality, changes in species abundance, distribution, and disturbance to terrestrial and aquatic biota). The RSA for the assessment of air quality (approximately 7.4 km circular radius surrounding the LSA) and aquatic (approximately 8 km downstream of the Ottawa River to Harrington Bay) environment is the largest extent wherein potential cumulative effects from the NSDF Project were assessed. Therefore, the RSA for traditional land and resource use is a combination of the RSAs for air quality and aquatic environments. As described in Section 5.9.4.1.3.4 in the final EIS, the SSA, LSA, and RSA all overlap active trapline areas to the south and west (Figure 5.9.4-1). While trapping is prohibited in the LSA and most areas of the RSA due to restricted public access within the CRL site boundary, results of consultation and engagement have identified that there may be some limited trapping activities at the southern portion of the RSA, beyond the CRL site boundary on the Garrison Petawawa property. As mitigation measures to limit potential effects on traditional hunting and trapping within the CRL site boundary, CNL will consult with trappers about their use of the surrounding areas for trapping activities and to understand any concerns. The NSDF Project is not predicted to have any terrestrial effects beyond the CRL site, and results of the aquatic

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			environment assessment identified only negligible residual effects on aquatic biodiversity valued components as a result of the NSDF Project. No residual effects on traditional land and resource use VCs are anticipated as a result of the NSDF Project.
CNL-ND58	MNO (August 16, 2017)	**5.8.3 Assessment Boundaries, 5.8.3.1 Spatial Boundaries, Page 5-536** The LSA should have been a combination of the LSA/RSA from air quality, groundwater water quality and surface water quality – not just water. Please amend.	Section 5.1.3.1 in the final Environmental Impact Statement (EIS) describes the distinction between the Local Study Area (LSA) and Regional Study Area (RSA) for each environmental discipline assessed in the EIS, including the assessment of residual effects of the Near Surface Disposal Facility (NSDF) Project on human health risk (Section 5.8.3). The LSA is selected to represent an area that is likely to be directly affected by the Project, helping to identify Project-specific effects (rather than cumulative effects of the Project in combination with other projects in the region). On the other hand, the RSA defines the maximum geographical extent of potential indirect effects of the Project; the RSA scales the cumulative effects that may result indirectly from interactions in the environment from the NSDF Project along with other existing or reasonably foreseeable developments. In Section 5.8.3.1 of the final EIS, the effects of the NSDF Project on human health VCs is assessed at different scales within the LSA and RSA and much of the potential impacts on human health may overlap between these two spatial boundaries. It does not represent one as more important than the other. The spatial boundaries are used to scale the residual and cumulative effects from NSDF Project activities and does not confer relative importance. Primary pathways which manifest residual effects require further analysis and classification to determine the environmental significance of NSDF Project effects on Valued Components (VCs). As described in Section 5.8.8 of the final EIS, the significance of human health is evaluated based on: (i) the potential magnitude of the response, as indicated by the comparison to dose limits (for radionuclides) or risk benchmark values (for non-radionuclides) and (ii) the degree of conservatism and uncertainty in the analysis.
CNL-ND59	MNO (August 16, 2017)	**5.9.3 Assessment Boundaries, 5.9.3.1 Spatial Boundaries, Page 5-575 and 5-576** The LSA should encompass the maximum extent of all project identified LSAs combined. The RSA should encompass the maximum extent of all Project identified RSAs, combined. At minimum, it must be extended to conform to the air quality RSA. As the MNO has previously commented on the sufficiency of the LSAs and RSAs, these comments should also be taken into account for this component.	Section 5.1.3.1 in the final Environmental Impact Statement (EIS) describes the distinction between the Local Study Area (LSA) and Regional Study Area (RSA) for each environmental discipline assessed in the EIS, including the assessment of residual effects of the Near Surface Disposal Facility (NSDF) Project on human health risk (Section 5.8.3). The LSA is selected to represent an area that is likely to be directly affected by the Project, helping to identify Project-specific effects (rather than cumulative effects of the Project in combination with other projects in the region). On the other hand, the RSA defines the maximum geographical extent of potential indirect effects of the Project; the RSA scales the cumulative effects that may result indirectly from interactions in the environment from the NSDF Project along with other existing or reasonably foreseeable developments. The effects of the NSDF Project on environmental assessment Valued Components (VCs) is assessed at different scales within the LSA and RSA and many of these effects may overlap between the two spatial boundaries. The spatial boundaries are used to scale the residual and cumulative effects from NSDF Project activities and does not confer relative importance (i.e., RSA is no less important than LSA). Primary pathways which manifest residual effects require further analysis and classification to determine the environmental significance of NSDF Project effects on VCs (i.e., how important the residual effects are). As described in Section 5.9.3, the RSA for the land and resource use assessment has been revised in the EIS. The RSA is defined to capture effects on the terrestrial and aquatic environments as a result of the NSDF Project (e.g., habitat loss, sensory disturbance for wildlife and changes to habitat from air quality and surface water quality, changes in groundwater and surface water quality, changes in species abundance, distribution and disturbances to wildlife and fish), as these effects have the potential to result in subsequent effects on land and resource use. Therefore, the RSA for land and resource use is a combination of the air quality and aquatic environment RSAs as this is the largest extent of potential cumulative effects on land and resource use. The air quality RSA is defined as an approximate 7.4 km circular radius surrounding the LSA, and the aquatic RSA includes the outlet of Perch Creek to the Ottawa River and extends roughly 8 km downstream in the Ottawa River to Harrington Bay. While there are no land and resource use tenures, or outdoor tourism or recreation activities occurring within the Chalk River Laboratories (CRL) site boundary, there may be some trapping occurring in Garrison Petawawa and in the RSA. The Ottawa River where it overlaps with the RSA boundaries would also most likely be used for some outdoor tourism and recreation.

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		Facility Design	
		Facility Design – General	
CNL-ND60	Greg Csullog (May 1, 2017)	**2.5.3 Facility Design – 2-28:** In a January 19, 2017 workshop on the both the NPD disposal and the NSDF projects, a question was raised concerning the level of the Ottawa River over the life of the NPD facility assuming that the existing dam upstream may not last. The response was that the river level would rise significantly and rise above the level of the top of the repository. Has such a scenario been taken into account for the NSDF relative to the issue of the ECM and the current water table level and its variation?	The Design Basis Flood level for the Chalk River Laboratories (CRL) site, for both precipitation events and for complex events involving random (or seismically related), failure of both the upstream dams (and of the control works at the exit from Lake Temiskaming), is 122 metres Above Sea Level (m ASL), which includes a margin of 2 m [1]. The Near Surface Disposal Facility (NSDF) has been designed to the Design Basis Flood level for the CRL site. The NSDF would not be directly affected by a flooding event since the surface elevations at the NSDF site range from a low of 156 m ASL near the north side of Perch Lake, to a high of 197 m ASL at the crest of the ridge that separates Perch Lake and Ottawa River drainage basins [1]. The ECM elevations range from approximately 163 m ASL to 202 m ASL, which correspond to the lowest elevation of the base liner system and highest elevation of the final cover system, respectively [1]. This is further evidenced by the fact that the low point of the NSDF has an elevation of approximately 156 m ASL, which is higher than the 100 year flood elevation of 115 m ASL and the CRL design basis flood level of 122 m ASL, for this portion of the Ottawa River [1]. Reference: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND61	OFWCA (Johanna Echlin) (May 8, 2017) The Canadian Association of Physicians for the Environment (CAPE) (April 18, 2017) Ronald and Michele Kaulbach (May 8, 2017) Cody Cuthill (August 4, 2017) Michael Stephens (August 14, 2017) Valerie Needham (August 15, 2017) Patrick Galligan (August 15, 2017) Irene Boland and Mark Barnes (August 15, 2017) Denise Roberge	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The commenters raised that holding intermediate level waste (ILW) in an above ground mound is contrary to International Atomic Energy Agency (IAEA) standards. Even an NSDF is not recommended for disposal of intermediate-level wastes that can be hazardous for hundreds of thousands of years. Intermediate-level wastes require a stable geological environment. Based on the precautionary principle and IAEA guidelines, several commenters expressed the view that intermediate level waste should not be placed in an engineered containment mound or NSDF to maintain consistency with international standards derived to protect the environment. Further, the commenters raise that the project as a whole does not give appropriate attention to the differences in waste criteria and the considerations given for the longer lasting ILW, given the proposed oversight period, are inadequate to assure protection of the environment and human health for now and future generations.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). As outlined in Section 2.5.2.2.1 of the final EIS, the International Atomic Energy Agency (IAEA) definition of a near surface disposal is the placement of solid, or solidified, radioactive waste in a disposal facility located at or near the land surface (IAEA SSG-29 – *Near Surface Disposal Facilities for Radioactive Waste* [2]). An NSDF is a suitable and technically feasible means of disposing of LLW and the effectiveness of such facilities for disposal of LLW has been demonstrated as illustrated by the near surface facilities in North America listed in Table 2.5.2-1 of the final EIS. Section 3.1.1.1 of the final EIS has an extensive discussion regarding how the NSDF aligns with regulatory and international guidelines. The key safety features of the NSDF Project have addressed the IAEA design principles for radioactive waste disposal by incorporating: multiple safety functions, containment of radioactive waste, isolation of radioactive waste and surveillance and control of passive safety features into the facility design. The engineered containment mound is designed to contain and isolate the wastes from the environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW and most of the radioactivity decays in the first 100 years after closure, the design of the NSDF Project is commensurate with the hazard. This is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration in the engineered containment mound (ECM) decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter.

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Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

Number	Source	**Comment Summary** (all original submissions can be found on the Canadian Environmental Assessment Registry, reference #80122) **Synthèse des commentaires** (toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)	**Response (to be completed by CNL)** **Réponse (à remplir par la LNC)**
	(August 15, 2017 Angela Solar (August 14, 2017) David Thomson (August 14, 2017) Catherine Galligan (August 14, 2017) Douglas Nichols (August 14, 2017) Glen Moore (August 14, 2017) José Moreno-Lacalle (August 14, 2017) James Hooper (August 15, 2017) Matt D. (August 14, 2017) John Ankenman (August 16, 2017) Kevin Costello (August 16, 2017) Susan Parks (August 16, 2017) Jake Deacon (August 16, 2017) Mike Schreiner (August 16, 2017) Sharon Thorne (August 16, 2017) Sharon Thorne (August 16, 2017) Owen Gleason (August 16, 2017) John Almstedt (August 16, 2017) Linda Gasser (August 16, 2017) Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) Angela Bischoff	Taking this into consideration and that ILW require considerably greater safeguards, some commenters recommended that CNL design a disposal facility that will only accept low-level waste (LLW). [Français] Les commentateurs ont souligné que le fait de détenir des déchets radioactifs de moyenne activité (DRMA) dans un monticule en surface est contraire aux normes de l'Agence internationale de l'énergie atomique (AIEA). Même une installation de gestion des déchets près de la surface n'est pas recommandée pour la gestion des DRMA qui peuvent être dangereux pendant des centaines de milliers d'années. Les déchets radioactifs de moyenne activité nécessitent un environnement géologique stable. En se fondant sur le principe de précaution et les lignes directrices de l'AIEA, plusieurs commentateurs ont exprimé l'opinion que les DRMA ne devraient pas être placés dans un monticule de confinement artificiel ou une installation de gestion des déchets près de la surface afin de maintenir la cohérence avec les normes internationales établies pour protéger l'environnement. De plus, les commentateurs soulèvent que le projet dans son ensemble n'accorde pas suffisamment d'attention aux différences dans les critères de gestion des déchets et que les considérations relatives à la durée de vie utile plus longue des DRMA, compte tenu de la période de surveillance proposée, sont inadéquates pour assurer la protection de l'environnement et de la santé humaine pour les générations actuelles et futures. Compte tenu de cela et du fait que les DRMA nécessitent des mesures de protection beaucoup plus importantes, certains commentateurs ont recommandé que les LNC conçoivent une installation de gestion des déchets qui n'acceptera que les déchets radioactifs de faible activité (DRFA).	Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [Français] Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire des déchets destinés à l'installation de gestion des déchets près de la surface (IGDPS) et y ont apporté des changements. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été officiellement annoncée par les LNC le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage permanent des DMA (section 2.2.2.1 de l'EIE définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [1]). Comme l'indique la section 2.5.2.2.1 de l'EIE définitive, l'Agence internationale de l'énergie atomique (AIEA) définit la notion de gestion des déchets près de la surface comme étant la mise en place de déchets radioactifs solides ou solidifiés dans une installation de gestion située à la surface ou près de la surface du sol (SSG-29 – *Near Surface Disposal Facilities for Radioactive Waste* [2]). Une IGDPS convient et est techniquement adaptée au stockage des DFA, et l'efficacité de ce type d'installation pour le stockage des DFA a été prouvée, comme l'attestent les installations de ce type en Amérique du Nord énumérées au tableau 2.5.2-1 de l'EIE définitive. La section 3.1.1.1 de l'EIE définitive comporte une longue analyse de la conformité de ce type d'installation à la réglementation en vigueur et aux directives internationales. Les principales caractéristiques de sûreté de l'IGDPS respectent les principes de conception prévues par l'AIEA applicables au stockage de déchets radioactifs puisqu'elles comprennent de multiples fonctions de sûreté, le confinement des déchets radioactifs, l'isolement des déchets radioactifs, et la surveillance et le contrôle des mécanismes de sûreté passifs intégrés à la conception de l'installation. Le monticule de confinement artificiel est conçu pour confiner les déchets et les isoler de l'environnement pendant 550 ans, après quoi la radioactivité diminue jusqu'à se rapprocher des concentrations naturelles de fond. Comme l'IGDPS envisagée ne traitera que des DFA et que la plupart de leurs éléments radioactifs se désintégreront au cours des 100 ans suivant la fermeture, l'IGDPS est un type d'installation proportionnel aux risques. C'est ce qu'illustre la figure 3.3.1-2 de l'EIE définitive : la radioactivité du contenu du monticule de confinement artificiel (MCA) diminue d'un facteur d'environ 2 000 au cours des cent premières années et commence à se rapprocher des concentrations naturelles de fond peu après. Références [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [2] AIEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014.

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	(August 16, 2017) Greenspace Alliance of Canada's Capital (August 17, 2017) Martine Ouellet (Bloc Québécois) (August 14, 2017) Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) Kerrie Blaise, CELA (August 15, 2017) Dr Éric Notebaert, ACME (August 11, 2017) AANTC (August 14, 2017) STOP Oléoduc Outaouais (August 15, 2017) William Turner (May 31, 2017)		
CNL-ND62	Greg Csullog (May 1, 2017) Cody Cuthill (August 4, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **Table 2.5-3 – 2-31:** Given the importance of the statement that the AGCV concept is overkill and the NSDF concept is suitable, the proponents should provide details of how their conclusion was achieved. In addition, "exceeds the requirement for the vast majority of the NSDF waste volume forecast" does not appear to include the containment requirements for the ~1% ILW to be emplaced (the minority of the volume). Was the containment requirement for ILW assessed for both the AGCV and NSDF concepts? The comparison between the ECM and AGCV concepts assume the entire volume of waste identified to be contained in each NSDF. A combination of each would provide for a greater level of safety. An ECM can and should be used for short lived waste with limited concentrations of long lived waste at 10 Bq/g and long lived waste with values greater than 10 Bq/g be disposed in an AGCV. A limit that defines intermediate level waste should be determined and stored or placed in geological disposal facilities. NSDF are acceptable for short lived radionuclides that can decay while the barriers are considered intact.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Section 2.5 of the final EIS has expanded the comparison of an Engineered Containment Mound (ECM) to Above Ground Concrete Vaults (AGCV). As summarized in Table 2.5.3-1, both alternatives are technically and environmentally feasible. Both alternatives can be constructed such that they meet the purpose of the NSDF Project and both alternatives can be constructed to accommodate up to 1,000,000 m^3 of radioactive waste. The AGCV and ECM facility designs are best available technology and there are several international examples of each. Both have relatively moderate technical requirements and can be sited on the CRL site. The AGCV is expected to be more vulnerable to seismic events compared to an ECM which behaves as a single "entity" and is more resilient to seismic events. The life cycle costs associated with an AGCV design are approximately five times the cost of the ECM alternative. In addition, the additional packaging and containment is not required for most of the LLW intended to be disposed on the CRL site. Therefore, the most favourable alternative facility design for the NSDF is an ECM.

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			Canadian Nuclear Laboratories (CNL) acknowledges that the proposed inventory for NSDF includes several long-lived radionuclides as shown by Table 3.3.1-2 of the final EIS. Long-lived radionuclides are included in the NSDF inventory as they are intrinsically part of the radiological fingerprints of waste streams at Chalk River Laboratories (CRL) and other CNL sites. It is not technically or economically feasible to separate the long-lived radionuclides from the waste streams. However, the concentrations of long-lived radionuclides that are proposed in the NSDF Licensed Inventory are in limited activity concentrations consistent with CSA Group (CSA) and International Atomic Energy Agency (IAEA) guidance ([2] & [3], Sections 2.2(4) of [2] and 2.24 of [3], for example). The substantial decrease of radioactivity concentrations in the first 100 years after the facility has been closed (as shown in Figure 3.3.1-2 of the final EIS is the result of the decay of the shorter-lived radionuclides. The remaining radioactivity present in the NSDF after the 300-year Institutional Control period is the limited inventory of long-lived radionuclides. The risk of the presence of these long-lived radionuclides has been studied in detail in the Post-Closure Safety Assessment [4]. The calculated dose consequence and environmental concentrations meet the dose acceptance criteria and environmental quality standards, respectively, thus do not pose an unacceptable risk to the public or environment. All wastes emplaced in the NSDF will be required to meet the Waste Acceptance Criteria (WAC) [5]. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] CSA Group. CSA N292.0-9: General Principles for the Management of Radioactive Waste and Irradiated Fuel. 2019 [3] IAEA General Safety Guide (GSG)-1. Classification of Radioactive Waste. IAEA (International Atomic Energy Agency). 2009. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [5] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND63	Greg Csullog (May 1, 2017)	**Table 2.5-3 – 2-31:** Has an assessment been done to show whether or not the ECM also "offers a level of containment that exceeds the requirement for the vast majority of the NSDF waste volume forecast"? If most of the waste volume may be very low-level waste (VLLW) from decommissioning and demolition (39%) and remediation (37%) per Table 3.2.1-1, would it not be more advantageous economically to implement a hybrid VLLW-LLW facility where the VLLW component provides a lower cost, lower level of containment suitable for VLLW? The commenter suggests that the NSDF proponents and the CNSC investigate AECL report RC-2015, "STDF Concept Assessment Project Final Report", which describes a VLLW facility concept that would be suitable for bulk decommissioning and remediation wastes.	The NSDF design and operation will provide containment during the operations phase through preventing and controlling the release of nuclear and/or hazardous substances. The NSDF Project has considered measures to contain and isolate waste during placement, specifically to minimize/prevent contact water and radionuclide migration. The principles of isolation and containment in the International Atomic Energy Agency (IAEA) SSR-5 [1], are satisfied in the inventory management, design features and planned operational practices. The engineered containment mound consists of a total of ten individual, but contiguous disposal cells, designed to maintain structural integrity and containment of wastes over the 550 year design life. The total radioactivity decays quickly because low-level waste (LLW) contains many short-lived radioisotopes. As a result, the total radioactivity of the Facility is greatly reduced in the first 100 years, and the radioactivity concentration begins to approach natural background concentrations. Canadian Nuclear Laboratories has made an informed decision to design and operate a facility that will safely accommodate both very low-level radioactive waste (VLLW) and LLW. A VLLW facility was considered as part of the alternative means assessment in Section 2.5.2.4 of the final Environmental Impact Statement (EIS). Very low-level waste is a subcategory of LLW. Canadian Nuclear Laboratories had previously considered development of a VLLW disposal facility at the Chalk River Laboratories (CRL) Site. Canadian Nuclear Laboratories implemented a trial to demonstrate the viability of segregation and storage of VLLW. The trial demonstrated that the fraction of the total LLW that could be segregated as VLLW was disproportionate to the time, effort, storage requirements that were expended to realize any net benefit from the work. In addition, the LLW with higher activity that is segregated from the VLLW will still require a separate LLW disposal facility. Therefore, the development of a VLLW

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			disposal facility does not meet the Project purpose which recognizes the need for a LLW disposal facility and a VLLW disposal facility is not considered technically feasible. The planned cost of developing a VLLW disposal facility is expected to be similar to the cost of developing a LLW disposal facility (i.e., the current NSDF Project); however, a VLLW disposal facility would require additional time and effort to segregate and manage the VLLW from the rest of the LLW. The development of a LLW disposal facility (inclusive of VLLW) would eliminate duplication of effort, time, dose and facility construction, operation and closure costs and would enable reduction of Canada's liabilities earlier than it would have if a small percentage of the total inventory had been segregated and disposed separately. Therefore, the development of a separate VLLW disposal facility is not considered economically feasibility when compared to the cost savings associated with the development of a LLW facility that is inclusive of VLLW. Reference: [1] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011 April.
CNL-ND64	Dr. J.R. Walker (May 9, 2017) David Raman (August 3, 2017)	There is a lack of design drawings offered in this report to illustrate the physical structure of the propose project. Figure 3.6.1-1, 3.6.1-2, 3.6.1-3 and 3.6.1-4 show plan information only. Some figures and cross-sections are needed to illustrate: a. the depth of the excavation b. the height of the mound c. the location and thicknesses of the engineered features (liners and mound cap) d. the proposed loading of waste packages, loose material and backfill; e. the location of drainage systems f. how all of this is located in relation to the actual and anticipated elevation of the water table g. the internal structures	Additional drawings have been included in the final Environmental Impact Statement (EIS). The following information is offered to support the comment; a) Figure 3.4.1-1 shows a cross section of the engineered containment mound (ECM) and the elevations of various features. b) Figure 3.4.1-1 shows a cross section of the ECM and the elevations of various features. c) Figure 3.4.1-1 shows a cross section of the ECM and the elevations of various features. Additionally, Figure 3.4.1-4 shows details of the base liner including the thickness of the various layers. Figure 3.4.1-8 shows similar details for the final cover. d) No figure has been added to illustrate this activity. However, it has been conceptually described in Section 3.4.1.7. e) The drainage system, referred to as the Leachate Collection System (LCS), is located within the base liner system for leachate collection See Figure 3.4.1-4. Figure 3.4.1.9 shows the final grading and drainage plan for the ECM. f) Figure 3.4.1-1 shows a cross section of the ECM and the elevations of various features including the water table. The inside of the mound is not a structure. It will contain waste layers with soil filling the void; however, there is a herringbone system of berms at the base of the ECM to direct water to the leachate collection system. This can be seen on Figure 3.4.1-3. g) Figure 3.1.1-1 shows the NSDF site layout including the internal structures and buildings.
CNL-ND65	David Raman (August 3, 2017)	Overall, the design appears to rely primarily on the peripheral engineered features (liners, leachate collection) and as such is not a true defence-in-depth strategy, where there are multiple internal barriers beginning with the waste form itself. Administrative controls and procedures are not satisfactory barriers for a disposal facility. Given the challenges of the chosen site (proximity to surface waters) it would be expected that additional engineered barriers would be incorporated into the design.	Section 3.4.1 of the final Environmental Impact Statement (EIS) states: "Containment and isolation of the waste allows radioactive decay to occur and delays the release of any contaminants to the environment. The base liner, final cover and perimeter berm constitute a multiple barrier system because: • the different materials used in their design and construction have different chemical and physical properties that ensure the long life of these structures; and • there is no common failure mode that would simultaneously fail all layers of the liner and cover (e.g., subsidence and seismic activity)." Section 3.1.1.1 of the final EIS states: "The engineered containment mound (ECM) is designed with a number of engineered barriers to provide multiple layers of safety to support the long-term containment and isolation requirements. In accordance with the defence-in-depth principle, the safety performance of the Near Surface Disposal Facility (NSDF) Project is not dependent on any single safety function. The perimeter berm, the high density polyethylene (HDPE) geomembrane cover

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			system, and the double HDPE geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment for thousands of years." Section 3.4.1 and Section 7.4 of the NSDF Safety Analysis Report [1] describes the defence-in-depth principle and how this safety principle was applied to the NSDF design. Defence-in-depth is incorporated in the NSDF design by having: 1) At least two barriers between the disposed LLW and the environment and members of the public; and 2) Two barriers between the leachate/contaminated water and the environment and members of the public, until the treated water meeting the effluent discharge targets is released to the environment. The NSDF design has used three levels of defence-in-depth: Levels 1 – 3 based on the guidance in CNSC REGDOC-2.5.2 *Design of Reactor Facilities: Nuclear Power Plants* [1]. Administrative controls are defined as provisions relating to organization and management procedures, record keeping, assessment, and reporting necessary to ensure the safe operation of a Facility. The safety of the NSDF is achieved through active engineered features, passive engineered features and administrative controls. Administrative controls, serve as a complement to the design and engineered safety features, while not as direct-acting, ensure that appropriate hazard controls are developed, maintained and properly functioning. Administrative controls ensure that policies and decisions for safety are implemented, safety is continuously improved and a strong safety culture is developed and promoted. Environmental monitoring of the NSDF (discussed in section 5.7.9 of the EIS) over its operating life and during the Institutional Control period will provide a means to monitor the effectiveness of barriers that are in place. Lastly the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 [3] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. The radioactive decay from the time of closure of the engineered containment mound (ECM) is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] CNSC, Design of Reactor Facilities: Nuclear Power Plants, REGDOC-2.5.2, 2014 May. [3] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements, Safety Standards Series No. SSR-5, STI/PUB/1449, 2011 April.
CNL-ND66	Matt D. (August 14, 2017)	The commenter indicates that the use of geosynthetics in this manner is risky to say the least and is a cheap "band-aid" way to solve a legacy issue. The reduction factors to be used for the design of this repository have not even been published as there is no case history to go off of.	As outlined in Section 2.5.2.2.1 of the final Environmental Impact Statement (EIS), the International Atomic Energy Agency (IAEA) definition of a near surface disposal is the placement of solid, or solidified, radioactive waste in a disposal facility located at or near the land surface. The IAEA also states that the preferred option for disposal of low-level waste (LLW) is in near surface disposal facilities [1]. A Near Surface Disposal Facility (NSDF) is a suitable and technically feasible means of disposing of LLW and the effectiveness of such facilities for the cleanup of impacted nuclear sites to facilitate disposal of LLW has been demonstrated as illustrated through the following near surface facilities currently in operation North America. Section 3.1.1.1 of the final EIS states: "The engineered containment mound (ECM) is designed with a number of engineered barriers to provide multiple layers of safety to support the long-term containment and isolation requirements. In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm, the high density polyethylene (HDPE) geomembrane cover system, and the double HDPE

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			geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment for thousands of years." As also stated in Section 3.1.1.1 of the final EIS Canadian Nuclear Laboratories (CNL) partnered with Queens University to perform a comprehensive HDPE geomembrane testing and evaluation program [2]. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2000 years. The "reduction factors" for the geomembranes were studied as part of the HDPE geomembrane testing program. The testing program includes an accelerated aging process in conditions comparable to the NSDF application. The testing investigated changes of chemical and physical properties of geomembrane using standardized tests, including Tensile Strength. Considering these factors, the conclusion of the testing program is that the projected service-lives of the two candidate geomembranes exceed the 550-year design-life required for the NSDF engineered containment mound. For the reasons noted above, CNL do not consider the use of geosynthetics as components of a multiple barrier system to be risky. References: [1] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements, Safety Standards Series No. SSR-5, STI/PUB/1449, 2011 April. [2] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024.
CNL-ND67	Paul Tonner (August 16, 2017)	The commenter states that in reviewing the available information on the proposed NSDF project at Chalk River, there is no mention of a movable roof feature used at a similar facility in France. The absence of a movable roof is all the more surprising since the French facility is limited to disposal of very low-level waste (VLLW), as opposed to the more active low-level waste (LLW) proposed for the NSDF. As explained by the commenter, placing of waste at the French VLLW facility occurs only under the movable roof, which covers a fraction of the total area of the facility. When the area under the movable roof is filled, the roof is left in place until an impermeable cap over this area is installed and tested. Only then is the movable roof repositioned to a new area and the process repeated. The use of a movable roof in this manner keeps rainwater from falling on the area being filled, thus greatly reducing the volumes of leachate collected. Indeed, the amount of leachate collected in the French VLLW facility is typically so low that monitoring for the presence of leachate is used as an additional operational safety parameter for their VLLW facility. This provides an additional barrier of defence and helps build public confidence in the facility. I wholeheartedly agree. The commenter seeks a response as to why a movable roof concept is not included as part of the proposed NSDF at Chalk River.	The objective of placing a temporary roof on active disposal cells is to isolate and contain waste. Although the design of Near Surface Disposal Facility (NSDF) currently does not utilize a temporary roof, the principles of isolation and containment are satisfied in other design features and planned operational practices. First the proposed inventory for NSDF has been significantly reduced since the draft Environmental Impact Statement (EIS) through the removal of any intermediate level waste streams. The revised inventory proposed for the NSDF is solid low-level radioactive waste (LLW) which will be controlled through the Waste Acceptance Criteria (WAC) [1]. Additionally the WAC applies a graded approach to control leachate radionuclide concentrations during placement of waste. There will be a small portion of waste which will be required to utilize robust packaging to prevent the spread of contamination. Specifically leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. During waste placement operations, all efforts are made to minimize the contact of precipitation with the contaminated waste thus leachate production. The operation of NSDF is limited to one cell at a time in order to limit the surface area of waste that is exposed to the environment (i.e., precipitation) at any given time. As a cell is constructed, interim covers are placed over waste to limit infiltration of precipitation and promote surface water run-off. As each disposal cell is completed the final cover system is installed over the filled disposal cell. Other operational practices to limit contact with precipitation include grading and compaction of the waste fill to promote surface water run-off.

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			Furthermore, any water that makes contact with (or is suspect of contacting) the contaminated waste will be collected by the leachate collection system and treated to remove contaminants in the wastewater treatment plant (WWTP) prior to controlled release into the environment. Treated effluent discharge targets are established to be protective of human and non-human biota health. The design of the NSDF engineered containment mound (ECM) is a large contiguous construct, in which active cells are located adjacent to closed cells. For a movable roof system, the roof base structure requires load-bearing support and anchorage, able to accommodate any potential dynamic loads such as design-basis tornado and earthquake. In designs where temporary roofs are utilized, between each adjacent cell there is an intermediate structural berm, which provides the necessary height and foundations for the moveable roof system. The NSDF ECM design does not have an intermediate "structural berm" between its cells. The NSDF ECM has a common perimeter structural berm around all of its cells, not between cells. In this way, the ECM design provides the necessary utilization of the limited NSDF site area. However, as mentioned in Section 2.5.7.6.1, weather cover designs are being evaluated for compatibility with the NSDF configuration and if feasible, could be implemented as a mitigation measure and operational optimization. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND68	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* The commenters express the view that the proposed technology is inadequate for the following reasons: • This technology exposes the waste to precipitation for 50 years, creating large volumes of liquid radioactive wastes (leachate) that are extremely difficult to contain and treat, therefore creating a considerable risk of polluting Perch Lake and the Ottawa River. • This technology is designed to contain hazardous wastes and has not been adequately tested to contain nuclear wastes for hundreds of years let alone a thousand years.	An Engineered Containment Mound (ECM) type of disposal facility was selected by the Near Surface Disposal Facility (NSDF) Project. The primary reasons for the selection of this type of facility is that it is the best design for the type of waste that will be disposed in the facility: a large volume of solid, low-level radioactive waste primarily consisting of bulk waste types (i.e., contaminated soil and building demolition debris). The radiological inventory for NSDF has been significantly reduced since the draft Environmental Impact Statement (EIS) through the removal of any intermediate level waste (ILW) streams. The total inventory placed in the NSDF will be controlled through the Waste Acceptance Criteria (WAC) [1]. Additionally the WAC applies a graded approach to control leachate radionuclide concentrations during placement of waste. There will be a small portion of waste which will be required to utilize robust packaging to prevent the spread of contamination. Specifically leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclide concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. During waste placement operations, all efforts are made to minimize the contact of precipitation with the contaminated waste; thus, limiting leachate production. During the operation of NSDF only one cell is open at a time to limit the surface area of waste that is exposed to the environment (i.e., precipitation). As a cell is constructed, interim covers are placed over waste to limit infiltration of precipitation and promote surface water run-off. As each disposal cell is completed the final cover system is installed over the filled disposal cell. Other operational practices to limit contact with precipitation include grading and compaction of the waste fill to promote surface water run-off. Section 3.1.1.1 of the final EIS states: "The ECM is designed with a number of engineered barriers to provide multiple layers of safety to support the long-term containment and isolation requirements. In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm,

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			the high density polyethylene (HDPE) geomembrane cover system, and the double HDPE geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment for thousands of years." Note that the NSDF Project is an improvement over the current situation at the Chalk River site where legacy wastes are being stored in facilities that have not been appropriately designed to contain and isolate the waste for its hazardous lifetime. As also stated in Section 3.1.1.1 of the final EIS CNL partnered with Queens University to perform a comprehensive HDPE geomembrane testing and evaluation program [2]. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2000 years. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024.
CNL-ND69	CELA (May 19, 2017)	Provide a description of the process by which consideration for sustainability contributions was incorporated throughout the assessment and design of the preferred NSDF option.	Section 2.5.1 of the final Environmental Impact Statement (EIS) provides a discussion on how sustainability was addressed when considering the alternative means to arrive at the preferred option for carrying out the Near Surface Disposal Facility (NSDF) Project. Sustainability as a value is shared by many individuals and organizations who demonstrate this value in their policies, everyday activities and behaviours. For example, Canadian Nuclear Laboratories' (CNL's) Environmental Policy has recently been amended to include a clear commitment to sustainability. This change supports CNL's alignment to standards set by the Government of Canada, specifically the 2016-2019 Federal Sustainable Development Strategy. The following fundamental design principles were considered the NSDF Project design in accordance with the International Atomic Energy Agency (IAEA) *Technical Considerations in the Design of Near Surface Disposal Facilities for Radioactive Waste* [1]. • Protection of human health – radioactive waste shall be managed in such a way as to secure and acceptable level of protection for human health. • Protection of the environment – radioactive waste shall be managed in such a way as to provide an acceptable level of protection of environment. • Protection of future the e generations – radioactive waste shall be managed in such a way that predicted effects on the health of future generations will not be greater than relevant levels of effects that are acceptable today. • Burdens on future generations – radioactive waste shall be managed in such a way that will not impose undue burdens on future generations. • Safety of facilities – the safety of facilities for radioactive waste management shall be appropriately assured during their lifetime. Consistent with the above principles, the objective of the design of a near surface disposal facility is to ensure the facility can be built and waste received, handled, and disposed of without undue risk to human health and the environment, both during the facility operation and after facility closure.

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			Sustainability is a key part of the assessment approach. Assessment endpoints are qualitative expressions used to assess the significance of residual effects on Valued Components (VCs) and represent the key properties of the VC that should be protected for future human generations (i.e., incorporates sustainability). For example, self-sustaining and ecologically effective fish and wildlife populations, continued land use opportunities and protection of archaeological resources may be assessment endpoints for fish and wildlife, land use and tenure and archaeological resources, respectively. Reference: [1] IAEA, Technical considerations in the design of near surface disposal facilities. IAEA-TECDOC-1256, November 2001.
CNL-ND70	MNO (August 16, 2017)	**2.5.2 Facility Type, Page 2-16** "…the specific aims of disposal remain the same according the [sic] IAEA Specific Safety Requirements (IAEA 2011): … • to isolate the waste from the accessible biosphere and to reduce substantially the likelihood of, and all possible consequences of, inadvertent human intrusion into the waste…" How can the NSDF isolate the waste from the accessible biosphere when the final cover system will not be implemented until closure?	The quote from International Atomic Energy Agency (IAEA) Specific Safety Requirements [1] refers to scenarios following closure of the facility. During operation, Canadian Nuclear Laboratories (CNL) isolates the waste from the public with several safety features including administrative security controls on entering the Chalk River Laboratories (CRL) site and the Near Surface Disposal Facility (NSDF). There are also physical controls in place as part of the design of the facility to further restrict intruders and animals including fencing around the engineered containment mound. Containment of the waste is provided during operations with the installation of the base liner as well as daily covers (soil or fixative) that are used at the end of each work day. The temporary cover will reduce water ingress into the waste and reduce dust generation. As discussed in Section 3.4.1.9.3 of the final EIS the installation of the cover system is initiated as each individual cell is filled; thus isolating the waste from the biosphere prior to complete closure of the facility. Once the facility is closed the remainder of the final cover system is completed. Monitoring of NSDF activities through the Environmental Assessment Follow Up Monitoring Program (EAFMP) will be conducted to verify Environmental Assessment (EA) predictions as summarized in the EIS. This includes groundwater monitoring along the perimeter of the Engineered Containment Mound (ECM) and surface water quality monitoring at down-stream water bodies. Lastly, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with IAEA SSR-5 [3] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. The radioactive decay from the time of closure of the engineered containment mound (ECM) is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. Reference: [1] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011 April.
CNL-ND71	Pravin Shah (April 8, 2017)	The Draft EIS Report does not provide meaningful Design Criteria or Design Basis/philosophy for the design and details for proposed major structures, such as the Engineered Containment Mound (ECM) and the Wastewater Treatment Plant (WWTP). How do the acceptability of such structures be quality verified?	The Environmental Impact Statement (EIS) provides an overview of the design and design criteria throughout the document. In particular Section 2.4 of the final EIS summarizes these Design Principles. A more complete description is provided in the Design Description document [1]. The Near Surface Disposal Facility (NSDF) design was developed to meet the required codes and standards. This includes requirements and guidance from the International Atomic Energy Agency (IAEA), federal regulators and provincial authorities.

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			Canadian Nuclear Laboratories has engaged a highly-experienced engineering consulting firm to prepare the design. Canadian Nuclear Laboratories has engaged third parties to review key aspects of the design produced by the consulting firm to ensure that the analysis underpinning the design are robust and in compliance with codes and standards. Any nuclear facility designed, constructed and operated at the Chalk River Laboratories (CRL) site is required to satisfy the CRL licence requirements and CNL Management Systems. The Canadian Nuclear Safety Commission (CNSC) will independently review the NSDF design to ensure all regulatory requirements are met. Reference: [1] Design Description 232-503212-DD-001.
CNL-ND72	Greg Csullog (May 1, 2017)	**Section 2.4, Project Design Principles:** This section does not provide enough detail of facility requirements that is provided by 10 CFR Part 61. If this information is/will be provided in a performance assessment document for the NSDF, the EIS needs to, as a minimum, delineate those performance requirements and cross reference how the are/will be met. It would be advantageous for "the average concerned citizen" to see a list of NSDF performance objectives similar to the USNRC regulatory requirements and to see cross references to EIS sections that demonstrate how these performance objectives are or will be met. The EIS needs to provide an easy to follow roadmap from how the NSDF is supposed to perform to how performance was assessed. For example, 10 CFR Part 61 states, "The disposal site must be generally well drained and free of areas of flooding or frequent ponding. Waste disposal shall not take place in a 100-year flood plain, coastal high-hazard area or wetland" and, on page 9-3 the EIS states, "In addition, the low point of the ECM has an elevation of approximately 160 metres above sea level (masl), while the 100-year flood elevation for the portion of the Ottawa River adjacent to the CRL property is 155 masl". I had to do a search within the EIS to make this comparison.	The quoted 10 CFR Part 61 is a US Nuclear Regulatory Commission (NRC) document and as such does not directly apply in the Canadian licensing context and has not been considered for the Near Surface Disposal Facility (NSDF) Project. A Post-Closure Safety Assessment [1] has been prepared in accordance with Canadian regulatory guidance in REGDOC-2.11.1 Vol III *Assessing the Long-Term Safety of Radioactive Waste Management* [2], to analyze the long-term implications of the NSDF Project. Section 2.4, Project Design Principles of the final Environmental Impact Statement (EIS) has been revised and is in accordance with Canadian Nuclear Safety Commission (CNSC) REGDOC-2.9.1: *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [3]. It addresses general design principles including ensuring radiation safety by the use of multiple barriers and ensuring safety is provided by passive means during the post-closure phase. Section 3.1.1.1 of the final EIS has an extensive discussion regarding how the NSDF aligns with Canadian regulatory and International Atomic Energy Agency (IAEA) guidelines previously identified in Section 2.4. The key safety features of the NSDF Project have addressed the IAEA design principles for radioactive waste disposal by incorporating: multiple safety functions, containment of radioactive waste, isolation of radioactive waste and surveillance and control of passive safety features into the facility design. As a point of clarification, the reference to the 100 year flood elevation of 155 metres above sea level (m ASL) in Section 9 of the 2017 draft EIS was an error. The final EIS correctly notes the 100 years flood level as 115 m ASL (section 10.1.2, page 10-4). References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004 [2] CNSC, Assessing the Long-Term Safety of Radioactive Waste Management, REGDOC 2.11.1 Volume III, 2018 May. [3] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September.
CNL-ND73	Gordon and Karen Lorimer (August 16, 2017)	The commenter expresses the concern that based on previous experience and events, failures are more likely to occur as a combination of small errors in construction and ongoing operation rather than design. The commenter indicates that the design should take into consideration evolving risk factors (e.g., budgets may gradually erode, staff training may not be kept up or supervision may become lax) and build in greater safeguards as a protection measure.	Canadian Nuclear Laboratories (CNL) has a strong nuclear safety culture demonstrated over decades of safe operation of its sites, including the Chalk River Laboratories (CRL) site. Canadian Nuclear Laboratories' (CNL's) ability to maintain training and supervision for staff is a condition of its licence issued by the Canadian Nuclear Safety Commission (CNSC). Atomic Energy of Canada Limited (AECL), a federal Crown corporation, is the owner of the site and will remain as such in the future. It is responsible for the stewardship of the site and its associated radioactive waste responsibilities. This oversight

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			ensures that the qualifications of CNL staff is maintained, as well as the appropriate budgets to maintain the site and facilities. Canadian Nuclear Laboratories has undertaken a study of OPEX (operational experience) pertinent to the Near Surface Disposal Facility (NSDF). This includes lessons learnt through construction and design that materialise during operations and this experience has been incorporated into the NSDF design. The design and construction of the NSDF adhere to strict quality assurance (QA) requirements to reduce the number of errors. The NSDF design incorporates passive safety features such as the base liner system (Section 3.4.1.4 of the final Environmental Impact Statement (EIS)), final cover (Section 3.4.1.9.3 of the final EIS) and perimeter berm (Section 3.4.1.5 of the final EIS). The passive safety features perform their containment and isolation functions without intervention, and do not rely on a power source of any kind.
CNL-ND74	William Turner (May 31, 2017) 84.	It appears that the proposed design does not meet the following two fundamental principles: Protection of Future generations and Burdens on Future Generations.	Section 2.4.1 of the final EIS identifies the Near Surface Disposal Facility (NSDF) Project is required to meet the following principles from REGDOC 2.11.1, *Waste Management, Volume III* [1]: • The management of radioactive waste is commensurate with its radiological, chemical and biological hazard to the health and safety of persons and the environment, and to national security; • The assessment of future impacts of radioactive waste on the health and safety of persons and the environment encompasses the period of time when the maximum impact is predicted to occur; and • The predicted impact on the health and safety of persons and the environment from the management of radioactive waste is no greater than the impact that is permissible in Canada at the time of the regulatory decision. Section 3.1.1.1 of the final Environmental Impact Statement (EIS) outlines how each of these principles are met and repeated below: • The ECM is designed to contain and isolate the wastes from the environment for 550 years, after which the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW and most of the radioactivity; thus, the hazard, decays in the first 100 years after closure, the design of the NSDF Project is commensurate with the hazard. • The assessment of future impacts from the facility is performed in the Post-Closure Safety Assessment document [2]. Canadian Nuclear Laboratories (CNL) followed the guidance of CNSC's REGDOC-2.11.1 [1], to determine that a 10,000-year assessment timeframe is appropriate for the facility. This timeframe encompasses the duration of institutional control, the hazardous lifetime of the wastes and the design life of the facility barriers. Peak dose during the most reasonably anticipated evolution of the facility is 0.015 mSv/y at approximately 4100 years • A near surface design is appropriate since the public dose predicted for all plausible scenarios is less than the regulatory dose limit for a member of the public of 1 mSv/yr, as prescribed in the *Radiation Protection Regulations*. In addition, the Normal Evolution Scenario of the PostSA meets the 0.3 mSv/a dose constraint as recommended by IAEA SSR-5 [3]. In the pre-closure phase, the regulatory limit for a member of the public and dose constraint above are also met. References:

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			[1] CNSC, Waste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004 [3] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011 April.
CNL-ND75	David Raman (August 3, 2017)	Section 3.3.1 does not contain any design requirements. The first most basic design requirement is the expected useful life of the facility (normally at least 300 to 350 years for near surface disposal facilities). Some other basic design requirements that should be presented here are: a. Engineered Barriers to retard the release of harmful substances - the waste form matrix and the package (if identified as required) - the facility - the depth of trenches/cells required, the liners needed, drainage systems, backfilling materials - the cover system b. Performance Requirements of components in order to achieve the design life - resistance to chemical degradation (i.e. effects of chloride on concrete and rebar) - resistance to leaching of radionuclides - resistance to microbial effects - resistance to radiation effects, such as the breakdown of organic binders used in concrete/grout formulations - tensile strength of concrete waste forms	Note that the referenced Section 3.3.1 has been removed from the final Environmental Impact Statement (EIS). The following information addresses the specific information requested in the comment: **a) Design requirements [1] for the engineered barriers are:** • The design life of the facility is 550 years (including 50 years of operation and 500 years following the end of operation). The Post-Closure Safety Assessment (PostSA) [2] assesses the dose and risk to receptors (humans) living on and near the site for 10,000 years into the future. The assessments indicate that doses to the receptors are a small fraction of both the regulatory dose limit for a member of the public of 1 mSv/yr and the natural background dose. The rapid decay of the radiological inventory means that the facility has a hazardous lifetime of less than 100 years after closure. See Section 3.1.2 of the final EIS. • The 550 year design life of the Facility encompasses the timeframe where the NSDF radiotoxicity equals the radiotoxicity of natural ore bodies in the local area, and is therefore an appropriate facility lifetime. • While Type 5 waste is placed in packages, no credit is taken for the package as an engineered barrier in the long-term safety assessments (i.e., Post-closure Safety Assessment). The Waste Acceptance Criteria (WAC) document identifies two types of waste packages: leachate controlled waste packages and non-leachate controlled waste packages. Leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus, more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. As such, these packages could be expected to provide an engineered barrier to the release of contaminants; however, as noted, no credit is taken and this is a conservatism in the modeling. Non-leachate controlled waste packages (standard drums, B25 boxes etc.) are used only for waste that meets the bulk waste disposal criteria as these packages would not be expected to provide any barrier to the release of contaminants. See Section 3.3.1.1 of the final EIS. • Section 3.4.1 of the final EIS and its associated sub-sections, provides more detail on the design of the engineered containment mound (ECM), its barrier systems and the leachate collection system. Specifically Section 3.4.1.4 describes the base liner system, Section 3.4.1.5 describes the berms, Section 3.4.1.9.3 describes the final cover, and Section 3.4.1.12 describes the leachate collection and removal. **b) Performance requirements:** • There is no concrete or rebar within the ECM. Concrete and rebar are used only to construct the foundations of the support facilities where the existing ground will be excavated. After construction, the foundations will be backfilled with clean soil with very low chloride. No harmful chemical degradation is expected during the service life of the concrete and rebar. • As stated in Section 3.1.1.1 of the final EIS, CNL partnered with Queens University to perform a comprehensive HDPE geomembrane testing and evaluation program [3]. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2000 years. • Degradation by radiation energy of the baseliner geomembrane has been evaluated. Canadian Nuclear Laboratories

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<tr><td></td><td></td><td></td><td>calculated the total absorbed dose (Gy) and peak absorbed dose rate (Gy/hr) to the high density polyethylene (HDPE) geomembrane material [1]. The calculation demonstrates that the HPDE may receive a cumulative total of 0.11 Gy (11 Rad) over the 550 year design life, which is millions of times less than the value of 108 Rad that HDPE geomembranes can take without significant damage [4].
The materials used in the engineered barriers that make up the base liner system, the berms and the final cover are not subject to microbial degradation during the design life of the facility. Additionally, little microbial activity would be expected in a nuclear disposal facility.
Grout may be used in the ECM to fill void space to mitigate subsidence. Degradation of grout is not expected to affect the design life of the facility.
No tensile strength of concrete waste is relied upon in the waste forms.
Additional information on design and performance requirements have been included in the EIS as appropriate.

References:
[1] Near Surface Disposal Facility Design Requirements, 232-503212-DR-001.
[2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
[3] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024.
[4] Absorbed Dose Assessment to the Near Surface Disposal Facility Liner from Leachate. 232-106010-TN-004.</td></tr>
<tr><td>CNL-ND76</td><td>Pravin Shah
(April 8, 2017)</td><td>Para 3.5.2.5 (Berms) states that "A Slope Stability Analysis was completed to provide the information needed to support the design of the base slopes, sidewalls, and side slopes of the ECM".

The commenter explains that Slope Stability Analysis addresses the range of anticipated loading conditions, under both short term and long term scenarios, and size and shape of the berms and each of the elements and layers were determined using a seismic design basis.

Have the engineers carried out the slope stability analysis of the whole NSDF site as a composite? The sliding and sloughing of the whole area (due to seismic or other conditions) into the water body nearby can have disastrous consequences. Has the possibility of this even occurring been considered?</td><td>The NSDF Engineered Containment Mound (ECM) is designed to withstand the 10,000-year ground motion at the NSDF site while maintaining containment of waste and leachate, as defined by Canadian Standards Association (CSA) Standard N289.4-12 [1]. The ECM design utilized Peak Ground Acceleration (PGA) of 0.55 g, defined by PSHA for the NSDF site [2], as the design basis earthquake. Series of seismic numerical analyses (e.g., deformation and slope stability analyses) confirmed that the ECM design will have minimal displacement and minimize potential risk of liquefaction due to design basis earthquake.

The design criteria, methods, conditions and results of the seismic analyses performed in the design of the ECM, WWTP and support facilities are summarized in the Seismic Analysis Report [3].

A slope stability analysis was also completed and confirmed that the slope designs will satisfy minimum factor-of-safety requirements for stability [4]. The ECM is mostly located on bedrock which is very stable.

Section 10.3 (Seismic Events) of the final Environmental Impact Statement (EIS) summarizes the seismic analysis completed for the NSDF Project.

References:
[1] CSA Group N289.4-12: Testing Procedures for Seismic Qualification of Nuclear Power Plant Structures, Systems, and Components. 2012.
[2] Probabilistic Seismic Hazard Analysis, 232-10170-REPT-001.
[3] Seismic Analysis, 232-503212-REPT-015.
[4] Slope Stability Analysis, 232-503212-REPT-011.</td></tr>
<tr><td colspan="4">Facility Design – Site Location</td></tr>
</table>

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CNL-ND77	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) Martin Flood (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions.* The commenters express the view that the proposed site is not favourable due to site geology & hydrogeology (see Appendix 1 of the Ottawa Riverkeeper submission for further details). In particular, the commenters are of the opinion that the proposed site is not favourable due to the close proximity to Waste Management Areas A & B where legacy wastes have caused extensive pollution of groundwater and vegetation. What evidence has CNL provided to support their claim that the proposed site is the best possible site out of the 10,000 acres owned by AECL? (Other site selection concerns are highlighted in other sections of this table).	The alternative means Section 2.5.5 (Site Selection) has been expanded in the final Environmental Impact Statement (EIS) to provide more transparency on the assessment. The site selected on the Chalk River Laboratories (CRL) site is the preferred location based on the site selection process described below. The Chalk River Laboratories (CRL) siting process includes three sets of criteria: mandatory, exclusion and comparison. The mandatory criteria are those attributes that sites must have. By contrast, the exclusion criteria are those attributes that make the site unsuitable for hosting the Near Surface Disposal Facility (NSDF). Table 2.5.5-1 in the final EIS summarizes how fifteen potential sites were compared based on mandatory and exclusionary criteria. This table outlines the suitability of the sites and how they meet appropriate criteria for the purpose of the project. The mandatory criteria used during the site selection included: • minimum area of 14 ha; • site must be at least 200 m wide; • access to Class IV electricity for power; • access to water for sanitary and process requirements; and • access to gas or other heating source. Exclusion criteria were developed by considering physical, cultural and biological features which may be at risk during the intended development of the NSDF Project. The exclusion criteria applied during the site selection included: Ottawa River Floodplain • Areas which are below the 1 in 100 year Ottawa River flood elevation of 115 m ASL. • Areas that are below the flood elevation of 130 m above sea level (ASL) which would result from a hypothetical failure of the Des Joachims Main Dam and McConnell Lake Control Dam. Areas with a slope in excess of 25%. Areas with a slope of less than 10% are desirable. Areas within 50 m of Plant Road. The three key reasons for this setback are: • Protection of CRL workers in transit on Plant Road during waste emplacement. • Limiting visibility of structures from Plant Road. Geotechnical Characteristics • Areas with outcrops and organics >20% of the proposed siting area. • Areas with liquefaction potential and active fault lines. Species at Risk • Areas of nationally or provincially significant plant or tree species, in small groups or stands, in accordance with the *Federal Species at Risk Act* (SARA) and habitat of those threatened or endangered species as per the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listing. Research plantations at CRL may contain these species. • Known or likely habitats of national or provincially significant wildlife species in accordance with the Federal SARA or COSEWIC listing as per guidance by CNL Environmental Protection. Wetlands

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			• Areas that are seasonally or permanently inundated with water. • Areas within 30 m from a water courses wetlands. <u>Located adjacent to provincially registered archaeological sites.</u> <u>Areas within 100 m from existing CRL site boundaries.</u> <u>Sites of existing or previously sited facilities. Areas protected for low background purposes.</u> The geology and hydrogeology of the lower Perch Lake basin where the NSDF site is located has been studied for over 60 years. These studies have provided detailed characterization of the geology, hydraulic properties, groundwater flow paths, groundwater transit times, and radionuclide migration rates in the region adjacent to the NSDF site. The known groundwater transit times and slow contaminant migration rates are the basis for selection of the NSDF site and provide confidence that the site is suitable for hosting a low-level waste (LLW) disposal facility. With regards to proximity of NSDF to contaminant plumes from Waste Management Area (WMA) A and WMA B. The impact of legacy groundwater contaminant plumes from WMA's on the CRL site has been assessed in the *Environmental Risk Assessment of Chalk River Laboratories* [1]. There are localized exceedances of dose benchmarks for protection of biota. These exceedances are localized and are therefore, unlikely to be important at the population level. Groundwater plumes on the CRL site are monitored and potential impacts evaluated on an on-going basis. Four groundwater treatment systems have been installed to remediate contaminant plumes on the CRL site. Three of these are in the Perch Lake basin. A groundwater treatment system was installed in 2013 to treat the Strontium-90 contaminant plume emanating from WMA A. Two groundwater treatment facilities are in place to treat a contaminant plumes emanating from the Chemical Pit, located adjacent to WMA A and WMA B. The impact of existing contaminant plumes are considered in the final EIS under baseline conditions (See Section 5.7.4.5 Radioactivity in Surface Water and Section 5.7.4.6 Radioactivity in Groundwater). The EIS provides an assessment of the combined impact of baseline conditions and the NSDF Project (Section 5.7) which has been expanded in the final EIS. Section 8.3.3 of the final EIS summarizes the cumulative effects on the surface water environment. It concludes that residual effects on Ottawa River water quality are determined to be negligible during operations and post-closure phases and may result in a net benefit due to remediation of legacy waste storage areas. Reference: [1] Environmental Risk Assessment of Chalk River Laboratories, ENVP-509220-REPT-003.
CNL-ND78	Pravin Shah (April 8, 2017)	A lot of environmental studies of the area (earlier carried out) may be available; use of these existing/available studies reduces the need for further time consuming studies and thus allow/facilitate faster decision as to the selection of a site for the proposed NSDF.	Existing studies were available and were applied into the Site Selection process (Section 2.5.5 in the EIS); the findings from these studies supported the completion of the Site Selection report [1]. For example, the physical characteristics of the environment at the CRL site is examined in [2, 3, 4] while the characteristics of existing contamination from past waste storage practices and existing baseline conditions are summarized in [5, 6, 7, 8]. These all served to inform the selection of sites to carry out the Project. Further environmental studies were conducted to provide additional baseline data for the NSDF site selection process. These include geotechnical investigations, species at risk studies (bats, turtles, and forest song birds), archaeological surveys, radiological surveys for soil and vegetation and surveys of fish inventory on Chalk River Laboratories (CRL) lakes [9, 10,

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			11]. As an example, two subsurface geotechnical surveys were conducted which characterized the surface geomorphology and hydrology at the two sites considered in Section 2.5.5 of the EIS: one characterized the Alternate site (Section 2.5.5.2 in the EIS) as having an undulating ground surface with elevations ranging from approximately 115 to 172 metres above sea level (m ASL) with groundwater levels ranging from approximately 0.5 to 9 m from the surface [12] while the other characterized the East Mattawa Road (EMR) (Section 2.5.5.1 in the EIS) site as having a relatively low-lying, flat terrain north of Perch lake rising to a much higher ridge in the eastern section [13]. Surface elevations at the EMR site range from approximately 160 to 196 m ASL with groundwater levels ranging from approximately 0.5 m to more than 11.4 m from surface. The ground surface at the Alternate site slopes to the west with good drainage expected in the southwestern section and low-lying areas with seasonal accumulation of surface water in the central portion. On the other hand, the ground surface at the EMR site generally follows the contours of the bedrock which is exposed at the surface in the south along East Mattawa Road and is covered by more than 10 m of overburden in the northern section. References: [1] CNL. Near Surface Disposal Facility Site Selection Report, 232-10300-TN-001. [2] CNL. Characterization of Water and Sediments from and around Perch Lake, 232-121221-REPT-002. [3] Hydrological Studies on a Small Basin on the Canadian Shield, AECL-5041-001. [4] The Water and Energy Balances of Perch Lake (1969-1980). Atmosphere-Ocean 23(3), AECL-9013, Revision 0. [5] CNL. Contaminant Migration from Waste Management Area A, 153-121265-REPT-001. [6] CNL. Subsurface Radionuclide Migration from the Chemical Pit, 3613-121250-REPT-008. [7] CNL. Baseline Groundwater Quality in the Vicinity of the Proposed NSDF Project site, 232-121221-021-000-0004. [8] CNL. Background Concentrations of Metals in Soils at the CRL Site, 182-509245-021-000-0004. [9] CNL. Ichthyofauna Survey Data for Perch Lake, Toussaint Lake, Main Stream, and East Swamp Stream, ENVP-509200-021-000-0415. [10] The Ichthyofauna of the Chalk River Property of Atomic Energy of Canada Limited. University of Waterloo, ENVP-03710-401-000. [11] CNL. 2015 Annual Species at Risk Report, CRL-509213-REPT-007. [12] Golder Associates, Ltd. Subsurface Geotechnical Survey of Proposed VLLW Sites, 361104-10180-ASD-002. 2014 May. [13] Golder Associates, Ltd. Subsurface Geotechnical Survey of Proposed Near Surface Disposal Facility at Chalk River Laboratories, Ontario – Interim Report. 2016 February.
CNL-ND79	Pravin Shah (April 8, 2017) Kathy Eisner (May 12, 2017) Sir Patrick and Lady Diana Gillam (April 17, 2017) Joann McCann (May 2, 2017) Martin Flood (May 31, 2017) CAPE	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English]	The Near Surface Disposal Facility (NSDF) has been robustly designed to provide containment and isolation of radioactive materials for the design life of the facility. This robust design prevents leakage of radioactive material and impacts to surrounding water bodies and sources of drinking water. The proposed NSDF site is approximately 1.1 km from the Ottawa River; however, the alternative means assessment considered alternative locations and technical solutions including locations outside of the CRL site and sites further away from the Ottawa River. Section 2.5 of the final Environmental Impact Statement (EIS) has been updated and provides a detailed evaluation which led to the conclusion that the proposed NSDF on the CRL site is the most favourable option. The detailed assessment addresses the fact that although the proposed NSDF site is physically closer to the Ottawa River, the transit time of groundwater from the proposed site is longer than the alternate site because the path and direction of the groundwater flow is the determining factor in transit time; not the physical proximity to the Ottawa River.

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	(April 18, 2017) Thomas Ringland (April 30, 2017) Peter van Hoof and Sue Gibbs (May 6, 2017) Phyllis Kirby and Rick Bradshaw (May 8, 2017) Jake Deacon (Petawawa Point Cottagers Association) (May 16, 2017) Mark Jennings (May 12, 2017) Julie McCann (May 17, 2017) Ted and Linda Kucharski (May 16, 2017) Janet Still and Benedykt Syposz (May 22, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Brian Eichstaedt (June 22, 2017) Anne Watelet (May 17, 2017) Stefanie McArdle (May 1, 2017) Kirk Groover (May 15, 2017) David Herbert (May 2, 2017) Kimberly O'Brien (May 5, 2017) Paul Carroll (May 8, 2017) Francis Styles (May 11, 2017)	Many commenters request that the location of such a facility should be far from water bodies, potable drinking water sources and human populations for the following reasons: • The proposed facility location is too close to the Ottawa River and is situated on porous, fractured bedrock which will facilitate drainage and runoff from the facility into the environment, and as such, leaks from this facility could significantly contaminate drinking water downstream. • The proposed facility location being situated so close to the Ottawa River goes against IAEA guidance for this type of storage facility. • The proposed facility location is on a major fault line and is surrounded by wetlands that drain into the Ottawa River. • The Perch Creek Basin is already contaminated by existing radioactive waste areas. This ECM would further burden this environment, and 34 acres of mature forest will be destroyed. Several commenters asked the following questions: • When the CRL site is so large (10,000 acres), why was the site closest to Perch Lake and the Ottawa River chosen, and thus any overflow from the proposed facility or from the proposed Treatment Plant will have a shorter route to the River (and aided by the existing channel - the Perch Creek)? • How does CNL justify the choice of the facility's location and why wasn't a more geologically stable terrain chosen? The facility, that will not be leak-proof and subject to the forces of erosion and human intrusion, is being sited on a slope leading to wetlands that flow into the river. This type of facility has been built elsewhere in the world but not typically bordering water systems, it is normally found in desert areas. Furthermore because the site is located on a major seismic fault line, above fractured porous bedrock and according to studies conducted in the 1990's it was determined that groundwater from the site was flooding into the Ottawa River. Lastly, some commenters expressed the position that economic factors should not be a driving criteria in site location for this type of project. [Français] De nombreux commentateurs demandent que l'emplacement d'une telle installation soit loin des plans d'eau, des sources d'eau potable et des populations humaines pour les raisons suivantes : • L'emplacement proposé de l'installation est trop près de la rivière des Outaouais et est situé sur un substrat rocheux poreux et fracturé, ce qui facilitera le drainage et le ruissellement de l'installation dans l'environnement et, par conséquent, les fuites de cette installation pourraient contaminer considérablement l'eau potable en aval. • L'emplacement proposé de l'installation située si près de la rivière des Outaouais va à l'encontre de l'orientation de l'AIEA pour ce type d'installation de stockage. • L'installation proposée se trouve sur une ligne de faille majeure et est entourée de terres humides qui se jettent dans la rivière des Outaouais. • Le bassin du ruisseau Perch est déjà contaminé par les zones de déchets radioactifs existantes. Ce MCA alourdirait davantage cet environnement et 34 acres de forêt mature seront détruits.	It should be noted that the NSDF is located on the Canadian Nuclear Laboratories (CNL) property. Access to the CNL site is controlled; thus, there is no access to the groundwater at CNL and it is not used as a drinking water source by any of the surrounding communities. Section 3.4.2.5.1 of the final EIS states: "The Wastewater Treatment Plant (WWTP) effluent discharge targets for radionuclides are the maximum acceptable concentrations for drinking water and are derived using Health Canada Guidelines for Canadian Drinking Water Quality [1]. The use of drinking water concentrations for radionuclides is considered conservative as there is no public access to the Perch Creek and Perch Lake watershed where WWTP effluent discharges will occur." The geology of the NSDF site is typical of the entire CRL site, which is Precambrian rock with glacial till overburden. Groundwater flow rates through fractured bedrock are very low due to the low hydraulic conductivity and porosity of the bedrock. The base liner and final cover systems are composed of a combination of natural materials (e.g., compact clay liner) and synthetic materials (e.g., high density polyethylene geomembranes) designed to work together to mitigate the release of contaminants into the environment. Long-term performance tests have been conducted to provide confidence that the synthetic high density polyethylene geomembrane component of the liner systems will meet the 550-year design life thus complementing the natural clay component which will provide a hydraulic barrier for thousands of years. The possibility for leachate leakage from the engineered containment mound (ECM) is accounted for through redundancy in design of the ECM base liner. A leachate collection system and a leak detection system is part of the design for the base liner of the ECM (Section 3.4.1.4 of final EIS). During the closure phase, the placement of the final cover will prevent any precipitation from infiltrating into the ECM thereby eliminating leachate generation. Groundwater monitoring along the perimeter of the ECM during operations and institutional control phases will provide for further monitoring of potential leaks from the containment mound. Section 5.3.2.8 outlines the proposed monitoring and follow-up for groundwater. Table 11.0-1 also summarizes the conceptual monitoring program for the Environmental Assessment (EA) Follow-up monitoring program for the NSDF Project, including groundwater monitoring. In the development of the NSDF, CNL has followed both Canadian and International requirements and guidance. This includes the Canadian Nuclear Safety Commission (CNSC) Guidance such as REGDOC 2.11.1 (*Management of Radioactive Waste; Assessing the Long-Term Safety of Radioactive Waste Management. Waste Management, Volume III)* [2] and International Atomic Energy Agency (IAEA) *Safety Standards for Disposal of Radioactive Waste* (SSR-5) [3], *Near Surface Disposal Facilities for Radioactive Waste* (SSG-29) [4], *Safety Case and Safety Assessment for the Disposal of Radioactive Waste* (SSG-23) [5]. Section 3.1.1.1 has been added to the final EIS and it discusses how the NSDF meets applicable IAEA guidance for near surface disposal. The proposed facility is not situated on a major fault line. As per Section 5.3.1.4.2.3 of the final EIS, major seismic events (i.e., earthquakes) are related to movements at tectonic plate boundaries. The CNL property is located in the Ottawa-Bonnechere Graben geologic feature and adjacent to the Western Quebec Seismic Zone. This region of the country has continued to experience minor to moderate seismic activity, and several earthquakes have been documented within this zone. The Site Study Area is located within a region (within 500 km) that has historically experienced low- to moderate-magnitude seismicity. However, few recent (i.e., Quaternary) faults have been mapped within this region. This is in agreement with the findings of a recent paleoseismicity investigation completed at the CRL site. Although the NSDF site characterization does not support the presence of a fracture in the bedrock below the proposed facility footprint, the presence of a hypothetical undetected bedrock fracture has been assessed in groundwater modeling and dose calculations. The impact

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	Marilyn and Peter Primeau (May 6, 2017) Kimberly O'Brien (May 5, 2017) Margaret Lomore (May 6, 2017) Cara Rose-Brown (May 15, 2017) Ish Theilheimer (May 16, 2017) Rri Povey (May 11, 2017) Jeff and Mary Margaret Johnson (May 10, 2017) Ted and Linda Kucharski (May 16, 2017) James Holden (July 10, 2017) Candace Prong (July 24, 2017) Luke Gillam (July 21, 2017) Johnathan Blake (July 19, 2017) CCNR (August 16, 2017) David Prentice (August 16, 2017) Emma March (August 15, 2017) Laurie Wagner (August 15, 2016) Carole Nevills (August 15, 2017) Michael Nogas (August 15, 2017) Patrick Galligan (August 15, 2017) Irene Boland and Mark Barnes (August 15, 2017)	Plusieurs commentateurs ont posé les questions suivantes : • Puisque le site des LCR est si vaste (10 000 acres), pourquoi a-t-on choisi le site le plus près du lac Perch et de la rivière des Outaouais, de sorte que tout débordement de l'installation proposée ou de l'usine de traitement proposée aura un trajet plus court vers la rivière (et avec l'aide du chenal existant – le ruisseau Perch)? • Comment les LNC justifient-ils le choix de l'emplacement de l'installation et pourquoi n'a-t-on pas choisi un terrain plus stable sur le plan géologique? L'installation, qui ne sera pas étanche et qui sera soumise aux forces de l'érosion et de l'intrusion humaine, est située sur une pente menant à des terres humides qui se jettent dans la rivière. Ce type d'installation a été construit ailleurs dans le monde, mais n'est généralement pas en bordure de systèmes d'eau, on le trouve normalement dans des zones désertiques. De plus, parce que le site est situé sur une ligne de faille sismique majeure, au-dessus d'un substrat rocheux poreux fracturé et selon des études menées dans les années 1990, il a été déterminé que l'eau souterraine du site inondait la rivière des Outaouais. Enfin, certains commentateurs ont exprimé la position selon laquelle les facteurs économiques ne devraient pas être un critère déterminant de l'emplacement d'un site pour ce type de projet.	on groundwater flow rates would be negligible thus the presence of a fracture in the bedrock would not result in a higher dose consequence to the public. This is because the primary pathway for groundwater is through the overburden above the bedrock and not through the bedrock itself. The NSDF is positioned in the Perch Lake basin which features wetlands to the west of the site. The wetlands are contaminated as a result of past waste management practices in Waste Management Area (WMA) A in the adjacent liquid dispersal pits which did not have the benefit of engineered containment. The movement of contaminants in the swamps has been studied for several decades and there is much data upon which to make predictions. Currently there are multiple surface water monitoring points in the Perch Lake basin. Sampling points in the wetlands and no material change to the health of the wetland is expected as a result of the NSDF because contaminants will be removed from leachate to meet discharge limits prior to its release to the environment. Section 8.3.3 of the final EIS summarizes the cumulative effects on the surface water environment. It concludes that residual effects on Ottawa River water quality are determined to be negligible during operations and post-closure phases and may result in a net benefit due to remediation of legacy waste storage areas. Other than the built-up (main campus) area of the site, much of the nearly 4,000 hectares CRL property is heavily forested. The construction of the NSDF will result in the clearing of approximately 34 hectares of forested land, which is a small fraction of the forested area of the CRL site. The process to select the site is detailed below. Species at Risk and biodiversity were considerations for the overall site selection of the NSDF (Section 2.5.5 of final EIS). The preferred East Mattawa Road (EMR) site does not appear to fragment the Blanding's turtle habitat, development at the EMR site may encroach on some portion of the species terrestrial habitat. The Alternate site evaluated as part of the alternative means encroaches on the Blanding's turtles travelling corridor within the CRL site, which would potentially cause a slight fragmentation between habitats and may increase the potential for road mortality. Canadian Nuclear Laboratories has performed additional site characterization since the 2017 draft EIS and has updated the groundwater modelling [6]. The groundwater travel time ranges between 5 and 15 years with an average transit time of 7 to 10 years (See Section 5.3.2.6.1.2 of the final EIS). The groundwater flow path from the ECM to Perch Creek (the nearest water course), is via a shallow sandy aquifer and has a distance of approximately 300 m. The predicted migration rate is consistent with observed migration rate observed in other areas in the Perch Lake basin for non-reactive contaminants (i.e., tritium). By contrast, the Alternate site is about 3.5 km from the main channel of the Ottawa River, but about 850 m from Chalk Lake. Chalk Lake is a long narrow bay in the Ottawa River, and for the site evaluation it has been considered to be a part of the river. The ECM has been designed to withstand seismic events of 1 in 10,000 years as determined throughout the application of the relevant Canadian Standards Association (CSA) standard (i.e., CSA N289.1-18 [7]). Ground acceleration rates for the specified frequencies of seismic event return were determined from a Probabilistic Seismic Hazard Assessment of the CRL site that examined relevant earthquakes, large and small, that have occurred close to and several hundred kilometres from the site since the 17th century [8]. The resulting ground motions and the loads they generate were used in the development structural design of the ECM. As summarized in Section 10.3 of the final EIS, based on the conclusions of a seismic analysis completed on the NSDF design the ECM is expected to remain functional under the 1 in 10,000-year design seismic event scenario. While the primary consideration for the NSDF is that an appropriate technical solution which ensures the safety of the public and environment is implemented, the EIS process requires technical, economic and environmental feasibility to be assessed.

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	Judy Sauvé (August 15, 2017) Sylvie Pilon-Tiden (August 15, 2017) Jeff Kelly (August 15, 2017) Gray Hammond (August 15, 2017) Denise Roberge (August 15, 2017 Janice Cunningham and Claude Allard (August 15, 2017) Liz Barett (August 15, 2017) Louise Labrosse (August 15, 2017) Patrick T. Galligan (August 13, 2017) Jo Hayward-Haines (August 13, 2017) Angela Solar (August 14, 2017) David Thomson (August 14, 2017) JoAnne Hungate (August 14, 2017) Robert M. Daisley (August 14, 2017) Catherine Galligan (August 14, 2017) Peter and Barbara Haughton (August 14, 2017) Tony Reddin (August 14, 2017) Jacqueline Scott (August 14, 2017) Glen Moore (August 14, 2017) Janice Tokaryk (August 14, 2017) José Moreno-Lacalle		The Government of Canada, through AECL, is funding the construction of the NSDF to address their liability; therefore, CNL must ensure a fiscally responsible solution is developed. The alternative means Section 2.5.5 (Site Selection) has been expanded in the final EIS to provide more transparency on the assessment including the site selection. A comparison of Table 2.5-1 between the 2017 draft EIS and the final EIS illustrates the major changes: site selection has been expanded in the final EIS from 2 sites to 15 sites and alternatives for effluent discharge options and discharge types have been added to the final EIS that were not in the 2017 draft EIS. References: [1] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3 [2] CNSC, Waste Management, Volume III: Assessing the Long-term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [3] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011. [4] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [5] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012. [6] Groundwater Flow Modelling of the Near Surface Disposal Facility, 232-509249- REPT-001, Revision 5, 2019 July. [7] CSA Group N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants. 2018 [8] Probabilistic Seismic Hazard Assessment, 232-10170-REPT-001. [Français] L'installation de gestion des déchets près de la surface (IGDPS) a été solidement conçue pour confiner et isoler des matières radioactives et les isoler durant toute la durée de vie nominale de l'installation. Cette conception prévient la fuite des matières radioactives et empêche qu'elles aient des effets sur les cours d'eau et les sources d'eau potable environnants. Le site prévu pour l'IGDPS se trouve à environ 1,1 km de la rivière des Outaouais, mais l'évaluation d'autres solutions a permis d'envisager d'autres emplacements et d'autres moyens techniques, dont des emplacements à l'extérieur du site des LCR et d'autres plus éloignés encore de la rivière des Outaouais. La section 2.5 de l'Étude d'impact environnemental (EIE) définitive a été mise à jour pour décrire l'évaluation détaillée qui a mené à la conclusion que l'IGDPS proposée sur le site des LCR était la solution la plus favorable. L'évaluation détaillée permet de comprendre que, même si l'emplacement proposé pour l'IGDPS se trouve physiquement plus proche de la rivière des Outaouais, le délai de transit des eaux souterraines depuis cet emplacement est plus long qu'à d'autres endroits parce que la trajectoire et la direction de l'écoulement des eaux souterraines est le facteur déterminant dans le délai de transit, et non pas la proximité de la rivière des Outaouais. Rappelons que l'IGDPS se trouvera sur un site appartenant aux Laboratoires nucléaires canadiens (LNC). L'accès au site des LNC est contrôlé, il n'y a pas d'accès aux eaux souterraines sur place, et celles-ci ne servent pas de source d'eau potable pour les collectivités environnantes. La section 3.4.2.5.1 de l'EIE définitive prévoit ce qui suit : « Les objectifs de rejet d'effluents de l'usine de traitement des eaux usées (UTEU) concernant les radionucléides sont les concentrations maximales acceptables dans l'eau potable et sont inspirés des Recommandations canadiennes pour la qualité de l'eau potable (Santé

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	(August 14, 2017) Lorna Brennan (August 15, 2017) James Hooper (August 15, 2017) Matt D. (August 14, 2017) Tom Schwalb (August 14, 2017) Marilee DeLombard & Robert Wills (August 16, 2017) Mary Myles (August 16, 2017) John Ankenman (August 16, 2017) Sheila Allwright and Ellen Cameron (August 16, 2017) Alex Thomson (August 16, 2017) John Evans (August 16, 2017) Richard Duff (August 16, 2017) Andrew Harper (August 16, 2017) Virginia MacLatchy (August 16, 2017) Susan Parks (August 16, 2017) Patrick Miller (August 16, 2017) Michael Dworkind (August 16, 2017) Mike Schreiner (August 16, 2017) Alan Darch, Elizabeth Elliott and Clem Trail Residents Association		Canada) [1]. Les seuils de radionucléides dans l'eau potable sont considérés comme une mesure prudente, parce qu'il n'y aura pas d'accès public au bassin versant du ruisseau Perch et du lac Perch où seront rejetés les effluents de l'UTEU. » Les caractéristiques géologiques de l'emplacement de l'IGDPS sont typiques de l'ensemble du site des LCR, qui est composé de roche précambrienne recouverte de mort-terrain de till glaciaire. Le débit des eaux souterraines à travers le substrat rocheux est très lent en raison de la faible conductivité hydraulique et de la porosité de ce substrat. Le revêtement de base et la couverture définitive sont composés de matériaux naturels (p. ex. d'argile compacte) et de matériaux synthétiques (p. ex. de géomembranes de polyéthylène haute densité) dont l'effet conjugué est destiné à atténuer les émissions de contaminants dans l'environnement. Des tests de performance à long terme ont été effectués pour garantir que la géomembrane de polyéthylène haute densité pourra durer les 550 ans de vie utile prévue et compléter ainsi la protection offerte par l'argile naturelle, qui constituera une barrière hydraulique pendant des milliers d'années. Le risque de fuite de lixiviat à partir du monticule de confinement artificiel (MCA) a été pris en compte au moyen d'une redondance dans la conception de son revêtement de base. Un système de collecte du lixiviat et un système de détection des fuites sont intégrés au revêtement de base du MCA (section 3.4.1.4 de l'EIE définitive). Au cours de la phase de fermeture, le placement de la couverture définitive permettra d'éviter l'infiltration d'eau de pluie dans le MCA, ce qui éliminera la production de lixiviat. La surveillance des eaux souterraines le long du périmètre du MCA au cours des phases d'exploitation et de contrôle institutionnel permettra de mieux contrôler les fuites éventuelles du monticule de confinement. La section 5.3.2.8 indique les moyens proposés pour surveiller les eaux souterraines. Le tableau 11.0-1 résume également le programme théorique de surveillance associé au programme de suivi et de surveillance de l'Évaluation environnementale pour le projet d'IGDPS, dont la surveillance des eaux souterraines. Durant l'élaboration du projet d'IGDPS, les LNC ont tenu compte d'exigences et de directives canadiennes et internationales, notamment du REGDOC 2.11.1 de la Commission canadienne de sûreté nucléaire (*Gestion des déchets, Tome III : Évaluation de la sûreté à long terme de la gestion des déchets radioactifs, Tome III)* [2] et des directives de l'Agence internationale de l'énergie atomique (AIEA) énoncées dans *Stockage définitif des déchets radioactifs, Prescriptions de sûreté particulières* (SSR-5) [3], *Near Surface Disposal Facilities for Radioactive Waste* (SSG-29) [4] et *Safety Case and Safety Assessment for the Disposal of Radioactive Waste* (SSG-23) [5]. La section 3.1.1.1 a été ajoutée à l'EIE définitive pour fournir une analyse de la conformité de l'IGDPS aux directives de l'AIEA en matière de stockage près de la surface. L'installation proposée ne sera pas située sur une ligne de faille majeure. Comme l'indique la section 5.3.1.4.2.3 de l'EIE définitive, les principaux phénomènes sismiques (tremblements de terre) sont liés aux mouvements des plaques tectoniques. Le site des LNC se trouve dans la formation géologique du graben d'Ottawa-Bonnechère, à proximité de la Zone sismique de l'Ouest du Québec. Cette région du pays reste une zone d'activité sismique faible à moyenne, et plusieurs tremblements de terre y ont été enregistrés. La zone d'étude du site se trouve dans une région (dans un rayon de 500 km) qui est depuis toujours une zone à sismicité faible à moyenne. Cela dit, peu de failles récentes (Quaternaire) ont été cartographiées dans la région. Cela correspond aux résultats d'une récente étude paléosismique effectuée sur le site des LCR. Selon l'analyse du site de l'IGDPS, il n'y aurait pas de fracture dans le substrat rocheux sur lequel s'appuierait l'empreinte de l'IGDPS, mais la présence d'une hypothétique fracture qui n'aurait pas été détectée a fait l'objet d'une évaluation dans le cadre de la modélisation des eaux souterraines et des calculs de doses. Les répercussions sur le débit des eaux souterraines seraient négligeables, et la présence d'une fracture dans le substrat rocheux n'entraînerait donc pas de doses supérieures pour la

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	(August 16, 2017) Durham Nuclear Awareness (August 16, 2017) Anthony Cowan (August 16, 2017) Sharon Thorne (August 16, 2017) Owen Gleason (August 16, 2017) John Almstedt (August 16, 2017) Linda Gasser (August 16, 2017) OFWCA (August 15, 2017) PCWO (August 16, 2017) Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) Angela Bischoff (August 16, 2017) Greenspace Alliance of Canada's Capital (August 17, 2017) Martine Ouellet (Bloc Québécois) (August 14, 2017) Jutta Spiettstoesser (August 13, 2017) Vincent J.Carbonneau (Parti vert du Québec) (August 14, 2017) STOP Oléoduc Outaouais (August 15, 2017) Coalition Eau Secours!		population. La raison en est que la voie de contamination primaire des eaux souterraines est le mort-terrain recouvrant le substrat rocheux et non le substrat lui-même. L'IGDPS sera située dans le bassin versant du lac Perch, qui est composé de terres humides à l'ouest. Ces terres humides sont contaminées en raison de pratiques antérieures de gestion des déchets dans la zone de gestion des déchets (ZGD), puisque les fosses de dispersion des liquides n'étaient pas protégées par des dispositifs de confinement artificiels. La circulation de contaminants dans les marais fait l'objet d'études depuis des décennies, et il existe suffisamment de données pour faire des prévisions. Il y a, actuellement, de nombreux points de contrôle des eaux de surface dans le bassin versant du lac Perch. Des points d'échantillonnage sont installés dans les terres humides, et on ne s'attend pas à des changements importants en raison de la construction de l'IGDPS, puisque les contaminants seront préalablement supprimés dans le lixiviat déversé dans l'environnement compte tenu des limites de rejet. La section 8.3.3 de l'EIE définitive résume les effets cumulatifs dans les eaux de surface. En conclusion, les effets résiduels sur la qualité de l'eau de la rivière des Outaouais seraient négligeables au cours des phases d'exploitation et de post-fermeture et pourraient se traduire par un avantage net en raison de l'assainissement des zones d'entreposage des déchets hérités du passé. En dehors de la zone construite (campus principal), une grande partie des presque 4 000 hectares du site des LCR est densément boisé. Pour construire l'IGDPS, il faudra déboiser environ 34 hectares, soit une faible fraction de la zone forestière du site des LCR. Le processus de sélection de l'emplacement de l'IGDPS est expliqué ci-dessous. Les espèces en péril et la biodiversité ont compté dans ce processus (voir la section 2.5.5.3 de l'EIE définitive). La zone privilégiée de la route Mattawa Est (RME) ne semble pas fragmenter l'habitat de la tortue mouchetée, mais une construction pourrait y empiéter sur une partie de l'habitat d'espèces terrestres. L'autre emplacement évalué dans le cadre de l'analyse de solutions de rechange empiéterait sur le couloir de circulation des tortues mouchetées sur le site des LCR, ce qui pourrait entraîner une légère fragmentation des habitats et multiplier la mortalité routière. Les Laboratoires nucléaires canadiens ont effectué d'autres analyses du site depuis la version provisoire de l'EIE de 2017 et actualisé la modélisation des eaux souterraines [6]. Le délai de transit des eaux souterraines est de 5 à 15 ans, avec une moyenne de 7 à 10 ans (voir la section 5.3.2.6.1.2 de l'EIE définitive). L'écoulement des eaux souterraines depuis le MCA jusqu'au ruisseau Perch (cours d'eau le plus proche) se fait à travers un aquifère sablonneux peu profond et s'étend sur environ 300 m. Le taux de migration prévisionnel est conforme au taux de migration de contaminants inertes (tritium) observé dans d'autres zones du bassin versant du lac Perch. Par contre, l'autre site évalué se trouve à environ 3,5 km du chenal principal de la rivière des Outaouais, mais à environ 850 m du lac Chalk. Ce lac est une longue baie étroite de la rivière des Outaouais et a été considéré comme partie de la rivière dans le cadre de l'évaluation. Le MCA est conçu pour résister à des phénomènes sismiques de 1/10 000 ans en application de la norme CSA N289.1-18 [7]. Les taux d'accélération du sol correspondant aux périodicités des phénomènes sismiques sont tirés d'une évaluation probabiliste des risques sismiques sur le site des LCR effectuée en fonction des tremblements de terre, importants ou mineurs, qui se sont produits à proximité du site et à plusieurs centaines de kilomètres de distance depuis le 17^{e} siècle [8]. Les mouvements du sol qui en découlent et les charges qu'ils produisent ont servi à concevoir la structure du MCA. Comme le résume la section 10.3 de l'EIE définitive, compte tenu des conclusions de l'analyse sismique effectuée dans le cadre de la conception de l'IGDPS, le MCA est censé rester fonctionnel dans l'hypothèse d'un phénomène sismique de 1/10 000 ans.

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	(August 15, 2017) Mario Gervais (August 16, 2017) Elssa Martinez (August 15, 2017) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017) Grand Council Chief Madahbee (Anishinabek Nation) (August 16, 2017) Dr Éric Notebaert, ACME (August 11, 2017) Ville de Gatineau (August 15, 2017)		L'objectif primordial dans la conception de l'IGDPS est de trouver la solution technique qui garantira la sécurité de la population et de l'environnement, mais le processus de l'EIE suppose une étude de la faisabilité technique, économique et écologique de l'installation. Le gouvernement du Canada, par le biais d'AECL, finance la construction de l'IGDPS dans le but de réduire son passif nucléaire, et les LNC se doivent donc d'élaborer une solution financièrement responsable. La section 2.5.5 (choix de l'emplacement) a été enrichie dans l'EIE définitive pour améliorer la transparence de l'évaluation, notamment au regard du choix de l'emplacement de l'installation. Au tableau 2.5-1, une comparaison entre la version provisoire de l'EIE de 2017 et la version définitive actuelle illustre les principaux changements apportés entretemps : les emplacements évalués sont passés de 2 à 15 dans la version définitive, et des solutions de rejet des effluents et des types de rejet y ont été ajoutées. Références [1] Santé Canada, Recommandations pour la qualité de l'eau potable au Canada – Tableau sommaire, Bureau de la qualité de l'eau et de l'air, Direction générale de la santé environnementale et de la sécurité des consommateurs, Ottawa (Ontario), juin 2019. Voir : https://www.canada.ca/fr/sante-canada/services/sante-environnement-milieu-travail/rapports-publications/qualite-eau/recommandations-qualite-eau-potable-canada-tableau-sommaire.html [2] CCSN, Gestion des déchets, Tome III : Évaluation de la sûreté à long terme de la gestion des déchets radioactifs, REGDOC-2.11.1, mai 2018. [3] AIEA, Stockage définitif des déchets radioactifs, Prescriptions de sûreté particulières, norme de sûreté SSR-5, STI/PUB/1449, 2011. [4] AIEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [5] AIEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012. [6] Groundwater Flow Modelling of the Near Surface Disposal Facility, 232-509249- REPT-001, révision 5, juillet 2019. [7] Groupe CSA, norme N289.1-18 : Exigences générales relatives à la conception et à la qualification parasismique des centrales nucléaires, 2018. [8] Probabilistic Seismic Hazard Assessment, 232-10170-REPT-001.
CNL-ND80	Joan Lougheed and Town of Deep River (August 16, 2017)	The commenter indicates that the selection of the EMR Site is apparently based, in large measure, on the very long "calculated" groundwater / surface water transit times (stated as 10 to 12 years) (see pg. 2-47). It is not clear whether these calculations have been confirmed by actual field measurements or are simply based on theoretical modeling. If the latter, evidence must be provided of how these models have been qualified for a comparable environment. Since the public, and society in general, have great concerns regarding the locating of waste disposal facilities near major water bodies (see the Kincardine Deep Geologic Repository challenges for its location adjacent to Lake Huron), direct evidence of slow migration of releases is important to reassure the public, and should be provided and thoroughly described in the draft EIS. It is unclear why the proposed Alternate site at CRL has a faster transit time of releases to the Ottawa River than the EMR Site. Specifically, why releases to the Ottawa River from the Alternate site could be "less than three years" (see pg. 2-47), whereas similar releases are expected to take 10 to 12 years for the EMR Site (see pg. 2-47), which is much closer to the Ottawa River. The information presented is not self-evident or compelling.	Section 2.5.5 of the final Environmental Impact Statement (EIS) discusses why the East Mattawa Road (EMR) site was selected. The EMR site is located on a bedrock ridge that naturally forces water away from the Ottawa River. The proposed EMR site is 1.1 km from the main channel of the Ottawa River, but groundwater passing below it, discharges to Perch Creek before draining to the Ottawa River, providing a flow path distance of about 2.6 km. Canadian Nuclear Laboratories (CNL) has performed additional site characterization since the 2017 draft EIS and has updated the groundwater modelling. The groundwater transit time for the flow path from the engineered containment mound (ECM) to Perch Creek is in the final EIS. The groundwater transit time ranges between 5 and 15 years with an average transit time of 7 to 10 years (See Section 5.3.2.6.1.2 of the final EIS). The groundwater flow path from the ECM to Perch Creek (the nearest water course), is via a shallow sandy aquifer and has a distance of approximately 300 m. Direct evidence of slow migration of releases is provided by several decades of contaminant migration monitoring at legacy waste management areas in the Perch Lake basin, which do not have the benefit of engineered containment. The predicted migration rate from groundwater flow modelling is consistent with the observed migration rate observed from legacy waste management areas in the Perch Lake basin for non-reactive contaminants (i.e., tritium).

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CNL-ND81	Joan Lougheed and Town of Deep River (August 16, 2017)	With respect to actual site location, Section 2.5.4.3 notes that the selection of a non-CRL site would involve approximately 50,000 shipments of radioactive waste being transported by truck to WL or Nuclear Power Demonstration ("NPD") which "may raise perceived safety concerns amongst the public" (see pg. 2-37). While the NSDF project may involve substantially less shipments to CRL from off-site sources, there will still be significant safety concerns amongst the public (see pgs. 2-35 to 2-37). Fewer shipments do not necessarily result in decreased public concern. Remaining silent on the number of shipments from primary off-site sources, such as NPD and WL, is not consistent with being fully forthcoming with respect to the extent of shipments to CRL from off-site locations. In addition, the potential environmental effects resulting from the acceptance of waste from off-site sources are not addressed in the draft EIS (i.e. vehicle and machinery emissions).	Canadian Nuclear Laboratories (CNL) agrees and understands that fewer shipments are not the only factor regarding public concern with the Near Surface Disposal Facility (NSDF) project. However, Atomic Energy of Canada Limited (AECL) in the past (and now CNL) has been transporting waste and other nuclear materials between its sites (including Whiteshell Laboratories (WL) and Chalk River Laboratories (CRL)) for decades and will continue to do so in a safe and compliant manner as required by established program requirements, procedures, licences and permits. Transportation of nuclear materials is stringently regulated by the Canadian Transportation Agency with oversight by Canada's nuclear regulator, the Canadian Nuclear Safety Commission (CNSC). Since most of the waste (approximately 90%) destined for the NSDF exists or will be generated at the CRL site. Both WL and NPD are scheduled to be closed within the next decade, and therefore, will not have the services and management infrastructure required to safely and securely operate the NSDF. As such, WL and NPD off-site locations are less favourable. While not insignificant, the total number of shipments to the NSDF from off-site sources is small in comparison to the volume of waste arising from the CRL Site. Regarding the proposed inventory of CNL low-level waste (LLW) from Whiteshell and other sites, the amount of waste proposed from sites outside CRL is relatively small. Here are the sources of waste proposed for the NSDF by percentage: • 90% waste from Chalk River Laboratories – past, present and future (waste owned by AECL) • 5% waste from decommissioning at WL in Manitoba and other federal nuclear liabilities (waste owned by AECL) • 5% from other Canadian sources, such as universities and hospitals Transportation of waste from off-site sources is not within the scope of the environmental assessment for the NSDF Project. At present, the consolidation of waste to CRL site is incorporated into the existing Integrated Waste Strategy [1] as well as is part of the existing site licences; transportation of waste from off-site locations is not specific to the NSDF Project. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND82	Joan Lougheed and Town of Deep River (August 16, 2017)	Regarding accepting transported waste at the NSDF, Deep River is concerned that without stringent parameters regarding the sourcing and origination of waste, the NSDF could become a national repository for radioactive waste without prior consultation and acceptance of such. Due to the vast quantity of waste that the NSDF will ultimately be capable of accepting, it is important for the municipality and other stakeholders to ascertain the source and the origination of the waste to be deposited at the NSDF prior to the commencement of its construction. The descriptions of the origination and sourcing of waste is broad and vague (see more detail and examples in the original submission). Further to this, in Section 5.10.8.2.3 additional information is required to support the conclusions for transportation and traffic. Highway 17 is already an issue for local municipalities and residents of Renfrew County and Deep River. There will be approximately 230 truck trips per day during site preparation and construction (115-in and 115-out) (see pg. 5-637). CNL does not advise how long this will continue, nor what time of year it is expected to occur. Increased road degradation is identified as a Residual Effect, without addressing the impact this increased traffic will have on municipal roads.	The amount of waste proposed from sites outside Chalk River Laboratories (CRL) is relatively small. Here are the sources of waste proposed for the Near Surface Disposal Facility (NSDF) by percentage: • 90% waste from Chalk River Laboratories – past, present and future (waste owned by AECL) • 5% waste from decommissioning at Whiteshell Laboratories in Manitoba and other federal nuclear liabilities (waste owned by AECL) • 5% from other Canadian sources, such as universities and hospitals. There are no plans to accept waste from sources other than those listed above. The NSDF is meant to accept waste that is owned by AECL; any changes from this plan would require approval from AECL. Furthermore, it should be noted that, in accordance with *Canada's Radioactive Waste Policy Framework,* the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. The Canadian Nuclear Laboratories (CNL) Integrated Waste Strategy [1] is the guiding document which describes the strategic approach to waste management for CNL. Transportation of waste from off-site sources is not within the scope of the environmental assessment for the NSDF Project. At present, the consolidation of waste to CRL site is incorporated into

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		Furthermore, the Section regarding traffic is limited to construction materials and does not include transportation requirements and effects for the truckloads of radioactive waste planned to be delivered from WL and other CNL sites to CRL. This assessment should include a description of how this is going to occur, along with the timing and volume of traffic.	the existing IWS [1] as well is part of the existing site licences; transportation of waste from off-site locations is not specific to the NSDF Project. The analysis of transportation and traffic in the final Environmental Impact Statement (EIS) (Section 5.10.8.2.3) analyses additional off-site traffic mainly associated with construction (expected to last approximately 2 years) and thus a relatively short time frame. The analysis concludes there is no significant impact from increased road degradation due to increased traffic volume from the transportation of workers, supplies and equipment. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND83	David Raman (August 3, 2017)	The "mandatory criteria" used for selecting the site appear to be only those of immediate operational convenience, such as space availability, proximately to existing infrastructure and waste arisings. While these are legitimate, they are not sufficient basic criteria for a landfill that will need to perform its function for several centuries. Where are the criteria for: • Topography • Climatology and Hydrology • The basic geological features of the site, including seismic activity. (Will the site be stable during its design life?) • The hydrological and geochemical features of the site (e.g. groundwater flow, ground water chemistry, retardation processes, etc.) • Geomorphologic processes that may be experienced over the site, functional life. • Isolation from sensitive environmental features so that contingency measures may be implemented before adverse impacts can occur (i.e. an attenuation zone). Figure 2.5.5-1 shows the proposed site, and it is bordered on three sides by surface water and wetlands. It does not appear that the above criteria were part of the site selection process.	Responses to the particular points are provided below. Topography The overall design of the engineered containment mound (ECM) will be compatible with Chalk River Laboratories (CRL) site topography. The geometric profile and height of ECM shall be designed to ensure that ECM is not visible either from Ottawa River, plant road or CRL campus. The base of the ECM (i.e., top of the primary liner) shall be designed to maintain a minimum of 1.5 m above the seasonal high groundwater table. Climatology and Hydrology Climate was considered in the design process, but was not included as a requirement of the facility's siting. The NSDF is designed to take into account to the local climate at the time of design and construction, but also the climate in the foreseeable future. The Post-Closure Safety Assessment (PostSA) [1] includes the effects of climate change in the evaluation of the facility's performance for hundreds and thousands of years into the future. The greatest expected impact from climate change is the change in hydrologically effective rainfall (HER), which was accounted for in water balance calculations and which can affect the erosion rate of the cover of the facility. Geological features The CRL site is located in the Ottawa-Bonnechere Graben geologic feature and adjacent to the Western Quebec Seismic Zone. This region of the country experiences minor to moderate seismic activity. Canadian Nuclear Laboratories has conservatively chosen a 1 in 10,000 year earthquake as the Design Basis Earthquake for the Engineered Containment Mound. The 1 in 10,000 year earthquake is derived from the CSA N289.1 standard [2], which is the same earthquake frequency applied to the design of a nuclear power plant. The contents of the NSDF remain hazardous for only a couple hundred years, until radioactive decay brings the average radioactivity in the facility down to near back-ground levels. A seismic design that allows the facility to withstand a 1-in-10,000 year event is conservative given the short amount of time that the facility is potentially hazardous. The understanding of detailed geochemical features is part of the site characterization program. Site characterization activities have included: • Identification of soil types, bedrock elevations and groundwater elevations consisted of 14 test pits, seven boreholes, four auger soundings and geophysical testing - grain size distribution and moisture content.

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			• Phase 1 field work across the proposed ECM footprint and supporting structures, consisted of 14 Standard Penetration Test borings, 8 Cone Penetration Tests, four downhole seismic explorations, and three soil resistivity areas. • Phase 2 field work was performed to supplement Phase 1 findings and consisted of seven borings to collect rock cores and construct monitoring wells, and 11 Cone Penetration Tests. • Phase 3 field work was performed to supplement existing geotechnical data and field work findings, and consisted of five Standard Penetration Test borings, three test pits to conduct percolation tests to support the design of septic bed/exfiltration gallery, and Ground Penetrating Radar (GPR) survey to produce a bedrock topographic map. • Phase 4 field work was performed to supplement existing geotechnical data and field work findings, and consisted of nine Standard Penetration Test borings and two auger borings drilled to the top of the rock. • Phase 5 field work involved hydraulic conductivity tests using both rising and falling head single-well methodology in the monitoring wells installed during the Phase 4 field work. • Phase 6 field work was performed to provide sufficient data/information for the design and construction of the effluent forcemain, and consisted of five Standard Penetration Test borings of which three borings were finished as monitoring wells. Hydrological and geochemical features of the site The selected site is required to have substantial data regarding the local hydrogeological features. The Perch Lake basin, site of some of the world's first waste management areas, is perhaps one of the best studied plots of land in the world. Information about groundwater flow, ground water chemistry, and retardation processes are well known for the selected site. Site characterization processes are described in the previous discussion. Geomorphologic processes Evolution of the site, and the geomorphologic properties, are considered and evaluated through the Features, Events, and Processes (FEPs). The Post-Closure Safety Assessment (PostSA) [1] evaluates the evolution of the local environment, both in the Normal Evolution Scenario, and as other Disruptive Events scenarios. Isolation from environment The groundwater transit times for the site have been studied extensively. It is known that the groundwater transit time from the facility to Perch Creek is about 7-12 years. This long transit time allows CNL to respond in the event that groundwater monitoring data suggests elevated concentrations of contaminants, and therefore a potential problem with containment. The monitoring data and long transit time gives several years for mitigation measures to be put into place before the contaminants reach the surface environment. References: [1] Post-Closure Safety Assessment for the NSDF Project, 232-509240-ASD-004. [2] CSA Group. CSA N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants. 2018.
CNL-ND84	David Raman (August 3, 2017)	**Facility Size:** In Figure 2.5.5-1, the size of the proposed facility may be compared to those in existence. While a large facility may have some operational advantages, and it is appreciated that the new site is intended primarily for high-volume decommissioning wastes (the existing ones were sized for smaller volume on-going operational wastes); it should be noted that the sizes of the existing ones illustrate the	Section 2.5 of the final Environmental Impact Statement (EIS) contains a detailed assessment of alternative means to complete the project including the selection of an appropriate site for the Near Surface Disposal Facility (NSDF) and the choice of an Engineered Containment Mound (ECM) as the preferred disposal facility type.

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		difficult topography of the Chalk River site. The sizes of the waste management areas were adapted to the land available that was considered suitable for such purposes. Simply put, if this site was a good candidate for a waste management facility, it probably would have been selected at some time in the past. A more successful application might entail the use of a number of smaller near surface disposal facilities on the Chalk River site.	Historically, the size of Waste Management Areas (WMAs) at Chalk River Laboratories (CRL) were influenced by operational activities and minimal environmental remediation and decommissioning activities leading to many small WMA over several decades. Currently the site is undergoing major environmental remediation projects and a revitalization program requiring decommissioning of more than 100 buildings. The environmental remediation activities are intended to place the waste currently stored in some of the historical WMAs into an engineered facility; thus, reducing the environmental liability. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. A large centralized facility is the most practical design for the large volume of low-level waste that requires disposal. The design, licensing, operation, maintenance, and post-closure care of several facilities would be prohibitively expensive and difficult to manage. For example, as shown on Figure 3.1.1-1 of the final EIS, the NSDF includes: • Wastewater Treatment Plant (WWTP). • Support facilities like administrative offices, an operations center, a vehicle decontamination facility, and the vehicle refueling station. • Services including: potable and fire water, sanitary sewage, electricity, natural gas, perimeter fencing and road, and water management ponds. It would not be practical/economically prudent to design, licence, build, and operate small ECM's each requiring the above.
CNL-ND85	Pravin Shah (April 8, 2017)	There is no mention of any review by outside independent professional expert(s) on the site selection which would lend some credibility to the Report.	The environmental assessment process provides for a robust and independent review of the entire Environmental Impact Statement (EIS) including the selection of the site. Independent expert reviewers from federal and provincial agencies, among others, provided detailed comments. Section 2.5 of the final EIS was revised to incorporate comments provided on the 2017 draft EIS. Furthermore an international subject matter expert panel, commissioned by Atomic Energy of Canada Limited, led by the U.S. Department of Energy provided an independent third party review of Canadian Nuclear Laboratories (CNL) NSDF safety case and assessment documents. The results of the independent review have been submitted to Canadian Nuclear Safety Commission staff. Overall, the initial panel's conclusions were that the NSDF has been conservatively designed to dispose of the planned radioactive inventory and have future releases much below all appropriate standards.
CNL-ND87	William Turner (May 31, 2017) 56. William Turner (August 7, 2017)	Figure 2.5.5-1 Site Options Evaluated for the NSDF Project. The selected site straddles the East Mattawa Road. I understand that this road is designated as an Emergency Road #3 (ER3) in the event of a nuclear accident in the built-up area of the CRL site. During the clearing of the location, the construction, operation, and closure of the facility, this route will not be available. Somehow, not including this fact in the site selection criteria suggests those criteria are just not credible. In Section 2.5.5.1.1, it is stated that ER3 will be "… re-routed as part of a previously planned upgrade to this road". I wonder where that re-routing will occur. Somehow, I doubt there would be any requirement to re-route this road if the mound was not located on that road. An examination of the figures presented in the EIS (for example this figure) suggests that its current location is optimal. This is especially true, since any new route will have to cross Perch Creek, and the current crossing is adjacent to the mound facility. Yet there is nothing in the assessment that addresses the changes required to this route. Further, there is no mention of this road (or its relocation). None of the figures in the EIS report identify the East Mattawa Road as the Emergency Road #3 (ER3).	The upgrade/re-route of emergency route 3 (ER3) was recommended by the Emergency Preparedness program based on changes to the Chalk River Laboratories (CRL) site parking, roads and intersections and results from site evaluation drills. The ER3 project will result in improved emergency egress for employees in the event of an evacuation requirement. The ER3 project is not part of the Near Surface Disposal Facility (NSDF) Project. Archaeological assessments were performed for both candidate sites (East Mattawa Road (EMR) and Alternate). While artefacts have been found and are being recovered from the EMR site, none of the finds have been deemed to be of Class 1 significance based on the opinion of an expert archaeologist. Chalk River Laboratories is following the same archaeological practice for the NSDF Project that it does for the developments elsewhere on its site. From an archaeological perspective, the EIS Table 2.5.5-2 clearly notes that the Alternate site has a most favourable assessment while the EMR site has a favourable assessment (Land and Resource Use) demonstrating that the cultural features aspect was considered in the application of CNL's site selection criteria.

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		It has also been noted that CNL has identified East Mattawa Road as having cultural heritage value. By selecting this site as the preferred location for their proposed Mound, CNL has failed to meet the site selection criteria it set for itself. If CNL had applied these exclusion criteria in the site selection process, I am at a loss as to how the "East Mattawa Road" site was selected. See the link for a figure that depicts part of the NSDF Poster Number 7 from the July 2016 Public Information sessions (downloadable from the link http://www.cnl.ca/site/media/Parent/PSA-NSDF-Eng_July.pdf). Thus, how were the site selection criteria applied, specifically the criterion of "cultural … features". At least one of these features is straddled by the East Mattawa Road site whereas; none of these features located in the Alternative Site. CNL need to explain the application of the CNL site selection criteria, specifically the "cultural … features" aspect. Further, they need to explain why the "Cultural Heritage Priority" they identified in the July 2016 Posters (see figure below) was ignored when distinguishing which of the two sites is the optimal choice.	The Cultural Heritage Priority was addressed in a number of ways: 1) by including cultural features as one of the selection criteria for the site, 2) by appropriately scoring the Alternate site more favorably than the East Mattawa Road site during the site selection process, 3) by undertaking Stage 2,3 and 4 archeological assessments to identify required mitigations and to manage identified artefactsand 4) by modifying the NSDF footprint to avoid a homestead (See Section 2.5.5.3 of the final EIS).
CNL-ND88	Verna Polson, Grand Chief: Algonquin Anishinabeg Nation Tribal Council (May 12, 2017) Jean Guy Whiteduck (Kitigan Zibi Anishinabeg) (May 11, 2017) AANTC (August 14, 2017) R. Donald Maracle (Mohawks of the Bay of Quinte) (August 16, 2017)	*Concerns on this topic were expressed by more than one indigenous group, and comments have been summarized.* Leakage into the Ottawa River shed would be calamitous to the environment - potential impacts to our traditional territory would be severe, and would affect our people for many generations to come. For the Anishinabeg people, water is sacred and essential for all life. The Chalk River Laboratories Site is located in close proximity to waterways such as Perch Lake, Maskingonge Lake, and the Ottawa River, and as such we are deeply concerned about potential impacts of nuclear waste on the health of these waterways. We are opposed to the transport and storage of radioactive waste on First Nations ancestral lands. The location for the proposed NSDF is potentially problematic – the lack of natural features that could protect local water sources from malfunctions at the NSDF mean that engineered features would be solely responsible for ensuring the integrity of the facility. This could increase the risk associated with human error or future malfunctions at the facility, as they would not be mitigated by any natural geological or hydrological features.	Canadian Nuclear Laboratories (CNL) employees live along and utilize the Ottawa River and its protection is also important to us. We are taking the time to ensure the design of the facility is robust enough to contain the waste under all contemplated environmental conditions. Canadian Nuclear Laboratories views the Near Surface Disposal Facility (NSDF) proposal as an improvement over the current environmental conditions at the Chalk River Laboratories (CRL) site. As noted in Section 1.0 of the final Environmental Impact Statement (EIS) (Introduction): "For more than 70 years Atomic Energy of Canada Limited (AECL) (and now CNL) has been making advances in nuclear science and technology in the interest of Canadians. This includes the production of medical isotopes that have treated over one billion patients worldwide, as well as developments in clean energy which help reduce greenhouse gas emissions. Through investments in the revitalization of the CRL site, that mission and innovative science will continue into the future. However, this proud history has created nuclear liabilities in the form of waste. Furthermore, past waste management practices, which met the standards of the day, are no longer acceptable now. Specifically, the historic waste management areas (WMAs) lack robust containment, which has led to impacts in the surrounding environment." Presently, wastes at the CNL sites are temporarily contained in waste storage systems in accordance with current licence conditions that protect workers, the public and the environment. However, the practice of continuing to build additional temporary storage systems at the CRL site for low-level waste (LLW) is not consistent with modern waste management principles. In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. The purpose of the NSDF Project is to provide the permanent disposal of current and future LLW at the CRL site in a manner that is protective of both the public and the environment. Further, the NSDF Project would enable the remediation of historically contaminated lands and legacy WMAs, as well as the decommissioning of outdated infrastructure to facilitate the CRL site revitalization. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options has not been included in the final NSDF EIS.

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			The NSDF is designed to be a permanent solution which will reduce the risk associated with temporary waste storage at the CRL site because the facility has the appropriate design life to contain and isolate the inventory until it is sufficiently decayed to levels that does not pose a risk to the public or the environment. Note that, since only LLW will go in the NSDF, consequences to the public or the environment from any event are very low to negligible. Canadian Nuclear Laboratories acknowledges that First Nations ancestral lands are an on-going area of discussion between the Government of Canada and the First Nations that is beyond the scope of this EIS. Section 3.1.1.1 of the final EIS contains a description of how the design of the NSDF is protective of the environment. It includes the following statement: "The engineered containment mound (ECM) is designed with a number of engineered barriers to provide multiple layers of safety to support the long-term containment and isolation requirements. In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm, the high-density polyethylene (HDPE) geomembrane cover system, and the double HDPE geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment for thousands of years."` Section 7.0 of the final EIS provides a detailed discussion of possible accidents and malfunctions from all causes including human error. In all cases mitigations are identified and the effect on the environment following mitigation is assessed. The NSDF has been designed to provide robust containment of radioactive material and significant malfunctions are not expected; however, Section 11.0 of the final EIS provides a summary of the monitoring and follow up programs that will be put in place to detect any issues with the integrity of the NSDF in the event there was a problem in the future.
		Facility Design – Engineered Containment Mound	
CNL-ND89	Anna Tilman (June 22, 2017) Kerrie Blaise, CELA (August 15, 2017)	According to the EIS, waste streams with high tritium content will be placed in special packaging so that no more than 3.9 x 1013 Bq will be available for leaching prior to ECM enclosure (EIS 5-513). Can CNL please explain this statement further? The PA report (section 4.2) states that the tritium inventory available for leaching can be limited by either: 1. Excluding a small number of packages with high tritium content from the NSDF, or 2. Subjecting such consignments to special packaging requirements which are designed to be leak tight and can be credited not to leach during the period of operations. Are these measures adequate? Also do they consider preventative measures for the more important tritium-to-air emissions? Further technical discussion is required given the seriousness of the resulting tritium doses to the public.	The total inventory of tritium allowed in the NSDF is limited (see Table 3.3.1-2 of the final Environmental Impact Statement (EIS) which includes the Licensed Inventory for tritium). Additionally, the concentration of tritium in individual wastes is also controlled (See Table 3.3.3-1 of the final EIS which provides the waste acceptance criteria for tritium). There will be a small portion of waste which will be required to use robust packaging to prevent the spread of contamination. Specifically, leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years); thus more mobile radionuclides, such as tritium, are kept isolated from the environment minimizing radionuclide concentrations in the liquid effluent during the operations phase. This principle has been incorporated into the design basis of the Wastewater Treatment Plant (WWTP). Section 5.7.6.1.2.1 of the final EIS includes a discussion of radionuclide airborne concentrations and doses to engineered containment mound (ECM) workers. It concludes that the dose to the ECM worker dose is negligible from ECM airborne concentrations of radon, tritium and carbon--14. Since the dose to the ECM worker is negligible, the radiological effect on ecological receptors will also be negligible from ECM airborne concentrations of radon, tritium and carbon-14. Similarly, as the dose to ECM workers is negligible, the dose to the public (who is farther from the facility in comparison to the worker) will also be negligible. The leachate and contact water will contain tritium as well. The leachate and the contact water are collected and transferred to the Wastewater Treatment Plant (WWTP). The concentration of the tritium is measured prior to the effluent being discharged to ensure it meets the effluent discharge target (see Table 3.4.2-2 of the final EIS for discharge targets). The

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			NSDF WWTP tritium discharge target (360,000 Bq/L) [1] is based on maintaining tritium concentrations below the Health Canada drinking water guideline [2] of 7,000 Bq/L in Perch Creek (and by extension, the Ottawa River). Section 11.0 of the final EIS provides a summary of the monitoring and follow-up programs. References: [1] Near Surface Disposal Facility Effluent Discharge Targets. 232-106499-REPT-002. [2] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3
CNL-ND90	OFWCA (Johanna Echlin) (May 8, 2017) Michael Stephens (August 14, 2017) Emma March (August 15, 2017) Laurie Wagner (August 15, 2016) Jeff Kelly (August 15, 2017) Patrick T. Galligan (August 13, 2017) Angela Solar (August 14, 2017) Matt D. (August 14, 2017) Alex Thomson (August 16, 2017) Kevin Costello (August 16, 2017) Durham Nuclear Awareness (August 16, 2017) Anthony Cowan (August 16, 2017) Sharon Thorne (August 16, 2017) Ralliement contre la pollution radioactive (August 3, 2017) William Turner	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* Several commenters expressed the position that CNL's ECM is more closely comparable to a municipal landfill. CNL must provide comparable examples of mounds - or near surface landfill type of facilities - that are used as repositories for low and intermediate-level radioactive waste. Fifteen to twenty years of successful operation is not a sufficient period to justify CNL's claim of "proven". According to the International Atomic Energy Agency a landfill - which is what is being proposed by CNL for the ECM - is only suitable for very low-level radioactive wastes with short half-lives of no more than a few centuries. This ECM is not adequate for radioactive wastes with half-lives of thousands, hundreds of thousands and millions of years (as is planned). Some commenters expressed the concern that large volumes of highly radioactive waste will be disposed of in a surface landfill on the Ottawa River, without an emergency plan and containment technologies designed for relatively harmless municipal landfills. How does a berm constructed of rock provide any containment for the wastes in the mound? What is the source of the materials for these berms? In Figure 4.1 it is noted that the liner for the mound expends to the crest of the berm on the waste side. In other words any leachate from the wastes within the berm will not be collected in the Leachate Collection System. Also the berm road is not shown in the figure. How can the containment berm function as a waste repository? What would the WAC be for the wastes to be used in the berm?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The revised NSDF EIS no longer refers to the Engineered Containment Mound (ECM) being "proven technology" rather the term "best available technology" is used, consistent with the "best available technology and techniques economically achievable (BATEA)" principle within REGDOC 2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [2]. However, this type of facility has been demonstrated as being effective in the clean-up of similarly impacted nuclear sites. Radioactive waste disposal facilities similar to NSDF have been operating safely since the 1960s. Section 2.5.2.2.1 has been revised in the final EIS and includes Table 2.5.2-1 "Attributes of Selected Near Surface Facilities in Canada and USA for Long Term Management of Low Level Radioactive Waste". The table includes a summary of key attributes for a number of near surface facilities in Canada and USA. The key purpose of this table is to demonstrate that for other nuclear sites undergoing a large environmental remediation and decommissioning missions, a near surface ECM is a best available technology due to the magnitude of waste volume (i.e., approaching one million cubic meters) and type of waste streams (i.e., contaminated soils and demolition debris). The proposed NSDF Project has been specifically designed for the environmental characteristics for the Chalk River Laboratories (CRL) site and its proposed Licensed Inventory. As outlined in Section 2.5.2.2.1 of the final EIS, the International Atomic Energy Agency (IAEA) definition of a near surface disposal is the placement of solid, or solidified, radioactive waste in a disposal facility located at or near the land surface (IAEA SSG-29 – *Near Surface Disposal Facilities for Radioactive Waste* [3]). The IAEA also states that the preferred option for disposal of LLW is in near surface disposal facilities (*Technical Considerations in the Design of Near Surface Disposal Facilities for Radioactive Waste* [4]). Section 3.1.1.1 of the final EIS describes how the NSDF aligns to regulatory and international guidelines. Section 7.5 of the final EIS describes CNL's Emergency Response Program and how it applies to NSDF. If an accident or malfunction situation occurs, CNL has procedures in place that address requirements for immediate response and post-event clean-up or remediation. Of note, CNL's *Emergency Preparedness Program* (described in Section 3.5.2.5 of the final EIS) has been designed for immediate response to emergency situations. The program ensures emergency readiness and

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	(May 31, 2017) 87. 88. 89.		emergency management to support programs such as reactor safety/accident management, decommissioning, radiation and environmental protection, fire and occupational health and safety. The ECM and berms have been designed to maintain their containment functions for up to a 1-in-10 000 year seismic event. As outlined in Section 3.1.1.1 of the final EIS, the ECM is designed with a number of engineered barriers to provide multiple layers of safety to support the long-term containment and isolation requirements. In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm, the high-density polyethylene (HDPE) geomembrane cover system, and the double HDPE geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment for thousands of years. In addition to the engineered barriers, the NSDF Project site is well above the Ottawa River flood levels on a bedrock ridge that naturally forces water to flow in the opposite direction from the river. As outlined in Section 3.4.1.5 of the final EIS, the primary function of the berms is to maintain the integrity of the ECM during operations and throughout the post-closure period. The berms will consist of three main geotechnical elements, or layers, each contributing to the soundness and integrity of the berm itself and the whole ECM. The inside of the berm will be covered with the various liner system layers (described in Section 3.4.1.4), while the outside will be covered with an intrusion barrier rockfill over HDPE geomembrane, geotextile cushion and geogrid. The top of the berm will be covered with a layer of granular A material, an HDPE geomembrane and geotextile cushion, with the top layer granular A becoming the top of berm road. All leachate will be directed to the ECM's leachate collection system. To clarify where the berm roads are see Figure 3.4.1-5 of the final EIS. To clarify, the containment berm does not contain waste; it is part of the waste repository (ECM) and simplistically can be considered the "walls" of the ECM where the base liner is the "floor" and the final cover is the "roof". There is no separate Waste Acceptance Criteria (WAC) [5] for the berm; there is only the WAC for the ECM. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002 [2] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September. [3] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [4] IAEA, Technical Considerations in the Design of Near Surface Disposal Facilities for Radioactive Waste. 2001. [5] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND91	OFWCA (Johanna Echlin) (May 8, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) CCNR (August 16, 2017) Michael Stephens (August 14, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* CNL claims in the EIS, in ads and in interviews that this ECM is "proven technology". However, a number of experts have concluded that these facilities are in no way comparable to CNL's ECM (none of these other facilities are mounds - Radioactive waste, in these other sites, are often in containers which provide cover from precipitation and shielding for the protection of workers and public, none of these facilities are on bodies of water - one is in the desert). Based on the information provided, there is no direct evidence that the technology is proven for 500 years. Indeed, since the technology incorporated into the design has not been in existence for 500 years,	The final Near Surface Disposal Facility (NSDF) Environmental Impact Statement (EIS) no longer refers to the Engineered Containment Mound (ECM) as being "proven technology" rather the term "best available technology" is used, consistent with the "best available technology and techniques economically achievable (BATEA)" principle within REGDOC 2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures*. However, this type of facility has been demonstrated as being effective in the cleanup of similarly impacted nuclear sites. Radioactive waste disposal facilities similar to NSDF have been operating safely since the 1960s. Section 2.5.2.2.1 has been revised and includes Table 2.5.2-1 "Attributes of Selected Near Surface Facilities in Canada and USA for Long Term Management of Low Level Radioactive Waste (LLW)". The table includes a summary of key attributes for a number of near surface facilities in Canada and USA. The key purpose of this table is to demonstrate that for other nuclear sites undergoing a large environmental remediation and decommissioning missions, a near surface ECM is a best available technology due to the magnitude of

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	Emma March (August 15, 2017) Valerie Needham (August 15, 2017) Carole Nevills (August 15, 2017) Craig Robinson (August 15, 2017) James Hooper (August 15, 2017) Ralliement contre la pollution radioactive (August 3, 2017 Anna Tilman (August 11, 2017) William Turner (May 31, 2017)	"proven" is incorrect terminology. If these technologies are to be described as "proven" for a 500 year lifetime, supporting data and evidence must be provided. The more advisable approach would have been to discuss the selection of the design parameters and to inform what technologies and experts the proponent consulted. This information would have provided Deep River greater confidence that the selected materials have the requisite integrity. That this is unproven has also been well documented in the submissions from Concerned Citizens of Renfrew County and Area (CCRCA). The NSDF violates basic guidelines laid down by the International Atomic Energy Agency (IAEA). These violations have been detailed in submissions made by CCRCA. [see http://ccnr.org/Disregard_for_safety.pdf] Another commenter stated: why we are using the ECM model which has only been successfully operational for decades - and in the desert? And then there is Finland - they rejected a similar NSDF model, why are we settling?	waste volume (i.e., approaching one million cubic meters) and type of waste streams (i.e., contaminated soils and demolition debris). The ECM is designed to contain and isolate the wastes from the environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW, all short-lived radioactive contaminants – the primary component of LLW – decays in the first 100 years after closure. Based on International Atomic Energy Agency (IAEA) standards of management of nuclear hazards and wastes, the design of the NSDF Project is commensurate with the hazard. The project recognizes that high-density polyethylene (HDPE) geomembranes have only been used for several decades. Consequently, a well-established laboratory test method was used to demonstrate the service life of the geomembrane for the NSDF. The work included a series of laboratory tests and analyses. The results conclude that candidate NSDF geomembranes will exceed the required design life of 550 years (NSDF Geomembrane Relative Performance Report [1]). Conservatism was applied to address uncertainty: • Several leachates were utilized in the tests. These included Municipal Solid Waste (MSW) simulated leachate which is more harmful to the geomembrane's long-term performance than the NSDF simulated leachates. • In the laboratory test, both sides of the geomembrane samples were exposed to the simulated leachates, which is more harmful than their application in the field. Some studies confirm that the geomembrane service-life estimated using such a laboratory test is more conservative than large-scale tests considering multiple components of barrier systems. The design of the ECM base liner and final cover systems has incorporated multiple barriers systems comprising of natural and synthetic materials. The design of the ECM liner system has incorporated the recommendations of the Subject Matter Experts (SME) from academic institutions and industries, as well as the recent existing Research & Development results. A Compacted Clay Liner (CCL) and Geosynthetic Clay liner (GCL) are part of the base liner system. As outlined in Section 2.5.2.2.1 of the final EIS, the IAEA definition of a near surface disposal is the placement of solid, or solidified, radioactive waste in a disposal facility located at or near the land surface (IAEA SSG-29 – Near Surface Disposal Facilities for Radioactive Waste [2]). The IAEA also states that a suitable option for disposal of LLW is in near surface disposal facilities (IAEA-TECHDOC-1256, *Technical Considerations in the Design of Near Surface Disposal Facilities for Radioactive Waste*) [3]. In the development of the NSDF, Canadian Nuclear Laboratories (CNL) has followed both Canadian and International requirements and guidance. This includes the Canadian Nuclear Safety Commission (CNSC) Guidance such as REGDOC 2.11.1 (*Management of Radioactive Waste; Assessing the Long-Term Safety of Radioactive Waste Management. Waste Management, Volume III)* [4] and IAEA *Safety Standards for Disposal of Radioactive Waste* (SSR-5) [5], *Near Surface Disposal Facilities for Radioactive Waste* (SSG-29) [2], *Safety Case and Safety Assessment for the Disposal of Radioactive Waste* (SSG-23) [6]. Section 3.1.1.1 of the final EIS describes how the NSDF aligns to regulatory and international guidelines. References:

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			[1] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024. [2] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [3] IAEA, Technical Considerations in the Design of Near Surface Disposal Facilities for Radioactive Waste. 2001. [4] CNSC, Waste Management, Volume III: Assessing the Long-term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [5] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011. [[6] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012.
CNL-ND92	AANTC (August 14, 2017)	Additional information should be provided in the EIS concerning the base of the mound, including precautions to avoid wrinkling or puncturing the geomembrane that could impact the facility's integrity.	Section 3.1.1.1 of the final Environmental Impact Statement (EIS) contains a description of the design of the baseliner of the Near Surface Disposal Facility (NSDF). It includes the following statement: "The engineered containment mound (ECM) is designed with a number of engineered barriers to provide multiple layers of safety to support the long-term containment and isolation requirements. In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm, the high-density polyethylene (HDPE) geomembrane (GMB) cover system, and the double HDPE geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment for thousands of years." Additional details with respect to the overall design of the Engineered Containment Mound have been added to the EIS, including the base liner system (see Section 3.4.1.4 of the final EIS). Selection of the HDPE GMB will be followed by the application of a comprehensive Construction Quality Assurance Program during the NSDF construction phase. Construction Quality Assurance addresses potential aspects that can affect the HDPE GMB performance during construction (e.g., tensile membrane strains/stresses induced by poor construction practice; wrinkles of HDPE GMB; and optimization of the welding locations and methodology). Table 4.3.2-1 (which discusses how key public issues were addressed in the final EIS), under Design Engineering, of the final EIS discusses the Construction Quality Assurance that will be applied. It states: "To ensure the integrity of the HDPE materials and quality of installation, the project will apply a Construction Quality Assurance (CQA) program. The CQA Program will include confirmatory tests and inspection by qualified personnel prior to and during liner installation. The design also includes systems to monitor and detect any leakage."
CNL-ND93	Ole Hendrickson (August 16, 2017)	The EIS should: Fully describe procedures for "packaging" and "stabilizing" waste, noting that a key document in this regard (CNL. 2017. "NSDF-Acceptable Waste Packaging." Revision 1, 232-508600-430-000) has not been provided to the public;	The Environmental Impact Statement (EIS) is a planning level document and is not intended to provide fully developed operational procedures for packaging and stabilizing of waste. However, Section 3.3.3 of the final EIS provides a high level overview of the waste acceptance criteria and physical characteristics of the waste, including some examples of packaging. The NSDF Waste Acceptance Criteria (WAC) [1] has been revised and is publicly available on the CNL website (www.cnl.ca/nsdf) which also discusses packaged waste. Documents related to the NSDF Project are also available by contacting ermstakeholder@cnl.ca The NSDF safety assessments took no credit for hold-up of radionuclides in waste packages nor due to stabilization and conservatively estimates leachate concentrations and airborne emissions based on this modeling assumption. While packaging and stabilization would have a positive effect, because they are not credited for performing a safety function, they were not addressed in the EIS. If waste is stabilized or re-packaged, it is to meet physical NSDF Waste Acceptance Criteria (WAC) [1] requirements for structural stability/void space. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.

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CNL-ND94	Northwatch (August 16, 2017) William Turner (May 31, 2017)	The draft EIS promotes an argument that the acceptability of the waste mound as currently proposed is demonstrated by performance of a number of other facilities, all of which CNL refers to as a "near surface disposal" facilities. CNL introduces this notion in Section 2.4.2 "Design Principles from External Sources", with the very general suggestion that "In addition to CNL design principles, the design and operation of the NSDF will also use Canadian and international best practices and safety fundamentals, including those from the International Atomic Energy Agency (IAEA) and the CNSC." This argument is continued in Section 2.5.2.1.1 of the draft EIS, titled "Technical Feasibility", where CNL describes the suitability and effectiveness of an NSDF, with reference to other facilities operating globally (referenced on p. 11-12 of the Northwatch submission (Comment on Draft EIS)). **2.5.2.1.1** - The draft EIS states that "A near surface disposal facility is a suitable and technically feasible means of disposing of LLW and ILW and the effectiveness of such facilities for disposal of LLW and ILW has been demonstrated as illustrated through the following near surface facilities currently in operation globally" and then goes on to list nine facilities, of which one is in the U.K. and the remainder in the U.S. No description of discussion of these facilities of the means by which they demonstrate "effectiveness" is provided. Of the listed facilities, only one receives later mention, and that is a mention only: Section 6.2, titled "General Approach" states that hazard identification involved a literature review of documents and guidance and lists "Some of the documents included as part of the literature review", and a Performance Assessment for the Idaho CERCLA NSDF (US DOE 2011) is listed. We emphasise that this is a listing only; there is no description of the document, and no discussion of how the Performance Assessment for the Idaho CERCLA NSDF informed the development of CNL's proposed waste mound. While the draft EIS asserts that the nine sites listed demonstrate the effectiveness of "near surface disposal" the draft EIS provides no information about the nine facilities, their operation, their design, the waste inventory being managed, or their performance. Northwatch Information Request #27: Provide reports on each of the nine sites listed describing their design, period of operation, waste streams and inventories including characterization of hazards, and their performance assessment, and provide a detailed comparison of each of these facilities to the proposed ECM.	Section 2.4 of the final EIS "Project Design Principles" states that any nuclear facility designed, constructed and operated at the Chalk River Laboratories (CRL) site is required to satisfy the CRL licence requirements [1] and CNL Management Systems. Canadian Nuclear Laboratories (CNL) has utilized CNSC and International Atomic Energy Agency (IAEA) design principles which ensure the safety of long-term radioactive waste management or disposal facilities. These principles are essential elements in the design and development of a disposal facility and were used to inform the definition of evaluation criteria in Section 2.5.1 (alternative means assessment). The alternatives selected as the preferred or most favourable means of developing a disposal facility must meet the design principles and requirements discussed in Sections 2.4.1 (CNSC) and 2.4.2 (IAEA). Section 3.1.1.1 of the final EIS provides a discussion regarding how the NSDF aligns with Canadian regulatory and International Atomic Energy Agency (IAEA) guidelines. The key safety features of the NSDF Project have addressed the IAEA design principles for radioactive waste disposal by incorporating: multiple safety functions, containment of radioactive waste, isolation of radioactive waste and surveillance and control of passive safety features into the facility design. The purpose of listing other facilities which have employed a near surface disposal facility is for the purposes of demonstrating that an engineered containment mound has been successfully constructed and licenced for the disposal of LLW generated during the cleanup of similarly impacted nuclear sites. The characteristics of a radioactive waste disposal facility are dependent on the requirements of the host nation's federal government/regulator, the type of wastes requiring disposal, and the local environmental characteristics. Furthermore, a facility's performance assessment can vary drastically between nations and regulators. The NSDF safety assessments represent the various phases of the facility's lifecycle and have been prepared according to Canadian regulatory requirements and guidance, which includes both the respective regulatory documents and IAEA guidance. In 2017, the NSDF Project had a single "Performance Assessment" that covered all phases of the NSDF Project. This has now been divided into two documents – the NSDF Safety Analysis Report (SAR) [2] and the Post-Closure Safety Assessment (Post SA) [3]. The SAR [2] assesses the construction, operations and closure phase and the accident and malfunctions are summarized within Section 7, Accidents and Malfunctions, of the final EIS. The states of the Facility considered in the NSDF SAR [2] are normal operation, anticipated operational occurrences (AOOs), design basis accidents (DBAs) and beyond design basis accidents (BDBAs). The safety analysis objectives of [2] align with Canadian regulatory guidance in REGDOC-2.4.1 *Deterministic Safety Analysis* [4]. The Post SA [3] has also been prepared in accordance with Canadian regulatory guidance in REGDOC-2.11.1 *Vol III Assessing the Long-Term Safety of Radioactive Waste Management* [5], to analyze the long-term implications of the NSDF Project. The long-term safety aspects are summarized in Section 5.7 (Ambient Radioactivity and Ecological Heather) and Section 5.8 (Human Health) of the final EIS. Section 2.5.2.2.1 has been revised in the final Environmental Impact Statement (EIS) including Table 2.5.2-1 "Attributes of Selected Near Surface Facilities in Canada and USA for Long Term Management of Low Level Radioactive Waste". The table includes a summary of key attributes for a number of near surface facilities in Canada and USA. The key purpose of this table is to demonstrate that for other nuclear sites undergoing a large environmental remediation and decommissioning missions, a near surface engineered containment mound is a best available technology due to the magnitude of waste volume (i.e., approaching one million cubic meters) and type of waste streams (i.e., contaminated soils and demolition debris).

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			Table 2.5.2-1 provides a comparison of the design (i.e., all are near surface facilities), period of operation (i.e., when they were built and operational status), waste streams (i.e., waste type), inventory (i.e., capacity and waste type). While although CNL cannot distribute the requested documents, since they are not CNL owned, a few of the performance assessments for the listed international facilities are available in the public domain through the internet. References: [1] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [4] CNSC, Safety Analysis: Deterministic Safety Analysis, REGDOC 2.4.1, 2014 May. [5] CNSC, Assessing the Long-Term Safety of Radioactive Waste Management, REGDOC 2.11.1 Volume III, 2018 May.
CNL-ND95	Anna Tilman (August 11, 2017)	Concern over existing groundwater contamination on the CRL site (specifically in areas downgradient of specific existing waste areas) – what is the cause of these elevated concentrations and how long have they been tracked as being present? What does CNL plan to do with respect to this existing groundwater contamination? How will such contamination of groundwater be prevented by a NSDF?	As noted in Section 1.0 of the final Environmental Impact Statement (EIS) (Introduction): "For more than 70 years Atomic Energy of Canada Limited (AECL) (and now Canadian Nuclear Laboratories (CNL)) has been making advances in nuclear science and technology in the interest of Canadians. This includes the production of medical isotopes that have treated over one billion patients worldwide, as well as developments in clean energy which help reduce greenhouse gas emissions. Through investments in the revitalization of the Chalk River Laboratories (CRL) site, that mission and innovative science will continue into the future. However, this proud history has created nuclear liabilities in the form of waste. Furthermore, past waste management practices, which met the standards of the day, are no longer acceptable now. Specifically, the historic waste management areas lack robust containment, which has led to impacts in the surrounding environment." The contaminated groundwater originates from historic waste management areas (WMAs) which do not have the benefit of engineered containment. Canadian Nuclear Laboratories and the Canadian Nuclear Safety Commission (CNSC) are aware of the contamination and have been monitoring it for decades. There are several groundwater treatment facilities on the CRL site which intercept and treat the plumes thus the groundwater contamination does not currently pose a risk to either the environment or the public. However, in most cases the best remedial strategy is containment and isolation of the source of the plume. Thus once the Near Surface Disposal Facility (NSDF) is built it will provide a modern, engineered solution to permanently dispose of low-level waste including the sources of several of the groundwater plumes on-site. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. The NSDF is a modern engineered facility that has the appropriate design life to contain and isolate the inventory until it is sufficiently decayed to levels that do not present a risk to the public and environment. Contamination of the groundwater is prevented through the use of a number of engineered barriers to provide multiple layers of safety. In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm, the high-density polyethylene (HDPE) geomembrane cover system, and the double HDPE geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment for thousands of years. The perimeter berm is described in Section 3.4.1.5 of the final EIS, the final cover is described in Section 3.4.1.9.3 of the final EIS and the base liner is described in Section 3.4.1.4 of the final EIS.

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CNL-ND96	William Turner (May 31, 2017)	In Section 3.6.1.3, it is not clear that the disposal cell cover described is adequate to minimize water ingress into an open cell during inclement weather (i.e. thunderstorms, microbursts etc.) during the operational phase (see pgs.3-49 and 3-50).	There are two types of operational covers, daily cover and interim cover. Daily cover is applied at the end of each work day over the active disposal area or the placed waste working face, to control the release of fugitive dust from the surface of the waste. The daily cover also fulfills other functions including: minimizing erosion of placed waste, minimizing blowing litter, reducing odour, discouraging vector and vermin activity, improving equipment access to the active disposal area, and maintaining a more aesthetically pleasing site appearance. The daily cover consists of 0.150 m layer of clean soil or an alternative daily cover material that is pre-approved for use including tarpaulin, fixative (crusting agent), or similar temporary cover system material. The daily cover consists of 0.150 m layer of clean soil or an alternative daily cover material that is pre-approved for use including tarpaulin, fixative (crusting agent), or similar temporary cover system material. The interim cover consists of 0.3 m layer of clean soil or clean sand that is overlain by a sacrificial liner to promote non-contact surface water run-off, and minimize precipitation infiltration into the waste material. The interim cover is applied to: • Waste disposal areas that will remain inactive for more than 30 days and are not considered part of the active disposal area, but are scheduled to receive waste in the future. • Waste disposal areas that have reached the design waste fill grade, and are not scheduled to receive additional waste and are awaiting installation of the final cover system. The sacrificial liner is a 1.0 mm (40 mil) thick, double-sided, textured, white-surfaced (top side only) linear low-density polyethylene (LLDPE) geomembrane that is adequately anchored to prevent uplift by wind. In addition, the sacrificial liner is to be durable, have a suitable coefficient of expansion and be resistant to ultraviolet radiation damage. The interim cover consisting of 0.3 m layer of clean soil overlain by a sacrificial liner is applied to waste disposal areas that will remain inactive for more than 30 days. The interim cover, including the clean soil layer and sacrificial liner, are removed prior to the resumption of waste placement, to the extent practical, to promote hydraulic connection between waste lifts. The interim cover consisting of 0.3 m layer of clean sand overlain by a sacrificial liner is applied to waste disposal areas that have reached the design waste fill grade, and are awaiting installation of the final cover system. The interim cover is installed on the 1 m layer of select waste. The primary function of the sacrificial liner is to protect the 0.3 m layer of clean sand, first layer of the final cover system, against erosion, promote non-contact surface water run-off, and limit precipitation infiltration into the sand layer and underlying wastes prior to the installation of the remaining layers of the final cover system. The sacrificial liner is removed during the installation of the final cover system. The 0.3 m clean sand layer of the interim cover is not removed for the installation of the final cover system, and is regraded to eliminate low areas. During waste placement operations, all efforts are made to minimize the contact of precipitation with the contaminated waste thus, minimizing contact water and leachate generation. The operation of the NSDF is limited to one open cell at a time to limit the surface area of waste that is exposed to the environment (i.e., precipitation) at any given time. As a cell is constructed, interim covers are placed over the waste to limit infiltration of precipitation and promote non-contact surface water run-off. As each disposal cell is completed, the final cover system is installed over the filled disposal cell. Other operational practices to limit contact with precipitation include grading and compaction of the waste fill to promote surface water run-off.

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			To prevent storm water from entering the Leachate Collection System of the base liner system, a sacrificial liner for Phase 1 is provided to cover the entire floor and an interim cover is applied to the 3:1 side slope of waste disposal areas that will remain inactive for more than 30 days. Conditions to prevent and minimize contact water and leachate (for both placed waste and waste in temporary storage) include, but are not limited to: • Daily cover is applied at the end of each work day over the active disposal area or the placed waste working face, to control the release of fugitive dust from the surface of the waste. The daily cover performs several functions, including minimizing erosion and dust generation. • Interim cover is applied to: 1) waste disposal areas that will remain inactive for more than 30 days; and 2) waste disposal areas that have reached the design waste fill grade. The interim cover is used to promote non-contact surface water run-off. • The surface of each waste lift is graded at a minimum 2% slope to promote run-off and minimize infiltration of surface water into the waste.
CNL-ND97	William Turner (May 31, 2017)	Section 3.10.4.1.2 Please explain how the geo-membrane is also expected to prevent or limit the upward migration of radon and other landfill gases from the waste fill into the atmosphere.	The wording regarding the geomembrane preventing or limiting the upward migration of radon and other landfill gases has been removed from the final Environmental Impact Statement (EIS) (see Sections 3.4.1.9.3 and 3.4.1.9.4). Section 5.7.6 and 5.8.6 of the final EIS provide a detailed discussion on the environmental and human health aspects from radon emissions and conclude there is negligible impact.
		Facility Design – Test Laboratory	
CNL-ND98	Pravin Shah (April 8, 2017)	The EIS report does not mention a need for a project dedicated test laboratory (both for the classification of wastes as well as for the quality of leachate). Will this be necessary and established at the site?	A dedicated test laboratory for the characterization of wastes and verification that the treated effluent meets the effluent discharge targets is not within the scope of the Near Surface Disposal Facility (NSDF) project. Canadian Nuclear Laboratories (CNL) will employ one or more of the following laboratory options to characterize waste and measure the concentration of contaminants in the treated effluent: • Existing analytical capability at CNL • New analytical capability at CNL • External analytical capability Canadian Nuclear Laboratories (CNL) had expanded its waste characterization capabilities including the construction of a new Waste Characterization Facility (WCF). While although not formally part of the NSDF Project the WCF acts as a hub for waste characterization equipment and processes, thus also supporting NSDF operations in the waste characterization requirements. Sample preparation and assay activities take place while also coordinating samples that are sent to other CNL and external laboratories. The Wastewater Treatment Plant (WWTP) includes a process laboratory as part of the design. The purpose of this laboratory is primarily to optimize the WWTP process chemistry for the removal of contaminants in the wastewater. Samples of the WWTP influent (including the leachate component) will be analysed in the WWTP laboratories prior to treatment.
		Facility Design – Wastewater Treatment Plant	
CNL-ND99	CAPE (April 18, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on*	The engineered containment mound (ECM) in the Near Surface Disposal Facility (NSDF) will be filled and covered on a cell by cell basis thus limiting the exposure of placed waste to precipitation. Once a cell has been filled an impermeable

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	Jake Deacon (Petawawa Point Cottagers Association) (May 16, 2017) Anne Watelet (May 17, 2017) Pravin Shah (April 8, 2017)	*this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The surface of the site will be constantly exposed to rain and snow until 2070, when the site is expected to close. It is expected that the water will be partially recovered and returned to the dump, but the tritium will be released into the river. Landfill projects of this type are currently designed in desert areas, with concrete sarcophagus around the waste. This is not the case at Chalk River. The proposed facility seems to be a deep hole (or multiple cells) in the ground and, during heavy rain or after winter snow melts, the hole(s) would be filled with water like a bath-tub. How would this be dewatered and processed through the Treatment Plant before being released to the River (during the construction and operation stages)? Why does table 3.4.1-1 (*Equipment Required for the NSDF Project Site Preparation Activities*) not list any dewatering equipment? [Français] La surface du site sera constamment exposée à la pluie et à la neige jusqu'en 2070, date à laquelle le site devrait fermer. On s'attend à ce que l'eau soit partiellement récupérée et retournée au dépotoir, mais le tritium sera rejeté dans la rivière. Les projets de décharge de ce type sont actuellement conçus dans des zones désertiques, avec des sarcophages en béton autour des déchets. Ce n'est pas le cas à Chalk River. L'installation proposée semble être un trou profond (ou plusieurs cellules) dans le sol et, pendant les fortes pluies ou après la fonte des neiges en hiver, le ou les trous seraient remplis d'eau comme une baignoire. Comment cette eau serait-elle drainée et traitée par l'usine de traitement avant d'être rejetée dans la rivière (durant les étapes de construction et d'exploitation)? Pourquoi le tableau 3.4.1-1 (*Équipement requis pour les activités de préparation du site du projet d'IGDPS*) n'énumère-t-il aucun équipement de drainage?	cover will be placed over the filled cell to prevent rain and snow from contacting the waste. This approach minimizes the amount of leachate which could potentially be generated. As noted in the comment, precipitation entering the ECM must be managed. For the purposes of water management, there are three different sources of water that must be managed: leachate, contact water and non-contact water. Leachate is water that has come in contact with the waste and percolated through it to the leachate collection system in the base liner of the ECM. Leachate collection is described in Section 3.4.1.12 and 3.4.2.3 of the final Environmental Impact Statement (EIS). Contact water is water that has potentially come in contact with the waste, thus is treated as suspect and collected on the surface of the ECM in a contact water pond. Management of contact water is described in Section 3.4.2.3 of the final EIS. Non-contact water is water that falls in the ECM but does not contact the waste (e.g., precipitation that falls on cells that are not yet open). The management of this water is described in Section 3.4.4.5 of the final EIS and includes directing non-contact water to temporary holding ponds within the ECM and then pumping the non-contact water to one of the three surface water management ponds outside the ECM. Leachate and contact water are combined and directed to the wastewater treatment plant (WWTP) for treatment and removal of any contaminants. Prior to release from the WWTP to either the exfiltration gallery or Perch Lake, the treated effluent will be sampled to confirm that it meets the effluent discharge targets documented in Section 3.4.2.2 and 3.4.2-3 of the final EIS. Canadian Nuclear Laboratories' (CNL's) approach is to minimize the generation of leachate and contact water. This approach includes: limiting the active cell area to 21,000 m^2, the separate management of contact and non-contact water, a sacrificial liner over the Phase 1 non-active area to direct precipitation to non-contact water ponds and then surface water management ponds and a sacrificial liner over the entire Phase 2 area to direct precipitation to the internal control pond and then surface water management ponds. As outlined in Section 2.5.7.6.1, CNL is also evaluating the feasibility of weather cover designs or compatibility with the NSDF configuration and if feasible, could be implemented as an additional measure to limit precipitation contact with the waste. Note that Table 2.5.2-1 of the final EIS includes information on near surface facilities in North America, including those with a similar climate to the NSDF. Table 3.4.1-1 of the 2017 draft EIS is now Table 3.2.1-1 in the final EIS. The equipment listed in this table is a non-exhaustive list of some of the equipment required during site preparation activities, which has been noted as a footnote to the table. During this phase there is no waste present and all of the water that falls on the NSDF footprint would be non-contact (i.e., clean) water. The constructor would use conventional equipment to dewater the site if required. The dewatering equipment required during the operations phase is described in the sections of the final EIS as noted above. [Français] Le monticule de confinement artificiel (MCA) de l'installation de gestion des déchets près de la surface (IGDPS) sera rempli et recouvert cellule par cellule afin de limiter l'exposition des déchets aux précipitations. Lorsqu'une cellule aura été remplie, une couverture imperméable sera placée par-dessus pour éviter que les déchets soient exposés à la pluie ou à la neige. Cette méthode permettra de réduire au minimum la production éventuelle de lixiviat. Comme l'indique le commentateur, il faut s'occuper de l'eau qui pénètre dans le MCA, et il faut prendre des mesures à

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			l'égard de trois sources : le lixiviat, l'eau de contact et l'eau sans contact. Le lixiviat est de l'eau qui a percolé à travers les déchets et a été acheminé au système de collecte du lixiviat intégré au revêtement de base du MCA. Le système de collecte du lixiviat est décrit aux sections 3.4.1.12 et 3.4.2.3 de l'Étude d'impact environnemental (EIE) définitive. L'eau de contact est l'eau éventuellement entrée en contact avec les déchets et qui sera donc considérée comme suspecte et recueillie à la surface du MCA dans un bassin de collecte de l'eau de contact. La gestion de l'eau de contact est décrite à la section 3.4.2.3 de l'EIE définitive. L'eau sans contact est l'eau qui tombe sur le MCA, mais n'entre pas en contact avec les déchets (p. ex., la pluie qui tombe sur les cellules qui ne sont pas encore ouvertes). La gestion de cette eau est décrite à la section 3.4.4.5 de l'EIE définitive et prévoit l'acheminement de l'eau sans contact vers des bassins de retenue à l'intérieur du MCA, puis son pompage vers l'un des bassins de gestion des eaux de surface à l'extérieur du MCA. Le lixiviat et l'eau de contact sont combinés et acheminés vers l'usine de traitement des eaux usées (UTEU) pour traitement et suppression des contaminants. Avant d'être acheminés de l'UTEU à la galerie d'exfiltration ou au lac Perch, les effluents traités seront échantillonnés pour confirmer qu'ils sont conformes aux objectifs de rejet d'effluents décrits à la section 3.4.2.2 et au tableau 3.4.2-3 de l'EIE définitive. La méthode adoptée par les Laboratoires nucléaires canadiens (LNC) vise à réduire au minimum la production de lixiviat et d'eau de contact. Elle englobe les mesures suivantes : limiter la superficie d'une cellule active à 21 000 m^2, séparer la gestion de l'eau de contact de celle de l'eau sans contact, prévoir un revêtement sacrificiel sur toute la superficie non active de la phase 1 pour acheminer l'eau de pluie vers les bassins d'eau sans contact, puis vers les bassins de gestion des eaux de surface, et prévoir un revêtement sacrificiel sur toute la superficie de la phase 2 pour acheminer l'eau de pluie vers le bassin de contrôle interne, puis vers les bassins de gestion des eaux de surface. Comme l'indique la section 2.5.7.6.1, les LNC évaluent également la faisabilité d'une protection contre les intempéries ou de sa compatibilité avec la configuration de l'IGDPS et, dans le meilleur des cas, la possibilité d'ajouter cette mesure pour limiter le contact entre l'eau de pluie et les déchets. Rappelons que le tableau 2.5.2-1 de l'EIE définitive comprend de l'information sur les installations de gestion des déchets près de la surface d'Amérique du Nord, dont celles qui se trouvent dans des conditions climatiques semblables à celles de l'IGDPS envisagée. Le tableau 3.4.1-1 de la version provisoire de l'EIE de 2017 est maintenant le tableau 3.2.1-1 de l'EIE définitive. Le matériel énuméré dans ce tableau est une liste non exhaustive de ce dont on aura besoin pour préparer le site (voir la note au bas du tableau). À ce stade, il n'y a pas de déchets sur place, et toute l'eau qui tombe sur l'empreinte de l'IGDPS est de l'eau sans contact (non contaminée). L'entrepreneur en construction utilisera du matériel conventionnel pour assécher le site le cas échéant. Le matériel d'assèchement nécessaire au cours de la phase d'exploitation est décrit dans les sections de l'EIE définitive susmentionnées.
CNL-ND100	Martin Flood (May 31, 2017)	There needs to be detailed engineering specifications as to how the water is captured, held and treated before being released into the environment.	Detailed engineering design drawings and specifications as to how the water is captured, held and treated before being released into the environment have been developed [1]. Section 3.4.1.12 and 3.4.2.3 of the final Environmental Impact Statement (EIS) provides a summary of the specifications but do not include the detailed design information. For the purposes of capturing water, the Near Surface Disposal Facility (NSDF) project defines three different sources of water: leachate, contact water and non-contact water. Leachate is water that has come in contact with the waste and percolated through it to the leachate collection system in the base liner of the engineered containment mound (ECM). Leachate collection is described in Sections 3.4.1.12 and 3.4.2.3 of the final EIS. Contact water is water that may have come

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			in contact with the waste thus is treated as suspect and collected on the surface of the ECM in a contact water pond. Management of contact water is described in Section 3.4.2.3 of the final EIS. Non-contact water is water that falls in the ECM but does not contact the waste (e.g., precipitation that falls on cells that are not yet open). The management of this water is described in Section 3.4.4.5 of the final EIS and includes directing non-contact water to temporary holding ponds within the ECM and then pumping the non-contact water to one of the three surface water management ponds outside the ECM. Leachate and contact water are combined and directed to the wastewater treatment plant (WWTP) for treatment and removal of any contaminants. Prior to release from the WWTP to either the exfiltration gallery or Perch Lake, the treated effluent will be sampled to confirm that it meets the effluent discharge targets documented in Table 3.4.2-2 and Table 3.4.2-3 of the final EIS. The NSDF Design Description [1] is available on request (ermstakeholder@cnl.ca). Reference: [1] Design Description 232-503212-DD-001.
CNL-ND101	City of Ottawa (August 4, 2017)	How will the wastewater be transported to the on-site wastewater treatment facility located near the river shoreline? What measures will be put in place to minimize the risk of a spill during transport and treatment?	The Near Surface Disposal Facility (NSDF) project includes a new purpose built Wastewater Treatment Plant (WWTP) in its design that is adjacent to the Engineered Containment Mound (ECM) and is located approximately one kilometer away from the Ottawa River shoreline. The proposed NSDF will not be utilizing the Chalk River site's existing on-site wastewater treatment facility. The following text is contained in Section 3.4.2.3 of the final Environmental Impact Statement (EIS):"The leachate and contact water transfer system is comprised of gravity drains and two pumping stations. Sources of wastewater at the NSDF Project site include the ECM (generates leachate and contact water), the vehicle decontamination facility (generates decontamination wastewater), the operations support center (generates decontamination wastewater) and the WWTP (process related drains). Wastewater is transferred by gravity drain to one of two pump stations, which then pumps to the WWTP's collection tanks for eventual treatment. The pump stations are cylindrical high-density polyethylene (HDPE) structures that provide dual containment by means of a 2,400 mm diameter cylindrical tank (carrier wall) installed inside of a 3,000 mm diameter cylindrical tank (containment wall). There is a leak detection system between the carrier wall and containment wall. If the leak detection system detects moisture, an alarm is generated and the tanks will be inspected. A pipe in a pipe approach is used to provide dual containment between the pump station and the WWTP collection tanks."
CNL-ND102	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* The onsite wastewater treatment plant (WWTP) will be a critical process to reduce risks associated with this project. Technologies for treating liquid radioactive wastes are in early stages of development and are very complicated. We know that tritium cannot be removed from the effluent stream and will subsequently be released into Perch Lake and the Ottawa River. Although CNL is confident they can meet their derived release limits for tritium, over time there will be a significant and steady amount of tritium released into the environment, making its way into the drinking water source for over 5 million people. Dilution is not going to adequately reduce the risks associated with many of the waste products in	The processes for the treatment of contaminated wastewater are mature and well understood. Radioactive and non-radioactive chemicals behave the same from a chemistry point of view; thus, if a wastewater treatment process is designed to remove non-radioactive strontium, then the process will be able to remove radioactive strontium with the same efficiency. Additionally, the final Environmental Impact Statement (EIS) states in Table 4.3.2-1 (which discusses how key public issues were addressed in the final EIS), "Canadian Nuclear Laboratories (CNL) has performed pilot testing of the proposed wastewater treatment process utilizing simulated wastewater representative of what we expect to collect and treat when the Near Surface Disposal Facility (NSDF) is in operation.

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		the effluent. Wastes ultimately removed from the liquid waste stream at the WWTP will have to be placed back into the NSDF, only to get rained on and continually produce liquid radioactive waste that needs to be collected and treated at the WWTP. This treatment technology will never relieve us of our nuclear liability from the Chalk River site.	Through pilot testing we have demonstrated that we can achieve the effluent discharge targets. Furthermore, the plant is designed for batch releases, which means all liquid effluent must be sampled and proven to meet our targets before discharge. The comment correctly indicates that tritium cannot be easily removed with a water treatment plant. The NSDF will minimize the concentration of tritium (and other radionuclides) in the wastewater by limiting the amount of radioactive material that is exposed to precipitation. This is achieved by employing a number of strategies: • Ensuring wastes with higher concentrations of tritium (as well as other radionuclides) are placed in the Engineered Containment Mound (ECM) in leachate controlled waste packages that provide containment of the waste during the time that the disposal cell is not covered by the final cover (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase, • Employing the use of interim covers (see Section 3.4.1.9.2 of the final EIS) to prevent precipitation from contacting the waste and • Limiting operations in the ECM so that only one of the ten cells is open at any time; thus reducing the amount of waste exposed to precipitation. Once a cell is full the initial layers of the final cover is placed over that cell thus the amount of leachate generated from that cell will decrease. • The Licensed Inventory for NSDF has been significantly reduced since the 2017 draft EIS through the removal of any intermediate level waste streams. • Grading and compaction of the waste fill to promote surface water run-off. Once all ten cells have been closed and the final cover placed over the entire ECM, it is expected that the generation of leachate from the entire ECM will trend toward zero over time. The NSDF has been designed to contain and isolate the waste long enough to allow for radiologic decay to near background levels through the use of a multi-layer barrier system in the ECM. The NSDF radiological discharge targets in the effluent are based on drinking water guidelines with one exception (i.e., tritium). As noted above, tritium releases will be managed by packaging high inventory tritium wastes in leachate controlled packages so that the tritium concentration in Perch Creek will not exceed the drinking water guideline of 7,000 Bq/L (Section 3.4.2.5.1 of final EIS) rather than in the effluent. In all cases, the concentrations of radionuclides in the Ottawa River will be less than the drinking water guidelines. Further information can be found in the NSDF Effluent Discharge Targets [1] which is available on request (ermstakeholder@cnl.ca). Reference: [1] Near Surface Disposal Facility Effluent Discharge Targets, 232-106499-REPT-002.
CNL-ND103	Ottawa Riverkeeper (August 15, 2017) William Turner (May 31, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions.* Although there are several pages in the EIS about the proposed wastewater treatment plant (WWTP) they are lacking details and references to provide confidence that the very complex treatment process will work. Treating liquid nuclear waste is extremely complex and a quick search of the literature is not reassuring. We would like to see examples of where these wastewater treatment technologies are being used, how effective they are and how difficult it is to operate a WWTP designed to remove radionuclides	The Near Surface Disposal Facility (NSDF) will not accept liquids for disposal, therefore, the term "liquid nuclear waste" does not apply in this context. The wastewater requiring treatment at the Wastewater Treatment Plant (WWTP) is in the form of leachate and contact water – precipitation that has made contact with the solid waste placed in the NSDF. This water will be lightly contaminated with radionuclides and chemical contaminants that are water soluble. A number of low-level waste (LLW) water treatment facilities utilize the type of process technologies selected for the NSDF WWTP. Some examples are:

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		and hazardous waste. There are no details on risks/impacts associated with power outages. There are no details on a monitoring plan for the WWTP effluent.	(1) Port Hope and Port Granby Long-Term Waste Management Facilities. CNL has been operating WWTPs of two LLW facilities since 2016. These two facilities were designed to treat contaminants primarily associated with residue ore from radium and uranium refining activities. (2) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee. Its treatment processes include chemical precipitation and clarification for removal of metals and radioisotopes, and reducing hardness; ion exchange for removal of strontium, cesium, and other radioisotopes; zeolite ion exchange for removal of cesium. (3) Waste Control Specialists, Andrews, Texas. Its processes include chemical precipitation and powdered activated carbon. (4) West Valley Demonstration Project, West Valley, New York. Its processes include chemical precipitation, flocculator-clarifier, anthracite filter, ion exchange, and centrifuge for dewatering of precipitated solids. (5) Fukushima Daiichi Emergency Water Treatment Okuma, Fukushima, Japan. Its processes include ion exchange technology, for effective removal of cesium. Additionally, Canadian Nuclear Laboratories (CNL) has successfully operated a number of wastewater and groundwater treatment facilities to remove radioactive contaminants for many years. These include the Waste Treatment Centre, Spring B, South Swamp, and the Wall and Curtain Pump and Treat. The facilities noted above demonstrate the feasibility of treating wastewater contaminated with radionuclides and soluble chemicals. Additionally, pilot scale testing was performed specifically for the NSDF Project, focusing on chemical precipitation, membrane filtration, and ion exchange technologies to demonstrate that these technologies would be suitable for treating wastewater with the expected NSDF composition. The pilot scale test report [1] is available and can be provided upon request at ermstakeholder@cnl.ca. Canadian Nuclear Laboratories (CNL) also had a third party review of the Wastewater Treatment Plant completed. The expected performance of these types of technologies is well understood; they are used in many wastewater treatment facilities worldwide. The NSDF pilot-scale testing used simulated wastewater, where a conservative composition of the expected wastewater (e.g., leachate from the engineered containment mound (ECM)) was determined and thereby, provided the "recipe" for the simulated wastewater. Chemical precipitation was demonstrated during the pilot-scale testing to be very effective for reducing concentrations of most cations, including heavy metals and the radionuclide surrogate for strontium, to very low or non-detectable levels. The microfiltration process was demonstrated to consistently remove the precipitated solids. The ion exchange process was demonstrated to remove the radionuclide surrogates of strontium and cesium. Strong acid cation resin was used for removal of strontium, and zeolite resin was used for removal of cesium. Both resins provided removal of other cations as well. Zeolite resin was demonstrated to be very effective for removal of cesium, and served as the primary removal mechanism for this radionuclide surrogate. Effective removal of the minor concentrations of radium was demonstrated by the strong acid cation resin. Section 3.4.2.1 of the final Environmental Impact Statement (EIS) discusses the quantity of wastewater. It notes the average amount of wastewater produced is 11,000 m^3/year or approximately 30 m^3/day. The WWTP has been designed with three 1,900 m^3 storage tanks to store wastewater. The plan is to limit the operational volume in these storage tanks to 990 m^3 leaving 4,710 m^3 of unused storage capacity. This provides approximately 150 days of wastewater storage capacity at the average wastewater production rate.

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			The WWTP is designed for redundancy and high reliability. The WWTP has two redundant wastewater treatment process trains and can operate on a single train if the other train is out of service for maintenance or repairs. A single train can treat 11.36 m^3/hour, and is therefore much more than capable to treat the average daily flow rate. Interconnections between the treatment trains also allow flow to be diverted between trains at each major process step. The WWTP also is supplied with back-up power from a 750 kW natural gas powered generator to provide additional reliability. Given the large storage capacity and high reliability, CNL do not foresee that an extended outage could lead to an inability to treat the wastewater. Section 3.5.1.3 of the final EIS discusses the management and monitoring of emissions. Specifically it states: Emissions and effluents from the NSDF Project during the construction, operations, and closure phases will be managed according to CNL's procedure for *Management and Monitoring of Emissions* [2] (available on request). This procedure defines the key requirements, responsibilities, and processes for the management of radioactive and non-radioactive emissions at CNL operated sites. This document expands on regulatory requirements for the effective management of these emissions, and involves the following activities: • identification and assessment of emission pathways; • control and treatment of emissions; • operational control monitoring; and • effluent verification monitoring. In addition, Table 5.3.2-7 of the final EIS notes each batch of treated effluent will be sampled and confirmed that it meets the effluent discharge targets before being released to the environment. Additionally, the EA Follow-up Monitoring Program (EAFMP), which will be implemented for the NSDF Project during its construction, operations, and closure phases, will include environmental, effluent, and groundwater monitoring to ensure that releases and subsequent environmental concentrations are below the relevant guidelines. Section 11.0 of the EIS presents a framework for the EAFMP aligned with the requirements of the *Generic Guidelines for the Preparation of an EIS* [3]. The EAFMP will follow the systematic informed planning process outlined in Canadian Standards Association (CSA) Standards for environmental (N288.4-10) [4], effluent (N288.5-11) [5], and groundwater monitoring (N288.7-15) [6]. It is expected that regulatory monitoring will be maintained through the EAFMP for the duration of the institutional control period of the NSDF Project (i.e., for approximately 300 years). The EAFMP will be a dynamic program and may change in accordance with the normal evolution of the NSDF Project (i.e., through its progression from the construction to operations to closure and post-closure phases). Canadian Nuclear Laboratories will continue to offer opportunities for the general public to provide feedback as the EAFMP is developed and reviewed by the Canadian Nuclear Safety Commission (CNSC). Environmental Monitoring data for the CRL site is provided annually to CNSC, and made available to the public on the CNL website (www.cnl.ca). References: [1] Pilot Scale Test Report, B1551-503214-TR-001. [2] Management and Monitoring Emissions, 900-509200-STD-009. [3] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [4] CSA N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [5] CSA N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [6] CSA N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015.

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Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

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CNL-ND104	Deborah Powell (August 16, 2017) City of Laval (September 15, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] Effluent discharge criteria should be established for the treated effluent being discharged from the Wastewater Treatment Plant. The plant should be designed to accommodate ample storage of leachate in the event of a power failure or in the event of poor treatment results. In addition, since the effluent from the WWTP would be discharged into the Ottawa River, communities drawing their drinking water from this river or one of its tributaries should be informed of the quality of the affluent and effluent in order to validate the adequacy of the current processing chain of their drinking water plants and to better prepare in the event of a failure of the WWTP of the proposed NSDF or of the infrastructure for the transport of contaminated water between the proposed NSDF and the WWTP. These performance data from the WWTP should be diligently made available to the public (via the Internet). [Français] Des critères de rejet des effluents devraient être établis pour l'effluent traité qui est rejeté de l'usine de traitement des eaux usées. L'usine devrait être conçue de manière à pouvoir stocker suffisamment de lixiviat en cas de panne de courant ou de mauvais résultats de traitement. En plus, comme l'effluent de cette station d'épuration serait rejeté dans la rivière des Outaouais, les communautés puisant leur eau potable dans cette rivière ou dans un de ses tributaires doivent être informées de la qualité de l'affluent et de l'effluent afin de valider l'adéquation de la chaîne de traitement actuelle de leurs usines de production d'eau potable et de mieux se préparer en cas de défaillance de la station d'épuration des eaux usées du dépotoir radioactif ou de !'infrastructure de transport des eaux souillées entre le dépotoir et la station d'épuration. Ces données de performance de la station d'épuration devraient être diligemment mises à la disposition du public (via internet).	Canadian Nuclear Laboratories (CNL) confirms that the wastewater treatment plant (WWTP) effluent discharge targets have been established [1]. The treatment targets are shown in the final Environmental Impact Statement (EIS), Table 3.4.2-2 and Table 3.4.2-3 and are protective of biota. Section 3.4.5.2.1 of the final EIS provides detail on how the effluent discharge targets were set. The Near Surface Disposal Facility (NSDF) design provides ample storage for untreated leachate, in three 1,900 m^3 collection tanks (i.e., 5,700 m^3 total storage capacity) which are described in the EIS Section 3.4.2.4. Section 3.4.2.1 of the final EIS indicates that the average amount of water requiring treatment per year is 11,230 m^3 or approximately 30 m^3/day. For treated effluent, the NSDF design specifies two large final effluent tanks, each with specified working volume of 91 m^3 for total working volume of 182 m^3. The final effluent is sampled prior to discharge and in the event that treatment targets have not been met, the contents of these tanks can be routed back to the collection tanks. The collection tanks provide ample storage in the event of an extended power outage or the production of effluent that does not meet the effluent discharge targets. As a point of clarification, the treated effluent from the WWTP does not discharge directly to the Ottawa River although it will eventually make its way there. As described in Section 3.4.2.6 of the final EIS, the effluent is discharged preferentially to an exfiltration gallery on the NSDF site or, in the event that the exfiltration gallery does not have sufficient capacity to manage the treated effluent (e.g., under high groundwater elevations), a portion of the treated effluent will be discharged directly to Perch Lake through a submerged diffuser. Environmental performance of the CNL site is currently made available to the public via the CNL Website: (www.cnl.ca). When the NSDF goes into operation, the environmental performance data of the NSDF, including specific environmental performance of the WWTP, will be made available to the public. Reference: [1] Near Surface Disposal Facility Effluent Discharge Targets, 232-106499-REPT-002. [Français] Les Laboratoires nucléaires canadiens (LNC) confirment que des objectifs de rejets des effluents ont été fixés à l'usine de traitement des eaux usées (UTEU) [1]. Les objectifs de traitement, qui visent à protéger les biotes, sont indiqués dans l'Étude d'impact environnemental (EIE) aux tableaux 3.4.2-2 et 3.4.2-3. La section 3.4.5.2.1 de l'EIE définitive fournit des détails sur le mode d'établissement de ces objectifs. L'IGDPS est conçue pour fournir suffisamment d'espace d'entreposage pour le lixiviat non traité, dans trois réservoirs de collecte de 1 900 m^3 (soit 5 700 m^3 de capacité totale), dont la description se trouve à la section 3.4.2.4 de l'EIE définitive. La section 3.4.2.1 indique que le volume moyen d'eau nécessitant un traitement est de 11 230 m^3 par an, soit environ 30 m^3/jour. Pour les effluents traités, l'IGDPS comprend deux grands réservoirs dont le volume utile est de 91 m^3 pour un total de 182 m^3. Les effluents traités sont échantillonnés avant d'être rejetés, et, s'ils ne sont pas conformes aux objectifs de rejet d'effluents, le contenu des réservoirs peut être réacheminé vers les réservoirs de collecte. Les réservoirs de collecte sont suffisamment grands pour entreposer des effluents en cas de panne d'électricité ou de production d'effluents non conformes aux objectifs de rejet.

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			À titre de précision, les effluents traités rejetés depuis l'UTEU ne sont pas directement acheminés vers la rivière des Outaouais, bien qu'elle soit leur destination finale. Comme l'indique la section 3.4.2.6 de l'EIE définitive, les effluents sont acheminés de préférence vers une galerie d'exfiltrations située sur le site de l'IGDPS ou, si la galerie n'a pas de capacité suffisante pour absorber les effluents traités (p. ex., lorsque le niveau des eaux souterraines est élevé), une partie en est rejetée directement dans le lac Perch au moyen d'un diffuseur submergé. Les données de rendement environnemental du site des LNC peuvent être consultées par la population sur le site Web des LNC (www.cnl.ca). Lorsque l'IGDPS sera mise en exploitation, les données de rendement environnemental de l'installation, dont celles de l'UTEU, seront également rendues publiques. Référence [1] Objectifs de rejet des effluents de l'installation de gestion des déchets près de la surface, 232-106499-REPT-002.
CNL-ND105	Anna Tilman (August 11, 2017)	To what degree, and how will CNL provide assurance that the proposed leachate collection and waste water treatment system will prevent leachate migration (to the subsurface and groundwater) during operational, closure and post closure phases? How can this be determined with the degree of certainty as indicated in the EIS? How realistic are the estimates of flow rates from back-to-back storm events?	Section 3.4.1.12 of the final Environmental Impact Statement (EIS) describes the design of the Leachate Collection System (LCS) including the capacity, layout and features necessary to collect the quantities of leachate that will be generated during the operational, closure, and post-closure phases. The leachate drains within the LCS to a collection point (leachate collection sump) for removal. The LCS design provides access points for inspections and maintenance. The engineered containment mound (ECM) design includes both a primary composite liner system and a secondary composite liner system, therefore, providing defence-in-depth. Any leak of leachate from the primary liner system is captured by the Leak Detection System (LDS) which will be continuously monitored during the operations phase (including sampling, analysis and treatment of the recovered liquid). The majority of leachate production occurs when a cell is active; after a cell is closed and receives its final cover ("capped"), the leachate production is minimal. After the final cover system has been installed over the ECM, leachate volume is expected to fall dramatically over the course of several years trending toward zero as the length of the post-closure time period increases. As per the Section 3.2.4 (Post-Closure Phase) of the final EIS, the Near Surface Disposal Facility (NSDF) shall be monitored and maintained during the Institutional Control period. Note that for planning purposes the Institutional Control period is at least 300 years; however, the intent is the Institutional Control period will be as long as necessary to ensure the safety of the public and the environment. Post-closure maintenance shall ensure that the LCS and LDS continues to be structurally intact and not clogged, and that the ECM final cover system is intact and retains the appropriate slope for positive drainage off the ECM surface. Monitoring of the LCS and LDS sump levels will continue during the ECM closure and the Institutional Control period. If the rate of flow into the sumps and subsequent physical inspections determine that a cover layer is leaking, then a response action will be proposed and implemented, such as initiating cap repair. Performance monitoring throughout the Institutional Control period will be carried out to confirm that the ECM final cover continues to function as intended. Groundwater wells will be monitored for leachate constituents at the frequency required, during the Institutional Control period. The design life of the ECM baseliner system and final cover system is 550 years, although laboratory testing suggests that the liners will last much longer. As illustrated by Figure 3.3.1-2 of the final EIS, the radioactivity concentration in the ECM

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			decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. Consequently, any leachate generated following the design life of 550 years will have no significant effect of public health or the environment. The wastewater treatment system receives the leachate via double-walled high-density polyethylene (HDPE) pipelines. These double-walled HDPE pipelines are engineered reliable systems designed for all internal and external loads, and are constructed under rigorous quality control. HDPE pipe provides many advantages over pipes of other materials; excellent lifespan, containment performance, corrosion resistance, hydraulic performance, and flexibility. Any leakage that might occur into the annulus between the inner (carrier) HDPE pipe and the outer (containment) HDPE pipe will be detected, located and alarmed via the leak detection system. The HDPE pipelines that convey wastewater uphill to the WWTP equalization tanks, are installed in redundant pairs, enabling any pipeline section to be shut down for periodic internal inspection or maintenance. All elements of the systems that transport wastewater to the wastewater treatment plant (WWTP) have a double-containment feature with leak detection. The WWTP process equipment (which treats the wastewater) is protected by secondary containment and engineered containment drain systems to prevent any release of wastewater to the environment. Prior to post-closure, decommissioning of the WWTP and all associated structures will be performed after the leachate quantity no longer warrants this dedicated treatment facility for wastewater treatment. Any residual leachate collected during post-closure will be sent to an alternate facility. The long-term leachate treatment needs will be evaluated prior to the future shutdown of the WWTP. In summary, the defence-in-depth of the base liner system, the accessibility of the final cover for inspection and repair, and the design of the LCS provides a high degree of assurance (as indicated in the EIS) that leachate will be prevented from migrating to the subsurface and groundwater during the operational, closure and post-closure phases. The maximum hydraulic flow rate was determined by evaluating the expected contact water volume that would be produced during back-to-back 100-year, 24-hour storm events. It is estimated that back-to-back 100-year, 24-hour storm events would produce a contact water volume of 3,600 m^3 at a maximum rate of 75 m^3/hour. The estimates of flow rates resulting from a postulated back-to-back 100-year storm event are highly conservative; precipitation events exceeding this are not plausible during the operational phase of the ECM.
		Facility Design – Base Liner	
CNL-ND111	Dr. David J. Winfield (May 3, 2017) Cara Rose-Brown (May 15, 2017) Ted and Linda Kucharski (May 16, 2017) Stefanie McArdle (May 1, 2017) Jana Clarke (May 3, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The lifetime of the liners and protective barriers between the waste and the environment is not as long as the lifetime of the product and I do not see this being spoken about, or dealt with. Long-lived radioactive wastes would be hazardous long after plastic liners had deteriorated and leachate collection and treatment had ceased, and would spread into surrounding wetlands, lakes and waterways The proposed liner used to contain the low-level and intermediate level nuclear waste is in no way capable of maintaining its integrity for as long as the materials it is being used to contain remain	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS)). The engineered containment mound (ECM) design life of 550 years has been established to ensure containment of radionuclides until the radiological inventory has sufficiently decayed to levels that do not pose a risk to the public or environment. This is discussed in Section 3.3.1.3 of the final EIS along with a list of the specific radionuclides that are expected to be part of the ECM waste inventory (Table 3.3.1-2).

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	Karen Keon (May 7, 2017) Jake Deacon (Petawawa Point Cottagers Association) (May 16, 2017) Ted and Linda Kucharski (May 16, 2017) Karen Keon (May 7, 2017) Ish Theilheimer (May 16, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) Emma March (August 15, 2017) J. P. Unger (August 15, 2017) Denise Roberge (August 15, 2017 Patrick Miller (August 16, 2017) Durham Nuclear Awareness (August 16, 2017) Anthony Cowan (August 16, 2017) Sharon Thorne (August 16, 2017) Angela Bischoff (August 16, 2017) Elssa Martinez (August 15, 2017)	radioactive. The CNL has not stated that the liner will prevent the release of radioactive materials into the ecosystem, merely slow its progress. The EIS provided no references or analysis or accelerated life testing data that could be found to support the claim [the base liner / geomembrane] would last for 500 years, other than repeating tediously, no less than 16 times in the report, exactly the same sentences saying it would do a good job. There is no information on whether the membrane can be inspected in situ in any way. If inspection is not feasible then how is the claim of a 500-year lifetime to be demonstrated, as actual usage experience with HDPE geo-membranes appears, from the literature, to be only about 25 years? There are many similar multiple repeats of statements in this report, which should be removed or consolidated for clarity. Regarding Section 3.5.2.4, CNL states that "the service life of the geomembrane liner with respect to oxidative. degradation is expected to be greater than 700 years and probably on the order of 1,000 years (or longer)" (see pg. 3-19). This seems to be unrealistic and lacks compelling scientific verification, notwithstanding "reported laboratory studies involving exposure of the geomembrane to accelerated oxidation conditions" (see pg. 3-19). Such claims weaken the credibility of the case overall. A detailed summary of the accelerated aging tests and the key features and limitations of the tests must be provided. In addition to the absence of reliable ways to effectively detect and stop leaks promptly, particularly through the bottom of the landfill, the EIA admits that there are a number of intrinsic risks of accidents and malfunctions throughout the project's life and beyond. "Accidents or malfunctions could take place throughout all phases of the NSDF Project as either internally-initiated events (e.g., equipment failures) or externally-initiated events (including natural hazards)."	Since the waste disposed in the ECM is exclusively low-level waste (LLW), the isolation and containment are only required for periods of time up to a few hundred years. The design life of the ECM at 550 years is sufficient to achieve this goal as the radioactivity in the ECM decreases by a factor of 2,000 in the first 100 years, and begins to approach background levels of concentration shortly thereafter; this is illustrated in Figure 3.3.1-2 in the final EIS. Details on the analysis and accelerated life testing of the geomembranes to support the 550 year design life is provided in the Near Surface Disposal Facility Geomembrane Relative Performance Report [1]. The reliability of the ECM design is based on the recommendations and studies of the Subject Matter Experts (SME) from academic institutions and industry. These studies undergo academic peer review which are rigorously conducted prior to their publication. A well-established laboratory test method was used to estimate the service life of multiple prototypes of geomembrane that are considered appropriate for NSDF. The method was developed from extensive studies in geotechnical/geo-environmental engineering in Canada and worldwide. To simulate an accelerated aging process, samples of the geomembrane prototypes were exposed to conditioning experiments under elevated temperatures. This serves to demonstrate, within a shorter experimental timeframe, how the geomembrane material will evolve over its long-term usage. Several experimental conditions were applied to maintain conservatism and address uncertainty: • Several leachates were utilized in the tests. These included Municipal Solid Waste (MSW) leachate which has more aggressive chemical characteristics than can be expected in leachate generated in the NSDF ECM. • During laboratory tests, geomembrane samples were completely immersed in leachate (i.e., both sides of the geomembrane were exposed to leachate). This level of exposure induces a greater extent of damage than can be expected from field applications. • The estimated 550-year design life is only for the geomembrane material. When incorporated into the multi-layered base liner system which includes layers of geosynthetic and natural earthen barriers, the barriers that will isolate waste within the ECM can be reliably expected to last more than 550 years. The design of the ECM multi-layered primary and secondary base liner are described in Section 3.4.1.4 and 3.4.1.9.3 of the final EIS. As a protective barrier above the surface, the disposal cell cover and especially the final cover system prevents water in the form of precipitation (rain, snow) from coming in contact with the waste emplaced in the ECM thereby reducing leachate generated (Section 3.4.1.9.3 and Figure 3.4.1-8 in final EIS). It is worth remembering that any water which may come in contact with the emplaced waste in the ECM is treated as leachate and is pumped out of the ECM for treatment in the wastewater treatment plant (WWTP) (Section 3.4.2.4 of the final EIS). In order to protect against accidental leakage due to in situ punctures or tears in the HDPE geomembrane, the ECM base liner system includes a Geosynthetic Clay liner (GCL) (Section 3.4.1.4 of the final EIS). The GCL creates a composite liner with the HDPE geomembrane to mitigate defects and/or damage. The GCL expands in the presence of moisture, thus acting to cushion and "plug" punctures or tears in the textured geomembrane. The leachate collection system (LCS) and leak detection system (LDS) are monitored during operation and post-closure of the NSDF to detect any unanticipated leakage from the primary liner system. The LDS alert NSDF staff of any accidental leaks from the ECM while the LCS provides a mechanism of removal of leaked leachate out of the bottom of the ECM. At the very bottom of the secondary base liner (below the primary liner), the Compacted Clay Liner (CCL) is a thick impermeable layer which provides hydraulic isolation from the geosphere – clay, as a natural sediment material, acts to retard water flow in the subsurface. What is important in determining whether the ECM can safely isolate and contain LLW without leachate leakage is the combination of individual layers (the double liner system at the bottom of

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			the ECM and the final cover over the emplaced waste) as well as monitoring systems all work simultaneously to minimize the amount of leachate that is generated within the ECM. This reduces the leachate that may require treatment as wastewater. Reference: [1] Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted), 232-503212-REPT-024.
CNL-ND112	CAPE (April 18, 2017) Kirk Groover (May 15, 2017) Janet Still and Benedykt Syposz (May 22, 2017) Laurie Wagner (August 15, 2016) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The radioactive waste in this facility would be stored over two plastic liners such as those used in municipal dumps. These "geomembranes" are not waterproof. The causes of leakage could be numerous: incorrect installation, physical deterioration of membranes, perforations by sharp or heavy objects, chemical deterioration, seismic activity, flooding or sabotage. The membrane that is being proposed is the same kind of membrane used for municipal landfills and is not impermeable nor is it very resistant. Rather it is susceptible to chemical or physical deterioration, perforations from heavy or sharp objects, intrusion of animals or tree roots, and seismic activity. Any of these actions could lead to potential leakage. Any perforation of the top liner and not the bottom liner could create a "bath" like effect that would see the water pool in the disposal facility before overflowing out to the wetlands and river. Furthermore, there are other contaminants of concern that CNL plans to store along with the nuclear waste that also pose a threat to the environment and human health, all of which could be released into the environment through a breach in the facility's liner or mismanagement of the waste water treatments. [Français] Les déchets radioactifs de cette installation seraient stockés sur deux systèmes de recouvrement en plastique, comme ceux utilisés dans les décharges municipales. Ces « géomembranes » ne sont pas étanches. Les causes de fuites peuvent être nombreuses : mauvaise installation, détérioration physique des membranes, perforations par des objets pointus ou lourds, détérioration chimique, activité sismique, inondation ou sabotage. La membrane proposée est le même type de membrane utilisée dans les décharges municipales et n'est ni imperméable ni très résistante. Elle est plutôt sensible à la détérioration chimique ou physique, aux perforations d'objets lourds ou tranchants, à l'intrusion d'animaux ou de racines d'arbres et à l'activité sismique. L'une ou l'autre de ces mesures pourrait entraîner une fuite potentielle. Toute perforation du	The base liner and final cover systems are multi-layer engineered barriers composed of a combination of natural materials (e.g., compact clay liner) and synthetic materials (e.g., high density polyethylene (HDPE) geomembranes) designed to work together to prevent the release of contaminants into the environment. Construction of the geomembrane will follow a stringent construction/installation plan with confirmatory tests and inspection by qualified personnel. After the geomembrane is installed, electrical dipole testing will be performed after placing a select layer of the waste. Table 4.3.2-1 (which discusses how key public issues were addressed in the final EIS), under Design Engineering, of the final Environmental Impact Statement (EIS) discusses the Construction Quality Assurance that will be applied. It states: "To ensure the integrity of the HDPE materials and quality of installation, the project will apply a Construction Quality Assurance (CQA) program. The CQA Program will include confirmatory tests and inspection by qualified personnel prior to and during liner installation. The design also includes systems to monitor and detect any leakage." To address physical and chemical deterioration of the geomembranes, Section 3.1.1.1 of the final EIS also states: "Canadian Nuclear Laboratories (CNL) partnered with Queen's University to perform a comprehensive HDPE geomembrane testing and evaluation program [1]. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2,000 years." Conservatism in the testing was applied to address uncertainty: • Several leachates were utilized in the tests. These included Municipal Solid Waste (MSW) leachate which is more harmful to the geomembrane long-term performance than the NSDF leachates. • In the laboratory test, the geomembrane samples were exposed to the leachate in both sides, which is more harmful than their application in the field. The base liner system is protected by an initial "select layer" of waste as described in Section 3.4.1.7.1 of the final EIS. This section states: "As each cell is constructed, the initial waste is placed as a 1 m-thick select waste layer that will consist of homogeneous Type 1 soil and soil-like waste. Select waste is waste that is free of large stones/boulders or other foreign materials and is relatively free draining (e.g., free of silts and clays). The purpose of the select material layer is to protect the leachate collection system and underlying composite base/sidewall liner components during subsequent waste placement. Equipment used to place the select waste layer will work from the perimeter of the cell, toward the center and only on top of previously placed waste. To prevent damage to the collection layer or other components of the composite base/sidewall liner, no equipment is permitted to operate directly on the surface of the leachate collection system layer. Only low-ground-pressure equipment is used for construction, operations, and maintenance until the initial 1 m select waste layer is in place. Placement of debris, large bulky items, or packaged waste is not permitted within approximately 10 m of the sidewall slopes or within 1 m of the leachate collection and final cover systems."

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		recouvrement supérieur et non du recouvrement inférieur pourrait créer un effet de « bain » qui verrait l'eau se déverser dans l'installation de gestion avant de déborder vers les terres humides et la rivière. De plus, il y a d'autres contaminants que les LNC prévoient stocker avec les déchets nucléaires qui représentent également une menace pour l'environnement et la santé humaine, et qui pourraient tous être rejetés dans l'environnement par une brèche dans le revêtement de l'installation ou une mauvaise gestion du traitement des eaux usées.	The design of the Near Surface Disposal Facility (NSDF) engineered containment mound (ECM) included seismic analyses to evaluate the performance of geomembrane due to seismic event and concluded that the geomembrane will be able to withstand the design basis seismic event considered for the NSDF. The risk of sabotage damaging the geomembranes is negligible. The Chalk River Laboratories is a controlled site. Only individuals with approved security clearances can work on site. As noted above, the geomembranes undergo an extensive Construction Quality Assurance program that would detect any damage to the geomembranes. Animal intrusion or damage from tree roots is only a concern for the geomembranes in the ECM final cover, not the base liner, as described in Section 3.4.1.9.3 of the final EIS. The final cover incorporates a 500 mm thick Intrusion Barrier Rockfill layer to deter burrowing animals and roots from deeper-rooted plant species reaching and possibly damaging the final cover lining system. It will also inhibit the roots from penetrating into and transporting contaminants from the waste fill. This rockfill layer would also help deter inadvertent future intrusion into the buried wastes by humans. As noted in the comment, in the event that the final cover were to develop a leak but the base liner did not, a bathtubbing situation could occur. The final cover has a design life of 550 years and is expected to last much longer. Section 3.2.4.1 of the final EIS discusses the on-going maintenance and inspection that would be required after the ECM has been closed during the Institutional Control period, which is assumed to last for at least 300 years. This section, as well as Section 11.2 of the final EIS, specifically discusses the repairs that would be made in the event of a cover failure. Once the Institutional Control period ends and there is no monitoring being performed, the failure of the final cover and the onset of bathtubbing is assumed to occur. The impacts on the public and the environment were assessed in the Post-Closure Safety Assessment (PostSA – available upon request)) [2]. The Post-Closure Safety Assessment (PostSA) [2] assesses a conservative timing of the final cover failure as part of the Normal Evolution Scenario and looks at a Sensitivity Case where the final cover fails even sooner. In both cases there were no significant consequences to the public or the environment. This can be attributed to the LLW inventory which is expected to decay significantly within the first 100 years and will be close to natural background concentrations once the facility approaches its design life. One of CNL's corporate values is excellence in all that we do, including the management of our sites and facilities. Section 3.5 of the final EIS summarizes CNL's comprehensive Management System as it applies to the NSDF Project. Additionally, the Canadian Nuclear Safety Commission (CNSC) as the regulator for nuclear facilities in Canada provides strong oversight to ensure that CNL is managing its sites and facilities to the required standard. References: [1] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [Français] Le revêtement de base et la couverture définitive sont des barrières à plusieurs couches composées d'une combinaison de matériaux (p. ex., de l'argile compact) et de matériaux synthétiques (p. ex., une géomembrane de polyéthylène haute densité (PEHD)) conçus pour se compléter afin de prévenir le rejet de contaminants dans l'environnement.

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			La construction de la géomembrane sera assujettie à un plan de construction et d'installation strict et assorti de tests de confirmation et de mesures d'inspection par du personnel qualifié. Lorsque la géomembrane sera installée, des tests de dipôles électriques seront effectués après la mise en place d'une couche de déchets. Le tableau 4.3.2-1 (qui traite de la manière dont les principaux problèmes publics ont été traités dans l'EIE finale) de l'Étude d'impact environnemental (EIE) définitive analyse, dans la colonne Conception/ingénierie, le mode d'assurance de la qualité de la construction qui sera appliqué. On y lit ceci : « Pour assurer l'intégrité des matériaux PEHD et la qualité de l'installation, le projet sera soumis à un programme d'assurance de la qualité de la construction (AQC). Le programme AQC comprendra des essais de confirmation et une inspection par du personnel qualifié avant et pendant l'installation des revêtements. La conception comprend également des systèmes de surveillance et de détection des fuites. » Comme l'indique la section 3.1.1.1, les mesures suivantes seront prises pour atténuer la détérioration des géomembranes physiques et chimiques : « Les Laboratoires nucléaires canadiens (LNC) se sont associés à l'Université Queen's pour réaliser un programme complet d'essai et d'évaluation de géomembranes de PEHD [1]. Les résultats permettent de conclure que ces géomembranes devraient non seulement tenir pendant la durée de vie nominale de 550 ans de l'installation, mais qu'elles auraient probablement une durée de vie théorique allant jusqu'à 2 000 ans. Les tests ont été effectués de façon prudente compte tenu du degré d'incertitude : • Plusieurs lixiviats ont été employés, dont le lixiviat des déchets solides municipaux (DSM), qui a des effets plus nocifs sur le rendement à long terme des géomembranes que les lixiviats de l'IGDPS. • Dans les essais en laboratoire, les échantillons de géomembrane ont été exposés des deux côtés au lixiviat, alors que les effets sont moins nocifs dans la réalité. Le revêtement de base est protégé par une première « couche de déchets sélectionnés », selon la description qu'en donne la section 3.4.1.7.1 de l'EIE définitive. On y lit ce qui suit : « À mesure que chaque cellule sera construite, on y placera une première couche de déchets sélectionnés d'une épaisseur de 1m, qui sera composée de déchets homogènes de type 1 (terre et matières apparentées). Les déchets sélectionnés seront exempts de grosses pierres/roches et d'autres matières étrangères et ils seront relativement perméables (c.-à-d. qu'ils ne contiendront pas de limon ni d'argile). Les matières sélectionnées serviront à protéger le système de collecte du lixiviat et les éléments composites du revêtement de base/latéral sous-jacent au cours de la mise en place des déchets suivants. L'équipement employé pour mettre en place la couche de déchets sélectionnés se déplacera du pourtour de la cellule vers son centre, et seulement par-dessus les déchets déjà mis en place. Pour prévenir la détérioration éventuelle de la couche de collecte ou d'autres éléments composites du revêtement de base/latéral, aucun équipement ne sera autorisé à se déplacer directement sur la surface de la couche du système de collecte du lixiviat. Tant que les déchets de la première couche de 1 m ne seront pas mis en place, il ne sera possible d'employer que de l'équipement à faible pression au sol pour les activités de construction, d'exploitation et de maintenance. La mise en place de débris, de gros objets encombrants ou de déchets emballés ne sera pas autorisée à moins d'une dizaine de mètres des pentes latérales ou à moins d'un mètre du système de collecte du lixiviat et de la couverture définitive. » La conception du monticule de confinement artificiel (MCA) de l'installation de gestion des déchets près de la surface (IGDPS) a comporté des analyses sismiques visant à évaluer le rendement de la géomembrane en cas de phénomène sismique, qui ont permis de conclure qu'elle pourra résister au phénomène sismique de référence théorique envisagé pour l'IGDPS. Le risque de sabotage de la géomembrane est négligeable. Le site des Laboratoires de Chalk River est contrôlé. Seules les

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			personnes dûment dotées des autorisations de sécurité nécessaires peuvent y travailler. Comme nous l'avons expliqué plus haut, les géomembranes sont assujetties à un programme détaillé d'assurance de la qualité de la construction, qui permet de détecter la moindre dégradation. L'intrusion d'animaux ou les dégâts causés par les racines d'arbres ne sont une préoccupation que pour les géomembranes de la couverture définitive du MCA, pas pour le revêtement de base (voir la section 3.4.1.9.3 de l'EIE définitive). La couverture définitive comprend une couche de remblai anti-intrusion de 500 mm pour dissuader les animaux fouisseurs et prévenir le risque que des espèces végétales à racines profondes atteignent et endommagent le revêtement de la couverture définitive. Cela évitera également que les racines pénètrent la zone d'enfouissement et en transportent des contaminants. La couche de remblai permettra également de prévenir d'autres intrusions accidentelles par les êtres humains dans les déchets enfouis. Comme l'indique le commentateur, s'il devait y avoir une fuite dans la couverture définitive sans que le revêtement de base soit compromis, il pourrait se produire un effet baignoire. La couverture définitive a une durée de vie théorique de 550 ans et devrait en fait durer plus longtemps. La section 3.2.4.1 de l'EIE définitive explique les activités de maintenance et d'inspection qui seront nécessaires après la fermeture du MCA, au cours de la phase de contrôle institutionnel, qui est censée durer au moins 300 ans. Cette section et la section 11.2 de l'EIE définitive porte précisément sur les réparations qu'il faudrait faire en cas de défaillance de la couverture. Au terme de la période de contrôle institutionnel, s'il n'y a pas de surveillance, on suppose que la couverture définitive se dégradera et qu'il y aura effet baignoire. Les répercussions sur la population et l'environnement ont été évaluées dans le cadre de l'évaluation de la sûreté après la fermeture (disponible sur demande) [2]. Cette évaluation prévoit un délai prudent de défaillance de la couverture dans le cadre du scénario d'évolution normale et envisage une analyse de sensibilité au cas où la couverture se dégraderait plus tôt. Dans les deux cas, les conséquences pour la population et pour l'environnement sont négligeables. Cela peut être attribué au fait que l'inventaire est composé de DFA qui sont censés se désintégrer considérablement au cours des 100 premières années et que les concentrations se rapprocheront des concentrations naturelles de fond lorsque l'installation sera près de la fin de sa durée de vie utile. L'une des valeurs phares des LNC est l'excellence dans tout ce que nous faisons, notamment dans la gestion de nos sites et de nos installations. La section 3.5 de l'EIE définitive résume le système de gestion complet des LNC tel qu'il s'applique au projet d'IGDPS. De plus, la Commission canadienne de sûreté nucléaire (CCSN), qui réglemente les installations nucléaires au Canada, assure une surveillance étroite permettant de garantir que les LNC gèrent leurs sites et leurs installations conformément aux exigences de la réglementation. Références [1] Rowe, R. K., 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (version expurgée), Laboratoires nucléaires canadiens (LNC), 232-503212-REPT-024, 2019. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND113	[Michael Milgram](#) (May 16, 2017) [Anna Tilman](#) (June 22, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* On page ES-xvi it is written: "Failure of the liner has been assessed as part of the long-term performance of the NSDF." - Q5-1: What was the result of this assessment?	The failure of the base liner and its impact on the public and the environment were assessed in the Post-Closure Safety Assessment (Post SA) [1] and summarized in the final Environmental Impact Statement (EIS) in Section 5.8.6.1. The PostSA assesses the most likely evolution of the base liner failure as part of the Normal Evolution Scenario and looks at a Sensitivity Case where the base liner fails much sooner. In both cases there were no significant consequences to the public or the environment. This can be attributed to the LLW inventory which is expected to decay significantly within the first 100 years and will be close to natural background concentrations once the facility approaches its design life.

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		How effective will the leachate collection system and liners be over time to prevent leakage? How can that even be guaranteed?	Section 3.1.1.1 of the final EIS contains a description of the design of the baseliner of the Near Surface Disposal Facility (NSDF). It includes the following statement: "The engineered containment mound (ECM) is designed with a number of engineered barriers to provide multiple layers of safety to support the long-term containment and isolation requirements. In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm, the high-density polyethylene (HDPE) geomembrane cover system, and the double HDPE geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment for thousands of years." Additional details with respect to the overall design of the Engineered Containment Mound have been added to the EIS, including the base liner system (see Section 3.4.1.4 of the final EIS). To ensure that the base liner meets it design life of 550 years, construction of the geomembrane will follow a stringent construction/installation plan with confirmatory tests and inspection by qualified personnel. After the geomembrane is installed, electrical dipole testing will be performed after placing a select layer of the waste. Table 4.3.2-1 (which discusses how key public issues were addressed in the final EIS), under Design Engineering, of the final EIS discusses the Construction Quality Assurance that will be applied. It states: "To ensure the integrity of the HDPE materials and quality of installation, the project will apply a Construction Quality Assurance (CQA) program. The CQA Program will include confirmatory tests and inspection by qualified personnel prior to and during liner installation. The design also includes systems to monitor and detect any leakage." Section 3.1.1.1 of the final EIS also states: "Canadian Nuclear Laboratories (CNL) partnered with Queens University to perform a comprehensive HDPE geomembrane testing and evaluation program [1]. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2,000 years." Conservatism in the testing was applied to address uncertainty: • Several leachates were utilized in the tests. These included Municipal Solid Waste (MSW) leachate which is more harmful to the geomembrane long-term performance than the NSDF leachates. • In the laboratory test, the geomembrane samples were exposed to the leachate in both sides, which is more harmful than their application in the field. The leachate collection system (LCS) has been robustly designed and will be subject to on-going inspection and maintenance while it is in use. As such it is expected to perform as required for the period in which it is needed. It will be primarily used during the planned 50 years of operation phase of the NSDF (Section 3.2.2 of the final EIS). The LCS will continue to be operated during the closure phase of the NSDF (Section 3.2.3 of the final EIS) until the volume of leachate generated has decreased to the point that routine removal and treatment is not required. Sections 3.4.1.4 of the final EIS describes the components of the LCS that are part of the base liner system. These buried components of the LCS are designed to be passive features that require no maintenance. Section 3.4.2.3 of the final EIS discusses the components of the LCS that are outside the ECM. These components, while robustly designed, can be maintained as necessary. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND114	Pravin Shah (April 8, 2017)	**Figure 3.5.2** of the report shows a section of the proposed Primary and Secondary Liners. Would the clay layer remain intact over the years or possibly migrate through the subgrade as there is no buffer geomembrane liner or other intervening material?	The clay liner will remain intact and not migrate through the subgrade. There are two reasons why migration will not occur. First, the clay liner subgrade materials will have very small pore sizes that will minimize any penetration by the clay liner

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		I understand that 0.75 m. of clay layer is sitting on the subgrade and understand the subgrade refers to the native material.	particles. Second, the cohesive nature of the clay liner material will tend to keep the particles together and resist erosion or migration under the expected seepage forces. The subgrade material the clay liner will be resting on will vary throughout the engineered containment mound (ECM) footprint. In areas of proposed bedrock blasting/excavation, the subgrade liner that it sits upon will consist of a 0.2 m thick (minimum) layer of imported sand and gravel placed/compacted on the exposed bedrock. Elsewhere, the subgrade liner that it sits upon will consist of native silty sand material. The NSDF design has material specifications for the subgrade material.
CNL-ND115	Karen Keon (May 7, 2017)	Has the geomembrane liner system been used in other locations and has the testing included animal invasion and wear and tear on the membrane over a 300 year period?	There are several disposal sites using geomembrane liner system including Port Granby Long Term Waste Management Facility, Port Hope Long Term Waste Management Facility, Oakridge National Laboratories Environmental Management Waste Management Facility, Fernald On-site Disposal Facility and Portsmouth On-site Waste Disposal Facility. More information about these facilities can be found in Table 2.5.2-1 of the final Environmental Impact Statement (EIS). Dr. Kerry Rowe, a globally recognized expert in geomembrane systems based at Queens University has undertaken testing of the NSDF geomembrane and provided the scientific evidence to demonstrate with confidence that 550-year service-life will be met. Methods for testing and data analyses were performed in accordance with applicable standards and have been published in a number of peer-reviewed journals. This is summarized in Section 3.1.1.1 of the EIS: "CNL partnered with Queens University to perform a comprehensive HDPE geomembrane testing and evaluation program [1]. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2,000 years." The proposed final cover of the engineered containment mound (ECM) (see Section 3.4.1.9.3 of the final EIS) is an engineered multi-layered system. Each of the layers of the final cover serves a different function. The geomembrane is one of the layers of the final cover. The primary function of the geomembrane is to limit the infiltration rate through the final cover, and not to prevent animal invasion. The geomembrane will be protected from wear and tear by the layers of the final cover above it. The final cover includes a 0.5 metre thick intrusion barrier rockfill layer to prevent invasion by burrowing animals and roots from any deep-rooted plant species reaching and potentially damaging the lower layers of the final cover (including the geomembrane). In addition, as part of Post-Closure Plan, the final cover will be inspected and maintained for possible disturbance due to animal intrusion. Reference: [1] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024.
CNL-ND116	Martin Flood (May 31, 2017)	Why is a geomembrane being used to contain the nuclear waste rather than concrete? We are told that the technology chosen to encase the nuclear waste features a textured HDPE geomembrane. It has been used in other countries and Ontario. Its viability over the long term however, is certainly unproven. A concrete containment "box" with the membrane liner is a much more secure construction. Has a concrete "box" with cells been considered? If not, why not?	The alternative means that were considered for the project are documented in Section 2.5 of the final Environmental Impact Statement (EIS). One of the alternative means that was considered was an Above Ground Concrete Vault (AGCV). Section 2.5.3 of the final EIS provides a detailed comparison of the Engineered Containment Mound (ECM) design and the AGCV design and provides the rationale for selecting the ECM design. Both alternatives are technically and environmentally feasible. Both alternatives can be constructed such that they meet the purpose of the Near Surface Disposal Facility (NSDF) Project and both alternatives can be constructed to accommodate up to 1,000,000 m^3 of radioactive waste. The AGCV and ECM facility designs are best available technology and there are several international examples of each. Both have relatively moderate technical requirements and can be sited on the Chalk River Laboratories (CRL) site. The AGCV is expected to be more vulnerable to seismic events compared to an ECM which behaves as a single "entity" and is more resilient to seismic events. The monitoring requirements for these surface-located options are similar and employ conventional environmental technologies. The life cycle costs associated with an AGCV

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			design are approximately five times the cost of the ECM alternative. In addition, the additional packaging and containment is not required for most of the low-level waste (LLW) intended to be disposed on the CRL site. Therefore, the most favorable alternative facility design for the NSDF is an ECM. Dr. Kerry Rowe, a globally recognized expert in geomembrane systems based at Queens University has undertaken testing of the NSDF geomembrane and provided the scientific evidence to demonstrate with confidence that 550-year service-life will be met. Methods for testing and data analyses were performed in accordance with applicable standards and have been published in a number of peer-reviewed journals. This is summarized in Section 3.1.1.1 of the final EIS: "CNL partnered with Queens University to perform a comprehensive HDPE geomembrane testing and evaluation program [1]. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2,000 years. Reference: [1] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024.
CNL-ND117	Northwatch (August 16, 2017)	**1.1 -** Northwatch Information Request #6: The terminology throughout the draft EIS is overly generalized and lacks the necessary precision. One concern - the draft EIS states: "The base liner system includes a primary and secondary liner to contain the waste and to limit the potential release of contaminated water (i.e., leachate) to the subsurface and groundwater. The surface water management system will control clean surface water on-site, while preventing contact with contaminated areas. The final cover system (i.e., cap for the mound) will be designed to eliminate exposure due to direct contact with waste, and provide gamma radiation shielding. It will also limit the infiltration of precipitation to the waste, thereby limiting leachate generation." Provide quantitative estimates for the release of contaminated water to the subsurface and groundwater and for the infiltration of precipitation to the waste after the final cover is installed. If these details are provided elsewhere in the document, in those instances where general statements (such as in Section) are made, provide a foot note or bracketed reference to the location in the document where details are provided.	Section 3.4.2.1 of the final Environmental Impact Statement (EIS) contains an improved discussion of the wastewater quantity. During the operations of the Near Surface Disposal Facility (NSDF), approximately 11,000 m^3 of leachate and contact water will be generated annually. All of this water will be collected and treated in the wastewater treatment plant (WWTP); therefore, there will be no release of untreated effluent to groundwater or the subsurface during the 550 year design life of the facility. At the end of the 50-year operational life (and into the early post-closure phase) after all ten cells have been closed, the total leachate expected to be generated from the engineered containment mound (ECM) is 45 m^3/yr. As noted in Section 3.4.1.12.1 of the final EIS, it is expected that of the generation of leachate in the ECM will eventually trend toward zero over time. Residual moisture present within the buried waste material will drain to the leachate collection system (LCS) and leachate detection system (LDS) sumps and be removed. Before the WWTP is shut down, the long-term treatment needs for any leachate derived from the ECM will be evaluated. Low-flow mobile leachate removal equipment is expected to be adequate to remove leachate from the LCS and LDS sumps once the WWTP is shut down. The leachate will be collected and treated through post-closure and Institutional Control period to meet guidelines for protection of the environment. The treated effluent will be routed to the exfiltration gallery with a portion being routed to Perch Lake as described in Section 3.4.2.6 of the final EIS. Effluent discharges must meet the effluent discharge targets described in Section 3.4.2.5.1 of the final EIS. For instances where general statements are made, foot notes or bracketed references to the location in the document where details are provided are not a requirement of the EIS and have not been included.
		Facility Design – Other Construction Materials	
CNL-ND118	Pravin Shah (April 8, 2017)	Where and how will excavated material be stored until it is utilized for daily/interim cover and for the placement of the final cover? Para 3.5.1 - Construction Materials states: *It is estimated that 155,000 cubic meters of soil will be excavated for the initial design fill capacity of 525,000 cubic meters of waste. The volume of excavated*	Due to design changes in the construction of the ECM, the volumes of excavated material have increased slightly. As stated in Section 3.2.1.1 of the final Environmental Impact Statement (EIS). The anticipated quantities of blasted rock are approximately 170,000 m^3. There will also be an allowance made for additional trench blasting that may be required to facilitate utility runs. Materials excavated during construction will be transported to nearby locations in bulk quantities. The locations may be on Chalk River Laboratories (CRL) property or off CRL property, or a combination thereof. The locations will be determined

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		soil will be sufficient to meet the soil volume requirements for the daily/interim cover and for placement of the final cover.	together with Canadian Nuclear Laboratories (CNL) Site Planning and Property Management, as well as the chosen Construction Contractor. An example of on-site storage includes the Twin Lake soil spoils stockpiles.
CNL-ND119	Great Lakes and St. Lawrence Cities Initiative (August 15, 2017)	**Physical Characteristics (Section 3.2.2.1)** • While the packages listed may be useful for transport and handling, none of them can be credited in the safety assessment to retain their contents for any period of time. • If these packages are expected to maintain any degree of containment, why are they not leak tested before emplacement? • Why are High Integrity Containers not being considered? There is much international experience on their use, and these are probably the most appropriate package for the process wastes.	The Near Surface Disposal Facility (NSDF) long-term safety assessments took no credit for hold-up of radionuclides in waste packages nor due to stabilization and conservatively estimate leaching and airborne emissions based on this modeling assumption. While packaging and stabilization would have a positive effect, because they are not credited for performing a safety function, they were not addressed in the final Environmental Impact Statement (EIS). Similarly, as they are not credited with providing a safety function, leak testing of the packages is not required. During the operations phase, the NSDF design has defined two types of packaged waste: non-leachate controlled and leachate controlled (see Section 3.3.1.1 of the final EIS). The two package types allow for different radionuclide concentrations (see Table 3.3.3-1 of the final EIS) based on the design of the package. Specifically leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. High Integrity Containers (HICs) are an example of a type of package that would meet the design requirements for a leachate controlled package that could be used in the NSDF.
CNL-ND120	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* The longevity of synthetic geotextiles and the capped engineered mound remains to be adequately tested after being exposed to the elements and natural forces for centuries.	Longevity of the geomembranes is discussed in Section 3.1.1.1 of the final Environmental Impact Statement (EIS) which states: "Canadian Nuclear Laboratories (CNL) partnered with Queens University to perform a comprehensive high-density polyethylene (HDPE) geomembrane testing and evaluation program [1]". This report is available and can be provided on request by contacting ermstakeholder@cnl.ca. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2,000 years. Section 3.1.1.1 of the final EIS also contains a discussion on anthropogenic analogues. There is a 13 m earthen mound in Newgrange, Ireland, which was constructed over 5,000 years ago. Monks Mound in Collinsville, IL, USA, is a 30 m high earthen mound constructed over 1,000 years ago. These structures were built with primitive engineering and construction methodologies, but have retained their structural stability for thousands of years. The Near Surface Disposal Facility (NSDF) will be constructed with modern construction and design methodologies, and is expected to perform as well or better than these two examples. The use of analogues to support long-term safety assessment has its limitations; however, NSDF uses the above examples as an additional line of evidence complementing the safety assessments carried out. As noted in Table 4.3.2-1 (which discusses how key public issues were addressed in the final EIS) a number of comments were received questioning CNL's confidence in the 550-year design life of the engineered containment mound, a key component of which is are the High Density Polyethylene (HDPE) Geomembranes (GMB). Dr. Kerry Rowe, a globally recognized expert in geomembrane systems based at Queens University has undertaken testing of the NSDF geomembrane and provided the scientific evidence to demonstrate with confidence that 550-year service-life will be met. Methods for testing and data analyses were performed in accordance with applicable standards and have been published in a number of peer-reviewed journals. Table 10.6-1 of the final EIS summarizes the design features and mitigation implemented to reduce or eliminate potential effects of the environment on the NSDF Project components and activities. It states: The NSDF Project has been designed to include a layer of clean fill on the floor of the engineered containment mound (ECM) of sufficient thickness to prevent freezing of the base liner systems prior to waste placement. The HDPE geomembrane liner components of the side slope lining system will not be adversely affected by freeze-thaw cycles, whereas the geosynthetic and compacted clay liner

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			components of the side slope lining system could undergo an increase in hydraulic conductivity prior to placement of the wastes on the side slopes. However, after placement of the waste, the clay liners will consolidate under the weight of the waste, healing the voids caused by freezing. The final cover system will be installed to its full thickness progressively as areas of the ECM reach the final waste contours. The final cover system design has 1.75 m of granular/soil materials above the lining system, which is sufficient to prevent freezing of the final cover system liner components. Reference: [1] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024.
CNL-ND121	MNO (August 16, 2017)	**3.6.1.2.6 Waste Placement Procedures, Dust Control during Waste Placement, Page 3-46** "Water application is controlled to avoid generation of free liquids. Fixatives (e.g., chemical suppressant) may also be used for dust control during winter season or shutdown periods, and for use as daily/interim cover." The MNO request additional information on the use of fixatives. Including specific detail on the type of fixative used; and the process for ensure fixatives do not interact with surface water runoff.	A preliminary Dust Management Plan has been developed to describe the control measures Canadian Nuclear Laboratories (CNL) will use to minimize dust from becoming airborne. Canadian Nuclear Laboratories has provided this Dust Management Plan to the Métis Nation of Ontario to provide comment on and potentially further discussion. As noted in Table 5.2.1-8 of the final Environmental Impact Statement (EIS), the Dust Management Plan provides information on dust mitigation, including: • Use of water spraying or misting techniques (e.g., water trucks) as the primary dust control method. • Use of fixatives (e.g., chemical suppressant) for dust control. • Covering stockpiles and exposed areas prior to high wind or dry conditions where standard dust suppressants may be inadequate in preventing dust generation caused by wind erosion. • Minimizing the size of the exposed working areas containing contaminated materials to the extent practicable using a phased excavation approach. • Revegetating affected areas or adding mulch to completed cells and excavated areas as soon as practicable. • Dampening soil in dry areas prior to commencing truck/machinery activities in the area. • Reducing activities to avoid unnecessary dust generation. • Using wind fencing around work areas. • Postponing work activities likely to cause dust if sustained wind speeds are predicted to exceed 40 km/hr, unless it can be shown that the work site is sufficiently protected that wind will not generate unacceptable amounts of dust. Water will be used as the primary dust control measure for construction and operation activities. Chemical dust suppressants will be an option if required. Only Chalk River Laboratories (CRL) approved dust suppressants will be used. Selection of a suitable dust suppressant is based on Ontario Provincial Standard Specification (OPSS) 506, Construction Specification for Dust Suppressants. Additionally, dust suppressants must be compatible with the engineered containment mound (ECM) engineered barriers and the wastewater treatment processes. Specific to water run-off, the following steps are to be followed: • Applications shall not proceed during periods of rain when the surface is in a saturated condition or on areas of ponded water. • Applications shall not proceed when weather forecasts indicate a high probability of rainfall. If used, calcium chloride and magnesium solutions/concentrations will follow OPSS 2501 [1] & 2503 [2]. All surface water run-off will be monitored for discharge criteria. The construction contractor will develop a dust management plan specific to NSDF construction activities which will be approved by CNL staff from the CRL Environmental Protection group before use.

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			References: [1] Ontario Provincial Standard Specifications 2501. Calcium Chloride. November 2017. [2] Ontario Provincial Standard Specifications 2503. Magnesium Chloride Solid and Solution. November 2017.
		Waste Management	
		Facility Design – Other Construction Materials	
CNL-ND122	Denise Anne Walker (May 8, 2017) David Raman (August 3, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* How can the EA be conducted in the absence of radiologically-meaningful "Waste Acceptance Criteria"? How can the EA be conducted in the absence of the proponent's "Integrated Waste Management Plan"? What is presented in this section are very general statements indicating that the work has not been sufficiently developed to warrant inclusion in this environmental assessment.	The radiological waste inventory studied in the 2017 Environmental Impact Statement was intended to be an upper estimate, or bounding inventory. The revised radiological waste inventory has been reduced by approximately 99% of the original radioactivity values. The development of the Waste Acceptance Criteria (WAC) [1] is a good example of the "iterative approach" to the design and licensing of a disposal facility. The WAC was refined through advancements in both the operational and post-closure safety assessments, and through changes to the reference inventory and finally producing a total Licensed Inventory for NSDF. Both the Reference Inventory Report [2] and the WAC [1] have been made available to the public on the CNL website (www.cnl.ca/nsdf) or can be requested from ermstakeholder@cnl.ca Canadian Nuclear Laboratories' (CNL's) Integrated Waste Strategy (IWS) [3] has been developed to enable the integration of waste management across CNL and ensure activities are carried out in a way that protects people and the environment, complies with Government and Regulatory policies and provides value for the taxpayer. The Near Surface Disposal Facility (NSDF) forms an important part of the plan, but is not defined by it. The purpose of the environmental assessment is to study the feasibility and impacts of a proposed project, whereas the IWS forms a strategic plan for all CNL wastes. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [3] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND123	William Turner (May 31, 2017) 6.	Why does the Integrated Waste Strategy ignore "Very Low Level Waste" as defined in the Site Operating Company (SOC) Agreement?	Very low-level waste (VLLW) is a subcategory of low-level waste (LLW). Canadian Nuclear Laboratories has proposed, and AECL has endorsed, a single waste disposal facility to manage AECL's LLW, including VLLW. As noted in Section 2.5.2.4 of the final Environmental Impact Statement (EIS) a Very Low Level Waste (VLLW) facility was considered as part of the alternative means assessment. Very Low Level Waste is a subcategory of LLW. Canadian Nuclear Laboratories had previously considered development of a VLLW disposal facility at the Chalk River Laboratories (CRL) Site. Canadian Nuclear Laboratories (CNL) implemented a trial to demonstrate the viability of segregation and storage of VLLW. The trial demonstrated that the fraction of the total LLW that could be segregated as VLLW was disproportionate to the time, effort, storage requirements that were expended to realize any net benefit from the work. In addition, the LLW with higher activity that is segregated from the VLLW will still require a separate LLW disposal facility. Therefore, the development of a VLLW disposal facility does not meet the Project purpose which recognizes the need for a LLW disposal facility and a VLLW disposal facility is not considered technically feasible, nor was it considered economically feasible (duplication of effort).

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CNL-ND124	William Turner (May 31, 2017) 7.	Which came first, the decision for the disposal facility or the IWS?	In accordance with *Canada's Radioactive Waste Policy Framework* waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. The NSDF Project is based on the mandate of Atomic Energy of Canada Limited (AECL), a federal crown corporation, to substantially reduce the risks associated with the low-level waste (LLW) and to create conditions for the revitalization of the Chalk River Laboratories (CRL) site. Canadian Nuclear Laboratories (CNL) is a private-sector company that is contractually responsible for the management and operation of nuclear sites, facilities and assets owned by AECL. In the interest of effectively managing AECL's nuclear liabilities, CNL and AECL are working actively at strategic and operational levels to identify strategies and solutions for waste management of the entire life cycle of all waste classifications including LLW, intermediate level waste (ILW), high level waste (HLW), hazardous waste and clean (non-radiological) waste. Aligned to this, CNL has developed an Integrated Waste Strategy [1] that concisely details a cradle to grave approach for all CNL-managed waste classifications, from generation to disposal. The Integrated Waste Strategy is based on CNL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. Canadian Nuclear Laboratories (CNL) first issued an Integrated Waste Strategy in 2017 as the successor to CRL's Integrated Waste Plan which was initiated in 2011. In 2013 the Integrated Waste Plan first introduced a near surface option for LLW disposal, identifying it as a strategy for further development. Following the implementation of Government owned Contractor operated (GoCo) model, CNL revised the IWS to specifically include NSDF in recognition of the preferred LLW disposal approach. Given the NSDF is CNL's strategic plan, endorsed by AECL, recognition of it in the IWS was appropriate even though decision has not been rendered by the Canadian Nuclear Safety Commission (CNSC) as part of the Environmental Assessment process. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND125	Greg Csullog (May 1, 2017) William Turner (May 31, 2017)	**2.2 CNL Integrated Waste Strategy – 2.1:** If CNL is relying on a cradle to grave strategy, it not only needs to provide details of the various pathways, it also needs to describe a management system that indicates how wastes are collected at point-of-origin and are routed through all stages to their endpoints without loss of chain-of-command. In other words, it is insufficient to only provide an A to B pathway, it is essential to show the verifiable process for ensuring that waste go from A to B and not A to C, etc. CNL must revise text to include "pollution prevention" and "reduction at source" as part of the strategy for this undertaking. Note from commenter: Document CW-508600-PLA-006 provides no insight into such a management system. Document CW-508600-PLA-006 is a very high level plan that excludes any detail on the mechanics of how the strategy will be implemented. From what I can see, CNL's cradle to grave strategy identifies the various cradles and graves but provides no meaningful information about how wastes from the various cradles will be put into the appropriate graves.	The Integrated Waste Strategy document [1] has been updated and is available to the public on the CNL website (www.cnl.ca/nsdf) or upon request from ermstakeholder@cnl.ca The Integrated Waste Strategy [1] presents Canadian Nuclear Laboratories' (CNL's) strategy to address all waste streams currently on the Chalk River Laboratories (CRL) site, as well as wastes from other CNL sites (e.g., Whiteshell, Nuclear Power Demonstration (NPD), Douglas Point, Gentilly-1, Port Hope Area Initiative, Historic Waste Programs). The Integrated Waste Strategy also summarizes the Waste Management Lifecycle that includes Waste Planning, Generation, Transportation, Processing, Storage and Disposal and CNL's Waste Hierarchy where prevention and reduction is the preferred approach but, where waste is generated, reuse and recycle are preferred to disposal. The Waste Management Program's Management Control Procedures and Standards, including Management of Waste [2] and Waste Characterization [3], describe in detail the Waste Management Lifecycle. Canadian Nuclear Laboratories (CNL) continues to develop plans and strategies for the management and ultimate disposal of all waste types. These plans and strategies can be improved with stakeholder engagement and public input.

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			References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Management of Waste, 900-508600-MCP-004. [3] Waste Characterization, 900-508600-STD-003.
CNL-ND126	Northwatch (August 16, 2017)	The draft EIS reports that *"Canadian Nuclear Laboratories has developed an Integrated Waste Strategy (IWS) which concisely details "cradle to grave" pathways for all CNL waste streams, from generation to final disposition. The IWS is based on CNL's waste inventory and forecast data and founded on the fundamental principles of waste avoidance, minimization and re-use".* The strategy is summarized briefly in Sections 2.2 and 3.2 of the draft EIS, but is not provided, is not available on the public registry or through the CNL web site or through a general search, and is not identified in the list of references included in the draft EIS; singly and in combination this failure to provide the Integrated Waste Strategy as part of the EIS and supporting documents a) suggests that it has not been given the central importance it merits, b) it may be CNL's assessment that the document would not withstand public scrutiny. Only through an intervenor's submission posted on the public registry20 would the public even have been able to confirm the existence of a full version of the Integrated Waste Strategy21. **2.2.2.2** - The draft EIS states: "*The IWS recognizes the need for a disposal solution for ILW. The feasibility of locating an ILW repository deep underground within bedrock at CRL has been assessed and it was determined that CRL bedrock is suitable for such a facility. To determine the best way forward, further options and locations need to be identified and studied, and national discussions held. Treatment of ILW may be required to meet the WAC for the future repository."* Throughout the draft EIS there are general and incomplete descriptions of or references to the Integrated Waste Strategy, but the IWS has not been made available, either as an appendix or supporting document, and it is not available on the CNL web site or the public registry. The IWS is a central document and should form part of a set of (publicly available) documents related to this project. Northwatch Information Requests # 11, 12 and 13: Provide a copy of the Integrated Waste Strategy. Provide background information and supporting documents related to statements in the draft EIS about the assessment and suitability of "CRL bedrock" for a "deep underground" facility for ILW". Describe what treatment may be required of ILW to meet the WAC for the future repository, and how this would compare to treatment of the ILW to meet the WAC for the ECM.	The Integrated Waste Strategy document [1] has been updated and is available to the public on the CNL website (www.cnl.ca/nsdf) or upon request from ermstakeholder@cnl.ca. Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Canadian Nuclear Laboratories (CNL) will continue to investigate options for the disposal of ILW however is outside the scope of this environmental assessment. The treatment of wastes, and the Waste Acceptance Criteria (WAC) for a hypothetical future ILW repository cannot be identified without a proposed location or facility design, neither which exist at this time. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND127	Greg Csullog (May 1, 2017) OFWCA (Johanna Echlin) (May 8, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* This EIS provides no significant information about data and records management associated with the cradle-to-grave management of wastes. How will CNL keep track of the inventory of different wastes? Noticeably missing are any references to activities and systems that are described in documents such as the following (not even a basic discussion of requirements for record keeping in support of disposal):	Canadian Nuclear Laboratories follows international guidance and regulatory requirements on record keeping. Waste records and record management are required as per Canadian Standards Association (CSA) N292.0-19 [1], Section 10.2, as a minimum. Canadian Nuclear Laboratories' Waste Management Program has developed and follows its Waste Data Management Control Procedure, which is consistent with the CSA N292.0-19 and meets the requirements of the Chalk River Laboratories (CRL) site licence. The Waste Management Program is responsible for documenting the activities involving the waste management lifecycle. Reference: [1] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019.

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		• "Maintenance of Records for Radioactive Waste Disposal ", IAEA technical document TECDOC-1097, August 1999 • "Waste Inventory Record Keeping Systems (WIRKS) for the Management and Disposal of Radioactive Waste ", IAEA technical document TECDOC-1222, June 2001 • "Records for Radioactive Waste Management up to Repository Closure: Managing the Primary Level Information (PLI) Set ", IAEA technical document TECDOC-1398, July 2004 • G.W. Csullog, "The Link Between Performance Assessment and Quality of Data", Second International Seminar on Radioactive Waste Products, 28 May - 1 June 1990, Jülich, Germany. • G.W. Csullog, M.A. terHuurne, M.T. Miller, N.W. Edwards, V.R. Hulley and D. J. McCann, "Assessing Inventories of Past Radioactive Waste Arisings at Chalk River Laboratories ", presented at Waste Management '98, Tucson, Arizona, 1998 March.	
CNL-ND128	Anna Tilman (June 22, 2017)	Has CNL allowed for a contingency amount of waste (e.g., a percentage increase in volume of waste), as does the LTWMF at Port Hope?	The 1,000,000 m^3 design basis for the Near Surface Disposal Facility (NSDF) is based on conservative estimates about the waste volumes that will be generated over the next 50 years, plus the wastes already stored at Chalk River Laboratories (CRL). Canadian Nuclear Laboratories (CNL) will responsibly manage the NSDF and consider all waste diversion options to ensure optimization and efficient use of the NSDF. Ideally, the NSDF will be the only disposal facility for low-level waste at the CRL site. The NSDF site cannot be easily expanded. The maximum amount of waste material that can disposed of on the NSDF site is 1,000,000 m^3. If there is more low-level waste (LLW) than can fit into NSDF, a different disposal solution will be required. With that said, it is in CNL's best interest to treat the capacity of the NSDF as an asset and to use it efficiently. Detailed waste characterization and the use of exemption/clearance levels will be utilized to maximize the NSDF's capacity for LLW.
CNL-ND129	Anna Tilman (June 22, 2017) Anna Tilman (August 11, 2017)	Hazardous waste is also considered acceptable at a licensed commercial disposal facility. What quantities of this type of waste will be shipped off-site and where? Do any of these facilities accept radioactive substances?	Section 4.1 of the Waste Acceptance Criteria (WAC) [1] discusses the restrictions placed on hazardous waste. Only hazardous waste that is also radioactive waste will be accepted at NSDF. More specifically, that hazardous wastes must be treated to meet the requirements of Ontario Regulation 347 [2] in order to qualify for disposal at the Near Surface Disposal Facility (NSDF). Non-radioactively contaminated hazardous wastes are to be disposed of elsewhere. There are off-site waste processing facilities that Canadian Nuclear Laboratories (CNL) may use to treat radioactively contaminated hazardous waste before disposal into the NSDF. One example of such a facility exists in Brampton, Ontario. However, all radioactive wastes that are sent off-site for processing are all returned to Chalk River Laboratories (CRL) for long term management or disposal. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND130	Anna Tilman (June 22, 2017)	Hazardous waste is also considered acceptable at a licensed commercial disposal facility. What quantities of this type of waste will be shipped off-site and where?	Section 4.1 for the Waste Acceptance Criteria (WAC) [1] discusses the restrictions placed on hazardous waste. Only hazardous waste that is also radioactive waste will be accepted at NSDF. More specifically, that hazardous wastes must be treated to meet the requirements of Ontario Regulation 347 [2] in order to qualify for disposal at the Near Surface Disposal Facility (NSDF). Non-radioactively contaminated hazardous wastes are to be disposed of elsewhere.

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			There are off-site waste processing facilities that Canadian Nuclear Laboratories (CNL) may use to treat radioactively contaminated hazardous waste before disposal into the NSDF. One example of such a facility exists in Brampton, Ontario. However, all radioactive wastes that are sent off-site for processing are all returned to Chalk River Laboratories (CRL) for long term management or disposal. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND131	Greg Csullog (May 1, 2017)	**3.2 Integrated Waste Strategy – 3-6:** The IWS is not limited to the CRL property since it includes the management of radwastes at or for sites like Whiteshell and NPD. It is worthwhile to include cross references to Table 2.2-1 and Figure 2.2-1 in the opening paragraph for Section 3.2.	The Integrated Waste Strategy (IWS) [1] for Canadian Nuclear Laboratories (CNL) applies to all of CNL's site and is now summarized in Section 2.2 of the final Environmental Impact Statement (EIS). The IWS concisely details a cradle to grave approach for all CNL-managed waste classifications, from generation to disposal. The IWS is based on CNL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. The IWS document was updated in 2019. The document is available to the public on the CNL website (www.cnl.ca/nsdf), or can be obtained by contacting ermstakeholder@cnl.ca. A cross-reference to Section 2.2 of the final EIS (Canadian Nuclear Laboratories Integrated Waste Strategy) is also included in the opening paragraph for Section 3.3 of the final EIS (Waste Strategy). Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND132	Anna Tilman (June 22, 2017)	In that the disposal cells may not necessarily contain the same type of waste, detailed information is needed to describe the specific contents designated for the cells.	The contents of each waste cell will be recorded as waste shipments arrive at the Near Surface Disposal Facility (NSDF) for disposal. Waste cells are defined for operational and construction logistics purposes, and do not necessarily include any physical boundaries or walls between them. The NSDF Project Waste Acceptance Criteria (WAC) [1] ensures Canadian Nuclear Laboratories (CNL) meets its responsibility as the licensee; that all waste received for disposal is in compliance with the design and licensing basis for the facility (Section 3.3.3 of the final Environmental Impact Statement (EIS)). Waste shall comply with all of the criteria in the WAC to be considered acceptable for disposal in the ECM. Waste that does not meet the WAC will not be placed in the NSDF and will be placed in safe storage. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND133	Anna Tilman (June 22, 2017) Ole Hendrickson (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* The EIS should: Provide greater precision to statements that a "few percent" of wastes will be imported from off-site, including clarity on intent to ship wastes from Gentilly-1 and Douglas Point to Chalk River, and types of commercial waste that would be put in the facility. What is the volume, characteristics, components and activity of the wastes from each of the off-site sources proposed to be emplaced in the NSDF?	The transportation and consolidation of Canadian Nuclear Laboratories' (CNL's) waste is considered routine operations, and not necessarily related to the Near Surface Disposal Facility (NSDF) project. Waste has always been transported from off-site locations to Chalk River Laboratories (CRL) in order to place wastes into safe storage in accordance with the CRL Site Licence Conditions Handbook [1]. The amounts of waste from Gentilly-1 and Douglas Point that may be transported is subject to the further development of the decommissioning plans for these specific facilities. Canadian Nuclear Laboratories' (CNL's) acceptance of waste related to "commercial activities" is unrelated to the NSDF

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			Project. Canadian Nuclear Laboratories (CNL) has been accepting waste from small Canadian waste generators for decades, as a service to the industry and as a service to Canada. These waste generators include hospitals, universities, and small commercial industries. An example of a commercial waste generator could be manufactures which use tritium for its radioluminescence properties in green "EXIT" signs. All waste, regardless of the source, must meet the same Waste Acceptance Criteria (WAC) [2] in order to qualify for disposal at the NSDF. Section 3.3.3 of the final Environmental Impact Statement (EIS) provides more detail on the NSDF WAC. The WAC has also been made available to the public on the CNL website (www.cnl.ca/nsdf), or can be requested from ermstakeholder@cnl.ca References: [1] Canadian Nuclear Safety Commission, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND134	Michael Milgram (May 16, 2017)	On page ES-ix it is written: "Treated effluent will meet site-specific criterion developed to be protective of human health and the environment". It is not clear if this sentence is written in the past or future tense. - Q3-1: Have these criterion been already developed or are those criteria "a development to be"? - Q3-2: How does one treat radioactive effluent to be protective of human health and the environment?	Canadian Nuclear Laboratories (CNL) confirms that wastewater treatment plant (WWTP) effluent discharge criteria (treatment targets) have been established. The treatment targets are shown in the final Environmental Impact Statement (EIS), Table 3.4.2-2 and Table 3.4.2-3, and are protective of human health and biota. The treatment targets were derived specifically for the Near Surface Disposal Facility (NSDF). Radioactive and non-radioactive versions of the same element or compound, behave in the same way chemically. For example cesium-137 (radioactive) and cesium-133 (non-radioactive) can be removed using the same chemical treatment processes. The removal of radionuclide contaminants relies on their physical and chemical characteristics and determines what water treatment chemicals are used in the chemical precipitation tank to precipitate radioactive and non-radioactive solids. The solids settle to the bottom of the tank and are subsequently removed through filters. Due to the impracticality of treating the wastewater to remove tritium, CNL has instead placed stringent limits on the total amount of tritium that can be placed in the NSDF (see Table 3.3.1-2 of the final EIS) and on the tritium concentration in individual waste shipments (see Table 3.3.3-1 of the final EIS). The amount of tritium emplaced in the ECM is controlled and limited through waste packaging; this enables the NSDF WWTP tritium discharge targets to be maintained below the Health Canada drinking water guidelines [1] in Perch Creek. Reference: [1] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3
CNL-ND135	Anna Tilman (June 22, 2017)	On what basis can CNL indicate that it would have the capacity to take excess waste from Port Hope if the Port Hope LLTWDF is unable to contain all the waste from Port Hope?? That facility has a design capacity of 1,900,000 m3 of LLW, (which includes a 30% contingency on waste volume estimates). No contingency volume has been mentioned for the proposed NSDF if the waste volume would exceed 1,000,000 m3, nor is it evident that the capacity of the NSDF can even take all the waste it is supposed to from all the operations at CRL, off-site CNL facilities, and the other of-site facilities.	Canadian Nuclear Laboratories (CNL) has a waste forecast of material, which may be eligible for acceptance within the Near Surface Disposal Facility (NSDF). This forecast includes waste from all CNL sites. For Port Hope specifically, an allowance of up to 10,000 m^3 of material may be transferred to Chalk River Laboratories (CRL), which are related to closing activities. This Port Hope waste volume is included in the proposed 1,000,000 m^3. At this point in the Port Hope Area Initiative projects, it is unlikely that wastes will be transported from Port Hope to CRL, but the space has been accounted for.

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			No contingency volume has been mentioned as the intent would be to use all of the allowed volume (unless NSDF reaches its total inventory limits first). There is contingency built in based on current baseline forecasts. Contingency is included as waste volume estimates have been established through conservative estimates. Forecasting the amount of waste that may be suitable for NSDF over the next 50 years is a process with a considerable amount of uncertainty. As such, CNL will responsibly manage the NSDF and consider all waste diversion options to ensure optimization and efficient use of the NSDF. Ideally, the NSDF will be the only disposal facility for low-level waste (LLW) at the CRL site.
CNL-ND136	Anna Tilman (June 22, 2017)	**Table 2.2.1 (EIS p.2.2)**: provides a description of the classes of waste and the planned disposition mainly in general terms for CNL's facilities. As noted in the table, some of the proposed storage facilities, specifically for HLW and ILW, are not currently available. It cannot be presumed if and when these facilities would be available. With respect to ILW, it is noted that some of this waste would be suitable for disposal in the NSDF, but as noted above, no conditions are given as to what this suitability would be.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The management strategy for Intermediate Level Waste (ILW) and High Level Waste (HLW) is to continue to manage it safely in temporary storage until disposal solutions exist [1]. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND137	Concerned Citizens of Renfrew Country (Ole Henrickson) (July 3, 2017) Ole Hendrickson (August 16, 2017) William Turner (May 31, 2017)	The Environmental Impact Statement (EIS) for the NSDF makes no reference to emplacement of very low-level waste (VLLW) in the NSDF (CNL 2017b, p. 2-5), although it would appear that the facility would contain large amounts of VLLW. The EIS says intermediate level waste (ILW) would constitute "approximately 1% by volume" of the waste in the NSDF (CNL 2017b, p. 1-1), but its description of ILW ("wastes with higher levels of radioactivity that may require shielding for worker protection during handling") does not conform to the IAEA waste classification. To lump VLLW and LLW along with some ILW into one repository is not acceptable in the long-term. Further, this is not international best practice. The EIS should: Revise the Table 2.2-1 and Figure 2.2-1 in the EIS to explicitly identify the VLLW waste class and should provide a description of how the technological details and siting process for a very low-level waste facility (mentioned in the Comprehensive Preliminary Decommissioning Plan for the Chalk River Laboratories) were modified to create a proposed facility for low-level and intermediate-level waste.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The Near Surface Disposal Facility (NSDF) will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). A very low-level waste (VLLW) facility was considered as part of the alternative means assessment (Section 2.5.2.4 of the final EIS). Very low-level waste is a subcategory of LLW. Canadian Nuclear Laboratories (CNL) had previously considered development of a VLLW disposal facility at the Chalk River Laboratories (CRL) Site. Canadian Nuclear Laboratories (CNL) implemented a trial to demonstrate the viability of segregation and storage of VLLW. The trial demonstrated that the fraction of the total LLW that could be segregated as VLLW was disproportionate to the time, effort, storage requirements that were expended to realize any net benefit from the work. In addition, the LLW with higher activity that is segregated from the VLLW will still require a separate LLW disposal facility. Therefore, the development of a VLLW disposal facility does not meet the Project purpose which recognizes the need for a LLW disposal facility and a VLLW disposal facility is not considered technically feasible. The planned cost of developing a VLLW disposal facility is expected to be similar to the cost of developing a LLW disposal facility (i.e., the current NSDF Project); however, a VLLW disposal facility would require additional time and effort to segregate and manage the VLLW from the rest of the LLW. The development of a LLW disposal facility (inclusive of VLLW) would eliminate duplication of effort, time, dose and facility construction, operation and closure costs and would enable reduction of Canada's liabilities earlier than it would have if a small percentage of the total inventory had been segregated and disposed separately. Therefore, the development of a separate VLLW disposal facility is not considered economically feasible when compared to the cost savings associated with the development of a LLW facility that is

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			inclusive of VLLW. The underpinning for this experience is being illustrated presently at the Port Granby facility where if such a VLLW program were to have been implemented, CNL would have had to develop a further facility to contain the fraction of wastes which would have had higher activity. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND138	Anna Tilman (June 22, 2017)	What are the clearance levels and exemption quantities for unconditional release of radioactive material? How much of the waste at CNL facilities would be "cleared" for re-use and recycling or sent to landfills?	Exemption quantities and unconditional clearance levels are defined by the *Nuclear Substances and Radiation Devices Regulations* (SOR/2000-207) [1], which is a regulation under the *Nuclear Safety and Control Act*. Waste generated at Chalk River Laboratories (CRL) is routinely cleared using these prescribed limits. In 2019, approximately 20,000 m^3 of clean waste was cleared from Chalk River Laboratories (CRL) site for disposal or recycling to either on-site or off-site facilities. Reference: [1] Nuclear Substances and Radiation Devices Regulations (SOR/2000-207). https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-207/index.html.
CNL-ND139	Anna Tilman (June 22, 2017)	What quantities and types of waste (LLW, ILW) would be attributed to the facilities slated for decommissioning and remediation? The total volume of decommissioning and demolition waste is estimated to be 390,000 m3 [Table 3.2.1-1], but the description of this waste is not broken down into specific facilities or types of waste. [EIS p. 3-8].	The CRL Site CPDP [1] was revised in 2018 March to align AECL's strategy to reduce nuclear liabilities through the decommissioning of outdated buildings at the Chalk River site implemented under the Government owned Contractor operated (GoCo) objectives. The CPDP outlines the decommissioning strategy and planning. As part of the decommissioning planning cycle, preliminary decommissioning plans are captured in the CRL Site CPDP which may have scoping level estimates of waste to be generated. Prior to decommissioning each facility on CRL site will have either a Building Removal Plan (for non-nuclear facilities) or a Detailed Decommissioning Plan (for nuclear facilities). In accordance with Canadian Standards Association CSA-N294 *Decommissioning of facilities containing nuclear substances* the decommissioning plan will have a detailed forecast and estimate of waste types and volumes that will be generated [2]. Table 3.3.1-1 of the final Environmental Impact Statement (EIS) provides the estimated volume of bulk and packaged waste expected to be disposed of in the Near Surface Disposal Facility (NSDF). The volumes were established by extrapolating waste already currently in storage, as well as waste forecasts from environmental remediation projects and decommissioning projects data to an assumed total volume of the NSDF at time of closure. The NSDF Reference Inventory provides context on how decommissioning and environmental remediation waste projections were determined for NSDF based on existing scoping and detailed decommissioning plans currently available [3]. Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [4]). Facilities decommissioning waste is made up of mostly building material, e.g., concrete blocks, wood framing, shingles, drywall, etc. Reasonable efforts will be made to ensure that uncontaminated materials are cleared for reuse or off-site disposal via the guidelines of the *Nuclear Substances and Radiation Devices Regulations* (SOR/2000-207) [5].

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			References: [1] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001. [2] CSA Group N294.0-19: Decommissioning of facilities containing nuclear substances. 2019. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [4] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002 [5] Nuclear Substances and Radiation Devices Regulations (SOR/2000-207). https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-207/index.html
CNL-ND140	Greg Csullog (May 1, 2017)	Without strict front-end control, generators could either place their wastes at the wrong collection point (e.g., an ILW waste bag place at an LLW collection point – such cases were documented even when the management system was fully in place and routinely checked) or use the wrong waste data sheet. With system failure, the likelihood of misrouting waste likely increased (i.e., the chance of mingling LLW and ILW likely increased).	Canadian Nuclear Laboratories' (CNL's) Waste Management Program oversees the Waste Certification process. Waste Certification ensures that the Waste Management process can be repeated and evaluated for producing waste that is within the expected characteristics. This is achieved through waste assurance activities conducted prior to, and following, waste generation including planning documents and waste observations and surveillances. Additionally, as described in Section 3.3.2 of the final Environmental Impact Statement (EIS), and the NSDF Waste Acceptance Criteria (WAC) [1], there is an NSDF waste verification process that can occur at any step of the waste disposition process and may include visual inspection, non-destructive assays and/or destructive sampling and analysis. All waste intended to be emplaced in the NSDF, including legacy waste, shall have sufficient characterization data to ensure compliance with the NSDF WAC [1]. Canadian Nuclear Laboratories' (CNL's) waste characterization process ensures characterization plans are developed for waste streams according to the specific data objectives. The approach for verification of compliance with WAC [1] is described in Section 3.3.2 of the final EIS. Waste will be verified against the submitted documentation accompanying the waste shipment. Verification activities may include: • The waste identification labels are recorded and cross-referenced to the Waste Package Data Form and supporting documentation. • Off-site waste – The waste identification labels are recorded and cross-referenced to the waste manifest completed by the off-site generator. • Physical inspection of waste packages for damage or non-compliance with the WAC [1] packaging requirements. • Visual inspection of the bulk waste against the bulk waste physical requirements in the WAC [1]. • Visual inspection of the waste packages or transportation containers against the supporting documentation. • Radiological monitoring of the waste packages or transportation containers for external radiation and contamination, and assessment against radiation limits in the WAC [1]. • Non-destructive assays (e.g., inspection or evaluation). • Destructive sampling and analysis. Procedures on waste verification will be developed as part of the licensing process. Canadian Nuclear Laboratories (CNL) has been segregating wastes with NSDF in mind. Efforts are being made to ensure that ILW is not placed with NSDF-ready wastes. Furthermore, waste generation is a quality controlled process where active monitoring and characterization is conducted. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND141	Joan Lougheed and Town of Deep	In Section 3.5.4.2.2, there is discussion of the scales that will be used to determine the weight of the wastes received, using computerized waste quantity tracking equipment (see pg. 3-33). Since the waste	Note that Section 3.5.4.2.2 of the 2017 draft EIS has been renumbered as 3.4.3.1 in the final EIS. The weight of waste measured by the scales cannot be easily converted into a volume. As noted in the comment, the waste will come in different

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	River (August 16, 2017)	will be in all shapes, sizes and densities, there is no discussion as to how the weight will be converted into waste volumes and emplaced in the ECM, nor is the equipment or methodology that is used for tracking the volumes arriving from off-site sources specified. The overall risk to the environment and the public over the 500-year lifetime of the ECM is significantly dependent on the waste that is put into it. From the information provided (see Section 3.6.1.1, pgs. 3-35 to 3-37), it is difficult to assess whether the processes described - profiling, acceptance and verification - are adequate. More specifics should be provided as well as detailed examples of the step-by-step processes for each type of waste and its source (e.g. New operational waste, waste retrieved from storage facilities, both packaged and not packaged, and waste from the decommissioning of facilities).	sizes and shapes; however, it will be shipped to the engineered containment mound (ECM) in standard haul vehicles or packages (B25 boxes, drums, etc.) of known volume and these volumes would be used to determine the inventory. Section 3.4.1.7 of the final EIS (previously section 3.6.1.2 of the 2017 draft EIS) has been updated to discuss the equipment and methodology for placing waste in the ECM. No physical equipment or separate methodology exists to specifically track volumes arriving from off-site because off-site waste is treated in the same manner as on-site waste. In all cases (on-site and off-site), the waste generator is responsible for providing sufficient information so that Near Surface Disposal Facility (NSDF) staff can verify that the waste meets the NSDF Waste Acceptance Criteria (WAC) [1] before it is accepted into the facility. Section 3.3.2 of the final EIS provides more detail on waste approval, verification and acceptance process while Section 3.3.3 of the final EIS provides more detail on the WAC. With regard to the methodology of waste acceptance to the proposed NSDF site, all shipments of waste received shall be accompanied by a completed Waste Package Data Form and supporting documentation as required. The Waste Package Data Form lists, or references a document that lists, the origin of the waste and a description of the waste form, volume, radionuclide content, and content of any other hazardous materials, as identified by the waste generator. The supporting documentation may include a Waste Profile Form, Waste Management Plan, Waste Assessment Form, Characterization Documentation, Waste Container Inventory Form, and pictures. All waste packages received shall have a Waste or Package Identification label/sticker attached to the package. With regard to tracking the inventory, Canadian Nuclear Laboratories (CNL) will be using a database (not yet specified) and will record key information regarding each waste shipment including volume, weight inventory of radionuclides, inventory of non-radioactive contaminants of potential concern, packaging (if applicable), waste generator etc. Careful tracking of the inventory in the ECM is required to ensure that the maximum quantities of radionuclides does not exceed the total Licenced Inventory which represents a bounding limit at closure of the facility (see Table 3.3.1-2 of the final Environmental Impact Statement (EIS)). Additionally, CNL will be required to annually report the inventory in the ECM to the Canadian Nuclear Safety Commission (CNSC). Section 3.6.1.1 of the 2017 draft EIS (Section 3.3.2 of the final EIS) was intended to provide a high level discussion of the waste approval, verification and acceptance process as noted in the comment. These activities are governed by CNL's Waste Management Program which is part of CNL's governing documents under the Chalk River Laboratories (CRL) Site Licence Condition Handbook [2] issued by the CNSC. Section 3.5.2.3 of the final EIS provides a brief overview of the Waste Management Program. The Waste Management Program and its implementing procedures provide more detail about topics such as waste certification, management of waste, waste data, and waste characterization. Section 6 of the NSDF Waste Acceptance Criteria [1] Document (available on request by contacting ermstakeholder@cnl.ca) provides additional detail regarding how these activities will be implemented for the NSDF. Detailed examples of the step-by-step processes for each type of waste and its source are not currently available at this stage of regulatory approvals. These will be further developed along with details of the proposed NSDF operating procedures should the Project proceed. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Canadian Nuclear Safety Commission, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25.

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CNL-ND142	Joan Lougheed and Town of Deep River (August 16, 2017)	The draft EIS consistently informs that "A few percent of the waste volumes to be placed in the ECM will be from off-site sources" (see pg. 1-5 and pg. 3-2); however, CNL's website contradicts this, in that it states up to ten percent of the radioactive waste deposited at the NSDF will be from off-site sources (see: http://www.cnl.ca/en/home/environmental-stewardship/nsdf/default.aspx under the heading "What will go in it?"). Further, the draft EIS fails to inform of the total amount of ILW to be deposited at the NSDF from off-site locations by percentage of volume and radioactivity level. CNL also intends to accept both LLW and ILW from the Douglas Point and Gentilly-1 prototype reactor sites at the NSDF (see pg. 2-4). CNL goes on to state that it will also continue to accept waste on a commercial basis (e.g. medical waste from hospitals) (see pg. 2-6). Without further detail, it is difficult to understand how off-site sourcing of waste will be limited to "a few percent, or even less than ten percent (as per the CNL website), given the numerous other significant sources that CNL intends to accept waste from and there being no restrictions or parameters referred to in the draft EIS that will prevent the list of waste sources from expanding.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Section 1.0 of the final EIS provides more detail on the waste. The majority of LLW proposed for the NSDF is currently located on the Chalk River Laboratories (CRL) site, with a small percentage of the waste volume coming from off-site locations (i.e., approximately 10% by volume). The sources of waste propose for the NSDF by percentage are as follows: • 90 percent (%) waste from CRL – past, present and future (waste owned by Atomic Energy of Canada Limited (AECL)); • 5% from commercial waste Canadian sources such as universities and hospitals; and • 5% waste from decommissioning at Whiteshell Laboratories in Manitoba and other AECL nuclear liabilities. Waste disposed in the NSDF is subject to the Waste Acceptance Criteria (WAC) [2] of its source. Canadian Nuclear Laboratories (CNL) currently manages waste from off-site sources in interim storage facilities. The EIS has been revised to ensure for consistency regarding waste volumes. With regards to how off-site sourcing of waste will be limited to less than 10%. The volume estimates for off-site sources are bounding estimates. For example, historically the volume of waste from commercial sources such as universities and hospitals has been much less than the projected volume provided for NSDF. Actual volumes of off-site waste will likely be less than 10% of the volume of NSDF. Waste volumes emplaced in the NSDF will be tracked by waste generator and documented as described in Section 6.5 of the NSDF WAC. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND143	Great Lakes and St. Lawrence Cities Initiative (August 15, 2017)	Before the EIS is approved, In order to reduce the risk of seepage or leakage from the facility, the Cities Initiative asks that radioactive waste be prohibited in liquid form. This waste needs to be solidified to reduce the risk of it spreading into the environment.	The Near Surface Disposal Facility (NSDF) Waste Acceptance Criteria (WAC) [1] restricts wastes to solid form only. Section 3.3.3.1 of the final Environmental Impact Statement (EIS) speaks to this, as well as Section 3.5 of the WAC document, reproduced below: "Free standing liquids are not permitted in NSDF waste (i.e., equal to or greater than 1% free standing liquids by volume). Wastes that are suspect to contain free liquids (e.g., high moisture content) can be tested using: • SW-846 Test Method 9095B: Paint Filter Liquids Test; or • Test Method for the Determination of Liquid Waste (slump test). Note waste is defined as "Liquid Waste" if it slumps more than 150 mm. Wastes that have been rendered solid via stabilization (e.g., cementation) or pre-treatment are required to meet this performance objective." Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.

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CNL-ND144	David Raman (August 3, 2017)	While some of the intended waste materials like soils and concrete rubble could be directly emplaced, consideration should be given to processing wastes to a waste form of known integrity and leaching performance, as it is the waste form itself that provides the first barrier for the protection of the environment.	The removal of the Intermediate Level Waste (ILW) streams has drastically reduced the number of packages that require special consideration from an integrity and leaching performance perspective. The waste inventory to be placed in the NSDF is restricted to low-level waste (LLW) and the waste must meet the Waste Acceptance Criteria [1]. Restricting the NSDF waste inventory to only LLW aligns with the near surface disposal facility requirements of the International Atomic Energy Agency (IAEA) Disposal of Radioactive Waste, SSR-5 [2] and IAEA's Near Surface Disposal Facilities for Radioactive Waste (SSG-29) [3]. This approach to limiting the waste to only LLW [1] is consistent with Requirement 22 of SSR-5 [2], long-term safety, and specifically paragraph 5.11, "for near surface facilities, the waste acceptance criteria will limit any consequences of human intrusion to within the specified criteria (see para. 2.15), even if control over the site is lost". In addition, the Waste Acceptance Criteria (WAC) [1] specifies the requirements for accepted packaged waste for receipt/placement in the Near Surface Disposal Facility (NSDF). Type 5 Packaged Waste has been divided into two sub-categories: non-leachate controlled waste packages and leachate controlled waste packages. Wastes with higher concentrations of tritium (as well as other radionuclides), will be placed in leachate controlled waste packages. Leachate Controlled Waste Packages are packages that provide inventory management control and containment of the waste with more mobile and higher radionuclide activity concentrations during the time the disposal cell is not covered with the final cover. Containment of the waste can be provided by the final waste form itself, or by using approved overpacks or waste processing methods. Additional reference to, and discussions of Type 5 waste has been provided in Section 3.3.1.1 of the final Environmental Impact Statement (EIS). References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011. [3] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014.
CNL-ND145	David Raman (August 3, 2017)	As the proponent plans to use equipment like compactors to achieve a uniform waste density, then none of the waste packages referred to earlier could expect to survive intact. Although detailed records may be maintained of a packages contents and location in the facility, it would be very difficult to identify and recover any particular package should the need arise.	As outlined in Table 3.3.1-1 of the final Environmental Impact Statement (EIS), the waste inventory is 87% bulk waste and 13% packaged waste. Waste placement procedures are outlined in Section 3.4.1.7 of the final EIS. Bulk waste will be compacted to optimize its in-place density, reduce void space, and ensure stability. Some of the waste in the Near Surface Disposal Facility (NSDF) will be containerized waste. The void space in the containers placed in the engineered containment mound (ECM) will be controlled by grouting or compaction. All the above listed activities will minimize any settling and ensure that the mound is structurally sound to support the final cover. The ECM design included the differential settlement analyses and concluded that the differential settlement will not compromise the integrity of the final cover system. Further optimization of waste and containerized waste placement will be conducted in the future operational phase. Type 5 Packaged Waste has been divided into two sub-categories: non-leachate controlled waste packages and leachate controlled waste packages. Only the leachate controlled waste packages are required to maintain integrity after compaction. Leachate controlled packaged waste is required to have a void space of less than 10% to help with the structural integrity. Packaged waste are often placed in the engineered containment mound (ECM) in small batches. Packages are placed as close to each other as possible, with voids around packages filled with either soil or grout. A thick layer of soil-like wastes surrounds the packages on all sides. Only then will compaction activities take place. The solid structure of the package works with the thick layer of soil to distribute the force of the compaction equipment, limiting damage to the package.

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			Accurate record keeping will allow for the package location to be determined. As recommended in International Atomic Energy Agency (IAEA) SSG-31, Monitoring and Surveillance of Radioactive Waste Disposal Facilities [1] waste retrieval, may be performed to reverse the action of waste placement. For the NSDF, waste may only be retrieved from a cell before the final cover is installed. Waste retrieval is not intended, nor is required, thus is not assessed in the safety assessments. In the unlikely event that a waste retrieval becomes necessary, a safety assessment for waste retrieval will be required prior to the retrieval activities [2]. The assessment will be unique to the type of waste being retrieved, the volume of waste excavated, and the types of wastes surrounding the retrieval target. References: [1] IAEA, Monitoring and Surveillance of Radioactive Waste Disposal Facilities, SSG-31, STI/PUB/1640, 2014. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND146	Michael Stephens (August 14, 2017)	One commenter indicates that "much of the waste will be untreated. Over 80% of the wastes will be bulk unpackaged wastes (EIS, section 3.2.1.2, page 3-8). After being dumped onto the NSDF mound, they will be bulldozed and compacted (that is, crushed) (EIS, section 3.6.1.2.4, page 3-41). No temporary weather shelter will be used to protect the wastes from precipitation until they are adequately covered. The wastes will also contain a significant amount of organic material (vegetation and other) which will eventually degrade and slump, which may lead to failure of the cover. The position of particular wastes in the facility will be uncertain, so it would be difficult and expensive, if not impossible, to locate and retrieve them if wastes must be selectively removed for further treatment."	As outlined in Table 3.3.1-1 of the final Environmental Impact Statement (EIS), the waste inventory is 87% bulk waste and 13% packaged waste. Waste placement procedures are outlined in Section 3.4.1.7 of the final EIS. Bulk waste will be compacted to optimize its in-place density, reduce void space, and ensure stability. Some of the waste in the Near Surface Disposal Facility (NSDF) will be containerized waste. The void space in the containers placed in the engineered containment mound (ECM) will be controlled by grouting or compaction. All the above listed activities will minimize any settling and ensure that the mound is structurally sound to support the final cover. The ECM design included the differential settlement analyses and concluded that the differential settlement will not compromise the integrity of the final cover system. Further optimization of waste and containerized waste placement will be conducted in the future operational phase. During waste placement operations, all efforts are made to minimize the contact of precipitation with the contaminated waste thus leachate production. The operation of NSDF is limited to one cell at a time in order to limit the surface area of waste that is exposed to the environment (i.e., precipitation) at any given time. As a cell is constructed, interim covers are placed over waste to limit infiltration of precipitation and promote surface water run-off. As each disposal cell is completed the final cover system is installed over the filled disposal cell. Other operational practices to limit contact with precipitation include grading and compaction of the waste fill to promote surface water run-off. Furthermore, any water that makes contact with (or is suspect of contacting) the contaminated waste will be collected by the leachate collection system and treated to remove contaminants in the wastewater treatment plant (WWTP) prior to controlled release into the environment. Treated effluent discharge targets are established to be protective of human and non-human biota health. The design of the NSDF ECM is a large contiguous construct, in which active cells are located adjacent to closed cells. For a movable roof system, the roof base structure requires load-bearing support and anchorage, able to accommodate any potential dynamic loads such as design-basis tornado and earthquake. In designs where temporary roofs are utilized, between each adjacent cell there is an intermediate structural berm, which provides the necessary height and foundations for the moveable roof system. The NSDF ECM design does not have an intermediate "structural berm" between its cells. The NSDF ECM has a common perimeter structural berm around all of its cells, not between cells. In this way, the ECM design provides the necessary utilization of the limited NSDF site area. However, as mentioned in Section 2.5.7.6.1, weather cover designs are being evaluated for compatibility with the NSDF configuration and if feasible, could be implemented as a mitigation measure and operational optimization.
CNL-ND147	Northwatch (August 16, 2017)	The information provided on wastes, waste volumes, types and categories should be provided in volume instead of by percentage; quantification of the radiological burden by waste volume, type and unit should also be provided, and information should be provided and presented in such a way as to allow comparative analysis across waste types, categories, sources and locations.	Table 3.3.1-1 of the final Environmental Impact Statement (EIS) provides the estimated volume of bulk and packaged waste expected to be disposed of in the Near Surface Disposal Facility (NSDF). The volumes were established by extrapolating waste already currently in storage, as well as waste forecasts from environmental remediation projects and decommissioning projects data to an assumed total volume of the NSDF at time of closure.

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		CNL's waste strategy lacks quality assurance and quality control and does not provide any indication that there is a chain of custody with respect to the wastes being handled, whether they are from internal (currently on site) sources or external (off site) sources; the deficiencies include gaps with respect to tracking wastes from the point of origin to endpoint, inadequate waste characterization and classification, and inadequate waste segregation and routing procedures.	Section 3.3 of the final EIS contains discussions about the waste types, volumes, radiological inventory, as well as the waste acceptance criteria and processes. In addition, the Reference Inventory Report [1] discusses the methodology used to calculate and extrapolate the revised radionuclide inventory. Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Management Control Procedure (MCP) [2] that has been submitted to Canadian Nuclear Safety Commission (CNSC) staff. The MCP describes characterization requirements for waste. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. Appendix A of CNL's waste characterization procedure includes several characterization resources and guidelines are referenced including the International Organization for Standardization (ISO) 21238 standard. It is worth noting that the revised waste characterization procedures have been designed to include aspects about NSDF to help guide waste generators. Section 3.3.2 of the EIS outlines the waste approval, verification and acceptance process. All waste proposed for disposal at the NSDF will be characterized in order to compare the wastes to the limits of the Waste Acceptance Criteria [3]. As outlined in Section 6.5 of the WAC [3], waste records for all waste generated or accepted at CNL operated sites, are managed in a manner that preserves information including location, characteristics, and inventories. Waste Management records are controlled to prevent loss, destruction or alteration of the waste records, and conform to a standardized format. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Waste Characterization Management Control Procedure 900-508600-MCP-001. [3] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND148	Northwatch (August 16, 2017)	**2.2.2.1** - The draft EIS states: "Radioactive waste will be emplaced in the ECM and as necessary, treated in advance of shipment to the NSDF". The draft EIS does not provide any description about the referenced "treatment in advance of shipment" of wastes to be placed in the NSDF. Northwatch Information Request #9: Provide a description of the methods and effects of the "treatment" in advance of shipment" referenced in this section. In particular, describe the location, means, and proponent/operator for the treatments.	In the context of disposal, waste treatment is defined in by the International Atomic Energy Agency (IAEA) Safety Glossary, 2018 edition [1], p.g. 187-189. Waste treatment refers to operations intended to benefit safety by changing the characteristics of the waste. The basic treatment objectives are: a) Volume reduction b) Removal of radionuclides c) Change of composition Methods used to achieve the treatment objectives include: • **Conditioning**. Those operations that produce a waste package suitable for handling, transport, storage and/or disposal. Conditioning may include the conversion of the waste to a solid waste form, enclosure of the waste in containers and, if necessary, provision of an overpack. • **Immobilization**. Conversion of waste into a waste form by solidification, embedding or encapsulation. Immobilization reduces the potential for migration or dispersion of radionuclides during handling, transport, storage and/or disposal • **Packaging**. Preparation of radioactive waste for safe handling, transport, storage and/or disposal by means of enclosing it in a suitable container • **Overpacking.** A secondary (or additional) outer container for one or more waste packages, used for handling, transport, storage and/or disposal

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			Examples of treating waste to meet the Near Surface Disposal Facility (NSDF) Waste Acceptance Criteria (WAC) are: • Adding concrete or grout to a waste to ensure that it is solid; • Placing the waste into appropriate packaging, if required; • Adding concrete or grout to a waste package to meet void space requirements; • Cutting pipes or larger structures to minimize void space; • Removal of hazardous constituents to meet WAC non-radiological requirements. Waste treatment can also refer to steps taken to ensure that the wastes meet the requirements of Ontario Regulation 347 [2], which are primarily related to ensuring that waste concentrations meet leachate toxicity requirements. Waste treatment operations may be performed by the waste generator themselves, or by a third party depending on the kinds of treatment required. Waste treatment processes and locations are not in the scope of the NSDF Project. References: [1] IAEA Safety Glossary. Terminology Used in Nuclear Safety and Radiation Protection, 2018 Edition. [2] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND149	Anna Tilman (August 11, 2017)	Other than PCB concentrations, what are the disposal limits for other hazardous substances contained in the mixed waste?	As outlined in Section 3.3.3.3, waste placed in the Near Surface Disposal Facility (NSDF) will meet the intent of land disposal and leachate requirements specified in Ontario's *Regulation 347, General – Waste Management* [1]. This has been defined as a requirement in the Waste Acceptance Criteria (WAC) [2]. The acceptance of waste into the ECM will be controlled through proper waste characterization and application of Ontario Regulation 347 limits. Waste that, not considering its radioactive component, is classified as hazardous waste is not permitted for disposal in the ECM unless the hazardous waste has been treated using methods for land disposal described in Ontario Regulation 347. The WAC for the Near Surface Disposal Facility (NSDF) provides further details on hazardous substances that may be accepted in the NSDF [2]. References: [1] General – Waste Management, Revised Regulations of Ontario, 1990, Regulation 347, Environment Protection Act, Ontario. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND150	William Turner (May 31, 2017) 8. 23. 132.	The EIS does not address the Waste Hierarchy as presented in the IWS summary document (Prevent, Reduce, Reuse, Recycle). This is clearly missing in Figure 2.2-1 as well. Why is the first "R" (Reduce) ignored? By reducing waste requiring "disposal", CNL would reduce its disposal costs significantly both in the short and ultimately in the long-term. As a consequence, the impacts to the environment would also be significantly reduced. CNL must revise the IWS to address all aspects of the CNSC Policy P-290 including the most important of the three "R's", Reduce. There is no information in the EIS as to how CNL is minimizing the wastes that require management (which in this case is disposal). What measures are proposed to reduce the volume of the wastes that need to be disposed of in the ECM? With respect to the managing the wastes in a manner that is commensurate with its hazards, I cannot understand why CNL decided to use its self-defined waste types instead of using	Canadian Nuclear Laboratories' (CNL's) Integrated Waste Strategy (IWS) [1] is summarized in Section 2.2 of the final Environmental Impact Statement (EIS). The IWS is based on CNL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. The IWS is available to the public at www.cnl.ca/nsdf or by contacting ermstakeholder@cnl.ca Canadian Nuclear Laboratories adheres to Canadian Standards Association (CSA) N292.0-19 [2], which specifies to minimize the generation of radioactive waste to the minimum practicable level. Waste minimization, as per CNL Waste Management Program documentation, is performed through the waste hierarchy and the main mechanism is through identification, characterization and segregation of waste materials. The specific details, such as minimizing actions, are currently detailed through individual waste management plans or supporting documentation.

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		the waste classes as defined by international best practice, IAEA, GSG-1, Classification of Radioactive Waste. (See Comment 67 above) The five IAEA waste classes are based on their radiological hazard, whereas the CNL waste types are not.	The waste classes presented in International Atomic Energy Agency (IAEA) GSG-1 [3] describe the range of radioactive wastes from exempt waste to used fuel. The Near Surface Disposal Facility (NSDF) has updated the Waste Acceptance Criteria (WAC) [4] to be consistent with this document's guidance on the classification of Low Level Waste (LLW). The waste types described Section 3.3.1.1 of the final EIS are descriptions of the physical characteristics of the various wastes that may be accepted at the NSDF. This type of categorization is useful for people to understand the kinds of materials that are being proposed for NSDF, and is also important to recognize physical attributes of the waste for the purposes of adherence to the facility design principles. Waste types, as described in Section 3.3.1.1, are not meant to be confused with waste classification such as "LLW". References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND151	William Turner (May 31, 2017) 9.	The EIS seems to ignore the "main waste management drivers" listed on Page 3-6 of the IWS summary	The final Environmental Impact Statement (EIS) discusses Canadian Nuclear Laboratories' (CNL's) Integrated Waste Strategy (IWS) in Section 2.2. The term "main waste drivers" no longer appears in the revised Integrated Waste Management Strategy (IWS) document. Where the term appeared in the original was in a section related to the Waste Hierarchy. It is therefore understood that the commenter is questioning CNL's adherence to the waste diversion or hierarchy principles, which states that the options for dealing with waste, in order from most favoured to least favoured, are: • Prevent • Reduce • Reuse • Recycle • Dispose With respect to each point, and the Near Surface Disposal Facility (NSDF) project: • Prevent – a large portion of waste proposed for NSDF has already been created, either in the form of buildings constructed up to 60 years ago, to contaminated lands as a result of poor waste management practices in the past. CNL will be "generating" a lot of low-level waste (LLW) during the decommissioning process, but the material already exists. • Reduce – reasonable efforts are made to segregate wastes that can be cleared through the application of exemption and clearance levels. It is in CNL's best interest to clear waste streams this way. Sending clean waste off-site to a commercial waste disposal facility ensures NSDF is treated as an asset. NSDF has a limited capacity at 1,000,000 m^3 and CNL intends to use this space efficiently to avoid the need for a second low-level waste facility. • Reuse & Recycle – as above, waste that can be cleared can be sent to off-site locations where re-se and recycling of the material is an option. However, much of the contaminated soils can be used as fill inside of the NSDF, effectively re-using this material for another purpose. • Dispose – wastes that exist and cannot be cleared require a disposal route. The NSDF is the proposed solution for LLW. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.

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CNL-ND152	William Turner (May 31, 2017) 24.	I note that this figure makes no provision for pre-treatment of any wastes. Apparently all the wastes will be stored then transferred to their ultimate "Disposition Route:" CNL must revise the IWS to include waste processing and/or pre-treatment, such as incineration, metal melt, supercompaction, etc. as demonstrated by international best practice. The objective of these treatment processes is to reduce the volume that needs to be disposed of. Volume reduction will significantly reduce the potential environmental impact of any repository.	Canadian Nuclear Laboratories' (CNL's) existing waste processes include waste segregation, size reduction and treatment (where a benefit exists). The following text is contained in the Integrated Waste Strategy (IWS) document [1]: "The baseline strategy for solid low-level waste (LLW) at Chalk River Laboratories (CRL), WL (excluding WR-1), Douglas Point and Gentilly-1 is to segregate where practical, process as required and place in storage until the proposed Near Surface Disposal Facility (NSDF) becomes available. In the near term a sort/ segregation facility at CRL is planned to manage some of the legacy LLW to produce disposal ready packages." Although waste conditioning, such as the reduction of organic waste through incineration, has not been explicitly considered in the final EIS, conservative and bounding waste estimates were projected and assessed to arrive at the 1,000,000 m^3 capacity for the ECM. Canadian Nuclear Laboratories will continue to explore and utilize other waste processing during the NSDF's operating phase, especially those that reduced the volume, if practicable to do so (e.g., incineration). Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
		Integrated Waste Management – General	
CNL-ND153	Cody Cuthill (August 4, 2017) William Turner (May 31, 2017) 70.	The EIS outlines waste of type 3 to include materials that do not meet the slump test or sludge's. These should not be allowed in a landfill type design and be required to be solidified prior to disposal. CNL must describe the processes that will ensure that liquids are not placed in a facility designed for solid waste.	The NSDF Waste Acceptance Criteria (WAC) [1] has been revised and is available to the public at www.cnl.ca/nsdf or by contacting ermstakeholder@cnl.ca Free-standing liquids are not accepted at the Near Surface Disposal Facility (NSDF). Section 3.5 of the WAC document [1] states the following: "Free standing liquids are not permitted in NSDF waste (i.e., equal to or greater than 1% free standing liquids by volume). Wastes that are suspect to contain free liquids (e.g., high moisture content) can be tested using: • SW-846 Test Method 9095B: Paint Filter Liquids Test; or • Test Method for the Determination of Liquid Waste (slump test). Note waste is defined as "Liquid Waste" if it slumps more than 150 mm. Wastes that have been rendered solid via stabilization (e.g., cementation) or pre-treatment are required to meet this performance objective." All waste accepted into the NSDF must meet all the requirements of the WAC [1]; thus, Type 3 waste must meet the above criterion. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND154	Cody Cuthill (August 4, 2017)	The EIS outlines waste of type 4 to include pipe and structural steel or type 6 tanks. Requirements that these materials be decontaminated or attempts at decontamination should be required prior to disposal to ensure compliance with the principals or recycling and ensure longevity to the disposal facility. In addition, metal containerized waste should not be allowed as the leachate is not compatible and will cause deterioration.	As part of adhering to waste diversion principles, Canadian Nuclear Laboratories (CNL) will make every reasonable effort will be made to reduce metal waste volumes by the sorting and segregation of clean waste from radioactively contaminated wastes, the decontamination of waste metals where reasonable practical and when feasible recycling of radioactive metals within the nuclear industry. With that said, radioactively metal waste has been accommodated for within the safety analysis of the NSDF as well as within the design of the Wastewater Treatment Plant, pending the waste meets the Waste Acceptance Criteria [1] of the NSDF. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.

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CNL-ND155	Cody Cuthill (August 4, 2017)	The EIS does not provide detailed computer modelling such as RESRAD. A RESRAD model of the Silverberry NORM landfill outlined an exposure to future generations of approximately 0.3 mSv/a at 5 Bq/g for long lived Ra226 with an average soil concentration limit of under 3 Bq/g. A modelling of the long lived radionuclides being accepted should be conducted to verify total landfill activity limits for each long lived radionuclide (total Bq) in addition to limiting the activity concentrations (Bq/g).	Section 5.8 of the final Environmental Impact Statement (EIS) is a summary of the modelling and calculations performed in support of the short and long-term performance of the Near Surface Disposal Facility (NSDF). The RESRAD tool was used to evaluate the project in support of the 2017 draft EIS. The final EIS uses information from the Post-Closure Safety Assessment (PostSA) [1] to evaluate the long-term performance of the facility and resulting dose. The PostSA uses an internationally recognized tool called AMBER to perform the compartmental modelling of the disposal facility system. Canadian Nuclear Laboratories (CNL) acknowledges that the proposed inventory for NSDF includes several long-lived radionuclides as shown by Table 3.3.1-2 of the final EIS. Long-lived radionuclides are included in the NSDF inventory as they are intrinsically part of the radiological fingerprints of waste streams at Chalk River Laboratories (CRL) and other CNL sites. It is not technically or economically feasible to separate the long-lived radionuclides from the waste streams. However, the concentrations of long-lived radionuclides that are proposed in the NSDF licensed inventory are in limited concentrations consistent with CSA Group (CSA) and International Atomic Energy Agency (IAEA) guidance ([2] & [3], Sections 2.2(4) of [2] and 2.24 of [3], for example). The substantial decrease of radioactivity concentrations in the first 100 years after the facility has been closed (as shown in Figure 3.3.1-2 of the final EIS is the result of the decay of the shorter-lived radionuclides. The remaining radioactivity present in the NSDF after the 300-year Institutional Control period is the limited inventory of long-lived radionuclides. The risk of the presence of these long-lived radionuclides has been studied in detail in the PostSA [1]. The calculated dose consequence and environmental concentrations meet the dose acceptance criteria and environmental quality standards, respectively, thus do not pose an unacceptable risk to the public or environment. Section 5.8.6.1.2.2 of the final EIS summarizes the findings of the PostSA and presents dose results. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] CSA Group. CSA N292.0-19: General Principles for the Management of Radioactive Waste and Irradiated Fuel. 2019. [3] IAEA General Safety Guide (GSG)-1. Classification of Radioactive Waste. IAEA (International Atomic Energy Agency). 2009.
		Integrated Waste Management – Low Level and Intermediate Level Waste	
CNL-ND156	OFWCA (Johanna Echlin) (May 8, 2017) Greg Csullog (May 1, 2017) Anna Tilman (June 22, 2017) William Turner (May 31, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* No reference is made as to limitations or restrictions as to what radionuclides would not be acceptable for storage in a NSDF. Why would consider ILW in the NSDF if it feels a separate repository for ILW may be required? What are the characteristics of some ILW that could possibly be suitable for the NSDF? The EIS indicates that treatment of ILW may be required to meet the Waste Acceptance Criteria (WAC) for the future repository, although what this treatment would entail is not specified. [EIS 2.2.2.2]. … Also, there is no clear delineation specified for the classification of what is ILW.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The limitation for radionuclides are located in the NSDF Waste Acceptance Criteria (WAC) [2] and include radionuclide activity concentration limits (included below) and the requirement to comply with the Licensed Inventory [3]; the maximum radioactivity of significant radionuclides that the NSDF will accept. The radionuclide concentration limits for waste are provided for a single radionuclide; or in the case of a mixture of radionuclides, the sum of the component radionuclide limit fractions must not exceed 1 to demonstrate compliance and

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			referred to as the "Sum of Fractions" rule. The calculation of the concentration limits shall exclude the mass of packaging and shielding. Limits for Bulk Waste and non-leachate controlled waste packages: • 100 Bq/g for alpha-emitting radionuclides. • 1,000 Bq/g for long-lived beta and gamma emitting radionuclides (half-life > Cesium-137). • 10,000 Bq/g for short-lived beta and gamma emitting radionuclides (half-life ≤ Cesium-137). • 100,000 Bq/g for tritium. Limits for Leachate Controlled Waste Packages: • 400 Bq/g for alpha-emitting radionuclides. • 10,000 Bq/g for long-lived beta gamma emitting radionuclides (half-life > Cesium-137). • 10,000 Bq/g for Cesium-137. • 10,000 Bq/g for Strontium-90. • 10,000,000 Bq/g for tritium. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND157	Greg Csullog (May 1, 2017) Anna Tilman (June 22, 2017) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017) William Turner (May 31, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] **2.2.2– 2-4:** The phrase "stored on CNL sites as Low and Intermediate Level Waste (L&ILW)" appears to contradict Figure 2.2-2, which implies that LLW and ILW were managed separately – the phrase appears to confirm that LLW and ILW were managed together (co-mingled), even if the IAEA waste classification was not used. It is critical that an inventory of radionuclides must list **both ILW and LLW separately**. Regarding "segregated based on handling and storage requirements", historically this was based on radiation fields, package size/type and other physical parameters – wastes were NOT segregated according to suitability for long-term storage or disposal. A misrepresentation of historic practices, even unintentionally, puts into doubt strategic planning for the future since moving to the future requires a detailed knowledge and understanding of the past.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Section 3.3.1.3 of the final EIS have been updated to reflect the revised radiological and non-radiological inventory proposed for disposal in NSDF. All waste, whether presently in interim storage at Chalk River Laboratories (CRL), or waste generated as a result of facility decommissioning or environmental remediation, requires characterization, such that an assessment against the Waste Acceptance Criteria (WAC) [2] can be performed before it can be considered for disposal in the NSDF. Canadian Nuclear Laboratories (CNL) has made an informed decision to design and operate a facility that will safely accommodate both very low-level radioactive waste (VLLW) and low-level radioactive waste (LLW). As per CSA N292.0 General principles for the management of radioactive waste and irradiated fuel [3], VLLW is a subcategory of LLW for which CNL has proposed both for disposal in NSDF thus, CNL does not make a distinction of VLLW as a separate waste classification. The term "legacy wastes" has been introduced to refer to the wastes that have been in storage at CRL for many decades, much of which are not currently located in modern radioactive waste management facilities. The term does not refer to any specific class of waste nor does the term describe the characteristics of the waste.

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		The text in Section 2.2.2 raises doubts and concerns about the ability to adequately demonstrate the characteristics of waste from "legacy waste management areas" to allow their dispositioning in the NSDF. It would seem to me that it would be more cost-effective and prudent to include these wastes in an ILW repository or in an Above Ground Concrete Vault facility. The waste inventory for Ontario Power Generation (OPG)'s proposed Deep Geological Repository (DGR) lists both LLW and ILW separately. Furthermore, compared to LLW, ILW contains significant and higher concentrations of long-lived radionuclides which typically exhibit levels of penetrating radiation sufficient to require shielding for worker protection during handling and interim storage. [EIS 1-1. Also, Section 2.2.2.2 and Table 2.2.1]. Given the inherent danger of higher active waste, especially alpha emitters, the clarification and distinction as to the ILW content in the waste is not only critical, it is absolutely essential, irrespective of the percentage by volume. CNL should make adequate distinction between very low and low-level waste, as suggested by the IAEA. There is no waste class (or waste type) identified as "CNL legacy wastes". CNL should provide a definition and listing of "CNL Legacy Wastes" along with categorize these "legacy wastes" into five IAEA waste classes, along with an estimate of their quantities (not just volumes). [Français] **2.2.2– 2-4 :** L'expression « stockés sur les sites des LNC en tant que déchets radioactifs de faible et de moyenne activité (DRFMA) » semble contredire la figure 2.2-2, qui implique que les DRFA et les DRMA ont été gérés séparément – l'expression semble confirmer que les DRFA et les DRMA ont été gérés ensemble (mélangés), même si la classification des déchets de l'AIEA n'a pas été utilisée. Il est essentiel qu'un inventaire des radionucléides dresse une liste **distincte des DRMA et des DRFA**. En ce qui concerne l'expression « triés en fonction des exigences en matière de manipulation et de stockage », elle était historiquement fondée sur les champs de rayonnement, la taille et le type de colis et d'autres paramètres physiques – les déchets n'étaient PAS triés en fonction de leur caractère adéquat pour le stockage ou l'évacuation. Une fausse représentation des pratiques historiques, même involontairement, met en doute la planification stratégique pour l'avenir, puisque pour regarder vers l'avenir, il faut une connaissance et une compréhension détaillées du passé. Le texte de la section 2.2.2 soulève des doutes et des préoccupations quant à la capacité de démontrer de manière adéquate les caractéristiques des déchets provenant des « zones de gestion des déchets historiques » afin de permettre leur élimination dans l'IGDPS. Il me semble qu'il serait plus rentable et plus prudent d'inclure ces déchets dans un dépôt de DRFA ou dans installation de voûte de béton en surface. L'inventaire des déchets du dépôt géologique en profondeur proposé par Ontario Power Génération (OPG) énumère de façon distincte les DRFA et les DRMA. En outre, par rapport aux DRFA, les DRMA contiennent des concentrations importantes et plus élevées de radionucléides à longue période qui	References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] CSA Group. CSA N292.0-19: General Principles for the Management of Radioactive Waste and Irradiated Fuel. CSA Group. 2019. [Français] Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire de déchets destinés à l'installation de gestion des déchets près de la surface (IGDPS) et y ont apporté des modifications. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été officiellement annoncée par les LNC le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage permanent des DMA (section 2.2.2.1 de l'Étude d'impact environnemental (EIE) définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [1]). La section 3.3.1.3 de l'EIE définitive a été mise à jour compte tenu du nouvel inventaire de déchets radiologiques et non radiologiques destinés à l'IGDPS. Tous les déchets, qu'ils se trouvent actuellement dans une zone d'entreposage temporaire sur le site des Laboratoires de Chalk River (LCR) ou qu'ils soient le produit du déclassement d'une installation ou de l'assainissement de l'environnement, doivent être classés pour qu'il soit possible de procéder à une analyse en fonction des critères d'acceptabilité des déchets (CAD) [2] avant d'envisager de les éliminer dans l'IGDPS. Les Laboratoires nucléaires canadiens (LNC) ont pris la décision raisonnée de concevoir et d'exploiter une installation qui permettra de gérer en toute sécurité des déchets radioactifs de très faible activité (DTFA) et des déchets radioactifs de faible activité (DFA). Selon la norme CSA N292.0 (Principes généraux pour la gestion des déchets radioactifs et du combustible irradié) [3], les DTFA sont une sous-catégorie des DFA, mais les LNC proposent de traiter les deux catégories de déchets dans l'IGDPS sans faire de distinction entre les deux. L'expression « déchets historiques » désigne les déchets hérités du passé qui se trouvent dans des zones d'entreposage sur le site des LCR depuis des décennies et dont une grande partie ne se trouve pas actuellement dans des installations modernes de gestion des déchets radioactifs. L'expression ne renvoie pas à une catégorie particulière de déchets ni ne constitue une description de ces déchets. Références [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [2] Critères d'acceptation des déchets de l'installation de gestion des déchets près de la surface, 232-508600-WAC-003. [3] Groupe CSA, norme N292.0-19 : Principes généraux pour la gestion des déchets radioactifs et du combustible irradié, 2019.

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		présentent généralement des niveaux de rayonnement pénétrant suffisants pour nécessiter un blindage afin d'assurer la protection des travailleurs pendant la manutention et l'entreposage provisoire. [EIE 1-1. Aussi, section 2.2.2.2 et tableau 2.2.1]. Étant donné le danger inhérent aux déchets plus actifs, en particulier les émetteurs alpha, la clarification et la distinction quant au contenu des DRMA dans les déchets ne sont pas seulement critiques, elles sont absolument essentielles, quel que soit le pourcentage en volume. Les LNC devraient faire une distinction adéquate entre les déchets radioactifs de très faible activité et les déchets radioactifs de faible activité, comme le suggère l'AIEA. Il n'y a pas de catégorie de déchets (ou de type de déchets) identifiée comme « déchets historiques des LNC ». Les LNC devraient fournir une définition et une liste des « déchets historiques des LNC », classer ces « déchets historiques » en cinq catégories de déchets de l'AIEA et fournir une estimation de leurs quantités (et pas seulement des volumes).	
CNL-ND158	Northwatch (August 16, 2017)	**2.2.4 -** The draft EIS states: "*Mixed waste is hazardous waste that is radiologically contaminated. It is generally dispositioned as it is generated and will continue to be sent to a commercial processor for treatment unless or until an appropriate local (CRL) treatment process is developed. The commercial processor returns the radioactive portion of the material to CRL, where it is stored until disposal as per the radioactive classification of the material. Mixed waste may be accepted for disposal in the NSDF provided that it meets the intent of land disposal and leachate requirements specified in the Ontario Environmental Protection Act, Regulation 347 General Waste Management. Where required, mixed waste must be processed in advance of placement in the ECM.*" The draft EIS provides insufficient information about this waste stream to determine its importance and potential impacts as a result of emplacement in the proposed ECM. Information Requests 16 and 17: Describe the current disposal pathway for "mixed waste", including its destination, treatment by "commercial processors", the location of the "commercial processors", the packaging requirements for the outgoing "mixed waste" and the returning "radioactive portion" of these wastes. Describe the radiological hazard of the returning "radioactive portion" of these wastes and the additional chemical or other characteristics of the outgoing and returning wastes.	The terminology "mixed waste" is no longer used, and the new terminology used is more direct: "low-level waste (LLW) containing non-radiological constituents". As noted in Section 3.3.3.3 of the final Environmental Impact Statement (EIS) and Section 4.1 of the Waste Acceptance Criteria (WAC) [1], there are restrictions placed on hazardous waste. Only hazardous waste that is also radioactive waste will be accepted at NSDF. More specifically, that hazardous wastes must be treated to meet the requirements of Ontario Regulation 347 [2] in order to qualify for disposal at the Near Surface Disposal Facility (NSDF). Non-radioactively contaminated hazardous wastes are to be disposed of elsewhere. This requirement effectively limits the chemical characteristics of the waste including the leachability of non-radiological constituents. As a result, the non-radiological inventory was revised to reflect this restriction. Until the Near Surface Disposal Facility (NSDF) is operational, there is no disposal pathway for LLW containing non-radiological constituents. These wastes remain in interim storage until appropriate disposal routes are identified. The generation, segregation, transportation, and processing of "mixed waste" is outside of the scope of the NSDF Project and EIS. These kinds of activities are considered normal operations, they occur on a regular basis, and are covered by other licenses and permits. For example mixed wastes that are transported to or from the Chalk River Laboratories (CRL) site meet applicable requirements under the Transportation of Dangerous Goods Act and associated regulations. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND159	Joan Lougheed and Town of Deep River (August 16, 2017)	In Canada, ILW makes up seven percent of the total volume of radioactive waste (see pg. 5 of DIS-16-03). The draft EIS states that "limited quantities" of ILW may be suitable for disposal in the NSDF (see Table 2.2-1 on pg. 2-2), and currently, only one percent of waste by volume is forecasted to be ILW (see Table 3.2.1-1 on pg 3-8). However, CNL has not been consistent with respect to the one percent reference. In Section 3.2.2.2, CNL states that "A few percent of containerized ILW (i.e., Type 5 waste) has been included in the NSDF Project waste inventory". The volume of ILW to be deposited at the NSDF must be clarified.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.

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		It appears from the figure that the NSDF will be the only current permanent waste disposal facility for ILW that CNL has access to. Other long-term waste management facilities operated by CNL, such as those in Port Hope and Port Granby, do not accept ILW. The ILW problem becomes increasingly apparent as the only potential long-term solution proposed by CNL for the disposal of a significant quantity of ILW (other than in-situ entombment) is the construction of a geologic waste management facility (see pg. 2-23 and Section 2.0 in its entirety, which is a consideration of the Alternative Means for Carrying out the Project). The construction and lifecycle costs of a geologic waste management facility are nearly prohibitive (the GWMF considered by CNL in the draft EIS was estimated to cost $10,000,000,000.00) and the construction schedule is substantially longer than that required for the NSDF (see pgs. 2-20 and 2-23). The Town of Deep River is concerned that an appropriate permanent ILW disposal facility will never be constructed, leaving the NSDF as the only ILW disposal facility operated by CNL. I	
CNL-ND160	David Raman (August 3, 2017)	**Bounding NDSF Project Waste Radionuclide Inventory (Table 5.7.6-1)** It can be seen in this table that there is the intent to emplace significant quantities of actinides in the NDSF, more than may be reasonably expected to be entrained in other suitable low-level wastes. Due to chemical and radiological toxicity these materials are not suitable for near surface disposal, and historically were always intended by CRL to be sent to deeper geological facilities, like a shallow rock cavity. What has changed to make them suitable for the NDSF?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and the NSDF will accept only low-level waste (LLW) that meets the Waste Acceptance Criteria (WAC) [1]. This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [2]). The primary International Atomic Energy Agency (IAEA) document which provides guidance on the NSDF WAC [1] is *IAEA General Safety Guide – 1* (GSG-1), *Classification of Radioactive Waste* [3]. IAEA GSG-1 (Section 2.27) provides guidance on the classification of low-level radioactive waste. This guidance is adopted by Canadian Standards Association (CSA) N292.0-19 [4]. Canadian Nuclear Laboratories is committed to disposing of low-level waste (LLW) only in NSDF, therefore the WAC is now in alignment with both the IAEA GSG-1 and CSA N292.0-19 guidance for the classification of low-level waste. In fact, the NSDF WAC limits utilize the lower end of the ranges provided within the guidance. For example, the guidance suggests a limit of 400 Bq/g on average and up to 4000 Bq/g for individual packages for long-lived alpha emitting radionuclides, whereas the NSDF WAC uses a limit of 100 Bq/g for bulk waste and up to 400 Bq/g in leachate controlled packages for long-lived alpha emitting radionuclides. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [4] CSA Group. CSA N292.0-19 - General principles for the management of radioactive waste and irradiated fuel. 2019.
		Integrated Waste Management – Waste Acceptance Criteria	
CNL-ND161	Ole Hendrickson (August 16, 2017) Ottawa Riverkeeper	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* There is insufficient information regarding the waste that will eventually be accepted for disposal into the NSDF. It is impossible to assess ecological risk without a complete understanding of the composition and	Section 3.3.3 of the final Environmental Impact Statement (EIS) now contains a much more detailed description of the Waste Acceptance Criteria (WAC). In addition, the WAC document [1] has been made available to the public, and is fully transparent with regards to what radioactivity limits are acceptable at the facility. These radioactivity limits are consistent with International Atomic Energy Agency (IAEA) and Canadian Standards Association (CSA) guidance for the classification of low-level waste (LLW) [2]. This approach is consistent with Requirement 22 of IAEA SSR-5 [3] where

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	(August 15, 2017) Deborah Powell (August 16, 2017)	amounts of the wastes that will be placed in the dump. More details about our concerns related to the Waste Acceptance Criteria (WAC) can be found in Appendix 2 of the Ottawa Riverkeeper submission, page 5. The proponent should fully document the NSDF Waste Acceptance Criteria and the process for their development; and compare them to criteria used by other countries for very low-level waste, low-level waste, and intermediate level waste disposal.	near surface disposal facilities must utilize waste acceptance criteria to ensure the long-term safety of the public and environment. In addition to radioactivity concentration limits, the WAC also has information on: • Physical properties (size, mass, etc.). • Chemical properties (meeting the intent of Ontario Regulation 347 [4]). • Hazardous waste (listed waste, characteristic waste, PCBs, biohazardous). • Restricted materials (liquids, pressurized containers, etc.). • Criticality limits and restrictions. • External dose rates. • Disused sources. While the WAC places limits on the characteristics of the waste, the Licensed Inventory is the maximum radiological inventory allowable into the facility, as outlined in Table 3.3.1-2 of the final EIS. This inventory has been evaluated through long-term modelling and assessment to ensure that all dose requirements are met. The WAC and Reference Inventory document [5] are available at www.cnl.ca/nsdf or can be obtained by contacting ermstakeholder@cnl.ca. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] CSA Group. CSA N292.0-19: General Principles for the Management of Radioactive Waste and Irradiated Fuel. CSA Group. 2019. [3] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5. 2011 April. [4] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347. [5] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND162	Northwatch (August 16, 2017)	Section 3.2.2 describes - very generally - the development process for the WAC. Inarguably, the means by which the WAC are developed is important. However, this brief description offers little in terms of understanding the basis for the WAC, the methodology for its development, or the grounding of its development in either best practices or regulatory standards. Instead, it raises numerous questions: - How do the timelines for the development of the WAC, safety analysis, performance assessment, facility design, and the environmental assessment process compare or coincide? - What is the nature of the "iterative process" among the cited project components? - Which IAEA guidelines, relevant regulations and WAC documents from other approved similar waste disposal sites were relied upon? - If there were differences among these referenced documents, what were they and how were they reconciled? - Which of the CSA standards are the WAC based on? - What CNL strategic planning and stakeholder workshops are the WAC based on? Who participated in those sessions? At what point and in how many of the "iterations" were the strategic planning and/or the stakeholder workshops convened?	The primary studies and analyses that used, or informed the development of the Waste Acceptance Criteria (WAC) [1] were the Post-Closure Safety Assessment (PostSA) [2], the Safety Analysis Report (SAR) [3], and the Reference Inventory Report [4], as well as feedback from the regulatory agencies and public during the review of the 2017 draft Environmental Impact Statement (EIS). These are the documents and studies that had the most impact on determining the appropriate waste acceptance criteria for the Near Surface Disposal Facility (NSDF). These documents were complete products when they fed the WAC and have been updated to reflect feedback from stakeholders (i.e., regulatory agencies and the public). The "iterative process" refers to a process where a radiological inventory is proposed, and then assessed through the SAR and/or PostSA to determine if the short and long-term risks are acceptably low and meet all requirements. For example, in the PostSA [2], several Human Intrusion scenarios were assessed. In the most conservative and unlikely of the scenarios, the calculated dose consequence to the receptor was over the regulatory dose limit for a member of the public of 1 mSv/yr. The PostSA presented which radionuclides contributed the majority of the dose (plutonium-239 and iodine-129), and calculated the inventory reductions that would be required in order to meet the regulatory dose limit for a member of the public of 1 mSv/yr. The recommendation to reduce the plutonium-239 and iodine-129 inventories resulted in a further iteration of the total radiological inventory, known as the Licenced Inventory.

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		In addition, the brief description of the development of the WAC as an iterative process is ambiguous as to whether this process is now complete or is ongoing. However, given some of these elements that were purportedly developed "in parallel" with the WAC are still under development – such as the safety analysis, performance assessment, facility design, and the environmental assessment process – the reader must conclude that the iterative process is still ongoing and the products are not complete.	The proposed NSDF inventory and WAC have been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [4]. The revised waste inventory is captured in Section 3.3.1.3 of the final Environmental Impact Statement (EIS). The primary International Atomic Energy Agency (IAEA) document which provides guidance on the NSDF WAC is *IAEA General Safety Guide – 1, Classification of Radioactive Waste* [5]. IAEA GSG-1 (Section 2.27) provides guidance on the classification of low-level radioactive waste. This guidance is adopted by Canadian Standards Association (CSA) N292.0-19 [6]. Canadian Nuclear Laboratories is committed to disposing of low-level waste (LLW) only in NSDF, therefore the WAC is in alignment with both the IAEA GSG-1 and CSA N292.0-19 guidance for the classification of low-level waste. In fact, the NSDF WAC limits utilize the lower end of the ranges provided within the guidance. For example, the guidance suggests a limit of 400 Bq/g on average and up to 4000 Bq/g for individual packages for long lived alpha emitting radionuclides, whereas the NSDF WAC uses a limit of 100 Bq/g for bulk waste and up to 400 Bq/g in leachate controlled packages for long live alpha emitting radionuclides. The NSDF WAC document examined WAC at several other similar disposal facilities as benchmarking activities: • LLW disposal facility in Clive, Utah, USA. • CERCLA Disposal Facility, Idaho, USA. • LLW Repository near Drigg, UK. • LLW disposal facility at Andrews, Texas, USA. The WAC developed at any disposal facility are intended to be specific to the facility design, location, environment, and other requirements specific to the nation or state. As a result, WAC for similar facilities are unlikely to be identical, and differences between them are not subject to reconciliation. With that said, the WAC from other facilities were used as benchmarking tools to help develop the WAC for the NSDF. This process is described further in Table 9 of the WAC [1] and Section B.1.2.2 of the NSDF Reference Inventory Report [4]. The initial development and screening of radionuclides for inclusion into the Reference Inventory was done via workshop which included project stakeholders and Canadian Nuclear Laboratories (CNL) waste subject matter experts. After the initial screening, variations in the Reference Inventory were primarily driven through long-term modelling results (See Figure 1 of the Reference Inventory Report [4]). Adjustments to the WAC were a result of adjustments to the total inventory, and a result of CNL's commitment to accept only LLW. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [5] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [6] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019.
CNL-ND163	Greg Csullog (May 1, 2017)	**3.2.2:** Regarding, "any waste consignment accepted for disposal at NSDF shall not exceed the following values…4,000Becquerels per gram (Bq/g)", it is not clear if the 400 Bq/g value is the average per consignment, per waste block, per waste stream or that average for the facility as a whole. This needs to be explicitly stated.	The radionuclides concentration limits found in Table 4 of the NSDF Waste Acceptance Criteria (WAC) [1] are applicable to the average per consignment of waste. Additionally, radionuclides that were identified as significant radionuclides and are required to be tracked to ensure the inventory does not exceed the safety basis.

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			There are two upper limits to the amount of waste that the NSDF can accept: 1. The maximum radioactivity of significant radionuclides must be below the activity (Bq) specified in the Licensed Inventory (See column 4 of Table 3.3.1-2 of the final EIS); 2. The total volume of waste cannot exceed 1,000,000 m^3. The weight or mass of the waste is not considered a limiting factor, but average densities were an important input to the design and analysis. Section 3.3.3 of the final Environmental Impact Statement (EIS) now contains a much more detailed description of the WAC. In addition, the WAC document [1] has been made available to the public, and is fully transparent with regards to what radioactivity limits are acceptable at the facility. These radioactivity limits are consistent with International Atomic Energy Agency (IAEA) [2] and Canadian Standards Association (CSA) [3] guidance for the classification of low-level waste (LLW). In addition to radioactivity concentration limits, the WAC also has information on: • Physical properties (size, mass, etc.) • Chemical properties (meeting the intent of Ontario Regulation 347) • Hazardous waste (listed waste, characteristic waste, PCBs, biohazardous) • Restricted materials (liquids, pressurized containers, etc.) • Criticality limits and restrictions • External dose rates • Disused sources The WAC document is available to the public at www.cnl.ca/nsdf or can obtained by contacting ermstakeholder@cnl.ca The limits on radiological properties are as follows (see Section 5.2 of the WAC [1]): The radionuclide concentration limits for waste are provided for a single radionuclide; or in the case of a mixture of radionuclides, the sum of the component radionuclide limit fractions must not exceed 1 to demonstrate compliance and referred to as the "Sum of Fractions" rule. The calculation of the concentration limits shall exclude the mass of packaging and shielding. Limits for Bulk Waste and non-leachate controlled waste packages: • 100 Bq/g for alpha-emitting radionuclides. • 1,000 Bq/g for long-lived beta and gamma emitting radionuclides (half-life > Cesium-137). • 10,000 Bq/g for short-lived beta and gamma emitting radionuclides (half-life ≤ Cesium-137). • 100,000 Bq/g for tritium. Limits for Leachate Controlled Waste Packages: • 400 Bq/g for alpha-emitting radionuclides. • 10,000 Bq/g for long-lived beta gamma emitting radionuclides (half-life > Cesium-137). • 10,000 Bq/g for Cesium-137. • 10,000 Bq/g for Strontium-90. • 10,000,000 Bq/g for tritium. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste.

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			[3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019.
CNL-ND164	Greg Csullog (May 1, 2017)	**3.2.3 Waste Acceptance Criteria Variance Process – 3-13:** What about storage since off-site disposal or disposal at another type of facility may not be available options?	Specific information on the Waste Acceptance Criteria (WAC) variance process is no longer included in the final Environmental Impact Statement (EIS). The Near Surface Disposal Facility (NSDF) Project WAC [1] ensures Canadian Nuclear Laboratories (CNL) meets its responsibility as the licensee; that all waste received for disposal is in compliance with the design and licensing basis for the facility. The WAC [1] has been revised to clarify waste that do not meet the WAC non-compliant waste and the variance process is analogous to the Infrequently Performed Operations [2] process. Waste that does not meet the WAC [1] is non-compliant waste. Non-compliant waste is assessed on a case by case following the CNL procedure, Infrequently Performed Operations [2]. The non-compliant waste will be authorized on a case by case basis by the NSDF Facility Authority, and the waste will not in any circumstances result in contravening the safety goals and design targets for normal operations or design targets for accidents [3]. The non-compliant waste will be stored at the generator's site or at the Chalk River Laboratories (CRL) Waste Management Areas during the assessment stage. Any waste accepted for disposal into NSDF using the Infrequently Performed Operations [2] process will be reported to the Canadian Nuclear Safety Commission (CNSC) in Chalk River Laboratories' (CRL's) Annual Compliance Monitoring Report. Wastes that are not disposed of in the NSDF will continue to be stored at the CRL site until a disposal solution exists. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Infrequently Performed Operations, 900-508200-MCP-008. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND165	Anna Tilman (June 22, 2017) Joan Lougheed and Town of Deep River (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* As stated in the EIS, the development of WACs is an "iterative process - based on interpretation and applications of IAEA guidelines, CSA standards, CNL's strategic planning and stakeholder workshops". [EIS 3.2.2 p. 3.9] WACs are expressed in units of specific activity (Bq/g). The total specific activity not to be exceeded for emplacement is 4,000 Bq/g for all alpha emitters and 100,000 Bq/g for all long-lived beta radionuclides. Wastes with activity greater than 400 Bq/g for alpha-emitting radionuclides and 10,000 Bq/g for long lived beta radionuclides require special packaging and/or treatment to ensure the radioactive wastes remain isolated and contained in the waste packages. • What is the basis for setting these activity levels, both for the limits for acceptance and for the wastes that would require special treatment? • In that these levels are expressed as concentrations, is there a limit on the actual amount of waste (in weight or activity)?	The Waste Acceptance Criteria (WAC) [1] has been revised to reflect the reduction of inventory to only low-level waste, provide transparency on the basis of the WAC, and incorporate Canadian Nuclear Safety Commission (CNSC) comments during licensing reviews. Section 3.3.1 recognizes that only low-level waste (LLW) as defined in the Canadian Standards Association (CSA) standard for the nuclear industry N292.0-19 General Principles for the Management of Radioactive Waste and Irradiated Fuel [2] and International Atomic Energy Agency's (IAEA's) general guide GSG-1 Classification of Radioactive Waste [3], will be accepted for disposal in Near Surface Disposal Facility (NSDF). CSA N292.0-19 and IAEA GSG-1 are the basis for the revised WAC concentration limits for bulk and packaged waste in Section 3.3.3.2 of the final Environmental Impact Statement (EIS). Although these guidance documents provide a concentration range for low-level waste, to remain conservative the NSDF Project has used the lower bounds of the low-level waste guidance was used (e.g., the guidance suggests that low-level waste could contain up to 400 Bq/g of alpha-emitting waste on average. The NSDF WAC limit for bulk waste is 100 Bq/g of alpha emitting radionuclides). There are two upper limits to the amount of waste that the NSDF can accept. Neither of the following may be exceeded: 1. The maximum radioactivity of each radionuclide must be below the amount specified in the Licensed Inventory (See column 4 of Table 3.3.1-2 of the final EIS); 2. The total volume of waste cannot exceed 1,000,000 m^3. The weight or mass of the waste is not considered a limiting factor, but average densities were an important input to the design and analysis.

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		It would be informative and reassuring for the reader if examples could be provided that illustrate the extra steps taken, including an outline of what fraction of the NSDF will be used for these special packages. With this knowledge, the robustness of the design can be better assessed.	The WAC has been revised to specify the requirements for accepted packages for receipt/emplacement in the NSDF. Type 5 Packaged Waste has been divided into two sub-categories: non-leachate controlled waste packages and leachate controlled waste packages. Packages with higher concentrations of tritium (as well as other radionuclides), will be placed in leachate controlled waste packages. Additional reference to, and discussions of Type 5 waste has been provided in Section 3.3.1.1 of the final EIS. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste.
CNL-ND166	Concerned Citizens of Renfrew Country (Ole Henrickson) (July 3, 2017)	CNL's Waste Acceptance Criteria document suggests the possibility of developing "Safety Criteria" to limit the "total radioactivity of NSDF at closure" but does not indicate what these limits would be (CNL 2017a).	The term "safety criteria" was not well defined in the 2017 draft Environmental Impact Statement (EIS). The intent of this term is to describe the different criteria that different assessments are evaluating to, most of them related to either public dose, dose to biota, and environmental concentrations of contaminants. In terms of "total radioactivity of Near Surface Disposal Facility (NSDF) at closure", this has been developed as a type of safety criteria and evaluated in the Post-Closure Safety Assessment [1]. The total radioactivity at closure is presented in Table 3.3.1-2 of the final EIS. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND167	OFWCA (Johanna Echlin) (May 8, 2017) Anna Tilman (June 22, 2017) Michael Stephens (August 14, 2017) Jake Deacon (August 16, 2017) Anna Tilman (August 11, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* How will CNL specifically limit ILW and mixed wastes to 1% each? - What is CNL's waste categorization system with respect to all radioactive waste and mixed waste that will be placed in NSDF? - How will these wastes be verified with WAC? - How will quantities of ILW and mixed wastes be inventoried and verified and limits controlled? - Without the WAC, we do not know the quantities and types of any of the wastes including PCBs, Mercury, Arsenic. We want to know this information. Re: remediation of impacted soils - isn't some of this highly radioactive? How will this be handled and where will it be placed in NSDF? - Treatment may work for some hazardous material but what will this mean for the levels of tritium that cannot be removed from this water even with treatment? - How much of the waste material will not meet the NSDF Waste Acceptance Criteria? It could be voluminous. What will be done with it? - How much ILW will be generated by the proposed decommissioning of the NRX and NRU reactors, their fuel storage and handling bays, the hot cells, the waste storage facilities, and the above-ground plutonium extraction vault in Building 220 dating from the cold war era? These wastes contain substantial quantities of long-lived radioactive contaminants and can't be disposed of either in the NSDF or in place. - If hazardous waste is segregated from mixed waste only "to the extent possible" would this waste still be treated as mixed waste and disposed of in the NSDF?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Section 3.3.2 of final EIS states that for waste to be accepted for disposal in the engineered containment mound (ECM), the waste generator will need to characterize the waste, complete and submit a Waste Profile Record for review and approval, and apply for and receive approval to transport the waste to the Project NSDF site. As part of the waste acceptance process, CNL will verify the NSDF-bound waste against the submitted documentation. The verification may include: • visual inspection of waste; • visual inspection of waste package; • non-destructive assays (e.g., inspection or evaluation); and/or • destructive sampling and analysis. All waste that will be placed for disposal in the NSDF will be LLW as defined by Canadian Standards Association (CSA) N292.0:19 (*General principles for the management of radioactive waste and irradiated fuel*) [2]. The radiological and non-radiological inventory disposed of in the NSDF will be controlled through the NSDF Waste Acceptance Criteria (WAC) [3]. Canadian Nuclear Laboratories (CNL) has limited the chemical characteristics of the waste inventory (including toxicity) by requiring waste to meet the land disposal and leachate requirements of Ontario's Regulation 347, *General – Waste Management* [4]. The restrictions on waste characteristics are documented in the Waste Acceptance Criteria [3]. Waste that,

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			not considering its radioactive component, is classified as hazardous waste is not permitted for disposal in the ECM, unless the hazardous waste has been treated using methods for land disposal described in Ontario Regulation 347. The terminology "mixed waste" is no longer used and the new terminology used is "LLW containing non-radiological constituents". As noted in Section 3.3.3.3 of the final EIS, waste that is placed in the ECM will meet the intent of land disposal and leachate requirements specified in Ontario's Regulation 347, *General – Waste Management*. This requirement effectively limits the chemical characteristics of the waste including the leachability of non-radiological constituents. As such the non-radiological reference inventory was revised to reflect this restriction. Tritium releases from the ECM will be minimized by packaging high activity tritium waste in Leachate Controlled Packages. The discharge targets derived for radionuclides including tritium will ensure that cumulative radiological emissions are well below Chalk River Laboratories (CRL) site Derived Release Limits [5] and doses to the public from CRL site emissions remain well below license requirement of 0.3 mSv/a. The amount of ILW that may be generated from the decommissioning of the National Research Experimental Reactor (NRX) and National Research Universal Reactor (NRU) or other facilities is not related to the NSDF Project or the final EIS. Information regarding CNL's longer-term waste management and disposal plans for all waste types can be found in the Integrated Waste Strategy [1]. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [3] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [4] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347. [5] Derived Release Limits for CNL's Chalk River Laboratories. CRL-509200-RRD-001.
CNL-ND168	Evelyn Gigantes (May 17, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Anna Tilman (June 22, 2017) Greg Csullog (May 1, 2017) Joan Lougheed and Town of Deep River (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* Ambiguity about the nuclear waste to be buried: Answers from CNL regarding related questions have been unsatisfactory with general responses: "*The facility will have limits. WAC (Waste Acceptance Criteria) Some Uranium (Pu) will go into the facility. Inventory limits will be decided upon, subject to what is suitable and what is safe."* Other examples like this are provided Evelyn Gigantes. The Town of Deep River's submission also quoted from the EIS *"All waste to be disposed of at the NSDF will be required to meet the waste acceptance criteria established thus ensuring operational and long-term safety requirements." (page ES-ii)* The WAC documentation has not been established, finalized and released, which precludes the draft EIS from being appropriately reviewed. The development of WACs is obscure and thus, it is unclear whether they are even adequately or sufficiently protective both for workers and the public. [Refer to p. 10 of Anna Tilman's submission on this topic.] This is a significant shortcoming of the draft EIS. Understanding and clearly defining the WAC is a pillar to understanding the risks associated with the NSDF, the current feasibility of the NSDF, and the effect of the NSDF on generations to come. The WAC	The Near Surface Disposal Facility (NSDF) Waste Acceptance Criteria (WAC) [1] has been shared with the public, and its contents summarized in Section 3.3.3 of the final Environmental Impact Statement (EIS). Canadian Standards Association (CSA) N292.0-19 *General Principles for the Management of Radioactive Waste and Irradiated Fuel* [2] and International Atomic Energy Agency (IAEA) *GSG-1 Classification of Radioactive Waste* [3] are the basis for the revised WAC concentration limits for bulk and packaged waste (Section 3.3.3.2 of the final EIS). Although these guidance documents provide a concentration range for low-level waste, to remain conservative the NSDF Project has used the lower bounds of the low-level waste guidance. For example, the CSA 292.0-19 [2] and IAEA GSG-1 [3] guidance for the concentration of alpha emitters in low-level waste suggests that low-level waste could contain up to 400 Bq/g of alpha-emitting radionuclides on average. For NSDF, the WAC [1] limit for bulk waste is 100 Bq/g of alpha-emitting radionuclides in bulk waste. The development of the WAC [1] was an iterative process completed in conjunction with the development of other safety significant documents (most importantly, the Safety Analysis Report [4] and Post-Closure Safety Assessment [5]). The WAC [1] has been revised to reflect the reduction of inventory to only low-level waste, provide transparency on the basis of the WAC, and incorporate Canadian Nuclear Safety Commission (CNSC) comments during licensing reviews. Compliance to the WAC will be managed through the Canadian Nuclear Laboratories (CNL) Waste Management Program which begin with waste characterization and flows down to the Waste Profile where packages are created and accepted in accordance with the waste generator's waste management plan. The overarching Management Control Procedure for the Waste Management Program is based on CSA N292 series guidance, and meets the requirements of the Chalk River

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		is essential for ensuring only wastes with acceptable physical, radiological, and chemical characteristics are disposed of at the NSDF (see pg. 3-9). How will CNL ensure that wastes meet the WAC?	Laboratories (CRL) site licence [6]. Canadian Nuclear Laboratories (CNL) employs a quality management system that requires adherence to processes and procedures. Regular internal audits are performed to ensure procedures are adhered to. In addition, the regulator performs compliance inspections to ensure CNL meets license requirements [6]. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] CSA Group. CSA N292.0-19 - General principles for the management of radioactive waste and irradiated fuel. 2019. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [4] Near Surface Disposal Facility Safety Analysis Report. 232-508770-SAR-002. [5] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004. [6] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25.
CNL-ND169	Great Lakes and St. Lawrence Cities Initiative (August 15, 2017)	Before the EIS is approved, list the conditions by which waste will be accepted in the CNL facility. It would be necessary for the site's waste-acceptance criteria to be clearly outlined.	Section 3.3.3 of the final Environmental Impact Statement (EIS) now contains a much more detailed description of the Waste Acceptance Criteria (WAC) [1]. The NSDF WAC fully transparent with regards to what radioactivity limits are acceptable at the facility. These radioactivity limits are consistent with International Atomic Energy Agency (IAEA) [2] and Canadian Standards Association (CSA) [3] guidance for the classification of low-level waste (LLW). In addition to radioactivity concentration limits, the WAC also has information on: • Physical properties (size, mass, etc.) • Chemical properties (meeting the intent of Ontario Regulation 347 [4]) • Hazardous waste (listed waste, characteristic waste, PCBs, biohazardous) • Restricted materials (liquids, pressurized containers, etc.) • Criticality limits and restrictions • External dose rates • Disused sources The WAC document is available to the public at www.cnl.ca/nsdf or can obtained by contacting ermstakeholder@cnl.ca The limits on radiological properties are as follows (Section 5.2 of the WAC [1]): The radionuclide concentration limits for waste are provided for a single radionuclide; or in the case of a mixture of radionuclides, the sum of the component radionuclide limit fractions must not exceed 1 to demonstrate compliance and referred to as the "Sum of Fractions" rule. The calculation of the concentration limits shall exclude the mass of packaging and shielding. Limits for Bulk Waste and non-leachate controlled waste packages: • 100 Bq/g for alpha-emitting radionuclides. • 1,000 Bq/g for long-lived beta and gamma emitting radionuclides (half-life > Cesium-137). • 10,000 Bq/g for short-lived beta and gamma emitting radionuclides (half-life ≤ Cesium-137). • 100,000 Bq/g for tritium. Limits for Leachate Controlled Waste Packages: • 400 Bq/g for alpha-emitting radionuclides. • 10,000 Bq/g for long-lived beta gamma emitting radionuclides (half-life > Cesium-137). • 10,000 Bq/g for Cesium-137.

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			• 10,000 Bq/g for Strontium-90. • 10,000,000 Bq/g for tritium. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [3] CSA Group. CSA N292.0-19 - General principles for the management of radioactive waste and irradiated fuel. 2019. [4] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND170	Greg Csullog (May 1, 2017) Anna Tilman (June 22, 2017) David Raman (August 3, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **2.2.2.1 Near Surface Disposal Facility – 2-5:** Section 2.2.2.1 does not clarify why some "ILW may be suitable for disposal in the NSDF Project", it simply states, "The NSDF will accept… …ILW", without justification other than they would "meet the WAC". Regarding, "The NSDF will accept LLW, ILW (less than 1% by volume)", small volumes of ILW may have quantities of long-lived radionuclides that could adversely affect the long term safety of the NSDF if not adequately quantified. The volume of ILW is likely irrelevant. How did CNL determine that the volume of ILW should be less than one-percentage ILW? What is the basis of assuming a 1% ILW content? Are there specific radionuclides in ILW that should not be in this facility? Does this relate to the activity of the waste, the half-life of the radionuclide? What is considered to be "long-lived activity"? **As otherwise noted in comments:** intermediate level waste is defined as waste that contains long lived radionuclides in quantities that need a greater degree of isolation from the biosphere than is provided by near surface disposal", which should preclude them from the NSDF.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). However, CNL acknowledges that the proposed inventory for NSDF includes several long-lived radionuclides as shown by Table 3.3.1-2 of the final EIS. Long-lived radionuclides are included in the NSDF inventory as they are intrinsically part of the radiological fingerprints of waste streams at Chalk River Laboratories (CRL) and other CNL sites. It is not technically or economically feasible to separate the long-lived radionuclides from the waste streams. However, the concentrations of long-lived radionuclides that are proposed in the NSDF Licensed inventory (Table 3.3.1-2 of EIS) are in limited activity concentrations consistent with CSA Group (CSA) and International Atomic Energy Agency (IAEA) guidance ([2] & [3], Sections 2.2(4) of [2] and 2.24 of [3], for example). The substantial decrease of radioactivity concentrations in the first 100 years after the facility has been closed (as shown in Figure 3.3.1-2 of the final EIS is the result of the decay of the shorter-lived radionuclides. The remaining radioactivity present in the NSDF after the 300-year Institutional Control period is the limited inventory of long-lived radionuclides. The risk of the presence of these long-lived radionuclides has been studied in detail in the Post-Closure Safety Assessment [4]. The calculated dose consequence and environmental concentrations meet the dose acceptance criteria and environmental quality standards, respectively, thus do not pose an unacceptable risk to the public or environment. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] CSA Group. CSA N292.0:19. General Principles for the Management of Radioactive Waste and Irradiated Fuel. CSA Group. 2019. [3] IAEA General Safety Guide (GSG)-1. Classification of Radioactive Waste. IAEA (International Atomic Energy Agency). 2009. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004.
CNL-ND171	Michael Milgram (May 16, 2017)	Why is "volume" used as a measure of acceptable quantities of ILW rather than "activity" or "toxicity"?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]).

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			Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND172	Michael Milgram (May 16, 2017)	What will be the activity and toxicity fractions (and limits) of ILW in the proposed NSDF?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND173	David Raman (August 3, 2017)	Why is there no consideration of off-site incineration of combustible materials (e.g. wood plastics and other organic material) that would otherwise decompose with the ensuing gas evolution and subsidence problems, ultimately leading to loss of containment?	Canadian Nuclear Laboratories (CNL) does employ the use of off-site waste processing facilities for some of its combustible waste streams. Although the reduction of organic waste through incineration has not been explicitly considered in the final EIS, conservative and bounding waste estimates were projected and assessed to arrive at the 1,000,000 m^3 capacity for the ECM. Canadian Nuclear Laboratories (CNL) will continue to explore and utilize other waste processing during the NSDF's operating phase, especially those that reduced the volume, if practicable to do so (e.g., incineration). The engineered containment mound (ECM) has been designed to accommodate the level of wood and organics that are expected from CRL's decommissioning and demolition activities. With proper waste placement and compaction, the resulting settlement or subsidence of the ECM will be linear, and accommodated by the design. The generation of landfill gases have been fully evaluated in the design of the ECM. Section 3.4.1.9.4 of the final Environmental Impact Statement (EIS) summarizes the approach to accommodating landfill gas generation: A passive landfill gas (LFG) venting system will also be installed in conjunction with the final cover construction as part of the final closure activities. The LFG venting system is designed to prevent excessive gas pressure under the low-permeability barrier components of the final cover, as excessive gas pressure could result in damage or disruption of the final cover system. LFG monitoring probes will be installed around the perimeter of the ECM and will be monitored periodically during the ECM post-closure phase to detect evidence of potential LFG migration away from the ECM.
CNL-ND174	David Raman (August 3, 2017)	What is "Packaged Waste?" Is this really "process waste" and as such represents a wide variety of sources and compositions. Is it intended that the package be credited as part of the safety case for emplacement in the NDSF? If so, B-25's and cardboard or wooden boxes are unlikely to have long useful lives.	Packaged waste is defined as waste contained in rigid containers or packages for disposal. Bulk waste is defined as waste that is a large mass, in large quantities and is not containerized nor contained within a package for final disposal. Waste packages are not credited in the Post-Closure Safety Assessment [1]. That is, the waste packages are expected to have fully degraded in a matter of years and are no longer physically containing the waste. The Waste Acceptance Criteria (WAC) [2] specifies the requirements for accepted packaged waste for receipt/placement in the Near Surface Disposal Facility (NSDF). Type 5 Packaged Waste has been divided into two sub-categories: non-leachate controlled waste packages and leachate controlled waste packages. Wastes with higher concentrations of tritium (as well as other radionuclides), will be placed in leachate controlled waste packages. Leachate Controlled Waste Packages are packages that provide inventory management control and containment of the waste with more mobile and higher radionuclide activity concentrations during the time the disposal cell is not covered with the final cover. Containment of the waste can be provided by the final waste form itself, or by using approved overpacks or waste processing methods.

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			Section A.3.3.2 of the Waste Acceptance Criteria document [2] provides more details on Leachate Controlled Packages. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND175	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.4 Waste Acceptance Criteria:** A detailed, regulatory review of "approved waste generator QA arrangements" is essential to assess NSDF inventory control, especially given that, historically: 1. waste generators did not have the resources, procedures or trained staff to characterize their wastes, 2. waste generators did not know how to classify their wastes for storage and disposal (that function was performed by the WIP-III auto-categorization algorithm within waste management operations), and 3. the WI Program developed the procedures for waste collection/transfer to waste operations and waste collection points signs, both of which were posted in generators' facilities – how were these implemented within the "approved waste generator QA arrangements"? Part of "control of the waste from its generation to its acceptance" is identifying where various wastes are generated and specifying how they are collected to ensure proper segregation prior to transfer to "CRL". "Acceptance by CRL" implies the acceptance of wastes from non-CRL sites and that the "approved waste generator QA arrangements" would also be implemented at these other sites.	Quality assurance requirements around the oversight of waste generation and waste acceptance have been clarified and are included in the NSDF Waste Acceptance Criteria (WAC) [1]. Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Management Control Procedure (MCP) [2]. The MCP describes characterization requirements for waste. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. Appendix A of CNL's waste characterization procedure includes several characterization resources and guidelines are referenced including the International Organization for Standardization (ISO) 21238 standard. It is worth noting that the revised waste characterization procedures have been designed to include aspects about Near Surface Disposal Facility (NSDF) to help guide waste generators. All waste proposed for disposal at the NSDF will be characterized in order to compare the wastes to the limits of the WAC. This includes all legacy waste in storage. The Canadian Nuclear Safety Commission (CNSC) also provides regulatory oversight on CNL activities at the CRL site including the NSDF Project. In September 2017, the CNSC completed a compliance inspection of the NSDF waste characterization process. Of the 6 actions and 14 recommendations, all have been addressed and closed. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Waste Characterization Management Control Procedure, 900-508600-MCP-001.
CNL-ND176	David Thompson (April 11, 2017)	**Section 3.2.3 Waste Acceptance Criteria Variance Process**: The Waste Management organization is given the authority to provide exemptions as to what waste is allowed into the NSDF. What is the Waste Management organization, who is part of the organization and what is their terms of reference?	Specific information on the Waste Acceptance Criteria (WAC) [1] variance process is no longer included in the final Environmental Impact Statement (EIS). The Near Surface Disposal Facility (NSDF) Project WAC ensures Canadian Nuclear Laboratories (CNL) meets its responsibility as the licensee; that all waste received for disposal is in compliance with the design and licensing basis for the facility. The WAC [1] has been revised to clarify waste that do not meet the WAC is anticipated to be rare and the variance process is analogous to the Infrequently Performed Operations [2] process as outlined in Facility Authorizations. This process applies a graded approach for determining if a requested operation requires review and approval by Canadian Nuclear Safety Commission (CNSC) staff. These instances shall be authorized on a case by case basis by the Facility Authority and shall not in any circumstances result in contravening the design or safety basis of NSDF, including the overall waste inventory on which the post-closure predictions are based on. Other safety goals and design targets which must be considered are presented in Section 3.0 of the Safety Analysis Report (SAR) [2]. Any waste accepted using the Infrequently Performed Operations process will be reported to the CNSC in Chalk River Laboratories (CRL's) Annual Compliance Monitoring Report. Wastes that are not disposed of in the NSDF will continue to be stored at the CRL site until a disposal solution exists.

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			The "Waste Management Organization" referred to in the 2017 draft EIS was a generic term used to describe CNL's internal Waste Management Program, or the Waste Operations department. The wording in the final EIS provides clarity on the organizations involved in the waste generation process (e.g., Section 1.3.2, Figure 1.3-2, and Section 3.5.2.3). References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Infrequently Performed Operations, 900-508200-MCP-008. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND177	David Raman (August 3, 2017)	The proponent should expend every effort to determine the characteristics of the wastes beforehand and include them in this assessment. The proponent should also give due consideration on how to convert non-compliant waste into compliant waste (i.e. packaging, processing, immobilization etc.) and include these processes in the environmental assessment.	Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Management Control Procedure (MCP) [1] that has been submitted to Canadian Nuclear Safety Commission (CNSC) staff. The MCP describes characterization requirements for waste. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. Appendix A of Canadian Nuclear Laboratories' (CNL's) waste characterization procedure includes several characterization resources and guidelines are referenced including the International Organization for Standardization (ISO) 21238 standard. It is worth noting that the revised waste characterization procedures have been designed to include aspects about Near Surface Disposal Facility (NSDF) to help guide waste generators. All waste proposed for disposal at the NSDF will be characterized in order to compare the wastes to the limits of the Waste Acceptance Criteria (WAC) [2]. The Reference Inventory [3] identified the significant radionuclides and was estimated and extrapolated using historical waste data, current waste operations data, and current decommissioning waste data. The Reference Inventory [3] was used to inform the design and safety assessments. The outcome of the safety assessments was a modified reference inventory known as the Licensed Inventory. The Licensed Inventory is the maximum radioactivity of the significant radionuclides that the NSDF will accept [4]. The Licensed Inventory can be found in Table 3.3.1-2 of the final Environmental Impact Statement (EIS). Waste that does not meet the WAC [2] is non-compliant waste. Non-compliant waste is assessed on a case by case following the CNL procedure, Infrequently Performed Operations [5]. The non-compliant waste will be authorized on a case by case basis by the Facility Authority, and the waste will not in any circumstances result in contravening the safety goals and design targets for normal operations or design targets for accidents [5]. Packaging, processing, and immobilization are all valid methods that may help some waste streams meet the WAC [2]. Ontario Regulation 347 [6] will be used for non-radiological constituents, and Ontario Regulation 347 recognizes these methods for the treatment of non-radiological constituents. References: [1] Waste Characterization Management Control Procedure 900-508600-MCP-001. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [4] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [5] Infrequently Performed Operations, 900-508200-MCP-008. [6] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.

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CNL-ND178	Greg Csullog (May 1, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Craig Robinson (August 15, 2017) Durham Nuclear Awareness (August 16, 2017) William Turner (May 31, 2017) 66. 67.71.	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **3.6.1.1.1:** While one of the steps in profiling is "waste characterization" it is not clear what this involves. Previous to indicating this step, the EIS states: "Profiling the waste material contents includes the following information, activities, and documentation to support and validate the waste profiling process" This is compliance monitoring as opposed to waste characterization itself. How will the radioactive wastes be categorized and separated? The EIS needs to specify the options for actual waste characterization, such as gamma spectrometry, representative sampling and radiochemical analysis (for hard to measure nuclides), chemical analysis, computer aided tomography, etc. CNL's inventory of wastes for their proposed disposal site is not complete. The process of identifying the wastes is still ongoing, so the actual inventory is yet to be finalized. Other related questions: • How can a waste site be reviewed or approved for construction properly if details of the waste are missing? • Will approval happen before this is done? • Will there be chance to have input once the details of the wastes planned for the facility are clear? • Are the details vague on purpose so they can add stuff later? The EIS must include details of the characterization program for both radiological and non-radiological contaminants in the wastes. It must also include descriptions of both the sampling protocol and the analytical procedures. If CNL proposes to use off-the-shelf methodology, then references to that methodology must be provided. Any in-house methods (whether sampling or analytical) must be summarized. All method descriptions must include an explanation of the required Quality Assurance and Quality Control. CNL must include a summary of the errors and uncertainties that must be met by any methodology chosen to address both sampling and analysis. Further, CNL must describe when particular methods will be used to characterize the wastes, and ensure responsibilities for conducting that assessment are assigned. Note: the characterization program must be defined up front, before any of the wastes are emplaced in the ECM. Waste types must be classified according to their radioactive and chemical characteristics and potential releases to the environment.	Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Management Control Procedure (MCP) [1] that has been submitted to Canadian Nuclear Safety Commission (CNSC) staff. The MCP describes characterization requirements for waste and is prepared in accordance with CSA N292.0 *General principles for the management of radioactive waste and irradiated fuel*. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. Appendix A of Canadian Nuclear Laboratories' (CNL's) waste characterization procedure includes several characterization resources and guidelines are referenced including the International Organization for Standardization (ISO) 21238 standard. It is worth noting that the revised waste characterization procedures have been designed to include aspects about Near Surface Disposal Facility (NSDF) to help guide waste generators. All waste proposed for disposal at the NSDF will be characterized in order to compare the wastes to the limits of the Waste Acceptance Criteria (WAC) [2]. This includes legacy wastes that were previously categorized under WIP-III. The Reference Inventory [3] establishes a representative radionuclide inventory in the engineered containment mound (ECM). It is calculated and extrapolated using historical waste data, current waste operations data, and current decommissioning waste data. The Reference Inventory can be found in Table 3.3.1-2 of the final Environmental Impact Statement (EIS). Each waste generator must perform valid waste characterization in order to send waste to NSDF. Each shipment of waste to the NSDF will have associated waste characterization documentation and/or certificates. The waste generator's waste characterization process is either controlled internally by CNL procedures, or performed independently off-site. The waste generator's characterization program is subject to their own licence conditions, and is also subject to audit by CNL Waste Programs. Due to the variability in laboratory procedures, locations, and types of analysis required for different kinds of waste, these activities are not in the scope of the NSDF Project or the EIS. Furthermore, the physical act of analyzing a waste sample in a laboratory setting is not commonly associated with having environmental effects, and is therefore not appropriate for inclusion in an environmental impact statement. With respect to the bulleted points: • A waste site is unlikely to be approved for construction if significant details related to safety are missing. An Environmental Impact Statement (EIS) is a summary of the studies put forth in support of the project, to determine if there are likely to be significant adverse effects from the project. Environmental Assessments can be used as scoping studies before a proponent decides to continue seeking approvals. In this case, CNL has revised project documentation including the proposed radionuclide inventory to make it more suitable for near surface disposal. For example, the Reference Inventory [3] and Waste Acceptance Criteria [2] are both fully developed at this time and are both available to the public at www.cnl.ca/nsdf or upon request, by contacting ermstakeholder@cnl.ca. • Under the *Canadian Environmental Assessment Act* (2012), approvals for the NSDF are the purview of the Canadian Nuclear Safety Commission (CNSC). In parallel, CNL has been submitting documents in support of the licence application under the *Nuclear Safety and Control Act*. Although not all the details of the specific waste streams are known, operating limits and conditions have been identified to support the safety basis. A decision under both the EA and licencing processes may be rendered based on a bounding safety case presented in the NSDF submissions. • Additional opportunities exist for formal input and interventions as part of the NSDF Commission Hearing proceedings. The schedule of the Commission Hearings have not been determined yet.

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			• Canadian Nuclear Laboratories did not make the details of the waste inventory purposely vague. Additional detail on the revised waste inventory and WAC are now provided in the final EIS. If a decision in favour of NSDF is rendered, CNL will be required to careful tracking of the inventory in the ECM is required to ensure that the maximum quantities of radionuclides does not exceed the total Licenced Inventory which represents a bounding limit at closure of the facility (see Table 3.3.1-2 of the final Environmental Impact Statement (EIS)). Additionally, CNL will be required to annually report the inventory in NSDF to the CNSC. References: [1] Waste Characterization, 900-508600-STD-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND179	Joan Lougheed and Town of Deep River (August 16, 2017)	The draft EIS fails to : 1. Inform readers what the "long-term safety objectives" are. The draft EIS fails to inform readers what "criticality safety" is. 2. Inform readers how a "proven track record" will be determined and by whom or what administrative body. 3. Inform what the "safety case" is. It is difficult to provide meaningful comment on the WAC, and the draft EIS generally, without knowing the meaning of the above noted terms and phrases.	1. The long-term safety objective for the Near Surface Disposal Facility (NSDF) is dose-related. That is, the normal evolution of the NSDF shall not impart a dose greater than 1 mSv per year to the public. "Criticality safety" refers to actions taken to ensure that fissile materials are not present in sufficient quantities and concentrations that could potentially cause spontaneous fission. Canadian Nuclear Laboratories (CNL) has a Nuclear Criticality Safety Program, as outlined in Section 3.5.2.6 of the final Environmental Impact Statement (EIS), which is intended to prevent criticality accidents through appropriate design, analysis, operations, and decommissioning of facilities involving fissionable materials. The program applies to activities involving the use, processing, transfer, storage and disposal of fissionable materials. It requires that criticality safety analysis be conducted and that processes and procedures be established to provide assurance that a sufficient safety margin is established. 2. Reference to "proven track record" or "proven technology" has been removed from the final EIS. Rather the term "best available technology" is used, consistent "best available technology and techniques economically achievable (BATEA)" principle within REGDOC 2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [1]. However, this type of facility has been demonstrated as being effective in the cleanup of similarly impacted nuclear sites. 3. In this context, "safety case" is defined as "a structured summary of the scientific evidence and resulting conclusions that support the compelling safety arguments which demonstrate CNL's commitment to ensuring the long-term environmental safety of Chalk River Laboratories (CRL) and surrounding communities, by emplacing legacy, current and future Low-Level radioactive Waste (LLW) in an optimized NSDF. The final EIS informs the safety case, which was developed following International Atomic Energy Agency (IAEA) Guidance SSG-23 *The Safety Case and Safety Assessment for the Disposal of Radioactive Waste* [1]. References: [1] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September. [2] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012.
CNL-ND180	David Raman (August 3, 2017)	What happens to waste that does not meet the acceptance criteria?	Waste that does not meet the Waste Acceptance Criteria [1] is non-compliant waste. Non-compliant waste is assessed on a case by case following the CNL procedure, Infrequently Performed Operations [2]. The non-compliant waste will be authorized on a case by case basis by the Facility Authority, and the waste will not in any circumstances result in contravening the safety goals and design targets for normal operations or design targets for accidents [3]. Waste that does not meet the NSDF Waste Acceptance Criteria [1] for the Near Surface Disposal Facility (NSDF) will continue to be stored safely at Chalk River Laboratories (CRL) until a disposal path becomes available. Table 2.2.1-1 of the

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			final Environmental Impact Statement (EIS) gives examples of strategies for managing waste not appropriate for the NSDF. More information about Canadian Nuclear Laboratories' (CNL's) waste strategy can be found in CNL's Integrated Waste Strategy [4]. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Infrequently Performed Operations, 900-508200-MCP-008. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND181	David Raman (August 3, 2017)	How will the restriction of "no free liquids" be enforced? Where will cementation/other liquid immobilization activities be carried out and are they not also subject to this environmental assessment?	Waste arriving at the Near Surface Disposal Facility (NSDF) must be solid, as per the Waste Acceptance Criteria (WAC) [1] (excerpt below). The method in which a waste generator chooses to process their waste is subject to its own licence and licence conditions. Liquid immobilization will not occur at the NSDF. Solid wastes that require processing will occur in the Temporary Storage Waste Receiving Area (TSWRPA) within the ECM. The only processing that is performed is staging of waste or container preparation for grouting in the ECM. The TSWRPA is constructed within the footprint of the active cell or adjacent cell, and includes the drum and waste unloading platform. The TSWRPA is constructed at grade, consisting of aggregate material provided to minimize dust generation and facilitate contamination control. Free-standing liquids are not accepted at the NSDF. Section 3.5 of the WAC document [1] states the following: "Free standing liquids are not permitted in NSDF waste (i.e., equal to or greater than 1% free standing liquids by volume). Wastes that are suspect to contain free liquids (e.g., high moisture content) can be tested using: • SW-846 Test Method 9095B: Paint Filter Liquids Test [2]; or • Test Method for the Determination of Liquid Waste (slump test) [3]. Note waste is defined as "Liquid Waste" if it slumps more than 150 mm. Wastes that have been rendered solid via stabilization (e.g., cementation) or pre-treatment are required to meet this performance objective." References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] *Paint Filter Liquids Test*, SW-846 Test Method 9095B, United States Environmental Protection Agency, November 2004. [3] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND182	Northwatch (August 16, 2017)	The EIS then proceeds to argue against itself in terms of the WAC being of central importance to the safe performance of the facility by intimating that the process for setting radiological limits for the WAC potentially involved some trading off between safety and volume: *Radiological limits for WAC were determined in a manner designed to ensure that NSDF can meet safety objectives while maximizing potential range of suitable waste.5*	Section 3.3.3 of the final Environmental Impact Statement (EIS) gives a summary of the NSDF Waste Acceptance Criteria (WAC) [1]. The NSDF Project has revised the approach on developing the WAC and has removed the original Section 3.2.2 content from the revised EIS. Section 3.3.3 of the revised EIS recognizes at a high level that the WAC is an example of the "iterative approach" to the design and licensing of a disposal facility. The WAC was refined through advancements in both the operational and post-closure safety assessment and thus, developed from specific safety or design criteria provided within the Design Description [2], feedback from the regulatory agencies and public on the EIS, the Post-closure Safety Assessment

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		The draft EIS very briefly describes a three-step approach which was purportedly used to define activity limits and screen potential waste, but it is so sparse in its description that important information is omitted. This presentation falls apart on several counts: - Only the two final criteria are identified, with no discussion of or indication of what the other four – or more – criteria were, the basis for considering the initial group of six criteria (i.e. the basis for selecting those initial six "candidate" criteria) and the basis for retaining only two of them. - The retained criteria "Meeting Performance Assessment Safety objectives" is meaningless in the absence of any discussion or description of those Performance Safety Objectives and the basis for their development and selection. - The retained criteria "Proven technology" is meaningless in the absence of any discussion or description of those technologies and the basis for their selection and reliable analysis of the technologies' performance elsewhere; the information would have to be sufficiently detailed to allow readers to develop an understanding of the degree to which to those other instances are applicable to the project as being proposed. - There is no information provided about the "group of subject matter experts", what their inputs were, what basis or methodology they used for identifying the initial six separate criteria. - It is unclear whether the same "group of subject matter experts" shortlisted the criteria from six to two, or if that was done by some other means or party.	[3] and the Safety Analysis Report [4]. Further details on the basis of the NSDF WAC can be found in Appendix A of [1]. The WAC document [1] has been made available to the public at www.cnl.ca/nsdf or upon request to ermstakeholder@cnl.ca, and is fully transparent with regards to what radioactivity limits are acceptable at the facility. The radioactivity limits are consistent with International Atomic Energy Agency (IAEA) GSG-1 [5] and Canadian Standards Association (CSA) N292.0-19 [6] guidance for the classification of low-level waste (LLW). In addition to radioactivity concentration limits, the WAC also has information on: • Physical properties (size, mass, etc.). • Chemical properties (meeting the intent of Ontario Regulation 347 [7]). • Hazardous waste (listed waste, characteristic waste, PCBs, biohazardous). • Restricted materials (liquids, pressurized containers, etc.). • Criticality limits and restrictions. • External dose rates. • Disused sources. The reference to "Meeting Performance Assessment Safety objectives" refers to developing a WAC and total Reference Inventory that result in doses to the public that meet regulatory criteria (i.e., less than 1 mSv/yr), and that result in environmental concentrations that are protective of the environment and biota (i.e., environmental quality guidelines). This refers to the iterative process of developing the WAC [1] and Reference Inventory [8], as described above. The WAC also controls radionuclide and constituents of potential concern (COPC) concentrations in generated leachate for treatment by the Wastewater Treatment Plant, such that NSDF Effluent Discharge Targets will be met, described in Section 3.4.2.5.1 of the final EIS. Canadian Nuclear Laboratories (CNL) no longer refers to the engineered containment mound (ECM) design as "proven technology". However, the design concept has been demonstrated around the world as best available technology suitable for the cleanup of similarly impacted nuclear sites. Examples include: • Port Granby and Port Hope Long-Term Waste Management Facilities, Ontario • Waste Control Specialists Facility, Texas • Maxey Flat Facility, Kentucky • Environmental Management Waste Management Facility, Tennessee • Idaho Comprehensive Environmental Response, Compensation, and Liability Act Disposal Facility, Idaho References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Design Description. 232-503212-DD-001. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [4] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [5] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [6] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [7] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347. [8] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.

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CNL-ND183	Northwatch (August 16, 2017)	It is unclear whether the following few paragraphs (see Northwatch's August 16 submission for more information) are a discussion of the criteria that were discarded. The discussion reads as a grab-bag of half-statements on safety analysis, objectives, and principles, and is written in such a manner as to leave the reader uncertain as to whether the statements are a partial discussion of the discarded four criteria which are not identified (see regarding Northwatch's previous comment), or are simply random statements. These paragraphs raise additional questions: - What were the separate analysis that considered "Criticality Safety and potential constraints on the quantities of fissile material", and what were the inputs and outcomes of these analysis? - Why were fissile materials and hazardous chemicals considered using separate analyses, and how are / would the outcomes of those separate analysis inform the WAC? - What "other, operational safety objectives" were considered, and how do those considerations inform the WAC? This question requires a much more detailed answer that the offered statement of "such as WWTP operations and compliance with the ALARA principle were considered". - If, as stated earlier, the WAC is (to be) developed in "an iterative process that occurs in parallel with the development of the safety analysis, performance assessment, facility design, and the environmental assessment process" how is it that "these requirements can be met through appropriate design measures and operational systems and should not impact radiological limits for WAC"? - The safety analysis and the performance assessment are not presented in the draft EIS. There is no presentation – or even discussion – of the safety case, despite the many references to the safety case - There are several references to the long-term performance of the engineered containment mound (ECM) but there is no presentation or discussion of that long-term performance and how it is going to evaluated and benchmarked in qualitative and/or quantitative means	Section 3.3.3 of the final Environmental Impact Statement (EIS) includes a revised summary of the Waste Acceptance Criteria (WAC). The WAC document [1] has also been made available to the public (www.cnl.ca/nsdf or by request at ermstakeholder@cnl.ca) and includes an appendix which provides the design or safety basis for any of the WAC requirements for improved traceability. Wastes disposed in the NSDF may or may not contain fissile material. Natural and depleted uranium as well as thorium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other fissile material may exists with the NSDF inventory as residual unrecoverable amounts, predominately as contaminants on waste equipment, demolished structures and in soil as a result of nuclear fuel cycle activities (e.g., operation of (National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Thus a Criticality Safety Document has been prepared in accordance with regulatory requirements and guidance in REGDOC 2.4.3 (*Nuclear Criticality Safety*) [2]. The output of this criticality safety analysis includes restrictions and limits to ensure the nuclear criticality safety of NSDF. Specific examples within the WAC [1], include fissile material limits within the waste (Section 5.3) as well as restrictions on the chemical properties of the waste (Section 4.3). Section 3.3.3.3 of the final EIS and Section 4.1 of the WAC [1] discusses the restrictions placed on hazardous waste. Specifically, that hazardous wastes must be treated to meet the requirements of Ontario Regulation 347 [3] in order to qualify for disposal at the Near Surface Disposal Facility (NSDF). This requirement effectively limits the chemical characteristics of the waste including the leachability of non-radiological constituents. Since NSDF adopted provincial guidelines to ensure the protection of the public and environment from hazardous constituents, no separate analysis for hazardous material was required. "Other, operational safety objectives" refers primarily to keeping the dose to workers on the NSDF site as low as reasonably achievable. The WAC limits the external dose rate of packaged and bulk waste material which in turn keeps the exposure to workers during placement in NSDF low. The sentence "these requirements can be met through appropriate design measures and operational systems and should not impact radiological limits for WAC" was referring to the aforementioned operational safety objective of protecting the workers from unnecessary radiological doses. "Appropriate design measures" refers to adding additional shielding to a package or extra shielding to a Wastewater Treatment Plant process to reduce dose to workers. This particular statement is somewhat dated, as the NSDF will only be accepting low-level waste (LLW), and as a result the potential dose rates to workers is much lower. In 2017, the NSDF Project had a single "Performance Assessment' that covered all phases of the NSDF Project. This has now been divided into two documents – the NSDF Safety Analysis Report (SAR) [4] (which examines safety during the operational phase of NSDF) and the Post-Closure Safety Assessment [5] (which examines the long-term safety of NSDF). Summaries of both these analysis are discussed in both Sections 5.7 (Ambient Radioactivity and Ecological Health) and 5.8 (Human Health) of the final Environmental Impact Statement (EIS). The Post-closure Safety Assessment examines the reference inventory in all plausible evolutions and future scenarios of the NSDF and makes recommendations on the total inventory limits – which is captured in the WAC as the Licenced Inventory (Table 13) [1]. Thus the Post-closure Safety Assessment specifically supports the claim that the future public doses will be below the regulatory dose limit for a member of the public of 1 mSv/yr.

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			One of the more important barriers in the engineered containment mound is the composite geomembrane system, comprised of a high density polyethylene liner supported by a geosynthetic clay liner. A comprehensive testing and evaluation program was conducted by Dr. Kerry Rowe of Queen's University [6]. The results of the testing program suggest that the geomembrane is expected to fulfill its 550 year design life, and could last up to 2000 years without significant degradation. The report can be requested from ermstakeholder@cnl.ca. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] CNSC, REGDOC 2.4.3 Nuclear Criticality Safety, September 2020. [3] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347. [4] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [5] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [6] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version. Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024.
CNL-ND184	Northwatch (August 16, 2017)	The commenter notes as more general comments, based on their review of sections related to the Waste Acceptance Criteria, that the draft EIS: - Repeatedly confuses topics: for example, it moves between discussions of the Waste Acceptance Criteria, waste types and waste characteristics in a disorganized fashion. - Makes numerous unsupported and unsubstantiated statements, some of them reading as complete non-sequiturs, such as "Containers and packaging will meet the WAC requirements for dimension and mass in order to assure safe handling and on-site transportation of the package"; meeting the WAC requirements for dimension and mass might be good very good measures, but will not in themselves assure safe handling and on-site transportation of the package; further, the draft EIS dos not appear to present WAC requirements for dimension and mass	Section 3.3.3 of the final Environmental Impact Statement (EIS) includes a revised summary of the Waste Acceptance Criteria (WAC). The WAC [1] has been made available to the public (www.cnl.ca/nsdf or by request at ermstakeholder@cnl.ca) and the WAC is consistent with international [2] and Canadian guidelines [3], including providing information on: • Physical properties (size, mass, etc.). • Chemical properties (meeting the intent of Ontario Regulation 347 [4]). • Hazardous waste (listed waste, characteristic waste, PCBs, biohazardous). • Restricted materials (liquids, pressurized containers, etc.). • Criticality limits and restrictions. • External dose rates. • Disused sources. A new appendix (Appendix A) has been included in the WAC document to provide the design or safety basis for any of the WAC requirements for improved traceability. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [4] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND185	Northwatch (August 16, 2017)	Section 3.2.2.2 of the draft EIS, titled "Radiological Characteristics" states that "Waste has been defined as suitable for disposal in the ECM on the following basis" and then proceeds to set out three non-definitive and very general descriptions of radiological characteristics, as follows: - limited concentrations of long-lived alpha-emitters, fission and activation products, such that long-term safety objectives can be met - limited concentrations of fissile materials, such that criticality safety can be assured	Section 3.3.3 of the final Environmental Impact Statement (EIS) includes a summary of the Waste Acceptance Criteria (WAC). The WAC document [1] has been made available to the public and the WAC is consistent with international [2] and Canadian guidelines [3]. The document describes all limits and restrictions for waste acceptance into the Near Surface Disposal Facility (NSDF). "limited concentrations of long-lived alpha-emitters, fission and activation products, such that long-term safety objectives

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		- during the NSDF Project operations and post-closure; and, - proven track record of successful disposal of similar waste types in near surface repositories in other jurisdictions These statements are close to meaningless, given that they are completely unquantified and wholly subject to interpretation. They do not contribute in any meaningful way to a Waste Acceptance Criteria, other than – being as generous as possible – if they were to serve as a general introductory preamble to an actual discussion of Waste Acceptance Criteria which set real and measurable limits and thresholds.	can be met" – the presence of long-lived radionuclides in the LLW has been studied in detail in the Post-Closure Safety Assessment [4] and demonstrated to be no impacts to human health and the environment. "limited concentrations of fissile materials, such that criticality safety can be assured" – a criticality safety analysis has been performed and the output of this safety analysis includes restrictions and limits, as well as restrictions on the chemical properties of the waste, to ensure the nuclear criticality safety of NSDF. "during the NSDF Project operations and post-closure" – this refers to developing WAC and inventory limits that ensure that doses to the worker, pubic, and biota are below respective regulatory limits, as well as ensuring that environmental concentrations of contaminants remain below the relevant federal and provincial guidelines. "proven track record of successful disposal of similar waste types in near surface repositories in other jurisdictions" – other low-level radioactive waste facilities were studied. Similar facilities have been successful in obtaining a licence and operating around North America, including: • Port Granby and Port Hope Long-Term Waste Management Facilities, Ontario • Waste Control Specialists Facility, Texas • Maxey Flat Facility, Kentucky • Environmental Management Waste Management Facility, Tennessee • Idaho Comprehensive Environmental Response, Compensation, and Liability Act Disposal Facility, Idaho A new appendix has been included in the revised WAC document to provide the design or safety basis for any of the WAC requirements for improved traceability. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND186	Northwatch (August 16, 2017)	The "Waste Acceptance Criteria Variance Process" outlined in Section 3.2.3 of the draft EIS lacks clarity, definition and rigour. While having failed to present actual Waste Acceptance Criteria in the draft EIS, with the "Waste Acceptance Criteria Variance Process" the proponent has outlined a process which effectively voids any Waste Acceptance Criteria that might be put in place as part of or prior to project approval. Northwatch's comments include the following: - the purpose of the WAC is to support the performance of the operation by limiting wastes to those within the range of radiological activity anticipated during project design; exceedances of or exemptions from the WAC risk impairing facility performance no rationale is provided for why the WAC should be exceeded - wastes should have been analyzed to identify the radiological, chemical, or physical hazards in advance of deployment to the facility, providing advance knowledge that the waste will meet the WAC, not after-the-fact information about who it does not meet the WAC	Section 3.3.3 of the final Environmental Impact Statement (EIS) includes a summary of the Waste Acceptance Criteria (WAC). The WAC document [1] has been made available to the public and the WAC is consistent with international [2] and Canadian guidelines [3]. The document describes all limits and restrictions for waste acceptance into the Near Surface Disposal Facility (NSDF). Specific information on the WAC variance process is no longer included in the final Environmental Impact Statement (EIS). Canadian Nuclear Laboratories agrees with the commenter that the purpose of the WAC is to support the performance of the operation by limiting wastes to those that meet the criteria in [1]. The NSDF Project WAC ensures Canadian Nuclear Laboratories (CNL) meets its responsibility as the licensee; that all waste received for disposal is in compliance with the design and licensing basis for the facility. The WAC [1] has been revised to clarify waste that do not meet the WAC is anticipated to be rare and the variance process is analogous to the Infrequently Performed Operations [4] process as outlined in Facility Authorizations. This process applies a graded approach for determining if a requested operation requires review and approval by Canadian Nuclear Safety Commission (CNSC) staff. These instances shall be authorized on a case by case basis by the Facility Authority and shall not in any circumstances result in contravening the design or safety basis of NSDF, including the overall waste inventory on which the post-closure predictions are based on. Other safety goals and design targets which must be considered are presented in Section 3.0 of the Safety Analysis Report (SAR) [5]. Any waste accepted using the Infrequently Performed

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		- while we might assume that the "Waste Management organization" is the CNL, such an entity is not mentioned elsewhere in the document, including the glossary of terms the Waste Acceptance Criteria was developed, according to earlier sections of the draft - EIS, during an iterative process that incorporated considerations from the development of the safety argument (although the terms used in Section 3.2.2. were safety analysis and performance assessment) so it simply doesn't follow to suggest that a "safety argument can be made" for accepting waste shipments that are at odds with the Waste Acceptance Criteria	Operations process will be reported to the CNSC in Chalk River Laboratories' (CRL's) Annual Compliance Monitoring Report. Wastes that are not disposed of in the NSDF will continue to be stored at CRL until a disposal solution exists. Canadian Nuclear Laboratories acknowledges and agrees that waste must be characterized before being placed into the facility. Waste characterization is a fundamental step required in order to compare the waste characteristics against the waste acceptance criteria. The "Waste Management Organization" referred to in the original 2017 EIS was a generic term used to describe CNL's internal Waste Management Program, or the Waste Operations department. The wording in the final EIS has improved clarity on the organizations involved in the waste generation process (e.g., Section 1.32, Figure 1.3-2, and Section 3.5.2.3). References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [4] Infrequently Performed Operations, 900-508200-MCP-008. [5] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND187	William Turner (May 31, 2017) 77.	Section 6.4.4.4.2 – by stating that the "estimated exposure to a farmer residing atop the mound will be higher than the regulatory dose limit" demonstrates that CNL have failed to meet their purpose.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available. As a result of this inventory change, the doses to the farmer residing atop the mound have been drastically reduced, to less than 1 % of the regulatory dose limit for a member of the public of 1 mSv/yr. A summary of the doses to receptors in the post-closure period can be found in Section 5.8.6.1.2.2 of the final Environmental Impact Statement (EIS). For more details, please see the Post-Closure Safety Assessment document [1]. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND188	William Turner (May 31, 2017) 78. 80. 81. 82.	Section 3.2.2 – Please provide more detail as to how the WAC were developed. An assertion stating that it is based on "the interpretation and application of IAEA guidelines, relevant regulations… and CNL's strategic planning and stakeholder workshops" is not good enough for a critical requirement for a radioactive waste disposal facility. Furthermore, please explain why even considering the disposal of fissile materials in a mound is acceptable. And how "appropriate design measures and operational systems" will ensure that they quantity of fissile material emplaced in the mound will not "impact the radiological limits for the WAC".	Studies and analyses have informed the development of the Waste Acceptance Criteria (WAC) [1], particularly the Post-Closure Safety Assessment (PostSA) [2], the Safety Analysis Report (SAR) [3], and the Reference Inventory Report [4] as well as regulatory agency and public feedback on the 2017 draft Environmental Impact Statement (EIS). These are the documents and studies that had the most impact on determining the appropriate waste acceptance criteria for the Near Surface Disposal Facility (NSDF). The "iterative process" refers to a process where a radiological inventory is proposed, and then assessed through the SAR and/or PostSA to determine if the short and long-term risks are acceptably low and meet all requirements. The proposed inventory and WAC have been optimized through an iterative process as captured in Figure 3-33 of the NSDF Safety Case [4]. The revised waste inventory is captured in Section 3.3.1.3 of the final Environmental Impact Statement (EIS). The initial development and screening of radionuclides for inclusion into the Reference Inventory was done via workshop which included project stakeholders and Canadian Nuclear Laboratories (CNL) waste subject matter experts. After the initial

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			screening, variations in the Reference Inventory were primarily driven through long-term modelling results (See Figure 3-33 of the NSDF Safety Case [4]). Adjustments to the WAC were a result of adjustments to the total inventory, and a result of CNL's commitment to accept only LLW. The primary International Atomic Energy Agency (IAEA) document which provides guidance on the NSDF WAC is *IAEA General Safety Guide – 1, Classification of Radioactive Waste* [5]. IAEA GSG-1 (Section 2.27) provides guidance on the classification of low-level radioactive waste. This guidance is adopted by Canadian Standards Association (CSA) N292.0-19 [6]. The NSDF is committed to disposing of low-level waste (LLW) only, therefore the WAC is in alignment with both the IAEA GSG-1 [5] and CSA N292.0-19 [6] guidance for the classification of low-level waste. In fact, the NSDF WAC limits are lower than the guidance provided. For example, the guidance suggests a limit of 400 Bq/g for alpha emitters, whereas the NSDF WAC uses a limit of 100 Bq/g. Wastes disposed in the NSDF may or may not contain fissile material. Natural and depleted uranium as well as thorium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other fissile material may exist within the NSDF inventory as residual unrecoverable amounts, predominately as contaminants on waste equipment, demolished structures and in soil as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Thus a Criticality Safety Document has been prepared in accordance with regulatory requirements and guidance in REGDOC 2.4.3 (*Nuclear Criticality Safety*) [7]. The output of this criticality safety analysis includes restrictions and limits to ensure the nuclear criticality safety of NSDF. Specific examples within the WAC [1], include fissile material limits within the waste (Section 5.3) as well as restrictions on the chemical properties of the waste (Section 4.3). Note that the discussion regarding: "appropriate design measures and operational systems" will ensure that they quantity of fissile material emplaced in the mound will not "impact the radiological limits for the WAC" has been removed from the final EIS. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001. [5] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [6] CSA Group. CSA N292.0-19 General principles for the management of radioactive waste and irradiated fuel. 2019. [7] CNSC, REGDOC 2.4.3 *Nuclear Criticality Safety*, September 2020.
CNL-ND189	William Turner (May 31, 2017) 92.	Section 3.13.1 – "Releases of radiological substances to the environment will be first prevented, then mitigated…" The WAC are designed to be as broad as possible, prevention is not once of the safety objectives of this project. CNL need to ensure all project activities meet CNL's Safety Policies and Objectives.	The Engineered Containment Mound (ECM), coupled with leachate collection system and the Wastewater Treatment Plant, are designed to prevent the release of radioactive material from the mound. The ECM has a design life of 500 years, supported by a geomembrane testing program [1] that concludes that the high density polyethylene geomembrane could last up to 2,000 years. The primary studies and analyses that used, or informed the development of the Waste Acceptance Criteria (WAC) [2] were the Post-Closure Safety Assessment (PostSA) [3], the Safety Analysis Report (SAR) [4], and the Reference Inventory Report [5]. These are the documents and studies that had the most impact on determining the appropriate waste acceptance criteria for the NSDF.

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			As a proposed licenced nuclear facility on the Chalk River Laboratories (CRL) site, the Near Surface Disposal Facility (NSDF) is required to meet Canadian Nuclear Laboratories' (CNL's) Safety Policies and Objectives as captured in the CRL site licence [6]. References: [1] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version. Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [4] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [5] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [6] Nuclear Research and Test Establishment Operating Licence. Chalk River Laboratories. NRTEOL-01.00/2028.
		Integrated Waste Management – Waste Profiling and Acceptance Process	
CNL-ND190	Greg Csullog (May 1, 2017)	**3.6.1.1.1 Waste Profiling Process – 3-36:** This statement appears to say that profiling applies to the average characteristics of a waste stream. Such profiling is common for cases where routine wastes have average characteristics within specified limits, such as routine Nuclear Power Plant operations wastes. Such profiling can be applied to some routine wastes at CRL from facilities such as fuel fabrication, isotope production, etc. However, as noted in the IRUS PSAR, "The nature of CRL operations is such that a wide variety of wastes are generated, and the variability in the wastes exceeds that associated with the routine operation of, for example, a large power reactor or an isotope user or producer", that is, establishing the average characteristics of most CRL wastes, including defining the variability of those characteristics, is a major, and possibly impossible, challenge. In addition, profiling, if it is to establish the average characteristics of a routine waste, does not apply to decommissioning and remediation wastes, which are not tied to routine processes, and require case-by-case characterization, not profiling in the sense of average characteristics.	All waste are required to meet the Waste Acceptance Criteria (WAC) [1]. Accordingly, all wastes must be characterized before they can be compared against the WAC. A Waste Profile can be generated for a specific laboratory process, manufacturing campaign, or decommissioning activity. Canadian Nuclear Laboratories (CNL) understands that its wastes in storage are a result of many waste streams over decades of nuclear research and operations. Canadian Nuclear Laboratories does not intend to average characteristics of most CRL waste. A Waste Profile will be developed for each unique process or waste stream that can be identified. Case-by-case characterization is being implemented through in CNL's Waste Management Program including on decommissioning and remediation wastes. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND191	Greg Csullog (May 1, 2017)	**3.6.1.1.2 – Waste Acceptance Process – 3-36 - Note from commenter:** In the context of "to provide proper designation" of wastes, my questions are: 1. Are generators to provide this proper designation or does this responsibility remain with waste operations? Note, the first paragraph of Section 3.6.1.1.2 states, "This information is then used to complete the Radioactive Waste Profile Record" while the end of Section 3.6.1.1.1 states that the Waste Profile Record is reviewed and approved by the Waste Acceptance Team. This can be interpreted as "proper designation" is done by generators prior to waste acceptance. This needs to be clarified. 2. Is the auto-categorization function a part of the WIP-II replacement? 3. If the answer to 2. is Yes, what QA has been performed to ensure that auto-categorization works as desired? 4. If the answer to 2. is No, how will "proper designation[s]" be assigned for wastes to ensure that NSDF accepts wastes suitable for NSDF?	Section 3.3.2 of the final Environmental Impact Statement (EIS) states the following: "For waste to be accepted for disposal in the engineered containment mound (ECM), the waste generator will need to characterize the waste, complete and submit a Waste Profile Record for review and approval, […]". Wastes are characterized by generators and the characteristics are summarized in the waste profile. The Waste Profile is required to be approved by the Facility Authority of the Near Surface Disposal Facility (NSDF) (or authorized designate) prior to acceptance of waste for disposal. The acceptance of waste for disposal is based on the characteristics of the waste complying with all of the requirements of the NSDF Waste Acceptance Criteria [1], and not solely on the classification of the waste (nonetheless, the NSDF will only accept Low Level Waste for disposal). Historic or legacy waste already currently in storage will be reassessed for adequate and appropriate characterization details thus not automatically be accepted in NSDF on the basis of information or auto-categorization within WIP-III. The WIP-III database has been replaced with a new waste tracking system. Canadian Nuclear Laboratories uses an electronic database to input information that is tracked in a Waste Tracking System.

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		My understanding is that the WIP-III database has or is being replaced at CRL. Unsolicited, I contacted CRL staff on a number of occasions asking if the principal functions of WIP-III would be retained in its successor. No feedback was received.	Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND192	Greg Csullog (May 1, 2017) Pravin Shah (April 8, 2017) Joan Lougheed and Town of Deep River (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **3.6.1.1.1:** While generators retain responsibility for waste until they are accepted by Waste Operations, it is not clear from the last profiling step "notice of approval to transport to the NSDF" if profiling is a generator responsibility or not. As worded in the EIS, Waste Operations could accept waste then profile it prior to NSDF acceptance. Is profiling a generator responsibility that is required prior acceptance by Waste Operations? If so, the NSDF proponents need to demonstrate that generators can actually meet their responsibilities (have the facilities, the methodologies and the trained staff to profile their wastes). How will the Waste Acceptance team be qualified, i.e., what training, experience? Will there be written procedures to follow and if so, who will qualify them and how will the procedures be qualified? Consideration should be given to having a centralized, quality assured service undertake this profiling (with the support of the waste generator) to ensure consistency in the waste profiling I characterization of the received wastes. If not, the EIS makes no mention of waste characterization facilities under Waste Management Operations or NSDF project control. It seems anomalous that a Waste Water Treatment Building is described yet no characterization facilities are described. If, as the IRUS PSAR states, "A detailed knowledge of the waste inventory is of fundamental importance when preparing the safety case for waste disposal", it seems anomalous that no details of waste characterization facilities, methodologies, personnel or responsibilities for this critical part of the NSDF are provided in the EIS. What is the definition of a waste stream? What is the CNL approach? Is the concept of waste blocks, as implemented in the WI Program, still in place?	The waste generator has the primary responsibility to have their waste characterized and profiled, and is able to be assisted in this task by Waste Programs personnel, if required. The Waste Profile documents the physical properties, chemical and radiological characterization data, radiological surveys of the waste, the hazardous waste status, estimated waste volume, and the identification of any unique properties of the waste, for the purpose of establishing handling, transportation, processing, storage and/or disposal requirements. Since the announcement of the Near Surface Disposal Facility (NSDF) project, the Waste Programs department at Canadian Nuclear Laboratories (CNL) have revised their procedures and requirements for waste characterization of all waste streams. For example, the radionuclides presented as part of the Licensed Inventory (Table 3.3.1-2 of the final EIS) must be fully characterized in order to maintain accurate accounting of total radionuclide content in the NSDF. The Waste Profile needs to be accepted by NSDF Operations before the waste generator will receive authorization to ship the waste. Canadian Nuclear Laboratories (CNL) employs a quality management system that requires adherence to processes and procedures. Regular internal audits are performed to ensure procedures are adhered to. In addition, the regulator performs compliance inspections to ensure CNL meets license requirements. Canadian Nuclear Laboratories (CNL) staff involved in any aspect of the waste management process (e.g., waste generator, transportation of waste, NSDF operations etc.) will be trained and qualified to the level required to effectively and compliantly manage waste to meet the criteria for disposal in the NSDF. Waste characterization is an important part of routine CNL operations implemented across the Chalk River (CRL) site. Current practices of waste storage at CRL already characterize and segregate waste based on an improved Waste Acceptance Criteria (WAC). This WAC is planned to be implemented as part of the NSDF Project operations. As a result, the NSDF is driving improvements and new requirements for the Waste Characterization Program at CNL. The Waste Management Program Description Document [1] contains a list of the definitions and terms specific to the Waste Management program. "Waste stream" is defined as "waste with defined radiological and non-radiological characteristics, which requires the same handling, processing, storage and disposal." In this respect, the concept of waste "blocks" has been superseded by the use of Waste Streams. Reference: [1] Waste Management Program Description Document, 900-508600-PDD-001.
CNL-ND193	Greg Csullog (May 1, 2017)	**Figure 2.2-2 – 2-3:** To present Figure 2.2-2 as at least a partial basis for its waste management strategy, the EIS has to demonstrate the relevance and validity of the Figure. Indicating that 95% of waste in storage, by volume, is LLW may be misleading both to the public and to strategic planners if "as managed", a strategically significant portion of LLW is actually a mix of LLW and ILW and, therefore, may have to be managed as ILW. Given the nature of the work conducted on the CRL site over decades, the historical lack of effective waste management, and only the fairly recent management system to track wastes, it is not unreasonable to assume that ILW (that … need a greater degree of isolation from the biosphere than is provided by near surface disposal) are mingled with LLW in storage.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Section 3.3.1.3 and Table 3.3.1-2 of the final EIS describe the revised inventory. More detail on the inventory is provided in the Reference Inventory Report [2].

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		How does the NSDF project plan to address this situation?	All waste are required to meet the Waste Acceptance Criteria (WAC) [3]. Accordingly, all wastes must be characterized before they can be compared against the WAC. Historic or legacy waste already currently in storage will be reassessed for adequate and appropriate characterization details and re-characterized as required. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [3] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND194	Joan Lougheed and Town of Deep River (August 16, 2017)	If the waste does not meet the WAC, CNL informs that the waste will be further reviewed for acceptance at the NSDF through the WAC variance process (see pg. 3-13). A pivotal step in the WAC variance process is considering whether a safety argument can be made, and if so, the Waste Management organization will determine and approve a procedure for reviewing and accepting the waste (see pg. 3-13). The draft EIS does not inform readers as to what a "safety argument" is or what the principal considerations are when considering a "safety argument". Nor does the draft EIS inform readers who or what administrative body is responsible for making the "safety argument11 and determining if the "safety argument" is appropriate (see pg. 3-13). Given the description of the WAC in the draft EIS, the only conclusion is that even CNL is uncertain what will constitute acceptable forms of radioactive waste for disposal at the NSDF. Greater effort should have been made in the draft EIS to provide specifics of the radionuclide content and mobility regarding the quantity and type of wastes to be emplaced in the NSDF. The Town of Deep River, as the host municipality, is of the opinion that there should be no uncertainty regarding the types of radioactive waste that will actually be accepted by CNL at the NSDF for permanent disposal.	All waste for acceptance in the Near Surface Disposal Facility (NSDF) must meet the NSDF Waste Acceptance Criteria (WAC) [1]. Specific information on the WAC variance process is no longer included in the final Environmental Impact Statement (EIS). The level of detail is beyond that appropriate for the EIS. The NSDF WAC ensures Canadian Nuclear Laboratories (CNL) meets its responsibility as the licensee; that all waste received for disposal is in compliance with the design and licensing basis for the facility. The NSDF WAC document [1] has been made available for the public and is available upon request by contacting ermstakeholder@cnl.ca. Section 3.3.3 of the final EIS summarizes the Waste Acceptance Criteria. The Waste Acceptance Criteria has been revised to clarify waste that does not meet the WAC is anticipated to be rare and the variance process is analogous to the Infrequently Performed Operations [2] process as outlined in Facility Authorizations. This process applies a graded approach for determining if a requested operation requires review and approval by Canadian Nuclear Safety Commission (CNSC) staff. These instances shall be authorized on a case by case basis by the Facility Authority and shall not in any circumstances result in contravening the design or safety basis of NSDF, including the overall waste inventory on which the post-closure predictions are based on. Other safety goals and design targets which must be considered are presented in Section 3.0 of the Safety Analysis Report (SAR) [3]. Any waste accepted using the Infrequently Performed Operations process will be reported to the CNSC in Chalk River Laboratories' (CRL's) Annual Compliance Monitoring Report. Wastes that are not disposed of in the NSDF will continue to be stored at CRL until a disposal solution exists. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Infrequently Performed Operations, 900-508200-MCP-008. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND195	William Turner (May 31, 2017) 73.	Table 3.2.1-1. Please explain what is meant by Phase 1 and 2 Waste Types and Volumes. What are the phases?	As outlined in Section 3.4.1.1 of the final EIS, the construction and operation of the ECM will be accomplished in two phases. Phase 1 will include six cells providing a capacity to accommodate the disposal of 525,000 m³ of waste (Figure 3.4.1-2). Phase 2 will include four cells providing a capacity of 475,000 m³ to accommodate the remainder of the waste (Figure 3.4.1-3).
		Integrated Waste Management – Waste Types and Volumes	
CNL-ND196	Greg Csullog (May 1, 2017) William Turner	**3.2.1 Waste Types and Volumes – 3-6 and Waste Types – 3-7:** What waste characterization? Where is this information? Section 3.2.2, Waste Acceptance Criteria, states what is acceptable for the NSDF but, as yet, I have yet to find any actual information about the characteristics of any wastes in this document. If	Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Standard [1] that has been submitted to Canadian Nuclear Safety Commission (CNSC) staff.

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	(May 31, 2017) 75.	this information exists it needs to be referenced. Does "The waste characterization" refer to an estimated radionuclide inventory, an estimated hazardous materials inventory, etc. based on historical information (which is minimal)? If so, this is not waste characterization and should be cited as "the estimated source term of the NSDF". Regarding, "future waste are based on projections using known waste that have been fully characterized", what wastes have been fully characterized? If this information exists it needs to be referenced. If most waste has not been characterized, how reliable are the future waste projections?	The Standard describes characterization requirements for waste. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. It is worth noting that the revised waste characterization procedures have been designed to include aspects about Near Surface Disposal Facility (NSDF) to help guide waste generators. All waste proposed for disposal at the NSDF will be characterized in order to compare the wastes to the limits of the Waste Acceptance Criteria (WAC) [2]. The Reference Inventory [3] is a representative radionuclide inventory in the engineered containment mound (ECM). It is calculated and extrapolated using historical waste data, current waste operations data, and current decommissioning waste data. The maximum radiological content of the facility is referred to as the Licensed Inventory, and can be found in Table 3.3.1-2 of the final Environmental Impact Statement (EIS). References: [1] Waste Characterization, 900-508600-STD-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND197	Greg Csullog (May 1, 2017)	**3.2.1 Waste Types and Volumes – 3-6:** "Waste characteristic information (i.e., type and volume)" is important for handling but no mention is made of the radiological and physical/chemical characterization needed to assure that the waste being handled is actually suitable for the NSDF in the first place. The text implies the waste is suitable for the NSDF and that the importance of "waste information" is solely for the efficient and effective emplacement of the wastes in the NSDF.	Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Standard [1] that has been submitted to Canadian Nuclear Safety Commission (CNSC) staff. The Standard describes characterization requirements for waste. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. It is worth noting that the revised waste characterization procedures have been designed to include aspects about Near Surface Disposal Facility (NSDF) on them to help guide waste generators. All waste proposed for disposal at the NSDF will be characterized in order to compare the wastes to the limits of the Waste Acceptance Criteria (WAC) [2]. The Reference Inventory [3] is representative radionuclide inventory in the engineered containment mound (ECM). It is calculated and extrapolated using historical waste data, current waste operations data, and current decommissioning waste data. The maximum radiological content of the facility is referred to as the Licensed Inventory, and can be found in Table 3.3.1-2 of the final Environmental Impact Statement (EIS). References: [1] Waste Characterization 900-508600-STD-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND198	Greg Csullog (May 1, 2017)	**3.2.1.1 Waste Types – 3-7 -** Referring back to Table 2-5-3 on page 2-32: In Table 2-5-3, the following appears: Criteria: Economic Feasibility, Lifecycle Cost Alternative 1 – (ECM): $600M Alternative 2 – (AGCV): $3,400M	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]).

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		The above appears to be based on 1,000,000 m3 of LLW + ILW for both concepts. A more reasonable scenario might be to cost out the NSDF for 990,000 m3 LLW and an AGCV for 10,000 m3 ILW, even if an ILW away-from-surface repository is being considered.	Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND199	Greg Csullog (May 1, 2017) Anne Watelet (May 17, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] **3.2.1.1 Waste Types – 3-7:** Based on 1,000,000 m3, an inventory of 1% ILW would be 10,000 m3, or roughly 5x the IRUS inventory and in a facility with a lower containment capability than an AGCV. As such, expectations of including up to 1% of the volume of the NSDF inventory with ILW need careful consideration. This 1% value is very high considering the large volume of waste stored on the site. [Français] **3.2.1.1 Type de déchets – 3-7 :** Sur la base de 1 000 000 m^3, un inventaire de 1 % de DRMA représenterait 10 000 m^3, soit environ 5 fois l'inventaire du projet IRUS et dans une installation ayant une capacité de confinement inférieure à celle d'une voûte de béton en surface. Par conséquent, les attentes consistant à inclure des DRMA jusqu'à 1 % du volume de l'inventaire de l'IGDPS doivent être examinées avec soin. Le site acceptera 1 % de déchets de moyenne radioactivité, ce qui est très élevé considérant le grand volume de déchets entreposés sur le site.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [Français] Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire de déchets destinés à l'installation de gestion des déchets près de la surface (IGDPS) et y ont apporté des modifications. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été officiellement annoncée par les LNC le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage permanent des DMA (section 2.2.2.1 de l'Étude d'impact environnemental (EIE) définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [1]). Référence [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002.
CNL-ND200	Greg Csullog (May 1, 2017)	**3.2.1.1 Waste Types – 3-7:** Based on the characteristics of bales presented as part of the IRUS disposal concept's PSAR, this expert concluded that bales were not suitable for surface disposal due to the in-growth of long lived nuclides (in-growth was not dealt with in the PSAR). This conclusion was shared with senior management in the Decommissioning and Waste Management Division.	Radionuclide progeny and ingrowth are considered in the Post-Closure Safety Assessment [1], calculated as a result of the full Reference Inventory [2] at closure. The ingrowth of radionuclides currently in storage is expected to be small compared to the final inventory. All waste are required to meet the Waste Acceptance Criteria (WAC) [3]. Accordingly, all wastes must be characterized before they can be compared against the WAC and tracked against the maximum radionuclide activity captured as the Licensed Inventory, as outlined in Section 3.3.1.3 of the final EIS. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [3] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.

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CNL-ND201	Greg Csullog (May 1, 2017)	**3.2.1.1 Waste Types – 3-7:** If "immobilized liquids" include bituminized waste from the Waste Treatment Centre (WTC), this waste may not suitable for the NSDF due to an inventory of long lived radionuclides, such as C-14, Cl-36, I-129, Nb-94, Th-230 and U-235 (Intrusion Resistant Underground Structure (IRUS) Preliminary Safety Assessment Report (PSAR)) [12]. It is worth noting that the radiological characteristics of bituminized wastes proposed for IRUS were determined by rigorous analytical measurements.	All waste intended to be placed in the Near Surface Disposal Facility (NSDF) shall have sufficient characterization data to ensure compliance with the Waste Acceptance Criteria [1] and tracked against the maximum radionuclide activity captured as the Licensed Inventory, as outlined in Section 3.3.1.3 of the final EIS. Long-lived radionuclides including Carbon-14, Chlorine-36, Iodine-129, Niobium-94, Thorium-230 and Uranium-235 are considered in the Post-Closure Safety Assessment [2] and are treated as significant radionuclides in the WAC. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND202	Greg Csullog (May 1, 2017) STOP Oléoduc Outaouais (August 15, 2017)	**3.2.1.1 Waste Types – 3-7:** If compacted wastes include bales from the WTC, this waste may also not be suitable for the NSDF, due to an inventory of long lived radionuclides, such as C-14, Cl-36, I-129, Nb-94, Th-230 and U-235 (IRUS PSAR). It is worth noting that the radiological characteristics of baled wastes destined for IRUS were determined by rigorous analytical measurements.	All waste intended to be emplaced in the Near Surface Disposal Facility (NSDF) shall have sufficient characterization data to ensure compliance with the NSDF Waste Acceptance Criteria [1] and tracked against the maximum radionuclide activity captured as the Licensed Inventory, as outlined in Section 3.3.1.3 of the final EIS. Long-lived radionuclides including Carbon-14, Chlorine-36, Iodine-129, Niobium-94, Thorium-230 and Uranium-235 are considered in the Post-Closure Safety Assessment [2] and are treated as significant radionuclides in the WAC. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND203	Greg Csullog (May 1, 2017)	**3.2.1.1 Waste Types – 3-7:** Regarding, "Less than 1% by volume of packaged wastes will be intermediate-level waste" (IRUS volume), it is worth noting that the reference waste inventory in the IRUS PSAR consisted of 1912 m3 of bales (compacted waste) and bituminized waste (immobilized liquids) in an AGCV concept. This inventory was classified as LLW and suitable for near surface disposal. As noted, the in-growth of nuclides puts the IRUS safety case in doubt as to whether or not these wastes were actually suitable for near surface disposal so the issue needs to be revisited in the context of ILW in the NSDF.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Radionuclide progeny and ingrowth are considered in the Post-Closure Safety Assessment [2], calculated as a result of the full Reference Inventory [3] at closure. The ingrowth of radionuclides currently in storage is expected to be small compared to the final inventory. All waste intended to be emplaced in the NSDF shall have sufficient characterization data to ensure compliance with the Waste Acceptance Criteria [4] and tracked against the maximum radionuclide activity captured as the Licensed Inventory, as outlined in Section 3.3.1.3 of the final EIS. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND204	Greg Csullog (May 1, 2017)	**3.2.1.1 Waste Types – 3-7:** Regarding, "The following section provides a summary of the waste types and expected volumes for each waste type.", the information provided does not make any mention of the radionuclide inventories in the various waste types, which is critical information for determining if the wastes are LLW (suitable for the NSDF) or ILW (unsuitable according to the IAEA definition).	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]).

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			Table 3.3.1-1 of the final EIS has been updated and shows the estimated volume of each type of waste expected to be disposed of at the NSDF Project. The most abundant waste types by volume are decommissioning and demolition wastes (Type 4) and soil and soil-like wastes (Type 1). Waste types 1,2,3,4 and 6 constitute bulk waste, and Type 5 is packaged waste. Approximately 87% of the wastes will be bulk unpackaged wastes and approximately 13% of the wastes will be packaged. All waste intended to be emplaced in the NSDF shall have sufficient characterization data to ensure compliance with the Waste Acceptance Criteria [2] and tracked against the maximum radionuclide activity captured as the Licensed Inventory, as outlined in Section 3.3.1.3of the final EIS. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND205	Greg Csullog (May 1, 2017)	**3.2.1.1 Waste Types – 3-7:** The NSDF project needs to consider restricting the NSDF inventory for its initial safety case (e.g., to decommissioning and remediation wastes with minimal radioactive contamination) and presenting a comprehensive plan for expanding the NSDF inventory and re-submitting its safety case in concert with detailed, specific plans to characterize wastes with higher radionuclide inventories that would have a higher impact on NSDF performance. If the 2020 target is crucial to ensure no delays in decommissioning/remediation activities, then it seems logical and prudent that the NSDF should focus on getting operational approval for these wastes and put other, higher impact wastes, on a later timetable.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The 2017 draft EIS did include optimistic timelines. In response to comments received from the public on the 2017 draft Environmental Impact Statement (EIS), Canadian Nuclear Laboratories (CNL) has conducted several additional studies and analyses, including an operational safety analysis, comprehensive post-closure safety assessment and ecological risk assessment, the results of which are included in the final EIS. The revised timelines for the project, pending regulatory approval, are outlined in Section 1.1 of the final EIS. The construction phase, which includes site preparation, is anticipated to start in 2021 or as soon as the relevant regulatory permits and approvals are in place. The operations phase is anticipated to begin in 2024 and will end in approximately 2070 (i.e., approximately 50 years). It is more appropriate to ensure the NSDF Project is comprehensively scoped and planned in accordance with CNL's Integrated Waste Strategy [1], rather than limiting the scope at the onset of the project to near term objectives. All waste intended to be emplaced in the Near Surface Disposal Facility (NSDF), including legacy waste, shall have sufficient characterization data to ensure compliance with the Waste Acceptance Criteria [2]. Canadian Nuclear Laboratories' (CNL's) waste characterization process ensures characterization plans are developed for waste streams according to the specific data objectives. The NSDF Safety Analysis Report [3] and the Post-Closure Safety Assessment [4] demonstrate that the safety of the public and workers is protected during operations and in the post-closure phase. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.

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CNL-ND206	Greg Csullog (May 1, 2017)	**3.2.1.1 Waste Types – 3-7:** The PSAR for IRUS indicated that this waste was suitable for near surface disposal but IRUS was an AGCV concept, which according to the EIS would provide a much higher level of containment than the NSDF. Given that, the NSDF containment of bituminized waste and baled waste needs to be assessed if this waste is being considered for the NSDF. In addition, as discussed below, the in-growth of long lived nuclides was not dealt with in the IRUS PSAR and an expert's opinion is that such in-growth might preclude this waste from near surface disposal.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). As outlined in Section 3.3.1.3 of the final EIS, all waste intended to be emplaced in the Near Surface Disposal Facility (NSDF) shall have sufficient characterization data to ensure compliance with the Waste Acceptance Criteria [2] and the maximum radionuclide activity must stay below the limits of the Licensed Inventory [3]. Radionuclide progeny and ingrowth are considered in the Post-Closure Safety Assessment [4], calculated as a result of the full Reference Inventory [5] at closure. The ingrowth of radionuclides currently in storage is expected to be small compared to the final inventory. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [5] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND207	Greg Csullog (May 1, 2017)	**Section 3.2.1, Waste Types and Volumes – 3-6:** What are the legacy wastes and from which storage facilities?	The Government of Canada's nuclear legacy liabilities have resulted from ~70 years of nuclear research and development (R&D). The majority of these liabilities are located at the CRL Site and consist of shut down research buildings (including prototype and research reactors), plus a wide variety of buried and stored wastes, and contaminated lands (e.g., Waste Management Area A and Liquid Dispersal Area). The term does not refer to any specific class of waste, nor does the term describe the characteristics of the waste.
CNL-ND208	Dr. J.R. Walker (May 9, 2017)	CNL admit to the bounding radiological inventory being of doubtful provenance (Section 5.7.6.1.1 of the Draft EIS). CNL further state that "the waste quality and characterization program will assure the inventory envelope is not exceeded". The "waste quality and characterization program" is not described in the Draft EIS.	Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Management Control Procedure (MCP) [1] that has been submitted to Canadian Nuclear Safety Commission (CNSC) staff. The MCP describes characterization requirements for waste. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. Appendix A of CNL's waste characterization procedure includes several characterization resources and guidelines are referenced including the International Organization for Standardization (ISO) 21238 standard. It is worth noting that the revised waste characterization procedures have been designed to include aspects about NSDF on them to help guide waste generators. All waste proposed for disposal at the Near Surface Disposal Facility (NSDF) will be characterized in order to compare the wastes to the limits of the Waste Acceptance Criteria [2]. The Reference Inventory [3] is representative radionuclide inventory in the engineered containment mound (ECM). It is calculated and extrapolated using historical waste data, current waste operations data, and current decommissioning waste data. The maximum radiological content of the facility is referred to as the Licensed Inventory, and can be found in Table 3.3.1-2 of the final Environmental Impact Statement (EIS). References: [1] Waste Characterization Management Control Procedure 900-508600-MCP-001.

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			[2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND209	Anna Tilman (June 22, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) David Raman (August 3, 2017) Ralliement contre la pollution radioactive (August 3, 2017) Dr Éric Notebaert, ACME (August 11, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The descriptions of these waste types are totally inadequate. A far more comprehensive and detailed description of the contents of these waste types, including a clear indication as to whether and what level of ILW is in these waste streams, is essential. This is particularly important for Types 4-6, but other than waste volumes, no specific information is provided. As has been previously noted, there is no description of the specific types of waste (LLW, ILW) attributed to the facilities slated for decommissioning and remediation, despite this waste representing almost 40% of the waste to be emplaced in the NSDF. The EIS has indicated that approximately (or less than) 1% will be ILW. According to the Table 3.2.1-1 of waste volumes, the volume of Type 5 is 150,000 m3, this means that the volume of ILW would be £ 1500 m3. But on p. 3-11, the EIS states that: A few percent of containerized ILW (i.e., Type 5 waste) has been included in the NSDF Project waste inventory. The total volume of such waste type is estimated to represent about 1% of the total emplaced volume (i.e., 1% of 1,000,000 m3). Such types may include containers with ion exchange resins, compacted trash and small quantities of other miscellaneous items. The majority of radiologically contaminated wastes will meet requirements for LLW handling. A small quantity of the containerized ILW may need to be remotely handled for worker protection. It is entirely unclear as to how much ILW would actually be in the waste in the NSDF. It would seem that not only Type 5 waste would include ILW, and ILW is present in Types 4 and 5 wastes would also include some ILW. If so, that amount and activity should be indicated specifically. With respect to Packages Waste, CNL must be much more specific as to which packages contain ILW (volume and activity), and the criteria for requiring remote-handling and/or shielding for the protection of workers. It is imperative to have a full and precise understanding of exactly what type and form of waste will be deposited at the NSDF, and to ensure that strict internal and external monitoring and enforcement procedures will be in place. Not all of the materials described are radioactively contaminated and could be successfully diverted to existing facilities.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The proposed inventory of the NSDF, the Licensed Inventory, has been optimized through an iterative process as captured in Figure 3-32 of the NSDF Safety Case [2]. The Licensed Inventory is the maximum radioactivity of significant radionuclides that the NSDF will accept. Significant radionuclides are defined in the NSDF Reference Inventory [3] that was used to inform the design and safety assessments. The Licensed Inventory is captured in Section 3.3.1.3 of the final EIS. Table 3.3.1-1 of the final EIS has been updated Table 3.3.1-1 shows the estimated volume of each type of waste expected to be disposed of at the NSDF Project. The concept of waste types was introduced to describe the physical characteristics of the proposed waste streams, in order to support the design of the facility. The most abundant waste types by volume are decommissioning and demolition wastes (Type 4) and soil and soil-like wastes (Type 1). Waste Types 1,2,3,4 and 6 constitute bulk waste, and Type 5 is packaged waste. Approximately 87% of the wastes will be bulk unpackaged wastes and approximately 13% of the wastes will be packaged. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility NSDF Safety Case, 232-03610-SAR-001. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [Français] Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire de déchets destinés à l'installation de gestion des déchets près de la surface (IGDPS) et y ont apporté des modifications. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été officiellement annoncée par les LNC le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage permanent des DMA (section 2.2.2.1 de l'Étude d'impact environnemental (EIE) définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [1]). L'inventaire proposé pour l'IGDPS (inventaire autorisé) a été optimisé grâce à un processus itératif illustré à la figure 3-32 du document [2] (NSDF Safety Case). L'inventaire autorisé est le maximum de radioactivité de radionucléides importants que l'IGDPS pourra accepter. Les radionucléides importants sont définis dans l'inventaire de référence de l'IGDPS [3] employé pour procéder aux évaluations de la conception et de la sûreté. L'inventaire autorisé est expliqué à la section 3.3.1.3 de l'EIE définitive.

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		[Français] Les descriptions de ces types de déchets sont totalement inadéquates. Une description beaucoup plus complète et détaillée du contenu de ces types de déchets, y compris une indication claire de la présence ou non et du niveau de DRMA dans ces flux de déchets, est essentielle. Ceci est particulièrement important pour les types 4 à 6, mais à l'exception des volumes de déchets, aucune information particulière n'est fournie. Comme indiqué précédemment, il n'y a pas de description des types particuliers de déchets (DRFA, DRMA) attribués aux installations destinées au déclassement et à l'assainissement, bien que ces déchets représentent près de 40 % des déchets à placer dans l'IGDPS. L'EIE a indiqué qu'environ 1 % (ou moins de 1 %) seront des DRMA. Selon le tableau 3.2.1-1 des volumes de déchets, le volume du type 5 est de 150 000 m^3, ce qui signifie que le volume des DRMA serait de £1 500 m^3. Mais à la page 3-11, l'EIE indique que : On a inclus un petit pourcentage de DRMA conteneurisés (c.-à-d. déchets de type 5) dans l'inventaire des déchets du projet d'IGDPS. Le volume total de ce type de déchets devrait représenter environ 1 % du volume total mis en place (c.-à-d. 1 % de 1 000 000 m^3). Ces déchets conteneurisés peuvent comprendre des résines échangeuses d'ions, des déchets compactés et de petites quantités d'autres articles divers. La majorité des déchets présentant une contamination radiologique satisferont aux exigences relatives à la manipulation des déchets radioactifs de faible activité (DRFA). Une petite proportion des DRMA conteneurisés devront être manipulés à distance afin d'assurer la protection des travailleurs. Il n'est pas du tout clair quant à la de DRMA qu'il y aurait réellement dans les déchets de l'IGDPS. Il semblerait que non seulement des déchets de type 5 incluraient des DRMA, mais que les déchets de type 4 et 5 incluraient également certains DRMA. Dans l'affirmative, cette quantité et cette activité devraient être indiquées de façon spécifique. En ce qui concerne les déchets emballés, les LNC doivent être beaucoup plus précis quant aux emballages qui contiennent des DRMA (volume et activité) et aux critères pour exiger la télémanipulation et/ou le blindage pour la protection des travailleurs. Il est impératif d'avoir une compréhension complète et précise du type et de la forme exacte des déchets qui seront déposés dans l'IGDPS, et de veiller à la mise en place de procédures internes et externes strictes de surveillance et d'application de la loi. Les matières décrites ne sont pas toutes contaminées par la radioactivité et pourraient être détournées avec succès vers des installations existantes.	Le tableau 3.3.1-1 de l'EIE définitive a été mis à jour. Il indique le volume estimatif de chaque type de déchets susceptibles d'être stockés dans l'IGDPS. L'idée de classer les déchets a été adoptée pour décrire les caractéristiques physiques des déchets proposés et étayer la conception de l'installation. Les types de déchets les plus abondants sont les déchets de déclassement et les débris de démolition (type 4) et la terre et les matières apparentées (type 1). Les déchets de type 1, 2, 3, 4 et 6 sont des déchets en vrac, tandis que les déchets de type 5 sont des déchets emballés. Environ 87 % des déchets seront des déchets en vrac non emballés, et environ 13 % seront des déchets emballés. Références [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [2] Near Surface Disposal Facility NSDF Safety Case, 232-03610-SAR-001. [3] Rapport sur l'inventaire de référence de l'installation de gestion des déchets près de la surface, 232-508600-REPT-003.
CNL-ND210	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 26, 2017)	The EIS does not describe the wastes that it intends to dispose of in adequate detail. (i.e., If CNSC intends to dispose of all the building decommissioning waste at the Chalk River Laboratories property, to dispose of waste from the Whiteshell Laboratory and Nuclear Power Demonstrator reactors, waste from remediation of existing Waste Management Waste Areas and commercial waste, EIS must describe this in adequate detail).	The following are the sources of waste proposed for the Near Surface Disposal Facility (NSDF) by percentage: • 90% waste from Chalk River Laboratories (CRL) – past, present and future (waste owned by AECL). • 5% waste from decommissioning at Whiteshell Laboratories in Manitoba and other federal nuclear liabilities (waste owned by AECL). • 5% from other Canadian sources, such as universities and hospitals.

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			It is worth noting that much of the waste intended for NSDF currently exists at the CRL site. A large portion is in the form of contaminated soil, the other is in the form of currently-standing buildings at CRL that are slated for demolition. Wastes from other AECL establishments, such as the Whiteshell site, have traditionally been transported to the CRL site when it has been appropriate to do so for consolidation purposes. AECL/CNL has been accepting waste from hospitals and universities for decades as a service to the industry, and a service to Canada. The presence of NSDF is not related to past or future acceptance of these wastes. In other words, the availability of the NSDF does not mean off-site wastes shipments to the CRL site will increase or decrease. Regardless of the source of the wastes, all wastes must meet the Waste Acceptance Criteria (WAC) [1], and the total radioactivity cannot exceed the limits expressed in Table 3.3.1-2 of the final Environmental Impact Statement (EIS). Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND211	Ron and Nancy Vellenga (May 7, 2017)	To include intermediate-level waste in this proposal is a reckless idea that does not pass the test of responsible management.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND212	Evelyn Gigantes (May 17, 2017)	Questions regarding topics that are unclear: Where are the most dangerous elements of the waste coming from? What is the exact nature of those wastes? What are they? Are they liquid? Are they long-lived? And how, exactly, is CNL proposing to deal with them?	The NSDF will be accepting low-level radioactive waste (LLW) only. Low-level waste contains mostly shorter-lived radionuclides, but does contain a small concentration of longer lived radionuclides. For perspective, the concentration of long-lived radionuclides in the NSDF will be similar to the natural background only 100 years after closure of the facility. Regardless of the source of the wastes, all wastes must meet the Waste Acceptance Criteria (WAC) [2], and the total radioactivity cannot exceed the limits expressed in the Licenced Inventory captured in Table 3.3.1-2 of the final EIS. The following are the sources of waste proposed for the Near Surface Disposal Facility (NSDF) by percentage: • 90% waste from Chalk River Laboratories (CRL) – past, present and future (waste owned by AECL). • 5% waste from decommissioning at Whiteshell Laboratories in Manitoba and other federal nuclear liabilities (waste owned by AECL). • 5% from other Canadian sources, such as universities and hospitals. It is worth noting that much of the waste intended for NSDF currently exists at CRL. A large portion is in the form of contaminated soil, the other is in the form of currently-standing buildings at CRL that are slated for demolition. Wastes from other Canadian Nuclear Laboratories (CNL) operated sites, such as the Whiteshell site, have traditionally been transported to CRL when it has been appropriate to do so for consolidation purposes. Canadian Nuclear Laboratories has been accepting waste from hospitals and universities for decades as a service to the industry, and a service to Canada. The presence of NSDF is not related to past or future acceptance of these wastes.

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			The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. The revised waste inventory, referred to as the Licensed Inventory is captured in Section 3.3.1.3 of the final Environmental Impact Statement (EIS). Table 3.3.1-1 of the final EIS has been updated Table 3.3.1-1 shows the estimated volume of each type of waste expected to be disposed of at the NSDF Project. The most abundant waste types by volume are decommissioning and demolition wastes (Type 4) and soil and soil-like wastes (Type 1). Waste types 1,2,3,4 and 6 constitute bulk waste, and type 5 is packaged waste. Approximately 87% of the wastes will be bulk unpackaged wastes and approximately 13% of the wastes will be packaged. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND213	Anna Tilman (August 11, 2017)	Appendix Section 5.4-2, Table 1 provides a list of COPCs however missing details such as amounts of each substance, missing some contaminants (such as asbestos) . *note that AECLs Comprehensive Preliminary Decommissioning Plan document includes a table indicating arsenic is present in CRL's Waste Management Area F – therefore why is this not included in the EIS. Does CNL know the amount, or approximate amount, of arsenic or other COPCs actually stored at CRL? Is arsenic found in other Waste Management Areas? Table 5.4.2-6 – Table only includes 13 COPCs – is this adequate?	Section 3.3.3.3 of the final Environmental Impact Statement (EIS) states the following on the acceptance of non-radiological materials: "The majority of low-level waste (LLW) accepted in the engineered containment mound (ECM) will be on-site building waste from decommissioning and soil and soil-like wastes from environmental remediation. As such, LLW may also contain chemical constituents of potential concern (COPCs), as residual contamination." Waste placed in the ECM will meet the intent of land disposal and leachate requirements specified in Ontario's Regulation 347, General – Waste Management [1]. This is a requirement of the Waste Acceptance Criteria (WAC) [2]. The acceptance of waste into the ECM will be controlled through waste characterization and utilizing Ontario Regulation 347 limits. Waste that, not considering its radioactive component, is classified as hazardous waste is not permitted for disposal in the ECM, unless the hazardous waste has been treated using methods for land disposal described in Ontario Regulation 347. The commenter specifically asks about asbestos and arsenic. These wastes, like all non-radioactive wastes, must meet the intent of *Ontario Regulation 347: General – Waste Management* [1] to qualify for disposal at the Near Surface Disposal Facility (NSDF), as well as the specific requirements of the Waste Acceptance Criteria [2]. An excerpt from the WAC is included here: "Asbestos Waste shall: • Be placed in an impermeable container, bag or liner of sufficient strength (minimum thickness is 0.15 mm [6 mil]) to accommodate the weight and nature of the waste; • The container, bag or liner must be sealed; • The container, bag or liner must be free from punctures, tears or leaks; • The external surfaces of the container, bag or liner must be free from asbestos waste; • Asbestos Waste shall be segregated from other waste streams." For arsenic, leachate limits are found in Schedule 4 of *Ontario Regulation 347: General – Waste Management* [1]. The limit for arsenic is 2.5 mg/L using the Toxicity Characteristic Leaching Procedure. References: [1] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.

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			[2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND214	Anna Tilman (August 11, 2017)	EIS 5-213, 4 Criteria for designating a substance a COPC is not clear – how will CNL ensure the proposed model will provide the information necessary to prevent or limit the concentration of these substances in effluent through treatment? Is the proposed model even valid? How has the potential for these substances to mobilize over time been taken into account?	As outlined in Section 3.4.2.2 of the final Environmental Impact Statement (EIS), wastewater quality is managed by controlling what wastes are placed in the engineered containment mound (ECM). The NSDF Waste Acceptance Criteria (WAC) [1] were developed to ensure only waste with acceptable physical, radiological, and chemical characteristics will be placed in the ECM (see Section 3.3.3 of the final EIS). Specifically, that hazardous wastes must be treated to meet the requirements of Ontario Regulation 347 [2] in order to qualify for disposal at the Near Surface Disposal Facility (NSDF). This requirement effectively limits the chemical characteristics of the waste including the leachability of non-radiological constituents. Since NSDF adopted provincial guidelines to ensure the protection of the public and environment from hazardous constituents, no separate analysis or model for hazardous material was required. The Wastewater Treatment Plant (WWTP) used for the Near Surface Disposal Facility (NSDF) is similar to that used at a municipal water treatment plant. It is designed to remove contaminants with a high degree of efficiency, and produce effluent that meets drinking water guidelines. The mobilization of contaminants is modelled in the post-closure period in the Post-Closure Safety Assessment [3]. This study examines the concentrations of contaminants in the environment as the facility ages, using very conservative assumptions with respect to how long the engineered barriers perform. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347 . [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND215	Kerrie Blaise, CELA (August 15, 2017)	Page 3-11 of the EIS report states that 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 (2 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. CELA requests a response as to whether these estimates are correct, particularly the latter estimate of 10 Sv per hour, which is a lethal dose rate. CELA also asks, what is the dose rate limit for the maximum beta-particle radiation field of each waste package, measured at 1 m?	This is a typographical error in the 2017 Environmental Impact Statement (EIS) and should have read "10 mSv/h". Worker exposure is controlled by existing site administrative procedure. Through existing procedures, Nuclear Energy Workers who perform radiation work are assigned an administrative control for dose from 1 to 20 mSv, depending on where the employee works and the work performed. The Waste Acceptance Criteria (WAC) [1] for the Near Surface Disposal Facility (NSDF) have been revised. The dose rate limits and the means of handling and transferring that shall be applied to the bulk and packaged waste at the NSDF are presented in Table 7 of the WAC, and are derived from the Safety Analysis Report [2]. Radiation Type Dose Rates: • Total gamma and neutron: ≤0.5 mSv/h near contact and ≤0.01 mSv/h at a distance of 1 metre • Total gamma and neutron: >0.5 mSv/h to ≤2 mSv/h near contact and >0.01 mSv/h to ≤0.1 mSv/h at a distance of 1 metre • Total gamma and neutron: >2 mSv/h near contact or >0.1 mSv/h at a distance of 1 metre • Beta: <10 mSv/h near contact These requirements are also included in Section 3.3.3.2 of the final EIS.

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			Maximum expected annual doses to NSDF workers have been conservatively calculated in the Safety Analysis Report [2], and presented in Section 5.8.6.1.2.1 of the final EIS. Worker exposure levels are normally calculated and controlled for an annual time period. The reason that the beta dose rate near-contact is acceptable at 10 mSv/h is due to the nature of beta radiation specifically. Most beta radiation has a range of only a few feet in air, and is almost completely shielded by personal protective equipment, including thin layers of plastic. Weak beta particles, like those who have already traveled a dozen centimeters in air, rarely have enough energy to penetrate the dead layer of skin on the outside of a human body, and therefore deliver zero effective dose. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND216	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* L'EIE affirme, sans jamais le démontrer, que l'ensemble des déchets radioactifs existants et susceptibles d'être placés dans le dépotoir projeté au cours des 25 premières années d'exploitation représentent environ la moitié (52,5 %) du volume total du dépotoir projeté. Ce sont les « déchets actuels » que l'on peut décrire avec une certaine précision, par opposition aux déchets « futurs » qui demeurent encore hypothétiques. Pourtant, l'étude d'impact ne fournit jamais les divers volumes de déchets relativement calculables de cette première phase d'exploitation. Le tableau 3.2.1-1, par exemple, ne décrit que le contenu hypothétique d'un dépotoir complètement rempli plutôt que l'inventaire des déchets actuels, bien plus certain. Le Ralliement contre la pollution radioactive demande que l'EIE décrive séparément les volumes de déchets qui seront enfouis dans chacune des deux phases de l'exploitation du dépotoir projeté ; qu'elle précise, pour chacun des 6 types de déchets prévus (sols, résidus de démolition, déchets emballés, etc.) non seulement leur volume respectif, mais aussi l'origine des déchets de chaque catégorie et un inventaire des quantités de produits radioactifs que chacun contient, incluant l'intensité et les types de rayonnement (alpha, beta et gamma), leur période ainsi que leur mobilité dans l'environnement. Le Ralliement contre la pollution radioactive demande que le promoteur explique la méthodologie et les hypothèses qui ont guidé l'évaluation des futurs volumes hypothétiques de la deuxième phase de l'exploitation. Nous demandons qu'il évalue aussi la possibilité que la seconde phase d'exploitation ne se réalise jamais et qu'il analyse les conséquences d'un dépotoir final qui demeurerait plus petit que prévu. Ainsi, le Ralliement contre la pollution radioactive demande la question suivant : quelle serait l'impact sur l'environnement et la sécurité publique s'il n'y avait plus aucune « institution » pour faire la « surveillance institutionnelle » du dépotoir, pour réparer les fuites de lixiviat, pour couper les arbres du monticule avant que le vent ne les déracine, pour corriger le drainage et le terrassement du tas de déchets	Les volumes estimatifs de déchets traités durant la phase 1 sont les suivants : • Type 1 : 220 000 m3 • Type 2 : 45 000 m3 • Type 3 : 5 000 m3 • Type 4 : 170 000 m3 • Type 5 : 80 000 m3 • Type 6 : 5 000 m3 Les déchets de types 1 à 3 sont généralement produits par les activités d'assainissement de l'environnement. Les déchets de types 4 et 6 sont généralement produits par les activités de déclassement. Les déchets de type 5 sont généralement produits par les activités d'exploitation, y compris les activités antérieures. Cependant, les déchets de type 5 comprennent également certains matériaux associés aux activités d'assainissement ou de déclassement qui ne correspondent pas à la description physique des déchets de type 1 à 4. En général, on peut trouver des radionucléides dans tous les types de déchets, dont des émetteurs alpha, bêta et gamma. Cependant, les déchets de types 1 à 4 ont généralement un rayonnement de faible intensité, tandis que les déchets de type 5 ont une radioactivité plus élevée. Sur une grande quantité de déchets, les concentrations moyennes devraient être comparables aux chiffres indiqués dans la dernière colonne du tableau 12 du rapport sur l'inventaire de référence [1]. S'il n'y a pas suffisamment de déchets pour remplir l'installation de gestion des déchets près de la surface (IGDPS) à pleine capacité, il sera possible de la fermer plus tôt et d'y installer la couverture définitive. Une fermeture anticipée ou un moindre volume de déchets dans le monticule de confinement artificiel ne devraient pas entraîner de conséquences néfastes. L'estimation des volumes de déchets s'est appuyée sur une extrapolation des données sur les déchets actuellement entreposés et des données sur les déchets produits par des activités de déclassement et de démolition. L'inventaire de référence [1] est censé représenter la limite supérieure des activités radioactives. Toutes les études et les évaluations de la sûreté s'appuient sur l'inventaire de référence pour recommander des mesures d'atténuation des effets. La durée prévue de la période de contrôle institutionnel selon le scénario d'évolution normale est d'au moins 300 ans. Les Laboratoires nucléaires canadiens (LNC) attestent que le contrôle institutionnel se poursuivra aussi longtemps qu'il le faudra et que le délai de 300 ans sert aux fins de planification.

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		à mesure qu'il se déformerait sous l'effet du tassement des déchets, pour procéder aux réparations requises et pour écarter les intrus?	L'analyse de sensibilité incluse dans l'évaluation de la sûreté après la fermeture [2] compare les effets d'une période de contrôle institutionnel de seulement 100 ans par rapport au délai de 300 ans (compte tenu d'un moindre degré de décroissance radioactive avant tel ou tel phénomène post-contrôle institutionnel). L'examen d'une période de contrôle institutionnel différente permet d'avoir une perspective utile sur le rôle que joue la période de contrôle institutionnel du point de vue des doses absorbées par les récepteurs. Les concentrations et les doses qu'absorberaient les récepteurs humains selon les prévisions sont indiquées à la section 6 de l'évaluation de la sûreté après la fermeture [2] et à la section 5.8.6 de l'EIE définitive. Les doses prévisionnelles absorbées par les biotes non humains sont indiquées à la section 5 de l'ERÉco [3] et à la section 5.7.6 de l'EIE définitive. Tous les effets prévus en matière de santé humaine et de radioactivité dans l'environnement sont largement inférieurs aux critères réglementaires applicables à la phase de post-fermeture. Les résultats offrent une perspective permettant de conclure que la sûreté à long terme de l'IGDPS ne dépend pas des mécanismes de contrôle institutionnel, mais surtout du fait que l'inventaire a été limité aux DFA et des barrières artificielles garantissant le confinement des déchets pour une période suffisante permettant la désintégration radiologique. Références [1] Rapport sur l'inventaire de référence de l'installation de gestion des déchets près de la surface, 232-508600-REPT-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Évaluation des risques écologiques (ERÉco) du projet d'IGDPS, 232-121240-ASD-001.
CNL-ND217	William Turner (May 31, 2017) 69.72.	Type 1 waste includes 370,000 m^3 of contaminated soil. Without an evaluation of the environmental effects of these excavations, the environmental impact assessment of the project is incomplete. CNL must include an assessment of the potential environmental impacts of the excavation of the 370,000 m3 of contaminated soils from around the laboratory complex. If the project intends to remediate the resulting holes, then those remediation activities must be included in this assessment. The type and quantity of the radiological, chemical and biological hazards contained in the wastes and any changes to the inventory over the long term are the components that must drive the design, operation, closure and eventual abandonment. Volume considerations can only be addressed once the inventory of the hazards is known. Please provide a table that addresses both the hazardous content (inventory) and the changes to that inventory resulting from the decay and potential release to the environment.	Environmental remediation of the existing Waste Management Areas (WMAs) on the Chalk River Laboratories (CRL) site are not within the scope of the NSDF Project [1]. The timelines for the remediation of some of these WMA, several of which are still in operation, is over many years (or decades). Remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place. The remediation process, including the approach for determining remedial options is captured in CNL's Decommissioning and Demolition Program Description Document [2]. As noted above the remediation of the WMAs would be subject to separate licensing decisions by the CNSC thus discussion of the remediation options has not been included in the final EIS. However, CRL is registered under ISO-14001. Our environmental policy states: "We review the impacts of our activities, facilities, projects, services and products on the environment". For non-routine work, this review is conducted through CNL's environmental review process. Since CRL is located on Federal lands, step 1 of this process is to determine whether the particular project would be subject to a section 82 review under the Impact Assessment Act. Regardless of whether a particular project is subject to the Impact Assessment Act (IAA), the review process is the same. Canadian Nuclear Laboratories assesses all potential environmental impacts and implements appropriate mitigation measures. For more information about CNL's overall strategy for waste management, please see the Integrated Waste Strategy [3] Table 3.3.1-1 of the final EIS shows the estimated volume of each type of waste expected to be disposed of at the NSDF. Table 3.3.1-2 provides the bounding radionuclide inventory in the ECM. References: [1] Record of Decision on the Scope of Environmental Assessments for Three Proposed Projects at Existing Canadian Nuclear Laboratories' Facilities, 2017 March 8. [2] Decommissioning and Demolition Program Description Document, 900-508300-PDD-001.

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			[3] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
		Integrated Waste Management – Radionuclide Inventory	
CNL-ND218	Ole Hendrickson (August 16, 2017)	The EIS should: Provide all available information on alpha-emitting wastes at the Chalk River site: how they were created, where they are found on site, and quantities proposed to be put in the NSDF.	The level of detail that the commenter requests concerning alpha-emitting radionuclides present on the CRL site is not in the scope of the NSDF Project. However, the NSDF Reference Inventory Report [1] provides, in detail, the total quantities and concentrations of the proposed inventory of the NSDF, including the alpha emitters. Although alpha-emitting radionuclides can be naturally occurring thus inherently present within soils or demolition debris, within the proposed NSDF inventory alpha-emitting radionuclides also exist as contaminants in general waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Table 3.3.1-2 of the final EIS presents a numerical summary of the radionuclide quantities, and also identifies the alpha emitters. Reference: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND219	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* Le Ralliement contre la pollution radioactive demande que le promoteur : 1) qu'il explique clairement comment il a établi la « recette » des quantités maximales de 30 radionucléides qu'il peut placer « sécuritairement » dans le dépotoir, selon le tableau 5.8.6-2 ; 2) qu'il décrive la nature et la quantité des déchets particuliers à laquelle correspond cette recette (combien de panneaux remplis de tritium, par exemple ?) 3) qu'il rende immédiatement disponible sur son site internet toutes les études, rapports et documents auxquels il fait référence dans son étude d'impact environnemental. *Veuillez référer aux pages 3 et 4 de cette soumission, qui contiennent également des détails pertinents relatifs à ces commentaires.*	La section 3.2 et l'annexe B de l'inventaire de référence [1] décrivent le processus de sélection ayant permis de déterminer les radionucléides les plus importants présents dans l'IGDPS dans une perspective de sûreté à long terme. En voici un résumé. Des centaines de radionucléides sont susceptibles d'être présents dans les déchets radioactifs. Par exemple, la base de données sur les déchets radioactifs de Chalk River en a enregistré plus de 200 depuis 25 ans. Beaucoup de ces radionucléides ont une faible radioactivité ou ont une très courte vie, de sorte qu'ils ne peuvent pas contribuer de façon significative aux répercussions radiologiques. Par ailleurs, beaucoup de radionucléides sont des produits à croissance de courte durée, comme c'est le cas du baryum 137, pris en compte dans l'analyse en même temps que ses parents respectifs. Pour prouver que les radionucléides pris en compte dans l'analyse sont bien les principaux radionucléides contribuant aux doses de radioactivité, la méthode suivante a été adoptée : 1. Évaluer l'importance du radionucléide : a) Définir les voies de contamination dominantes. b) Tenir compte de l'ensemble des données sur les radionucléides disponibles dans l'inventaire des LCR. c) Classer les radionucléides en tenant compte des activités et des coefficients de dose correspondant aux voies de contamination importantes. 2. Tenir compte d'autres facteurs, comme l'effet de la décroissance radioactive et des propriétés de croissance et de sorption. a) Faire des comparaisons avec des études/installations semblables. b) Déterminer si la liste employée pour l'IGDPS est adaptée aux fins poursuivies. L'évaluation de la sûreté après la fermeture [2] permet d'attester que l'inventaire radiologique proposé convient à l'installation, car les doses et l'exposition des récepteurs humains et non humains sont inférieures aux critères réglementaires. On peut obtenir cette évaluation sur demande en s'adressant à ermstakeholder@cnl.ca.

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			Références [1] Rapport sur l'inventaire de référence de l'installation de gestion des déchets près de la surface, 232-508600-REPT-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND220	Greg Csullog (May 1, 2017) Kerrie Blaise, CELA (August 15, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** If waste retrieved from WMA B bunkers represent the conservative accident scenario, am I to assume that wastes will not be recovered from Area C (these would likely be in worse physical shape than bunkers)? Table 4.2 of the PA report sets out the nuclide inventories of the proposed NSDF. However, this single table mixes intermediate and low-level wastes. In addition to table 4.2, it is necessary to show two separate tables - one each, for ILW nuclide amounts and LLW nuclide amounts (and possibly a table for HLW nuclide amounts). It should be noted that previous discussions which limited ILW to short-lived wastes no longer apply in these documents. The PA report makes clear (page 4-2) that ILW will contain some very long-lived wastes.	In 2017, the NSDF Project had a single "Performance Assessment' that covered all phases of the NSDF Project. This has now been divided into two documents – the NSDF Safety Analysis Report (SAR) [1] (which examines safety during the operational phase of NSDF) and the Post-Closure Safety Assessment [2] (which examines the long-term safety of NSDF). The Safety Analysis Report (SAR) [1] evaluates anticipated operational occurrences and accident scenarios involving individual waste shipments. With respect to conservative accident scenarios, the SAR uses packaged waste that are at the upper limit for external dose rate (0.1 mSv/hr at 1 meter from the package) that contain Cobalt-60 as the radiological source. Appendix D of the SAR is a good example of the accident scenario assessed, and describes the properties of the waste package. Canadian Nuclear Laboratories (CNL) Waste Operations will adhere to CNL's Radiation Protection Program when developing waste retrieval campaigns, including those from any individual Waste Management Area on site. Only wastes that meet the NSDF Waste Acceptance Criteria [3] would be candidates for NSDF. Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [4]). References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [4] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND221	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** If waste retrieved from WMA B bunkers represent the conservative accident scenario, am I to assume that wastes will not be recovered from Area C (these would likely be in worse physical shape than bunkers)?	In 2017, the NSDF Project had a single "Performance Assessment' that covered all phases of the NSDF Project. This has now been divided into two documents – the NSDF Safety Analysis Report (SAR) [1] (which examines safety during the operational phase of NSDF) and the Post-Closure Safety Assessment [2] (which examines the long-term safety of NSDF). The Safety Analysis Report (SAR) [1] evaluates anticipated operational occurrences and accident scenarios involving individual waste shipments. With respect to conservative accident scenarios, the SAR uses packaged waste that are at the upper limit for external dose rate (0.1 mSv/hr at 1 meter from the package) that contain Cobalt-60 as the radiological source. Appendix D of the SAR is a good example of the accident scenario assessed, and describes the properties of the waste package.

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			Canadian Nuclear Laboratories (CNL) Waste Operations will adhere to CNL's Radiation Protection Program when developing waste retrieval campaigns, including those from any individual Waste Management Area on site. Only wastes that meet the NSDF Waste Acceptance Criteria [3] would be candidates for NSDF. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND222	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** If WIP-III was the basis for the projected inventory, the following need to be addressed in the context of going forward during NSDF operation. From Page 28: 1. My understanding is that the WIP-III database has or is being replaced at CRL. 2. Are generators to provide this proper designation or does this responsibility remain with waste operations [this is the issue of waste classification, making sure the right wastes are emplaced in the NSDF]? 3. Is the auto-categorization function a part of the WIP-III replacement? 4. If the answer to 2. is Yes, what QA has been performed to ensure that auto-categorization works as desired? 5. 5. If the answer to 2. is No, how will "proper designation[s]" be assigned for wastes to ensure that NSDF accepts wastes suitable for NSDF?	The Waste Inventory Program version 3 (WIP-III) database has been replaced with a new waste tracking system. Canadian Nuclear Laboratories (CNL) uses an electronic database to input information that is tracked in a Waste Tracking System. Figure 2.2-2 was derived using the characterization data available found in CNL's Waste Inventory Program, version 3 (WIP-III). The disposal code of radioactive waste in WIP-III is based on radionuclide concentration (like the IAEA's waste classification); therefore, the disposal code can generally be used to infer a waste classification. The waste with known characterization information was then extrapolated to be inclusive of the other radioactive waste in storage that was either without or with limited waste characterization information. When the radionuclide inventory was assembled (documented in [1]), the assigned waste codes of the waste (from WIP III) were no longer used and the radionuclide activity of individual waste packages (utilizing sum of fractions) was analysed. Future waste was classified based on waste forecast analysis. Section 3.3.2 of the final EIS states the following: "For waste to be accepted for disposal in the ECM, the waste generator will need to characterize the waste, complete and submit a Waste Profile Record for review and approval, […]" Wastes are characterized by generators and the characteristics are summarized in the waste profile. The Waste Profile is required to be approved by the Facility Authority of the NSDF (or authorized designate) prior to acceptance of waste for disposal. The acceptance of waste for disposal is based on the characteristics of the waste complying with all of the requirements of the NSDF Waste Acceptance Criteria [2], and not solely on the classification of the waste (nonetheless, the NSDF will only accept Low Level Waste for disposal). References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND223	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** If WIP-III was used to project the radionuclide inventory for the NSDF, then the EIS should address or at least acknowledge the following issues: From Page 6: 1. Historically AECL's wastes were not managed as LLW, ILW, etc.	The process for projecting the radionuclide inventory for the NSDF is included in the NSDF Reference Inventory Report [1]. Waste packages with radionuclide data available in Waste Inventory Program version 3 (WIP-III) were screened through the radionuclide concentration limits of the NSDF Waste Acceptance Criteria [2], regardless of the historical classification of the waste. The qualified packages were retained and extrapolated to create the Waste Package fraction of the NSDF Radionuclide Inventory. Section 3.3.2 of the final EIS states the following: "For waste to be accepted for disposal in the ECM, the waste generator will need to characterize the waste, complete and submit a Waste Profile Record for review and approval, […]"

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		2. The WIP-III database used multi-digit waste class "codes" almost 100% based on the estimated (not known or verified) radionuclide content of wastes to indicate where wastes should be stored and possibly disposed. 3. It is not unreasonable to assume that ILW (that … need a greater degree of isolation from the biosphere than is provided by near surface disposal) are mingled with LLW in storage. How did the project compile inventories of waste according to LLW and ILW classes when WIP-III does not use these classes? Estimating the radionuclide inventory of a waste class would first rely on effectively collating the wastes in that class.	Wastes are characterized by generators and the characteristics are summarized in the waste profile. The Waste Profile is required to be approved by the Facility Authority of the NSDF (or authorized designate) prior to acceptance of waste for disposal. The acceptance of waste for disposal is based on the characteristics of the waste complying with all of the requirements of the NSDF Waste Acceptance Criteria [2], and not solely on the classification of the waste (nonetheless, the NSDF will only accept Low Level Waste for disposal). References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND224	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** Regarding, "The inventory was then screened to remove waste streams which did not meet safety objectives…", with high uncertainty about some past wastes, i.e., those with little or no reporting of long lived radionuclides, it would not be hard to imagine not removing some "streams" due to a lack of knowledge (they may have unreported inventories of long lived nuclides that could preclude them from the NSDF). Massaging an inventory (leave this, take out that) when the components of that inventory are poorly characterized or not characterized at all might be an academic exercise.	The process for projecting the radionuclide inventory for the NSDF is included in the NSDF Reference Inventory Report [1]. The screening does not automatically qualify waste used in the reference inventory for disposal in NSDF. Existing packages of waste in the currently stored CNL inventory will require characterization, including a complete inventory of long-lived radionuclides, prior to acceptance for disposal at the NSDF. Uncertainties associated with historical waste inventories will be addressed through a program of evaluation and characterization assessments that is currently underway to ensure that the wastes are safely handled and disposed with regard to radiological and non-radiological hazardous constituents of concern. This process will include identification and quantification of short and long-lived radionuclides and it will be informed by, but not reliant upon, historical data and records. Subject to development and approval of detailed decommissioning plans for these facilities, wastes will be retrieved and disposed in the NSDF. Reference: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND225	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** The project needs to provide a least a description of how it qualified its inventory estimate within document 232-509240-ASD-001 rather than (possibly) including this information in a bibliography. Specifying the inventory for the NSDSF is critical component of the project – demonstrating that the project effectively "projected [the] radionuclide inventory" for the performance assessment would instill confidence for future projections. Not doing a defensible job on the inventory projection would have the opposite effect.	The NSDF Reference Inventory [1] has been updated to provide an estimation of the total radiological inventory required to inform the safety assessments, where the inventory is tested against selected scenarios to determine the long-term consequences of the proposed facility. This is described in Section 3.3.1.3 of the final Environmental Impact Statement (EIS). The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. The reference inventory establishes a representative radionuclide inventory by considering waste already in storage and waste forecasts from environmental remediation and decommissioning projects data to predict an assumed total volume of waste at the NSDF at time of closure. All LLW that is expected to be generated has been meticulously described, or "characterized", before its generation to ensure the cumulative total inventory of the NSDF Project is tracked against the reference inventory. The upper limit of radioactivity content in the waste is known as the Licensed Inventory (Section 3.3.1.3/Table 3.3.1-2 of EIS), and is a result of further reductions to the Reference Inventory resulting from safety assessments. Reference: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.

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CNL-ND226	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** An example of nested packages are individual bales of waste placed into what was called a "red crate". While the radionuclides for bales were reported on their individual data sheets, for many years the WIP-III database did not have the feature of adding up the radionuclides for the individual bales to, for example, create a tally for the red crate. As a result, a red crate's data sheet would not show any radionuclides, so in effect, radionuclide inventories for bales would "disappear". If the radionuclides for red crates were part of the "15% of waste vol. is from past waste", doing the 100/15 calculation would also result in 100/15 x 0 for these wastes, making the calculation even more suspect.	Existing packages of waste in the currently stored Canadian Nuclear Laboratories (CNL) inventory will require characterization such that they can be compared to the Waste Acceptance Criteria [1] before accepted for disposal at NSDF. Uncertainties associated with historical waste inventories will be addressed through a program of evaluation and characterization assessments required by CNL procedures that are currently underway to ensure that the wastes are safely handled and disposed with regard to radiological and non-radiological hazardous constituents of concern. These processes will include identification and quantification of short and long lived radionuclides and it will be informed by, but not reliant upon, historical data and records. Canadian Nuclear Laboratories (CNL) will apply knowledge and experience of past and present workers and will review historic waste records to assist in documenting and evaluating waste for acceptance in the NSDF. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND227	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** Another problem with the approach is related to the issue of "reported nuclides" as most of the "reporting" relied on estimates of waste characteristics within the WI Program, which were not verified analytically in most cases. For bales, which were part of the proposed IRUS disposal concept, pre-2000 analytical verification was done for bales. However, after that point verification was carried out for a number of years but the data were lost. Over the years, the characteristics of bales would have changed as processes and operations changed on the CRL site, however, the radionuclides "reported" initially for bales were not adjusted. This is the case for many waste blocks at CRL – their characteristics likely changed over the years but their estimated characteristics were likely not adjusted. As such, the uncertainty of the characteristics of wastes with "reported" nuclides is unknown, making the 100/15 calculation even more suspect.	Existing packages of waste in the currently stored CNL inventory will require characterization such that they can be compared to the Waste Acceptance Criteria [1] before accepted for disposal at NSDF. Uncertainties associated with historical waste inventories will be addressed through a program of evaluation and characterization assessments required by CNL procedures that are currently underway to ensure that the wastes are safely handled and disposed with regard to radiological and non-radiological hazardous constituents of concern. These processes will include identification and quantification of short and long lived radionuclides and it will be informed by, but not reliant upon, historical data and records. Canadian Nuclear Laboratories' (CNL's) Waste Certification process ensures that the Waste Management process can be repeated and evaluated for producing waste that is within the expected characteristics. This is achieved through waste assurance activities conducted prior to, and following, waste generation. This includes waste verification steps such as non-destructive or destructive sampling and analysis of waste. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND228	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** Regarding "account for decay" Were in-growth calculations done at all?	Radionuclide progeny and ingrowth are considered in the Post-Closure Safety Assessment [1], calculated as a result of the Reference Inventory [2] at closure. The ingrowth of radionuclides currently in storage is expected to be small compared to the final inventory. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND229	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** The conclusion that the "the total radionuclide inventory within the ECM has been overestimated" using the cited methodology has to be proven by a rigorous assessment of past wastes,	The process for projecting the radionuclide inventory for the NSDF is included in the NSDF Reference Inventory report [1]. Specifically Section 4 of [1] describes the methodology used to calculate the expected inventory at closure. Some of the reasons that the extrapolated inventory is assumed to be conservative include:

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		otherwise the conclusion is suspect and the uncertainty may not be mitigated. In fact, if the approach taken by the project is not defensible, that serves to heighten uncertainty about the project.	• The database does not decay its radioactivity, and as a result, the shorter lived radionuclides such as Cesium-137, Strontium-90, Cobalt-60 and tritium are all over estimated in the inventory. For example, any amount of Cobalt-60 placed in storage 50 years ago would have almost completely decayed by the present date, yet that quantity is assumed to be present. Any tritium placed over 10 years ago has decayed by about half. • Historically, waste characterization has been performed with a focus on worker protection. Conservative approaches to developing radionuclide fingerprints were used, such as applying hot-spot measurement values to the entire waste stream. This practice overestimates the actual quantity of radioactivity. • When multiple packages were received as part of the same shipment, the exposure rate of the most radioactive package was applied to the entire shipment. • Prior to the establishment of the Waste Analysis Facility in 2007, waste generated from the controlled areas was not able to be monitored with high enough confidence to be designated for unconditional release. Therefore, there is a possibility that there are waste packages in storage assigned radionuclide values that are essentially free of radioactivity. All of these factors above contribute to the over-estimation of the current radioactivity held in storage. The current radioactivity values were extrapolated to include 50 more years of operations. All wastes proposed for NSDF must be characterized such that they can be compared to the Waste Acceptance Criteria [2] before emplacement in the facility. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND230	Northwatch (August 16, 2017)	No safety case was presented in the draft Environmental Impact Statement. Perhaps in its stead, the Canadian Nuclear Laboratories has prepared a "Performance Assessment for Near Surface Disposal Facility to support the Environmental Impact Statement"; a "performance assessment" is referred to repeatedly in the draft EIS and the details of which are included in the EIS reference section.8 However, the terms "safety case" and "performance assessment" are excluded from the glossary of terms in the draft EIS, making it difficult to determine the degree to which CNL may be using the terms interchangeably or what relationship CNL contends exists between a safety case and a performance assessment for a radioactive waste facility. Furthermore, noteable in its absence, this performance assessment was not presented or even summarized in the draft EIS, the document is not included in the appendices 9 and is not available on-line through the public registry, through the CNL web site, or through a general search. The draft EIS asserts that the limits for total specific activity of any waste consignment accepted for disposal at NSDF is based on the analysis of long-term performance of NSDF, but in the absence of CNL having presented any evidence or even information with respect to the safety case and/or performance assessment this cannot be verified or even assessed.	A Safety Case document has been prepared and submitted to the Canadian Nuclear Safety Commission (CNSC) staff. The purpose of this Safety Case is to present an integrated collection of safety arguments and evidence to demonstrate the safety of the NSDF. The NSDF Safety Case [1] covers the pre-closure period and the post-closure period of the Facility and will be updated as required during the life cycle of the proposed facility. The NSDF Safety Case is part of the licencing submission to the CNSC. The following documents establish the frame work for the Safety Case: - REGDOC-2.11.1: *Assessing the Long-Term Safety of Radioactive Waste Management* [2] - SSG-23: *The Safety Case and Safety Assessment of Disposal of Radioactive Waste* [3] - SSG-29: *Near Surface Facilities for Radioactive Waste* [4] - SSR-5: *Disposal of Radioactive* Waste [5] In 2017, the NSDF Project had a single "Performance Assessment' that covered all phases of the NSDF Project. This has now been divided into two documents – the NSDF Safety Analysis Report (SAR) [6] and the Post-Closure Safety Assessment [7]. The Post-Closure Safety Assessment represents the long-term performance analysis for NSDF and is summaries in both Sections 5.7 (Ambient Radioactivity and Ecological Health) and 5.8 (Human Health) of the final Environmental Impact Statement (EIS). The NSDF Safety Case and the Post-Closure Safety Assessment are available by contacting ermstakeholder@cnl.ca

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			References: [1] Near Surface Disposal Facility Safety Case. 232-03610-SAR-001. [2] CNSC, Waste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [3] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012. [4] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [5] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011. [6] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [7] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND231	Pravin Shah (April 8, 2017) Concerned Citizens of Renfrew Country (Ole Henrickson) (July 3, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The NSDF EIS makes no distinction between short lived and long lived radionuclides with regard to the wastes to be placed in the proposed facility. Both the NSDF Waste Acceptance Criteria (CNL 2017a) and the NSDF EIS (2017b) indicate that CNL would place significant quantities of highly radioactive wastes with long half-lives in this proposed landfill-type facility. Neither document sets clear limits on total amounts of long-lived radionuclides to be placed in the NSDF. Historical activities at the Chalk River Laboratories site included the manufacture of plutonium for atomic weapons, which generated large quantities of long-lived, alpha-emitting radionuclides (AECL 2014). Many of these "legacy" wastes would be classified by the IAEA as intermediate level. Their safe management requires placement in a geological facility.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). Due to this significant reduction in inventory, the concentration of longer-lived radionuclides has been drastically reduced. Near surface disposal is primarily suitable for waste containing mainly short lived radionuclides (radionuclides with half-lives of less than about thirty years are considered to be short lived) and only low concentrations of long lived radionuclides (IAEA SSG-29, *Near Surface Disposal Facilities for Radioactive Waste* [2]). Near surface disposal refers to the emplacement of solid, or solidified, radioactive waste containing predominantly short lived radionuclides in a disposal facility located at or near the land surface (IAEA SSG-29). Based on the results presented in the Post-Closure Safety Assessment (PostSA) [3], the activity concentrations of long-lived radionuclides are at a level that is acceptable and does not impact the post-closure safety of the NSDF. The activity of long-lived radionuclides placed in the ECM is limited by the Waste Acceptance Criteria (WAC) [4]. All waste proposed for disposal into the NSDF must be characterized in order to compare against the requirements of the Waste Acceptance Criteria [4]. In addition, the total radioactivity disposed of must remain within the limits of the Licensed Inventory, described in Table 3.3.1-2 of the final EIS. The table also lists the half-lives of the radionuclides. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND232	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 2: Please provide documentation showing how the U-238 inventory was determined. (page 3)	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS), and has been made available to the public. Through the removal of Intermediate Level Waste (ILW) streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1].

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			Waste stream inventories forecasted for emplacement in the NSDF are based on extrapolation of CNL's waste database for stored waste packages as well as planning estimates for the decommissioning of facilities and environmental remediation projects across CNL. Estimates of waste constituents are provided in the NSDF Reference Inventory Report [1] and Section 3.3.1.3 of the final EIS. These estimates indicate that, by mass, total quantities of fissionable material in forecasted waste streams are estimated to be less than 0.5% of the total waste currently slated for emplacement at the NSDF. The total uranium in the estimate closely resembles the distribution of depleted uranium; however, the isotopic distribution within the reference inventory is an artefact of averaging and is not sourced from a single waste stream profile. Natural uranium (thus Uranium-238) may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other amounts of fissile material (thus Uranium-238) may exists as residual unrecoverable amounts, predominately as contaminants on waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Discrete and recoverable amounts of nuclear materials are controlled, and are not destined for NSDF. The total emplaced Uranium-238 content under the revised inventory is equivalent to an average concentration of about 0.08 Bq/g. This is extremely close to the average natural background concentration of 0.07 Bq/g quoted by the Health Physics Society [2] although it is noted that this value varies widely depending on the local geology. Appendix D.3 of the Reference Inventory Report [1] is an analysis of the ratio of different uranium isotopes in the inventory. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf
CNL-ND233	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 3: Please provide documentation showing how the U-235 and U-234 inventories were determined. (page 3-4)	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS), and has been made available to the public. Through the removal of Intermediate Level Waste (ILW) streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. Waste stream inventories forecasted for emplacement in the NSDF are based on extrapolation of CNL's waste database for stored waste packages as well as planning estimates for the decommissioning of facilities and environmental remediation projects across CNL. Estimates of waste constituents are provided in the NSDF Reference Inventory Report [1] and Section 3.3.1.3 of the final EIS. These estimates indicate that, by mass, total quantities of fissionable material in forecasted waste streams are estimated to be less than 0.5% of the total waste currently slated for emplacement at the NSDF. The total uranium in the estimate closely resembles the distribution of depleted uranium; however, the isotopic distribution within the reference inventory is an artefact of averaging and is not sourced from a single waste stream profile. Natural uranium (thus Uranium-235 and Uranium-234) may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other amounts of fissile material (thus Uranium-235 and Uranium-234) may exists as residual unrecoverable amounts, predominately as contaminants on waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU)

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			and other research and development activities). Discrete and recoverable amounts of nuclear materials are controlled, and are not destined for NSDF. The concentration of the Uranium-235 and Uranium-234 in the waste is 3.10×10^{-3} Bq and 7.19×10^{-2} Bq, respectively. Appendix D.3 of the Reference Inventory Report [1] is an analysis of the ratio of different uranium isotopes in the inventory. Reference: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND234	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 4: Please provide documentation showing how the Cs-137 and Sr-90 inventories were determined. (page 4)	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS) is available to the public (www.cnl.ca/nsdf or by request at ermstakeholder@cnl.ca. Through the removal of Intermediate Level Waste (ILW) streams, many radionuclide activities were reduced by 99%. The Reference Inventory was developed through an iterative process between safety assessments and evaluation against dose acceptance criteria. The first step involved the collection of data from CNL waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the CSA [2] and IAEA [3] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF. The revised waste inventory is captured in Section 3.3.1.3 of the final EIS. Cesium-137 is discussed further in Appendix D, Section D1, of the Reference Inventory Report [1]. In the revised inventory, the amount of Cesium-137 and Strontium-90 present is approximately equal. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] International Atomic Energy Agency. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009.
CNL-ND235	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 5: Please provide documentation showing how the I-129 inventory was determined. (page 4)	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS), and has been made available to the public. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. The Reference Inventory was developed through an iterative process between safety assessments and evaluation against dose acceptance criteria. The first step involved the collection of data from CNL waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the CSA [2] and IAEA [3] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF.

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			The revised waste inventory is captured in Section 3.3.1.3 of the final EIS. The total amount of I-129 was adjusted using the ORIGIN code to align with the actual production potential assuming an 80% burn up of fuel in the National Research Universal reactor. This decision is documented in Section D.5 of the Reference Inventory Report [1]. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] International Atomic Energy Agency. *Classification of Radioactive Waste*. General Safety Guide (GSG)-1. 2009.
CNL-ND236	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 6: Please provide documentation showing how the Pu-241 inventory was determined. (page 4-5)	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS), and has been made available to the public. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. The Reference Inventory was developed through an iterative process between safety assessments and evaluation against dose acceptance criteria. The first step involved the collection of data from CNL waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the CSA [2] and IAEA [3] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF. The revised waste inventory is captured in Section 3.3.1.3 of the final EIS. The calculation of the Plutonium-241 activity is described in the Reference Inventory Report, especially as it related to the ingrowth of Americium-241. Relevant sections include Section D.1 and Table D.4. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] International Atomic Energy Agency. *Classification of Radioactive Waste*. General Safety Guide (GSG)-1. 2009.
CNL-ND237	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 7: Please provide inventory data for Eu-152/154, U-236, Pu-238 and Cm-244. (page 5)	Section 3.2 and Appendix B of the Reference Inventory Report [1] describe the screening process that was used to determine the most important radionuclides present in the NSDF from a long-term safety perspective. A summary is presented here. There are hundreds of radionuclides that can be present in radioactive waste. For example, the Chalk River Radioactive Waste Database has had over 200 radionuclides recorded during the last 25 years. Many of these radionuclides are present at low activities, or have very short half-lives, such that they cannot contribute significantly to the radiological impact. As well, many of the radionuclides are short-lived in-growth products, such as Barium-137m, which considered in the analysis in conjunction with their respective parents (e.g., Cesium-137).

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			To demonstrate that these radionuclides considered in the analysis are the primary radionuclides contributing to the dose consequence, the following approach was used: 1. Evaluate radionuclide significance: a) Define dominant pathways b) Consider full radionuclide dataset available in the CRL inventory program c) Rank radionuclides, taking into account activities and dose coefficients corresponding to significant pathways d) Consider other factors, such as the effect of decay and in-growth and sorption properties. 2. Compare against similar studies/facilities 3. Determine if the list used in NSDF is fit for purpose. The Post-Closure Safety Assessment (PostSA) [2] demonstrates the proposed radiological inventory is appropriate for the facility, as doses and exposure to both human and non-human receptors are below the regulatory criteria. The PostSA can be requested at ermstakeholder@cnl.ca. Additional work was performed to validate the assumptions of the screening process described in the Reference Inventory Report [1]. The following radionuclides were identified as being either present in small amounts in the inventory, or present in slightly different amounts than previously calculated. Note that Europium-152 and Europium-154 were screened out based on their low activities in the CNL waste database, and were not included. • Americium-242m • Americium-242 • Curium-243 • Curium-244 • Curium-245 • Curium-246 • Plutonium-238 • Plutonium-239 • Plutonium-240 • Samarium-151 • Uranium-236 The addition of these radionuclides, and the modification of some of the inventory values were evaluated separately through updated post-closure modelling to ensure that their contribution is, in fact, negligible. This exercise was performed as a verification of the final EIS results. Results indicate no significant change from the current dose modelling calculations presented in the final EIS thus these radionuclides are insignificant to the reference inventory. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND238	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 8: Please provide estimates of the amount of tritium escaping the CRL site via natural drainage of surface water. (Page 5-6)	Table 5.7.4-1 of the final Environmental Impact Statement (EIS) presents the CRL site's airborne and liquid release rates, which includes both airborne and liquid tritium. For more information on environmental monitoring and reporting, please see the latest site-wide Annual Compliance Monitoring Report [1], which can be found on the CNL website at https://www.cnl.ca/en/home/environmental-stewardship/performance-report/default.aspx.

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			The Annual Compliance Monitoring Report describes how much tritium exists in the environmental at CRL, giving special attention to the Perch Lake Basin (Figure 5) and the Maskinonge Lake Basin (Figure 6). For example, the average tritium releases from Perch Creek to the Ottawa River represents 0.02% of the Derived Release Limit [1]. The environmental concentrations in Perch Lake and Perch Creek were important inputs into the overall NSDF design. It is understood that tritium is not easily removed from liquid. Therefore, the amount of tritium that can be released from the ECM is calculated to ensure that the concentration in Perch Creek does not exceed the drinking water quality guideline of 7,000 Bq/L. This is achieved via 2 methods: • Restricting the amount of tritium inventory allowed in the bulk waste streams, and • The use of leachate-controlled packages which are designed to contain the waste material for the duration of time that the package is in the open/operating cell and subject to precipitation. Once the cell is closed and a cover is placed over the waste, the material is no longer available for leaching and is therefore controlled. Reference: [1] Annual Compliance Monitoring in 2018 at Chalk River Laboratories. CRL-509243-ACMR-2018.
CNL-ND239	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 9: (i): Please explain with appropriate documentation how the tritium inventory was determined. (ii): Please provide estimates of the amount of tritium escaping from the CRL site by evaporation of surface water from the lakes and wetlands noted above (p.6-7).	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS), and has been made available to the public. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. The Reference Inventory was developed through an iterative process between safety assessments and evaluation against dose acceptance criteria. The first step involved the collection of data from CNL waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the CSA [2] and IAEA [3] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF. In the case of tritium, the inventory was adjusted to ensure that concentrations in Perch Creek would meet drinking water quality guidelines (despite the fact that Perch Creek is not a source of drinking water for humans). Table 5.7.4-1 of the final EIS presents the CRL site's airborne and liquid release rates, which includes both airborne and liquid tritium. For more information on environmental monitoring and reporting, please see the site-wide latest Annual Compliance Monitoring Report [2], which can be found on the CNL website at https://www.cnl.ca/en/home/environmental-stewardship/performance-report/default.aspx. The Annual Compliance Monitoring Report describes how much tritium exists in the environmental at CRL, giving special attention to the Perch Lake Basin (Figure 5) and the Maskinonge Lake Basin (Figure 6). For example, the average tritium releases from Perch Creek to the Ottawa River represent 0.02% of the Derived Release Limit [4].

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			The environmental concentrations in Perch Lake and Perch Creek were important inputs into the overall NSDF design. It is understood that tritium is not easily removed from liquid. Therefore, the amount of tritium that can be released from the ECM is calculated to ensure that the concentration in Perch Creek does not exceed the drinking water quality guideline of 7,000 Bq/L. This is achieved via 2 methods: • Restricting the amount of tritium inventory allowed in the bulk waste streams, and • The use of leachate-controlled packages which are designed to contain material for the duration of time that the package is in the open/operating cell and subject to precipitation. Once the cell is closed and a cover is placed over the waste, the material is no longer available for leaching and is therefore controlled. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] International Atomic Energy Agency. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009. [4] Annual Compliance Monitoring in 2018 at Chalk River Laboratories. CRL-509243-ACMR-2018.
CNL-ND240	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 10: (i): Please provide documentation to show how the carbon-14 inventory was derived. (ii): Please provide evidence for the assumed proportionality between the C-14 inventory and the C-14 release rate from the CRL site. (iii): Please provide evidence to support the claim that fugitive carbon-14 emissions from the CRL site are "negligible". (page 9)	The Reference Inventory was developed through an iterative process between safety assessments and evaluation against dose acceptance criteria. The first step involved the collection of data from CNL waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the CSA [1] and IAEA [2] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF. The Derived Release Limit for Carbon-14 from CRL stacks is 1.22×10^{14} Bq/week [3], which is equivalent to 6.34×10^{15} Bq/year. The peak calculated Carbon-14 release rate from the Engineered Containment Mound is 3.76×10^{3} Bq/s [4], or about 1.19×10^{11} Bq/year. Therefore, the calculated Carbon-14 release from the Engineered Containment Mound is less than 0.002% of the Derived Release Limit. Table 5.7.4.-1 of the final EIS shows the results of CRL's Environmental Monitoring Program, specifically airborne releases, which includes Carbon-14 from the CRL site. More information on carbon-14 is discussed in Section 5.7.4.4.4 of the final EIS. Section 5.7.6.1.2.1 discusses airborne releases from the engineered containment mound during operations. Table 5.7.6-4 presents the calculated Carbon-14 concentration inside the ECM. This concentration is used to calculate the worker dose, which is 0.0000022 mSv/y. Because the dose to the most exposed receptor (the worker) is insignificant and negligible, it is concluded that the exposure to a person off-site would also be insignificant and negligible due to the several kilometer separation distance. Carbon-14 is assessed in the post-closure period, as a contributor to receptor dose. Carbon-14 is one of the more prominent contributors to dose in the long-term, but these doses are still around 1% of the regulatory dose limit for a member of the public of 1 mSv/yr, and are therefore acceptably low and negligible.

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			References: [1] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [2] International Atomic Energy Agency. *Classification of Radioactive Waste*. General Safety Guide (GSG)-1. STI/PUB/1419. ISBN 978-92-0-109209-0. 2009. [3] Derived Release Limits for CNL's Chalk River Laboratories. CRL-509200-RRD-001. [4] Radon and Other Landfill Gas Modelling and Evaluation. 232-503212-TN-001.
CNL-ND241	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	NSDF Inventory Request 11: Please provide details (source, type and Curie content – tritium & C-14) of ion exchange resin wastes currently stored or slated for storage on the CRL site. (page 9)	The requested level of detail on any single waste stream is not required for the purposes of reviewing the Environmental Impact Statement (EIS) or NSDF Project as a whole. The Reference Inventory was developed through an iterative process between safety assessments and evaluation against dose acceptance criteria. The first step involved the collection of data from CNL waste records, facility decommissioning, and environmental remediation projects. This inventory data was screened against the CSA [1] and IAEA [2] guidance for low level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory was established, which represents the maximum radiological inventory limit for the NSDF. More information regarding how the waste inventory was derived can be found in the Reference Inventory Report [3]. References: [1] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [2] IAEA. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND242	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	The Chalk River NSDF radionuclide inventory has been evaluated with regard to its precision and accuracy. Unfortunately, however, because very little explanation as to how the inventory was determined has been provided by the proponent, it is difficult to verify any of the NSDF data. Nevertheless, internal consistency checks, based on isotope ratios and specific activities, are possible and have been used to carry out a preliminary assessment of the inventory data. This approach has revealed many cases of anomalous inventories of radionuclides suggesting that, barring mathematical errors, unscientific assumptions have been made by CNL of the EIS Report in the process of deriving the inventory. These are further detailed in the comments from the John Jackson (Nuclear Waste Watch and OFWCA) submission. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	All wastes that are proposed for disposal into the NSDF must meet the Waste Acceptance Criteria [1], which have been developed to meet the low-level waste classification guidance of the CSA [2] and IAEA [3], as well as the intent of Ontario Regulation 347 [4]. In addition, the total radioactivity of the facility must remain within the bounds of the Licensed Inventory, as presented in Table 3.3.1-2 of the final EIS. More information regarding how the waste inventory was derived can be found in the Reference Inventory report [5]. Canadian Nuclear Laboratories (CNL) reviewed the commenter's submission, including the appendices. Unfortunately, the commenter's analysis of isotopic and fission product ratios is not necessarily related to the development of the Reference Inventory. The Reference Inventory does not represent the exact inventory that CNL has, or possibly will ever have. The Reference Inventory does not need to follow decay ratios, natural abundance ratios, or fission product ratios. The CRL site is complex, with many different laboratories and nuclear facilities containing a variety of chemical processes, with different missions over the decades since the laboratory was established in the 1940s. The hundreds of resulting waste streams are

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		Regardless of these specific anomalies, there are other concerns with the NSDF radionuclide inventory: (i) The ill-defined nature of the waste to be stored, (ii) The resulting large uncertainties in the radionuclide content of the waste, and (iii) The behavior of the waste over extended periods of time in the repository.	therefore unique, and it is of no surprise that the proportionality between any given radionuclides does not conform to established or expected ratios. This is in stark contrast to a nuclear power generating station which has a very consistent waste stream during its 60 years of operations, and possibly a single refurbishment waste stream. Uncertainties associated with historical waste inventories will be addressed through a program of evaluation and characterization assessments that is currently underway to ensure that the wastes are safely handled and disposed with regard to radiological and non-radiological hazardous constituents of concern. This process will include identification and quantification of short and long-lived radionuclides and it will be informed by, but not reliant upon, historical data and records. Subject to development and approval of detailed decommissioning plans for these facilities, wastes will be retrieved and disposed in the NSDF. Canadian Nuclear Laboratories' (CNL's) Waste Certification process ensures that the Waste Management process can be repeated and evaluated for producing waste that is within the expected characteristics. This is achieved through waste assurance activities conducted prior to, and following, waste generation. This includes waste verification steps such as non-destructive or destructive sampling and analysis of waste. The behavior of the wastes and the disposal facility are fully evaluated in the Post-Closure Safety Assessment [6]. The Post-Closure Safety Assessment used the IAEA's Safety Assessment Methodologies for Near Surface Disposal Facilities (ISAM) [7] approach in the development of the scenarios and long-term modelling. Through the Features, Events, and Processes (FEPs) screening, the behaviour of the wastes, and the facility itself, are captured and accounted for within the models. The evolution of the wastes, including decay and progeny, are also included in the assessment. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] International Atomic Energy Agency. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009. [4] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347. [5] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [6] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [7] IAEA. Safety Assessment Methodologies for Near Surface Disposal Facilities. 2004.
CNL-ND243	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017) William Turner (May 31, 2017)	Section 3 of the EIS Report states that the majority of radioactive waste slated for storage in the NSDF will be on-site building waste from decommissioning, (390,000 m3), soil and soil-like wastes from environmental restoration activities at CRL, (370,000 m3), and waste wood, metal and trash comingled with at least 50% soil, (80,000 m3), although the EIS Report fails to mention how much of this waste is already on site and volumes resulting from on-site remediation activities, including the proposed clean-up criteria for this remediation work, as this will determine the volume of the waste generated by these remediation activities. The EIS Report also notes: About 1% by volume of the total emplaced volume of waste will be intermediate-level waste (ILW) such as spent ion-exchange resin. Unfortunately, this is more or less the only information that has been provided by the proponent about the NSDF waste and as such it falls far short of providing a means to quantify and/or verify the radionuclide	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS), and has been made available to the public. Through the removal of Intermediate Level Waste (ILW) streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. The first step in calculating the inventory involved the collection of data from CNL waste records, facility decommissioning, and environmental remediation projects. This inventory data was screened against the CSA [2] and IAEA [3] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were

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		inventory reported in CNL's EIS. In addition, to quote waste quantities only in terms of volumes is very misleading. A good example of what should have been provided by the proponent of the NSDF would be OPG's Reference Inventory Report for its Deep Geological Repository (DGR) Project [18]. This 2010 OPG Report provides a very detailed characterization of all the wastes planned to be stored in the DGR, including a breakdown of the radionuclide content and specific activity of each type of waste. A similar report is clearly needed for the NSDF, because to date, specific details of the physical, chemical and radiochemical nature of the wastes to be stored in the NSDF have not been provided by the proponent. The commenter requests that the proponent provide a detailed description of the individual sources of radioactive waste slated for storage in the NSDF, along with the chemical and radiochemical data that were used to calculate the NSDF radionuclide inventory. These are further detailed in the comments from the John Jackson (Nuclear Waste Watch and OFWCA) submission. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	made to the inventory. This processes was repeated until a final Licensed Inventory was established, which represents the maximum radiological inventory limit for the NSDF. Canadian Nuclear Laboratories (CNL) has reviewed the appendix to the commenter's submission. The calculations presented are related to highly enriched uranium waste streams, which are not included in the NSDF inventory, and are therefore not relevant to the calculation of the NSDF inventory. It is important to note that the Reference Inventory does not represent the exact inventory that CNL has, or potentially will ever have. Waste stream inventories forecasted for emplacement in the NSDF are based on extrapolation of CNL's waste database for stored waste packages as well as planning estimates for the decommissioning of facilities and environmental remediation projects across CNL. Estimates of waste constituents are provided in the NSDF Reference Inventory Report [1] and Section 3.3.1.3 of the final EIS. These estimates indicate that, by mass, total quantities of fissionable material in forecasted waste streams are estimated to be less than 0.5% of the total waste currently slated for emplacement at the NSDF. The total uranium closely resembles the distribution of depleted uranium; however, the isotopic distribution within the reference inventory is an artefact of averaging and is not sourced from a single waste stream profile. This is in contrast to a nuclear power generating station which has a very consistent waste stream during its 60 years of operations, and possibly a single refurbishment waste stream. Canadian Nuclear Laboratories (CNL) has a research and development mission, and has a large number of varied waste streams; thus, it difficult to draw comparisons to Ontario Power Generation's Deep Geologic Repository inventory development which would be based on relatively routine waste fingerprints. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] IAEA. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009.
CNL-ND244	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**Anomalies in the CNL NSDF Radionuclide Inventory** (Table 1: The NSDF Radionuclide Inventory – See p. 2 of this August 11 submission): 1. U-238 data: The U-238 inventory of 1.24 × 1013 Bq translates into 996 tonnes of uranium which is equivalent to the uranium in about ten CANDU reactors. This is a very large amount of uranium. By comparison, the DGR is predicted to house less than 1 tonne of uranium when filled with waste by 2062. The very large inventory of uranium in the NSDF is discussed in greater detail in Section 3.0 of this submission. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS), and has been made available to the public. Through the removal of Intermediate Level Waste (ILW) streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. The first step involved the collection of data from CNL waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the CSA [2] and IAEA [3] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF. Waste stream inventories forecasted for emplacement in the NSDF are based on extrapolation of CNL's waste database for stored waste packages as well as planning estimates for the decommissioning of facilities and environmental remediation

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			projects across CNL. Estimates of waste constituents are provided in the NSDF Reference Inventory Report [1] and Section 3.3.1.3 of the final EIS. These estimates indicate that, by mass, total quantities of fissionable material in forecasted waste streams are estimated to be less than 0.5% of the total waste currently slated for emplacement at the NSDF. The total uranium closely resembles the distribution of depleted uranium; however, the isotopic distribution within the reference inventory is an artefact of averaging and is not sourced from a single waste stream profile. . Natural uranium (thus Uranium-238) may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other amounts of fissile material (thus Uranium-238) may exists as residual unrecoverable amounts, predominately as contaminants on waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Discrete and recoverable amounts of nuclear materials are controlled, and are not destined for NSDF. The total emplaced Uranium-238 content under the revised inventory is equivalent to an average concentration of about 0.08 Bq/g. This is extremely close to the average natural background concentration of 0.07 Bq/g quoted by the Health Physics Society [4] although it is noted that this value varies widely depending on the local geology. Appendix D.3 of the Reference Inventory Report [1] is an analysis of the ratio of different uranium isotopes in the inventory. Canadian Nuclear Laboratories (CNL) has a research and development mission, and has a large number of varied waste streams; thus, it difficult to draw comparisons to Ontario Power Generation's Deep Geologic Repository inventory development which would be based on relatively routine waste fingerprints. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003 [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] IAEA. *Classification of Radioactive Waste*. General Safety Guide (GSG)-1. STI/PUB/1419. ISBN 978-92-0-109209-0. 2009. [4] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf
CNL-ND245	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**Anomalies in the CNL NSDF Radionuclide Inventory** (Table 1: The NSDF Radionuclide Inventory – See p. 2 of this August 11 submission): 2. U-235 and U-234 data: The U-234 and U-235 inventory data in Table 1 may be used to determine isotopic abundances for these radionuclides in the NSDF waste by comparing them to the U-238 inventory. Values of 0.0017% for U-234 and 0.31% for U-235 are thereby calculated and may be compared to the natural abundance values of 0.0052% for U-234 and 0.72% for U-235. The fact that the U-234 and U-235 isotopic abundances in CRL's waste are much lower than the natural abundances of these radionuclides, indicates the presence of depleted uranium stemming from irradiated, or isotopically separated, uranium in the waste. However, the degree of depletion of U-234 is anomalous and inconsistent with the associated U-235 depletions; furthermore, U-234 abundances below 0.0030% are never observed, even in heavily irradiated CANDU or PWR fuels.	The NSDF Reference Inventory [1] has been updated since the 2017 draft Environmental Impact Statement (EIS), and has been made available to the public. Through the removal of Intermediate Level Waste (ILW) streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. The first step involved the collection of data from CNL waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the CSA [2] and IAEA [3] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF.

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		Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.	Waste stream inventories forecasted for emplacement in the NSDF are based on extrapolation of CNL's waste database for stored waste packages as well as planning estimates for the decommissioning of facilities and environmental remediation projects across CNL. Estimates of waste constituents are provided in the NSDF Reference Inventory Report [1] and Section 3.3.1.3 of the final EIS. These estimates indicate that, by mass, total quantities of fissionable material in forecasted waste streams are estimated to be less than 0.5% of the total waste currently slated for emplacement at the NSDF. The total uranium closely resembles the distribution of depleted uranium; however, the isotopic distribution within the reference inventory is an artefact of averaging and is not sourced from a single waste stream profile. Appendix D.3 of the Reference Inventory Report [1] provides an analysis of the ratio of different uranium isotopes in the inventory. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] IAEA. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009.
CNL-ND246	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**Anomalies in the CNL NSDF Radionuclide Inventory** (Table 1: The NSDF Radionuclide Inventory – See p. 2 of this August 11 submission): 3. Cs-137 and Sr-90 data: The Cs-137 inventory of 5.31 × 1017 Bq accounts for about 98% of the entire NSDF inventory. By comparison, the Sr-90 inventory is only 1.66 × 10^{15} Bq or a mere 0.3% of the Cs-137 inventory. This is highly anomalous because Sr-90 and Cs-137 are both high-yield fission products. All of the available references to Sr-90 and Cs-137 in radioactive waste at the CRL site indicate that these radionuclides are present in approximately equal amounts – See, for example, activities reported for Sr-90 and Cs-137 in references [1] and [2] which show Cs-137-to-Sr-90 activity ratios that are consistently in the range 0.5 to 2, i.e. ratios that are much smaller than the Cs-137-to-Sr-90 ratio of 320 estimated by CNL for the NSDF waste inventory. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	The NSDF Reference Inventory [1] has been updated since the 2017 EIS, and has been made available to the public. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. Cesium-137 is discussed in Appendix D, Section D1, of the Reference Inventory Report [1]. In the revised inventory, the amount of Cesium-137 and Strontium-90 present is approximately equal. Reference: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003
CNL-ND247	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**Anomalies in the CNL NSDF Radionuclide Inventory** (Table 1: The NSDF Radionuclide Inventory – See p. 2 of this August 11 submission): 4. I-129 data: I-129 in the NSDF waste inventory, expressed in mass units, is 229 kg which is more than the Cs-137 inventory of 166 kg. This is highly anomalous because both of these radionuclides are only produced by U-235 or Pu-239 fission, and the I-129 and Cs-137 fission yields favor the production of Cs-137 over I-129 by a factor of 8.7 for U-235 and 4.7 for Pu-239. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	The NSDF Reference Inventory [1] has been updated since the 2017 EIS, and has been made available to the public. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. The revised waste inventory is captured in Section 3.3.1.3 of the final EIS. The total amount of Iodine-129 was adjusted using the ORIGIN code to align with the actual production potential assuming an 80% burn up of fuel in the National Research Universal reactor. This decision is documented in Section D.5 of the Reference Inventory Report [1]. Reference: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.

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CNL-ND248	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**Anomalies in the CNL NSDF Radionuclide Inventory** (Table 1: The NSDF Radionuclide Inventory – See p. 2 of this August 11 submission): 5. Plutonium data: While the absolute amount of plutonium in the NSDF waste inventory is difficult to determine without detailed information on the nature of the wastes to be stored at the CRL site, plutonium isotope ratios, especially as a function of the irradiation history of uranium, are quite predictable. Furthermore, these ratios are essentially fixed in a plutonium waste stream, even after extensive chemical processing; this is because only elaborate isotopic separation procedures and/or secondary irradiations are capable of altering plutonium's isotopic composition. Three plutonium isotopic ratios are of special interest: Pu-239/Pu-240, Pu-239/Pu-241 and Pu-239/Pu-242. The NSDF waste inventory values reported for these isotope pairs lead to activity ratios of 0.64 (239/240), 19.7 (239/241), and 215 (239/242), respectively. The ratios for Pu-240 and Pu-242 are consistent with their production in natural or enriched UO2 irradiated to a burnup of at least 10,000 MWd/t. However, by comparison, the Pu-239/Pu-241 ratio of 19.7 is quite anomalous and suggests that the Pu-241 activity in the NSDF is seriously understated. In addition, it should be noted that decay correcting the Pu-241 inventory by the maximum possible amount, based on the assumption that the waste was generated in the early years of operation of the CRL facility (say 60 years ago), does not resolve this anomaly. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	The NSDF Reference Inventory [1] has been updated since the 2017 EIS, and has been made available to the public. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. Canadian Nuclear Laboratories (CNL) reviewed the commenter's submission, including the appendices. Unfortunately, the commenter's analysis of isotopic and fission product ratios is not necessarily related to the development of the Reference Inventory. The Reference Inventory does not represent the exact inventory that CNL has, or possibly will ever have. The Reference Inventory does not need to follow decay ratios, natural abundance ratios, or fission product ratios. The CRL site is complex, with many different laboratories and nuclear facilities containing a variety of chemical processes, with different missions over the decades since the laboratory was established in the 1940s. The hundreds of resulting waste streams are therefore unique, and it is of no surprise that the proportionality between any given radionuclides, including plutonium, does not conform to established or expected ratios. This is in stark contrast to a nuclear power generating station which has a very consistent waste stream during its 60 years of operations, and possibly a single refurbishment waste stream. Plutonium ratios, as they relate to other radionuclide production, are discussed further in Appendix D of the Reference Inventory Report [1]. Reference: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003
CNL-ND249	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**Anomalies in the CNL NSDF Radionuclide Inventory** (Table 1: The NSDF Radionuclide Inventory – See p. 2 of this August 11 submission): 6. Unreported radionuclides: There are several radionuclides one might expect to be in CNL's NSDF inventory, (such as Eu-152, Eu-154, U-236, Pu-238 and Cm-244), that are nonetheless not included in the list of radionuclides in Table 1. This appears to be an oversight on the part of CNL of the CNL EIS Report because the presence, and in some cases the approximate activity, of the omitted radionuclides may be inferred from radionuclides that are included in the inventory. Most remarkably. Radionuclides missing from the inventory Table are included in Table 3.5.3-1 of CNL's EIS Report. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	Section 3.2 and Appendix B of the Reference Inventory Report [1] describe the screening process that was used to determine the most important radionuclides present in the NSDF from a long-term safety perspective. As noted in the Reference Inventory Report there are over 200 radionuclides recorded in WIP, however some long-lived radionuclides have not been included as a result of the screening process summarized in Section 3.2 and expanded in Appendix B. After the systematic screening process was applied, a few radionuclides have been removed as a result of Subject Matter Expert judgement. This includes Californium-244 which is specifically discussed in Section B.1.1.3 The Post-Closure Safety Assessment (PostSA) [2] demonstrates that the proposed radiological inventory is appropriate for the facility, as doses and exposure to both human and non-human receptors are below the regulatory criteria. The PostSA can be requested at ermstakeholder@cnl.ca. Additional work was performed to validate the assumptions of the screening process described in the Reference Inventory Report [1]. The following radionuclides were identified as being either present in small amounts in the inventory, or present in slightly different amounts than previously calculated. Note that Europium-152 and Europium-154 were screened out based on their low activities in the CNL waste database, and were not included. • Americium-242m • Americium-242 • Curium-243 • Curium-244 • Curium-245 • Curium-246

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			• Plutonium-238 • Plutonium-239 • Plutonium-240 • Samarium-151 • Uranium-236 The addition of these radionuclides, and the modification of some of the inventory values were evaluated separately through updated post-closure modelling to ensure that their contribution is, in fact, negligible. This exercise was performed as a verification of the final EIS results. Results indicate no significant change from the current dose modelling calculations presented in the final EIS thus these radionuclides are insignificant to the reference inventory. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004.
CNL-ND250	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**Anomalies in the CNL NSDF Radionuclide Inventory Stemming from Table 3.5.3-1**: Table 3.5.3-1 in Section 3 of CNL's EIS Report lists estimated radionuclide concentrations in wastewater that would be produced in the event of water ingress into the ECM. The wastewater concentrations are derived from partition coefficients (Kd's) taken from CSA Standard N288.1-14, and radionuclide concentrations in the waste expressed in Bq per gram. The data in Table 3.5.3-1 may be used to back-calculate a radionuclide inventory. Dr. Greening highlights several concerns with this table, detailed on page 5 of this August 1st submission. For CNL to review and respond. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	The NSDF Reference Inventory [1] has been updated since the 2017 EIS. Through the removal of Intermediate Level Waste streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. The revised waste inventory is captured in Section 3.3.1.3 of the final EIS, and the expected radionuclide concentrations in wastewater are presented in Table 3.4.2-2. A back-calculation is not necessary. Canadian Nuclear Laboratories (CNL) has reviewed the appendices in the commenter's submission. Unfortunately, the calculation assesses Highly Enriched Uranyl Nitrate Liquid solution, which is not included in the NSDF inventory, and is therefore not relevant to this discussion.
CNL-ND251	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	Dr. Greening investigates sources of Radionuclides at the CRL site in section 3.0 of this August 11th submission. Using various references, existing data for the radionuclide inventory was analysed, leading to the conclusion that there are discrepancies regarding the actual amount of uranium projected to be in the NSDF, and that there are errors in the EIS inventory. Dr. Greening states: *"Thus, it appears highly probably that CNL's U-238 inventory is in error by a factor of ten but whether this is due to a computational or a transcription error is uncertain.* *However, what is certain is that CNL, or its surrogate consultant Golder and Associates, has poor quality control. This conclusion raises the uncomfortable question of the reliability of any of the data in CNL's EIS.* For CNL to review pages 6-9 of this submission (3.0 (i) and 3.0 (ii)) and respond to this analysis. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	The NSDF Reference Inventory [1] has been updated since the 2017 EIS, and has been made available to the public. Through the removal of Intermediate Level Waste (ILW) streams, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [1]. Waste stream inventories forecasted for emplacement in the NSDF are based on extrapolation of CNL's waste database for stored waste packages as well as planning estimates for the decommissioning of facilities and environmental remediation projects across CNL. Estimates of waste constituents are provided in the NSDF Reference Inventory Report [1] and Section 3.3.1.3 of the final EIS. These estimates indicate that, by mass, total quantities of fissionable material in forecasted waste streams are estimated to be less than 0.5% of the total waste currently slated for emplacement at the NSDF. The total uranium closely resembles the distribution of depleted uranium; however, the isotopic distribution within the reference inventory is an artefact of averaging and is not sourced from a single waste stream profile. Natural uranium (thus Uranium-238) may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other amounts of fissile material (thus Uranium-238) may exists as residual unrecoverable amounts, predominately as contaminants on waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and

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			development activities). Discrete and recoverable amounts of nuclear materials are controlled, and are not destined for NSDF. The total emplaced Uranium-238 content under the revised inventory is equivalent to an average concentration of about 0.08 Bq/g. This is extremely close to the average natural background concentration of 0.07 Bq/g quoted by the Health Physics Society [2] although it is noted that this value varies widely depending on the local geology. Appendix D.3 of the Reference Inventory Report [1] is an analysis of the ratio of different uranium isotopes in the inventory. Canadian Nuclear Laboratories (CNL) has reviewed pages 6-9 and the appendix of the commenter's written submission. Pages 6-9 list radionuclide data found in various publications, while the appendix assesses an inventory based on highly enriched uranyl nitrate liquid. CNL appreciates the literature review performed in the commenter's submission. Unfortunately, the Reference Inventory is not intended to be representative of the total amount of radioactivity in CNL's control, it is specific to the proposed NSDF. The Reference Inventory is used as the input into the design and safety assessments. Through the iterative process, the inventory was reduced until all dose acceptance criteria were met with the desired amount of safety margin. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf.
CNL-ND252	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	Dr. Greening investigates sources of Radionuclides at the CRL site in section 3.0 of this August 11th submission. In section iii the 2014 Preliminary Decommissioning plan for the CRL site is referenced, and a partial radionuclide inventory is included in Table 2 of this submission (p. 10). Discrepancies are highlighted between Tables 1 and 2 of this submission. For CNL to review and respond. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). There are several reasons for the discrepancy between radionuclide inventories listed in two independent documents: • The Preliminary Decommissioning Plan of 2014 was written before the accelerated decommissioning plan for 100+ structures on the CRL site was announced. • The 2017 draft EIS was prepared in 2016, using more up-to-date waste forecasts and estimates. The inventory presented in the final EIS has been through a screening process to remove consideration of radioisotopes with short half-lives, and those present in low enough quantities that their long-term effect would be negligible. The inventory was never intended to be an exact count of the radionuclides that exist on the CRL site, rather it was a representative bounding inventory for the purposes of designing and evaluating the NSDF. The Reference Inventory report [2] describes the process that was taken to derive the revised radionuclide inventory. The Reference Inventory is meant as a bounding inventory using conservative inputs and conservative extrapolations, and is meant for use in the NSDF design and safety assessments. The Reference Inventory does not represent the total inventory that exists, or may possibly exist, on the CRL site. The ratios between specific radionuclides may not match the relative abundance in nature, or ratios expected from fission. CRL is a complex site with hundreds of different waste streams generated over 70 years of research and operation.

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			The Comprehensive Preliminary Decommissioning Plan (CPDP) is a living document, updated about every 5 years. The most recent version [3] has been updated to reflect the planned construction of the NSDF and includes an updated waste volume forecast. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [3] Comprehensive Preliminary Decommissioning Plan. CPDP-508300-PDP-001.
CNL-ND253	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	Two types of radioactive wastes slated for disposal in CNL's NSDF that are potentially chemically unstable and therefore particularly dangerous under certain storage conditions. These wastes are spent ion exchange resins and fuel reprocessing residues. (i) Spent-ion Exchange Resin Waste (refer to description on page 17 of this submission related to the following question): How does it plan to stabilize or pre-condition its ion exchange resin wastes prior to disposal? (ii) Reprocessing Waste (refer to important context on page 17 of this submission related to the following): I ask that CNL to provide (a) Data on the amount of nitrate-rich waste that will be emplaced in the proposed NSDF and (b) Evidence that a WIPP-type nitrate salt accident could not happen in the proposed NSDF. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). General fuel reprocessing wastes and certain resin wastes are likely be classed as ILW's based on activity and radionuclide content, and are therefore, not suitable for disposal in NSDF. All wastes need to adhere to the Waste Acceptance Criteria (WAC) [2], which are specifically written to be in alignment with both the International Atomic Energy Agency (IAEA) GSG-1 [3] and CSA N292.0-19 [4] guidance for the classification of low-level waste. If the waste does not meet the WAC, it will not be disposed in the NSDF. Canadian Nuclear Laboratories has reviewed the lessons learned documentation defining the events and the causes of the WIPP-type nitrate salt accident which resulted from a lack of control; in this case, an incompatible strong oxidizing waste which reacted with an organic material in a container. The NSDF WAC prohibits 'reactive or potentially unstable wastes' and takes into account both radiological, physical and chemical characteristics of wastes. LLW containing non-radiological constituents must also meet the intent of the Land Disposal Requirements of Ontario Provincial Regulation 347 [5]. The CNL waste characterization process brings together the waste producer, knowledgeable of the process generating the waste, and a waste acceptance program authority, along with other Subject Matter experts to evaluate the waste. The waste characterization process ensures that oxidizing (e.g., "nitrate rich") waste is identified and, if suitable, is treated to meet the WAC prior to acceptance. This assessment will ensure incompatibles in wastes are not allowed as a general safety measure. An internal assessment was performed at CNL shortly after the WIPP incident to determine the potential risk from other nitrate rich or potential oxidizing wastes. After reviewing the causes for the incident, it was determined that no immediate corrective actions are required to prevent a similar incident occurring at CNL. Canadian Nuclear Laboratories personnel will continue to remain vigilant in their implementation of a robust certification process, which will be assured via the waste characterization process to ensure that an event of a similar nature can be prevented and mitigated from occurring at CNL.

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			References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [5] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND254	John Jackson (Nuclear Waste Watch and OFWCA) (August 15, 2017)	**An Assessment of the Radionuclide Inventory of Waste Slated for Near Surface Disposal at the Chalk River Laboratory Site by Frank Greening, August 15, 2017:** CNL's EIS for the proposed NSDF includes data on Ra---226 and its daughter Rn---222. Thus, for example, in Table 5.7.6---1 the total activity of Ra---226 in the NSDF waste is stated to be 5.79 × 1011 Bq. Once the NSDF is closed, (by 2070), this Ra---226 activity would be contained in 1,000,000 m3 of material that would mostly be in the form of contaminated soil from Port Hope uranium processing. Unfortunately, the EIS does not provide any estimate of the density of this waste; soil is typically assigned a density of 1500 kg/m3. Assuming this value applies to the Port Hope waste, we may derive the specific activity of the Ra---226 containing waste in two ways as follows: Ra---226 specific activity by volume = 5.79 × 105 Bq/m3 Ra---226 specific activity by weight = 0.386 Bq/g However, in Table 5.7.6---3 of the CNL EIS we have a value reported for the specific activity of Ra---226 (by weight) in the year 2400 **---** the assumed date of cessation of institutional control – stated to be 0.18 Bq/g. Now the half---life of Ra---226 is 1600 years and the year 2400 is 383 years in the future so a decay correction of 0.85 should be applied to the present---day activity of Ra---226, (0.386 Bq/g), making it 0.328 Bq/g in 2400. This is still almost twice the value of 0.18 Bq/g reported in the CNL EIS. Could the proponent please explain this discrepancy?	The radioactive waste inventory has been greatly reduced since the 2017 EIS with the removal of Intermediate Level Waste (ILW). Section 3.3.1.3 and Table 3.3.1-2 of the final EIS describes the Reference Inventory used as a bounding inventory for the safety assessments of the NSDF. The amount of Radium-226 planned for emplacement in the NSDF is now 3.65E+10 Bq, or 3.81E-02 Bq/g. The significant daughter product of Radon-222 has been included in the assessment of worker doses performed in the Radon and Other Landfill Gases Report [1]. Table 5.8.6-3 of the final EIS shows the calculated radon flux and concentration at the surface of the facility, and the resulting dose to the worker. Radon gas is also assessed separately in the Post-Closure period [2], where radon concentrations in the home of a hypothetical resident living on top of the waste are compared to radon gas limits and guidelines of Health Canada. The original discrepancy was likely due to the fact that the NSDF proposed inventory was never meant to represent all wastes owned by CNL, and was not required to be consistent with other literature or postulations. References: [1] Radon and Other Landfill Gas Modelling and Evaluation. 232-503212-TN-001. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004.
CNL-ND255	John Jackson (Nuclear Waste Watch and OFWCA) (August 15, 2017)	**An Assessment of the Radionuclide Inventory of Waste Slated for Near Surface Disposal at the Chalk River Laboratory Site by Frank Greening, August 15, 2017:** Radon-222 Exhalation from the NSDF, (or More precisely from its "engineered containment mound", or ECM), At the time of its closure in 2070, is reported in Table 5.7.6---5 of CNL's EIS to be 4.17 × 10−3 Bq/s. This value was evidently determined using RESRAD Offsite software. I have looked at Section C.2 of the *RESRAD Users Manual which* bears the heading: **RADON EXHALATION**, to try to validate this radon emission rate. However, the information supplied in this RESRAD document is generic in nature and is of no use in calculating the rate of radon emission from CNL's ECM *unless the values of certain key parameters are provided - which CNL's EIS has failed to do*. These parameters are: • The diffusion coefficient of radon in soil in m2/s • The total porosity of the soil (dimensionless) • The radon emission coefficient (dimensionless)	Radon gas generation rates reported in the 2017 draft EIS, were derived from RESRAD default inputs. As the safety assessment process has matured, several key inputs as well as the technical approach have changed along with a significant reduction of radioactive inventory. Radon-222 modelling was conducted under the guidance of US Nuclear Regulatory Commission documents NUREG/CR-3533, "Radon Attenuation Handbook for Uranium Mill Tailings Cover Design" and Regulatory Guide 3.64, "Calculation of Radon Flux Attenuation of Earthen Mill Tailings Covers". As requested, the input parameters for this calculation are a combination of NSDF-specific values while others are defaults. Calculation parameters used to predict the Radon Flux during the Operational Period of the NSDF [1]: **Radon-222 Modelling Parameters** — **value** NSDF exposed surface area (m^2) — 15000 Radon Emanation Coefficient — 0.25 Radium-226 concentration in waste (Bq/g) — 3.8E-2 Radon-222 flux with no cover ($Bq/m^2/s$) — 2.9E-2

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		• The bulk density of the soil material in kg/m3 • The upper surface area of the ECM in m2 Could the proponent please provide the numerical values it used for these five parameters and explain how they were derived?	Radon-222 flux with 1.5 m soil cover (Bq/m^2/s) : 6.4E-3 Porosity representing the NSDF : 0.3 Bulk density of the NSDF ECM (kg/m^3) : 1500 Regarding the request for the diffusion coefficient, a conservative assumption was used where Radon-222 w/progeny is mixed in the air to a height of 2 m at 10% of their equilibrium concentrations for the worker's breathing zone. Table 5.8.6-3 of the final EIS shows the calculated radon flux and concentration at the surface of the facility, and the resulting dose to the worker. Radon gas is also assessed separately in the post-closure phase within the Post-Closure Safety Assessment [2], where radon concentrations in the home of a hypothetical resident living on top of the waste are compared to radon gas concentration limits and guidelines of Health Canada [3]. References: [1] Radon and Other Landfill Gas Modelling and Evaluation. 232-503212-TN-001. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004. [3] Health Canada. Guide for Radon Measurements in Residential Dwellings (Homes). May 2017.
CNL-ND256	Dr. David J. Winfield (May 3, 2017)	**Table 5.7.6-1 – 5-513:** As the source of isotopes listed is not explained, there is no discussion as to whether the isotope list is complete and whether the list identifies only those isotopes that may be disposed of in the NSDF? There is no discussion of the intent of quoting multiple isotopes of one element. For example, does an individual isotope listing imply each isotope is considered as bounding? The bounding quantity of 1.2 x E13 Bq of U-238 is equivalent to a bounding mass of 1000 Mg of U-238 and 2.5 x E11 Bq of U-235 implies a bounding mass of 3 Mg of U-235. In this example the 235/238 ratio might perhaps simply be the ratio expected from a depleted uranium sample comprising 0.3% of U- 235? Without any explanation, each isotope could logically, but misleadingly, be taken as an individual isotope bounding inventory which, for U-235, in particular would give a misleading impression.	The NSDF reference inventory represents select radionuclides that were determined to be significant for long term safety and to inform design of the NSDF. The NSDF reference inventory does not represent a limited list of isotopes that may be disposed of in the NSDF. Details of the how the NSDF reference inventory was determined is presented in the NSDF Reference Inventory Report [1]. Within this report the reference inventory is established by extrapolating existing waste packages, environmental remediation projects and decommissioning projects data to an assumed volume of the NSDF at the time of closure. The screening of radionuclides that were included in the NSDF reference inventory is also discussed in the NSDF Reference Inventory Report [1]. Furthermore, the Licensed Inventory refers to the maximum (or bounding) inventory allowable into the facility, and is a result of a further reduction to the Reference Inventory based on the outcomes and recommendations of the safety assessments. Isotopic ratios should not be determined from the total NSDF inventory presented in Table 3.3.1-2 of the final EIS. The inventory takes information and records from over 60 years of nuclear research and operations which - for example - represents a variety of uranium enrichment levels. Each waste stream proposed for NSDF will have its own radiological fingerprint thus radionuclide ratios will vary. The final NSDF inventory is not required to conform to any established radionuclide ratios, but is meant to be a bounding limit to the facility inventory. Natural uranium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other amounts of uranium isotopes may exists as residual unrecoverable amounts, predominately as contaminants on waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Discrete and recoverable amounts of nuclear materials are controlled, and are not destined for NSDF. As a result of the decision to remove intermediate level waste (ILW) inventory from the proposed NSDF inventory, the total emplaced Uranium-238 content is equivalent to about 6 Mg (6,000 kg) thus present at an average concentration of about

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			0.08 Bq/g. This is extremely close to the average natural background concentration of 0.07 Bq/g quoted by the Health Physics Society [2] (although it is noted that this value varies widely depending on the local geology). References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf.
CNL-ND257	Dr. David J. Winfield (May 3, 2017)	**Table 5.7.6-1 – 5-513:** The information provided in the table text and footnote does not explain how the total Bq activities were derived, where the original raw data came from and when, and what was the accuracy of this data? The scaling up, using expert judgment, is also not explained. Expert judgment generally involves large uncertainties, yet the claimed Bq accuracy in the table is to three significant figures. This claimed accuracy seems unjustifiable and casts doubt of the technical understanding by the table's author. The footnote statement that there is uncertainty with this data set is meaningless, unless the uncertainty is quantified, which it is not.	Details of the how the NSDF waste inventory was determined are presented in the NSDF Reference Inventory Report [1]. The reference inventory establishes a representative radionuclide inventory by considering waste already in storage, and waste forecasts from environmental remediation and decommissioning projects data to predict an assumed total volume and radioactivity of waste at the NSDF at time of closure. All low-level waste (LLW) that is proposed for disposal in NSDF will be characterized before acceptance – as per the Waste Acceptance Criteria [2] – to ensure the cumulative total inventory of NSDF is tracked against the Licensed Inventory which is part of the safety basis [3]. During the characterization, uncertainties with the reported data will be identified and reported as part of the total cumulative total inventory tracking (see Section 5.1 of the Waste Acceptance Criteria [2]). The values presented in Table 5.7.6-1 of the original EIS contain three significant digits as a result of extrapolation calculations – not direct measurements. The quantities of each radionuclide is calculated based on hundreds of waste storage database entries and extrapolation to the final volume of waste. During characterization of waste streams proposed for NSDF, standard analytical measurements will performed and all significant radionuclides and their uncertainties must be reported for accurate waste inventory tracking by NSDF (see Section 5.1 of [2]). References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND258	Dr. David J. Winfield (May 3, 2017)	**Table 5.7.6-1 – 5-513:** The isotope listing and scale up process is not explained, the question then arises that, is a bounding limit of 1000 Mg of uranium in a near-surface disposal facility a meaningful limit, when presumably only trace/minor quantities should/might be in any one waste package? Waste Acceptance Criteria should presumably rule out very large uranium quantities, 1000 Mg certainly, being placed in the ECM? The Waste Acceptance Criteria discussion in the EIS, which should be linked to the bounding isotope limits, did not seem to provide any clarification.	The NSDF reference inventory represents select radionuclides that were determined to be significant for long term safety and to inform design of the NSDF. Details of the how the NSDF reference inventory was determined is presented in the NSDF Reference Inventory Report [1]. Within this report the reference inventory is established by extrapolating existing waste packages, environmental remediation projects and decommissioning projects data to an assumed volume of the NSDF at the time of closure. Furthermore, the Licensed Inventory, as outlined in Section 3.3.1.3 of the final EIS, refers to the maximum (or bounding) inventory allowable into the facility, and is a result of a further reduction to the Reference Inventory based on the outcomes and recommendations of the safety assessments. Natural uranium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other amounts of uranium isotopes may exists as residual unrecoverable amounts, predominately as contaminants on waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). The NSDF Waste Acceptance Criteria (WAC) does exclude accountable quantities of nuclear material (see Section 5.3 of [2]). That is, if a nuclear material is tracked under CNL's Safeguards Management Program, it will not be accepted for

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			disposal in NSDF. The WAC also recognizes the reporting of significant radionuclides by waste generators to the requirement for NSDF to track and report against the Licensed Inventory (Section 5.4 and A.5.4 of [2]). As a result of the decision to remove intermediate level waste (ILW) inventory from the proposed NSDF inventory, the total emplaced Uranium-238 content is equivalent to about 6 Mg (6,000 kg) thus present at an average concentration of about 0.08 Bq/g. This is extremely close to the average natural background concentration of 0.07 Bq/g quoted by the Health Physics Society [3] (although it is noted that this value varies widely depending on the local geology). References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf.
CNL-ND259	Joan Lougheed and Town of Deep River (August 16, 2017)	**Table 5.7.6-1 – 5-513**: this table lists the bounding radionuclide inventory to be placed in the ECM (see pg. 5-513). It is unclear how this inventory is converted to a concentration in Table 5.7.6-3 at year 2400, or whether it is assumed to be over the entire 1,000,000 m3 volume, or whether it is an average concentration, or whether is it a maximum cell concentration (see pg. 5- 516). It is not clear how the volume, which is the design basis, is converted to grams. Note, these comments also apply to Table 5.8.6-4 (see pg. 5-554). These important details should be provided. The amount of tritium that the NSDF Project is designed to release to Perch Lake allows for increases in the amount of tritium to reach 7,000 Bq/I, despite the fact that tritium levels have been steadily decreasing, and are now approximately 3,200 Bq/I. Hence, the allowable tritium inventory shown in Note (a) of Table 5.7.6-1 should be revisited and decreased accordingly.	The projected waste volumes and inventory of significant radionuclides in the bulk and packaged waste are documented in the NSDF Reference Inventory Report [1]. The NSDF Reference Inventory has been used to inform the design and safety analyses. The Licensed Inventory is a modified reference inventory, and represents a maximum radiological inventory limit (or bounding inventory) for the NSDF (Table 3.3.1-2 of final EIS). All low-level waste (LLW) that is expected to be generated has been described, or "characterized", before its generation to ensure the cumulative total inventory of the NSDF Project is tracked against the Licensed Inventory. The Licensed inventory at the time of emplacement is captured in Section 3.3.1.3 of the final EIS. Note that Tables 5.7.6-1, 5.7.6-3 and 5.8.6-4 have been updated in the final EIS to improve the clarity of the document and no longer contain information about the inventory of radionuclides and/or their concentrations. The note regarding tritium has also been removed from Table 5.7.6-1. The NSDF Wastewater Treatment Plant (WWTP) tritium discharge target (360,000 Bq/L) is based on maintaining tritium concentrations below the Health Canada drinking water guideline [2] of 7,000 Bq/L in Perch Creek. To this end, the predicted concentration of tritium in Perch Lake (which drains into Perch Creek) depends on the differences in the discharge rates out of the WWTP effluent and Perch Creek. The predicted WWTP effluent discharge rate is <1 m^3/hr which is much slower than the average flow rate in Perch Creek of 252 m^3/hr. This flow rate in Perch Creek can also be thought of as the "drain rate" out of Perch Lake since these water bodies are connected. The comparatively slower WWTP discharge enables rapid dilution of any tritium that may be part of the effluent that will be coming out of the WWTP and entering the receiving environment (Perch Lake and Perch Creek). These hydrological mechanisms enable tritium concentrations in Perch Creek to be a small fraction of the tritium concentrations that are predicted in the WWTP effluent discharge to Perch Lake. Because the Perch Lake and Perch Creek watershed is located within the CRL property, it is not accessible to the public; therefore, none of its open water bodies (i.e. Perch Creek and Perch Lake) are used as a source of potable water. As such, these water bodies do not present any exposure risks via ingestion to humans (i.e. there are no cottages or dwellings near the Lake). Additionally, the WWTP effluent tritium discharge target of 360,000 Bq/L (Table 3.4.2-2 of the EIS) is well below the ecological risk benchmark for tritium of 17.4×10^6 Bq/L (17,400,000 Bq/L). The ecological risk benchmark is the level above which adverse effects may occur in aquatic species. Current tritium concentrations in Perch Lake are in the order of a few thousand Bq/L (Table 5.7.4-8 of the EIS). Tritium concentrations are predicted to remain a small fraction of the ecological risk benchmark during the operation of the NSDF Wastewater Treatment Plant (WWTP).

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			Due to the impracticality of treating the wastewater to remove tritium, CNL has instead placed stringent limits on the total amount of tritium that can be placed in the NSDF (see Table 3.3.1-2 EIS) and on the tritium concentration in individual waste shipments (see Table 3.3.3-1). The amount of tritium emplaced in the ECM is controlled and limited through waste packaging; this enables the NSDF WWTP tritium discharge targets to be maintained below the Health Canada drinking water guidelines [2] in Perch Creek. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3
CNL-ND260	David Raman (August 3, 2017)	**Bounding NDSF Project Waste Radionuclide Inventory (Table 5.7.6-1)** What is the basis for these radionuclides, given that there has been a reluctance to adequately describe what is in the wastes in previous sections?	Details of the how the NSDF reference inventory, projected volumes and the selection of significant radionuclides was developed is presented in the NSDF Reference Inventory Report [1]. Within this report the reference inventory is established by extrapolating existing waste packages, environmental remediation projects and decommissioning projects data to an assumed volume of the NSDF at the time of closure. Through the removal of Intermediate Level Waste (ILW) streams, many radionuclide activities were reduced by 99%. The NSDF reference inventory was developed by using the following main steps [1]: 1. Assemble characterization data obtained or derived from waste package records, facility decommissioning and environmental remediation projects. 2. Assess the data against the WAC and report total radioactivity and radionuclide concentrations. 3. Evaluating the reference inventory against the long-term safety criteria to confirm the radiological inventory provides acceptable results in the long-term safety assessment. 4. Produce the Licensed Inventory representing a maximum or bounding radiological inventory limit. The proposed maximum radiological inventory of the NSDF, the Licensed Inventory, has been optimized through an iterative process as captured in Figure 3-21 of the NSDF Safety Case [2]. The Licensed Inventory is the maximum radioactivity of significant radionuclides that the NSDF will accept. Significant radionuclides are defined in the NSDF Reference Inventory [1] that was used to inform the design and safety assessments. The waste inventory, Licensed Inventory is captured in Section 3.3.1.3 of the final EIS. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001.
CNL-ND261	David Raman (August 3, 2017)	**Bounding NDSF Project Waste Radionuclide Inventory (Table 5.7.6-1)** It is noted that delay-and-decay will be applied to tritiated wastes, to control the maximum inventory. How long is the anticipated decay period and where would the wastes be located during such decay periods. Why is this physical activity not also a part of the scope of the environmental assessment?	"Delay and decay" is useful for shorter lived radionuclides, such as tritium. Any source of tritium that would be subject to this storage method could continue to be stored in their current location at Chalk River Laboratories (CRL), under the existing Chalk River Laboratories (CRL) Site licence conditions [1]. Thus the physical activity of allowing the current radioactive waste to remain in the licenced waste management facilities while it decays is not specific to the NSDF project.

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			The concentration of tritium in individual wastes proposed for disposal in NSDF is controlled (See Table 3.3.3-1 of the final EIS which provides the waste acceptance criteria for tritium). There will be a small portion of waste which will be required to use robust packaging to prevent the spread of contamination. Specifically, leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years); thus more mobile radionuclides, such as tritium, are kept isolated from the environment minimizing radionuclide concentrations in the liquid effluent during the operations phase. This principle has been incorporated into the design basis of the Wastewater Treatment Plant (WWTP). Reference: [1] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25.

CNL-ND262	Anna Tilman
	(June 22, 2017)
		The list of radionuclides is incomplete: Some radionuclides that would be in this waste are not included in the reference inventory table, but are in other tables. For example;
		• Table 3.5.3-1 p. 3-23, lists radionuclide concentrations in wastewater and treatment targets. Of particular note, missing from the reference inventory table are:
		  ○ Curium-244: strong alpha emitter, half-life 18.1 years, concentration is 55.2 Bq/g, (treatment is required)
		  ○ Plutonium-238: powerful alpha emitter, half-life 87.7 years, concentration is 5.8 Bq/g, treatment is required
		• Other radionuclides not listed in any of these tables include, for example:
		  ○ Fe-55 (Iron-55) – half-life of 2.7 years: (Decommissioning waste would include a lot of Fe-55 in any steel in-core or close to the core, such as end-fittings.)
		  ○ I-131 (Iodine-131) - half-life of 8 days: While a short-lived radionuclide, I-131 is a very pernicious radionuclide. It can re-concentrate by orders of magnitude in passing from air, to rain, to grass, to cow, to milk, to the thyroid gland.
			Section 3.2 and Appendix B of the Reference Inventory Report [1] describe the screening process that was used to determine the most important radionuclides present in the NSDF from a long-term safety perspective. A summary is presented here.
			
			There are hundreds of radionuclides that can be present in radioactive waste. For example, the Chalk River Radioactive Waste Database has had over 200 radionuclides recorded during the last 25 years. Many of these radionuclides are present at low activities, or have very short half-lives, such that they cannot contribute significantly to the radiological impact. As well, many of the radionuclides are short-lived in-growth products, such as Barium-137m, which considered in the analysis in conjunction with their respective parents (e.g., Cesium-137).
			
			To demonstrate that these radionuclides considered in the analysis are the primary radionuclides contributing to the dose consequence, the following approach was used:
			1. Evaluate radionuclide significance:
			  a) Define dominant pathways
			  b) Consider full radionuclide dataset available in the CRL inventory program
			  c) Rank radionuclides, taking into account activities and dose coefficients corresponding to significant pathways
			  d) Consider other factors, such as the effect of decay and in-growth and sorption properties.
			2. Compare against similar studies/facilities.
			3. Determine if the list used in NSDF is fit for purpose.
			
			As correctly noted by the commenter, the half-lives of Fe-55 and Iodine-131 are only 2.7 years and 8 days, respectively. For this reason, these radionuclides do not pose a long-term risk, as they decay to less than 0.1% of their original amounts in about 27 years, and 3 months, respectively. In other words, Fe-55 and Iodine-131 are screened out of the assessment due to their short half-life.
			
			The Post-Closure Safety Assessment (PostSA) [2] demonstrates that the proposed radiological inventory is appropriate for the facility, as doses and exposure to both human and non-human receptors are below the regulatory criteria. The PostSA can be requested at ermstakeholder@cnl.ca.
			
			Additional work was performed to validate the assumptions of the screening process described in the Reference Inventory Report [1]. The following radionuclides were identified as being either present in small amounts in the inventory, or present in slightly different amounts than previously calculated.
			• Americium-242m

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			• Americium-242 • Curium-243 • Curium-244 • Curium-245 • Curium-246 • Plutonium-238 • Plutonium-239 • Plutonium-240 • Samarium-151 • Uranium-236 The addition of these radionuclides, and the modification of some of the inventory values, were evaluated separately through updated post-closure modelling to ensure that their contribution is, in fact, negligible. This exercise was performed as a verification of the final EIS results. Results indicate no significant change from the current dose modelling calculations presented in the final EIS thus these radionuclides are insignificant to the reference inventory. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND263	Anna Tilman (June 22, 2017)	This EIS does include a reference inventory of radionuclides, which specifies the volume and activity for radionuclides [Table 5.7.6-1, p. 5-512-3]. This inventory, based on radioactive quantities expected in 2020, "is based on the existing characterized waste streams, which form a small portion of the inventory and extrapolated to 1,000,000 m3 using expert opinion. While there is uncertainty with this data set, the waste quality and characterization program will assure the inventory envelope is not exceeded." However, there are a number of issues with this reference inventory. • Cesium-137: The total activity as listed in this inventory is 531 quadrillion Bq (5.31 x 10 17 Bq). According to this table, Cs-137 would represent 98% of the total activity of the radioactive waste. How is this possible? • Strontium-90: The total activity is listed as 1.66 quadrillion (1.66 x 10 15 Bq), which is approximately 0.3% of the total activity of Cs-137 listed in CNL's inventory. These two fission radionuclides should be approximately equivalent in terms of activity. • Uranium-238: Total activity is listed as 1.24 x 10 13 Bq, which is equivalent to ~ 1000 tonnes. According to the Comprehensive Preliminary Decommissioning Plan document, the Waste Management Area F at Chalk River includes 80 Mg of U (80 tonnes) from contaminated soils and slags from Port Hope, Albion Hills, Mono Mills and Ottawa (~380,000 m3).3 • If these facilities are the primary sources of U-238, then there is a very serious discrepancy in describing the actual amount of U-238 and hence the activity in the inventory. On the other hand, if the 1000 tonnes is correct, then what is the source of this amount of uranium? • Tritium (H-3): The total activity is listed as 4.82 x 10 15 Bq. It is noted that this is the maximum inventory for the NSDF. However, tritium levels could actually be greater than indicated.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). Details of the how the NSDF reference inventory was determined is presented in the NSDF Reference Inventory Report [2]. The NSDF Reference Inventory [2] has been updated since the 2017 EIS, and has been made available to the public at www.cnl.ca/nsdf or by request ermstakeholder@cnl.ca. Through the removal of ILW, many radionuclide activities were reduced by 99%. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [2]. The reference inventory is established by extrapolating existing waste packages, environmental remediation projects and decommissioning projects data to an assumed volume of the NSDF at the time of closure. The iterative process refers to a process where a radiological inventory is proposed (from extrapolated data and waste forecasts), and then assessed through the various safety assessment, such as the Safety Analysis Report [3] and/or Post-Closure Safety Assessment [4], to determine if the short and long-term risks are acceptably low and meet all requirements. In addition, the inventory was "filtered" through the Waste Acceptance Criteria [5], which was developed to be in alignment with both the International Atomic Energy Agency (IAEA) GSG-1 [6] and CSA N292.0-19 [7] guidance for the classification of low level waste The revised waste inventory is captured in Section 3.3.1.3 of the final EIS. With respect to the specific radionuclides mentioned by the commenter: • There is a great deal of conservatism present in the calculation of Cesium-137 in the Reference Inventory caused primarily by 2 factors:

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			○ Un-decayed concentrations were used to represent the entire packaged waste radioactivity where a portion of the packages would have undergone significant decay, and ○ The practice of determining a package's radioactivity by "hot spot" or maximum activity detected. Cesium-137 is discussed further in Appendix D, Section D1, of the Reference Inventory Report [2]. The Cs-137 activity value has been reduced to 3.17E+12 Bq at closure. • In the revised Reference Inventory Report, the amount of Cesium-137 and Strontium-90 present is approximately equal [1]. • The total proposed Uranium-238 content in the revised Reference Inventory Report is equivalent to about 6,000 kg, or about 6 tonnes, with an average concentration of about 0.08 Bq/g [2]. This is extremely close to the average natural background concentration of 0.07 Bq/g quoted by the Health Physics Society [8] (Although it is noted that this value varies widely depending on the local geology). Natural uranium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other amounts of uranium may exists as residual unrecoverable amounts, predominately as contaminants on waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Discrete and recoverable amounts of nuclear materials are controlled, and are not destined for NSDF. • The tritium activity has been reduced to 2.79E+14 Bq at closure [2]. With a relatively short half-life of less than 12 years, the actual amount of tritium currently in storage is likely to be much less than reported. This is because CNL's database does not automatically correct for decay. For example, tritium entered into the database 12 years ago would have halved in activity since then, and tritium entered into the database 20 years ago would have decayed to about 30%. However, the Reference Inventory uses un-decayed activity levels in the calculations and extrapolations to the 1,000,000 m^3 of waste [2]. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [5] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [6] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [7] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [8] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf.
CNL-ND264	Joan Lougheed and Town of Deep River (August 16, 2017)	The reader cannot discern the radionuclide content of wastes arriving from off-site sources. It is uncertain whether these shipments contain a higher inventory of ILW to be emplaced at the NSDF than wastes originating at CRL, therefore potentially impacting the risk to the resident public. Deep River and its residents should be aware of whether they are accepting wastes with a greater radionuclide content at the NSDF from off-site than on-site sources.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). The amount of LLW proposed for disposal from sites outside Chalk River Laboratories (CRL) site is relatively small. The waste will include, but not be limited to, the following sources proposed for the NSDF by percentage:

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			• 90% waste from Chalk River Laboratories – past, present and future (waste owned by AECL) • 5% waste from decommissioning at Whiteshell in Manitoba and other federal nuclear liabilities (waste owned by AECL) • 5% from other Canadian sources, such as universities and hospitals. Canadian Nuclear Laboratories (CNL) has been accepting wastes from off-site sources such as Canadian universities and hospitals for decades, as a service to these industries, and to ensure that these wastes are managed responsibly. Canadian Nuclear Laboratories past and future acceptance of off-site wastes to the CRL site is not specific to the NSDF Project. In other words, the availability of the NSDF does not mean off-site wastes shipments to CRL will increase or decrease. Any off-site wastes must meet the NSDF Waste Acceptance Criteria (WAC) [2]. The NSDF Reference Inventory [3] was developed through an iterative process between safety assessments and evaluation against dose acceptance criteria. The first step involved the collection of data from Canadian Nuclear Laboratories (CNL) waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the CSA [4] and International Atomic Energy Agency (IAEA) [5] guidance for low-level waste (LLW), and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed reference inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF. Section 2.3 of the final Environmental Impact Statement (EIS) clarifies one of the purposes of the NSDF Project will be to reduce the liability associated with historical waste management practices, by remediation and disposal using modern engineering technology. The discussion recognizes that early waste management practices included burying LLW in sand trenches with no engineered barriers. The engineered containment mound has been sized to manage wastes from legacy Waste Management Areas (WMA) at Chalk River Laboratories (CRL). The NSDF is an engineered disposal facility with an engineered liner system and leachate collection system which provide multiple barriers (to ensure protection of the environment) which do not exist at other WMAs at CRL; these controls significantly reduce long-term environmental risks for legacy wastes currently stored in situ at the WMAs. Currently, large-scale environmental remediation of CRL WMA are deferred until the proposed NSDF is available to mitigate the need for additional storage capability. However, wastes from theses legacy WMA would only be transferred to NSDF following completed of characterization and demonstration of meeting the NSDF WAC [2]. It should also be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final NSDF EIS. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003 [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019

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			[5] IAEA. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009.
CNL-ND265	Joan Lougheed and Town of Deep River (August 16, 2017)	In Table 5.7.7-1 (see pg. 5-529), across from "Waste Inventory", the description under the "Uncertainty" heading indicates that the inventory in the ECM is uncertain. However, Table 5.7.6-1 lists many radionuclides at their bounding inventory (see pg. 5-513). Hence, the discussion should reconfirm that the assessment is based on the bounding inventory, which may or may not be conservative, given the acknowledged uncertainty in the actual inventory at this time. The last parameter in Table 5.7.7-1, Cumulative Effect, states that the contaminated lands from the WMAs and the Liquid Disposal Areas C1LDAs") would be removed if there is potential for exceeding safety objectives. CNL has not identified where these lands and soils will be placed (i.e. the NSDF or an alternative site).	The projected waste volumes and inventory of significant radionuclides in the bulk and packaged waste were developed by CNL, and are documented in the NSDF Reference Inventory Report [1]. The NSDF Reference Inventory has been used to inform the design and safety analyses. The Licensed Inventory is a modified reference inventory, and represents a maximum radiological inventory limit (or bounding inventory) for the NSDF (Table 3.3.1-2 of final EIS). All low-level waste (LLW) that is expected to be generated has been meticulously described, or "characterized", before its generation to ensure the cumulative total inventory of the NSDF Project is tracked against the Licensed Inventory. The Licensed Inventory which represents the maximum radiological inventory is captured in Section 3.3.1.3 of the final EIS. Section 2.3 of the final EIS clarifies one of the purposes of the NSDF Project will be to reduce the liability associated with historical waste management practices, by remediation and disposal using modern engineering technology. The discussion recognizes that early waste management practices including burying LLW in sand trenches with no engineered barriers. The engineered containment mound has been sized to manage wastes from legacy waste management areas (WMAs) at Chalk River Laboratories (CRL). The NSDF is an engineered disposal facility with an engineered liner system and leachate collection system which provide multiple barriers (to ensure protection of the environment) which do not exist at other WMAs at CRL; these controls significantly reduce long-term environmental risks for legacy wastes currently stored in situ at the WMAs. Currently, large-scale environmental remediation of CRL WMA are deferred until the proposed NSDF is available to mitigate the need for additional storage capability. However, wastes from theses legacy WMA would only be transferred to NSDF following completed of characterization and demonstration of meeting the NSDF WAC [2]. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND266	Kerrie Blaise, CELA (August 15, 2017)	The reports also state that heat–generating HLW, such as spent nuclear fuel and reprocessing wastes, will not be disposed of at the site, but large amounts and concentrations of heat-generating nuclides, including Cs-137, Sr-90 and several actinides are proposed to be stored on site, as shown in table 4.2 of the PA report. For example, it can be calculated (as shown in the table below) that about 160 kilos of heat-generating Cs-137 is proposed to be disposed of in the NSF. This is a large amount of Cs-137 relative to the small amounts emitted annually at most nuclear reactors. The presence of these heat-generating wastes acts to blur the CNL's waste definitions. In CELA's view, the question - should the wastes to be stored at the proposed facility be properly categorised as HLW as well as LLW and ILW? - needs to be addressed.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). Cesium-137 is discussed further in Appendix D, Section D1, of the Reference Inventory Report [2]. The Cesium-137 activity value has been reduced to 3.17E+12 Bq at closure. The reference to heat generating waste has been removed from the Environmental Impact Statement (EIS). Limits on heat generating waste were previously included due to the definition of ILW in CSA N292.0-19 (*General principles for the management of radioactive waste and irradiated fuel)* [3]. Low-level waste is not heat generating waste. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.

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Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

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			[2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019.
CNL-ND267	William Turner (May 31, 2017)	Section 3.2 – The commenter is concerned that this strategy does not address the appropriate disposal pathways for the hazardous content of the wastes (in other words, the risks associated with both radiological and non-radiological content). Without quantitative data about the inventories, and the hazardous content, I cannot see how CNL can assert that this disposal option will protect the health and safety of persons and the environment over the total lifetime of any proposed undertaking, including those required for decommissioning, pre-treatment, interim storage, transport, disposal, site closure and eventual abandonment of the site. Focusing on volumes may be appropriate for a municipal waste dump, but it cannot be acceptable for the proposed ECM. CNL must revise their IWS to address the actual risks from the rad and non-rad hazard content of the various wastes.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). The projected waste volumes and inventory of significant radionuclides in the bulk and packaged waste were developed by CNL, and are documented in the NSDF Reference Inventory Report [2]. The NSDF Reference Inventory has been used to inform the design and safety analyses. The Licensed Inventory is the outcome of safety analysis and represents a maximum radiological inventory limit for the NSDF (Section 3.3.1.3 of EIS). The purpose of the Post-Closure Safety Assessment (Post SA) [3] is to evaluate the effects of the Reference Inventory contained inside of the ECM for all plausible scenarios and evolutions of the site and engineered barriers. The Post SA modelling was used to refine the NSDF radiological inventory. During this iterative process, a decision was made to adjust the activity concentrations of many long-lived radionuclides, to ensure that the total radioactivity in the NSDF decays to near-background levels within a reasonable timeframe. In addition, the inventory was "filtered" through the Waste Acceptance Criteria [4], which was developed to be in alignment with both the International Atomic Energy Agency (IAEA) GSG-1 [5] and CSA N292.0-19 [6] guidance for the classification of low-level waste. As noted in Section 3.3.3.3 of the final EIS, waste that is placed in the ECM will meet the intent of land disposal and leachate requirements specified in Ontario's Regulation 347, *General – Waste Management* [7]. This requirement effectively limits the chemical characteristics of the waste including the leachability of non-radiological constituents. As a result, the non-radiological inventory was revised to reflect this restriction. Canadian Nuclear Laboratories (CNL) notes that the purpose of the Integrated Waste Strategy (IWS) [1] is to describe the strategic approach to waste management for CNL. Assessment of hazards and risks of the radiological and non-radiological wastes are done in the development phase of a project, as has been done through NSDF's Environmental Impact Statement (EIS) for the disposal of LLW. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [5] IAEA, General Safety Guide – 1, Classification of Radioactive Waste. [6] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [7] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.

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		Integrated Waste Management – Tritium Inventory and Emissions	
CNL-ND268	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**4.0 The Tritium Inventory and Tritium Emissions from the CRL Site:** The inventory of tritium in waste slated to be stored in the NSDF is listed in Table 1 as 4.82 × 1015 Bq. Similarly, Table 5.7.4.1 of the CNL EIS Report lists the current annual average airborne tritium emissions as 2.25 × 1014 Bq. This level of annual tritium emissions, if sustained into the future, implies that all of the tritium inventory on the CRL site would be released to the environment in a mere 21 years. On the other hand, the derived release limit (DRL) for airborne tritium at the CRL site is currently set at 1.25 × 1016 Bq. A tritium release limit of this magnitude is remarkable because it is so much larger than the entire tritium inventory. Indeed, such a DRL implies that, the CNSC is confident that all of the tritium stored at CRL could be released to the environment in one year without causing any adverse health effects to members of the public residing close to the site. This is very questionable, and of course ignores the likely adverse effects of high levels of tritium on wildlife and vegetation that are present on the CRL site. A similar situation applies to waterborne tritium releases from the CRL site – more information regarding this can be found on page 11 of this August 11th submission, and should be reviewed. For CNL to review and respond. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). As such there have been significant reductions to the proposed radionuclide inventory for the NSDF since the 2017 draft Environmental Impact Statement (EIS). The current total tritium value is calculated to be 8.91E+14 Bq, and this total value is reduced by half every 12 years from decay. The Derived Release Limit (DRL) is the upper limit for release of a single radionuclide from a single facility or site, derived from the regulatory dose limit for a member of the public of 1 mSv/yr considering all significant environmental pathways leading to exposure to an individual in the "critical group". The Chalk River Laboratories (CRL) site DRLs are calculated in accordance with the principles and methodology in the Canadian Standards Association N288.1-14 [1]. The DRL is used to assess the significance of releases. It is not surprising that the tritium DRL may be greater than the actual tritium inventory. Tritium is a weak beta emitter, and does not deliver significant radiological dose. A disproportional amount of attention is often directed towards tritium because it can exist in large activity amounts, but its actual radiotoxicity and radiological impact is quite low. Airborne tritium emissions from the engineered containment mound (ECM) are presented in Table 5.8.6-3 of the final EIS. The tritium emission estimates result in dose rates to workers standing on top of the ECM of 0.000016 mSv/y, and are tiny fraction of the DRL and well below regulatory dose limits to a member of the public. There will be a small portion of waste which will be required to utilize robust packaging to prevent higher concentrations of specific contaminants in the leachate. Specifically the leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. Leachate Controlled Waste Packages are discussed in Section 3.3.1.1 and the concentration limits are provided in Table 3.3.3-1 of the final EIS. Waterborne tritium emissions from the ECM and Wastewater Treatment Plant (WWTP) are controlled through limits on tritium concentration in the bulk waste, and also through the use of the Leachate Controlled Packages mentioned above. The Maximum Concentration in Treated Effluent is presented in Table 5.8.6-2 of the final EIS. The tritium discharge target is based on the criterion that tritium concentrations in Perch Creek which drains the Perch Lake watershed and discharge to the Ottawa River remain below 7,000 Bq/L, the Health Canada drinking water guideline [1]. Waterborne tritium emissions from the Perch Lake and Maskinonge Lake Basins are included in annual effluent verification monitoring and reporting, which are submitted to the Canadian Nuclear Safety Commission (CNSC) as a requirement based of the Chalk River Laboratories (CRL) site licence [3]. The annual environmental compliance monitoring reports are available to the public through the Canadian Nuclear Laboratories (CNL) website (www.cnl.ca) [4]. Canadian Nuclear

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			Laboratories effluent monitoring program is consistent with CSA Standard N288.5-11 Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills [5]. References: [1] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3[2] CSA Group. CSA N288.1-14. Guidelines For Calculating Derived Release Limits For Radioactive Material In Airborne And Liquid Effluents For Normal Operation Of Nuclear Facilities [3] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25. [4] Environmental Monitoring in 2018 at Chalk River Laboratories, CRL-509253-ACMR-2018 [5] CSA N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011.
CNL-ND269	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**4.0 The Tritium Inventory and Tritium Emissions from the CRL Site:** Tritium discharged into the Perch Lake and Maskinonge Lake Basins (over a period of 50 or more years) has been escaping into the local environment by two principal mechanisms: (i) Drainage into the Ottawa River and (ii) Surface water evaporation. For proper accounting of CRL's radiological emissions, the former tritium source (drainage) should be included in the site's liquid effluents; similarly, the other tritium escape mechanism (evaporation) obviously contributes to the site's airborne emissions. However, it is questionable that CNL's EIS properly accounts for any of these emissions in its effluent release data, as further explained in this submission. For CNL to review pages 11-12 of this August 11th submission and respond to these conclusions. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	Waterborne tritium emissions from the Perch Lake and Maskinonge Lake Basins are included in annual effluent verification monitoring and reporting, which are submitted to the Canadian Nuclear Safety Commission (CNSC) as a requirement based of the Chalk River Laboratories (CRL) site licence [1]. The annual environmental performance reports are available to the public through the Canadian Nuclear Laboratories (CNL) website (www.cnl.ca) [2]. Canadian Nuclear Laboratories effluent monitoring program is consistent with CSA Standard N288.5-11 Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills [3]. Tritium releases via evapotranspiration from Perch Lake wetlands and evaporation from Perch Lake have been estimated for the period 1955 to 2011. Process water discharged to Reactor Pit 2 over this period was the main source of tritium released to the wetland. Approximately 10% of the tritium released to the Perch Lake Basin has been evapotranspired from the wetland and 7% has evaporated from Perch Lake. Annual tritium releases via evapotranspiration and evaporation are a small percentage of CRL site airborne tritium emissions and are therefore, not a significant contributor to CRL site airborne tritium emissions. Tritium concentration in the wetlands and Perch Lake are declining as discharge of liquid radioactive wastes containing tritium to the liquid dispersal pits has ceased. The declining tritium concentrations will also lead to reduced evaporative tritium releases. Estimates of tritium releases via evaporation from Maskinonge Lake basin are not available. A cover has been placed on waste management area (WMA) C, the main source of tritium in the basin. Groundwater monitoring has shown a significant reduction in tritium in groundwater adjacent to the WMA C since placement of the cover. Tritium loading to downstream wetlands are declining. The wastewater treatment plant (WWTP) tritium effluent discharge targets (Table 5.8.6-2 of final EIS) is set specifically to limit the concentration of Perch Creek, which takes into account the existing tritium loading in the Perch Lake basin, and the existing tritium concentration of Perch Creek. Canadian Nuclear Laboratories notes that as per the most recent revision of the Comprehensive Decommissioning Plan (CPDP) [4], the large-scale remediation projects, including the WMAs and impacted areas on the CRL site, are intended to

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			be been brought forward to align with the proposed availability of NSDF. For example the conceptual schedule for the remediation of several WMAs currently impacting groundwater quality on the CRL site (i.e., WMA A, the Liquid Dispersal Area and WMA B sand trenches) have been advanced as much as 10 to 15 years from the previous version and strategy. These historic WMAs have minimal to no engineered barriers to contain the inventory. Although the releases and groundwater impact from these WMAs is currently being managed, the risk of future releases and environmental impacts the inventory poses could be substantially reduced through improved containment and isolation of the source term. NSDF is a purpose built disposal facility wherein the engineered containment mound design life of 550 years has been established to meet the required time period to allow for radiologic decay of the waste inventory. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. References: [1] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25. [2] Environmental Monitoring in 2018 at Chalk River Laboratories, CRL-509253-ACMR-2018 [3] CSA N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [4] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001.
CNL-ND270	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**4.0 The Tritium Inventory and Tritium Emissions from the CRL Site:** On pages 12 – 13 Dr. Greening analyzes the airborne tritium at CRL, finding another instance where a natural process – in this case, evaporation of tritiated water – is a major contributor to site emissions. Ironically, much of today's tritium emissions from the Chalk River site originated in the dumping of liquid wastes from chemical operations and fuel bay discharges, (starting in the early 1950s), into unlined "pits" in the Liquid Disposal Area (LDA) – See Section 3 of this submission. The numerous lakes and wetlands that account for 2.7 km2 and 5.2 km2, respectively, of surface areas that are sources of tritium evaporation should therefore be included in the tritium inventory and evaluated for their contribution to the airborne tritium emissions from the CRL site. However, at the present time, it is unclear if any of these sources of tritium have been considered by CNL of the NSDF EIS Report. If these fugitive tritium emissions are ignored, the airborne tritium emissions from the CRL site would be significantly understated., this is described in detail on pages 12-13 of this August 11th submission – please review and respond. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	Waterborne tritium emissions from the Perch Lake and Maskinonge Lake Basins are included in annual effluent verification monitoring and reporting, which are submitted to the Canadian Nuclear Safety Commission as a requirement based of the Chalk River Laboratories (CRL) operating licence [1]. The annual environmental performance reports [2] are available to the public through the Canadian Nuclear Laboratories (CNL) website (www.cnl.ca). Canadian Nuclear Laboratories (CNL) effluent monitoring program is consistent with CSA Standard N288.5-11 Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills [3]. Tritium releases via evapotranspiration from Perch Lake wetlands and evaporation from Perch Lake have been estimated for the period 1955 to 2011. Process water discharged to Reactor Pit 2 over this period was the main source of tritium released to the wetland. Approximately 10% of the tritium released to the Perch Lake Basin has been evapotranspired from the wetland and 7% has evaporated from Perch Lake. Annual tritium releases via evapotranspiration and evaporation are a small percentage of CRL site airborne tritium emissions and are therefore, not a significant contributor to CRL site airborne tritium emissions. Tritium concentration in the wetlands and Perch Lake are declining as discharge of liquid radioactive wastes containing tritium to the liquid dispersal pits has ceased. The declining tritium concentrations will also lead to reduced evaporative tritium releases. Estimates of tritium releases via evaporation from Maskinonge Lake basin are not available. A cover has been placed on waste management area (WMA) C, the main source of tritium in the basin. Groundwater monitoring has shown a significant reduction in tritium in groundwater adjacent to the WMA C since placement of the cover. Tritium loading to downstream wetlands are declining. The wastewater treatment plant (WWTP) tritium effluent discharge targets (Table 5.8.6-2 of final EIS) is set specifically to limit the concentration of Perch Creek, which takes into account the existing tritium loading in the Perch Lake basin, and the existing tritium concentration of Perch Creek.

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			Canadian Nuclear Laboratories notes that as per the most recent revision of the Comprehensive Decommissioning Plan (CPDP) [4], the large-scale remediation projects, including the WMAs and impacted areas on the CRL site, are intended to be been brought forward to align with the proposed availability of NSDF. For example the conceptual schedule for the remediation of several WMAs currently impacting groundwater quality on the CRL site (i.e., WMA A, the Liquid Dispersal Area and WMA B sand trenches) have been advanced as much as 10 to 15 years from the previous version and strategy. These historic WMAs have minimal to no engineered barriers to contain the inventory. Although the releases and groundwater impact from these WMAs is currently being managed, the risk of future releases and environmental impacts the inventory poses could be substantially reduced through improved containment and isolation of the source term. NSDF is a purpose built disposal facility wherein the engineered containment mound design life of 550 years has been established to meet the required time period to allow for radiologic decay of the waste inventory. References: [1] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25. [2] Environmental Monitoring in 2018 at Chalk River Laboratories, CRL-509253-ACMR-2018 [3] CSA N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [4] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001.
CNL-ND271	Martine Ouellet (Bloc Québécois) (August 14, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* L'EIE mentionne la présence du tritium, parmi le liquide à traiter cependant cet élément n'est pas filtrable par les systèmes actuels et se retrouvera donc dans l'Outaouais. Le promoteur estime que le tritium dans les écoulements pourrait émettre jusqu'à neuf millions de particules bêta par litre par seconde, et qu'il faudrait prendre des mesures pour réduire ce nombre à sept milles (la norme ontarienne actuelle pour l'eau de consommation). Il ne mentionne toutefois pas quelles seront les mesures pour diminuer la concentration de ce produit qui s'incorpore automatiquement aux organismes vivants dans les tissus corporels. Comment peut les LNC assurer que ces eaux seront capturées à 100 % par les membranes pendant une aussi longue période de temps ? Comment seront garantis la capture et le traitement des isotopes du tritium ?	Les critères d'acceptation des déchets (CAD) de l'IGDPS [1] ont été révisés pour préciser les exigences applicables aux déchets emballés destinés à être mis en place dans l'IGDPS. Les déchets emballés de type 5 ont été répartis en deux sous catégories : les colis contrôlés sans lixiviat et les colis contrôlés avec lixiviat. Les déchets à plus fortes concentrations de tritium (ainsi que d'autre radionucléides) seront placés dans des colis contrôlés avec lixiviat. Les déchets de type 5 sont également décrits et analysés à la section 3.3.1.1 de l'EIE définitive. Les colis contrôlés avec lixiviat sont censés constituer des barrières à court terme pour les déchets à plus fortes concentrations de radionucléides tant que la cellule de stockage n'est pas recouverte de la couverture définitive (délai approximatif de 5 à 10 ans). Par conséquent, les radionucléides plus mobiles, comme le tritium, sont isolés de l'environnement pour réduire au minimum le risque d'écoulement d'effluents liquides pendant la phase d'exploitation. Les colis contrôlés avec lixiviat sont analysés à la section 3.3.1.1, et les limites de concentration sont fournies au tableau 3.3.3-1 de l'EIE définitive. L'objectif de rejet du tritium est calculé en fonction d'un degré de concentration inférieur à 7 000 Bq/L (seuil fixé par Santé Canada en matière d'eau potable) dans le ruisseau Perch, qui se jette dans le bassin du lac Perch, puis dans la rivière des Outaouais [2]. Le lac Perch et le ruisseau Perch se trouvent sur le site des LCR. Il n'y a pas d'accès public au site des LCR, et ces cours d'eau ne servent pas de source d'eau potable. L'application du seuil de 7 000 Bq/L est donc une mesure prudente. Le seuil de 7000 Bq/L est inférieur de plusieurs ordres de grandeur au seuil de concentration du tritium sans effets sur le biote aquatique. Le principe est écologique et permet de protéger le biote non humain. Les rejets de tritium seront réduits au minimum grâce à l'emballage des déchets de tritium de haute activité et à des mesures d'atténuation destinées à réduire la production de lixiviat au minimum grâce à l'application de revêtements sacrificiels permettant de limiter l'eau de pluie entrant en contact avec les déchets (sections 3.4.2.5.1 and 3.4.1.9.2)). L'usage de la galerie d'exfiltration comme principal lieu de rejet allonge le délai de rétention permettant la désintégration radioactive du tritium dans la géosphère avant qu'il atteigne la biosphère et les récepteurs. Le tritium a une demi vie relative courte (12,3 ans) et peut donc se désintégrer dans le délai de transit des eaux souterraines depuis la galerie d'exfiltration jusqu'au lac Perch, qui est de plus de 16 ans.

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			L'IGDPS devrait permettre de réduire les concentrations de tritium et de strontium dans les eaux de surface du site des LCR. L'assainissement des zones de gestion des déchets hérités du passé et la mise en place des déchets dans l'IGDPS, qui permet le confinement de ces déchets, devraient permettre de réduire la propagation de ces contaminants dans l'environnement. Il convient de noter que l'assainissement des ZGD ferait l'objet d'un examen environnemental distinct et nécessiterait également un examen et une approbation de la Commission canadienne de sûreté nucléaire (CCSN) avant tout travail, de sorte que la discussion des options d'assainissement n'a pas été incluse dans de l'EIE definitive. Références [1] Critères d'acception des déchets de l'installation de gestion des déchets près de la surface, 232-508600-WAC-003. [2] Santé Canada, Recommandations pour la qualité de l'eau potable au Canada – Tableau sommaire, Bureau de la qualité de l'eau et de l'air, Direction générale de la santé environnementale et de la sécurité des consommateurs, Ottawa (Ontario), juin 2019. Voir : https://www.canada.ca/fr/sante-canada/services/sante-environnement-milieu-travail/rapports-publications/qualite-eau/recommandations-qualite-eau-potable-canada-tableau-sommaire.html.
CNL-ND272	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* There are no details regarding how CNL will prevent tritium concentrations in Perch Creek from exceeding 7,000 Bq/L. The concentration of tritium in the wastewater effluent is predicted to be 9,100,000 Bq/L, orders of magnitude greater than regulatory limits. Since there is no way to remove tritium from the effluent it appears that the plan is to slowly release and dilute the tritium which of course is highly concerning.	The NSDF Waste Acceptance Criteria [1] have been developed in consideration of the Wastewater Treatment Plant to ensure it is capable of treating the contaminants in the leachate at the concentrations expected from the waste. For example there will be a small portion of waste which will be required to utilize robust packaging to prevent higher concentrations of specific contaminants in the leachate. Specifically the leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. Leachate Controlled Waste Packages are discussed in Section 3.3.1.1 and the concentration limits are provided in Table 3.3.3-1 of the final EIS. The use of the exfiltration gallery as a primary discharge location provides additional retention time for radioactive decay of tritium within the geosphere prior to reaching the biosphere and receptors. Tritium has a relatively short half- life of 12.3 years and therefore benefits from decay over the groundwater transit time from the exfiltration gallery to eventually Perch Lake, which is greater than 16 years. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND273	Joan Lougheed and Town of Deep River (August 16, 2017)	Reference note (c) in Table 3.5.3-1 states that "Tritium releases will be managed such that tritium concentrations in Perch Lake do not exceed 7,000 Bq/I" (see pg. 3-24). Tritium concentrations in Perch Lake are currently an average of approximately 3,200 Bq/I(see ASR Environmental Monitoring at CRL Report CRL-509243-ASR-2015 (released 2016 June 14)), which is below the current drinking water standard of 7,000 Bq/I. Given that the tritium level in Perch Lake has been falling for many years, the NSDF should be designed so that Bq concentrations in Perch Lake are not permitted to rise again. Otherwise, this is not an environmentally sound approach, is not based on ALARA (As Low As Reasonably Achievable) principles, and disregards the pressure being placed on regulators by third parties to reduce the level below 7,000 Bq/I. The preferred approach would be to ensure that the releases of tritium are below the current level in Perch Lake. Improved packaging I containerization of tritium-containing wastes should provide the solution required. If not, the inventory of tritium in the NSDF should be significantly reduced. A similar approach	The NSDF Waste Acceptance Criteria (WAC) [1] has been revised to specify the requirements for accepted packages for receipt/emplacement in the NSDF. Type 5 Packaged Waste has been divided into two sub-categories: non-leachate controlled waste packages and leachate controlled waste packages. Packages with higher concentrations of tritium (as well as other radionuclides), will be placed in leachate controlled waste packages. Additional reference to, and discussions of Type 5 waste has been provided in Section 3.3.1.1 of the final EIS. Leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. Leachate Controlled Waste Packages are discussed in Section 3.3.1.1 and the concentration limits are provided in Table 3.3.3-1 of the final EIS. The tritium discharge target is based on the criterion that tritium concentrations in Perch Creek which drains the Perch Lake watershed and discharge to the Ottawa River remain below 7,000 Bq/L, the Health Canada drinking water guideline [2]. The use of the exfiltration gallery as a primary discharge

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		would also be appropriate for the releases of strontium, which should be carefully controlled, based on the results summarized in Table 6.2-1 (see pg. 3-53).	location provides additional retention time for radioactive decay of tritium within the geosphere prior to reaching the biosphere and receptors. Tritium has a relatively short half- life of 12.3 years and therefore benefits from decay over the groundwater transit time from the exfiltration gallery to eventually Perch Lake, which is greater than 16 years. The Perch Lake and Perch Creek watershed are on the Chalk River Laboratories (CRL) site. There is no public access to the CRL site and these waterbodies are not used for drinking water. Application of the drinking water guideline for these waters is therefore a conservative approach. The 7,000 Bq/L guideline value is several orders of magnitude below the benchmark concentration for tritium for no effects on aquatic biota. The approach is protective of non-human biota and environmentally sound. Tritium releases will be minimized through packaging of high activity tritium waste and mitigation measures to minimize leachate generation such as application of sacrificial liners to minimize precipitation coming into contact with the waste (Sections 3.4.2.5.1 and 3.4.1.9.2). The NSDF Project is expected to reduce tritium and strontium concentrations in surface water at the CRL site. Remediation of legacy waste management areas (WMAs) and placement of contaminated soils in the NSDF which provides engineered containment of these wastes is expected to reduce releases of these contaminants to the environment. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options has not been included in the final NSDF EIS. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3
CNL-ND274	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	Expert Dr. Greening included the following conclusion with this comments regarding the draft EIS: "As a result of the sloppy methodology used, CNL's radionuclide inventory is non-compliant with the CNSC's Regulatory Guide G–320 entitled "Assessing the Long-Term Safety of Radioactive Waste Management", issued December 2006, and must therefore be deemed unacceptable. [See ref: 1 in this submission, from August 11, 2017].	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). The NSDF Reference Inventory Report [2] has been updated to provide an estimation of the total radiological inventory is required to inform the safety assessments where the inventory is tested against selected scenarios to determine the long-term consequences of the proposed facility. The proposed inventory has been optimized through an iterative process as captured in Figure 1 of the Reference Inventory Report [2]. The reference inventory establishes a representative radionuclide inventory by considering waste already in storage and waste forecasts from environmental remediation and decommissioning projects data to predict an assumed total volume of waste at the NSDF at time of closure. All LLW that is expected to be generated has been meticulously described, or "characterized", before its generation to ensure the cumulative total inventory of the NSDF Project is tracked against the reference inventory. Section 3.3.1.3 and Table 3.3.1-2 of the final Environmental Impact Statement (EIS) discuss and present the revised radiological inventory.

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			It is noted that the commenter calculates the expected ratios between radionuclides, based on either natural abundance, expected fission burn-up, or decay. The use of ratios and scaling factors were used in the calculation of the Reference Inventory [2]. However, the Chalk River Laboratories (CRL) is a complex site that has used and processed uranium in multiple different forms over the course of 60-70 years. Uranium with a wide range of enrichment levels has been used as fuel at the CRL site, in multiple research reactors, critical and subcritical assemblies, and fuel manufacturing campaigns. In addition, different chemical separation processes have been used, which would create waste streams with varying concentrations of uranium and fission product isotopes. While adjustments have been made to ensure that the calculated Reference Inventory is consistent with some isotopic ratios, the inventory is meant as a bounding and conservative, and is not required to exhibit proportional ratios between radionuclides. Since the development of the 2017 drat EIS, Canadian Nuclear Safety Commission (CNSC) Regulatory Guide G-320 has been superceded by REGDOC 2.11.1, Volume III [4]. The NSDF Safety Case [5] and Post-Closure Safety Assessment [6] documents describe how the requirements of CNSC REGDOC 2.11.1 Volume 3 are met. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [3] CNSC, Regulatory Guide G-320, Assessing the Long Term Safety of Radioactive Waste Management. [4] CNSC, REGDOC-2.11.1, Waste Management, Volume III: Safety Case for Long-Term Radioactive Waste Management [5] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001. [6] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004.
		Integrated Waste Management – Carbon Inventory and Emissions	
CNL-ND275	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**5.0 The Carbon-14 Inventory and Carbon-14 Emissions from the CRL Site:** The inventory of carbon-14 reported in CNL's EIS for the proposed NSDF is 4.41×10^{13} Bq. This amount of C-14 is reported with no explanation as to how it was derived, or the type of wastes involved. Nevertheless, the EIS also includes, (in Table 5.3.2-6), an estimate of the concentration of C-14 in the stored waste – namely 306 Bq/gram. If we assume a waste density of 1 gram/cm3, we can infer that the NSDF C-14 inventory is contained in a waste volume of 144,000 m^3. *Please also refer to the appendices of this submission, which also contain pertinent details related to these comments.*	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). As such there have been significant reductions to the proposed radionuclide inventory for the NSDF since the 2017 draft Environmental Impact Statement (EIS). The revised inventory of Carbon-14 value is 1.71E+12 Bq, with an average concentration in the waste of 1.78 Bq/g, as presented in Table 12 of the Reference Inventory Report [2]. This change represents a reduction of 96%. Historical data combined with sampling results were used to determine scaling factors between Cesium-137 and Carbon-14 in waste streams. The Reference Inventory extrapolated what CNL currently has in storage to the full NSDF volume of 1,000,000 m^3. Detailed information about how all radionuclides were calculated and estimated can be found in the Reference Inventory Report [2]. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.

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			[2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND276	John Jackson (Nuclear Waste Watch and OFWCA) (August 11, 2017)	**5.0 The Carbon-14 Inventory and Carbon-14 Emissions from the CRL Site:** In Section 5.7.6.1.1 of CNL's EIS we find a discussion of tritium and C-14 emissions from the NSDF, referenced and described on page 14 of this submission. Dr. Greening highlights that these emission rates are not measured, but are calculated based on an assumed proportionality between the C-14 inventory and the C-14 release rate. The submission asks - is this assumption supported by any evidence? And are all possible sources of C-14 emissions accounted for? To answer these questions, Dr. Greening suggests that one must first consider the possibility of fugitive C-14 emissions from the CRL site – these are unmonitored emissions that may only be evaluated by indirect means. However, one should first note that in Section 5.7.6.1.2 of CNL's EIS we have the following claim about fugitive emissions from the NSDF: *The contribution from fugitive emissions is considered to be negligible in comparison to the ECM (i.e. the NSDF) releases.* This claim remains unsubstantiated in the EIS and is, in fact, demonstrably false as demonstrated by reference [16]. Here we read the following: *The storage of low-level radioactive waste in trenches overlying an unconfined groundwater flow system in sands has generated a contaminant plume containing C-14. Approximately 300 meters from the waste management site, the groundwater discharges to the surface. Radiocarbon input to the groundwater discharge area in 1991 was determined to be between 3.3 and 4.2 GBq.* *This study indicates that over 80% of the groundwater radiocarbon is rapidly lost to the atmosphere when the groundwater comes to the surface.* This shows that for at least one waste disposal area on the CRL site, unmonitored airborne C-14 emissions of 3 × 109 Bq/year have been observed. This is 10% of the monitored emissions and is consistent with the very high levels of airborne C-14 reported in [17] at many locations in the CRL's WMA C, especially in the vicinity of the Duke Swamp. Here airborne concentrations of C-14 as high as 10 Bq/m3 have been recorded. This is 100 times higher than the C-14 concentrations reported in Table 5.7.4-7 of the EIS Report. *Please also refer to pages 14 and 15, as well as the appendices of this submission, which also contain pertinent details related to these comments.*	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). As such there have been significant reductions to the proposed radionuclide inventory for the NSDF since the 2017 draft Environmental Impact Statement (EIS). The revised inventory of Carbon-14 value is 1.71E+12 Bq, with an average concentration in the waste of 1.78 Bq/g, as presented in Table 12 of the Reference Inventory Report [2]. This change represents a reduction of 96%. Canadian Nuclear Laboratories (CNL) acknowledges that the 2017 draft EIS performed only a qualitative analysis and assessment of Carbon-14 emissions and dose consequences. The final EIS includes a quantitative analysis of Carbon-14 emissions. Table 5.7.6-4 of the final EIS provides calculated values for Carbon-14 concentrations in air directly on top of the engineered containment mound (ECM) during operations. Using these concentrations, the radiological dose to the worker can be calculated. Carbon-14 is conservatively calculated to be responsible for 0.0000022 mSv/y to the worker within the ECM, which is completely negligible. If dose to a receptor working directly on the waste is negligible, it can be concluded that dose to a receptor off-site (member of the public) would only be a small fraction, and therefore also negligible. Section 5.7.4.4.4 of the final EIS discusses how Carbon-14 in air is monitored at Chalk River Laboratories (CRL). Table 5.7.4-7 of the final EIS provides baseline conditions considered representative of the NSDF Site and the Regional Study area and beyond. All areas that do not contain a direct source of waste have air concentration measurements near, or below the detection limit. This suggests that elevated Carbon-14 emissions is indeed localized to an emitting source on the CRL site and unlikely to impact the public. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
		Integrated Waste Management – Wastewater Treatment Plant	
CNL-ND277	Greg Csullog (May 1, 2017)	**Section 3.5.3.2:** What are the plans for characterizing the wastes that will be generated from waste water treatment?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until

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		If the Waste Water Treatment Plant is going to generate additional, potentially quite active wastes, then plans should be in place ahead of time to characterize such wastes. I did not see any reference to such plans (e.g., nothing appears in Section 3.5.4.2.1, Waste Water Treatment Building" or Section 3.5.4.2.5, "Vehicle Decontamination Facility" (historically at AECL, due to the lack of waste characterization support and the nature of decontamination operations, uncharacterized, highly variable wastes were routinely generated). **<u>Note from commenter:</u>** Historically, for example, AECL used ion exchange (IX) technology to clean water, which resulted in IX resins that were so radioactive that they had to be shielded. The size of the resin containers, sometimes 200L drums, precluded putting them into hot cells for characterization or sampling them for analysis. I, along with a colleague, repeatedly requested that such IX systems include a side-flow, mini column that could be used to characterize the main columns. To my knowledge, this was never implemented.	a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). As such there have been significant reductions to the proposed radionuclide inventory for the NSDF since the 2017 draft Environmental Impact Statement (EIS). By extension, the calculated dose rates from exposure to the IX columns have also been reduced. Table A-1 of the Safety Analysis Report [2] lists the calculated dose rates to a Wastewater Treatment Plant (WWTP) operator at each process step. The highest anticipated dose rate from the IX columns is 0.057 mSv/h. Therefore, the dose from the IX columns is manageable and characterization is anticipated to be possible without undue risk. All waste accepted for disposal in the NSDF requires characterization [3], including waste generated by the WWTP. Waste tracking will be implemented to prevent double counting of radioactivity accounted for at the time of acceptance and waste emplacement. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [3] Waste Characterization, 900-508600-STD-003.
CNL-ND278	Joan Lougheed and Town of Deep River (August 16, 2017)	It is unclear from the draft EIS what the strategy and approach is for the collection and the treatment of leachate in the event of an extended outage of the WWTP.	Section 3.4.2.1 of the final Environmental Impact Statement (EIS) discusses the quantity of wastewater generated from the NSDF Project. It notes the average total annual amount of wastewater which will require treatment is 11,000 m^3/year or approximately 30 m^3/day. The Wastewater Treatment Plant (WWTP) has been designed with three storage tanks each with a capacity of 1,900 m^3 to store wastewater. Collectively, this represents a total storage capacity of 5,700 m^3. The plan is to limit the operational volume in these storage tanks to a total of 990 m^3 leaving 4,710 m^3 of total unused storage capacity. With approximately 30 m^3/day of average wastewater produced, this provides approximately 150 days of wastewater storage capacity should the power go out. In other words, the WWTP for the NSDF can store wastewater from its operations during an extended power outage of about 150 days. The WWTP is designed for redundancy and high reliability. The WWTP has two redundant wastewater treatment process trains and can operate on a single train if the other train is out of service for maintenance or repairs. A single train can treat 11.36 m^3/hour of wastewater, and is therefore more than capable to treat the average wastewater produced daily (30 m^3/day). Interconnections between the treatment trains also allow flow to be diverted between trains at each major process step. Given the large storage capacity and high reliability of the designed WWTP, wastewater treatment for the NSDF can be conservatively accommodate during an extended power outage.
CNL-ND279	Joan Lougheed and Town of Deep River (August 16, 2017)	It is unclear how the entries in Table 3.6.2-1 (see pg. 3-53) were generated. A description of how the pilot-scale tests were conducted is also required.	Canadian Nuclear Laboratories (CNL) has performed pilot testing of the proposed wastewater treatment process utilizing simulated wastewater representative of what we expect to collect and treat when the NSDF is in operation. Wastewater quality was predicted taking into consideration the Wastewater Treatment Plant (WWTP) flow rates, waste inventory and the design and behaviour of the engineered containment mound (ECM). The wastewater quality is managed by controlling what wastes are placed in the ECM. The NSDF Waste Acceptance Criteria (WAC) [1] were developed to ensure only waste with acceptable physical, radiological, and chemical characteristics will be placed in the ECM (see Section 3.3.3 of final EIS). The results of the pilot scale testing/removal efficiencies (Table 3.6.2-1) has been removed from the final EIS. However, the findings from these pilot scale tests have been incorporated into the Design Description [2] which details the designed components of the WWTP.

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			The primary objectives of the pilot scale tests were to simulate the proposed treatment processes of the full-scale WWTP in a continuous operation mode, to confirm that the final treated effluent meets or exceeds regulatory requirements for discharge to a surface water body (i.e., Effluent Discharge Targets [3]), and to provide additional design information for incorporation into the WWTP design. Key insight from the pilot test include: • The pilot scale design basis was developed using the information available at the 60% design. The effectiveness of each process stage was measured to determine if additional improvements were needed (i.e., samples were taken and analysed before and after each process stage); • The chemical precipitation was used as the best available technology for the removal of multiple radionuclides. During the pilot scale testing, chemical precipitation effectively converted soluble metals and cations into insoluble precipitates which could be filtered from the wastewater. Removal efficiencies of cations via chemical precipitation were optimized by adding iron and aluminum salts as co-precipitation and coagulation agents, and by increasing the pH of the solution in the second precipitation reaction tank. • Pilot scale test evaluations of the granular activated carbon (GAC), used for removal of a broad range of organic contaminants of concern, did not demonstrate increased removal efficiencies of organic constituents. Nevertheless, the use of GAC was recommended in the full-scale WWTP design as an optional feature in the event the organic constituents in the actual wastewater differ from those in the simulant wastewater. • Ion exchange (zeolite resin followed by strong acid cation resin) was employed primarily for the removal of radionuclide surrogates (i.e., strontium and cesium). The pilot scale test identified the two best ion exchange media to be used for each radionuclide and the order in which they should be operated. The combined process removal efficiencies following ion exchange were 99.7% for cesium and 99.5% to 99.9% for strontium. Overall, the pilot scale test optimized the technologies to be used in the WWTP and demonstrated that the NSDF Effluent Discharge Targets [3] can be achieved for protection of the environment and human health using chemical precipitation, microfiltration, and ion exchange. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Design Description, 232-503212-DD-001. [3] Near Surface Disposal Facility Effluent Discharge Targets, 232-106499-REPT-002.
CNL-ND280	Joan Lougheed and Town of Deep River (August 16, 2017)	In Section 3.10.3, it is stated that "Decommissioning of the WWTP and all associated structures will be performed after the leachate quantity no longer requires this facility for treatment and the leachate is able to be treated using a different technique or it becomes more cost-effective to send leachate to an alternate off-site facility" (see pgs. 3-63 to 3- 64). Details regarding the specific parameters guiding this decision making process are required. Also, specifics regarding the lifespan of the WWTP, beyond the emplacement of the Final Cover, are required and should be based upon comparable facilities. The extended operational period of the WWTP provides assurance of minimal leachate releases to the environment. In Section 3.10.4, it is noted that "A series of drainage control features will be installed in conjunction with placement of final cover over the ECM" (see pg. 3-64).These drainage control features should be described, including whether they are passive or active in nature.	The description of the decommissioning of the Wastewater Treatment Plant (WWTP) during the closure period (previously Section 3.10) has been improved and is outlined in Section 3.2.3 of the final Environmental Impact Statement (EIS). During this period, the preferred approach to closure is to complete decommissioning in two phases. Phase 1 will include the decommissioning of the buildings and facilities that are no longer required once the operations phase is complete (e.g. vehicle decontamination facility). This will be followed by Phase 2 when buildings and facilities such as the WWTP which will still be required for a period of time after the placement of the final cover system on the engineered containment mound (ECM) (i.e., the ECM is no longer receiving waste). The WWTP is designed to treat leachate, contact water, decontamination waters, and contaminated process waters arising from NSDF operations as sources of wastewater. Since sources of wastewater will be significantly reduced after the ECM has permanently closed, operation of the WWTP after post-closure will no longer be necessary. Once the ECM is closed, the volume of wastewater for treatment in the WWTP will reduce to a substantially smaller flow, as will the quantity of residual solids. The closure phase will include continued operation of the WWTP and discharge of treated effluent WWTP between 2070 and 2100. The WWTP is designed for a 50-

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			year operational life, but may be operated for a period beyond 50 years if proper maintenance and equipment replacement are provided. This is detailed and discussed in the Design Description [1] of the NSDF Project. Decommissioning of the WWTP and all associated structures will be performed after the leachate quantity is able to be treated using a different technique or it becomes more cost-effective to send leachate to an alternate off-site facility. The solid wastes generated during the decommissioning of the WWTP will be packaged to meet the future storage or disposal capability. Waste associated with demolition of the WWTP and associated facilities will be disposed of off-site as determined at the time of closure. The specific parameters guiding the decision making process of when to stop using the WWTP and adopt an alternative treatment strategy are: • the selected method of treatment will need to meet applicable regulatory and licensing requirements (including discharge limits); • it will need to be suitably sized for the volume of wastewater being generated and; • it will need to be cost-effective for the volume of wastewater being generated. An updated and revised Final Closure Plan for the NSDF Project will be prepared at the time of final closure based on actual, verified conditions through the end of the operations phase of the NSDF Project. This will enable flexible planning and mitigation of changes and deviations from the initial planning during the operations phase. The final cover system of the ECM is described in Section 3.4.1.9.3 of the final EIS. Following the placement of the final cover over the ECM, surface water will be managed through passive drainage features. This system consists of a series of channels lined with turf reinforcement mats across the ECM cover. Each channel coveys the water into a riprap-lined down drain across the 4:1 sloping section of the cover perimeter. The down drains, in turn, extend down to the top of the berm, and then transition into concrete chutes which terminate into the ECM perimeter road ditches. The road ditches drain into Surface Water Management Ponds 2 and 3 located on the south and east end of the ECM, respectively. The Surface Water Management Ponds discharges will be to infiltration areas. Reference: [1] Design Description, 232-503212-DD-001.
		Integrated Waste Management – Long Term Safety	
CNL-ND281	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017)	EIS ignores the detailed guidance in CNSC Regulatory Guide G-320: Assessing the *Long-term Safety of Radioactive Waste Management.* The EIS fails in many ways to address important safety considerations for radioactive waste management discussed in Guide G-320, such as demonstration of long-term safety of the public and the environment.	The Environmental Impact Statement (EIS) has been prepared to meet the requirements of the *Canadian Environmental Assessment Act* (CEAA) 2012 and the *Generic Guidelines for the Preparation of an EIS* [1]. The EIS summarizes and presents the findings of the Post-Closure Safety Assessment [2], which assesses the long-term safety of the public and the environment. The PostSA [1] has been developed to meet both Canadian and International guidance for assessing the long term safety of a radioactive waste disposal facility, including the following documents: • *Assessing the Long-Term Safety of Radioactive Waste Management. Waste Management, Volume III*. REGDOC-2.11.1, Vol. III.(Note: This document supersedes CNSC G-320)[3] • *The Safety Case and Safety Assessment for the Disposal of Radioactive Waste.* SSG-23 [4]

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			• *Improvement of Safety Assessment Methodologies for Near Surface Disposal Facilities. Volume I: Review and Enhancement of Safety Assessment Approaches and Tools* [5] • *Disposal of Radioactive Waste. Specific Safety Requirements No. SSR-5* [6] References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] CNSC, Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [4] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012. [5] IAEA, Safety Assessment Methodologies for Near Surface Disposal Facilities, ISAM, Volume 1, Review and Enhancement of Safety Assessment Approaches and Tools, 2004. [6] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements. Safety Standards Series No. SSR-5, 2011.
		Integrated Waste Management – Data Management	
CNL-ND282	Greg Csullog (May 1, 2017) Heather Sanderson (May 12, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **10.1 Data Management– 10-2:** The EIS provides no significant information about data and records management associated with the cradle-to-grave management of wastes. Monitoring needs to be implemented for a long, long time, starting now and continuing through the storage process and far into the future. At the moment, CNL has an existing WIRKS [Waste Inventory Record Keeping System] with a lot of bad or missing data. CNL may not properly migrate data from its existing WIRKS to a new system.	As part of Canadian Nuclear Laboratories (CNL) Management System requirements under the Chalk River Laboratories (CRL) site licence [1], CNL is required to manage Information Assets that follows international and Canadian guidance as well as regulatory requirements on creating, capturing and using records. Waste records and record management are required as per CSA N292.0- 19 *General principles for the management of radioactive waste and irradiated fuel*, Section 10.2 [2], as a minimum. Canadian Nuclear Laboratories has developed and follows its Waste Data Management Control Document, which is consistent with the CSA N292.0-19 [2] requirements. References: [1] Nuclear Research and Test Establishment Operating Licence. Chalk River Laboratories. NRTEOL-01.00/2028 [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019
		Integrated Waste Management – Legacy Waste	
CNL-ND283	Greg Csullog (May 1, 2017)	**Section 2.1, Introduction:** What are the "legacy waste management areas"? This term is used multiple times in EIS Vol. 1 but these areas are not described. The term does not appear at all in Vol. 2, only "…long-term management of large quantities of waste from legacy waste…"	The term "legacy waste management areas" has been introduced to refer to the wastes that have been in storage at CRL for many decades, much of which are not currently located in modern radioactive waste management facilities. The term does not refer to any specific class of waste, nor does the term describe the characteristics of the waste. Canadian Nuclear Laboratories (CNL) notes that as per the most recent revision of the Comprehensive Decommissioning Plan (CPDP) [1], the large-scale remediation projects, including the legacy WMAs, are intended to be been brought forward to align with the proposed availability of NSDF. For example the conceptual schedule for the remediation of several legacy WMAs currently impacting groundwater quality on the CRL site (i.e., WMA A, the Liquid Dispersal Area and WMA B sand trenches) have been advanced as much as 10 to 15 years from the previous version and strategy. These historic WMAs have minimal to no engineered barriers to contain the inventory. Although the releases and groundwater impact from these WMAs is currently being managed, the risk of future releases and environmental impacts the inventory poses could be

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			substantially reduced through improved containment and isolation of the source term. NSDF is a purpose built disposal facility wherein the engineered containment mound design life of 550 years has been established to meet the required time period to allow for radiologic decay of the waste inventory. Reference: [1] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001.
CNL-ND284	Greg Csullog (May 1, 2017)	**2.2 CNL Integrated Waste Strategy – 2.1: T**he commenter expressed his view that the Integrated Waste Strategy document is "only a high level plan that excludes any detail on the mechanics of how the strategy will be implemented. That said, while it identifies the various cradles and graves, it provides no meaningful information about how wastes from the various cradles will be put into the appropriate graves."	The Integrated Waste Strategy (IWS) [1] is publically available at www.cnl.ca/nsdf, or by contacting ermstakeholder@cnl.ca. Detailed waste processes are in place for the majority of Canadian Nuclear Laboratories (CNL) wastes. As the CNL mission changes, new disposal capacity for radioactive waste is required and this need is outlined in the IWS. Regarding the purpose of an IWS: "The purpose of an IWS at CNL is to ensure the integration of the management of waste across CNL, and better define pathways for all CNL managed wastes using a life cycle (cradle to grave) approach. It will also enable completion of the scope to refine the Interim Waste Storage strategy, an area that has been highlighted as a gap in strategy, to facilitate accelerated decommissioning." The purpose of the original (Rev 0) IWS was to capture the CNL baseline waste strategies for all CNL sites, highlight gaps within the strategies, and identify actions required to improve the waste management approach. It is a living document, therefore, as work progresses to further integrate waste management practices, further iterations of the IWS will describe how these strategies will be improved and optimized. Revision 1 was published in February 2019. Canadian Nuclear Laboratories developed the initial version of the IWS using guidance from ENG 01 '*Specification and Guidance on the Content and Format of an Integrated Waste Strategy*`. As a result of the development of the initial version of the IWS, an Action Plan has been developed which is being actively used to address gaps in capability including the need for improved routes for the disposition of all wastes. As gaps are addressed, cradle to grave processes will be further developed to provide safe, reliable, predictable waste management for all CNL wastes. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND285	Greg Csullog (May 1, 2017)	**2.2 CNL Integrated Waste Strategy – 2.1:** Waste from "legacy waste management areas" (regardless of what these areas are) were most certainly not subject to rigorous chain-of-command controls, leaving high uncertainties as to: • whether or not wastes thought of as LLW are actually ILW (having levels of long lived nuclides precluding near surface disposal) since commonly measurements were restricted to gamma emitters and many waste had no radionuclides at all reported) or • LLW and ILW were not properly segregated even if they were properly classified.	All waste are required to meet the NSDF Waste Acceptance Criteria [1]. Accordingly, all wastes must be characterized before they can be compared against the WAC. This requirement implies that even legacy waste, which previously may have been categorized as low-level waste, will be re-evaluated and characterized according to more modern CNL waste characterization standard [2]. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Waste Characterization, 900-508600-STD-003.
CNL-ND286	Anna Tilman (June 22, 2017)	High- and intermediate-level liquid wastes are being stored at the Waste Tank Farm at the CRL site. According to the CPDP, the inventories of the contents of the tanks are well characterized.2 However, the EIS does not refer specifically to this waste. Similarly, tile holes on the site store both ILW and used fuel,	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been

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		but no reference is made to this waste, in particular, regarding the potential storage of any of the ILW in the proposed NSDF. Does this mean that none of the wastes from these two areas are intended to be stored at the NSDF?	proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). All waste are required to meet the NSDF Waste Acceptance Criteria [2], which have been selected specifically to meet LLW waste guidance as per International Atomic Energy Agency [3] and the Canadian Standards Association [4]. For example, related to the specific example of wastes currently stored in tile holes (i.e., used fuel) will not be accepted into NSDF. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003 [3] IAEA, General Safety Guide – 1, Classification of Radioactive Waste. [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019.
CNL-ND287	Michael Stephens (August 14, 2017)	The information on the characteristics of much of the waste inventory appears to be weak (G. Csullog, document #39). As indicated in the Performance Assessment for NSDF to Support the EIS (CNL document 232-508760-SAB-001 R0, section 4.2, page 4-4), *"Due to the differences in record keeping methods from present day and 60 years ago, there are some uncertainties in the waste characterization, particularly for some of the older waste streams. Any waste destined for disposal will require further characterization and assessment prior to acceptance at the NSDF."* Further, weak information is provided on how waste inventory information will be confirmed. These are key "incidental" aspects of the NSDF project and how they will be carried out are insufficiently described.	Canadian Nuclear Laboratories (CNL) acknowledges that the historical approach to waste characterization is not appropriate for the basis of acceptance into a modern disposal facility. As such, all waste intended to be emplaced in the NSDF, including legacy waste, shall have sufficient characterization data using current industry best practices [1] to ensure compliance with the NSDF Waste Acceptance Criteria (WAC) [2]. Section 6.9 of the NSDF Safety Analysis Report (SAR) [3] documents the waste characteristics of the low-level waste for disposal in the NSDF. A waste generator certification program, combined with a waste receiving inspection process, is employed to ensure received waste meets the NSDF WAC [2] in accordance with the procedures and protocols. Administrative controls for waste acceptance include [3]: • Waste generator certification. • Waste characterization. • Qualification for shipment. The frequency of waste verification uses a graded approach and depends on the waste certification requirements [2]. Waste Acceptance Criteria non-conformances identified through the verification process as well as discrepancies between waste acceptance documentation and verification results are managed through the Waste Certification process [4]. The general process for receiving and waste verification of bulk and packaged waste at the NSDF involves [3]: • Completion of pre-shipment documentation, including a waste package data form for the associated Waste Profile. • Qualify for Shipment and shipment schedule. • Documentation verification accompanying the waste shipment. • The waste identification labels are recorded and cross-referenced to the Waste Package Data Form and supporting documentation. • Off-site waste – The waste identification labels are recorded and cross-referenced to the waste manifest completed by the off-site generator. • Physical inspection of waste packages for damage or non-compliance with the WAC [2] packaging requirements. • Visual inspection of the waste packages or transportation containers against the supporting documentation [2]. • Visual inspection of the bulk waste against the bulk waste physical requirements in the WAC [2].

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			• Radiological monitoring of the waste packages or transportation containers for external radiation and contamination, and assessment against radiation limits in the WAC [2]. • Waste packages are assigned a unique identification number that is recorded in the waste database along with the information in the waste manifest. • Non-destructive assays, and destructive sampling and analysis, as required [2]. References: [1] Waste Characterization, 900-508600-STD-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Waste Certification, 900-508600-MCP-003.
CNL-ND288	Owen Gleason (August 16, 2017)	The contaminants that are **CURRENTLY** there should immediately be brought up to an acceptable storage standard, and be configured such that they can be: 1. Quickly transported to safety in case of a site failure or pending site failure e.g.: (dam burst, seismic event). 2. Transported to a site that is stable and suitable for long term storage when such a place becomes available. 3. Transported to a site that can process the waste as new technologies become available.	The NSDF is a key enabling facility to the clean-up of the Chalk River Laboratories (CRL) site. The commenter is correct in that historic waste management areas (WMAs) at Chalk River Laboratories have minimal to no engineered barriers to contain the inventory. Although the releases and groundwater impact from these WMAs is currently being managed, the risk of future releases and environmental impacts the inventory poses could be substantially reduced through improved containment and isolation of the source term. NSDF is a purpose built disposal facility wherein the engineered containment mound design life of 550 years has been established to meet the required time period to allow for radiologic decay of the waste inventory. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options has not been included in the final NSDF EIS. As outlined in CNL's Integrated Waste Strategy [1], the development of effective waste storage capabilities is a central objective and driver for the propose NSDF Project which will ensure effective management of solid low-level wastes. Specific responses to the three points are as follows: 1. Wastes currently present on the CRL site are carefully monitored and do not pose a hazard at this time. Safety assessments have been performed to determine the hazard and risk of external events such as seismic activity and dam breaks. The risk of seismic activity having an adverse effect on the waste management areas is very low, and the areas exist at a much higher elevation than the maximum flood level. Each time wastes are moved it involves a small risk to workers, from both conventional safety and radiation doses. The wastes are in a safe position now, and will not be moved until a disposal site is available. 2. Agreed, waste will be transported to a site that is stable and suitable for long term storage when such a place becomes available. This site is the proposed NSDF at the Chalk River Laboratories (CRL) site. 3. "Waste processing" is an important step in waste management and disposal operations. It could refer to volume reduction, packaging, solidifying, etc. Waste processing occurs both on the CRL site and off-site by third parties. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND289	Northwatch (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions.*	As indicated in Section 1.1 of the final Environmental Impact Statement (EIS), the placement of waste is expected to be completed in two phases. During Phase 1 of NSDF the majority of wastes that are planned to be disposed of in the facility will be from wastes currently in storage and wastes generated in the next 25 years. Phase 2 of NSDF will allow for the

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	Joan Lougheed and Town of Deep River (August 16, 2017)	**2.3 (2-6) -** The draft EIS states that the waste to be disposed in the NSDF includes the following: "waste now in storage that has resulted from legacy CNL operational and decommissioning activities and past commercial activities. The descriptions of waste sources and types in the draft EIS are overly general and require additional detail and description. Northwatch Information Request #20: Clarify whether this statement refers to waste in storage at the CRL, or in storage at CNL sites more generally. CNL fails to identify in the EIS exactly how much waste is currently in interim storage at CRL. Clarification is needed here.	inclusion of waste from future operations, decommissioning and remediation at the Chalk River Laboratories (CRL) site and off-site Canadian Nuclear Laboratories (CNL) managed facilities. The vast majority of the wastes are already located at CNL (90%), while some (5%) is anticipated to be generated at Whiteshell Labs, and the remaining 5% is l from off-site sources such as universities and hospitals. It is worth noting that CNL has been accepting waste from hospitals and universities for decades as a service to the industry. The presence of NSDF is not related to past or future acceptance of these wastes. The Reference Inventory Report [1] (Section 4) describes the sources of information that were used to calculate the waste volumes of bulk and packaged waste. For example, it is estimated that about 326,000 m^3 of waste will be generated by decommissioning projects across CNL, and estimated 541,000 m^3 of soil-like wastes will be generated by environmental remediation projects across Atomic Energy of Canada Limited (AECL) sites. Chalk River Laboratories also currently stores approximately 60,500 m^3 of soil wastes related to ore refining before the 1970s. Further, approximately 15,612 m^3 of packaged waste is in storage at CRL. These volumes were used for the calculation and extrapolation of the NSDF Reference Inventory [1]. Waste characteristic information (i.e., type and volume) is central to determining how waste will be handled, and is the basis for specific waste packaging, handling, and placement practices. In addition, for bulk wastes the waste constituents, such as concrete, wood, brick, and metal, must be described to an extent that allows assessment of waste placement efficiency, stability, and waste segregation strategies. Section 3.3.1 of the final EIS has information on Waste Types, Volumes and Inventory. Table 3.3.1-1 of the final EIS shows the estimated volume of each type of waste expected to be disposed of at the NSDF Project. The most abundant waste types by volume are decommissioning and demolition wastes (Type 4) and soil and soil-like wastes (Type 1). Waste Types 1,2,3,4 and 6 constitute bulk waste, and Type 5 is packaged waste. Approximately 87% of the wastes will be bulk unpackaged wastes and approximately 13% of the wastes will be packaged. Future waste storage or disposal options will be in accordance with the future licensing and environmental assessment processes if required and consistent with the CNL Integrated Waste Strategy [2]. Proposed decommissioning of infrastructure at the CRL site is authorized separately though the conditions of the CRL site licence [4]. Legacy wastes will be sorted via existing waste management and waste characterization procedures, with the intent of identifying and segregating wastes that meet the NSDF Waste Acceptance Criteria [3]. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [3] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [4] Nuclear Research and Test Establishment Operating Licence. Chalk River Laboratories. NRTEOL-01.00/2028
CNL-ND290	Northwatch (August 16, 2017)	**2.3 (2-6) -** The draft EIS states that the waste to be disposed in the NSDF includes the following: "future waste arising from continuing CNL operations, commercial activities, the decommissioning of buildings and structures that have not yet been built, and the remediation of soils from the CRL property." Northwatch Information Request #22 and 23: Provide a clear definition of "commercial activities" and supported statement of what volume of waste is associated with this category, what are the waste sources and types. Describe how is this commercial activity is enabled by the contract to manage the AECL sites.	Canadian Nuclear Laboratories' (CNL's) acceptance of waste related to "commercial activities" is unrelated to the Near Surface Disposal Facility (NSDF) project. Canadian Nuclear Laboratories (CNL) has been accepting waste from small Canadian waste generators for decades, as a service to the industry and as a service to Canada. These waste generators include hospitals, universities, and small commercial industries. An example of a commercial waste generator could be manufactures which use tritium for its radioluminescence properties in green "EXIT" signs.

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CNL-ND291	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* L'ÉIE ne fournit jamais un portrait global des déchets historiques actuels en déclinant simultanément toutes ces catégories et en évitant d'y mêler par surcroît des spéculations sur les éventuels déchets futurs. Et surtout, elle n'inclut pas toutes les variables prévues à la classification de l'AIEA comme les déchets à très courte période de désintégration ou encore les déchets de très faible activité. Le Ralliement contre la pollution radioactive demande que l'ÉIE décrive en détail l'ensemble des déchets historiques en déclinant simultanément leur origine, leur forme physique, leurs types de radiations alpha, beta et gamma, leur période, leur niveau de radioactivité (en fonction des critères de l'AIEA) et, pour chacune de ces catégories, les volumes en cause. L'intervenant demande aussi qu'elle décrive en détail, à tous les 50 ans, comment ces divers radionucléides vont se désintégrer (filiation radioactive) et comment les quantités de radionucléides et l'intensité de leurs rayonnements vont évoluer.	Tous les déchets doivent remplir les critères d'acceptation des déchets de l'IGDPS [1], précisément retenus en fonction des consignes de l'Agence internationale de l'énergie atomique [2] et du groupe CSA [3] en matière de déchets de faible activité (DFA). La modélisation à long terme de l'avenir de l'inventaire de déchets a été révisée en fonction du nouvel inventaire (déchets de faible activité seulement) et d'un logiciel d'analyse des voies de contamination différent. La nouvelle version est présentée dans l'évaluation de la sûreté après la fermeture [4] compte tenu du nouvel inventaire de référence à la fermeture (tableau 3-7 du document [4]). Les éléments sélectionnés dans cet inventaire font l'objet d'une analyse transparente à la section 5.3.2.1.2 du document [4]. Les produits de filiation de l'uranium et du thorium (p. ex., le thorium 230, le polonium 210 et le plomb 210) ont été quantifiés dans les différentes matrices environnementales en tenant compte de la présence ou de l'absence de l'équilibre séculaire entre les radionucléides dans les chaînes de désintégration (voir la section 5.3.3.1 de [4]). La section 6 de l'évaluation de la sûreté après la fermeture [4] présente les résultats de l'étude des voies de contamination, dont une analyse des contaminants radiologiques présents dans l'environnement (section 6.2.2). On peut se procurer l'évaluation de la sûreté après la fermeture en s'adressant à ermstakeholder@cnl.ca. Références [1] Critères d'acceptation des déchets de l'installation de gestion des déchets près de la surface, 232-508600-WAC-003. [2] AIEA, General Safety Guide – 1, Classification of Radioactive Waste. [3] Groupe CSA, norme N292.0-19 : Principes généraux pour la gestion des déchets radioactifs et du combustible irradié, 2019. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND292	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* L'ÉIE décrit brièvement, à l'alinéa 2.2, la stratégie intégrée de gestion des déchets des LNC. Malheureusement, cette information n'inclut aucun échéancier intégré qui permettrait d'évaluer la disponibilité d'installations complémentaires, surtout pour les déchets de moyenne activité. Cette stratégie doit aussi prévoir les installations requises pour analyser et caractériser les déchets radioactifs, pour les trier correctement, pour les concentrer et les décontaminer, pour les transformer ou les solidifier au besoin, pour les emballer de manière sécuritaire, etc. Les mésaventures de plusieurs sites nucléaires étrangers confirment qu'il y a un grand risque à mal caractériser les déchets ou à ignorer leur provenance et leurs combinaisons possibles avec d'autres déchets : risques d'explosion, de réactions chimiques, de dégagement de chaleur et d'interaction nucléaire. De toute évidence, ces installations sont une composante essentielle du dépotoir projeté : celui- ci ne peut pas fonctionner sans elles. Nous ne comprenons donc pas le silence de l'étude d'impact sur les risques environnementaux de ces activités. Le Ralliement contre la pollution radioactive demande que le promoteur fournit un échéancier détaillé de la mise en service des autres installations de gestion des déchets qui offriront des solutions de rechange	La Stratégie de gestion intégrée des déchets (SGID) [1] peut être consultée sur le site www.cnl.ca/nsdf. On peut également en obtenir le texte en s'adressant à ermstakeholder@cnl.ca. L'objet de la version originale (Rév. 0) était de prendre en compte les différentes stratégies de gestion des déchets en vigueur aux LNC, d'en souligner les lacunes et de circonscrire les mesures qui permettraient d'améliorer le mode de gestion des déchets. Il s'agit d'un document dynamique qui, par conséquent, intègre progressivement les bonnes pratiques et dont les versions successives décriront comment ces stratégies seront améliorées et optimisées. La révision 1 a été publiée en février 2019. Les Laboratoires nucléaires canadiens ont élaboré la première version de la SGID en s'inspirant du document intitulé *Specification and Guidance on the Content and Format of an Integrated Waste Strategy* (nº ENG 01). Une fois cette version élaborée, un plan d'action a été développé pour combler les lacunes en matière de capacité et notamment pour améliorer l'acheminement de tous les déchets vers leur lieu de stockage. À mesure que ces lacunes sont comblées, des processus de gestion des déchets, de leur production à leur stockage, seront élaborés pour garantir la gestion sûre, fiable et prévisible de tous les déchets des LNC. Le projet d'installation de gestion des déchets près de la surface (IGDPS) n'inclut pas d'installation dédiée permettant la caractérisation des déchets. Les LNC ont élargi leur capacité à cet égard, notamment en construisant une nouvelle installation de caractérisation des déchets (ICD). L'ICD ne fait pas partie du projet d'IGDPS, mais elle fait office de plateforme pour le matériel et les processus de caractérisation et appuie donc, de ce fait, les activités de l'IGDPS en ce qui a trait aux exigences de caractérisation des déchets.

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		plus sécuritaires pour l'élimination des déchets « historiques » trop dangereux pour le dépotoir. Dans le cas où des installations sont essentielles au bon fonctionnement du dépotoir (comme l'unité de caractérisation, de tri et d'emballage des déchets), l'intervenant demande que les LNC les décrivent et qu'ils les incluent dans son analyse des risques et de l'impact environnemental du dépotoir.	Référence [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002.
CNL-ND293	Anna Tilman (August 11, 2017)	Is existing CRL asbestos inventories intended to be placed in the NSDF?	Yes, existing inventories of radioactively contaminated asbestos waste currently in storage are intended to be placed in the NSDF, provided they comply with all of the requirements of the NSDF Waste Acceptance Criteria [1]. As per Section 3.4 of the revised Waste Acceptance Criteria [1], the NSDF will accept radiologically contaminated asbestos waste. The land disposal of asbestos waste is consistent with Ontario Regulation 347 [2]. Asbestos is only a significant hazard if its fibres become airborne and are subsequently inhaled in high concentrations. When properly sealed and handled, asbestos waste poses very little hazard. The following are example requirements found in the WAC regarding asbestos waste: Asbestos Waste shall: • Be placed in an impermeable container, bag or liner of sufficient strength (minimum thickness is 0.15 mm [6 mil]) to accommodate the weight and nature of the waste; ○ The container, bag or liner must be sealed; ○ The container, bag or liner must be free from punctures, tears or leaks; ○ The external surfaces of the container, bag or liner must be free from asbestos waste • Asbestos Waste shall be segregated from other waste streams. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND294	William Turner (May 31, 2017)	3.2.1 - The EIS must provide an estimate of the quantity (categorized by IAEA waste class) of the "legacy radioactive wastes currently stored on the [ECM] Project site.	The most recently published (and publically available) *Inventory of Radioactive Waste* by Natural Resources Canada [1] presents the current volumes of radioactive waste in Canada. As of 2016, it was estimated that CNL has 531,443 m^3 of LLW under its control, excluding the Port Hope Area Initiative. Most of this volume has been consolidated at the Chalk River Laboratories (CRL) site. The term "legacy wastes" has been introduced to refer to the wastes that have been in storage at CRL for many decades, much of which are not currently located in modern radioactive waste management facilities. The current generation of nuclear professionals have effectively inherited the responsibility of dealing with this waste, which is why the word "legacy" is an appropriate description. The term does not refer to any specific class of waste, nor does the term describe the characteristics of the waste. All wastes proposed for disposal into the NSDF must meet the Waste Acceptance Criteria [2], to be in alignment with both the International Atomic Energy Agency (IAEA) GSG-1 [3] and CSA N292.0-19 [4] guidance for the classification of low-level waste. This is regardless if waste is produced by CNL operations & decommissioning activities, or if it already exists as "legacy wastes". References:

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			[1] Natural Resources Canada. Inventory of Radioactive Waste in Canada, 2016. https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/uranium-nuclear/17-0467%20Canada%20Radioactive%20Waste%20Report_access_e.pdf [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019
		International Standards and Guidance	
CNL-ND295	Greg Csullog (May 1, 2017)	**2.1 Introduction – 2-1:** IAEA Safety Glossary - storage: The holding of radioactive sources, spent fuel or radioactive waste in a facility that provides for their/its containment, with the intention of retrieval… … Storage is by definition an interim measure, and the term interim storage would therefore be appropriate only to refer to short term temporary storage when contrasting this with the longer term fate of the waste. Storage as defined in the EIS with regards to wastes should not be described as interim storage.	Canadian Nuclear Laboratories (CNL) uses the terminology of interim storage for low-level waste (LLW) in storage awaiting final disposition (disposal). The use of the term interim storage is also documented in Canadian Nuclear Laboratories Integrated Waste Strategy [1]). Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-00.
CNL-ND296	Greg Csullog (May 1, 2017)	**3.2.1.1 Waste Types – 3-7:** Has the NSDF Project compared its proposed/existing waste characterization and waste acceptance systems and methodologies to those in other countries, such as USA-Department of Energy RADIOACTIVE WASTE MANAGEMENT MANUAL? The DOE document would appear to be an appropriate starting point for comparison since many DOE sites, like CRL, the "*nature of… …operations is such that a wide variety of wastes are generated, and the variability in the wastes exceeds that associated with the routine operation of, for example, a large power reactor or an isotope user or producer*".	Canadian Nuclear Laboratories (CNL) has conducted benchmarking activities to a number of operational waste management and disposal facilities in Canada, the USA and Europe. The NSDF Waste Acceptance Criteria [1] was developed using multiple criteria, including Regulations and Standards, and benchmarking of similar facilities. The NSDF WAC [1] provides a list of low-level waste disposal facilities in Canada and the United States that are designed with similar physical waste acceptance criteria. Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Management Control Procedure (MCP) Standard [2] that has been submitted to Canadian Nuclear Safety Commission (CNSC) staff. The MCP describes characterization requirements for waste. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. Appendix A of CNL's waste characterization procedure includes several characterization resources and guidelines are referenced including the International Organization for Standardization (ISO) 21238 standard. It is worth noting that the revised waste characterization procedures have been designed to include aspects about NSDF to help guide waste generators. Waste characterization plans will be reviewed by the Waste Management Program to align with the waste reporting requirements documented in the WAC [1]. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Waste Characterization, 900-508600-STD-003.
CNL-ND297	Greg Csullog (May 1, 2017)	**3.2.2, p. 3.9:** Neither CNSC Regulatory Policy P-290 (CNSC 2004) nor Guide G-320 (CNSC 2006), both of which are cited in Section 1.4.2 of the EIS, ***Relevant*** Standards, Codes and Guidelines, indicate radionuclide limits for disposal facilities, therefore, in Canada, the regulatory body has not established limits for the disposal of long lived radionuclides.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1] available upon request by contacting ermstakeholder@cnl.ca).

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		If the two cited CNSC documents are relevant to the implementation and if radionuclides limits are a key element, how do the NSDF proponents justify the disposal of wastes having activity greater than 400 Bq/g, especially given IAEA GSG-1 specifies **400 Bq/g on average** for waste packages? This is particularly significant given the issue of subsidence and the fact that both the US and French examples cited in GSG-1 include measures against subsidence (US, waste stability; France, AGCV) to ensure the facilities retain their integrity – something that appears to be lacking for the NSDF mound. **Note from commenter**: IAEA General Safety Guide GSG-1, Classification of Radioactive Waste, states, "**The regulatory body should establish limits for the disposal of long lived radionuclides** on the basis of the safety assessment for the particular disposal facility. A limit of 400 Bq/g **on average** (and up to 4000 Bq/g for individual packages) for long lived alpha emitting radionuclides has been adopted in some States.	To reflect this change, Table 3.3.3-1 in section 3.3.3.2 of the final EIS provides updated limits for alpha-emitting radionuclides. Specifically the limit for alpha-emitting radionuclides in bulk waste and non-leachate controlled package waste has been reduced to 100 Bq/g, while the limit for alpha-emitting radionuclides in leachate controlled package waste has been reduced to 400 Bq/g; thus, meeting the guidance in International Atomic Energy Agency (IAEA) General Safety Guide GSG-1 [2], and CSA standard for the nuclear industry, N292.0-19 General Principles for the Management of Radioactive Waste and Irradiated Fuel [3]. Note that Section 3.4.1.7.1 of the final EIS discusses how the potential for differential settlement (subsidence) will be reduced in the engineered containment mound. The final EIS now recognizes CNSC REGDOC 2.11.1 Volume 3 [4] as a requirement of the project in Section 1.4.2, noting that REGDOC 2.11.1 Volume 3 has superceded Regulatory Guide G-320 [5]. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] International Atomic Energy Agency. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009. [3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [4] CNSC REGDOC-2.11.1, Waste Management, Volume III: Safety Case for Long-Term Radioactive Waste Management. [5] CNSC Regulatory Guide G-320, Assessing the Long Term Safety of Radioactive Waste Management.
CNL-ND298	David Raman (August 3, 2017)	What is the justification for the 4000 bq/g limit for alpha emitters and how is it verified? Where would the equipment for such verification activity be located and should it not be included in the scope of this environmental impact statement?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1] available upon request by contacting ermstakeholder@cnl.ca). To reflect this change, Table 3.3.3-1 in section 3.3.3.2 of the final EIS provides updated limits for alpha-emitting radionuclides. Specifically the limit for alpha-emitting radionuclides in bulk waste and non-leachate controlled package waste has been reduced to 100 Bq/g, while the limit for alpha-emitting radionuclides in leachate controlled package waste has been reduced to 400 Bq/g; thus, meeting the guidance in International Atomic Energy Agency (IAEA) General Safety Guide GSG-1 [2], and CSA standard for the nuclear industry, N292.0-19 General Principles for the Management of Radioactive Waste and Irradiated Fuel [3]. Section 3.3.2 of the final EIS discusses the waste approval, verification and acceptance process. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019

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CNL-ND299	Greg Csullog (May 1, 2017)	**3.2.2:** Intermediate level waste is defined by the IAEA as waste that contains long lived radionuclides in quantities that need a greater degree of isolation from the biosphere than is provided by near surface disposal", which should preclude them from the NSDF.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the revised EIS final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). With the removal of ILW from the proposed NSDF inventory, the NSDF meets the guidance in International Atomic Energy Agency (IAEA) document SSR-5 [2] which states that near surface disposal facilities are appropriate for LLW. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011.
CNL-ND300	Greg Csullog (May 1, 2017)	**3.6.1.1.2 Waste Acceptance Process - Note from commenter:** To what extent has the NSDF Project and waste operations taken into account the IAEA document: Strategy and Methodology for Radioactive Waste Characterization (2007)? The NSDF needs to provide a detailed description of the facilities, methodologies, and training in place or to be in place to gain this "detailed knowledge of the waste inventory" for the NSDF. So far in my review of the EIS, I have not seen such information. **Note**: Dr. Kerry Burns (AECL retiree) led the development of the methodologies and his staff conducted the characterization of the wastes proposed for the IRUS facility in the 1990s. Dr. Burns, in my opinion, is the most qualified person in Canada to assess the requirements for and the state of waste characterization in support of the NSDF. I recommend that Dr. Burns be contracted to review waste characterization and compliance monitoring at CRL. Given the importance of this issue, external oversight by such a highly qualified technical expert, whose expertise is directly in this area, is essential.	The International Atomic Energy Agency (IAEA) *Strategy and Methodology for Radioactive Waste Characterization* [1] is being used as a guidance document for waste characterization. The NSDF's waste acceptance is being developed to meet the waste acceptance requirements in the IAEA's *Disposal of Radioactive Waste* [2] and *Near Surface Disposal Facilities for Radioactive Waste* [3]. The NSDF Waste Acceptance Criteria (WAC) [4] was developed using multiple criteria, including Regulations and Standards, and benchmarking of similar facilities. The WAC radionuclide concentration limits [3] are derived from the guidance of both IAEA GSG-1 [5] and CSA N292.0-19 [6] Waste characterization plans will be reviewed by the Waste Management Program to align with the waste reporting requirements documented in the WAC [3]. The Canadian Nuclear Safety Commission (CNSC) also provides regulatory oversight of activities at the Canadian Nuclear Laboratories (CNL) sites including the NSDF Project. In September 2017, the CNSC completed a compliance inspection of the Near-Surface Disposal Facility (NSDF) Waste Characterization Process. Of the 6 actions and 14 recommendations, all have been addressed and closed. References: [1] IAEA, Strategy and Methodology for Radioactive Waste Characterization, IAEA-TECDOC-1537, March 2007. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011 April. [3] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014 March. [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [5] *Classification of Radioactive Waste*, GSG-1, International Atomic Energy Agency, 2009 [6] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019.
CNL-ND301	Greg Csullog (May 1, 2017)	**3.6.1.2 – 3-37:** Disposal regulations in the USA for a near surface disposal facility require waste to be structurally stable, not just emplaced in manner that limits future settlement. If preventing/limiting NSDF subsidence is a performance objective, the emplacement strategy to limit future settlement of the waste would appear to be inadequate if the NSDF does not have sufficient	Waste from demolished structures is commonly disposed as bulk materials in comparable international facilities and the NSDF is designed for their disposal as well. The NSDF, like many other engineered containment mounds, is specifically designed to address the waste placement and compaction requirements to ensure the emplaced waste and void fill (e.g., sand, soil or grout) are made to be stable. The

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		inherent structural stability (in other words, it is likely to collapse). I cannot find enough info about the facility's design in the EIS. Obviously the project has considered settlement to be an issue but the EIS does not say why, what that implies, or how the project plans to address possible facility subsidence	NSDF detailed design includes a Waste Placement and Compaction Plan [1] that addresses the placement objectives as well as the general arrangements by waste type to avoid potential conditions that could lead to subsidence or differential settlement. Canadian Nuclear Laboratories has conducted an analysis examining the effects of settlement caused by wood within the Engineered Containment Mound (ECM) [2]. The settlement analysis shows that the ECM can accept the anticipated volumes of wood and organic material and still achieve long-term stability with minimal settlement and no slope reversals on the final cover. Inspections and monitoring routines are in place through the operational and the closure phases, as well as into the Institutional Control period, to monitor and repair any subsidence issues. Section 3.2 of the final Environmental Impact Statement (EIS) and its sub-sections describe the activities during the noted phases. Additional information has been included in the final EIS regarding this key performance feature. Specifically, Section 3.4.1.7 of the final EIS discusses waste placement. References: [1] Waste Placement and Compaction Plan, B1550-508600-PLA-001. [2] Canadian Nuclear Laboratories Near Surface Disposal Facility Technical Memorandum Analyzing the Effects of Settlement Caused by Wood within the Engineered Containment Mound, B1550-508600-021-000.
CNL-ND302	Greg Csullog (May 1, 2017) Anna Tilman (June 22, 2017) Cody Cuthill (August 4, 2017) OFWCA (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **3.8 Management of Waste Generated by the Project – 3-59:** As is the case throughout the EIS, a key element is not mentioned, that is, how will the wastes be characterized? These non-routine wastes, like decommissioning and remediation wastes, cannot be profiled and require case-by-case characterization. CNL's waste classification system does not match those of the International Atomic Energy Agency nor do the disposal methods (please see Cody Cuthill's submission from August 4 for the full classification and disposal method recommendations, p. 2-3). Because the classification systems do not match those of the IAEA, thus it is unclear which radioactive wastes they will dispose of. Instead of using the IAEA waste classifications (low-level, intermediate-level, high-level) in Table 3.2.1-1 of the EIS (p.112), CNL describes waste types and the volumes of each type of waste. Each waste should indicate whether they have short-lived or long-lived radionuclides. Hiding behind percentages and classifications that are not consistent with international standards is not transparent. To repeat "safe" one hundred times in the EIS does not make it safe. This repetitive tactic creates public distrust. Information about the quantity and the identity of all radioactive wastes must be made available. CNL must provide a comprehensive inventory of all wastes to be included. It is important to note that the wastes (LLW and some ILW) for emplacement in the proposed NSDF are not predominately short-lived, as clearly indicated by their reference inventory.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1] available upon request by contacting ermstakeholder@cnl.ca). Section 3.3.2 of the final EIS discusses the waste approval, verification and acceptance process. All wastes must be compliant with CNL's Waste Management Program (discussed in Section 3.5.2.3 of the final EIS) and this includes characterizing waste to ensure it meets the Waste Acceptance Criteria [2] (available at www.cnl.ca/nsdf or by contacting ermstakeholder@cnl.ca). These requirements are discussed in Section 3.3.3 of the final EIS. All wastes proposed for disposal into the NSDF must meet the NSDF WAC [2], to be in alignment with both the International Atomic Energy Agency (IAEA) GSG-1 [3] and CSA N292.0-19 [4] guidance for the classification of low-level waste. The classifications in Table 3.3.1-1 of the final EIS are intended to provide a general description of the types and forms of LLW that will be accepted. Table 3.3.1-2 provides the Licensed Inventory of radionuclides at the time of emplacement and includes the half-life, the predominant decay emission, activity and average concentration in the engineered containment mound (ECM). The long-term safety of the facility has been demonstrated in the Post-Closure Safety Assessment (Post SA) [5] and discussions to build confidence in the long term performance are provided in Section 6.4 of the Safety Case [6] (both documents available upon request by contacting ermstakeholder@cnl.ca). References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.

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		Furthermore, no such existing facility has been in service anywhere for a long enough period to assess its long-term safety.	[2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [5] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [6] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001.
CNL-ND303	David Thompson (April 11, 2017) Dr. J.R. Walker (May 9, 2017) Janey Bullivant (May 13, 2017) Kathy Eisner (May 12, 2017) OFWCA (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* If CNL wish to illustrate that "a near surface disposal facility is a suitable and technically feasible means of disposing of LLW and ILW", then CNL should cite examples that demonstrate where the proposed technology (engineered containment mound) has been used successfully to dispose of both low-level and intermediate level wastes. The examples must show that a significant public exposure risk does not exist after the period of institutional control or after the design life of the cited facility. This proposal is absolutely against the International Atomic Energy Agency's standards for permanent disposal of intermediate level nuclear waste. The sites referred to in CNL's project description do not appear to be comparable. - Has the same type of NSDF been built anywhere in the world? - Where? And are the conditions (climate etc.) the same? Is there any other NSDF site surrounded by river water (a major river where millions depend on it)? - How can we know how an NSDF will function after 100, 200, 500 years?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1] available upon request by contacting ermstakeholder@cnl.ca). It is recognized by the International Atomic Energy Agency (IAEA) that a near surface facility is an appropriate means of disposing of LLW [2]. In Canada, there are currently two long-term management waste management facility (LTWMF) in operation, licenced to store LLW: • Port Hope LTWMF (capacity = 1,200,000 m^3) • Port Granby LTWMF (capacity = 774,000 m^3). Both of these sites have similar climate conditions (e.g., wet climate, comparable average annual precipitation) as the Chalk River Laboratories and are within 1 km of Lake Ontario and other local water bodies. There are three additional examples of long-term waste disposal facilities in the USA. They are used to store LLW, are located in regions with similar climates as the Chalk River site (all sites have greater average annual precipitation), and are between 0.5 to 2.4 km of a running body of water (river/stream): • Portsmouth On-site Waste Disposal Facility in Ohio (under construction) • Fernald On-site Disposal Facility in Ohio • Environmental Management Waste Management Facility (EMWMF) at Oakridge National Laboratories in Tennessee. The project recognizes that high density polyethylene (HDPE) geomembranes have only been used for several decades. Consequently, a well-established laboratory test method was used to demonstrate the service life of the geomembrane for the NSDF. The work included a series of laboratory tests and analyses. The results conclude that preferred NSDF geomembrane will exceed required design life of 550 years (NSDF Geomembrane Relative Performance Report [3]). Conservatism were applied to address uncertainty: • Several leachates were utilized in the tests. These included Municipal Solid Waste (MSW) leachate which is more harmful to the geomembrane long-term performance than the NSDF leachates. • In the laboratory test, the geomembrane samples were exposed to the leachate in both sides, which is more harmful than their application in the field. Some studies confirm that the geomembrane service-life estimated such a laboratory test is more conservative than the large-scale tests considering multiple components of barrier systems.

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

Number	Source	Comment Summary (all original submissions can be found on the Canadian Environmental Assessment Registry, reference #80122) Synthèse des commentaires (toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)	Response (to be completed by CNL) Réponse (à remplir par la LNC)
			The design of the engineered containment mound (ECM) base liner and final cover systems has incorporated multiple barriers systems comprising of natural and synthetic materials. The design of the ECM liner system has incorporated the recommendations of the Subject Matter Experts from academic institutions and industries, as well as the recent existing research & development results. Compacted Clay Liner (CCL) and Geosynthetic Clay liner (GCL) are part of the base liner system. A revised Post-Closure Safety Assessment (PostSA) [4] has been prepared and now utilizes the NSDF reference inventory at closure to predict radiological dose to humans and contaminant concentrations in the environmental media (which are in turn used to predict radiological dose to non-human biota in the Ecological Risk Assessment (EcoRA) [5]. The modeling and calculations within the PostSA have included the following: • The expected duration of the institutional control period in the Normal Evolution Scenario is at least 300 years. Canadian Nuclear Laboratories (CNL) recognizes that the institutional control will continue for as long as necessary and that 300 years has been used for planning purposes. • A sensitivity case examines the impact of a shorter period of institutional control of only 100 years as opposed to 300 years (i.e., allowing for less radioactive decay to occur before a given post-institutional event occurs). Examining an alternative institutional control period provides useful perspective on the role the institutional control period plays in terms of doses to the receptor. The predicted concentrations and dose to human receptors can be found within Section 6 of the PostSA [5]. The predicted dose to non-human biota can be found within Section 5 of the EcoRA [5]. All predicted effects for human health and radioactivity in the environment are well below the regulatory criteria during post-closure phase. The results provide perspective that long-term safety of the NSDF is not reliant on institutional controls but primarily due to the inventory being restricted to LLW and the engineered barriers ensuring containment for an appropriate length of time to allow for radiologic decay. Discussions to build confidence in the long term performance are provided in Section 6.4 of the Safety Case [6]. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [3] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024 [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004 [5] Near Surface Disposal Facility Ecological Risk Assessment. 232-121240-ASD-001. [6] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001.
CNL-ND304	Greg Csullog (May 1, 2017) John Jackson (Nuclear Waste Watch and OFWCA)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **Figure 2.2-2 – 2-3:** The EIS needs to address - What is the distribution, by IAEA classes for wastes "as-managed"?	Figure 2.2-2 in Section 2.2 has been revised in the Final EIS to change the term "Mixed and hazardous waste" to "Hazardous Waste". The figure represents the waste classes in storage by volume. The comment on waste distribution "as managed" is acknowledged. The waste storage types are based on the waste classes. The NSDF will contain only low-level waste (LLW). Waste that is co-mingled with intermediate level waste (ILW) will not be accepted for disposal in the NSDF.

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	(May 15, 2017) Northwatch (August 16, 2017)	This would require a detailed assessment of historical records to see how much LLW-ILW co-mingling exists (as well as clarification of what the "legacy waste management areas" are). The problem with this approach would be the lack of verifiable characterization data for perhaps a majority of the waste currently in storage. Information that CNL has made available on the waste inventory in their EIS is so limited that it is impossible for us or a hearing panel to make judgements on the environmental effects that the proposed facility could have. Northwatch highlighted that in the earlier versions of the project descriptions and in the draft EIS CNL failed to clearly set out the various sources of waste; in the EIS it has failed to distinguish clearly between wastes that are already in storage or will be generated through a) cleanup and remediation at the CNL property, b) cleanup and remediation at other AECL properties, i.e. Rolphton and Whiteshell, c) from other AECL liabilities, i.e. Douglas Point and Gentilly 1, and d) from other sources, including commercial sources. Further, it has failed to differentiate between "commercial sources" which are institutional wastes (e.g. hospitals and universities) versus commercial and industrial wastes (e.g. the energy sector). It has also failed to differentiate between wastes that are in Canada, wastes that are being returned to Canada, and wastes from international sources.	The term "legacy waste management areas" has been introduced to refer to the wastes that have been in storage at CRL for many decades, much of which are not currently located in modern radioactive waste management facilities. The term does not refer to any specific class of waste, nor does the term describe the characteristics of the waste. Canadian Nuclear Laboratories (CNL) has a Waste Characterization Program, governed by a Management Control Procedure (MCP) [2] that has been submitted to Canadian Nuclear Safety Commission (CNSC) staff. The MCP describes characterization requirements for waste. All parameters (e.g., minimum number of samples and confidence intervals), are determined through a data quality objectives process. Appendix A of CNL's waste characterization procedure includes several characterization resources and guidelines are referenced including the International Organization for Standardization (ISO) 21238 standard. It is worth noting that the revised waste characterization procedures have been designed to include aspects about NSDF to help guide waste generators. All waste proposed for disposal at the NSDF will be characterized in order to compare the wastes to the limits of the Waste Acceptance Criteria [3]. The information on the waste inventory is provided in Section 3.3 of the final EIS. Additional information on the NSDF inventory is available in the supporting documents: NSDF Reference Inventory Report [1], NSDF Inventory of Constituents of Potential Concern (COPC) [4] and NSDF Waste Acceptance Criteria [3]. In Section 2.2.1.3 of the final EIS states: "Historically, low-level waste (LLW) has been stored on Canadian Nuclear Laboratories (CNL) managed sites. At Whiteshell Laboratories (WL), Douglas Point and Gentilly 1 prototype reactor sites, LLW that is not being disposed in-situ will be packaged and shipped to CRL for placement in storage pending availability of the NSDF Project. The exceptions to this are the LLW arising from the Nuclear Power Demonstration (NPD) and WR-1 facilities, which are proposed to be decommissioned in situ" Section 3.3.1.3 outlines that the licensed inventory below (Table 3.3.1-2) establishes a representative radionuclide inventory by considering waste already in storage and waste forecasts from environmental remediation and decommissioning projects data to predict an assumed total volume of waste at the NSDF at time of closure. All LLW that is expected to be generated has been meticulously described, or "characterized", before its generation to ensure the cumulative total inventory of the NSDF Project is tracked against the licensed inventory. Section 2.3 of the final EIS states: "Approximately 90% of the LLW will originate at the Chalk River Laboratories (CRL) site, with 5% of the LLW coming from decommissioning at WL in Manitoba and other Atomic Energy of Canada Limited (AECL) nuclear liabilities, and 5% from other Canadian sources, such as universities and hospitals. Wastes from international sources are not anticipated to be disposed of in the NSDF." Section 3.2.2 and 3.3.1 of the final EIS notes that CNL considers commercial waste sources to include hospitals and universities. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Waste Characterization Management Control Procedure 900-508600-MCP-001. [3] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

Number	Source	**Comment Summary** (all original submissions can be found on the Canadian Environmental Assessment Registry, reference #80122) **Synthèse des commentaires** (toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)	**Response (to be completed by CNL)** **Réponse (à remplir par la LNC)**
			[4] Non-Radiological Inventory of Constituents of Potential Concern (COPC), 232-508600-TN-007.
CNL-ND305	David Herbert (May 2, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017) Valerie Needham (August 15, 2017) Laurie Wagner (August 15, 2016) Robert Shellard (August 14, 2017) Ralliement contre la pollution radioactive (August 3, 2017) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017) Elssa Martinez (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] It involves a proposed containment method, particularly its 'near surface' nature, that is deemed inappropriate by the IAEA for intermediate waste and is perforce unproven for safe, very long-term containment of radioactive material. It is also built on an unprecedented scale, some four times the size of the recommended capacity for the storage of low and intermediate waste. CNL calls the proposal a Near Surface Disposal Facility which includes the Engineered Containment Mound (ECM), the leachate collection system, the Waste Water Treatment Plant (WWTP), several leachate collection ponds, and other service buildings. The ECM itself will be enormous covering almost sixteen hectares and will be 20-25 metres in height (CNL Responses Dec.16/2016 p.58). **This use of the term "near surface disposal facility" does not conform to the IAEA's use of this term.** The EIS should acknowledge that the proposal is not a "near surface disposal facility," but a landfill type facility with a mound whose summit would project some 25 meters above its base. Note: The IAEA deems landfilling of radioactive wastes acceptable only for very low-level radioactive wastes or wastes with very short half-lives that will decay to stable forms during the period in which the landfill is capable of isolating wastes from the environment. The proposed landfilling of intermediate-level radioactive wastes, or large amounts of low-level radioactive wastes with long half-lives, does not conform to IAEA Safety Standard SSR-5. Environmental impacts of the project should be assessed accordingly. **The EIS ignores the *IAEA Safety Standard for Disposal of Radioactive Waste* (SSR-5).** This is the preferred means for long-term management of low-level radioactive wastes according to IAEA *Safety Standard SSR-5.* [Français] Il s'agit d'une méthode de confinement proposée, en particulier sa nature « près de la surface », qui est jugée inappropriée par l'AIEA pour les déchets de moyenne activité et qui n'a pas encore fait ses preuves pour le confinement sûr et à très long terme des matières radioactives.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]) available on request by contacting ermstakeholder@cnl.ca). Near-surface disposal of LLW is consistent with International Atomic Energy Agency (IAEA) guidelines [2]. Table 2.5.2-1 was added to the final EIS comparing CNL's proposed NSDF to other near surface facilities. The table shows that the size of the NSDF is comparable to other near surface facilities and is smaller than most. The IAEA defines a near surface disposal facility as a facility for radioactive waste disposal located at or within a few tens of meters of the Earth's surface [3]. Based on this definition, the Engineered Containment Mound (ECM) is a near surface disposal facility as it is within a few tens of meters of the earth's surface. Canadian Nuclear Laboratories (CNL) has used IAEA SSR-5 to demonstrate the safety of the Near Surface Disposal Facility. Table B-3 of the Safety Case [4] (available upon request by contacting ermstakeholder@cnl.ca) identifies the CNL documents where specific SSR-5 [2] requirements are met. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] IAEA Safety Standards, Disposal of Radioactive Waste, Specific Safety Requirements, SSR-5. [3] IAEA Safety Glossary 2018 Edition. [4] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001. [Français] Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire de déchets destinés à l'IGDPS et y ont apporté des modifications. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été officiellement annoncée par les LNC le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage permanent des DMA (section 2.2.2.1 de l'EIE définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [1]) (le texte de la Stratégie peut être obtenu sur demande en s'adressant à ermstakeholder@cnl.ca). La gestion près de la surface des DFA est conforme aux directives de l'Agence internationale de l'énergie atomique (AIEA) [2]. Le tableau 2.5.2-1 a été ajouté à l'EIE définitive pour fournir une comparaison entre l'IGDPS proposée par les LNC et d'autres installations de gestion près de la surface. Il indique que l'IGDPS est d'une taille comparable à celle d'autres installations de ce type et qu'elle est plus petite que la plupart. Selon la définition de l'AIEA, une installation de gestion des déchets près de la surface est une installation de gestion des déchets radioactifs d'une hauteur de quelques dizaines de mètres ou moins au-dessus de la surface du sol [3]. Compte tenu

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

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		Elle est également construite à une échelle sans précédent, environ quatre fois plus grande que la capacité recommandée pour le stockage des déchets radioactifs de faible et de moyenne activité. Les LNC appellent la proposition une installation de gestion des déchets près de la surface qui comprend un monticule de confinement artificiel (MCA), un système de collecte du lixiviat, une usine de traitement des eaux usées (UTEU), plusieurs bassins de collecte du lixiviat et d'autres bâtiments de service. Le MCA lui-même sera énorme et couvrira près de seize hectares et aura une hauteur de 20 à 25 mètres (réponse des LNC datée du 16 décembre 2016 p.58). **L'utilisation de l'expression « installation de gestion des déchets près de la surface » n'est pas conforme à l'utilisation de ce terme par l'AIEA.** L'EIE devrait reconnaître que la proposition n'est pas une « installation de gestion des déchets près de la surface », mais une installation de type décharge avec un monticule dont le sommet s'élèverait à quelque 25 mètres au-dessus de sa base. Remarque : L'AIEA considère que la mise en décharge de déchets radioactifs n'est acceptable que pour les déchets radioactifs de très faible activité ou les déchets à très courte demi-vie qui se décomposeront en formes stables pendant la période où la décharge est capable d'isoler les déchets de l'environnement. La mise en décharge proposée de déchets radioactifs de moyenne activité ou de grandes quantités de déchets radioactifs de faible activité à longue demi-vie n'est pas conforme à la norme de sûreté SSR-5 de l'AIEA. Les impacts environnementaux du projet doivent être évalués en conséquence. **L'EIE ne tient pas compte de la norme de sûreté – *Stockage définitif des déchets radioactifs* (SSR-5)** de l'AIEA. C'est le moyen privilégié pour la gestion à long terme des déchets radioactifs de faible activité selon la *norme de sûreté SSR-5* de l'AIEA.	de cette définition, le monticule de confinement artificiel (MCA) est bien une installation de gestion des déchets près de la surface puisque sa hauteur est de moins de quelques dizaines de mètres au-dessus de la surface du sol. Les Laboratoires nucléaires canadiens (LNC) se sont appuyés sur la norme SSR-5 de l'AIEA pour attester la sûreté de l'installation de gestion des déchets près de la surface. Le tableau B-3 de l'analyse de la sûreté [4] (on peut obtenir le document sur demande en s'adressant à ermstakeholder@cnl.ca) indique les documents des LNC où les exigences spécifiques de la norme SSR-5 [2] sont remplis. Références [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [2] AIEA, Normes de sûreté, Stockage définitif des déchets radioactifs, Prescriptions de sûreté particulières, SSR-5. [3] AIEA, Safety Glossary, édition 2018. [4] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001.
CNL-ND306	Greg Csullog (May 1, 2017)	**Figure 2.2-2 – 2-3:** The EIS needs to address - How did AECL/CNL derive Figure 2.2-2 given the lack of characterization data and the fact that historically, and maybe even now, waste management operations used the WI Program waste class codes and not the IAEA's waste classification scheme?	The pie charts in Figure 2.2-2 of the Environmental Impact Statement (EIS) represent estimates based on the best available information. Figure 2.2-2 was derived using the characterization data available found in CNL's Waste Inventory Program, version 3 (WIP-III). The disposal code of radioactive waste in WIP-III is based on radionuclide concentration (like the International Atomic Energy Agency (IAEA) waste classification); therefore, the disposal code can generally be used to infer a waste classification. The waste with known characterization information was then extrapolated to be inclusive of the other radioactive waste in storage that was either without or with limited waste characterization information. When the radionuclide inventory was assembled in the NSDF Reference Inventory Report [1], the assigned waste codes of the waste (from WIP III) were no longer used and the radionuclide activity of individual waste packages (utilizing sum of fractions) was analysed. Reference: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND307	Greg Csullog (May 1, 2017)	**Comments on Performance Assessment Document (as referenced in EIS): 10.1 Inventory:** The recommended limit for the disposal of long lived radionuclides is 400 Bq/g on average, with exceptions for individual packages at 4,000 Bq/g. The project needs to be clear as to whether or not it is adhering to the 400 Bq/g on average limit – that is not clear from Section 10.1, which is part of conclusions for document 232-509240-ASD-001.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1].

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		As a reminder, IAEA GSG-1 [ ] states, "The regulatory body should establish limits for the disposal of long lived radionuclides on the basis of the safety assessment for the particular disposal facility. A limit of 400 Bq/g on average (and up to 4000 Bq/g for individual packages) for long lived alpha emitting radionuclides has been adopted in some States [10–12]."	To reflect this change, Table 3.3.3-1 in section 3.3.3.2 of the final EIS provides updated limits for alpha-emitting radionuclides. Specifically the limit for alpha-emitting radionuclides in bulk waste and non-leachate controlled package waste has been reduced to 100 Bq/g, while the limit for alpha-emitting radionuclides in leachate controlled package waste has been reduced to 400 Bq/g; thus, meeting the guidance in International Atomic Energy Agency (IAEA) General Safety Guide GSG-1 [2], and CSA standard for the nuclear industry, N292.0-19 General Principles for the Management of Radioactive Waste and Irradiated Fuel [3]. Note that the Performance Assessment has been replaced by the Post-Closure Safety Assessment [4]. Section 3.2.3 of the Post-Closure Safety Assessment [4], clearly indicates that the NSDF reference inventory adheres to the guidance in IAEA General Safety Guide GSG-1 [2]. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004.
CNL-ND308	Concerned Citizens of Renfrew Country (Ole Henrickson) (July 3, 2017) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The IAEA emphasizes that waste – with larger quantities of long-lived radionuclides – must be placed in geological facilities, because of the vulnerability of near surface facilities to human intrusion […]. [CNL quotes from page 18 of the 2014 IAEA document, *Near surface disposal facilities for radioactive waste*, Specific Safety Guide No. SSG-30.] The IAEA recommends that in order to account for human intrusion, "the adequacy of the limitations placed on the radioactive inventory should be assessed and confirmed, principally in terms of allowable quantities of long-lived radionuclides in the waste packages." The IAEA states clearly that "the amount of long lived radionuclides that can be disposed of in the near surface disposal facility should be limited (IAEA 2014, p. 27). The IAEA recommendations should be adopted by the Federal government to limit the levels of radiation permitted in an NSDF. [Français]	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]. Note that the comment refers to International Atomic Energy Agency (IAEA) SSG-30; however, the correct reference would be SSG-29 [2]. With the removal of ILW from the proposed NSDF inventory, the proposed NSDF Project meets the guidance in IAEA Specific Safety Guide SSG-29 [2] and IAEA document SSR-5 [3] both of which state that near surface disposal facilities are appropriate for LLW. In accordance with IAEA SSR-5, paragraph 5.11[3], the waste acceptance criteria have been reduced to limit any consequences of human intrusion to within the dose acceptance criteria. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002 [2] IAEA Safety Standards, Near Surface Disposal Facilities for Radioactive Waste, Specific Safety Guide, SSG-29. [3] IAEA Safety Standards, Disposal of Radioactive Waste, Specific Safety Requirements, SSR-5. [Français] Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire de déchets destinés à l'IGDPS et y ont apporté des modifications. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été officiellement annoncée par les LNC

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		L'AIEA souligne que les déchets – avec de plus grandes quantités de radionucléides à longue période – doivent être placés dans des installations géologiques, en raison de la vulnérabilité des installations près de la surface à l'intrusion humaine (....). [Les LNC citent la page 18 du document de l'AIEA de 2014, *Near surface disposal facilites for radioactive waste*, Specific Safety Guide No. SSG-29 (en anglais seulement).] L'AIEA recommande que, pour tenir compte de l'intrusion humaine, [traduction] « l'adéquation des limites imposées à l'inventaire radioactif soit évaluée et confirmée, principalement en termes de quantités admissibles de radionucléides à longue période dans les emballages de déchets ». L'AIEA indique clairement que [traduction] « la quantité de radionucléides à longue période qui peuvent être éliminés dans l'installation de gestion près de la surface devrait être limitée » (AIEA 2014, p. 27). Les recommandations de l'AIEA devraient être adoptées par le gouvernement fédéral, visant à limiter les niveaux d'émission de radiation permise pour l'IGDPS.	le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage permanent des DMA (section 2.2.2.1 de l'EIE définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [1]). Remarquons que le commentaire renvoie à la norme SSG-30 de l'Agence internationale de l'énergie atomique, mais que la référence correcte est, en fait, la norme SSG-29 [2]. Comme les DMA ont été retirés de l'inventaire proposé pour l'IGDPS, le projet remplit les critères énoncés dans la norme SSG-29 [2] et la norme SSR-5 [3] de l'AIEA : les deux attestent que les installations de gestion près de la surface conviennent aux DFA. Conformément au paragraphe 5.1 de la norme SSR-5 de l'AIEA [3], les critères d'acceptation des déchets ont été réduits pour limiter les conséquences éventuelles de toute intrusion humaine à des seuils inférieurs aux doses acceptées. Références [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [2] AIEA, Safety Standards, Near Surface Disposal Facilities for Radioactive Waste, Specific Safety Guide, SSG-29. [3] AIEA, Normes de sûreté, Stockage définitif des déchets radioactifs, Prescriptions de sûreté particulières, SSR-5.
CNL-ND309	[Concerned Citizens of Renfrew Country (Ole Henrickson)](#) (July 3, 2017)	International experts may find it difficult to understand how the NSDF proposal could have been advanced in an IAEA member state. Contributing factors may include: • the Government of Canada's failure to adopt the IAEA's waste classification scheme; • the absence of effective national-level policies and legislation governing radioactive waste management (with the possible exception of spent fuel); and • the Government of Canada's failure to develop and consult on an integrated strategy for managing its own "historic" and "legacy" wastes, which constitute the vast majority of the inventory of low- and intermediate-level wastes in Canada.	The Canadian Nuclear Safety Commission (CNSC) regulatory framework for radioactive waste management is Framework for Radioactive waste Management and Decommissioning in Canada [1]. This regulatory framework recognizes that there are four broad categories of radioactive waste found in Canada [1]: • Low-level radioactive waste (LLW). • Intermediate-level radioactive waste (ILW). • High-level radioactive waste (HLW). • Uranium mine and mill waste. The International Atomic Energy Agency (IAEA) classification of radioactive waste [2] is: • Exempt waste. • Very short lived waste (VSLW). • Very low-level waste (VLLW). • Low-level radioactive waste (LLW). • Intermediate-level radioactive waste (ILW). • High-level radioactive waste (HLW). • Uranium mine and mill waste. The CNSC's REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste* (currently under development) [3], has a waste classification that aligns with the IAEA's waste classification [2]. Canadian Standards Association (CSA) standards are an important part of the CNSC's regulatory framework and complement regulatory documents that are developed by CNSC staff [1]. The Chalk River Laboratories' Licence Condition Handbook [4] has licensing basis publications for the safety control area Waste Management that includes CSA's General Principles for the Management of Radioactive Waste and Irradiated Fuel [5]. This CSA standard [4] contains a waste classification that aligns with the IAEA's waste classification [2] and CNSC's waste classification in [1] and [3].

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			The NSDF will dispose of LLW and the waste classification of LLW for disposal in the NSDF aligns with Canadian framework [1], [3], international guidance [2] and Canadian standards [4]. In accordance with *Canada's Radioactive Waste Policy Framework* [6] and [1], the waste producers and owners of radioactive waste are responsible, in accordance with the principle of "polluter pays", for the funding, organization, management and operation of disposal and other facilities required for their wastes. The framework recognizes that arrangements may be different for the four broad categories of radioactive waste found in Canada [1]. In the interest of effectively managing Atomic Energy of Canada Limited's (AECL) nuclear liabilities, Canadian Nuclear Laboratories (CNL) and AECL are working actively at strategic and operational levels to identify strategies and solutions for management of the entire life cycle of all radioactive waste classifications including low-level waste (LLW), intermediate level waste (ILW), high level waste (HLW), hazardous waste and clean (non-radiological) waste. Aligned to this, CNL has developed an Integrated Waste Strategy [7] that concisely details a cradle to grave approach for all CNL-managed radioactive wastes, from generation to disposal. The Integrated Waste Strategy [7] is based on the inventory of AECL waste and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. References: [1] CNSC, Waste Management: Framework for Radioactive Waste Management and Decommissioning in Canada, REGDOC-2.11, ISBN 978-0-660-28841-3, 2018 December. [2] IAEA, Classification of Radioactive Waste, GSG-1, STI/PUB/1419, 2009 November. [3] CNSC, Waste Management, Volume I: Management of Radioactive Waste, REGDOC-2.11.1, Draft, 2019 March. [4] CNSC, Licence Conditions Handbook for Chalk River Laboratories, NRTEOL-LCH-01.00/2028 (CRL-508760-HBK-002), Revision 1, 2019 February 25. [5] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [6] Radioactive Waste Policy Framework, https://www.nrcan.gc.ca/energy/energy-sources-distribution/uranium-nuclear-energy/radioactive-waste/radioactive-waste-policy-framework/7725 (accessed on 2020/10/27). [7] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND310	Concerned Citizens of Renfrew Country (Ole Henrickson) (July 3, 2017) CCNR (August 16, 2017) David Prentice (August 16, 2017) Michael Nogas (August 15, 2017) Jeff Kelly (August 15, 2017) Alex Thomson (August 16, 2017) Richard Duff	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* Radioactive exposures to humans as a result of intrusion would exceed currently allowed limits by a large margin. Acceptance of the proposed NSDF project by Canadian regulatory authorities would violate international safety standards for radioactive waste disposal. Given that the Government of Canada is responsible for 95% of the national inventory of nearly 2.4 million cubic meters of low and intermediate radioactive waste, the absence of detailed policies and more appropriate strategies for managing these federal nuclear liabilities is deeply troubling. Canada lacks any policy or strategy on how radioactive waste is stored so a proponent is free to propose any project if the can prove (to its captured regulator) its proposal is safe. This is a bad way to govern nuclear industries and waste projects, Canada needs to develop policies, strategies and regulations for nuclear waste, as recommended by the IAEA and as implemented by many other countries. In this regulatory and strategic vacuum CNL is now positioning itself to reduce costs, meet deadlines, and accrue	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]. With the removal of ILW from the proposed NSDF inventory, the NSDF meets the guidance in International Atomic Energy Agency (IAEA) document SSR-5 [2] which states that near surface disposal facilities are appropriate for LLW. The Post-Closure Safety Assessment [3] has analysed Human Intrusion scenarios for the Near Surface Disposal Facility and demonstrated that there are no significant radiation dose consequences from any of the scenarios and that the regulatory dose limit for a member of the public of 1 mSv/yr are met. Canadian Nuclear Laboratories (CNL) works within the existing national and international policies and guidance on radioactive waste management and disposal. All wastes proposed for disposal into the NSDF must meet the Waste

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	(August 16, 2017) Virginia MacLatchy (August 16, 2017) Susan Parks (August 16, 2017) Patrick Miller (August 16, 2017) Mike Schreiner (August 16, 2017) Durham Nuclear Awareness (August 16, 2017) Sharon Thorne (August 16, 2017) Lynn Jones (Aug 16, 2017)	bonuses by increasing Canada's future waste issues with the NSDF project. As this project was originally proposed, a part of the Nuclear Legacy Liabilities Program and similar in design except it was meant for Very Low Level Waste, the current project with its plans for intermediate waste are the results of this lack of policy in Canada and the privatization of the Chalk River site. CCNR believes that the Government of Canada needs to develop a clear set of policy guidelines governing the long-term management of radioactive wastes, based on the precautionary principle. As a starting point, CCNR favours the five principles that have been laid down by the Anishinabek Nation and the Iroquois Caucus in their Joint Declaration on the Transportation and Abandonment of Radioactive Wastes: [see http://ccnr.org/Joint_Declaration_2017.pdf] See pages 4-5 of Ole Henrickson's submission from July 3, and the Canadian CCNR's (Glen Edwards) submission from August 16 (p. 3-4) for more context.	Acceptance Criteria [4], to be in alignment with both the IAEA GSG-1 [5] and CSA N292.0-19 [6] guidance for the classification of low-level waste. In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. For Intermediate and Low Level Waste, nuclear waste owners are responsible for developing strategies and plans to effectively manage the wastes that are generated as a consequence of producing energy, advancing science and medicine for the benefit of Canadians. In the interest of effectively managing Atomic Energy of Canada Limited's (AECL) nuclear liabilities, Canadian Nuclear Laboratories (CNL) and AECL are working actively at strategic and operational levels to identify strategies and solutions for management of the entire life cycle of all radioactive waste classifications including low-level waste (LLW), intermediate level waste (ILW), high level waste (HLW), hazardous waste and clean (non-radiological) waste. Aligned to this, CNL has developed an Integrated Waste Strategy [1] that concisely details a cradle to grave approach for all CNL-managed radioactive wastes, from generation to disposal. The Integrated Waste Strategy is based on the inventory of AECL waste and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002 [2] IAEA Safety Standards, Disposal of Radioactive Waste, Specific Safety Requirements, SSR-5 [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004 [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003 [5] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [6] CSA Group. CSA N292.0-19 General principles for the management of radioactive waste and irradiated fuel
CNL-ND311	Dr. J.R. Walker (May 9, 2017)	With respect to the safety of radioactive waste management, the Joint Convention has General Safety Requirements and requirements for Siting, Design and Construction, Assessment, Operation, and Institutional Measures after Closure in articles 11, 13, 14, 15, 16, and 17, respectively. CNL need to show compliance with the Joint Convention in a comprehensive and detailed manner, so that Canada can demonstrate that it has met its international obligations.	Canadian Nuclear Laboratories (CNL) acknowledges Canada's obligations under the Joint Convention with respect to disposal of radioactive wastes. The Articles referenced by the commenter are high level requirements and guidelines that CNL has been following through its adherence to International Atomic Energy Agency (IAEA) SSR-5 *Disposal of Radioactive Waste* [1] and CNSC REGDOC 2.11.1 Volume I *Management of Radioactive Waste* (currently under development) [2]. In Section 2.12 of the NSDF Safety Case [3], the international best practices that have been implemented includes: • IAEA SSR-5, *Disposal of Radioactive Waste* [1]. • IAEA SSG-23, *The Safety Case and Safety Assessment for the Disposal of Radioactive Waste* [4]. • IAEA, *Safety Assessment Methodologies for Near Surface Disposal Facilities, Improvement of Safety Assessment Methodologies (ISAM)*, Volume 1, [5] and Volume 2 [6]. • IAEA SSG-29, *Near Surface Disposal Facilities for Radioactive Waste* [7]. • IAEA SSG-31, *Monitoring and Surveillance of Radioactive Waste Disposal Facilities* [8]. References: [1] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [2] CNSC, Waste Management, Volume I: Management of Radioactive Waste, REGDOC-2.11.1, Draft, 2019 March. [3] Near Surface Disposal Facility Safety Case, 232-508770-SAR-001.

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			[4] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012. [5] IAEA, Safety Assessment Methodologies for Near Surface Disposal Facilities, ISAM, Volume 1, Review and Enhancement of Safety Assessment Approaches and Tools, 2004. [6] IAEA, Safety Assessment Methodologies for Near Surface Disposal Facilities, ISAM, Volume 2, Test Cases, 2004. [7] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, STI/PUB/1637, 2014 [8] IAEA, Monitoring and Surveillance of Radioactive Waste Disposal Facilities, SSG-31, STI/PUB/1640, 2014.
CNL-ND312	Michael Stephens (August 14, 2017)	The concept of the NSDF project deviates significantly from internationally-accepted waste management principles and practices. Before consideration is given to allowing it to be implemented, it should be subjected to a comprehensive technical review by an international group of experts arranged through the International Atomic Energy Agency, and the results should be made public.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]. With the removal of ILW from the proposed NSDF inventory, the NSDF meets the internationally-accepted waste management principles which includes that near surface disposal facilities are appropriate for LLW. Section 2.4 of the final Environmental Impact Statement (EIS) includes the project design principles that have been followed for the Near Surface Disposal Facility (NSDF) project, including those from the Canadian Nuclear Safety Commission (CNSC) and the International Atomic Energy Association (IAEA). Canadian regulatory guidance for approaches to long-term safety of radioactive waste management is provided in CNSC's REGDOC-2.11.1 *Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management* [1]. The NSDF Project has also been designed to meet the requirements of IAEA SSR-5 [2], *Disposal of Radioactive Waste*, and IAEA SSG-29 [3], *Near Surface Disposal Facilities for Radioactive Waste*. This includes: • multiple safety functions; • containment of radioactive waste; • isolation of radioactive waste; and • surveillance and control of passive safety features. An international subject matter expert panel, commissioned by Atomic Energy of Canada Ltd, led by the U.S. Department of Energy provided an independent third party review of Canadian Nuclear Laboratories (CNL) NSDF safety case and assessment documents. The results of the independent review have been submitted to CNSC staff. Overall the initial panel's conclusions were that the Facility will be conservatively designed to dispose of the planned radioactive inventory and have future releases much below all appropriate standards. References: [1] CNSC, Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [3] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014.
CNL-ND313	Northwatch (August 16, 2017)	While the draft EIS makes references to best practices and international experience, there is no substantive discussion of these topics and no actual information or analysis is provided.13	Some examples of best practices and international experience that have been used in the development of the NSDF Project include the following:

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			• Water quality control of the Stormwater Management Ponds (SWMPs), primarily for solids settling, is based on more frequent, smaller storms (Section 3.4.4.5.2). The guideline for removal of solids/sediments in the SWMP from Ontario Ministry of Environment, Conservation and Parks (MECP) is determined by the permanent pool volume of the pond, the drainage area, and percent imperviousness of the catchment [1].
			• Section 10.1.2 of the EIS includes information on design criteria to size contact and non-contact surface water management systems. The NSDF water collection and conveyance systems are typically designed to resist erosion, safely convey flows and maintain structural integrity during peak flows generated from various design storms up to a Probable Maximum Precipitation (PMP) storm event. Canadian Nuclear Laboratories (CNL) compared the draft Ministry of Natural Resources (MNR) 2006 PMP event (24-hour, 596 mm) to the NSDF [2, 3] (12-hour 570 mm event). The NSDF assessment produces a peak flow which is 12% higher than the 24-hour distribution. In doing so, a conservative design analysis was used to evaluate the safety of the NSDF surface water management system.
			• The approach to managing fugitive dust emissions follows best management practice guidance is provided in Management Approaches for Industrial Fugitive Dust Sources [4].
			• The methodology for the Safety Case [5] is based on international best practice, as embodied in the safety standards on the Safety Case and Safety Assessment for Radioactive Waste Disposal from the International Atomic Energy Agency (IAEA) SSG-23 [6], SSR-5 [7], and the recommendations of the IAEA program for the ISAM [8].In Section 2.12 of the NSDF Safety Case [2], the international best practices that have been implemented includes:
			  ◦ IAEA SSG-23, *The Safety Case and Safety Assessment for the Disposal of Radioactive Waste* [6].
			  ◦ IAEA SSR-5, *Disposal of Radioactive Waste* [7].
			  ◦ IAEA, *Safety Assessment Methodologies for Near Surface Disposal Facilities, Improvement of Safety Assessment Methodologies (ISAM),* Volume 1, [8] and Volume 2 [9].
			  ◦ *International Peer Reviews for Radioactive Waste Management: General Information and Guidelines* [10].
			  ◦ *Compendium of Dose Coefficients based on International Commission of Radiological Protection (ICRP) Publication 60* [11].
			  ◦ IAEA SSG-29, *Near Surface Disposal Facilities for Radioactive Waste* [12].
			  ◦ IAEA SSG-31, *Monitoring and Surveillance of Radioactive Waste Disposal Facilities* [13].
			  ◦ IAEA SSG-30, *Safety Classification of Structures, Systems and Components in Nuclear Power Plants* [14].
			
			The NSDF design has utilized the operational experience (OPEX) from similar facilities, including international experience as well as CNL's Port Hope and Port Granby Projects. Benchmarking site visits have been part of the design development. This is further outlined in the NSDF Safety Analysis Report (SAR) [15].
			
			References:
			[1] MOE (Ontario Ministry of Environment). 2003. Stormwater Management Planning and Design Manual. March 2003. ISBN 0-7794-2969-9, PIBS 4329e. Queen's Printer for Ontario, 2003. Available at: https://www.ontario.ca/document/stormwater-management-planning-and-design-manual-0
			[2] Surface Water Management Plan, 232-508600-PLA-02.
			[3] Surface Water Modelling and Evaluation, B1551-503212-TN-001.
			[4] Ontario Ministry of the Environment and Climate Change, Standards Development Branch, MOECC Technical Bulletin - Management Approaches for Industrial Fugitive Dust Sources, 2017 February.
			[5] Near Surface Disposal Facility Safety Case, 232-508770-SAR-001, Revision 2, 2020 October.

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			[6] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012. [7] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [8] IAEA, Safety Assessment Methodologies for Near Surface Disposal Facilities, ISAM, Volume 1, Review and Enhancement of Safety Assessment Approaches and Tools, 2004. [9] IAEA, Safety Assessment Methodologies for Near Surface Disposal Facilities, ISAM, Volume 2, Test Cases, 2004. [10] International Peer Reviews for Radioactive Waste Management: General Information and Guidelines, Organisation for Economic Co-operation and Development, Report NEA 6082, 2005. [11] International Commission on Radiological Protection (ICRP), Compendium of Dose Coefficients based on ICRP Publication 60, ICRP Publication 119, Ann. ICRP 41(Suppl.), 2012. [12] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, STI/PUB/1637, 2014. [13] IAEA, Monitoring and Surveillance of Radioactive Waste Disposal Facilities, SSG-31, STI/PUB/1640, 2014. [14] IAEA, Safety Classification of Structures, Systems and Components in Nuclear Power Plants, SSG-30, 2014. [15] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
		HEU Waste Management	
CNL-ND314	Heather Sanderson (May 12, 2017)	With new contracts underway to repatriate HEU spent fuel, CNL is basically and radically, opening up a giant metaphoric can of nuclear worms - old, highly radioactive spent fuel, and transferring it for transport. This fact should be an intensive part of any environmental assessment. Well, you know what HEU is, and that there is a reason they want to tuck it away, as it certainly shouldn't be ticking away along our shoreline, but are the accidents we have transferring the fuel from interim storage to travel vessels not adding, and going to greatly add to the contamination level of the site and environment?	The repatriation of Highly Enriched Uranium (HEU) (i.e., spent fuel) is outside of the scope of the NSDF Project. The governments of Canada and the United States committed to work cooperatively to repatriate spent highly-enriched uranium (HEU) fuel currently stored at CRL to the United States as part of the Global Threat Reduction Initiative, a broad international effort to consolidate HEU inventories in fewer locations around the world. This initiative promotes non-proliferation by removing existing weapons grade material from Canada and transferring it to the U.S. which has the capability to reprocess it for peaceful purposes.
		Radiological Characteristics	
CNL-ND315	Anna Tilman (June 22, 2017)	**EIS: 3.2.2.2 p. 3-10, 3-11:** Is the radiation field of 10 Sv/h for contact-handleable waste correct? If so, it is inordinately high and does not make sense. By comparison, the dose rate limit for **remote handling** of this waste is 200 mSv/h, (0.2 Sv/h), which would be expected to greater allowable radiation fields than for waste that is deemed contact-handleable. What is the total level of exposure being permitted for workers and over what time period?	This is a typographical error in the 2017 draft Environmental Impact Statement (EIS) and the corrected radiation field is 10 mSv/h. Worker exposure is controlled by existing site administrative procedure. Through existing procedures, CNL Employees who perform radiation work are assigned an administrative control for dose from 1 to 20 mSv, depending on where the employee works and the work performed. The Waste Acceptance Criteria (WAC) [1] for the NSDF have been revised. The dose rate limits and the means of handling and transferring that shall be applied to the bulk and packaged waste at the NSDF are presented in Table 7 of the WAC, and are derived from the Safety Analysis Report [2]. The revised radiation type dose rates are: • Total gamma and neutron: ≤0.5 mSv/h near contact and ≤0.01 mSv/h at a distance of 1 metre • Total gamma and neutron: >0.5 mSv/h to ≤2 mSv/h near contact and >0.01 mSv/h to ≤0.1 mSv/h at a distance of 1 metre • Total gamma and neutron: >2 mSv/h near contact or >0.1 mSv/h at a distance of 1 metre • Beta: <10 mSv/h near contact These requirements are also included in the final EIS, under Section 3.3.3.2.

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			Maximum expected annual doses to NSDF workers have been conservatively calculated in the Safety Analysis Report [2], and presented in Section 5.8.6.1.2.1 of the final EIS. Worker exposure levels are normally calculated and controlled for an annual time period. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND316	David Raman (August 3, 2017)	Section 3.2.2.2 should primarily describe the radionuclide content of wastes. In terms of radionuclides, world experience with near surface disposal indicates that a very limited suite of radionuclides (t ½ <30 years). The jurisdiction may allow some longer-lived radionuclides to be incorporated, depending upon the results of pathways analysis. • What is presented here is occupational radiation exposure control parameters, and is not sufficient for making a judgement on the environmental acceptability of the proposal. • On the subject of Nuclear Criticality Safety, neither of the references provided here nor the ANSI/ANS-8 series of standards referenced in CNSC regulatory documents provide any guidance for safety in disposal; the assumption is that all safety parameters will be controlled by the facility management at all times.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). While the NSDF will contain some longer lived radionuclides, the vast majority of the wastes decay within the first 100 years, as depicted in Figure 3.3.1-2 of the final Environmental Impact Statement (EIS). The final EIS now presents a more comprehensive assessment of the potential hazards and risks associated with the radiological inventory. Section 5.8 of the final EIS discusses the dose and risk for both the operations and post-closure phase. All doses are a fraction of the regulatory criteria and natural background dose. More details about the potential hazards and risks associated with the radiological inventory can be found in the NSDF Safety Analysis Report [2] and the Post-Closure Safety Assessment (PostSA) [3]. In particular, [3] provides a comprehensive pathways analysis during the post-closure phase. As stated in the NSDF Waste Acceptance Criteria [4], the NSDF will not accept accountable quantities of special fissile material. That is, if a material is tracked under CNL's Nuclear Materials and Safeguards Management Program, it is not candidate material for the NSDF. Criticality is required to be studied because there will be quantities of fissionable material that are intended for disposal in the Engineered Containment Mound (ECM). These materials are non-recoverable, and are present in very low concentrations. Thus a Criticality Safety Document has been prepared in accordance with the CNL Criticality Safety Program and regulatory guidance in REGDOC 2.4.3 *Nuclear Criticality Safety* [5], which is consistent with the ANSI/ANS-8 series of standards [6]. Additionally since the safety analysis is specific to LLW disposal, NUREG guidance and assessments have been utilized to demonstrate long-term criticality safety. Specifically NUREG/CR-6505 Volumes 1 and 2 [7], [8] and NUREG 6626 [9]. The Criticality Safety Document was also prepared to be consistent with the requirements of CNL's Nuclear Criticality Safety Program. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004 [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [5] CNSC, Nuclear Criticality Safety, REGDOC 2.4.3, 2019 February. [6] American Nuclear Society (ANS), "Nuclear Criticality Safety in Operations with Fissionable Material Outside Reactors," ANSI/ANS-8.1-2014

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			[7] Nuclear Regulatory Commission (NRC), "The Potential for Criticality Following Disposal of Uranium at Low-Level Waste Facilities," NUREG/CR-6505, Vol 1, 1997. [8] Nuclear Regulatory Commission (NRC), "The Potential for Criticality Following Disposal of Uranium at Low-Level-Waste Facilities," NUREG/CR-6505, Vol 2, 1998. [9] Oak Ridge National Laboratory (ORNL), "Emplacement Guidance for Criticality Safety in Low-Level-Waste Disposal," NUREG/CR-6626/ORNL/TM-13765, 2001.
CNL-ND317	CCNR (August 16, 2017) Emma March (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions.* The EIS does not address the very long-term implications of the project. For example, the NSDF is intended to house approximately 1000 tonnes of uranium-238, a primordial radioactive element with a half-life of 4.5 billion years. As time goes by, the disintegration of uranium-238 atoms creates a dozen other radioactive "decay products", all of them much more radiotoxic than uranium-238 itself. Thus the uranium-238 "family" becomes increasingly more radioactive, not less radioactive, as the centuries tick by. In the first year alone the radioactivity from uranium-238 in the NSDF will just about triple, due to the inbreeding of thorium-234 and protactinium-234. The total radioactivity of the uranium-238 family will continue to increase until it ends up being more than seven times as radioactive as the original uranium-238. The amount of radon gas generated inside the NSDF will steadily increase, year after year, virtually forever, as will the radium-226 content. In fact the NSDF facility will eventually hold the radioactive equivalent of 500,000 tonnes of Elliot Lake uranium tailings, just due to the uranium-238 family alone. (for another example, see p5 of the Canadian CCNR's submission).	The radionuclide inventory as proposed in the 2017 draft Environmental Impact Statement (EIS) has been significantly reduced, in fact most radionuclides are about 1% of the original values proposed. The revised reference inventory is presented in Table 3.3.1-2 of the final EIS. Canadian Nuclear Laboratories (CNL) understands that many radionuclides decay into radioactive progeny. This decay chain is captured and incorporated into the long-term safety modeling in the Post-Closure Safety Assessment (PostSA) [1]. Natural uranium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. Other amounts of uranium isotopes may exists as residual unrecoverable amounts, predominately as contaminants on waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Discrete and recoverable amounts of fissionable materials are controlled, and are not destined for NSDF. The total emplaced Uranium-238 content under the revised inventory is equivalent to about 6,000 kg, or about 6 tonnes, with an average concentration of about 0.08 Bq/g. This is extremely close to the average natural background concentration of 0.07 Bq/g quoted by the Health Physics Society [2] although it is noted that this value varies widely depending on the local geology. Uranium-238 occurs naturally in soil and rock all over the Earth, and is currently in equilibrium with its decay products. Any ingrowth occurring in the NSDF is occurring in the surrounding natural environment as well. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004. [2] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf.
		Decommissioning	
CNL-ND318	Greg Csullog (May 1, 2017)	**3.10.1 End-state Objectives – 3-62:** Are any of the project's facilities, like the WWTP, being designed with future decommissioning in mind? Is this stated anywhere in the EIS (I may have missed it)? If features to facilitate decommissioning are being included, a statement to this affect should be in the EIS to assure readers that decommissioning is thought out completely. That applies to any new facility at CRL (I sincerely hope such features are essential components of any facility design).	Yes, in accordance with Canadian Standards Association CSA-N294 *Decommissioning of facilities containing nuclear substances* [1] the NSDF systems and structures were designed with future decommissioning in mind. This requirement although not stated in the Environmental Impact Statement (EIS) is captured as a requirement of Canadian Nuclear Laboratories (CNL) Decommissioning and Demolition Program Description Document [2] which satisfies the Chalk River Laboratories (CRL) Site licence requirements [3]. A specific example of a feature which facilitates decommissioning is the wastewater treatment trains within the Wastewater Treatment Plant (WWTP). The wastewater treatment system is modular in design and skid mounted, thus making them easier to dismantle and remove.

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			Decommissioning activities are discussed in Section 3.2.3 (Closure Phase) of the Environmental Impact Statement (EIS). References: [1] CSA Group. CSA N294.0-19: Decommissioning of facilities containing nuclear substances. 2019. [2] Decommissioning and Demolition Program Description Document, 900-508300-PDD-001. [3] Canadian Nuclear Safety Commission, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25.
CNL-ND319	Ole Hendrickson (August 16, 2017)	The EIS should describe decommissioning and site remediation priorities associated with the project, how these priorities are set, and their impacts on releases of radionuclides to the Ottawa River and worker radiation doses.	Environmental remediation of the existing Waste Management Areas (WMAs) on the Chalk River Laboratories (CRL) site are not within the scope of the NSDF Project [1]. The timelines for the remediation of some of these WMA, several of which are still in operation, is over many years (or decades). The remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place. The remediation process, including the approach for determining remedial options is captured in CNL's Decommissioning and Demolition Program Description Document [2]. As noted above the remediation of the WMAs would be subject to separate licensing decisions by the Canadian Nuclear Safety Commission (CNSC) thus discussion of the remediation options has not been included in the final EIS. However, Canadian Nuclear Laboratories (CNL) is registered under ISO-14001. Our environmental policy states: "We review the impacts of our activities, facilities, projects, services and products on the environment". For non-routine work, this review is conducted through CNL's environmental review process. Since the CRL site is located on Federal lands, step 1 of this process is to determine whether the particular project would be subject to a section 82 review under the Impact Assessment Act. Regardless of whether a particular project is subject to the Impact Assessment Act (IAA), the review process is the same. Canadian Nuclear Laboratories (CNL) assesses all potential environmental impacts and implements appropriate mitigation measures. Canadian Nuclear Laboratories (CNL) maintains a comprehensive Environmental Monitoring Program for the CRL site as part of the site licence to verify that radiation doses to members of the public as a result of radioactive releases from the CRL site remain as low as reasonably achievable, taking into account both social and economic factors. The program demonstrates that the radiation dose to the most exposed members of the public (i.e., critical groups) due to CRL operations does not exceed regulatory limits, and also serves to verify that non-radioactive releases do not pose hazards to human health, and that neither radioactive nor non-radioactive releases pose hazards to the environment. Overall, the 2018 radioactive environmental monitoring results indicate stability in the performance of facilities and operations at CRL, and that the controls on the release of contaminants currently in place at CRL continue to provide protection to the environment and to the public. This report is publicly available at www.cnl.ca. References: [1] Record of Decision on the Scope of Environmental Assessments for Three Proposed Projects at Existing Canadian Nuclear Laboratories' Facilities, 2017 March 8. [2] Decommissioning and Demolition Program Description Document, 900-508300-PDD-001.
		Post Closure Phase	

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CNL-ND320	Michael Milgram (May 16, 2017)	On page ES-vii, reference is made to a gas venting system. On page ES-xii, it is written "dose to non-human biota from airborne emissions is calculated only for the operations phase of the NSDF. This represents the bounding case, since doses... during the post-closure phase would be less than the operations phase with the installation of the final cover". Further, on page ES-xv reference is made to the presence of Radon gas. This is consistent with the presence of (radioactive) actinides. - Q2-1: Since radioactive nuclides naturally transmute and decay and thereby create new radioactive gaseous species (e.g., Radon) over the lifetime of the NSDF, and since there will be an exhaust gas vent, what is the justification for not calculating the airborne dose of radioactive gases past the operations phase? -	The rate of radon production in the engineered containment mound (ECM) will be generally the same during the final phases of operation and during the post-closure phase. This is because the uranium is currently in equilibrium with its decay products, radon being one of them. That is in other words, radon gas is being produced by uranium at all times, not just during the post-closure phase. However gaseous emissions are far more likely during the operational phase than during the post-closure phase, due to the nature of waste emplacement operations performed in an open setting. After the final cap and cover are placed on the mound, these gaseous emissions will decrease significantly. The 2017 draft Environmental Impact Statement (EIS) had provided only qualitative assessments with respect to radon gas generation and dose consequence. The final EIS now contains radon gas emission rates and associated dose rates. Table 5.8.6-3 of the final EIS presents the rate of radioactive gas generation of the ECM during operations, and the associated doses to the workers. Radon gas in the post-closure phase is discussed on a per-scenario basis in Section 5.8.6.1.2.2 of the final EIS. These radon doses in both the operations and post-closure periods are tiny fractions of the regulatory dose limit for a member of the public of 1 mSv/yr. People living off-site would receive only a fraction of these calculated values.
CNL-ND321	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017)	**The EIS completely ignores waste redistribution.** The EIS fails to consider means by which future generations would be warned to stay away from the facility, and the very serious consequences if warnings were not heeded and waste redistribution were to occur. This deficiency makes it highly likely that the NSDF project would cause significant adverse environmental effects that cannot be justified in the circumstances.	Section 3.2.4.2 of the final Environmental Impact Statement (EIS) outlines the Institutional Controls. Institutional Controls are important in helping to protect engineered barrier systems by providing a means to ensure that the barriers remain effective, are not showing signs of degradation, and continue to limit the potential for being vandalized or damaged by outside elements (natural or human) in any way. The NSDF Project is designed to promote safety through passive means during post-closure but is complemented by active measures taken by Canadian Nuclear Laboratories (CNL), such as maintenance, security and surveillance. The NSDF Project site security features will include signage, markers, fencing and gate. A chain-link fence will deter intruders and animals from site access. A control gate will be located on the north side of the NSDF Project site to allow personnel access for required maintenance and observation. Institutional controls also include methods to preserve knowledge and to inform current and future generations of potential hazards and risks. Such administrative or legal controls help to reduce the potential for human exposure to contamination. The land use designation for the NSDF Project site is as a waste disposal facility. Upon closure, controls will be in place to limit land usage including recognition on the property title or deed to ensure the appropriate zoning restrictions and including buffer or attenuation zones. As the enduring federal entity, and owner of the assets and liabilities of CNL, AECL is committed to controlling and restricting the land use of the NSDF footprint for as long as necessary. Scenarios were assessed in the Post-Closure Safety Assessment [1] where it was assumed that institutional controls fail only 100 years after facility closure. As a result, the receptors are able to build a house and intrude into the waste far earlier than the Normal Evolution Scenario which assumes 300 years of institutional control. The results of the assessment demonstrate that doses are mostly unchanged from the Normal Evolution Scenario. This is largely a result of the minimal change in the radioactive waste inventory. The inventory decays to such low-levels rapidly, and by 100 years the receptors still only receive a small fraction of the regulatory dose limit for a member of the public of 1 mSv/yr. It should be noted the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 (Disposal of Radioactive Waste) [2] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004

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			[2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011.
CNL-ND322	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017)	The EIS fails to acknowledge that abandonment is a necessary phase and component of the project. Making a decision to allow abandonment of nuclear wastes without adequate information to inform this decision would set a very bad precedent for other disposal projects. The EIS must provide sufficient information to inform a federal decision on this matter.	The Chalk River Laboratories (CRL), which is managed by Canadian Nuclear Laboratories (CNL) have an on-going mission as Canada's premier nuclear science and technology organization. There are currently no plans for closure of CRL. It is entirely feasible that the NSDF will co-exist with on-going CRL operations, long after the NSDF has been filled to capacity and closed. Such on-going operations at CRL mean that a full security program, including restricted access to the site, will be maintained. This will likely overlap with much of the NSDF's post-closure period. Furthermore CNL will be required to provide an application to the Canadian Safety Nuclear Commission (CNSC) to progress to each stage in the life cycle of the proposed facility. As such the application will be subject to the commission hearing process which ensures public involvement and engagement prior to the CNSC rendering a decision. As demonstrated in the Post-Closure Safety Assessment [1], the hazardous lifetime of the facility is around 100 years. That is, most of the radiological decays occurs within the first 100 years after facility closure, and the concentration of radionuclides has approached the natural background levels. There are no current plans for the abandonment of the facility. Atomic Energy Canada Limited (a federal Crown corporation and the owner of the land) is committed to enforcing land-use restrictions on the site for as long as necessary. This includes passive controls such as restrictions placed on the property-deed, and could extend to ensuring that monitoring and maintenance continue for as long as necessary. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004.
CNL-ND323	Angela Bischoff (August 16, 2017)	With some of the wastes remaining hazardous for more than 100,000 years, the commenter expresses the view that abandonment cannot be built into the project timeline, as it is in the EIS. The commenter indicates that decisions cannot be made for eternity.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The intermediate level waste (ILW) that had been proposed will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available. This reduction in inventory also reduced the hazardous lifetime of the facility. As demonstrated in Figure 3.3.1-2 of the final Environment Impact Statement (EIS), the radioactivity concentrations in the NSDF decay very quickly in the first 100 years, to less than 0.1% of the initial inventory. After this, the concentration of radionuclides begins to approach the natural background concentration. The Post-Closure Safety Assessment (PostSA) [1] assesses the dose and risk to receptors (humans) living on and near the site for 10,000 years into the future. The assessments indicate that doses to the receptors are a small fraction of both the regulatory dose limit for a member of the public of 1 mSv/yr and the natural background dose. The rapid decay of the radiological inventory means that the facility has a hazardous lifetime of approximately 100 years. There are no current plans for the abandonment of the facility. Atomic Energy Canada Limited (a federal Crown corporation and the owner of the land) is committed to enforcing land-use restrictions on the site for as long as necessary. This includes passive controls such as restrictions placed on the property-deed, and could extend to ensuring that monitoring and maintenance continue for as long as necessary. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004.

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CNL-ND324	OFWCA (Johanna Echlin) (May 8, 2017) Heather Sanderson (May 15, 2017) Cara Rose-Brown, Iana and Carlos Ciatti (May 15, 2017) Ted and Linda Kucharski (May 16, 2017) Michael Stephens (August 14, 2017) Anna Tilman (August 11, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions.* How do you fix a leak under a football field of radioactive waste, and who will be responsible once CNL is no longer (in 100+ years)? Once active institutional control ends in 2100, how will the site -NSDF – be protected from sabotage? The Crown has mandated this corporation to manage their radioactive waste and decommissioning responsibilities but how are we to ensure that 100 years from now this will be done? Institutional control could easily falter or fail if society faces greater challenges that take precedence. Who can say whether society, and its capabilities, resources and priorities will be stable? Who knows if Canada will or any successor governmental entity will exist? Humanity may well be struggling for basic survival in the face of accelerating climate change in the year 2100, let alone at the end of the proposed institutional control period in 2400. A worldwide pandemic could relegate dealing with failure of the NSDF site to an afterthought. More reliable disposal facilities for the proposed long-lived waste contents of the NSDF are required – and are available.	During construction of the baseliner, quality assurance/quality control measures will be implemented to ensure the baseliner is constructed as designed to provide a leak proof barrier. The design of the engineered containment mound (ECM) base liner and final cover systems has incorporated multiple barriers systems comprising of natural and synthetic materials. The design of the ECM liner system has incorporated the recommendations of the Subject Matter Experts from academic institutions and industries, as well as the recent existing research & development results. The base liner system includes the leachate collection system (primary liner), the leak detection system (secondary liner) and compacted clay liner. For the NSDF Project, the 0.75 m thick clay liner combined with the overlying geomembrane and Geosynthetic Clay Liner (GCL) components of the proposed composite secondary lining system provide an effective and redundant hydraulic barrier system to protect against long-term contaminant releases from the ECM to groundwater, as outlined in Section 3.4.1.4 of the final Environmental Impact Statement (EIS). In the unlikely event of leak, proper planning and assessment would be required to further investigate in order to determine the cause of the failure. Once the failure is identified, repair options can be assessed and planned. Canadian Nuclear Laboratories (CNL) operates multiple sites across Canada, and manages Atomic Energy of Canada Limited's (AECL) nuclear waste liabilities. Atomic Energy of Canada owns the lands, facilities and liabilities that are managed by CNL. In the event that CNL no longer exists, AECL will continue to be responsible for the Chalk River Laboratories (CRL) site and NSDF as the owner. A Post-Closure Safety Assessment (PostSA) [1] has been prepared and utilizes the reference inventory [3] at closure to predict radiological dose to humans and contaminant concentrations in the environmental media. The approach to the PostSA ensures the assessment is performed to demonstrate that the NSDF long-term safety is not reliant on institutional controls in order to meet the regulatory dose requirements. The PostSA considers Human Intrusion scenarios including Borehole Drilling (acute exposures) and a House With a Basement (chronic exposures). Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control, a variant of this scenario is presented with the doses calculated from 100 years, to see how they would change with a shorter period of institutional control. Thus, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 (Disposal of Radioactive Waste) [2] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. The radioactive decay from the time of closure of the ECM is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration in the ECM decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. The overall safety objective for the NSDF is to protect individuals, society and the environment by establishing and maintaining an effective defence against radiological and chemical hazards. The safety assessments demonstrate that the overall safety objective for the NSDF has been satisfied, and demonstrates that the design, controls and processes are adequate for the radiological protection of workers, the public and the environment. Near surface disposal is primarily suitable for waste containing mainly short lived radionuclides (radionuclides with half-lives of less than about thirty years are considered to be short lived) and only low concentrations of long lived radionuclides as per IAEA SSG-29 (Near Surface Disposal Facilities for Radioactive Waste) [3]. Near surface disposal refers to the emplacement of solid, or solidified, radioactive waste containing predominantly short lived radionuclides in a disposal facility located at or near the land surface [3]. Based on the results presented in the PostSA [1], the activity concentrations of

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			long-lived radionuclides are at a level that is acceptable and does not impact the post-closure safety of the NSDF. The activity of long-lived radionuclides placed in the ECM is limited by the Waste Acceptance Criteria (WAC) [4]. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [3] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND325	Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017) PCWO (August 16, 2017) Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The EIS fails to provide sufficient detail on the post-closure and post-institutional control phases of the project, and does not provide an adequate analysis of environmental effects and costs associated with these phases. There is mention of a 300-year "post-closure control period", yet no details on what that would look like and why the 300 year time frame was chosen. It is unclear whether this period will involve monitoring of downstream surface water quality. Given the very long-lasting nature of some intermediate level nuclear waste, will it be abandoned or managed after the 50 year planned operation of the facility? What plans are in place to manage it over the very long term to protect future generations and the environment? In addition, one of the commenters would like CNL to specify whether it has planned to create a fund that would accumulate, during the period of operation, to cover the costs of post-closure management.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). The post-closure phase is described in Section 3.2.4 of the final Environmental Impact Statement (EIS). Included are discussions of maintenance, monitoring, and institutional controls that will be implemented. The Post-Closure Safety Assessment (Post SA) [2] and Ecological Risk Assessment (EcoRA) [3] are detailed safety assessments of the post-closure phase, evaluating the radiological dose and exposure risk to both human receptors and non-human biota. Both reports are available to the public by contacting ermstakeholder@cnl.ca. Discussion of the environmental effects are included in Section 5 of the EIS. The assessment of residual effects to the environment specifically during the post-closure phases of the project are discussed in Sections 5.7.6.1.1.2, 5.7.6.1.2.2, 5.7.6.2.1.2 and 5.7.6.3.2. The effects to human health in the post-closure phase are assessed in Sections 5.8.6.1.1.2, 5.8.6.1.2.2, 5.8.6.2.1.2, and 5.8.6.2.2.2. A period of 300 years of institutional control is generally used internationally for near surface disposal facilities [4]. This is largely due to the half-lives of Cesium-137 and Strontium-90, which are about 30 years. By 300 years, these radionuclides have decayed to less than 0.1% of their initial radioactivity levels. The 300 year period of institutional control aligns with the Chalk River Laboratories (CRL) site Comprehensive Preliminary Decommissioning Plan [5], and the institutional control period proposed for the overall site. For the NSDF, the radiation concentration levels decay very rapidly in the first 100 years of the post-closure period. As a result, the NSDF does not require a 300-year period of institutional control in order to maintain the dose criteria. This is demonstrated by a Sensitivity Case in the Post SA [2] where it is assumed that institutional controls fail at only 100 years after closure. The results of this sensitivity case demonstrate that the safety of the NSDF and surrounding environment are not reliant on long periods of institutional control. As the owner of the CRL site and radioactive waste, Atomic Energy Canada Limited (AECL), a federal Crown corporation, is committed to enforcing land-use restrictions (institutional controls) on the NSDF site into the future, for as long as necessary.

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			All liabilities of AECL are those of the Government of Canada, and funding for AECL's responsibilities, including the NSDF, is provided by the Government of Canada. Financial guarantees for these liabilities and the associated decommissioning and waste management work are provided by the Government of Canada. The current financial guarantee for AECL's sites was provided by the Minister of Natural Resources in 2015 and it continues to be valid. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004. [3] Ecological Risk Assessment (EcoRA) for the NSDF Project, 232-121240-ASD-001. [4] SKB International AB. International perspective on repositories for LLW. Ulla Bergstrom, Karin Pers, Ylva Almen. 2011 December. [5] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001.
CNL-ND326	Joan Lougheed and Town of Deep River (August 16, 2017)	In Section 5.7.5.5 the third primary pathway identified is "Release of gases during disposal of radioactive waste in the post-closure phase" (see pg. 5-512). This quote implies that radioactive waste will be disposed of during the post-closure phase. It is understood that there will be no waste deposited to the NSDF during the post-closure phase. It is critical that this important discrepancy be explained.	The statement 'Release of gases during disposal of radioactive waste in the post-closure phase' was incorrect and has been revised. There will be no waste disposal during the post-closure phase. Primary pathways for ecological health are described in Section 5.7.5.2.3 of the final Environmental Impact Statement (EIS). The release of gases is from wastes that are emplaced during the operations phase. The pathways analysis for ambient radioactivity and ecological health valued components assessed volatiles (e.g., radon, tritium) that could be released to air (Table 5.7.5-1 of final EIS). A passive gas venting system is part of the design of the ECM final cover system. Gases to be vented include, gases that may be derived from biological decomposition, corrosion, and gaseous radionuclides in the ECM.
CNL-ND327	Anna Tilman (August 11, 2017)	What actions would be taken if the cover for the ECM fails during closure and post-closure phases?	The closure period is within the 300 year institutional control period, meaning that it is assumed that the facility is being monitored by Atomic Energy Canada Limited (AECL), a federal Crown corporation, as the site owner. In the unlikely event that the cover system shows signs of failure during the closure period, the cover system will be repaired. The first 300 years of the post-closure phase overlaps with the 300 year assumed institutional control period. Therefore, for at least the first 300 years, it is assumed that the facility is monitored and repaired if needed. As noted in Section 11.2 of the final Environmental Impact Statement (EIS), monitoring during the institutional control period will confirm the performance of the containment system, and if necessary, remedial actions will be taken. Examples of mitigation that would be implemented include: • If erosion were present, the final cover would be repaired. • If a localized breach of the final cover were present, the cover would be repaired and the leachate system would be periodically assessed and inspected. • If there were multiple or an indeterminate number of breach locations in the final cover, another cover / cap system could be installed over the existing cover. • If the monitoring wells detected abnormal performance results, additional wells could be installed and the monitoring frequency increased. • Erosion of the berm would be mitigated by maintaining a healthy vegetation cover. After the 300 year institutional control period, it is not assumed that the cover will be repaired. To enhance confidence in the cover system design, Canadian Nuclear Laboratories (CNL) partnered with Queens University to perform a comprehensive

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			high density polyethylene (HDPE) geomembrane testing and evaluation program. Dr. Kerry Rowe, a globally recognized expert in geomembrane systems based at Queens University has undertaken testing of the NSDF geomembrane and provided the scientific evidence to demonstrate with confidence that 550-year service-life will be met [1]. Methods for testing and data analyses were performed in accordance with applicable standards and have been published in a number of peer-reviewed journals. The results of the program demonstrated that candidate HDPE geomembranes are not only expected to meet the 550-year design life of the facility, but is likely to have a design life of up to 2000 years [1]. Regardless of the ability to repair the cover after 300 years, CNL has performed studies to in order to determine the consequences of a failed cover are acceptably low. The Post-Closure Safety Assessment (PostSA) [2] has evaluated such scenarios, and concluded that cover failure results in a dose consequence far lower than the regulatory dose limit for a member of the public of 1 mSv/yr. This is largely a result of the NSDF containing only low-level waste (LLW), which decays to near-background levels of radioactivity in the first 100 years after closure. References: [1] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project. 232-509240-ASD-004.
		Public and Aboriginal Engagement	
		Public and Aboriginal Engagement - General	
CNL-ND328	OFWCA (Johanna Echlin) (May 8, 2017) Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* A project proposal that is planned from the outset in consultation with local communities would provide better guarantee long-term employment and social acceptance; this would improve CNL's reputation for responsible long-term radioactive waste management. The recent and thorough review of the CEAA 2012 provides important recommendations for restoring public confidence in the environmental assessment process. The review panel recommended the establishment of an independent authority to conduct impact assessments on behalf of the federal government. They go further to recommend the authority act as a quasi-judicial tribunal empowered to undertake a full range of facilitation and dispute resolution processes. The commenters express the view that the decision for creating Canada's first permanent nuclear disposal facility is a societal decision that requires a thorough understanding of the risks and also requires social acceptance of the project. It should be recognized that the disposal of nuclear waste is not a scientific decision alone; it is a public health issue and a societal issue that warrants an independent review and appropriate consultation with all Canadians.	As a designated project under the *Canadian Environmental Assessment Act* (CEAA 2012), the NSDF Project is subject to a federal environmental assessment and therefore requires authorization from the Canadian Nuclear Safety Commission (CNSC) to commence the project. Canadian Nuclear Laboratories (CNL) notes that the NSDF Project will remain under CEAA 2012 as per subsection 182 of the Impact Assessment Act with the CNSC as the Responsible Authority. Through the Environmental Impact Statement (EIS), CNL has identified a preferred solution for the disposal of low-level waste. The NSDF is an important component of the plan to effectively address Atomic Energy of Canada Limited's environmental responsibilities through the remediation of contaminated lands on the Chalk River Laboratories (CRL) site and the decommissioning of aging infrastructure. This work contributes to the revitalization of the CRL site, which provides employment to approximately 3,000 employees, the majority of which live in Renfrew County (Ontario) and Region of Outouais (Quebec). Public and Indigenous engagement is a key component of the environmental assessment process and reflects the corporate social responsibility of CNL. Section 4.0 of the final EIS summarizes CNL's past and proposed public and stakeholder engagement initiatives, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization.. These activities are intended to fulfil the requirements for public and Indigenous engagement under CEAA 2012 and the *Nuclear Safety and Control Act*. Section 4.0 of the final EIS describes past, on-going and proposed public and stakeholder

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			engagement activities and events, while section 6.2 describes Indigenous engagement activities, in accordance with the *Generic EIS Guidelines* developed by the CNSC [1]. Since 2015, the following public and Indigenous engagement activities were conducted to share information and receive feedback, as outlined in Sections 4.2 and 6.2.4: : • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote different events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Canadian Nuclear Laboratories (CNL) values all feedback received on project activities including comments provided through public and Indigenous engagement. In the instance of the NSDF Project, CNL made it a priority to engage with stakeholders. Based on the volume of feedback, engagement activities have been successful at initiating discussion and creating opportunities to improve stakeholder understanding while at the same time providing feedback to the project. Canadian Nuclear Laboratories (CNL) has taken public and Indigenous feedback and concerns obtained through the public review of the 2017 draft EIS into consideration to inform project plans as the proposed project continues to evolve and move forward. Canadian Nuclear Laboratories (CNL) values input from all stakeholders and will continue to engage on this project and other activities undertaken by the organization. Reference:

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			[1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND329	David Herbert (May 2, 2017) Evelyn Gigantes (May 17, 2017) Jake Deacon (Petawawa Point Cottagers Association) (May 16, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Ronald and Michele Kaulbach (May 8, 2017) Cara Rose-Brown (May 15, 2017) Iana and Carlos Ciatti (May 15, 2017) Ted and Linda Kucharski (May 16, 2017) David Prentice (August 16, 2017) Michael Nogas (August 15, 2017) Virginia MacLatchy (August 16, 2017) Durham Nuclear Awareness (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* Several commenters have expressed the view that CNL's public engagement process has been inadequate for the following various reasons: • Engagement process is not aligned with the scale and potential impact of the project • Engagement to date has been sparse and confusing • Lack of public awareness, including Ottawa residents • Information sessions were held during off-season which limited attendance to residents only and not cottagers • Timing of public engagement activities, including information sessions and announcement of public comment period on the EIS, were carried out during off-season which limited participation/attendance and did not reach larger portion of the population that lives in the area surrounding Chalk River • CNL should have used direct mail, and it certainly needed more public meetings, which should have had better advance notice than the ones we knew about. More generally, commenters are concerned about the lack of public awareness of the project, attributed to public engagement completed to date.	The NSDF Project offer the following in response to concerns expressed by the commenters: <u>Engagement process is not aligned with the scale and potential impact of the Project</u> Public and Indigenous engagement is a key component of the environmental assessment process and reflects the corporate social responsibility of Canadian Nuclear Laboratories (CNL). Section 4.0 of the final Environmental Impact Statement (EIS) summarizes CNL's past and proposed public and stakeholder engagement initiatives which commenced in 2015, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. These activities are intended to fulfil the requirements for public and Indigenous engagement under the *Canadian Environmental Assessment Act*, 2012 and the *Nuclear Safety and Control Act*. Section 4.0 describes past, on-going and proposed public and stakeholder engagement activities and events, while Section 6.2 describes Indigenous engagement activities, in accordance with the Generic EIS Guidelines developed by the Canadian Nuclear Safety Commission (CNSC) [1]. <u>Engagement to date has been sparse and confusing</u> As outlined in Section 4.2 and Section 6.2.3 of the final EIS, since CNL first brought forth the NSDF Project to the public, Indigenous communities and groups, local governments and the Environmental Stewardship Council (ESC) since 2015, CNL has conducted project-specific engagement methods and activities, which include the following: • project specific Indigenous agreements and long-term relationship meetings and negotiations; • Indigenous technical assistance and contribution agreements; • Indigenous workshops; • presentations to various Indigneous communities; • presentations to various stakeholders (members of the public, industry, elected officials and employees); • publishing and updating Project-specific webpage content; • posting and publishing Project-specific fact sheets; • publishing and distributing Contact community newsletter; • conducting NSDF Project site visits; • conducting project- specific workshops;conducting Project-specific public information sessions; • conducting Project-specific Indigenous information sessions; • conducting Project-specific employee information sessions; • conducting Indigenous benchmarking tours; • publishing and distributing Voyageur CNL internal newsletter; • participation in public events; • participation in Indigenous events; • increased transparency with interested members of the media – hosted journalists on-site for interviews and • presentations on the Project (i.e., Radio-Canada's Decouvertes, Presse Canadienne, Carleton Master's • Journalism students);

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			• "detect and correct" media relations (i.e., letters to the editor aimed at correcting inaccurate statements in • articles, disseminating factual information); • increased use of social media, including webinars, posting Project-specific videos to YouTube; • advertising campaign in support of public information sessions (online, intranet, newspapers, flyer insert, • radio public service announcement, social media, paid Facebook advertising); • distribution of factsheets and comment cards to local municipal offices in Ontario and Quebec, to function as • an information repository and support public input; • Indigenous and public email distribution lists (invitations to engagements, project updates and milestones etc.) • emails to Indigenous communites including notifications of the 2017 & 2019 draft EIS submission; and • emails to stakeholders including notifications of the 2017 draft EIS submission and responses to questions submitted. Since 2015, the following engagement activities were conducted to share information and receive feedback, as outlined in Sections 4.2 and 6.2.4: : • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote different events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Canadian Nuclear Laboratories (CNL) has extended, and will continue to extend, offers to meet with varying groups to discuss the project. To date, CNL has responded and engaged with different groups that have requested meetings.

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			Canadian Nuclear Laboratories welcomes the opportunity to discuss the Project with any group, from any locality, at their preference. <u>Lack of public awareness, including Ottawa residents Information sessions were held during off-season which limited</u> Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project from hosting regular in-person information sessions to hosting quarterly and now bi-monthly webinars in English and French, which is a more accessible approach to disseminate information to individuals from all regions as well as the opportunity for their questions to be answered. CNL will also attend public information events whenever requested. Social media has been used more recently to inform, educate, and promote awareness for all CNL activities including NSDF Project events and to receive feedback on the NSDF Project. Seven videos covering topics such as "why the NSDF?", "responsible water management" and Project updates have been uploaded to CNL YouTube channel. The videos have been added in an effort to make information and technical information more accessible. Canadian Nuclear Laboratories (CNL) has extended, and will continue to extend, offers to meet with varying groups from any locality – at their preference -to discuss the Project. To date, CNL has responded and engaged with different groups from well beyond the Ottawa Valley that have requested meetings on the NSDF Project. Canadian Nuclear Laboratories (CNL) welcomes the opportunity to discuss the Project with any group, from any locality, at their preference. <u>Information sessions were held during off-season which limited attendance to residents only and not cottagers</u> Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project, beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Canadian Nuclear Laboratories (CNL) remains available to provide a community based public information session when there is an expressed interest from stakeholders. To date, CNL has responded and engaged with different groups that have requested meetings on the NSDF Project. For instance, to enable a meeting with seasonal residents, CNL offered to meet with the Old Fort William Cottagers Association (OFWCA), at a time convenient to their members. In response, the OFWCA invited CNL to come to speak and answer questions about the plans for the NSDF Project in Fort William on 2017 July 15. The event was well-attended by seasonal residents of the region. <u>Timing of public engagement activities, including information sessions and announcement of public comment period on the EIS, were carried out during off-season which limited participation/attendance and did not reach larger portion of the population that lives in the area surrounding Chalk River</u> Canadian Nuclear Laboratories (CNL) made particular efforts to notify seasonal residents of the comment period for the 2017 draft EIS by emailing the local cottagers' association to advise of the opening of the comment period on the 2017 draft EIS and sharing information on how to participate in the public comment period. A special meeting was also held with the OFWCA during the public comment period. The event was well-attended by seasonal residents of the region. It is also noteworthy that the OFWCA is a member of the CNL Environmental Stewardship Council (ESC). In this capacity the Association has had "direct" and frequent access to CNL information on projects and CNL activities. In addition,

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			Association members received annual updates from their representative. These updates and meeting notes are posted to the Association's website and provided members with additional information on the NSDF Project. Canadian Nuclear Laboratories provided direct access to information on the project for stakeholders within and outside of the local community via a dedicated web page created to ensure easy online access – accessible anywhere in Canada - to the 2017 draft EIS and directing visitors to the CNSC's Public Notice on how to participate in the public comment period. Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project, beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Canadian Nuclear Laboratories (CNL) remains available to provide a community based public information session when there is an expressed interest from stakeholders. <u>CNL should have used direct mail, and it certainly needed more public meetings, which should have had better advance notice than the ones we knew about.</u> Canadian Nuclear Laboratories (CNL) has continued – and will continue – to improve and evolve its engagement activities based on stakeholder feedback and public comments. To improve its advertising reach of public information sessions CNL used a direct mail flyer reaching approximately 50,000 households. Canadian Nuclear Laboratories also advertised public information sessions by using Facebook Ads targeted to communities where the information sessions were held. Canadian Nuclear Laboratories has also informed local communities on the projects through its CONTACT newsletter which is directly mailed to over 55,000 households in Renfrew and Pontiac Counties. Participants at the public information sessions were given the opportunity to sign up and receive information and future public information session dates, events, webinars etc. Notification emails are distributed to public and Indigenous distribution lists prior to each public engagement activity and will continue with future engagement activities. Emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote different events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND330	OFWCA (Johanna Echlin) (May 8, 2017) Chris Cavan (May 27, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* CNL's approach to "informing" local communities about their proposal has been insufficient. CNL dismisses concerns and have not answered the questions sent to them in January. **65 Unanswered Questions**: The EIS states that "detailed written responses to stakeholder questions" is one of the communication tools that CNL developed to "effectively and meaningfully communicate with stakeholders for the NSDF Project". Although CNL prepared detailed answers to a number of questions	Responses to the 2017 January 24 comments were provided to the Old Fort William Cottagers Association on 2017 May 19. They were sent to Joanna Echlin for distribution to association members. The questions and answers that were provided to the Old Fort William Cottagers Association informed the development of the initial set of project FAQs and Quick Facts, available at https://www.cnl.ca/en/home/environmental-stewardship/near-surface-disposal-facility/FAQs.aspx Over the timespan of the Near Surface Disposal Facility (NSDF) Project, Canadian Nuclear Laboratories (CNL) has received many inquiries on similar themes. NSDF personnel heard and understood the key/main themes presented by

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		asked by the OFWCA, these triggered further questions. OFWCA sent these additional questions and others to CNL on January 24, 2017. Receipt was acknowledged; however, in spite of repeated reminders, as of May 8th, no answers have been received. Chris Cavan requested that the questions and key concerns raised in the OFWCA letters are not only answered by CNL, but answers released to the public.	interested public and continue to update publicly accessible project information. Section 4.3 of the final Environmental Impact Statement (EIS) summarizes feedback heard during public engagements and through formal comments and how this feedback was incorporated into the final EIS. Section 6.2, and more specifically 6.2.4, of the final EIS describes Indigenous engagements and feedback from each Indigenous community or organization. Additionally, Section 4.2.1.30 of the final EIS summarizes a meeting with the Old Fort William Cottagers Association. Further details are in Section 4.1.1 the Stakeholder Engagement Report [1]. Reference: [1] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November.
CNL-ND331	OFWCA (Johanna Echlin) (May 8, 2017)	How meaningful are CNL's statistics in this EIS (EIS p.188 Table 4.3.1-1 and Appendix 4.0-22 Public Feedback)?	The themes outlined in the 2017 draft Environmental Impact Statement (EIS) was a tool to gauge public views and points out areas where CNL can improve elements of the Near Surface Disposal Facility (NSDF) Project or EIS on current project information, alternative means, valued components, spatial and temporal boundaries and follow-up monitoring program. Section 4.3 of the final EIS summarizes the key themes that have been raised during outreach activities, including web inquiries and formal feedback on the 2017 draft EIS. More importantly, this section now also demonstrates how Canadian Nuclear Laboratories (CNL) has responded, verified and, when possible, incorporated this feedback into the development and design of the NSDF Project as well as the final EIS. Additionally, the project has posted these key themes and how they will be incorporated into the final EIS on the NSDF Project webpage.
CNL-ND332	Joan Lougheed and Town of Deep River (August 16, 2017)	The IWS is consistently referenced in the draft EIS, but is not defined; it has also not been released in its full version. The IWS should have been the subject of considerable discussion with the Town of Deep River well in advance of this project in order to gain public acceptance and to assist Deep River in potentially becoming a well- informed and eager host community.	The CNL Integrated Waste Strategy [1] is available on the CNL website or by request to ermstakehoder@cnl.ca. CNL is available at any time to have a detailed discussion on this or any other CNL document. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND333	Joan Lougheed and Town of Deep River (August 16, 2017)	As of the date hereof, there has been no consultation with the host municipality with respect to malfunction and disaster relief, assistance, training or planning regarding the NSDF.	The NSDF does not present an elevated risk to neighbouring communities. There is no change to Canadian Nuclear Laboratories (CNL) existing emergency preparedness program for the Chalk River Laboratories (CRL) site. Potential accident and mal-function events during the construction and operation phases and potential health and environmental effects have been evaluated and are discussed in Section 10 of the final Environmental Impact Statement (EIS). Credible events were identified through a review of project activities to identify hazards, which were assigned frequency, severity and risk rankings. Each of the credible accident and malfunction events underwent an analysis to determine the dose estimate for the on-site workers as well as the public. The assessment considered both radiological and non-radiological contaminants. The dose consequences to the on-site workers and the public for all potential accidents and malfunctions meet the respective regulatory limits thus residual effects from accidents and malfunctions of the NSDF Project are not significant. The proposed NSDF will be constructed and operated on the CRL site and will be part of the overall site emergency preparedness program. An emergency response plan has been prepared by the Laurentian Hills and Deep River Nuclear Emergency Preparedness Committee to provide officials, agencies and departments involved in emergency response to a

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			nuclear emergency with important information relating to roles, responsibilities and available resources. The Town of Deep River and CNL are committee members.
CNL-ND334	Martine Ouellet (Bloc Québécois) (August 14, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* Pourquoi le site choisi se place-t-il si proche du Québec et de la rivière des Outaouais, un affluent important du fleuve Saint-Laurent, qui tous deux approvisionnent en eau potable, des millions de Québécois, pourtant le processus ne facilite pas la participation et la consultation des Québécois, alors que les vents dominants, vers l'est, et la pente de déversement des eaux les exposent d'avantage?	La possibilité d'éloigner l'installation un peu plus loin de la rivière des Outaouais a été envisagée dans le cadre du processus de choix de l'emplacement et est analysée à la section 2.5.5 de l'Étude d'impact environnemental (EIE) définitive. Cette section a été enrichie pour inclure tous les emplacements envisagés dans le cadre de ce processus. Dans le bassin inférieur du lac Perch, où l'on propose de construire l'installation de gestion des déchets près de la surface (IGDPS), se trouve aussi la première zone de gestion des déchets (ZGD) du site des Laboratoires nucléaires canadiens (LNC). L'hydrogéologie de ce bassin est bien connue et fait l'objet d'études depuis plus de soixante ans. Au cours du processus de choix de l'emplacement de l'IGDPS, cet emplacement a été préféré à l'autre site envisagé, parce qu'il se trouve le long d'une crête rocheuse qui contraint l'eau à s'écouler naturellement à l'écart de la rivière des Outaouais et que le délai de transit des eaux souterraines en direction de la rivière des Outaouais y est plus long que sur l'autre site envisagé. Au cours des activités de mise en place des déchets, tout est fait pour réduire au minimum le contact entre les eaux de pluie et les déchets contaminés et réduire ainsi la production de lixiviat. Le fonctionnement de l'IGDPS est limité à une cellule à la fois pour circonscrire la superficie de déchets exposés à l'environnement (précipitations) en tout temps. Pendant la construction d'une cellule, les déchets sont recouverts pour limiter les infiltrations d'eau et favoriser le ruissellement en surface. Lorsqu'une nouvelle cellule est terminée, une couverture définitive est placée sur la cellule qui vient d'être remplie. D'autres moyens techniques permettent de limiter le contact avec les eaux de pluie, par exemple le nivellement et le compactage des déchets enfouis pour favoriser le ruissellement en surface. Par ailleurs, les eaux qui entrent en contact (ou dont on soupçonne qu'elles entrent en contact) avec les déchets contaminés seront recueillies grâce à un système de collecte du lixiviat et traitées dans une usine de traitement des eaux usées (UTEU) pour en enlever les contaminants avant d'être libérées de façon contrôlée dans l'environnement. Les objectifs de rejet d'effluents traités permettent de protéger la santé du biote humain et du biote non humain. Les modes de communication des Laboratoires nucléaires canadiens (LNC) concernant le projet d'IGDPS sont passés de séances d'information régulières en personne à des webinaires trimestriels, et désormais bimestriels, en français et en anglais, ce qui permet plus facilement de diffuser l'information à toutes les régions et de répondre aux questions. Les Laboratoires nucléaires canadiens (LNC) participeront à des séances d'information sur demande. Les demandes ont donné lieu aux mesures suivantes : • Dix séances d'information publiques ont été organisées dans la province de Québec (Rapides-des-Joachims, Sheenboro, Chapeau, Fort-William et Gatineau). Les commentaires et réponses issus des séances organisées au Québec se trouvent à l'annexe R du rapport sur la participation des parties prenantes [1]. La section 4.3 de l'EIE définitive résume la rétroaction de la population dans le cadre d'événements publics et sous la forme de commentaires officiels et explique comment le tout a été incorporé dans l'EIE définitive. • En mai 2017, LNC a rencontré le Conseil de la Première Nation des Anishinabeg de Kitigan Zibi à Maniwaki, au Québec, pour discuter du projet de l'installation de gestion de déchets près de la surface (IGDPS) et des commentaires formulés quant à la description de ce projet. À la suite de cette rencontre, le personnel de LNC a accueilli le personnel spécialisé en environnement de la Première Nation des Anishinabeg de Kitigan Zibi en juillet 2017 pour une visite sur place, pendant laquelle les participants ont visité le site proposé pour l'IGDPS et ont pu formuler leurs commentaires sur le projet, notamment sur les espèces en péril.Les Laboratoires nucléaires canadiens (LNC) ont participé et continueront de participer à des discussions demandées par des groupes. Le 3 août 2017, ils ont organisé une séance d'information à L'Isle-aux-Allumettes, où neuf participants se sont

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			présentés. Ils ont également rencontré et continueront de rencontrer les élus de L'Isle-aux-Allumettes, de Sheenboro, de la MRC de Pontiac et de la municipalité de Gatineau, à différents paliers de gouvernement. ◦ Décembre 2016 – Député Will Amos de Pontiac. ◦ Février 2017 – Conseil de la MRC de Pontiac. ◦ Avril 2017 – Conseil municipal de Sheenboro. ◦ Mai 2017 – Conseil municipal de L'Isle-aux-Allumettes. ◦ Juillet 2017 – Conseil de la MRC de Pontiac. ◦ Août 2017 – M[me] Ouellet, cheffe du Bloc Québécois. ◦ Février 2018 – Député Greg Fergus de Hull-Aylmer. ◦ Mars 2018 – Assemblée publique avec le député Fergus de Hull-Aylmer. ◦ Avril 2018 – Député Will Amos de Pontiac. ◦ Décembre 2018 – Conseil de la MRC de Pontiac. ◦ Février 2019 – Conseil de la MRC de Pontiac. ◦ Février 2019 – Gouvernement du Québec. ◦ Mai 2019 – Conseiller Duggan du district 3 d'Aylmer. • Depuis avril 2017, les LNC ont organisé quatre séances d'information publiques au Québec. Ils ont été accueillis par l'association Old Fort William Cottagers' Association à Sheenboro (juillet 2017) (section 4.1.18 du document [2]), par le député de Hull-Aylmer dans le cadre d'une assemblée publique à Gatineau (mars 2018 – section 3.1.8 du document [1]) et par le conseiller Mike Duggan à Lucerne/Aylmer (mai 2019 – section 3.1.27 du document [1]), mais n'ont pas pris note du nombre de participants ni n'ont obtenu de rétroaction sur le projet dans l'un ou l'autre cas. • En juin 2020, LNC a rencontré le Conseil tribal de la nation algonquine Anishinabeg (ouest du Québec), qui comprend la Première Nation de Kebaowek (lac Kipawa, Québec), pour discuter d'une entente de contribution visant à assurer l'appui de la participation du Conseil tribal de la nation algonquine Anishinabeg au processus d'évaluation environnementale dans le cadre du projet de l'installation de gestion de déchets près de la surface. • Les Laboratoires nucléaires canadiens (LNC) continuent de participer à toutes les activités de planification du projet d'IGDPS et, si un permis est accordé, ils continueront de participer aux activités de construction, d'exploitation, de fermeture et de post-fermeture en tenant dûment compte de leurs autres activités. Référence [1] Rapport sur la participation des parties prenantes, 232-513400-REPT-002, révision 0, novembre 2019.
CNL-ND335	Verna Polson, Grand Chief: Algonquin Anishinabeg Nation Tribal Council (May 12, 2017) OFWCA (Johanna Echlin) (May 8, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions.* Serious issues with the lack of information in both official languages were highlighted, given that CNL provided Quebec with an EIS in English, and nearly all CNL information is in English (as of May 8th).	The French version of the 2017 draft Environmental Impact Statement (EIS) was made available in the summer of 2017 for the public review. Canadian Nuclear Laboratories (CNL) made the 2019 draft EIS available in French in March 2020. The final EIS, federal and provincial comments, and public comments that were made in French along with their subsequent responses will be made available in both official languages, as outlined in Appendix A to the CNL-CNSC Administrative Protocol for the Near Surface Disposal Facility Project at Chalk River Laboratories (Step 31). Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project from hosting regular in-person information sessions to hosting quarterly and now bi-monthly webinars in English and French, which is a more accessible approach to disseminate information to individuals from all regions as well as the opportunity for their questions to be

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			answered. CNL has offered simultaneous translation to accommodate meetings with the AANTC.
CNL-ND336	Joan Lougheed and Town of Deep River (August 16, 2017) Michael Stephens (August 14, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* CNL writes at page 4-1 of the draft EIS: "Public and Aboriginal engagement is a key component of the environmental assessment process and reflects the corporate social responsibility of Canadian Nuclear Laboratories (CNL)." CNL goes on to state that their engagement efforts have focused primarily on the neighbouring communities, landowners and residents located closest to the CRL property -for instance, the host community (see pg. 4-2). No meaningful engagement with the Town of Deep River is notated as to the preferred solution for dealing with wastes at CRL, especially their disposal. Modern practice is that the proponent actively engages with the community in which they reside, or are most closely associate with, to reach agreement as to what would be the preferred solution for the waste. This form of detailed two-way consultation did not take place. The terms "social licence" and "willing host community" are widely used in the discussion of developing a radioactive waste disposal facility in most public discussions and jurisdictions. This is a major shortcoming of the engagement process adopted by CNL and AECL. With respect to Deep River, the process has been less "engagement of" and more "presented to". As of the date of publication of the draft EIS, CNL had held 14 public information sessions in seven nearby communities (see pg. 4-4). Two public information sessions were held in the Town of Deep River. The first was on June 21, 2016 from 6:00 p.m. to 9:00 p.m. The second was on October 18, 2016 from 6:00 p.m. to 8:00 p.m. (see pg. 4-4). CNL did not contact Deep River officials prior to scheduling these public information sessions and no formal meeting has ever occurred between CNL and Deep River Town Council. CNL should have contacted and collaborated with officials of the host community prior to the June 21, 2016 public information session to ensure that there were no competing or conflicting community events and to ensure that municipal officials were aware of the information session and could attend. CNL should have taken every measure to ensure that all members of the Deep River public had the opportunity to attend what they referred to as **public information sessions.** In addition, and notwithstanding the record of contact between CNL and members of the public (see Part 4 of the draft EIS and Appendices), the Town of Deep River is of the view that there has been no meaningful, real or substantial attempt on the part of CNL to engage the public in the NSDF project. Although the NSDF project description and design is described in detail in the draft EIS, the record suggests answers to questions raised by the public have not been provided (see pg. 4-7 and Appendix 4.0-14). The Town of Deep River is of the opinion that the public engagement process has been inadequate to this point and that additional effort is required so that the host community is involved in a meaningful and collaborative manner.	Public and Indigenous engagement is a key component of the environmental assessment process and reflects the corporate social responsibility of Canadian Nuclear Laboratories (CNL). Section 4.0 and 6.2 summarizes CNL's past and proposed public, stakeholder and Indigenous engagement initiatives, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. These activities are intended to fulfil the requirements for public and Indigenous engagement under the *Canadian Environmental Assessment Act*, 2012 and the *Nuclear Safety and Control Act*. Section 4.3 of the final EIS summarizes the key themes that have been raised during outreach activities, including web inquiries and formal feedback on the 2017 draft EIS. More importantly, this section now also demonstrates how Canadian Nuclear Laboratories (CNL) has responded, verified and, when possible, incorporated this feedback into the development and design of the NSDF Project as well as the final EIS. Additionally, the project has posted these key themes and how they will be incorporated into the final EIS on the NSDF Project webpage. The Town of Deep River is a member of the Canadian Nuclear Laboratories (CNL) Environmental Stewardship Council (ESC) for the Chalk River Laboratories (CRL) site. In this capacity the representative (Town of Deep River Mayor) has "direct" and frequent access to CNL information on projects and CNL activities. Since 2015 October, NSDF has been a topic of discussion at each subsequent ESC meeting. The ESC Council meets three times per year and the ESC representative provides on-going updates to council members. On-going working group engagements with CNL/Atomic Energy of Canada Limited (AECL)/Town of Deep River will continue. Additionally, the Mayor of Deep River and CNL's President and Chief Executive Officer and AECL have met on numerous occasions to discuss areas of mutual interest, including CNL's project activities and the potential for a host community agreement. Canadian Nuclear Laboratories has evolved in communication of the NSDF Project, beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Since 2015, the following public and Indigenous engagement activities were conducted to share information and receive feedback, as summarized in Sections 4.2 and 6.2.4 of the final EIS: : • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions

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			• 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote different events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Canadian Nuclear Laboratories (CNL) remains available to provide a community based public information session when there is an expressed interest from stakeholders. Canadian Nuclear Laboratories (CNL) has been successful with the high level of public participation in the regulatory process and the high level of feedback from the public activated by CNL's engagement activities. Canadian Nuclear Laboratories (CNL) has aimed to inform and gain feedback and public insight into the project and has achieved these goals so far. Canadian Nuclear Laboratories (CNL) continues to engage and receive public input on the project and continues to incorporate public feedback and make operating decisions based on public feedback. Further information on NSDF engagement activities can be found in: Stakeholder Engagement Report, Stakeholder Activities Report [1, 2]. References: [1] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November. [2] Stakeholder Activities Report – Near Surface Disposal Facility, 232-513400-REPT-001, Revision 0, 2017 November.
CNL-ND337	Northwatch (August 16, 2017)	CNL has failed to engage the public and indigenous peoples in building the project fundamentals, including the project's purpose, the project scope, the preferred design, and desired end-states.	Canadian Nuclear Laboratories (CNL) launched, and is carrying out the Environmental Assessment (EA) for the Near Surface Disposal Facility (NSDF) Project within *Canadian Environmental Assessment Act* (CEAA) 2012, meeting the requirements set forth in the Act and following the direction of the Canadian Nuclear Safety Commission's (CNSC) current regulatory guidance with respect to stakeholder and Indigenous engagement. Section 4.0 of the final Environmental Impact Statement (EIS) summarizes all engagement activities and Section 4.3 summarizes feedback heard during public engagements and through formal comments and how this feedback was incorporated into the final EIS. These sections also reflect how CNL continues to be responsive to public feedback and proactively works to ensure that the public are involved in the regulatory process. As part of its corporate, environmental and social responsibility, CNL recognizes and encourages the on-going engagement of Indigenous communities through the course of its environmental assessment process for the NSDF Project. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback

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			received and how CNL continues to engage with each Indigenous community or organization.Through its engagement activities, CNL seeks to inform communities while building awareness and understanding of NSDF Project activities. Canadian Nuclear Laboratories (CNL) communicates with community members on the potential effects of NSDF Project activities on the environment and on Indigenous and/or treaty rights including rights to trap, hunt, fish, gather or conduct cultural ceremonies. Regulatory requirements related to these activities are summarized in Section 2 of the Indigenous Engagement Report [1]. The CEAA 2012 provides a clear description of the environmental effects on Indigenous peoples that are to be taken into account. The CNSC REGDOC-3.2.2 [2] provides more detailed information and sets out the "requirements and guidance for licencees" with respect to Indigenous engagement. Since CNL first brought forth the NSDF Project to local governments and the Environmental Stewardship Council (ESC) in 2015, CNL has conducted project-specific engagement which are detailed and recorded in the NSDF Project's Stakeholder Engagement Report [3] and Indigenous Engagement Report [1]. The following provides a high-level summary of the engagement methods and activities, as outlined in Sections 4.2 and 6.2.3 of the final EIS: • project specific Indigenous agreements and long-term relationship meetings and negotiations; • Indigenous technical assistance and contribution agreements; • Indigenous workshops; • presentations to various Indigneous communities; • presentations to various stakeholders (members of the public, industry, elected officials and employees); • publishing and updating Project-specific webpage content; • posting and publishing Project-specific fact sheets; • publishing and distributing Contact community newsletter; • conducting NSDF Project site visits; • conducting project- specific workshops;conducting Project-specific public information sessions; • conducting Project-specific Indigenous information sessions; • conducting Project-specific employee information sessions; • conducting Indigenous benchmarking tours; • publishing and distributing Voyageur CNL internal newsletter; • participation in public events; • participation in Indigenous events; • increased transparency with interested members of the media – hosted journalists on-site for interviews and • presentations on the Project (i.e., Radio-Canada's Decouvertes, Presse Canadienne, Carleton Master's • Journalism students); • "detect and correct" media relations (i.e., letters to the editor aimed at correcting inaccurate statements in • articles, disseminating factual information); • increased use of social media, including webinars, posting Project-specific videos to YouTube; • advertising campaign in support of public information sessions (online, intranet, newspapers, flyer insert, • radio public service announcement, social media, paid Facebook advertising); • distribution of factsheets and comment cards to local municipal offices in Ontario and Quebec, to function as • an information repository and support public input; • Indigenous and public email distribution lists (invitations to engagements, project updates and milestones etc.) • emails to Indigenous communites including notifications of the 2017 & 2019 draft EIS submission; and • emails to stakeholders including notifications of the 2017 draft EIS submission and responses to questions

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			submitted. Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project, beginning in 2018 January quarterly and now bi-monthly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Since 2015, a number of public and Indigenous engagements using a variety of formats have occurred, as outlined in Sections 4.2 and 6.2.4 of the final EIS, including: • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote different events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. References: [1] Indigenous Engagement Report, 232-513130-REPT-001. [2] CNSC, Indigenous Engagement Version 1.1, REGDOC 3.2.2, 2019 August. [3] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November.
CNL-ND338	William Turner (May 31, 2017) 93. 96. 97.98. 99. 100. 103. 105.	The EIS report has all the symptoms of the "Decide-Announce-Defend" (DAD) approach to public engagement.	The Near Surface Disposal Facility (NSDF) project is subject to a federal environmental assessment process which facilitates opportunity for public and Indigenous engagement. Canadian Nuclear Laboratories (CNL) broadly advertises its project meetings and has been open and transparent about all aspects of the proposed facility. The Environmental Assessment for the NSDF Project was conducted in accordance with the *Canadian Environmental Assessment Act* (CEAA)

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		The DAD approach is not appropriate for a disposal facility whose potential impact to the communities in the vicinity will extend essentially forever. Figures depicting the facility have not changed since October 29th, 2015, despite comments received and question raised on the two versions of the Project Description and public info sessions and at Jan 2016 technical meetings. The EIS does not address any public comments submitted previously on the project description. Section 4.0 should be revised to address comments received on the Project description document. Figure 4.3.1-1 is also misleading and the main themes do not match those listed in 4.3.1.2.1 Please revise the "Medial Coverage" section addressing letters to the editor – in order to address the mistaken connotation that objections to this project are limited to a few individuals.	2012, the Generic Guidelines for the preparation of an Environmental Impact Statement [1] and Canadian Nuclear Safety Commission (CNSC) REGDOC 2.9.1 Environmental Protection: Environmental Principles, Assessments and Protection Measures [2]. Section 4.3 of the final Environmental Impact Statement (EIS) summarizes feedback heard during public engagements and through formal comments and how this feedback was incorporated into the final EIS. The detailed matrix is found in Appendix R of the Stakeholder Engagement Report [3] which is a table of responses to all questions/comments on the NSDF Project since 2016 August using the same medium in which the question/comment was received. Section 6.2, and more specifically 6.2.4, of the final EIS describes Indigenous engagements and feedback from each Indigenous community or organization. More details on Indigenous engagement can be found in the NSDF Indigenous Engagement Report [4]. Section 4.2.11 of the final EIS summarizes CNL's approach to media coverage. During the summer of 2017 coverage of the NSDF Project grew significantly with detractors of the project gaining traction in their messaging. However, CNL began actively utilizing a "detect and correct" method in sending in responses to articles that held misinformation. Section 3.12 of the Stakeholder Engagement Report [3] does include a detailed list of media coverage, including letters to the editor. The NSDF Project was covered in the media 72 times between 2017 August and 2019 June. See Table 3-12 for the full list of NSDF coverage. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September. [3] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November. [4] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND339	William Turner (May 31, 2017) 94.	CNL has not been consistent with poster boards, public information session information materials and CNL website content.	Canadian Nuclear Laboratories (CNL) has continued – and will continue – to improve and evolve its engagement activities and messaging based on stakeholder feedback and public comments. This has included updating language and terminology to better reach a wider audience who may be unfamiliar with the nuclear industry, using newer images more representative of the project as the design for the facility developed, and bringing in different examples of technologies to better explain what aspects of the facility resemble another facility.
CNL-ND340	William Turner (May 31, 2017) 101.	Newsletters 4.3.1.1.7 Please correct inconsistencies with regards to "proven technologies"	The final Environmental Impact Statement (EIS) no longer refers to the Engineered Containment Mound (ECM) being "proven technology, rather the term "best available technology" is used, consistent with the "best available technology and techniques economically achievable (BATEA)" principle within REGDOC 2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [1]. However, this type of facility has been demonstrated as being effective in the cleanup of similarly impacted nuclear sites. At the time of submission of the draft EIS in 2017, Canadian Nuclear Laboratories (CNL) had completed the preliminary design of the Near Surface Disposal Facility (NSDF). Since then, CNL has continued development of the design of the engineered containment mound, wastewater treatment plant and supporting facilities. While the overall design has generally

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			remained the same, several improvements have been made in many cases as a result of the decision to include only low-level radioactive waste, but also in response to valuable public and Indigenous input. Reference: [1] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September.
CNL-ND341	William Turner (May 31, 2017) 102.	Fact Sheets – neither version of the Fact Sheets discuss the classes of radioactive wastes destined for disposal in this facility. This is not acceptable.	Canadian Nuclear Laboratories (CNL) has shared information on the types of waste that are intended for the proposed Near Surface Disposal Facility (NSDF) throughout the life cycle of the proposed project. Canadian Nuclear Laboratories (CNL) staff communicate science-based evidence on the waste inventory proposed for the NSDF, which is now only low-level waste (LLW). The classes of radioactive waste in Canada are determined by the Canadian Nuclear Safety Commission with information available here, on their website http://www.cnsc.gc.ca/eng/resources/infographics/waste/index.cfm). These waste classes are also consistent with definitions of the Canadian Standard Association (CSA) N292.0-19 [1]. Reference: [1] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019.
CNL-ND342	William Turner (May 31, 2017) 104.	Public Feedback section 0- states the ECM will be constructed of clay - which is contradictory to statements made that it will be constructed of the wastes emplaced therein. If CNL is proposing to use clay – where will this clay come from?	The public feedback section of the 2017 Environmental Impact Statement (EIS) indicated that 'engineering containment mound construction (clay) was a main theme in feedback received. The overall design of the engineered containment mound has not changed drastically since 2017. The base liner and final cover systems are composed of a combination of natural materials (e.g., compact clay liner) and synthetic materials (e.g., high density polyethylene geomembranes) designed to work together to mitigate the release of contaminants into the environment. Long-term performance tests (discussed below) have been conducted to provide confidence that the synthetic high density polyethylene geomembrane component of the liner systems will meet the 550-year design life thus complementing the natural clay component which will provide a hydraulic barrier for thousands of years. The source of the clay will be determined should the Near Surface Disposal Facility (NSDF) project proceed. Clay sources have been considered but ultimately the clay will need to meet the quality requirements of the design. To ensure the integrity of the high-density polyethylene (HDPE) materials and quality of installation, the project will apply a Construction Quality Assurance (CQA) program. The CQA Program will include confirmatory tests and inspection by qualified personnel prior to and during liner installation.
CNL-ND343	Greg Csullog (May 1, 2017)	The EIS is a lengthy, complex document that is likely hard to assess by "the average concerned citizen".	The size and technical nature of the Environmental Impact Statement (EIS) is related to the complexity of the environmental assessment. Canadian Nuclear Laboratories (CNL) has revised the Executive Summary to provide a more simplified language to convey the overall results of the EIS. In 2020, CNL solicited input from a small focus group to assist in improving the Executive Summary, which has been reflected in the final EIS. Canadian Nuclear Laboratories (CNL) has also published an "Interactive Executive Summary", available at www.cnl.ca/nsdf which includes, for example, pop-ups to provide definitions, links to supporting information and photographs. Public comments and other direct communication avenues have been opened to help answer questions the public may have about the EIS.
		Public and Aboriginal Engagement - Aboriginal	

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CNL-ND344	Jennifer Jimmo (August 16, 2017)	Aboriginal engagement activities do not appear to have been conducted accordingly, per an overview of the First Nation/ Metis public comments submitted. Also, because the Engineered Containment Mound will inevitably decay and erode after 500 years, maximum, which would contaminate the surrounding environment and the Ottawa River. This is not in sync with the Algonquin Traditional Teachings of the Seven Generations. Furthermore the destruction of the Blanding's Turtle nesting grounds is another strike against the project, as the turtle is considered a great "Manitou" (spirit) to the Algonquin and other First Nations, and is often revered as their greatest spirit in ceremonial traditions and medicinal knowledge and teachings.	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous groups into one single section. This section is supported by Canadian Nuclear Laboratories' (CNL) Indigenous Engagement Report (IER) [1]. The IER was prepared in accordance with CNSC's *REGDOC-3.2.2 Indigenous Engagement* [2]. The IER outlines CNL's approach to Indigenous engagement to support the environmental assessment process for the planned Near Surface Disposal Facility (NSDF) Project. The IER is in many respects a more detailed version of Section 6.0 of the final EIS. In accordance with the REGDOC-3.2.2, the scope of the IER includes: • identification of Indigenous peoples (identified through consultation with the Canadian Nuclear Safety Commission (CNSC)); • planned Indigenous Engagement Activities, that have taken place up to the date of writing and a proposed schedule for interim reporting on these activities to the CNSC; and • the IER is also considered to form the plan on how CNL will engage with Indigenous peoples. Section 6.2.4 of the final EIS includes information on how feedback received from Indigenous communities was incorporated into the EIS. The NSDF is designed to protect the Ottawa River, not harm it. The engineered containment mound is designed to contain and isolate the wastes from the environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. Since the NSDF Project only accepts LLW and most of the radioactivity decays in the first 100 years after closure. The radioactive decay is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration in the engineered containment mound (ECM) decreases about 2,000 times in the first 100 years and begins to approach background levels of concentration shortly thereafter. Blanding's turtle conservation is also highly important to CNL. This species at risk is regulated under the Federal *Species at Risk Act* (SARA). CNL has started implementing the detailed Blanding's Turtle Road Mortality Mitigation Plan [1] and will continue to implement the plan moving forward. The Blanding's Turtle Road Mortality Mitigation Plan [1] is designed to reduce or eliminate turtle road mortality at the Chalk River Laboratories (CRL) site and increase connectivity among habitats. This plan includes mitigation implemented in four key areas: driver awareness; installation of permanent exclusion fencing; creation of nesting mounds; and replacement of culverts in key areas. Through CNL's engagement process, Indigenous communities and groups have conducted Traditional Knowledge and Land Use Studies (TKLUS) to support the NSDF Project EIS and have identified Valued Components (VCs) of particular interest to them. Through this engagement process, Indigenous interests have been incorporated into the selection of final VCs for the NSDF Project (see Section 6.4.2 of the final EIS). All SARA-listed species identified in Appendix 5.6-1 with confirmed observation records within the CRL site were considered as potential valued components at the species level. Each species was evaluated to determine whether its presence was likely in the Site Study Area (SSA) or the Local Study Area (LSA) defined for the terrestrial biodiversity assessment (see Section 5.6.3.1). Species that are unlikely to occur in the LSA, for which habitat was not present in the LSA or for which effects of the NSDF Project were unlikely were excluded as VCs. Rationale for inclusion or exclusion of each species at risk identified during surveys undertaken in the CRL site is presented in Appendix 5.6-1. As per Section 5.6.4.9.3 of the final EIS, with the implementation of the comprehensive mitigation noted above, CNL's activities in the Regional Study Area for the NSDF are predicted to have a net neutral or positive effect on the local Blanding's turtle population during the Base Case.

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			References: [1] Indigenous Engagement Report, 232-513130-REPT-001. [2] CNSC, Indigenous Engagement Version 1.1, REGDOC 3.2.2, 2019 August.
CNL-ND345	MNO (August 16, 2017)	**3.5 Construction Phase, Page 3-16** "An Environmental Protection Plan will also be implemented to reduce or eliminate environmental effects associated with these activities." The MNO should have input into the Environmental Protection Plan to ensure Métis rights and interests are reflected in the document for ongoing reduction of elimination of potential effects perceived by the MNO. The MNO request consultation on and input into the Environmental Protection Plan; specifically, for dust which may contain radiological and hazardous constituents.	Section 6.4.3.4.2 of the final Environmental Impact Statement (EIS) outlines that the Métis Nation of Ontario (MNO) recently completed a Traditional Land Use and Knowledge Study (TKLUS) that was undertaken specifically for the Near Surface Disposal Facility (NSDF)and Nuclear Power Demonstration (NPD) projects. The TKLUS has identified Valued Components (VCs) of particular interest to them. Through this engagement process, Indigenous interests have been incorporated into the selection of final VCs for the NSDF Project. The NSDF Project is not predicted to have any terrestrial effects beyond the Chalk River Laboratories (CRL) site, and results of the aquatic environment assessment identify that measurable residual effects on aquatic biodiversity VCs are not predicted as a result of the NSDF Project. Therefore, no effects on terrestrial or aquatic species defined as traditional land and resource use VCs are expected. An Environmental Assessment Follow-Up Monitoring program is under development for the NSDF Project. Input from the public and Indigenous people will be sought and considered.
CNL-ND346	PCWO (August 16, 2017)	The engagement of Aboriginal groups in the area was inadequate. i.e., meetings were recorded, but few, or no, Aboriginal representatives were noted as attending.	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous groups into one single section. This section is supported by Canadian Nuclear Laboratories' (CNL) Indigenous Engagement Report (IER) [1], recently updated by CNL in 2019. The IER was prepared in accordance with Canadian Nuclear Safety Commission (CNSC) REGDOC-3.2.2 Indigenous Engagement [2]. The IER outlines CNL's approach to Indigenous engagement to support the environmental assessment process for the planned Near Surface Disposal Facility (NSDF) Project. The IER is in many respects a more detailed version of Section 6.0 of the final EIS. In accordance with the REGDOC-3.2.2, the scope of the IER includes: • identification of Indigenous peoples (identified through consultation with the CNSC); • planned Indigenous Engagement Activities, that have taken place up to the date of writing and a proposed • schedule for interim reporting on these activities to the CNSC; and • the IER is also considered to form the plan on how CNL will engage with Indigenous peoples. As outlined in Section 6.2.2 of the final EIS, a proposed list of Indigenous communities with a potential interest in the NSDF Project was identified by CNL and included in the IER. Identification of communities was based on consultation with the CNSC and through the use of publicly available sources of information including: • Indigenous community and organization websites; • the Aboriginal and Treaty Rights Information System (Government of Canada and Indigenous and Northern Affairs Canada (INAC) 2016); and • Crown-Indigenous Relations and Northern Affairs Canada First Nation community profiles. The proposed list was based on the identified potential or established Indigenous or treaty rights of Indigenous communities in the vicinity of the Project and is provided in Table 6.2.2-1 of the final EIS along with a brief rationale for inclusion. The inclusion of specific communities considers the nature of the established and/or claimed rights and potential effects on those rights caused by the proposed Project based on a preliminary assessment of existing and available information. As such, the working list is subject to change based on information and dialogue with the identified Indigenous groups.

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Number	Source	**Comment Summary** (all original submissions can be found on the Canadian Environmental Assessment Registry, reference #80122) **Synthèse des commentaires** (toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)	**Response (to be completed by CNL)** **Réponse (à remplir par la LNC)**
			The IER provides background information on these communities and/or representative organizations with a potential interest in the NSDF Project and includes, where possible, reference to individual community's elected council, geographic location, population, and associations or memberships. The IER Technical Supporting Document (TSD) is revised as these communities and organizations provide additional information during the course of the environmental assessment. The information summarized in this EIS reflects the contents of the IER TSD at the time of preparation of the EIS. Section 6.2.4 of the final EIS provides a summary of engagement activities completed up to 2020 June with Indigenous communities and groups identified for the NSDF Project. The proposed list was based on the identified potential or established Indigenous or treaty rights of Indigenous communities in the vicinity of the Project and is provided in Table 6.2.2-1 along with a brief rationale for inclusion. The inclusion of specific communities considers the nature of the established and/or claimed rights and potential effects on those rights caused by the proposed Project based on a preliminary assessment of existing and available information. Engagement activities have varied and are at the discretion of the various communities and subject to community availability. Engagement experience has ranged from no response, to sharing of CNL archeological and/or technical reports, to the desire to establish formal relationship agreements. Establishment of a Memorandum of Understanding (MOU) has been one approach used to improve Project-related engagement requirements. Such agreements are beneficial to all parties, as the Project is able to engage effectively with specific communities and we jointly gain value from these engagements. References: [1] Indigenous Engagement Report, 232-513130-REPT-001. [2] CNSC, Indigenous Engagement Version 1.1, REGDOC 3.2.2, 2019 August.
CNL-ND347	MNO (August 16, 2017)	Aboriginal engagement, as used in the EIS, generally refers to a less comprehensive consultation process. This can be evidenced by the removal of Aboriginal from the study of baseline conditions and a description and assessment of project activities throughout all phases of the Project. In order for Aboriginal consultation, a duty delegated by the Crown, to be meaningful and accomplished, more than just engagement must take place with the MNO. Instead, there must be assessment of effects to Métis rights through consideration of baseline and project conditions. In addition, the wording in the EIS and consolidation of Aboriginal consultation with public minimizes the required process.	The Métis Nation of Ontario (MNO) and CNL have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. Canadian Nuclear Laboratories has communicated in writing to the MNO the following on 2017 August 25: "The Canadian Nuclear Safety Commission (CNSC), as an agent of the Crown, has responsibility for fulfilling its legal duty to consult, and where appropriate, accommodate Aboriginal peoples when its decisions may have an adverse impact on potential or established Aboriginal and/or treaty rights. While the CNSC cannot delegate its obligation, as per the guidance and requirements of CNSC REGDOC-3.2.2 Aboriginal engagement, CNSC licensees, such as CNL, can carry out the procedural aspects of the consultation process, where appropriate. Canadian Nuclear Laboratories takes this role seriously and is taking an active role in engaging with the MNO and other Indigenous groups who have expressed an interest with respect to its projects and their possible effects." Note: CNSC REGDOC 3.2.2 has been revised since this letter - CNSC, Indigenous Engagement Version 1.1, REGDOC 3.2.2 [2]. A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. This section is supported by Canadian Nuclear Laboratories' (CNL's) Indigenous Engagement Report (IER) [1]. With respect to traditional land and resource use, the NSDF environmental assessment determined that since all project activities occur within the CRL site and there are no

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			ecological effects that would negatively impact traditional harvesting, this signifies that NSDF activities will have no negative effects on Métis rights. References: [1] Indigenous Engagement Report, 232-513130-REPT-001. [2] CNSC, Indigenous Engagement Version 1.1, REGDOC 3.2.2, 2019 August.
CNL-ND348	MNO (August 16, 2017)	**Table 4.3.2-1: First Nation and Métis Communities Selected for NSDF Project Engagement Activities, Page 4-13** "Assertion of rights in the vicinity of the project…" The MNO have recognized rights in the vicinity of the project, not just an assertion of those rights. The rights are recognized and affirmed as part of the MNO-MNR harvesting agreement.	As outlined in Section 6.4.3.4.2 of the final Environmental Impact Statement (EIS), the Near Surface Disposal Facility (NSDF) Project occurs within the Mattawa/Lake Nipissing Traditional Harvesting Territory for the Métis Nation of Ontario (MNO) Mattawa Métis Council, North Bay Métis Council and Sudbury Métis Council, which is part of MNO Region 5. The MNO has indicated that the Chalk River Laboratories (CRL) site occurs on the border of Region 5 and Region 6. Table 6.2.2-1 Identified Indigenous Communities and Organizations in the EIS has been optimized to clarify that the MNO has rights in the vicinity of the NSDF Project ("Identification Rationale" column). A Traditional Land Use and Knowledge Study (TKLUS) was undertaken specifically for the NSDF and Nuclear Power Demonstration (NPD) projects. The TKLUS identified Valued Components (VCs) of particular interest to the MNO. Through this engagement process, Indigenous interests have been incorporated into the selection of final VCs for the NSDF Project. By incorporating these VCs into the NSDF environmental assessment, CNL recognizes the rights of Indigenous groups to the traditional use of land resources through harvesting or hunting in the vicinity of the NSDF Project. The MNO and Canadian Nuclear Laboratories (CNL) have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects.
CNL-ND349	MNO (August 16, 2017)	Lack of capacity to support extensive ongoing consultation and retention of qualified consultations made a detailed response on the letters and follow-up telephone calls by CNL (as listed in Table 4.3.2-2) impossible at the time.	The Métis Nation of Ontario (MNO) and Canadian Nuclear Laboratories (CNL) have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. Canadian Nuclear Laboratories is providing capacity under this agreement in addition to the Participant Funding the MNO is receiving from the Canadian Nuclear Safety Commission (CNSC) Participant Funding Program.
CNL-ND350	MNO (August 16, 2017)	**4.3.3 Future Engagement Activities Planned, Page 4-22 and 4-23** It is unclear from the planned future engagement activities how potential impacts to Métis rights will be identified and assessed should discussions between CNL and MNO continue.	Canadian Nuclear Laboratories' (CNL's) Indigenous Engagement Report (IER) [1] was prepared in accordance with Canadian Nuclear Safety Commission's (CNSC's) REGDOC-3.2.2 Indigenous Engagement [2]. The IER outlines CNL's approach to Indigenous engagement to support the environmental assessment process for the planned Near Surface Disposal Facility (NSDF) Project. The IER is in many respects a more detailed version of Section 6.0 of the final Environmental Impact Statement (EIS). In accordance with the REGDOC-3.2.2, the scope of the IER includes: • identification of Indigenous peoples (identified through consultation with the CNSC); • planned Indigenous Engagement Activities, that have taken place up to the date of writing and a proposed schedule for interim reporting on these activities to the CNSC; and • the IER is also considered to form the plan on how CNL will engage with Indigenous peoples. As stated in Section 6.2.5 of the final EIS, engagement activities with Indigenous communities regarding the NSDF Project continue as appropriate, necessary and requested as environmental assessment and Project planning activities progress. The nature of additional engagement activities will be consistent with CNL's Indigenous engagement objectives. Canadian Nuclear Laboratories (CNL) will endeavour to evaluate and integrate information provided by these communities in the Project planning and design.

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			The Métis Nation of Ontario (MNO) and CNL have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. References: [1] Indigenous Engagement Report, 232-513130-REPT-001. [2] CNSC, Indigenous Engagement Version 1.1, REGDOC 3.2.2, 2019 August.
CNL-ND351	MNO (August 16, 2017)	With respect to the statements made in the EIS regarding the Public Information Program (Executive Summary, section 4.2, etc.), MNO has indicated it is inappropriate to rely on an existing Public Information Program as the vehicle for consultation for a specific project; particularly as the MNO has developed an Interim Statement of Principles on Consultation and has negotiated and executed nine Regional Consultation Protocols. First, Aboriginal consultation must be distinct from public consultation programs in so far that there are higher standards and requirements for an Aboriginal consultation program than that for the general public. These standards are outlined in Guides for CEAA applications as well as in the Canadian Nuclear Safety Commission Public and Aboriginal Engagement – Aboriginal Engagement document. The general public do not hold constitutionally protected rights which must be considered in an assessment process. Secondly, by lumping the two programs together the effects of these activities almost certainly will be identified using environmental effects rather than effects to Aboriginal rights. For consultation to be meaningful, it must be specific; it must be relevant; and it must be related to the Project. Further, resources must be provided to allow for reciprocal consultation to occur; over and above any general capacity provided for ongoing relationship building activities. How will Métis be specifically engaged in a manner consistent with Aboriginal consultation principles outside of the Public Information Program, which is not sufficient for these purposes?	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS) to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. This section incorporates the results of consultation with Indigenous groups that are distinct from public consultation and is supported by the Indigenous Engagement Report (IER) [1], recently updated to support the final EIS. The IER was prepared in accordance with Canadian Nuclear Safety Commission (CNSC) REGDOC-3.2.2 Indigenous Engagement [2]. The IER outlines CNL's approach to Indigenous engagement to support the environmental assessment process for the planned Near Surface Disposal Facility (NSDF) Project. The IER is in many respects a more detailed version of Section 6.0 of the final EIS. In accordance with the *REGDOC-3.2.2*, the scope of the IER includes: • identification of Indigenous peoples (identified through consultation with the CNSC); • planned Indigenous Engagement Activities, that have taken place up to the date of writing and a proposed schedule for interim reporting on these activities to the CNSC; and • the IER is also considered to form the plan on how CNL will engage with Indigenous peoples. As stated in Section 6.2.5 of the final EIS, engagement activities with Indigenous communities regarding the NSDF Project continue as appropriate, necessary and requested as environmental assessment and Project planning activities progress. The nature of additional engagement activities will be consistent with CNL's Indigenous engagement objectives. As had been done during the environmental assessment for the NSDF which culminated into the development of Section 6.0 in the final EIS, CNL will continue to evaluate and integrate information provided by these communities in the Project planning and design. The Métis Nation of Ontario (MNO) and CNL have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. References: [1] Indigenous Engagement Report, 232-513130-REPT-001. [2] CNSC, Indigenous Engagement Version 1.1, REGDOC 3.2.2, 2019 August.
CNL-ND352	MNO (August 16, 2017)	With respect to the public engagement activities listed in the EIS, the MNO notes that no specific information sessions, presentations or site tours were conducted with the MNO. Therefore, the MNO was not afforded the opportunity to provide input in a manner consistent with Aboriginal consultation principles, nor was there an opportunity for MNO input to be taken into consideration for the final NSDF design.	For the Near Surface Disposal Facility (NSDF) project, the Duty to Consult is with the Canadian Nuclear Safety Commission (CNSC) as they are the representative of the Crown. Canadian Nuclear Laboratories' (CNL's) Indigenous engagement efforts are intended to support the Crown's Duty to Consult. Canadian Nuclear Laboratories (CNL) presented to the Métis Nation of Ontario (MNO) (Region 5) in July 2016 in the MNO's North Bay office on the NSDF Project. Since this initial presentation, CNL has requested additional engagement

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		Separate and distinct sessions must be offered to the MNO and its rights-bearing communities to ensure information is presented in a digestible manner that is relevant to the constitutionally protected rights of the MNO. Aboriginal consultation must also be a key aspect of the decision-making process. To date, this has not been the case.	opportunities. Meetings were resumed September 2017 in Sudbury, ON and discussions commenced on establishing a Memorandum of Understanding (MOU). MOU discussion meetings continued into 2018 and the representatives from Region 5 toured the Chalk River Laboratories (CRL) site (including Nuclear Power Demonstration (NPD) and NSDF) in June 2018. Since the signing of the MOU (late 2018). Canadian Nuclear Laboratories (CNL) has met with the MNO on three more occasions regarding the NSDF Project – April 2019 in Sudbury, October 2019 in North Bay, which included a community meeting, and February 2020 in Port Hope. Further meetings aimed at developing a Long Term Relationship Agreement between CNL and the MNO continued virtually in 2020.
CNL-ND353	MNO (August 16, 2017)	**Executive Summary – Engagement Activities** "In consultation with the Canadian Nuclear Safety Commission, and using tools provided through the Aboriginal and Treaty Rights Information System, CNL identified a proposed list of First Nations and Métis communities with potential interest in the NSDF Project." The Aboriginal and Treaty Rights Information System indicates that it contains information on "…some Métis organizations (local, provincial or territorial and national) …" In order to ensure that CNL is working from a comprehensive identification of Métis communities, please provide the MNO with the proposed list for review and confirmation, prior to filing the final EIS.	As outlined in Section 6.2.2 of the final Environmental Impact Statement (EIS), a proposed list of Indigenous communities with a potential interest in the Near Surface Disposal Facility (NSDF) Project was identified by Canadian Nuclear Laboratories (CNL) and included in the Indigenous Engagement Report (IER). Identification of communities was based on consultation with the Canadian Nuclear Safety Commission (CNSC) and through the use of publicly available sources of information including: • Indigenous community and organization websites; • the Aboriginal and Treaty Rights Information System (Government of Canada and Indigenous and Northern Affairs Canada (INAC) 2016); and • Crown-Indigenous Relations and Northern Affairs Canada First Nation community profiles. The proposed list was based on the identified potential or established Indigenous or treaty rights of Indigenous communities in the vicinity of the Project and is provided in Table 6.2.2-1 of the final EIS along with a brief rationale for inclusion. The inclusion of specific communities considers the nature of the established and/or claimed rights and potential effects on those rights caused by the proposed Project based on a preliminary assessment of existing and available information. As such, the working list is subject to change based on information and dialogue with the identified Indigenous groups. Specifically, with regards to the Métis Nation of Ontario (MNO) (community councils representing the Project location): • MNO North Bay • MNO Mattawa Métis • MNO Sudbury via the Mattawa/Lake Nipissing Traditional Territory Consultation Committee The MNO and CNL have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects.
CNL-ND354	MNO (August 16, 2017)	There was no consultation with the MNO on any archaeological work completed, including the recommendation for Stage 4 mitigation. At minimum, the MNO requires notification of archaeological work and a summary of identified archaeological sites. In 2011, the MNO did request participation in the archaeological work taking place but the MNO's request was rejected. CNL has real and constructive knowledge of the MNO's ongoing interest in archaeological work in the Project area. In addition, the archaeological assessment field studies did not include the participation of MNO Citizens. This leaves the Project potentially lacking information about Métis specific heritage resources. Particularly as there is reason to believe this area has the potential to include Métis archaeological resources as per the Mattawa Research (completed by two independent companies: Stone Circle	The Archaeological Assessment [1] work was conducted using heritage consultants who employ technicians, based on the consultant's licence requirements and the associated project activities. The preliminary and final archaeological reports have been provided to the Métis Nation of Ontario (MNO). Section 6.2.4.4 of the revised outlines that the Métis Nation of Ontario recently completed a Traditional Land Use and Knowledge Study (TKLUS) that was undertaken specifically for the Near Surface Disposal Facility (NSDF) and Nuclear Power Demonstration (NPD) projects. The TKLUS has identified Valued Components of particular interest to them. Through this engagement process, Indigenous interests have been incorporated into the selection of final Valued Components (VCs) for the NSDF Project.

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		Consulting and Know History and is a result of a tripartite research initiative financially supported by the Ontario Government and the Government of Canada). With respect to the Cultural Resource Management program, to date, the MNO has not been involved in this program. MNO should have involvement in this program to allow for Métis input into identification of unanticipated archaeological resources and implementation of adaptive management for those resources.	The MNO and CNL have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. Reference: [1] Stage 4 Archeological Assessment, 232-509213-REPT-003.
CNL-ND355	William Turner (May 31, 2017) 107.	The First Nations engagement activities shown are all quantity with very little quality. CNL must truly engage First Nations in determining their issues, not just providing information about the project.	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. This section is supported by Canadian Nuclear Laboratories' (CNL's) Indigenous Engagement Report (IER) [1] which was recently updated to support the final EIS. The IER was prepared in accordance with CNSC's REGDOC-3.2.2 Indigenous Engagement [2]. The IER outlines CNL's approach to Indigenous engagement to support the environmental assessment process for the planned Near Surface Disposal Facility (NSDF) Project. The IER is in many respects a more detailed version of Section 6.0 of the final EIS. In accordance with the *REGDOC-3.2.2*, the scope of the IER includes: • identification of Indigenous peoples (identified through consultation with the Canadian Nuclear Safety Commission (CNSC)); • planned Indigenous Engagement Activities, that have taken place up to the date of writing and a proposed schedule for interim reporting on these activities to the CNSC; and • the IER is also considered to form the plan on how CNL will engage with Indigenous peoples. As stated in Section 6.2.5 of the final EIS, engagement activities with Indigenous communities regarding the NSDF Project continue as appropriate, necessary and requested as environmental assessment and Project planning activities progress. The nature of additional engagement activities will be consistent with CNL's Indigenous engagement objectives. CNL will endeavour to evaluate and integrate information provided by these communities in the Project planning and design. Engagement activities have varied and are at the discretion of the various communities and subject to community availability. Engagement experience has ranged from no response, to sharing of CNL archeological and/or technical reports, to the desire to establish formal relationship agreements. Establishment of a Memorandum of Understanding (MOU) has been one approach used to improve Project-related engagement requirements. Such agreements are beneficial to all parties, as the Project is able to engage effectively with specific communities and we jointly gain value from these engagements. References: [1] Indigenous Engagement Report, 232-513130-REPT-001. [2] CNSC, Indigenous Engagement Version 1.1, REGDOC 3.2.2, 2019 August.
		Public and Aboriginal Engagement - Public	
CNL-ND356	OFWCA (Johanna Echlin) (May 8, 2017) David Prentice (August 16, 2017) Michael Nogas (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The EIS declares that CNL has been engaging the public. There were three scheduled information sessions in two communities in Quebec: Rapides-des-Joachims and Sheenboro. Two locations and six information sessions in one year in the entire province of Quebec is not sufficient. No sessions were held further downriver (Shawville, Fort Coulonge, Campbell's Bay). There were five locations in Ontario,	Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project from hosting regular in-person information sessions to hosting quarterly and now bi-monthly webinars in English and French, which is a more accessible approach to disseminate information to individuals from all regions as well as the opportunity for their questions to be answered. CNL will also attend public and Indigenous community information events whenever requested. In response to requests:

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	Virginia MacLatchy (August 16, 2017)	each with three sessions - Quebec lies on one entire side of the Ottawa River and could be impacted by whatever happens at Chalk River.	• Ten public information sessions have been held in the province of Quebec (Rapides-des-Joachims, Sheenboro, Chapeau, Fort William, and Gatineau). Comments and responses from the sessions in Quebec (QC) are found in Appendix R of the Stakeholder Engagement Report [1]. Section 4.3 of the final EIS summarizes feedback heard during public engagements and through formal comments and how this feedback was incorporated into the final EIS.
			• In May 2017, CNL met with Kitigan Zibi Anishinabeg First Nation Council in Maniwaki, Quebec to discuss the NSDF Project and the comments submitted on the NSDF Project Description. Following this meeting, CNL hosted Kitigan Zibi Anishinabeg First Nation environmental staff for a CRL site visit in July 2017, which included a tour of the proposed NSDF site and an opportunity to provide feedback on the project, which included feedback on species at risk.Canadian Nuclear Laboratories (CNL) has engaged, and continues to engage, with any groups that have requested meetings. On 2017 August 03 CNL held an information session on L'Isle aux-Allumettes; nine individuals attended. Canadian Nuclear Laboratories (CNL) has also met, and continues to meet, with elected officials from L'Isle-aux-Allumettes, Sheenboro, MRC Pontiac, and the City of Gatineau, at various levels of government.
			  ○ December 2016 – MP Will Amos, Pontiac
			  ○ February 2017 – MRC Pontiac Council
			  ○ April 2017 – Sheenboro Council
			  ○ May 2017 - L'Isle aux-Allumettes Council
			  ○ July 2017 – MRC Pontiac Council
			  ○ August 2017 - Bloc Québécois Leader Mme Ouellet
			  ○ February 2018 – MP Greg Fergus, Hull - Aylmer
			  ○ March 2018 – MP Fergus Town Hall, Hull-Aylmer
			  ○ April 2018 – MP Will Amos, Pontiac
			  ○ December 2018 – MRC Pontiac Council
			  ○ February 2019 – MRC Pontiac Council
			  ○ February 2019 – Government of Quebec
			  ○ May 2019 – Councillor Duggan, District 3 - Aylmer
			• Since 2017 April, CNL has hosted four public information sessions in Quebec. CNL was hosted by the Old Fort William Cottagers' Association in Sheenboro (July 2017) (Section 4.1.18 of [2]), by Hull-Aylmer MP for a Town Hall in Gatineau (March 2018 – Section 3.1.8 of [1]) and by Mike Duggan Councillor for Lucerne/Aylmer (May 2019 – Section 3.1.27 of [1] and did not track the number of participants or receive written feedback on the Project at either event.
			• In June 2020, CNL met with the Alqonquin Anishinabeg Nation Tribal Council (western Quebec), which included Kebaowek First Nation (Lake Kipawa, Quebec) to discuss a contribution agreement to ensure support of the AATNC's participation in the NSDF environmental assessment process.
			• Canadian Nuclear Laboratories (CNL) continues to engage throughout the planning of the NSDF Project and if a licence is granted, CNL will continue engagement through construction and operation, closure and post-closure phases although levels of engagement will be proportionate to CNL's other activities.
			
			Reference:
			[1] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November.

CNL-ND357	OFWCA (Johanna Echlin)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.*	Public and Indigenous engagement is a key component of the environmental assessment process and reflects the corporate social responsibility of Canadian Nuclear Laboratories (CNL). Section 4.0 of the final EIS summarizes CNL's past and

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	(May 8, 2017) Craig Robinson (August 15, 2017)	Information sessions were poster board sessions with no formal presentation by CNL. People could come and go, preventing group dialogue and people from learning from others questions, and leaving many without a clear understanding of their role, and the general project. Many who attended the sessions last June and October, did not sign in or register their concerns, not understanding that then they would be left out of CNL's "statistics" and are thus not taking into account. It is the impression of OFWCA that people were provided with little information of consequence unless they asked very specific questions. CNL did not go out of their way to describe the very real potential dangers of this radioactive waste disposal. People often left these sessions not knowing much more than when they arrived. These information sessions were geared to convey that all CNL's plans are proven, perfect, safe and according to regulations. For example: In their presentations they have used terms like "tiny bit" or "small amount" in referring to wastes from other sites that is actually about 100,000 cubic meters, and amounts of intermediate level waste estimated at 10.000 cubic meters, and continue to say that it is mostly demolition waste without explaining the details.	proposed public and stakeholder engagement initiatives, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. These activities are intended to fulfil the requirements for public and Indigenous engagement under the *Canadian Environmental Assessment Act*, 2012 and the *Nuclear Safety and Control Act*. All public information sessions for the NSDF were supported by having technical experts available based on the topic of discussion to address questions/comments on a one-on-one basis. Section 3.2.1 of the Stakeholder Engagement Report [1] and 4.2.2.1 of the final EIS includes information on the expertise that was present during the public information sessions. Participation in completing comment cards and "signing-in" are completely at the discretion of individuals attending CNL sessions. Canadian Nuclear Laboratories (CNL) staff communicate science-based evidence on the waste inventory proposed for the NSDF – low-level waste. The classes of radioactive waste in Canada are determined by the Canadian Nuclear Safety Commission with information available here, on their website http://www.cnsc.gc.ca/eng/resources/infographics/waste/index.cfm). These waste classes are also consistent with definitions of the Canadian Standard Association (CSA). These waste classes are also consistent with definitions of the Canadian Standard Association (CSA) N292.0-19 [1]. Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [2]). Since CNL first brought forth the NSDF Project to local governments and the Environmental Stewardship Council (ESC) in 2015, CNL has conducted project-specific engagement methods and activities, as outlined in Sections 4.2 and 6.2.3 of the final EIS, which include the following: • project specific Indigenous agreements and long-term relationship meetings and negotiations; • Indigenous technical assistance and contribution agreements; • Indigenous workshops; • presentations to various Indigneous communities; • presentations to various stakeholders (members of the public, industry, elected officials and employees); • publishing and updating Project-specific webpage content; • posting and publishing Project-specific fact sheets; • publishing and distributing Contact community newsletter; • conducting NSDF Project site visits; • conducting project- specific workshops;conducting Project-specific public information sessions; • conducting Project-specific Indigenous information sessions; • conducting Project-specific employee information sessions; • conducting Indigenous benchmarking tours; • publishing and distributing Voyageur CNL internal newsletter; • participation in public events;

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			• participation in Indigenous events; • increased transparency with interested members of the media – hosted journalists on-site for interviews and • presentations on the Project (i.e., Radio-Canada's Decouvertes, Presse Canadienne, Carleton Master's • Journalism students); • "detect and correct" media relations (i.e., letters to the editor aimed at correcting inaccurate statements in • articles, disseminating factual information); • increased use of social media, including webinars, posting Project-specific videos to YouTube; • advertising campaign in support of public information sessions (online, intranet, newspapers, flyer insert, • radio public service announcement, social media, paid Facebook advertising); • distribution of factsheets and comment cards to local municipal offices in Ontario and Quebec, to function as • an information repository and support public input; • Indigenous and public email distribution lists (invitations to engagements, project updates and milestones etc.) • emails to Indigenous communites including notifications of the 2017 & 2019 draft EIS submission; and • emails to stakeholders including notifications of the 2017 draft EIS submission and responses to questions submitted. Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project, beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Since 2015, a number of public and Indigenous engagements using a variety of formats have occurred, as outlined in Sections 4.2 and 6.2.4 of the final EIS, including: • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote different events, to advise of the public comment period on the draft EIS and to provide responses to

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			questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Section 4.3 of the final EIS summarizes feedback heard during public engagements and through formal comments and how this feedback was incorporated into the final EIS. The detailed matrix is found in Appendix R of the Stakeholder Engagement Report [3] which is a table of responses to all questions/comments on the NSDF Project since 2016 August using the same medium in which the question/comment was received. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. More details can be found in the NSDF Indigenous Engagement Report [4]. References: [1] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [2] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [3] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November. [4] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND358	OFWCA (Johanna Echlin) (May 8, 2017)	It was July 2016 before many had heard a thing about CNL's proposal. There was no public debate about the best solutions for the legacy of radioactive waste that currently exists at Chalk River. A decision was already taken without the input from anyone in the Valley let alone the communities right next door to this site at Chalk River (while residents have just months to figure out this complex plan and to react in some thoughtful way).	In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. Atomic Energy of Canada Limited has asked Canadian Nuclear Laboratories (CNL) to find solutions for the disposal of its low-level waste (LLW) as a means to reduce its legacy liabilities and to enable the remediation and revitalization of the CRL site. As a designated project under the *Canadian Environmental Assessment Act* (CEAA) 2012, the Near Surface Disposal Facility (NSDF) is subject to a federal environmental assessment and therefore requires authorization from the Canadian Nuclear Safety Commission (CNSC) to commence the project. Through the Environmental Impact Statement (EIS), CNL has identified a preferred solution for the disposal of LLW and the public is involved through the environmental assessment process. As outlined in Section 2.5 of the final EIS, CEAA 2012 requires that federal environmental assessments evaluate alternative means of carrying out a project that are technically and economically feasible and the environmental effects of any such alternative means. Each alternative is assessed, and the most preferable option is selected after a systematic consideration of technical feasibility, economic feasibility and environmental effects. Public and Indigenous engagement is a key aspect of the decision-making process. Section 4.0 of the final EIS summarizes CNL's past and proposed public and stakeholder engagement initiatives which commenced in 2015, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. These activities are intended to fulfil the requirements for public and Indigenous engagement under the CEAA 2012 and the *Nuclear Safety and Control Act*, in accordance with the Generic EIS Guidelines developed by the Canadian Nuclear Safety Commission [1].

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			Canadian Nuclear Laboratories (CNL) first brought forth the NSDF Project to local governments and the Environmental Stewardship Council (ESC) in 2015 - the Old Fort William Cottagers Association (OFWCA) is represented on CNL's Environmental Stewardship Council (ESC). Since 2015 October, the NSDF has been a topic of discussion at each subsequent ESC meeting. Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project, beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Since 2015, a number of public and Indigenous engagements using a variety of formats have occurred, as outlined in Sections 4.2 and 6.2.4 of the final EIS,, including: • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote engagements and events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Canadian Nuclear Laboratories (CNL) remains available to provide a community based public information session when there is an expressed interest from stakeholders. Canadian Nuclear Laboratories (CNL) has been successful with the high level of public participation in the regulatory process and the high level of feedback from the public activated by CNL's engagement activities. CNL has aimed to inform and gain feedback and public insight into the project and has achieved these goals so far. CNL continues to engage and

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			receive public input on the project and continues to incorporate public feedback and make operating decisions based on public feedback. Further information on NSDF engagement activities can be found in: Stakeholder Engagement Report, Stakeholder Activities Report [2, 3]. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November. [3] Stakeholder Activities Report – Near Surface Disposal Facility, 232-513400-REPT-001, Revision 0, 2017 November.
CNL-ND359	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	Please send us a public responsiveness document that details CNL's responses to the public's comments (concerns and suggestions) that they gave to CNL either through meetings or through sending comments to CNL in letters or e-mails. The responsiveness document should state what changes the CNL made in their engagement process and in the plans for the NSDF as a result of public input. The responsiveness document should also include reasons for not making changes in response to some comments. (Page 10).	Section 4.3 of the final EIS summarizes feedback heard during public engagements and through formal comments and how this feedback was incorporated into the final EIS. The detailed matrix is found in Appendix R of the Stakeholder Engagement Report [1] which is a table of responses to all questions/comments on the NSDF Project since 2016 August using the same medium in which the question/comment was received. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. More details can be found in the NSDF Indigenous Engagement Report [2]. Reference: [1] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November. [2] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND360	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	Several commenters have expressed the view that CNL has provided limited information in the EIS to be able to judge the adequacy of CNL's public engagement program.	Section 4.0 of the final EIS summarizes CNL's past and proposed public and stakeholder engagement initiatives which commenced in 2015, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. These activities are intended to fulfil the requirements for public and Indigenous engagement under the *Canadian Environmental Assessment Act*, 2012 and the *Nuclear Safety and Control Act*, in accordance with the Generic EIS Guidelines developed by the Canadian Nuclear Safety Commission. Furthermore the project has been engaging the public in accordance with CNL's Public Information Program which is aligned with REGDOC 3.2.1 *Public Information and Disclosure*. Further information on NSDF engagement activities can be found in: Stakeholder Engagement Report, Stakeholder Activities Report [1, 2].Further information on Indigensou engagement can be found in the NSDF Indigenous Engagement Report [3]. References: [1] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November. [2] Stakeholder Activities Report – Near Surface Disposal Facility, 232-513400-REPT-001, Revision 0, 2017 November. [3] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND361	Michael Stephens (August 14, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.*	As a designated project under *Canadian Environmental Assessment Act* (CEAA) 2012, the Near Surface Disposal Facility (NSDF) is subject to a federal environmental assessment and therefore requires authorization from the Canadian Nuclear Safety Commission (CNSC) to commence the project. Through the Environmental Impact Statement (EIS), Canadian

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	Robert M. Daisley (August 14, 2017) Durham Nuclear Awareness (August 16, 2017) Anthony Cowan (August 16, 2017) Linda Gasser (August 16, 2017)	An important lesson appears to have been forgotten from the ill-fated Canadian Nuclear Fuel Waste Management Program: social licence (or public endorsement) for a project cannot be assumed and must be earned. The Nuclear Waste Management Organization (NWMO) has taken that lesson to heart in its work to implement a solution to dealing with Canada's nuclear fuel waste. In contrast, the NSDF Proponent continues to use a one-way Decide-Announce-Defend (DAD) strategy rather than two-way public engagement. The public was not involved before the NSDF concept was selected and developed.	Nuclear Laboratories (CNL) has identified a preferred solution for the disposal of low-level waste (LLW). A key objective of the Environmental Assessment (EA) process is to engage the public and Indigenous groups on *proposed* projects, and to reflect input and feedback received in the project. As a result of such engagement, CNL has already made important adjustments to its plans, including the removal of Intermediate level waste from being accepted at the facility. Section 4.0 summarizes CNL's past and proposed public and stakeholder engagement initiatives, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. These activities are intended to fulfil the requirements for public and Indigenous engagement under the CEAA 2012 and the *Nuclear Safety and Control Act*. Canadian Nuclear Laboratories first brought forth the NSDF Project to local governments and the Environmental Stewardship Council in 2015 – public and Indigenous engagement has continued since that time.
CNL-ND362	Jason Phelps (August 14, 2017) Carole Nevills (August 15, 2017)	In these final days of public consultation, CNL has consistently failed to respond adequately to our questions and concerns. The OFWCA organized a well-attended public event at Hotel Pontic in Sheenboro Québec where dozens of well researched questions were asked and CNL reps were unprepared to respond. This whole consultation process was predetermined from the start. CNL has clearly stated that there is no 'Plan B'.	Section 4.3 of the final EIS summarizes feedback heard during public engagements and through formal comments and how this feedback was incorporated into the final Environmental Impact Statement (EIS). The detailed matrix is found in Appendix R of the Stakeholder Engagement Report [1] which is a table of responses to all questions/comments on the NSDF Project since 2016 August using the same medium in which the question/comment was received. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. All public information sessions for the NSDF were supported by having technical experts available based on the topic of discussion to address questions/comments on a one-on-one basis. Section 3.2.1 of the Stakeholder Engagement Report [1] and 4.2.2.1 of the final EIS includes information on the expertise that was present during the public information sessions. The commenter is correct – there is no "Plan B". In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. The waste liabilities are not retired until final and permanent disposal is completed. The purpose of the NSDF Project is to provide the permanent disposal of current and future low-level waste (LLW) at the Chalk River Laboratories (CRL) site in a manner that is protective of both the public and the environment. Further, the NSDF Project would enable the remediation of historically contaminated lands and legacy waste management areas (WMAs), as well as the decommissioning of outdated infrastructure to facilitate the CRL site revitalization. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options has not been included in the final NSDF EIS. On-going waste storage ("do nothing") as an alternative option has been included in the final EIS (Section 2.5.2.1). The 'do nothing' scenario option could involve the existing configuration of the CRL WMAs which includes the use of bunkers and storage buildings as well as rolling stewardship or monitored retrievable storage for continued storage and would need an indefinite interim storage space for existing legacy waste and waste that will be generated in the future (e.g., during decommissioning). However, the historic WMAs have minimal to no engineered barriers to contain their inventory. As such

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			these legacy wastes are exposed to weathering and erosion (rain, snow, corrosion, etc. resulting in the release of contaminants into the environment. Although the releases and groundwater impact from these WMAs is currently being managed, the risk of future releases and environmental impacts the inventory poses could be substantially reduced through improved containment and isolation of the source term. Leaving the historic WMAs in their current configuration as an alternative to LLW disposal is not technically feasible as it is unlikely to satisfy regulatory and licensing requirements for long-term waste management, specifically those specified within REGDOC-2.11.1 Volume III (*Assessing the Long-Term Safety of Radioactive Waste Management)* [2].Therefore, the practice of continuing to build additional temporary storage systems at the CRL site for LLW is not sustainable. It will not reduce the risks associated with waste release or the cost of laboratory operations. Furthermore, "doing nothing" will not help to create the conditions for the revitalization of the CRL property. Further, as noted in Section 2.3 of the final EIS, continuing to build additional temporary storage systems at the CRL site for low-level waste (LLW) is not consistent with modern waste management principles. In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal facilities required for their wastes. As such CNL does not consider the on-going waste storage as technically feasible as it is not aligned with national policies. References: [1] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November. [2] CNSC, Waste Management, Volume III: Assessing the Long-term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May.
CNL-ND363	Joan Lougheed and Town of Deep River (August 16, 2017)	Given the general public's interest in waste management (especially radioactive waste), the public information sessions and meetings with public representatives should have been more informative regarding the significant number of LLW and ILW waste shipments from non-CRL sites (WL, NPD and Gentilly-1) that will be made to CRL for disposal at the NSDF. Furthermore; no mention was made of the absolute and relative risk of these shipped wastes.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). Approximately 90% of the LLW planned to be emplaced in the NSDF is currently located on the Chalk River Laboratories (CRL) site and will not be transported on public roads. Off-site waste transportation is outside the scope of the NSDF Project because it is part of an on-going and existing activity conducted by CNL. That being said, AECL, and now CNL, has been transporting wastes safely and without incident for over 50 years. Transportation has been demonstrated to be safe and will continue to be carried out in order to consolidate radioactive wastes at CRL whether or not the proposed NSDF Project proceeds. Canadian Nuclear Laboratories maintains a Transportation Program to ensure that all shipments are carried out in accordance with all Canadian regulatory requirements and best practice. This will ensure that all transportation activities will not result in negative consequences to Canadians and the residents of Deep River. In order to reduce risks to CNL's security, the details of CNL's transportation activities are not published. Canadian Nuclear Laboratories (CNL) does engage with the public on a regular basis to explain status of work underway to consolidate wastes at CRL and how this work reduces Canada's nuclear liability and long-term risk. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND364	Joan Lougheed and Town of Deep	In Section 2.5 (Alternative Means for Carrying out the Project), it is noted that "Public engagement is a key aspect of the decision-making process", in relation to the alternative means assessment (see pg.2-12).	As a designated project under *Canadian Environmental Assessment Act* (CEAA) 2012, the Near Surface Disposal Facility (NSDF) is subject to a federal environmental assessment and therefore requires authorization from the Canadian Nuclear

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	River (August 16, 2017)	The record reveals that the public was not involved in the decision-making process carried out to complete this Alternative Means assessment. Rather, it seems that the Alternative Means were developed solely by CNL and its consultants. Furthermore, Table 2.5-1, taken in consideration with Sections 2.2.2 and 2.5 noted [in other areas of the Deep River submission from August 16] and the fact that there is no reference to a willing host community, an alternative scenario should have been considered whereby waste to be emplaced in the NSDF is restricted to waste generated exclusively at CRL.	Safety Commission (CNSC) to commence the project. Through the Environmental Impact Statement (EIS), Canadian Nuclear Laboratories (CNL) has identified a preferred solution for the disposal of low-level waste (LLW) and the public is involved through the environmental assessment process. The method followed to assess Alternative Means for carrying out the NSDF Project is found in Section 2.5 of the final EIS. The assessment of alternatives for the NSDF Project is consistent with the CNSC *Generic Guidelines for the Preparation of an EIS* [1] and the CEAAs Operational Policy Statement: Addressing the "purpose of" and "Alternative Means" under *CEAA*, 2012 (2015). Each alternative is assessed, and the most preferable option is selected after a systematic consideration of technical feasibility, economic feasibility and environmental effects. Public and Indigenous engagement is a key aspect of the decision-making process. Through the EIS, CNL has identified a preferred solution for the disposal of low-level waste, which is ultimately considered for a decision on the project proceeding. In accordance with *Canada's Radioactive Waste Policy Framework*, the waste producers and owners of radioactive waste are responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. Responsible nuclear waste management includes full life cycle management from generation to disposal. Atomic Energy of Canada Limited (AECL) has contracted CNL to find solutions for the disposal of its LLW as a means to reduce its legacy liabilities and to enable the remediation and revitalization of the CRL site. *Canadian Environmental Assessment Act* (2012) requires that federal EAs evaluate alternative means of carrying out a project that are technically and economically feasible and the environmental effects of any such alternative means. As summarized in the Section 2.5 of the final EIS, CNL has proposed a technically, environmentally, and economically feasible solution to permanently dispose of AECL's LLW. Public and Indigenous engagement is a key aspect of this decision-making process. In response to feedback from the public and the CNSC, CNL has evolved engagement activities since 2017 August with the public and indigenous groups based on its regulatory requirements for the proposal of a designated project (i.e., the NSDF). The Stakeholder Engagement Report [2] details the various public engagement mechanisms as well as records of public participation between 2017 August to 2019 June. Table 4.3.2-1 details how the key issues communicated by the public have been incorporated into the final EIS, including alternative means to carry out the project as well as site selection. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. Overall, CNL and its consultants took into consideration the concerns expressed by the public into its assessment of alternative means to carry out the project. The NSDF is proposed to be constructed on land currently under AECL ownership and CNL management, is close to the location of generation and/or storage of majority of AECL-owned waste, and is within an area that is already covered by a nuclear operations licence. The siting of NSDF takes into consideration "special circumstances", namely that a significant portion of the CRL site is historically impacted or contaminated by LLW (e.g., soil contaminated at WMA A). It was therefore practical to site the disposal facility at a location where major cleanup/remediation needs to occur. This contributes to the consolidation of existing AECL liabilities while reducing the risk to the environment (i.e., contaminated soil which needs to be excavated need not travel far). References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November.

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CNL-ND365	Joan Lougheed and Town of Deep River (August 16, 2017)	In Section 2.2.2, the draft EIS states: "At Whiteshell Laboratories (WL), and the Douglas Point and Gentilly-1 prototype reactor sites, these wastes [referring to LLW and ILW] will be segregated, packaged to meet transport requirements and shipped to CRL for either disposal at the NSDF or placement in long-term storage pending availability of an ILW Repository" (see pg.2-4). Due to this uncertain strategy regarding the permanent disposal of ILW, Deep River is concerned that CRL will become a national nuclear waste storage and disposal site, without meaningful consultation with the community. This concern is furthered in Section 2.2.2.2, where CNL informs that an ILW facility at CRL has been assessed as viable and is under consideration for the future (see pg.2-5).	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). The disposal options for Atomic Energy of Canada's (AECL's) ILW (managed by CNL) is outside the scope of the NSDF Project. The current strategy for AECL's ILW has not yet been defined. A program of work is planned to assess the options and decide on a path forward. Future work will follow all applicable regulatory processes. (Section 2.2.2.1 of the final EIS). Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
		Public and Aboriginal Engagement - Transparency	
CNL-ND366	Heather Sanderson (May 12, 2017) Janey Bullivant (May 13, 2017) Brian Ahearn (May 15, 2017)	The public deserves transparency about the operations and incidents at Chalk River and Rolphton, for the past, present and future. Commenters are interested in transparency and public consultation throughout the project.	Canadian Nuclear Laboratories (CNL) is committed to organizational transparency, ensuring that Indigenous communities, the general public, local communities, elected and appointed government officials and other industry stakeholders are properly informed about activities carried out at Canadian Nuclear Laboratories sites. This commitment is met through CNL's Public Information Program (PIP), a communications program that was developed to build public awareness and trust, and to encourage transparent and proactive communication with its various stakeholders. CNL's Public Information Program [1] includes specific communications to stakeholders, public access to information related to routine activities, radiological and non-radiological emissions, and non-routine items or events at the different sites managed by CNL. Canadian Nuclear Laboratories (CNL) provides these communications through the CNL website (www.cnl.ca). The requirements for public information programs and disclosure protocols are derived from the stated objectives of the Canadian Nuclear Safety Commission (CNSC) in *the Nuclear Safety and Control Act*. Additional guidance on public information programs are given in the CNSC REGDOC 3.2.1 *Public Information and Disclosure* [2]. Section 4.0 of the final EIS summarizes CNL's past and proposed public and stakeholder engagement initiatives which commenced in 2015 for the NSDF Project, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. These activities are intended to fulfil the requirements for public and Indigenous engagement under the *Canadian Environmental Assessment Act, 2012* and the *Nuclear Safety and Control Act*, in accordance with the Generic EIS Guidelines developed by the CNSC [3]. Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project, beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions.

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			Since 2015, a number of public and Indigenous engagements using a variety of formats have occurred, as outlined in Sections 4.3 and 6.2.4 of the final EIS, including: • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote engagements and events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Canadian Nuclear Laboratories (CNL) remains available to provide a community based public information session when there is an expressed interest from stakeholders. Canadian Nuclear Laboratories (CNL) has been successful with the high level of public participation in the regulatory process and the high level of feedback from the public activated by CNL's engagement activities. Canadian Nuclear Laboratories has aimed to inform and gain feedback and public insight into the project and has achieved these goals so far. Canadian Nuclear Laboratories (CNL) continues to engage and receive public input on the project and continues to incorporate public feedback and make operating decisions based on public feedback. Further information on NSDF engagement activities can be found in: Stakeholder Engagement Report, Stakeholder Activities Report [4, 5]. References: [1] Public Information Program for Canadian Nuclear Laboratories (CNL), CW-513430-REPT-001. [2] CNSC, REGDOC 3.2.1, Public Information and Disclosure. [3] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.

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			[4] Stakeholder Engagement Report, 232-513400-REPT-002, Revision 0, 2019 November. [5] Stakeholder Activities Report – Near Surface Disposal Facility, 232-513400-REPT-001, Revision 0, 2017 November.
CNL-ND367	Jake Deacon (Petawawa Point Cottagers Association) (May 16, 2017)	We are in full support of facility improvements at Chalk River and the ability to increase employment and stimulate the local economy, we simply want it done in an open, honest fashion and to not increase any threat of hazard to the local environment.	The NSDF is designed to protect the environment, not harm it. The NSDF is designed to be a permanent solution which will reduce the risk associated with temporary waste storage at the Chalk River Laboratories (CRL) site because the facility has the appropriate design life to contain and isolate the inventory until it is sufficiently decayed to levels that do not present a risk to the public and environment. The facility has been designed so that the wastes will be safely managed long term without a need for retrieval. Section 2.3 of the final Environmental Impact Statement (EIS) has been updated to provide a more accurate description of the overall purpose of the project as it relates to environmental remediation of the CRL site and site revitalization. Section 4.0 of the final EIS summarizes Canadian Nuclear Laboratories (CNL) past and proposed public and stakeholder engagement initiatives which commenced in 2015 for the NSDF Project, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. These activities are intended to fulfil the requirements for public and Indigenous engagement under the *Canadian Environmental Assessment Act, 2012* and the *Nuclear Safety and Control Act*, in accordance with the Generic EIS Guidelines developed by the Canadian Nuclear Safety Commission [1]. Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project, beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Since 2015, a number of public and Indigenous engagements using a variety of formats have occurred, as outlined in Sections 4.2 and 6.2.4 of the final EIS, including: • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide

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			Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote engagements and events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Canadian Nuclear Laboratories (CNL) remains available to provide a community based public information session when there is an expressed interest from stakeholders. Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND368	OFWCA (August 15, 2017)	At OFWCA's July 22nd meeting, members were clearly frustrated with CNL's lack of transparency and their lack of meaningful engagement with the local community and neighbouring communities. Outside of our membership, few people in the area are even aware that CNL exists or that there is a proposal for a radioactive waste dump right beside their River. This is not public engagement.	The NSDF is an engineered containment mound that will allow Canadian Nuclear Laboratories (CNL) to isolate low-level waste (LLW) from 60+ years of operations in a facility designed to keep the material separate from the environment. The NSDF Project would enable the remediation of historically contaminated lands and legacy waste management areas (WMAs), as well as the decommissioning of outdated infrastructure to facilitate the Chalk River Laboratories (CRL) site revitalization. The NSDF is designed to be a permanent solution which will reduce the risk associated with temporary waste storage at the CRL site. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. Section 4.0 of the final Environmental Impact Statement (EIS) summarizes CNL's past and proposed public and stakeholder engagement initiatives which commenced in 2015 for the NSDF Project, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. These activities are intended to fulfil the requirements for public and Indigenous engagement under the *Canadian Environmental Assessment Act, 2012* and the *Nuclear Safety and Control Act*, in accordance with the Generic EIS Guidelines developed by the Canadian Nuclear Safety Commission [1]. Canadian Nuclear Laboratories (CNL) has evolved in communication of the NSDF Project since 2015. Beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Canadian Nuclear Laboratories has increased the use of social media, using this as a method to advertise public information sessions. Information is also made available online (www.cnl.ca/nsdf), in newspapers, and through brochures. Since 2015, a number of public and Indigenous engagements using a variety of formats have occurred, as outlined in Sections 4.2 and 6.2.4 of the final EIS, including: • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec

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			• 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote engagements and events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. • Canadian Nuclear Laboratories (CNL) remains available to provide a community based public information session when there is an expressed interest from stakeholders. Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND369	PCWO (August 16, 2017)	The commenter recommends that CNSC be more inclusive, transparent and thorough as it initiates its first independent Environmental Assessment under the 2012 Canadian Environmental Assessment Act (CEAA), and the Canadian Nuclear Safety and Control Act, as a "prerequisite "of the CNL "licencing process 6. PCWO has been an intervenor at several comprehensive, intervenor –friendly hearings of independent Commissions, Boards and Environmental Assessment Panels over many years 7. Regrettably, the CNSC has not ensured that many of the public who might be most affected would hear about the project, and others received incomplete, shifting, conflicting, and hence, confusing CNL plan reports.	Canadian Nuclear Laboratories (CNL) cannot comment on Canadian Nuclear Safety Commission (CNSC) role in the EA/EIS public review. However, Section 4.0 of the final EIS summarizes CNL's past and proposed public and stakeholder engagement initiatives which commenced in 2015 for the NSDF Project, including documentation of meetings, presentation materials, discussion topics and outcomes, and relevant agreements. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage with each Indigenous community or organization. T hese activities are intended to fulfil the requirements for public and Indigenous engagement under the *Canadian Environmental Assessment Act, 2012* and the *Nuclear Safety and Control Act,* in accordance with the Generic EIS Guidelines developed by the CNSC [1]. Canadian Nuclear Laboratories has evolved in communication of the NSDF Project since 2015. Beginning in 2018 January quarterly webinar sessions/updates in English and French were introduced as an evolution of the public information sessions as a more modern approach to disseminate information to the public and answer their questions. Canadian Nuclear Laboratories has increased the use of social media, using this as a method to advertise public information sessions. Information is also made available online (www.cnl.ca/nsdf), in newspapers, and through brochures.

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			Since 2015, a number of public and Indigenous engagements using a variety of formats have occurred, as outlined in Sections 4.2 and 6.2.4 of the final EIS, including: • 17 Indigenous communities engaged • Indigenous Memorandums of Understanding (MOUs) • 200+ Project documents released in support of public and Indigenous reviews of the project • 25 Public information sessions • 2 Indigenous information sessions (community members) • 15 Presentations to regional municipalities in Ontario and Quebec • 3 Presentations to Indigenous communities in Quebec • 12 Environmental Stewardship Council meetings and tours of Nuclear Power Demonstration (NPD) / NSDF sites • 11 Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • 52 Indigenous meetings and site visits • 7 Employee information sessions • 7 Public and Industry open houses • 6 Project updates to federal and provincial officials • 8 Technical meetings and site visits with CNL Alumni and other stakeholders • 5 Interactive webinars • 3 Indigenous interactive webinars • 2017 Open House – CNL wide Further, emails have been used to connect with public stakeholders and Indigenous communities. In particular, emails were sent out to promote engagements and events, to advise of the public comment period on the draft EIS and to provide responses to questions submitted electronically. Public and Indigenous communities are encouraged to be added to an email distribution list to receive notices of upcoming events related to NSDF (webinars, breakfast briefings, etc.). The public and Indigenous email distribution list is over 300. Canadian Nuclear Laboratories remains available to provide a community based public information session when there is an expressed interest from stakeholders. Reference: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May.
CNL-ND370	Kerrie Blaise, CELA (August 15, 2017)	Several important CNL documents are not yet available for public examination, including an unredacted version of CNL's Waste Acceptance Criteria (WAC) report, its Safety Analysis Report (SAR), and its Criticality Safety Analysis (CSAR) report. CELA's requests for these documents were denied because they were marked "security sensitive." CELA's inability to obtain these reports, even in part, reflects a process which is neither transparent nor conducive to public review. CELA notes that this submission is not an endorsement of this review process, nor its ability to facilitate meaningful public engagement. Furthermore, these reports are likely to contain information pertinent to the overall project, particularly CNL's report on criticality. Relatively large amounts of fissile nuclides, including U-235 and Pu-239, are	Canadian Nuclear Laboratories (CNL) is committed to transparency with regard to the technical basis for the NSDF to the extent possible. The following documents are available to the public by request to ermstakeholder@cnl.ca. This includes the Waste Acceptance Criteria and Safety Analysis Report. 2019 Revised Draft Environmental Impact Statement (EIS) • Executive Summary • Revised NSDF 2019 draft EIS • Appendices to support revised 2019 draft EIS

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		proposed for the facility. Unless it can be demonstrated beyond reasonable doubt that the probability of a criticality incident (i.e. an uncontrolled chain reaction such as that which occurs in a nuclear bomb) involving these nuclides at the proposed facility is extremely remote, the project should not proceed.	Technical Support Documents • Air Quality Assessment for the NSDF Project • Climate Change Assessment for the NSDF Project • Design Description • Ecological Risk Assessment for the NSDF Project • Environmental Assessment Stakeholder Activities Report – NSDF & NPD Closure Projects • Groundwater Flow Modelling of the NSDF Project • Indigenous Engagement Report for the NSDF Project • Post-Closure Safety Assessment 3rd Iteration for the NSDF Project • Safety Analysis Report for the NSDF Project • Site Selection Report for the NSDF Project • Stage 4 Archaeological Assessment • Stakeholder Activities Report for the NSDF Project • Stakeholder Engagement Report • Surface Water Quality Assessment for the NSDF Project Other Supporting Documents • 2019 CNL Integrated Waste Strategy • NSDF Project Effluent Discharge Targets • NSDF Project Geomembrane Relative Performance Report • NSDF Project Inventory of Constituents of Potential Concern (COPC) • NSDF Project Reference Inventory Report • NSDF Project Waste Acceptance Criteria By their nature, criticality safety documents contain Protected-Sensitive information; however, these documents are provided to the Canadian Nuclear Safety Commission (CNSC) for their acceptance prior to a license to operate being granted. Criticality safety documents are required to show that criticality is not a credible event before the CNSC would grant an operating license. Since the 2017 draft EIS was issued, CNL has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). By excluding the ILW, the inventory of fissile nuclides has been significantly reduced. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND371	William Turner (May 31, 2017) 13.	The term "Safety Analysis Report" (SAR) occurs twice in the EIS. The first is on Page 3-14 in the footnote, and the second on Page 5-548 where it states: Worker dose is being assessed as part of the Safety Analysis Report. Therefore, radiological dose to workers is not quantitatively assessed in the EIS.	The Near Surface Disposal Facility (NSDF) Safety Analysis Report (SAR) [1] is under review by Canadian Nuclear Safety Commission (CNSC) staff as part of the licensing application review [1]. The purpose of this SAR [1], is to demonstrate the adequacy of the NSDF design in support of an application for a Licence to Construct a new nuclear facility. The intention of the NSDF is SAR [1], is to demonstrate to the CNSC that the proposed design of the new facility, NSDF, conforms to

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		The first instance suggests that the SAR has been completed. In the second instance, the report is yet to be completed. Is the SAR being written to support the conclusion that 'all is well' with the mound? What assurance can be made that this is not the case?	regulatory requirements and guidance provided by the CNSC and the International Atomic Energy Agency (IAEA), and if constructed as designed, will provide for safe operation on the designated site over the proposed operational facility life. The NSDF SAR [1] covers the pre-closure phase of the NSDF and is a technical supporting document to the Environmental Impact Statement (EIS), since paragraph 19(1)(a) of *Canadian Environmental Assessment Act* (CEAA) 2012 states that malfunctions and accidents shall be assessed in the environmental assessment [2]. The EIS should include [2]: • An assessment of potential health and environmental effects resulting from postulated radiological and conventional malfunctions or accidents. • A description of postulated malfunction and accident sequences leading to a radiological or non-radiological release considering, as appropriate, internal events, external events and human-induced events, including their frequency and an explanation of how these events were identified, and any modeling that was performed. • The source, quantity, mechanism, pathway, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment during the postulated malfunctions and accidents. The information required in the EIS on malfunctions and accidents [2] is contained within the NSDF SAR [1]. The NSDF SAR [1] present the operational safety analysis of the NSDF based on the detailed design package, proposed operations and identified hazards including all credible events identified through hazard analysis and Operating Experience (OPEX). The NSDF SAR [1] assesses the normal operations, anticipated operational occurrences (AOO) and accident conditions. The purpose of the safety analysis [1] is to identify the hazards, describe how hazards are controlled and or mitigated, and describe the management system in place to ensure the controls are effectively and consistently applied. The safety analysis is made up of several elements that collectively demonstrate how safety is achieved against an agreed set of safety acceptance criteria [1]. The NSDF SAR [1] is available to the public by request to ermstakeholder@cnl.ca Radiological consequences to the workers during normal operations were assessed in the SAR [1] and are presented in Section 5.8.6.1.1.1 of the final EIS. Worker radiological consequences (dose) for normal operations will be also kept below the occupational radiation exposures Action Levels for Chalk River laboratories [3], which are lower than the regulatory occupational and public effective and equivalent dose limits for normal operations [4] [5] (see Section 5.8.6.1.1 of final EIS and see Section 3.3.1 of the NSDF SAR [1]). Radiological consequences (dose) to the workers and the public as a result of AOOs and accident conditions are assessed in Section 14.3, 14.4 and 14.5 of the NSDF SAR [1], and are presented in Section 7.3 of the final EIS. Section 7.3.1 of the final EIS presents the dose acceptance criteria for accidents used in the NSDF SAR [1]. Hazards with non-radiological consequences are assessed in the Sections 14.2.5 and 14.2.6 of the NSDF SAR [1], and are presented in Section 7.4 of the final EIS. The safety analysis [1] demonstrates that the estimated radiological consequences to the workers and the public from the NSDF under normal operations and accident conditions, meet the effective and equivalent dose limits, the CNL radiation protection action levels, and the dose acceptance criteria for accidents, and that the NSDF does not pose an unreasonable risk for the public, workers and the environment.

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			References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, Version 1.2, ISBN 978-0-660-06255-6, 2020 September. [3] Radiation Protection Action Levels, 900-508740-MCP-006. [4] Radiation Protection Regulations, SOR/2000-203. [5] Regulatory Limits for Internal and External Exposure, 900-508740-MCP-004.
		Public and Aboriginal Engagement – Valued Components	
CNL-ND372	AANTC (August 14, 2017)	The draft EIS lacks any assessment of potential adverse impacts of the NDSF specific to Indigenous peoples' use of surrounding land and waters. For example, the EIS recognizes several species of fish as VECs that could potentially be affected by the NSDF but there is no evidence of any consultation or any study involving Indigenous communities to verify whether the list of identified VECs properly reflects the species that contribute specifically to Aboriginal fisheries. The same is true with respect to assessment endpoints and measurement indicators for the EIS' biodiversity assessment (Table 5.5.2-2, p 5-236 of the EIS). While this table notes that the EIS methodology includes consideration of ongoing fisheries' productivity, their ability to be self-sustaining, and support ecologically effective fish populations, these standards are very generalized, and may be informed by culturally-specific (Euro-Canadian) assumptions. It is not clear whether such standards employed in the EIS' methodology accurately reflect Indigenous conceptions of ecological value, nor is it clear whether these parameters accurately assess the wellbeing of potentially affected Aboriginal fisheries. Ultimately, there is insufficient information and analysis in the EIS to determine whether its methodology is responsive to Indigenous peoples' unique rights and uses of the land and water bodies that may be impacted by the NSDF.	The final Environmental Impact Statement (EIS) contains a new Section 6.0 – Indigenous Interests that consolidates and summarizes the major areas of assessment relevant to Indigenous peoples into one single section. Canadian Nuclear Laboratories (CNL) has incorporated direct feedback and traditional knowledge when it has been provided. For example: • Discussion of Valued Components (VCs) in Section 6.4.2 focuses on VCs related to Indigenous traditional land and resource use. Indigenous people have also expressed a great deal of interest in other VCs, particularly those related to the natural environment. VCs were identified based on the potential for the NSDF Project to interact with features or activities of value to Indigenous communities or groups, as per CNL's Indigenous Engagement Report [1]. • Through the engagement process, Indigenous interests have been incorporated into the selection of final VCs for the NSDF Project. A comparison of Indigenous suggested VCs and the NSDF Project VCs are outlined in Table 6.3.2-1. Canadian Nuclear Laboratories selected hydrology, surface water quality, fish habitat, fishing and fish species as VCs as these reflect water quality of the Ottawa River as well as lakes and streams on the CRL site, along with the health of many species of interest to all Indigenous communities that provided feedback on the NSDF Project. Surface water quality is an intermediate component that can capture any potential changes in the natural environment on which other VCs depend. Reference: [1] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND373	MNO (August 16, 2017)	**2.5.1.3 Environmental Effects, Page 2-15 and 5.1.2 Valued Components** How could the VCs selected for the NSDF have considered traditional, cultural and heritage importance to the Métis people without consulting with the Métis on aspects of importance prior to VC selection? Furthermore, rather than consider the traditional, cultural and heritage importance to First Nations and Métis people, the VCs should have considered Aboriginal rights and interests, specifically Métis rights and interests in the assessment and the potential for interaction with the NSDF Project and sensitivity to effects.	The final Environmental Impact Statement (EIS) contains a new Section 6.0 – Indigenous Interests that consolidates and summarizes the major areas of assessment relevant to Indigenous peoples into one single section. In the environmental assessment of the NSDF, Valued Components (VCs) are generic organisms that represent a particular contaminant pathway. The reed is a generic plant representative of the contaminant pathway from the sediment/soil to the plant to the primary consumer. Reed is a common name for several tall, grass-like plants of wetlands and include Poaceae (grasses), Cyperaceae (sedges), and Typhaceae (Cattails); as a generic plant, reed can represent a range of smaller plant species found on the CRL property, including cranberries. Reed were modelled as environmental receptors against environmental concentrations and is modelled conservatively to account for contaminant (e.g., radionuclides) uptake by plants from sediment/soil and the subsequent transfer to biota. The selection of species as VCs is not determined by whether the species under consideration is native or invasive in the local area. Since both reed and cranberries can be expected to exhibit similar contaminant uptake pathways (i.e., they occupy similar wetland spaces), they are effectively similar ecological receptors for the purpose of the NSDF environmental assessment whether or not one is an invasive species.

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			Discussion of VCs in Section 6.4.2 of the final EIS focuses on VCs related to Indigenous traditional land and resource use. Indigenous people have also expressed a great deal of interest in other VCs, particularly those related to the natural environment. VCs were identified based on the potential for the NSDF Project to interact with features or activities of value to Indigenous communities or groups, as per CNL's Indigenous Engagement Report [1]. Section 6.4.3.4.2 of the final EIS outlines that the Métis Nation of Ontario recently completed a Traditional Land Use and Knowledge Study (TKLUS) [1] that was undertaken specifically for the NSDF and Nuclear Power Demonstration (NPD) projects. The TKLUS has identified Valued Components of particular interest to them. A comparison of Indigenous suggested VCs and the NSDF Project VCs are outlined in Table 6.3.2-1, including those VCs identified by MNO. For example, the MNO through their TKLUS study identified moose, deer and bear as VCs due to traditional harvesting of these specific biota, while CNL has selected hunting as a VC to protect Indigenous traditional resource use. Table 6.3.2-1 in the EIS show how the selected VCs for the NSDF compare to VCs for which Indigenous groups have expressed concern in the local ecology. For the purpose of the Ecological Risk Assessment for the NSDF, Red Maple was used as a representative terrestrial vegetation receptor. Species that are abundant and less ecologically significant are commonly chosen as receptors (and thus, VC) to represent a guild (a group of species) due to their commonness. The exposure pathways for ecological receptors are determined based on their modes of exposure to radiological COPCs – for terrestrial plants, these modes include uptake from soil (root uptake) and exposure to soil. In the EcoRA, exposure pathways for terrestrial vegetation uses exposure factors that are not species-specific. As such, using generic tree bioaccumulation factors in the terrestrial environmental assessment means there is no difference in the dose predicted for conifer or deciduous trees. Furthermore, as determined in the Ecological Risk Assessment [2], the radiation dose benchmark of 2.4 mGy/day is well below the effect level for terrestrial plants. It is important to note that the dose benchmark of 2.4 mGy/day is a standard applied to all types of terrestrial plants and is based on the CSA N288.6-12 standard [3]. The MNO and CNL have signed a MOU and together, CNL and MNO have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. References: [1] Indigenous Engagement Report, 232-513130-REPT-001. [2] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001. [3] CSA Group. SA N288.6-12: Environmental Risk Assessment at Class 1 Nuclear Facilities and Uranium Mines and Mills.
CNL-ND374	[MNO](#) (August 16, 2017)	**Table 5.10.1-1: Summary of Areas of Interest Raised during Engagement Activities that Influenced the Scope of the Socio-Economic Assessment,** **Page 5-608** The issues listed are not reflective of the concerns related to the socio-economic environment from the MNO's perspective. A Métis specific traditional land use study should be completed to provide CNL insight into the Métis perspective on this component.	Indigenous socio-economic VCs were selected based on the potential for the NSDF Project to interact with the features of the Indigenous socio-economic environment. Section 6.4.3.4.2 of the final Environmental Impact Statement (EIS) outlines that the Métis Nation of Ontario recently completed a Traditional Land Use and Knowledge Study (TKLUS) [1] that was undertaken specifically for the NSDF and Nuclear Power Demonstration (NPD) projects. The TKLUS has identified Valued Components (VCs) of particular interest to them. Through this engagement process, Indigenous interests have been incorporated into the selection of final VCs for the NSDF Project.

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			The MNO and CNL have signed a MOU. Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects.
CNL-ND375	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	How was the public involved in making the judgements on the following loose terms: (i) "reasonable" as in "as low as reasonably achievable" [2.4.1.2, p. 2-8]; (ii) "feasible" as in "technically and economically feasible" [2.5.1.1 & 2.5.1.2, pp. 2-14 & 2-15]. (iii) "significant" as it is used throughout Section 5 on environmental effects, in deciding whether the effect is significant. - Did the community help CNL define the "valued components" throughout Section 5? If so, what processes did CNL use to obtain their view of valued components? What changes occurred in CNLs listing of "valued components" as a result of the public engagement? (Page 11)	As low as reasonably achievable (ALARA) in a principle of Radiation Protection that holds that exposures to radiation are kept ALARA, social and economic factors taken into account [1]. Radiation exposure within the NSDF and any release of radioactive material from the NSDF and its associated operation activities, shall be kept ALARA. The NSDF ALARA principle is in alignment with CNSC's Keeping Radiation Exposures and Doses "As Low as Reasonably Achievable (ALARA)" [2] and Radiation Protection Regulations [3]. The as low as reasonably achievable (ALARA) principle is that the residual risk associated with a particular design feature or operational procedure shall be as low as reasonably achievable. This principle is applicable to justifying risks from radiological hazards during routine operation and takes economic factors into consideration (Section 3.5.2.1 of the final Environmental Impact Statement (EIS)). Section 5.1 of the final EIS outlines the Environmental Assessment Approach applied to disciplines to determine significance of effects (if any). More specifically, Section 5.1.8 of the final EIS (Residual Effects Classification and Determination of Significance) outlines how significance in the environmental assessment was determined. Effects are classified using the criteria listed below, which follow the Generic EIS Guidelines and the CEAA's *Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act*, 2012. Specific definitions for the classification criteria have been developed for each Valued Component (VC) or discipline of study. The evaluation of significance for biophysical VCs considers the entire set of primary pathways that influence a particular assessment endpoint; thus, significance is not explicitly assigned to each pathway. Rather, the relative contribution of each pathway is used to determine the significance of potential adverse effects of the NSDF Project and other developments on an assessment endpoint. This approach is known as a "weight of evidence" approach (i.e., an evaluation of the persuasiveness of the collective evidence). As outlined in Section 5.1.2 of the final EIS, the selection of appropriate VCs allows the assessment to be focused on those aspects of the natural and human environment that are of greatest importance to society and species conservation. The list of VCs selected for the NSDF Project considered a number of factors, including: • presence, abundance and distribution within or relevance to the area associated with the NSDF Project; • potential for interaction with the NSDF Project and sensitivity to effects; • species conservation status or concern (e.g., rarity, sensitivity and uniqueness); • ecological and socio-economic value to communities, government agencies and the public; • traditional, cultural and heritage importance to Indigenous peoples; and • experience with similar projects, including the EIS completed in 2010 for the National Research Universal Reactor Long-term Management Project at the Chalk River Laboratories (CRL) property [4]. Valued Components (VC) were selected with due consideration of the results of baseline studies and subsequent consultation, with a focus on criteria used to evaluate the potential significance of residual effects. The rationale for discipline-specific VC selection is described in Sections 5.2 to 5.10, under the "Valued Components" subheading. The final list of VCs and rationale for inclusion in the effects assessment for the NSDF Project is provided in Table 5.1.2-1 of the final EIS. Societal values in particular related to the surface water environment (protection of the Ottawa River), aquatic environment (fishing).

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			Migratory birds, and Blanding's Turtle were included as VCs as an outcome of public feedback. Valued ecosystem component (VEC) is defined in REGDOC-3.6 Glossary of CNSC Terminology [1]. An environmental element of an ecosystem that is identified as having scientific, social, cultural, economic, historical, archaeological, or esthetic importance. Note: VECs are selected from the abiotic and biotic information collected as part of the baseline characterization. They may be surrogate organisms rather than actual plant or animal species (for example, a theoretical benthic feeding fish species), communities (for example, a benthic macroinvertebrate community) or specific species (for example, an endangered species), but may also include significant ecological features of the environment, such as wetlands. References: [1] CNSC, REGDOC 3.6 Glossary of CNSC Terminology. December 2019. [2] CNSC, Keeping Radiation Exposures and Doses "As Low as Reasonably Achievable (ALARA)", G-129, Revision 1, ISBN 0-662-38407-5, 2004 October. [3] Radiation Protection Regulations, SOR/2000-203. [4] Environmental Impact Statement for AECL's National Research Universal Reactor Long-Term Management Project, CRL-509200-ENA-043.
		Environmental Effects	
		Environmental Effects - General	
CNL-ND376	[Jaro Franta] (August 2, 2017)	CNSC places much importance on public outreach in general, and in particular on involvement of local communities potentially affected by a new project. Examples include "inviting public comments", "Educational resources", "Infographics" and "Mythbusters". Therefore, one would expect any EIS submitted for review by the CNSC to dedicate a section to providing a perspective relative to the local natural environment, which is written in a way that can be grasped by interested readers. In other words an "apples to apples" comparison of project-versus-nature environmental assessment (Elaboration on this topic found on p. 2-5 of Jaro Franta's August 12 submission). An unfortunate consequence of a failure to provide an appropriate perspective relative to the local natural environment is often the spread of a polemic of hyperbole (examples can be found in Jaro Franta's submission) – which can sometimes come to dominate discussion in the media and elsewhere, making progress difficult or impossible. It is important to recognise early that the problem exists, to begin with, and then devote appropriate resources into dispelling hyperbole and misinformation.	Canadian Nuclear Laboratories (CNL) appreciates suggestions that help make comparisons more understandable to the general public. In terms of "apples to apples" comparisons, the following approaches have been used thus far by the NSDF Project: • Radiation doses in the final Environmental Impact Statement (EIS) are often reported in their numerical value in mSv as well as a percentage of, or comparison to, the natural background levels. For example, Section 5.8.6.1.2.2 reports the calculated dose to the critical receptor as "The highest calculated dose rate to any receptor in the normal evolution scenario is 0.015 mSv/y, which is 20 times lower than the dose constraint of 0.3 mSv/yr" where the dose constraint is the maximum allowable dose to the public as a result of the CRL site. • The following statement is included in Section 5.8.6.1.2.2 of the final EIS: "Doses to receptors downstream of the NSDF are assessed as Receptors of Public Interest. These include residents in Sheenboro and Ottawa-Gatineau drawing water from the Ottawa River. The maximum peak dose for these residents was over 70,000 times lower than the dose constraint." • Radioactivity concentrations of naturally occurring rock formations in the Renfrew Country area is presented on Figure 3.3.1-2 of the final EIS, with the intention of demonstrating perspective. The average natural background radioactivity concentration at the CRL site also include on the figure. • The Safety Case document [1] provides discussion of relative radiological doses, "safety margin", and puts the risk of cancer from low doses of radiation into perspective. This report is available upon request from [ermstakeholder@cnl.ca]. Reference: [1] Near Surface Disposal Facility Safety Case. 232-03610-SAR-001.

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CNL-ND377	Hiawatha First Nation (April 18, 2017) Kimberly O'Brien (May 5, 2017) Margaret Lomore (May 6, 2017) Karen Keon (May 7, 2017) Kimberly Carroll (May 8, 2017) Drew Carroll (May 8, 2017) Heather Sanderson (May 12, 2017) Kimberly O'Brien (May 5, 2017) Lucy King (May 12, 2017) Sheila Marchant (May 17, 2017) Paul Esslinger (May 17, 2017) Patrick Galligan (August 15, 2017) Irene Boland and Mark Barnes (August 15, 2017) Sylvie Pilon-Tiden (August 15, 2017) Gray Hammond (August 15, 2017) Denise Roberge (August 15, 2017 Janice Cunningham and Claude Allard (August 15, 2017) Liz Barett (August 15, 2017) Jo Hayward-Haines (August 13, 2017) David Thomson (August 14, 2017)	*Many members of the public were concerned with the project impacts on people, wildlife and future generations.* *The Hiawatha First Nation was concerned and looking for reassurance that wildlife, habitat, and water tributaries will be adequately protected from contamination for 7 generations.*	Canadian Nuclear Laboratories (CNL) has conducted additional technical studies to provide assurance that people, wildlife, water tributaries and future generations will be protected. The Post-Closure Safety Assessment (PostSA) [1] provides the predicted radiation dose to the public for the Normal Evolution Scenario where engineered barriers fail at the end of the 550 year design life and for extreme conditions referred to as Disruptive Scenarios. The assessment timeframe for the PostSA is 10,000 years and captures the period of peak radioactivity and dose consequence. Section 2.3.4 of the PostSA provides further detailed justification for the selected assessment timeframe. For the Normal Evolution Scenarios, conservative degradation rates for the base liner and cover systems are assumed. Additionally, there are multiple scenarios which specifically address the scenario in which the base liner and final cover systems do not perform as anticipated and include: Enhanced Degradation of the Cover and Liner, Enhanced Erosion Case, Localized Cover Failure, Localized Liner Failure, Role of Cover and Role of Liner. The assessment and results of these scenarios are presented in Section 5.8.6 of the final Environmental Impact Statement (EIS). No effects on human health are predicted. Potential impacts and mitigation measures for extreme weather conditions, flooding and seismic events are summarized in Section 10 of the final EIS. The engineered containment mound (ECM) design has been optimized to withstand seismic events predicted for the Near Surface Disposal Facility (NSDF) site. The design of the ECM incorporates ground improvement technique (i.e., remove and replace), to avoid potential liquefaction (See Section 10.3 of the final EIS). The PostSA has included a scenario where a small household comprising of two adults, a child and an infant living on the ECM footprint. Hunting and recreational use of the areas surrounding the ECM is also considered. A summary of exposure groups considered for the Post-Closure phase is provided in Section 5.8.6.1.1.3 of the final EIS. A detailed characterization of exposure groups used in the long-term safety modeling can be found in Section 4.1 of the PostSA. The PostSA also includes a self-sufficient indigenous group "a group of indigenous peoples, including adults and children, using area surrounding the ECM, including Perch Creek and the Ottawa River, for hunting and gathering." Individuals in this group are assumed to obtain all of their food through hunting, and gathering in the area. It is assumed that this group would have increased consumption of fish and wild game. The predicted radiological dose to this group is a well below the regulatory dose limit for a member of the public of 1 mSv/yr (Section 6.5 of the final EIS). An updated approach to Ecological Risk Assessment (EcoRA) [2] during the post-closure phase has been prepared as a Technical Supporting Document to the final EIS. The EcoRA provides the predicted radiological dose and chemical exposure to ecological receptors including wildlife. The assessment results and scenarios considered are presented in Section 5.7.6 of the final EIS. No residual effects are expected. The impact of the NSDF on water tributaries and ecological health during the post-closure phase are assessed in Section 5.7.6.1.2.2 of the final EIS. The calculated peak environmental concentrations in water are very low. For example, the peak concentration of tritium in surface water (which will eventually flow to the Ottawa River) during the post-closure phase is predicted to be 0.000055 Bq/L, as compared to the Maximum Acceptable Concentration of 7,000 Bq/L of tritium in drinking water. This confirms that there will be no deterioration of the Ottawa River water quality in the medium or long-term.

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	Catherine Galligan (August 14, 2017) Peter and Barbara Haughton (August 14, 2017) Tony Reddin (August 14, 2017) Jacqueline Scott (August 14, 2017) Glen Moore (August 14, 2017) Janice Tokaryk (August 14, 2017) José Moreno-Lacalle (August 14, 2017) Tom Schwalb (August 14, 2017) John Comfort (August 16, 2017) Marilee DeLombard & Robert Wills (August 16, 2017) Mary Myles (August 16, 2017) John Ankenman (August 16, 2017) Alex Thomson (August 16, 2017) Andrew Harper (August 16, 2017) Virginia MacLatchy (August 16, 2017) Susan Parks (August 16, 2017) Jake Deacon (August 16, 2017) Virginia MacLatchy (August 16, 2017) Susan Parks (August 16, 2017)		References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001.

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	Patrick Miller (August 16, 2017) Michael Dworkind (August 16, 2017) Mike Schreiner (August 16, 2017) Durham Nuclear Awareness (August 16, 2017) Sharon Thorne (August 16, 2017) PCWO (August 16, 2017)		
CNL-ND378	David Herbert (May 2, 2017) Cara Rose-Brown, Iana and Carlos Ciatti (May 15, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* Surface water leakage, groundwater intrusion, migration of contaminated water, inadvertent intrusion, escape of radioactive gas to the atmosphere, erosion, deterioration, accidents, animals, ground movement, tornados, and disturbance to the terrestrial environment from the project footprint are all possible and probable occurrences which could seriously impact all lifeforms along the River.	Canadian Nuclear Laboratories (CNL) has conducted further analysis of features, events and processes that could affect the long term performance of the Near Surface Disposal Facility (NSDF) such as those identified by the reviewer (e.g., migration of contaminated water, inadvertent intrusion, erosion, ground movement tornadoes). The Post-Closure Safety Assessment (PostSA) [1] provides the updated analysis of Features, Events and Processes (FEPs). The FEP lists are developed by an international group of subject matter experts through a program of the Nuclear Energy Agency. The analysis of FEPs is documented in Appendix B of the PostSA and includes FEPs that could directly or indirectly influence the release and transport of contaminants (radiological and non-radiological) from the NSDF. The FEP analysis is for the complete 10,000 year assessment time frame. Events that have a high probability of occurring during the 10,000 year assessment time frame are included as part of the Normal Evolution Scenario. The Normal Evolution Scenario is a description of the most likely, expected, evolution of the Engineered Containment Mound and its surrounding environment. The Normal Evolution Scenario accounts for the expected degradation of the engineered barriers over the post-closure phase. Events that have a low probability of occurring are given for consideration as a disruptive event. These include human intrusion, enhanced erosion of the cover the disposal facility, and localized failure of the engineered barriers. A summary of scenarios assessed is provided in Section 5.8.6 of the final Environmental Impact Statement (EIS). The assessment and results of Normal Evolution and Disruptive Event scenarios are presented in Section 5.7 and 5.8 or the final EIS which address effects on ecological health and human health respectively. Negligible residual effects are expected for Normal Evolution and Disruptive Event scenarios. Potential impacts and mitigation measures for extreme weather conditions, flooding and seismic events are summarized in Section 10 of the final EIS. The engineered containment mound (ECM) design has been optimized to withstand seismic hazard characteristics of the NSDF site. The design of the ECM incorporates ground improvement technique (i.e., remove and replace), to avoid potential liquefaction (See Section 10.3 of the final EIS). Accidents and malfunctions that may occur during construction and operations phases of the NSDF Project were identified, characterized and evaluated in the NSDF Safety Analysis Report [2] and are summarized in Section 7 of the final EIS. The

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			assessment of potential accidents and malfunctions considered both radiological and non-radiological conventional events. Radiological accidents and malfunctions are events that involve radioactive substances and could result in the release of radioactivity as well as non-radiological substances. Non-radiological conventional accidents and malfunctions are events that involve only non-radiological substances and therefore have no potential for the release of radioactivity. The revised Ecological Risk Assessment [3] provides a quantitative assessment of radiological dose under the expected conditions of evolution of the site and disposal facility as well as for other evolutions of the site assessed within the PostSA. Dose to life forms from waterborne emissions has been assessed for scenarios which consider failure of the engineered containment mound cover and base liners. The potential effects of the NSDF Project on the ecological health of the Ottawa River for the post-closure phase are summarized in Section 5.7.6.1.2.2 of the final EIS. The calculated peak environmental concentrations in water are low in the context of environmental effects. For example, as calculated in the Post-Closure Safety Assessment (PostSA) [1], the peak concentration of tritium in surface water (which will eventually flow to the Ottawa River) during the post-closure phase is 0.000055 Bq/L, as compared to the Health Canada guideline value of 7,000 Bq/L [4] for the Maximum Acceptable Concentration of tritium in drinking water. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [3] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001. [4] [4] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3.
CNL-ND379	David Prentice (August 16, 2017) J. P. Unger (August 15, 2017) Michael Nogas (August 15, 2017) Janice Cunningham and Claude Allard (August 15, 2017) Douglas Nichols (August 14, 2017) James Hooper (August 15, 2017) Alex Thomson (August 16, 2017) Virginia MacLatchy	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* CNL's Environmental Impact Statement even admits there will be leaks! This is mind-boggling. And the EIS does not consider any effects on the River, boldly stating that the water "lies outside the boundary of the assessment." That's nonsense, absolute rubbish. Again, why are we even talking about this plan?	The spatial boundaries of the final Environmental Impact Statement (EIS) have been expanded in response to comments received from the public. The Regional Study Area (RSA) is defined as the area within which the potential effects of the Near Surface Disposal Facility (NSDF) Project may interact with the effects of other existing or reasonably foreseeable developments. The RSA for the surface water quality, aquatic environment, ecological health, human health and traditional land-use have been expanded to include a portion of the Ottawa River extending 8 km downstream of the Chalk River Laboratories (CRL) site to Harrington Bay (See Sections 5.4, 5.5, 5.7, 5.8 and 5.9 of the final EIS). As a result of the expansion of the RSA, species of risk for fish have been added as Valued Components for the Aquatic Assessment in Section 5.5 of the final EIS. These include Northern Brook Lamprey, American Eel and River Redhorse. Potential leaks and releases to the environment are assessed for the complete life cycle of the NSDF Project. Further studies have been conducted to demonstrate that the environment including the Ottawa River and human health are protected in the event of potential leaks from the NSDF. Accidents and malfunctions that may occur during construction and operations phases of the NSDF Project were identified, characterized and evaluated in the NSDF Safety Analysis Report [1] and are summarized in Section 7 of the final EIS. The assessment of potential accidents and malfunctions considered both radiological and non-radiological conventional events. Radiological accidents and malfunctions are events that involve radioactive substances and could result in the release of

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	(August 16, 2017) Sharon Thorne (August 16, 2017)		radioactivity as well as non-radiological substances. Non-radiological conventional accidents and malfunctions are events that involve only non-radiological substances and therefore have no potential for the release of radioactivity. The Post-Closure Safety Assessment [2] (PostSA) has been revised to provide a more complete analysis of events that could lead to a release of contaminants from the Near Surface Disposal Facility. Events that have a high probability of occurring during the 10,000 year assessment time frame are included as part of the Normal Evolution Scenario. The Normal Evolution Scenario is a description of the most likely, expected, evolution of the engineered containment mound (ECM) and its surrounding environment. The Normal Evolution Scenario accounts for the expected degradation of the engineered barriers over the post-closure phase. Events that have a low probability of occurring are given for consideration as a disruptive event. These include human intrusion, enhanced erosion of the cover the disposal facility, localized failure of the engineered barriers. A summary of scenarios assessed is provided in Section 5.8.6 of the final EIS. The assessment and results of Normal Evolution and Disruptive Event scenarios are presented in Section 5.7 and 5.8 or the final EIS which address effects on ecological health of the Ottawa River and human health respectively. Negligible residual effects are expected for Normal Evolution and disruptive scenarios. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND380	MNO (August 16, 2017)	**5.1.1 Scope of the Assessment, Page 5-2** "As described in Section 1.4, the Generic EIS Guidelines developed by the Canadian Nuclear Safety Commission (CNSC 2016a) provides an outline of the information to be included in the EIS, along with a high level description of the methods to be implemented for the environmental assessment." The Generic EIS Guidelines were not specifically referenced in Section 1.4, as identified in this Section.	A reference to the *Generic Guidelines for the Preparation of an Environmental Impact Statement (EIS)* pursuant to the *Canadian Environmental Assessment Act, 2012* [1] has been added to Section 1.4.2 of the EIS. A concordance table is provided in Appendix 1.0-1 of the EIS to help demonstrate compliance with the Generic Guidelines [1] and with REGDOC-2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [2]. The concordance table lists the requirements detailed in the Generic EIS Guidelines and in *REGDOC-2.9.1*, and the location of the corresponding information in the EIS. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September.
CNL-ND381	William Turner (May 31, 2017) 108.	Section 5.0 – Environmental Effects - A cursory examination of the figures presented in this section suggest that the location chosen for the mound is not the optimum spot. Below are five examples that demonstrate why the location chosen is not appropriate. This list is by no means exhaustive. • Figure 5.3.1-1 (page 5-87) depicts the chosen location as actually bring in a wetland (or as a minimum surrounded by wetlands), and yet most of the site is not near wetlands. In fact, the chosen location is about 50 meters from a surface stream that discharges directly into the Ottawa River. (see Figures 5.3.1-14, 5.3.2-3, 5.4.1-1, 5.4.1-2, 5.4.1-3, and many others).	The assessment of alternative means for site selection described in Section 2.5.5 of the final Environmental Impact Statement (EIS) has been expanded to include all sites on the Chalk River Laboratories (CRL) property that were considered as part of the site selection process. The site selection criteria and evaluation of how potential sites were compared is provided in Table 2.5.5-1 of the final EIS. Section 2.5.5 of the final EIS includes details on how Species at Risk were considered as exclusion criteria for the Near Surface Disposal Facility (NSDF) site selection. Specifically: • Areas of nationally or provincially significant plant or tree species, in small groups or stands, in accordance with the Federal *Species at Risk Act* and habitat of those threatened or endangered

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		• Figure 5.6.4-5 (page 5-305) depicts the Canada Warbler Habitat for the complete laboratory site. I note that this bird frequents the location for the mound. As depicted in this figure, this bird does not frequent large areas of the CRL site. Therefore, the rationale for choosing this location for the mound escapes me. From the figure, the western end of the site would be much better. Why was this location not considered? • Figure 5.6.4-9 (page 5-321) depicts the habitat for the Golden-Winged Warbler. I note that there are several locations on the laboratory site that are not frequented by this bird. Yet again, the location selected for the mound is likely habitat for this bird. • Figure 5.6.4-11 (page 5-329) depicts the habitat for bats. Again, there are large areas of the site that are shown in this figure that are not bat territory. Again, the location chosen for the mound is bat habitat. • Figures 5.6.4-13 and 5.6.4-14 depict the critical habitat for the Blanding's Turtle. It is somewhat disturbing that 65% (i.e. 22 ha/34 ha) of footprint of the proposed facility is critical habitat for this species. Although it is not clear from Figure 5.6.4-13, other locations on the Chalk River site are likely be less disruptive of the habitat of this endangered species. I am very disappointed that CNL did not conduct a more thorough investigation of alternative locations with the goal to minimize any potential impact to this turtle. A cursory examination of these figures suggest that there are locations for which the impact would be less than 22 ha.	species as per the *Committee on the Status of Endangered Wildlife in Canada* (COSEWIC) listing. Research plantations at CRL may contain these species. • Known or likely habitats of national or provincially significant wildlife species in accordance with the Federal *Species at Risk Act* or COSEWIC listing as per guidance by Canadian Nuclear Laboratories (CNL) Environmental Protection Program. Two candidate locations from the initial selection process were identified for further evaluation after the application of the mandatory attribute criteria and the exclusion criteria; 1) the East Mattawa Road (EMR) site; and 2) the Alternate site (11A). Section 2.5.5.3 and Table 2.5.5-2 of the final EIS provides a comparative evaluation of the two sites with regards to Species at Risk and terrestrial biodiversity. With regard to the reviewers specific comments: <u>Proximity of the Site to Wetlands and Surface Water Bodies</u> The NSDF Project was designed to limit disturbance to the natural environment to the extent feasible and will avoid stream and wetland habitats. For example, a 30 m buffer is established along all identified wetlands near the site boundaries. In addition to the wetlands buffer, a 5 m treeline buffer is established from the site boundary to limit disturbance to vegetation and large tree roots at the treeline. <u>Canada Warbler</u> The data collected by the passive recorders only contain 4 occurrences of a signing male detected at the same survey location on two different days (June 11 2016 and June 13 2016) and at two different time each day detected. We are confident that the occurrences detected by the passive recorder are from the same individual residing within the EMR footprint. In addition, according to the density estimates by bird conservation region (for CRL, BCR 12) from the Boreal Avian Modelling Project, the Canada Warbler density estimate (males per ha) is 0.0732. The EMR footprint is estimated to have 28.2 ha of suitable habitat, which could yield enough habitat for two pairs. <u>Golden-Winged Warbler</u> The Golden-winged warbler was reported in the surrounding wetlands of the proposed NSDF site and within the footprint of the alternative site. The suitable habitat of the current proposed location represents approximately 80% of suitable habitat for the species whereas the alternate site was covered 100% by suitable habitat for the species. Only three sightings of Golden-winged warblers were reported at CRL (two in 1997 and one in 2013). All sightings were located within wetland, not affected by the project. The analysis demonstrate that some suitable habitat will be lost for the construction of the NSDF but like the Canada warbler the removal of suitable habitat is considered within resiliency of the species. The CRL site have over 2,600 hectares of suitable habitat for the species. <u>Bat Species</u> Bat species at risk were reported at both locations assessed for the impact of biodiversity and the forested habitat of the current location represent approximately 80% of suitable habitat for the species whereas the alternate site comprises 100% of suitable habitat for the species. The analysis demonstrated that the maternity roosting habitat availability for bats exceeds 1,100 hectares but because bat species are known to be adapting fairly easily to bat boxes, CNL is proposing to replace the loss of habitat by installing 16 bat boxes.

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			In addition, a Forest Management Plan is currently being developed in collaboration with the Petawawa Research Forest. Forest management will be proposed and modeled to ensure bat habitat is preserved through time. Blanding's Turtle A comparison of the different locations for the construction of the NSDF demonstrated that the current proposed location is where the potential impact of the species is the least. A known hibernaculum was located within 30 metres of the alternate site, which is a very sensitive area whereas the current proposed locations did not have an issue in terms of fragmentation between wetland or travelling corridor as no individuals were seen on the road. The CRL site is home to a healthy Blanding's turtle population located in the wetland complex in the middle of the site. Due to this population, and the potential for individuals to undergo inter-wetland movement, the proposed critical habitat for the species, based on Environment and Climate Change Canada Recovery Strategy, there is a total of 2,788 hectares of proposed critical habitat for the species, representing 72.4% of the CRL site. The Blanding's turtle, Environment and Climate Change Canada (ECCC) has released a Recovery Strategy [RS BLTU] that defines critical habitat for the species. The critical habitat for the species has been taken into consideration during the site selection process. The Ontario Ministry of Natural Resources and Forestry has also released general habitat description for the species [http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_ghd_bln_trtl_en.pdf], which includes more granularity to the categorization of habitat as defined below: • Category 1: Nest and the area within 30 m or overwintering sites and the area within 30 m. • Category 2: The wetland complex (i.e., all suitable wetlands or waterbodies within 500 m of each other) that extends up to 2 km from an occurrence, and the area within 30 m around those suitable wetlands or waterbodies. • Category 3: Area between 30 m and 250 m around suitable wetlands/waterbodies identified in Category 2, within 2 km of an occurrence. The potential to remove critical habitat for this species at CRL is real as it covers over 72% of the entire site. Therefore, the conservation effort for the species at CRL are focused on the protection of nesting sites and hibernaculum and to reduce and eliminate the road mortality. The area proposed to be removed for the construction of the NSDF is classified as Category 3 habitat, habitat considered to have the highest tolerance to alteration.
CNL-ND382	William Turner (May 31, 2017) 115.	All the wastes originate from somewhere. About 76% of these wastes will be will be soils from site remediation activities and construction type wastes from decommissioning activities. (See Section 3.2.1.1, Waste Types and Table 3.2.1-1, Phase 1 and 2 Waste Types and Volumes). However, CNL have chosen to ignore these activities in their in their pathway analysis. Although I can understand this omission, if one does not include the waste generation in the scope of the project. However, this appears to be disingenuous. According to CNL' definition of Reasonably Foreseeable Developments (Section 5.1.3.3), these activities would be included, specifically in the assessment of cumulative effects. Since these activities must be included in the assessment of cumulative effects, then the identification of project interactions and the associated mitigation measures must address these activities.	Reasonably Foreseeable Developments are considered in the cumulative effects assessment. Table 8.2-1 of the final Environmental Impact Statement (EIS) identifies the Reasonable Foreseeable Developments considered. These include new research and development facilities (such as the proposed Small Modular Reactor) as well as decommissioning and environmental remediation activities. For the cumulative effects assessment, decommissioning projects at Chalk River Laboratories (CRL) are assessed as a grouped activity rather than by individual projects. Decommissioning activities are summarized in Section 8.2.1 and Table 8.2-1 of the final EIS and include decommissioning of over 100 building and structures and include both nuclear laboratories and conventional buildings. National Research Universal (NRU) reactor decommissioning, although not specifically mentioned, is a foreseeable project and the assessment of effects broadly addresses potential effects from NRU decommissioning. Similarly, environmental remediation of affected lands and non-operating waste management areas (WMAs) were assessed as a grouped activity. It should be noted that remediation of the WMAs would be subject to a

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			separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. The cumulative effects of Reasonable Foreseeable Developments in combination with Near Surface Disposal Facility (NSDF) are assessed for each environmental component in Section 8.3 of the final EIS. The assessment includes an evaluation of potential effects, mitigation measures and a determination of residual effects for each reasonable foreseeable development. It is noted in Section 8.3.11 that transport of waste from decommissioning activities for facilities on the main CRL campus are considered through this assessment. The decommissioning activities and haulage of waste from remediation of WMAs on the CRL site located outside of the main campus are anticipated to use existing roadways to NSDF; however, remedial action plans for the large-scale cleanup of the WMAs are not yet developed thus there is uncertainty on the extent of waste that will be received in NSDF and their transport routes. Once Remedial Action Plans are developed for WMAs (or other areas of large land contamination), the waste transport plans would be developed and trigger the appropriate Environmental Reviews at that time. If NSDF Project follow-up monitoring identifies a residual effect not predicted or anticipated by the EIS, the cumulative effects of the project would be re-evaluated.
CNL-ND383	Le Conseil provincial des femmes du Québec/The Provincial Council of Women of Quebec (CPFQ-PCWQ) (August 16, 2017	NCWC and its affiliated Provincial Councils have long supported a policy of using the "*precautionary principle"* when assessing projects that may well put human health and safety and the environment at risk. We very much hope that those making decisions about disposing of dangerous nuclear materials at the Chalk River Laboratories site will pay due attention to this important principle as well.	The precautionary principle has been taken into consideration throughout all aspects of the project, including project design (construction through to post-closure and beyond), development of mitigation measures, assessment of environmental effects, design and implementation of follow-up, and monitoring programs. The Near Surface Disposal Facility (NSDF) builds on the large base of experience for similar facilities that exist in the US, Europe and Canada. The following fundamental design principles incorporate the precautionary principle and were considered in the NSDF Project design in accordance with the International Atomic Energy Agency (IAEA) [1]. • Protection of human health – radioactive waste shall be managed in such a way as to secure an acceptable level of protection for human health. • Protection of the environment – radioactive waste shall be managed in such a way as to provide an acceptable level of protection of the environment. • Protection of future generations – radioactive waste shall be managed in such a way that predicted effects on the health of future generations will not be greater than relevant levels of effects that are acceptable today. • Burdens on future generations – radioactive waste shall be managed in such a way that will not impose undue burdens on future generations. • Safety of facilities – the safety of facilities for radioactive waste management shall be appropriately assured during their lifetime. Canadian regulatory guidance for approaches to long-term safety of radioactive waste management is reflective of these IAEA principles and provided in CNSC REGDOC-2.11.1 [2]. The CNSC identifies the need for long-term management of radioactive waste arising from licenced activities and considers the extent to which the owner of the waste has addressed the following principles:

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			• The management of radioactive waste is commensurate with its radiological, chemical and biological hazard to the health and safety of persons and the environment, and to national security; • The assessment of future impacts of radioactive waste on the health and safety of persons and the environment encompasses the period of time when the maximum impact is predicted to occur; and • The predicted impact on the health and safety of persons and the environment from the management of radioactive waste is no greater than the impact that is permissible in Canada at the time of the regulatory decision. Consistent with the above principles, the objective of the design of a NSDF is to ensure that the facility can be built and waste received, handled, and disposed of without undue risk to human health and the environment, both during the facility operation and after facility closure. Section 3.1.1.1 of the final EIS provides a discussion regarding how the NSDF aligns with Canadian regulatory and International Atomic Energy Agency (IAEA) guidelines. The key safety features of the NSDF Project have addressed the IAEA design principles for radioactive waste disposal by incorporating: multiple safety functions, containment of radioactive waste, isolation of radioactive waste and surveillance and control of passive safety features into the facility design. References: [1] IAEA, 2001. Technical considerations in the design of near surface disposal facilities for radioactive waste. IAEA-TECDOC-1256. [2] Canadian Nuclear Safety Commission, 2018. Regulatory Document 2.11.1. Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management.
		Environmental Effects – Valued Components	
CNL-ND384	MNO (August 16, 2017)	**5.1.2 Valued Components, Page 5-10** **5.1.6.1 Application Case, Page 5-25** Why does the assessment only use magnitude, duration and geographic extent as criteria? Other assessments conducted through CNSC and CEAA have used the full listing of EIS Significance Criteria including timing, frequency, probability of occurrence, reversibility, and ecological context. It is unclear why these criteria were not employed.	Criteria used to evaluate residual effects in the Near Surface Disposal Facility (NSDF) Environmental Impact Statement (EIS) follow guidance provided by Canadian Nuclear Safety Commission (CNSC) Generic Guidelines for the Preparation of an Environmental Assessment [1] and the Canadian Environmental Assessment Agency's Technical Guidance: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012.[2] The evaluation criteria include direction, magnitude, geographic extent, duration, reversibility and likelihood. Specific definitions for the classification criteria have been developed for each Valued Component (VC) or discipline of study. Magnitude is the primary criterion used to determine significance, with geographic extent and duration (which implies reversibility) providing important context for assigning magnitude. Frequency and likelihood act as modifiers for determining significance, where applicable. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CEAA, Technical Guidance: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012. 2018 March.
		Environmental Effects – Aquatic Environment	
CNL-ND385	Melinda Tan June 14, 2017	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.*	A near surface disposal facility has been assessed as a 'best available technology' which is internationally recognized as a safe solution for the permanent disposal of low-level nuclear waste (LLW) by the International Atomic Energy Agency

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	Julie McCann (May 17, 2017) Laurie Wagner (August 15, 2016) Peter and Barbara Haughton (August 14, 2017)	The river and surrounding area are home to large areas of wetlands of great biological importance. It is common knowledge that water works its way into the river with wetlands; the alarming and quite probable possibility of a rupture and/or leak from the proposed site could have calamitous results that would have an ecological impact for many generations, not to mention the highly probable result of radioactive contaminants ending up in the wetlands, lake, streams and into the Ottawa River itself. If radionuclides make their way into groundwater at the site or into the Ottawa River, our waters and aquatic ecosystem will be contaminated. Millions of Canadians drink the waters of the Ottawa River. The Ottawa River has social importance that needs to be preserved: Vital waterway of historical significance, provides economic sustenance for the communities and our country, in areas such as fishing, shoreline harvesting, river based communities, recreation, spiritual and cultural expression, water transport and exploration, not to mention the importance for access to drinking water and tourism to this area of our majestic country. It powers industries such as aerospace and defence; it is vital to the economic prosperity of the region.	(IAEA) [1]. Several examples of disposal facilities similar to the NSDF have successfully demonstrated that a near surface engineered containment mound (ECM) can safely accommodate the magnitude of waste volume (e.g., up to 1,000,000 m^3) and type of waste (e.g., contaminated soil and demolition debris) for nuclear sites undergoing a large environmental remediation and decommissioning protocols. This is examined in Section 2.5.2.2.1 in the final EIS. The ECM is designed to contain and isolate the wastes from the environment for 550 years after which the radioactivity decreases to levels close to natural background concentrations in the environment. Since the NSDF Project only accepts LLW, all short-lived radioactive contaminants contained in the ECM (i.e., the primary component of LLW) decays in the first 100 years after closure. Based on IAEA standards [1] of management of nuclear hazards and wastes, the design of the NSDF Project is commensurate with the hazard. The Waste Acceptance Criteria (WAC) [2] was developed to ensure only LLW waste with acceptable physical, radiological, and chemical characteristics will be placed in the ECM (this is described in Section 3.3.3 of the final EIS). Waste accepted and placed in the ECM will be contained in non-leachate and leachate controlled waste packages (described in Section 3.3.1.1 of the final EIS). Leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. Section 3.4.1.4 of the final EIS describes the ECM base liner which is designed to provide containment of the waste placed into the ECM and leachate generated during and following the operation of the ECM to minimize the potential release of contaminants (including radionuclides) into groundwater. The base liner is comprised of a primary as well as a secondary liner to provide redundancy in the event of primary liner failure – these are composed of a combination of natural earthen materials and geosynthetic barrier systems. The base liner system is integrated with the Leachate Collection System (LCS) and Leak Detection System (LDS). Section 3.4.1.4 of the final EIS and the NSDF Design Description [4] describes the LCS and LDS as a means of monitoring potential leakage of leachate through the primary liner and transferring leachate and condensate that accumulates to sumps for subsequent removal to the Wastewater Treatment Plant (WWTP). The WWTP (described in Section 3.4.2.4) will treat contaminants from wastewater associated with the operation of the ECM. Section 3.4.1.12 outlines how leachate will be removed from the LDS sumps and, along with the contact water (i.e., water such as rain which has come into contact with the LLW waste in the ECM and may be contaminated as a result), will be transferred to collection tanks and then to the WWTP for treatment. The NSDF design supports an integrated environmental monitoring system that includes groundwater monitoring and that conforms to the CNSC [5] and CSA requirements [6]. Environmental, effluent, and groundwater monitoring at the NSDF Project site will be evaluated annually by the Facility Manager as supplementary indications of the environmental impact of the operation of the NSDF. A summary of monitoring and follow-up programs anticipated to be implemented into the NSDF Project is included in Section 11.0 of the final EIS. References: [1] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Design Description 232-503212-DD-001. [5] CNSC, Environmental Principles, Assessments and Protection Measures, REGDOC 2.9.1, 2020 September.

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			[6] CSA N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015.
CNL-ND386	AANTC (August 14, 2017)	The commenters identify omissions in the EIS regarding the assessment on the aquatic environment. AANTC feel that the EIS is incomplete and is concerned about the following gaps in the draft document concerning aquatic biota: • A discussion on the ecological hazards of individual radionuclides that may be stored • Assessments should include potential impacts of NSDF on aquatic biota in the Ottawa River, and the river should be included as a VC • Information should be provided on the aquatic food chain and food web dynamics of ecosystems that may be impacted by the NSDF • Discrepancies between CNL's aquatic species at risk monitoring results and information in the EIS that need to be addressed, as well as gaps in the currently available species at risk information in the EIS • Existing data concerning radiological contamination in moose and beaver that may interact with the NSDF and local environment should be included in EIS • Potential impacts of the NSDF on wetlands immediate adjacent to the proposed site should be addressed in the EIS • Potential genetic impacts of exposure to radionuclides to aquatic organisms should be assessed for • Impacts on aquatic biota of potential tritium releases from the NSDF should be assessed. These assessments should include potential effects on species during their developmental life stages. Impacts of organically-bound tritium on these species should also be discussed in the EIS as it has the potential to accumulate in aquatic food chains. • Impacts of large precipitation events on water quality, aquatic biota, and resulting erosion should be assessed • Impacts of tree clearing on aquatic biota should be considered, as there are no proposed mitigation measures • Potential impacts of the surface water management ponds should be better assessed, including their construction • Potential risks of NSDF water management ponds to organisms, including migratory waterfowl, should be assessed in the EIS. Concerning surface water and groundwater: • The EIS requires more accurate measurements of current radioactive groundwater and surface water contamination around the Chalk River site. These measurements must in turn inform any determination of allowable contaminant releases from the NSDF. These measurements are required for the East Swamp as well as all downstream surface waters that will receive effluent from the NSDF's waste water treatment plant (WWTP). • The EIS should include a discussion of alternatives to holding 10,000 m3 of intermediate waste at the NSDF. • More information should be provided in the EIS concerning surface and groundwater monitoring after the WWTP is decommissioned. Regular monitoring will be required for as long as the waste remains potentially hazardous, in order to ensure the NSDF's continued integrity.	The final Environmental Impact Statement (EIS) has been revised address the concerns related to the EIS discrepancies identified by the commenter, in particular those related to residual effects of the NSDF Project on aquatic biodiversity (Section 5.5 of the final EIS). • **Ecological hazards of radionuclide contaminants:** Representative radionuclides that are expected to be present in low-level waste (LLW) have been included in a Licensed Inventory for the NSDF (Table 5.7.6-1 in the EIS). The approach to predict and assess the residual effects of radiological contaminants on ecological health due to NSDF Project activities are addressed in Section 5.7.6.1 of the final EIS. Based on a normal evolution scenario of the NSDF, the expected radionuclide emissions from NSDF operations result in dose rates much less than the benchmarks for protection of biota (see Section 5.7.6.1.2.1). Surface water quality modelling confirms that environmental concentrations of contaminants are below the No Effect concentrations for protection of aquatic biota for radiological contaminants with the exception of one parameter, gross beta as Strontium-90. Existing gross beta concentrations are elevated at East Swamp Stream and elevated concentrations are associated with an existing Strontium-90 groundwater plume in the area (see Section 5.7.4.6). Surface water quality modelling shows that impacts on baseline concentrations as a result of NSDF activities are negligible (Table 5.4.2-14) because the wastewater treatment plant (WWTP) is designed to remove Strontium-90 from effluent prior to discharge. The methodology used as well as numerical results of the surface water quality modelling are explained in Section 5.4.2 of the final EIS. The exposure of non-human biota to radiological and non-radiological contaminants during the post-closure phase of the NSDF Project was assessed in the Ecological Risk Assessment (EcoRA) [1]. Based on the assessment of possible post-closure scenarios assessed in the EcoRA, no potential residual effects to ecological receptors from radiological exposure were identified. • **Impacts on aquatic biota, Ottawa River as VC:** The EIS has been revised to include the expanded Regional Study Area (RSA) which extends roughly 8 km further downstream in the Ottawa River to Harrington Bay and includes both shorelines in Ontario and Quebec. The assessment of contamination in the Ottawa River has confirmed that there is no risk to ecological receptors as a result of the NSDF Project. The effects to ecological (non-human) receptors from changes in ambient radioactivity as well as non-radiological contamination as a result of interactions with the NSDF Project were assessed in Section 5.7.5 of the final EIS. Canadian Nuclear Laboratories (CNL) recognizes the concern of Indigenous groups for the Ottawa River. Indeed, the effects of the NSDF Project to fish from potential contamination of the Ottawa River has been raised as a major area of interest in the selection of the valued components (VCs) for the aquatic environment assessment (Section 5.5.1 and Table 5.5.1-1 of the final EIS). Inclusion of fish habitat VC describes any watercourse, waterbody, or wetland providing functions for life history stages of fish. The aquatic biodiversity assessment also examined potential changes to the fish community that use watercourses and waterbodies within the Perch Creek and Perch Lake Watershed which discharge or is hydrologically connected to the Ottawa River. Valued components (VCs) chosen include representative taxa that are documented to occur or potentially occur in the local and regional study areas. Specifically, benthic macroinvertebrate, zooplankton, and fish were used in the effects assessment to estimate potential exposures to radiological and non-radiological constituents (these are detailed in Table 5.7.2-1 of the final EIS). These indicator taxa were chosen as the VCs because the ecological impact of radionuclide contaminants (i.e., the residual effects) will manifest in organisms which live in and rely on the Ottawa River (among other aquatic habitats such as Perch Lake within the local and regional study area). The ecological risk assessment performed demonstrates that the NSDF design sufficiently contains and isolates the inventory to allow for radiological decay until the risk to the environment, including non-human biota, is sufficiently low.

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		However, this does not seem to be acknowledged in the EIS or the NSDF's project plans which provide an arbitrary date at which all monitoring will cease. • WWTP effluent criteria, including treatment targets, must be included in the EIS, especially in light of the alarming plan to potentially release an average of 140,000 Bq/L of tritium to surrounding waters from the WWTP. • More information must be provided concerning the monitoring regimes for the WWTP while it is in operation. • More information must be provided in the EIS concerning contingency responses to adverse monitoring results from the WWTP. • Mechanisms for independent review and public dissemination of WWTP monitoring results should be discussed in the EIS.	• **Food chain dynamics, animal exposure:** An overview of the role of aquatic species in the food web dynamics is described by their trophic category and feeding habitat characteristics – these are listed in Table 5.5.4-1 in the final EIS. The NSDF Ecological Risk Assessment (EcoRA) [1] assessed the potential effects of exposure of aquatic biota to radiological contaminants. Aquatic vegetation, benthic invertebrates, benthic and pelagic fish, and tadpole (frog) may be directly exposed to contaminated surface water and sediment; these organisms are thus, assessed against contaminant concentrations in surface water (i.e., uptake from or immersion in surface water) and sediment (i.e., immersion or exposure). As such, pathways of exposure (e.g., ingestion, inhalation, etc.) are not explicitly modelled (or needed) for these receptors. Higher trophic terrestrial organisms such as bald eagle, eastern wolf, and black bear will consume lower trophic species such as fish as part of their diet. Aquatic birds will ingest food including aquatic vegetation and benthic invertebrates whereas higher trophic species such as belted kingfisher, mallard, and great blue heron consume fish as part of their diet. These organisms, therefore, are part of the food chain dynamics of the aquatic ecosystem. The internal dose to these organisms from ingestion of fish, benthic invertebrates, and aquatic vegetation were quantified in the EcoRA. The exposure of mammals and birds to non-radiological contaminants of concern (COPCs) by way of food chain intake were calculated in the EcoRA using transfer factors and concentrations of COPCs in the tissue of terrestrial vegetation, seeds, earthworms, and small mammals and birds (as prey). Transfer factors accounted for the transfer of COPC from soil to biota, water to biota, and feed to tissue. From the EcoRA, no potential issues are identified from exposure of aquatic biota to radiological and non-radiological contaminants under a normal evolution scenario for the NSDF Project. However, certain higher trophic taxa may be exposed to non-radiological COPCs under certain hypothetical scenarios such as accelerated erosion of the final ECM cover after closure during normal evolution, failure of the ECM berm resulting in a series of landslides between 650 and 5,000 years after construction of ECM, and mass excavation of the whole inventory of the NSDF and mixing and dispersion on the surface. It should be noted that these hypothetical scenarios all represent extreme circumstances that are highly unlikely to occur. • **Aquatic species at risk**: The expansion of the RSA for the assessment of the aquatic environment has resulted in the inclusion of additional aquatic species at risk, namely Lake Sturgeon, American Eel, River Redhorse, and Northern Brook Lamprey. These occur in the Ottawa River and are species listed under the Species at Risk Act – they are now identified as specific VCs in the aquatic biodiversity assessment in the final EIS. Monitoring of fish is essential to identify population level changes as a result of NSDF operations. Fish composition information available prior to the proposition of the NSDF Project included data from 1981. To generate more current data representing present conditions, a new monitoring campaign was initiated in 2016; extensive baseline inventory data has been used to characterize the potential distribution of species in the aquatic environment assessment boundaries as described in Section 5.5.4.2.2 of the final EIS. The broad scale monitoring protocol was used, a methodology developed by fisheries biologists from the Ontario Ministry of Natural Resources and Forestry which has been adopted by other countries. • **Radiological contaminants in moose and beaver:** Radioactivity in large game animals (e.g., moose) from the CRL site and surrounding area is routinely monitored as part of CRL Environmental Monitoring Program (EMP). The results of these environmental monitoring programs (EMP) are the source of the Base Case (baseline conditions) radioactivity characterization data for the NSDF environmental assessment as described in Section 5.7.4.3 of the final EIS. Typically, samples from large game are obtained from animals donated by local hunters. As a result, the number of available samples and the type, age, and size of large game analyzed vary from year to year. The concentrations of key radioactive contaminants in large game animals measured from previous monitoring reports are listed and discussed in Section 5.7.4.10 of the final EIS. The NSDF facility will be fully fenced (as are other key areas on the CRL site) to further minimize the likelihood of animal interactions with the facility. Beaver

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			collection and analysis was recently added to the monitoring program in 2018. More specifically, five beavers were collected near the Maskinonge Lake Outlet and on the CRL Plant Road via opportunistic means (e.g., vehicle/animal interaction). In a recent CNL report, free water tritium and organically bound tritium results from all small animals sampled (beavers included) were comparable to what is typically measured in the flesh of large game animals sampled from within a 25 km radius of the CRL site. The interactions of terrestrial mammals such as moose and beaver with the Project site during the post-closure phase of the NSDF Project are examined in the EcoRA [1]. • **Potential impacts on wetlands** adjacent to the NSDF Site has been assessed as part of the environmental assessment of the surface water environment in Section 5.4 of the final EIS. The NSDF Project is located entirely within the Perch Creek and Perch Lake Watershed (Section 5.4.1.4.2.3 describes this watershed as well as the sub-basins which define it). The watershed includes waste management area (WMA) A and B as well as the Liquid Dispersal Areas which encompasses the Reactor Pits, the Laundry Pit, and the Chemical Pit. From Perch Lake, surface water (Perch Creek) flows in a north-easterly direction through Perch Creek to its confluence with the Ottawa River. The results of a residual effects analysis on the Perch Creek and Perch Lake Watershed as a result of its interaction with the NSDF Project is described in Section 5.4.1.5 of the final EIS. Potential impacts to wetland as a result of NSDF activities are proposed to be mitigated through design and operational controls. The design requirement for the NSDF Project footprint includes a 30 m setback from wetlands to limit potential disturbance of the wetlands during the construction and operations phases. Stormwater management ponds will be included to minimize erosion and sediment loading to wetlands. Surface waters from the Perch Lake Basin are currently monitored as part of routine CRL EMP. A Follow-Up Monitoring Program (EAFMP) is currently under development and will be implemented as part of the NSDF Project. Follow-up monitoring will include effluent, surface water, and groundwater monitoring specific to the NSDF Project for the complete project lifecycle. • **Impact of NSDF Project on genetic makeup of aquatic biota:** The impact of radiation exposure on the genetic makeup of aquatic biota is outside the environmental assessment (EA) scope for the NSDF Project. The radiation doses to biota as a result of the NSDF has been assessed in the EcoRA [1]. Site-specific Environmental Effect Concentration (EEC) values were developed for the CRL site and were derived based on a screening dose of 100 µGy/hr for terrestrial organisms and 400 µGy/h for aquatic organisms. These criteria used for the exposure assessment take into consideration internationally recommended safe levels that are unlikely to have any impact on aquatic or terrestrial biota; the radiological screening dose mentioned are consistent with the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) 2008 publication, *Sources and Effects of Ionizing Radiation, Annex E: Effects of Ionizing Radiation on Non-Human Biota* [2]. The results of the EcoRA indicate that predicted doses to all indicator species are below these internationally standardized dose benchmark values for adverse effects to occur throughout all phases of the project including post-closure phases; adverse effects related to genetics of aquatic biota are therefore not expected. • **Impact of tritium releases to aquatic biota, bioaccumulation:** Canadian Nuclear Laboratories **(**CNL) acknowledges that any potential discharges of effluent into fish frequented waters must be in compliance with subsection 36 (3) of the *Fisheries Act*, which prohibits discharge of deleterious substances of any type into waters frequented by fish. The results of measurement of radioactivity in aquatic biota (fish, clams) have been assessed in the final EIS and discussed in Section 5.7.4.9. In 2018, tissue concentrations of tritium, organically bound tritium, and gross alpha and beta (Table 5.7.4-17 in the final EIS) and gamma spectral analysis (Table 5.7.4-18 in the Final EIS) were measured in fish from Perch Lake. Measured concentration values from these analyses are listed in Table 5.7.4-17 in the final EIS. Based on a water content of 75% by mass [3] and an internal dose conversion coefficient of 0.000138 micrograys per day per Becquerel per kilogram (µGy/day)/(Bq/kg) as presented in the EcoRA, the

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

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			concentrations of tritium in fish and clams are significantly less than concentrations that would result in doses exceeding the benchmark 400 µGy/hr for aquatic biota. That said, tritium releases to the environment from the NSDF will be controlled and minimized by packaging waste with high tritium concentrations before emplacement in the engineered containment mound (ECM) during the operations phase. This will be ensured using the Waste Acceptance Criteria (WAC) [4]. Tritium concentrations in Perch Creek, which drains Perch Lake and discharges to the Ottawa River will remain below the drinking water guideline for protection of the public. Accordingly, no environmental or human health impacts from tritium or organically bound tritium are predicted. In the 2014 assessment of Ottawa River baseline sediment conditions, bioaccumulation of radiological (Cesium-137, Strontium-90, Cobalt-60) and non-radiological (mercury) constituents was assessed. Radionuclide concentrations in most benthic biota, including plants, mussels, and crayfish, were not found to be related to sediment concentrations. Cesium-137 is the only radionuclide that biomagnifies at the site and the only benthic taxa that bioaccumulate sediment-associated Cesium-137 are deposit feeding benthic invertebrates. For mercury, biomagnification of methyl mercury from sediments to ecological receptors was assessed using Biota-sediment accumulation factor models previously published and modified to model the CRL site. • **Impact of large precipitation on water quality, aquatic biota, and erosion:** Extreme rainfall and snowmelt events and the potential for flooding are considered in the design of the surface water management systems, berms, and the final cover system for the ECM. An overview of the potential effects of extreme environmental events on the NSDF as well as designed components to mitigate these impacts are included in Section 10.1.2 of the final EIS. Severe precipitation generates surface water that may result in the release of silt/sediment to the adjacent wetlands. Severe rainstorms or snowmelts could also affect roads and cause damage to natural or engineered slopes (e.g., berms), and the final cover system of the ECM through erosion. The ECM is designed to limit water infiltration, to direct infiltration and surface water run-off away from the ECM waste placement area. The topographical slopes within the ECM footprint are sufficient to promote drainage, and by lining the ECM surface water collection ditches and stilling basins with rip rap and other erosion control measures, sediment transport and erosion will be minimized (Section 3.4.1.9.3; the Post-Closure Safety Assessment or PostSA [5] studies the effect of enhanced erosion on the ECM). Surface Water Management Ponds (SWMP) are proposed to mitigate the impact of the NSDF Project on hydrology, surface water, and erosion at the Project site. The design of the SWMP and associated systems use standard surface water management principles by controlling erosion, capturing sediment, and allowing infiltration of non-contact water (water that does not come in contact with waste emplaced in the ECM). The current SWMP footprints reflect the overall storage required to control closure flows to pre-development for the 2-year through to 100-year rainfall events at the site (Section 3.4.4.5.2 of the final EIS). The management of surface water run-off from the ECM has both a contact and non-contact component: design of the contact and non-contact component uses run-off volumes to address WWTP requirements and uses back-to-back 100-year storm events as the design criteria; the non-contact component uses peak flows from the 100-year plus climate change event to address run-off from the ECM cover in down-chute design and run-off volumes from the 100-year event to address storage and pumping requirements within the ECM for those areas not covered. The ditches can convey the 100-year plus climate change flow and for most cases they can also convey probable maximum precipitation design flow. All roads, including the perimeter road, have ditches that convey not only road drainage but drainage from adjacent lands to the SWMP (Section 3.4.4.5.3 and 3.4.4.5.4 of the final EIS). Major system (e.g., 100-year event) flow routes follow the road system and ditches to the relevant SWMP and the probable maximum precipitation (PMP) flow generally follows major system routes. Annual inspection and maintenance activities will identify any erosion problems. Additional inspection and maintenance review will be completed after major storm events and after the annual spring melt to confirm that no major erosion or blockage of drainage ditches, culverts, and swales occurred.

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			• **Ecological impact of SWMP and its construction on aquatic biota**: The construction of the three SWMP, including the proposed layout and drainage patterns around the NSDF footprint, are addressed in Section 3.4.4.5.2 of the final EIS. The main purpose of SWMP is to address erosion and sediment control concerns during construction by providing interim sediment control and water quality/quantity (e.g., run-off) controls to the surrounding wetland receiving waters during operations, closure, and post-closure. The residual effects analysis where the SWMP impacts site hydrology is discussed extensively in Section 5.4.1.6 of the EIS. Results of hydrological modelling show that the surface water management system is designed such that flows during the closure phase are controlled to pre-development levels; thus, preventing increased erosion rates in the receiving water bodies due to increased discharge rates (e.g., during heavy precipitation). Implementation of the mitigation measures through surface water management (also explained in the previous bullet point above) for the NSDF Project is expected to limit the extent of changes to downstream discharge, water levels, and channel/bank stability in Perch Creek such that negligible residual effects are predicted to surface water and sediment quality. The overall effect of SWMP is that impacts on aquatic biota activity and habitat throughout the NSDF construction, operations, and post-closure phases are minimized.
			• **Vegetation (tree) clearing effects on aquatic biota:** Vegetation (tree) clearing will occur as part of NSDF site preparation during the construction phase. The potential impact of tree clearing on aquatic biota are assessed through an effects pathways analysis for any potential changes to local hydrology as summarized in Table 5.5.5-1 in the final EIS. Changes to local hydrology results from surface disturbances and is defined by changes to water levels, flows, and channel/bank stability at downstream locations, affecting water and sediment quality, and fish habitat quality. Examples of management practices and mitigation actions for this pathway are summarized in Table 5.5.5-1 and include the following:
			  ○ The NSDF Project footprint has been designed to avoid wetlands and limit disturbance to the natural environment to the extent feasible.
			  ○ A 30 m buffer is established along all identified wetlands near the NSDF site.
			  ○ Erosion and sediment control practices (e.g., silt fences, run-off management) applicable to the region and already in place at the CNL property will be used during construction around disturbed areas, where appropriate.
			• **SWMP and impacts on migratory waterfowl:** Migratory birds may be attracted to the SWMP, especially during the spring if these ponds are the only open sources of water in the area (i.e., they are ice free). Should this happen, these open surface water pond features are not predicted to contain any levels of contaminants that would be of concern to wildlife. Therefore, the SWMP are not expected to have any adverse effects on migratory waterfowl. Birds are not expected to spend extended periods of time in the ponds since they are migratory thereby further reducing the likelihood of any exposure to the SWMP waters. In addition, the ponds will be small compared to natural waterbodies in the RSA (e.g., Ottawa River) and LSA (Perch Lake, specifically); migratory waterfowl and other birds are thus, expected to be more attracted to these larger water bodies than the ponds within the SSA. As such, this pathway was determined to have no linkage to effects on the survival and reproduction of wildlife and is not anticipated to affect the maintenance of self-sustaining and ecologically effective wildlife populations that overlap the RSA.
			
			Concerning surface water and groundwater:
			• **Current groundwater and surface water radiological contamination, effluent from WWTP: Canadian Nuclear Laboratories (**CNL) recognizes that historical events have resulted in the contamination of groundwater and surface water. Annual CRL monitoring programs have identified these contaminated media (e.g., soil,

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			groundwater) and have made the CNSC and the public aware of them through annual compliance reports. The results of these monitoring programs inform the Base Case or baseline conditions for the assessment of the NSDF Project from which residual effects of NSDF activities can be identified. Radioactive releases from CRL as it relates to the NSDF Project is discussed in Section 5.7.4.2 of the final EIS. Section 5.7.6.1.2.1 in the final EIS specifies that the expected radionuclide emissions from NSDF operations result in dose rates much less than the benchmarks for protection of biota. Surface water quality modelling confirms that environmental concentrations of contaminants are below the No Effect concentrations for protection of aquatic biota for radiological contaminants with the exception of one parameter, gross beta as Strontium-90. Existing gross beta concentrations are elevated at East Swamp Stream. The elevated concentrations are associated with an existing Strontium-90 groundwater plume in the area (Section 5.7.4.6 of the final EIS). However, the WWTP is designed to remove Strontium-90 from NSDF effluent prior to discharge and surface water quality modelling shows that impacts on baseline concentrations as a result of NSDF activities are negligible (Table 5.4.2-14). That is, the treated effluent from the NSDF will not contribute additional contaminants to the existing Strontium-90 plume. The methodology used as well as numerical results of the surface water quality modelling are explained in Section 5.4.2.6 of the final EIS. The WWTP effluent discharge targets [6] were developed based on 'No Effects Concentrations' for the protection of aquatic biota and represent radionuclide concentrations for which no effects are expected at the population level. • **Alternatives to ILW:** Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. A critical change from the initial NSDF Project design is that the NSDF will now accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [7]). • **Monitoring regimes of WWTP during operations, after decommissioning:** The Environmental Assessment Follow-Up Monitoring Program (EAFMP), described in Section 11.0 of the final EIS, will be developed to continuously address the uncertainties associated with the effects predictions and the performance of mitigation, verify the effects predictions, identify any unanticipated effects, and provide for the implementation of adaptive management to limit these effects. The EAFMP will incorporate monitoring of WWTP as part of its protocol during the operations phase of the NSDF Project. Wastewater effluents and streams with the potential to release contaminants to the Ottawa River are subject to the EAFMP, as appropriate, providing a means of measuring and controlling releases of effluent to the environment [8]. The WWTP will only be operational during the NSDF Project operations phase and will be decommissioned following closure of the ECM. The EAFMP will be integrated into routine CRL site-wide environmental, effluent, and groundwater monitoring programs and is anticipated to continue through the institutional control period after the NSDF Project closes (i.e., after the WWTP is decommissioned). During the closure period, leachate collected after the WWTP has been decommissioned will be processed elsewhere. The monitoring of leachate quality and quantity during the institutional control period will inform if the cover system is performing as designed; monitoring will continue for as long as necessary. The NSDF will remain licenced as long as the waste is hazardous and all licenced facilities will require environmental monitoring subject to regulatory review as well as communication to the general public, including Indigenous groups. The progression of the project phase of a nuclear facility such as the proposed NSDF requires CNSC approval which is typically subject to commission hearings and public involvement. Therefore, CNL will continue to engage members of the public and Indigenous groups throughout its development of the lifecycle of the NSDF

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			Project even after its components have been decommissioned, including the development, implementation, and modification of the EAFMP. • **WWTP effluent discharge targets are included in the EIS [6], tritium release:** Effluent discharge targets for non-radiological and radiological COPC's were developed for the NSDF WWTP based on federal and provincial surface water guidelines (e.g., CCME, PWQO, etc.) for the protection of aquatic life – these are listed in Tables 3.4.2-2 and 3.4.2-3 of the final EIS. These effluent discharge targets were developed to be protective of human and non-human receptors and the environment are discussed in Section 3.4.2.2 of the final EIS. Treated effluent discharges from the WWTP will be controlled as batch releases and will be routinely sampled to ensure discharge targets are met prior to release to the environment (Section 3.4.2.4 of the final EIS). The estimated concentration of tritium discharge has been revised in the EIS. Section 3.4.2.5.1 of the final EIS describes how CNL has placed stringent limits on the total amount of tritium that can be placed in the NSDF (see Table 3.3.1-2 EIS) and on the tritium concentration in individual waste shipments (see Table 3.3.3-1). By placing stringent controls on the amount of tritium being placed in the NSDF, emissions from the WWTP will meet the tritium effluent discharge targets. The discharge target for tritium of 360,000 Bq/L is based on maintaining tritium concentrations in Perch Creek which discharges to the Ottawa River, below the drinking water guideline of 7,000 Bq/L. The tritium discharge target is also below the No Effects Concentration (NEC) for the protection of aquatic biota, although the drinking water guideline is more restrictive than the NEC. These effluent discharge targets will be required of the final treated effluent prior to discharge to an exfiltration gallery (hydrologically connected to East Swamp) or via a transfer line discharge to Perch Lake – Section 3.4.2.6 in the final EIS. It is important to note that the groundwater discharged to the wetland surrounding the NSDF site as well as surface water streams such as East Swamp Stream are not utilized for sources of potable water by any known communities. • **Monitoring programs for surface and groundwater quality:** The EA Follow-up Monitoring Program (EAFMP), which will be implemented for the NSDF Project during its construction, operations, and closure phases, will include environmental, effluent, and groundwater monitoring in order to ensure that releases and subsequent environmental concentrations are below the relevant guidelines. Section 11.0 of the final EIS presents a framework for the EAFMP aligned with the requirements of the *Generic Guidelines for the Preparation of an EIS* [9]. The EAFMP will follow the systematic informed planning process outlined in CSA Standards for environmental (N288.4-10) [10], effluent (N288.5-11) [11], and groundwater monitoring (N288.7-15) [12]. It is expected that regulatory monitoring will be maintained through the EAFMP for the duration of institutional control period of the NSDF Project (i.e., for approximately 300 years). The EAFMP will be a dynamic program and may change in accordance with the normal evolution of the NSDF Project (i.e., through its progression from the construction to operations to closure and post-closure phases). Canadian Nuclear Laboratories (CNL) will continue to offer opportunities for the general public and Indigenous peoples, to provide feedback as the EAFMP is developed and reviewed by the CNSC. • **Contingency plan for negative monitoring results:** The flexibility of the WWTP design allows CNL to modify the treatment approach based upon the actual wastewater characteristics. Canadian Nuclear Laboratories (CNL) will sample the leachate before treatment begins and at several stages throughout treatment to ensure that the treatment processes are working as expected. Canadian Nuclear Laboratories (CNL) can make adjustments to the treatment strategy where waste treatment process expectations are not met. The treated effluent goes to a final effluent storage tank where samples are analyzed prior to release to the environment. In the event that final effluent does not meet discharge targets, further investigation is conducted to determine the cause of exceedance in addition to monitoring of relevant media. Effluent which don't meet discharge criteria would be recycled to the beginning of

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			the WWTP process to be re-treated and remove any contaminants that exceeded target limit (See Design Description [13] technical supporting documents for specific mechanistic and operational details). • **Independent Review, public dissemination of monitoring plans:** A completed draft of the EAFMP will be submitted to the CNSC for independent review; the EAFMP will be revised accordingly based on any comments and requests for modification received during this review. Feedback from interested parties including Indigenous communities/groups, the public, and stakeholders will also be requested by CNL in its evaluation of the EAFMP. In addition, CNL expects that the EAFMP will only be finalized following final approval of the NSDF EA by the CNSC. Any additional monitoring requirements outlined in the CNSC decision would be included in the monitoring plans. Separate from this, the CNSC maintains an Independent Environmental Monitoring Program (IEMP) at the CRL site which is a planned sampling program designed to verify that public health and environmental conditions are safe and that CNL's environmental protection programs are working as intended. References: [1] Ecological Risk Assessment (EcoRA) for the NSDF Project, 232-121240-ASD-001. [2] UNSCEAR. 2008. Sources and Effects of Ionizing Radiation. Volume II. Scientific Annexes C, D and E. ISBN-13: 978-9291-142280-1. United Nations. April 2011. Accessed November 2019. Available at http://www.unscear.org/docs/publications/2008/UNSCEAR_2008_Annex-E.pdf [3] CSA Group. 2014. CSA N288.1-14: Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents for Normal Operation of Nuclear Facilities. March 2014. [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [5] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [6] Near Surface Disposal Facility Effluent Discharge Targets, 232-106499-REPT-002 [7] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [8] Environmental Assessment (and/or Environmental Effects Review). Project Description: Near Surface Disposal Facility at Chalk River Laboratories. 232-509200-ENA-001. [9] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [10] CSA N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [11] CSA N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [12] CSA N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015. [13] Design Description 232-503212-DD-001.
CNL-ND387	[Great Lakes and St. Lawrence Cities Initiative](#) (August 15, 2017)	It is essential to demand the establishment of satisfactory precautionary measures for all elements of the project, particularly for those identified in the environmental impact statement as having adverse residual effects. It is also important to establish zero-risk management practices, for example by reducing the frequency and size of shipments in terms of their quantity, concentration of contaminants, and radiation.	As summarized in Table 9.0-1 of the final EIS, there are no significant, negative residual effects for the NSDF. Transportation of waste from other sites is considered outside of scope for the NSDF Project. The transportation of waste to the Chalk River Laboratories (CRL) site is an activity covered by Canadian Nuclear Laboratories' (CNL) existing site licence [1] and other additional transport regulations. The environmental assessment (EA) of the NSDF Project is conducted in accordance with the *Canadian Environmental Assessment Act*, 2012, the *Canadian Nuclear Safety Act*, and relevant Canadian Standards Association. The EIS is compliant with the *Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012* [2] and with REGDOC-2.9.1 *Environmental Protection: Environmental Principles, Assessments, and Protection Measures* [3].

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			Zero risk is not an attainable goal; however, the EIS (and its supporting documents) demonstrate that the risk from the NSDF Project is negligible. The Safety Analysis Report (SAR) [4] was developed to demonstrate to the Canadian Nuclear Safety Commission (CNSC), CNL's federal regulator, the adequacy of the NSDF design in support of an application for a Licence to construct a new nuclear facility which conforms to regulatory requirements and guidance provided by the CNSC. The purpose of the SAR is to identify and describe the hazards and outline the controls and mitigation measures as well as management systems in place to ensure components of the NSDF work consistently to reduce residual effects identified in the EA. The SAR expands upon NSDF design which fulfill high-importance safety functions including control of radiation exposure to people and environment, containment and isolation of radioactive material, passive venting of gases, and criticality safety. The Post-Closure Safety Assessment (PostSA) [5] was performed to demonstrate that the NSDF long-term safety meets dose requirements after the closure of the NSDF. The assessment of each discipline in the EA provides a precautionary evaluation of potential residual effects of the NSDF Project and aims to overestimate potential effects where uncertainty is present. Where possible, methods are used to reduce uncertainty and increase the level of confidence in effects predictions. In addition, a conservative approach was implemented when information is limited so that effects are typically overestimated (e.g., defining the key input variables so that the results predict effects conservatively). Canadian Nuclear Laboratories (CNL) has proposed to undertake conceptual monitoring of each environmental discipline incorporated into the EA via the Environmental Assessment Follow-Up Monitoring Program (EAFMP) the construction, operations, closure, and post-closure phases (i.e., the institutional control period) of the NSDF Project. Section 11.0 of the EIS presents a framework for the EAFMP aligned with the requirements of the *Generic Guidelines for the Preparation of an EIS* [1]. These monitoring plans will follow the systematic informed planning process outlined in CSA Standards for environmental (N288.4-10) [6], effluent (N288.5-11) [7], and groundwater monitoring (N288.7-15) [8]. Residual effects which were predicted in the EIS will be monitored through the EAFMP and appropriate mitigation measures (including those proposed throughout the EIS) will be put in place, as necessary. Note that the EAFMP is presently under development and is expected to be a dynamic with elements that may be modified according to the evolution of the NSDF Project and as the significance of residual effects change. References: [1] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25. [2] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [3] CNSC, Environmental Principles, Assessments and Protection Measures, REGDOC 2.9.1, 2020 September. [4] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [5] Post-Closure Safety Assessment, 232-509240-ASD-004. [6] CSA N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [7] CSA N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [8] CSA N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015.
CNL-ND388	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	There is no assessment provided regarding the impacts of tritium on aquatic biota. More details in Appendix 2, pages 16-17 of the Ottawa Riverkeeper submission.	Canadian Nuclear Laboratories (CNL) acknowledges, through this Environmental Impact Statement (EIS), that historical events and previous outdated methods of radioactive waste storage has resulted in contamination of areas within the Chalk River Laboratories (CRL) site. In particular, the prevalence of tritium as a mobile and abundant contaminant at CRL may have ecological impacts on aquatic biota. Canadian Nuclear Laboratories (CNL) has assessed the residual effects of the NSDF on tritium exposure to aquatic biota as part of the final EIS.

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			Doses to ecological receptors (e.g., aquatic biota) were calculated based on water and sediment concentrations in East Swamp Stream which drains into Perch Lake. Table 5.7.6-2 in the final EIS shows the estimated maximum concentration of tritium in treated effluent coming from the Wastewater Treatment Plant (WWTP) to be 360,000 Bq/L based on its inventory in bulk waste, leachate generation rate and the total quantity of wastewater. Note that this is a bounding case. As outlined in Section 5.7.4.9 of the final EIS, fish are collected annually from upstream and downstream locations on the Ottawa River and from Chalk Lake. Fish have periodically been sampled from Perch Lake. Studies conducted in 2003 and 2013 included measurements of tritium oxide in water as well as tritium oxide and organically bound tritium in fish and clams. The results of these studies are shown on Figure 5.7.4-13 and Figure 5.7.4-14 of the final EIS. Based on a water content of 75% by mass and an internal dose conversion coefficient of 0.000138 micrograys per day per Becquerel per kilogram (µGy/day) / (Bq/kg) as presented in the CRL Environmental Risk Assessment [1], the concentrations of tritium in fish and clams are significantly less than concentrations that would result in doses exceeding the benchmark of 400 µGy/hr for aquatic biota. The 400 µGy/h benchmark for chronic radionuclide dose rate for non-human biota is determined by the International Commission on Radiological Protection (ICRP). The benchmark value serves as a guideline for all radionuclides, not just tritium. A study conducted by CNL in collaboration with the Institut de Radioprotection et de Sûreté Nucléaire (IRSN) tested the exposure of fish *in vivo* to various concentrations of tritium in water (Gagnaire et al., 2020) [2]. The study estimated that total dose rates were 0.094 µGy/h following 60 days after 25 kBq/L OBT exposure concentration and 0.65 µGy/h following 60 days after 180 kBq/L HTO exposure concentration. Based on the findings in this study, a tritium exposure concentration of 7kBq/L (7,000 Bq/L) – the maximum acceptable concentration of tritium based on Health Canada guidelines [3] – would result in a calculated dose rate of 0.025 µGy/h, well below the 400 µGy/h benchmark for the protection of aquatic biota set by the ICRP. The tritium effluent discharge target is a site-specific target which will ensure that tritium concentrations in Perch Creek which discharges to the Ottawa River do not exceed the drinking water guideline of 7,000 Bq/L. The use of drinking water concentrations for radionuclides is considered conservative as there is no public access to the Perch Creek and Perch Lake watershed where WWTP effluent discharges will occur. The effluent discharge targets [4] derived for radionuclides including tritium for the WWTP will ensure that cumulative radiological emissions are well below CRL site Derived Release Limits and doses to the public from CRL site emissions remain well below licence requirement of 0.3 mSv/yr. [5] The NSDF Project has provisions for the mitigation of tritium release from the ECM waste inventory. The NSDF Waste Acceptance Criteria (WAC) [6] has been developed to ensure the WWTP is capable of treating the contaminants in the leachate to meet effluent discharge targets that are protective of the environment and human health. The portion of waste with high concentrations of tritium will be required to utilize robust packaging (leachate controlled) to prevent leachate generation within the ECM. These leachate controlled packaging (discussed in Section 3.3.1.1 of the final EIS) will provide short-term barriers for wastes with higher radionuclides concentrations such as tritium during the time the disposal cell is not covered with the final cover system (approximately 5-10 years) within the ECM. More mobile radionuclides, such as tritium, are thus kept isolated from the environment to minimize liquid effluent releases during the operations phase and enable partial or complete radioactive decay within the ECM (rather than in the environment as leachate). The use of the exfiltration gallery as a primary discharge location provides additional retention time for radioactive decay of tritium within the geosphere prior to reaching the biosphere and receptors. Tritium has a relatively short half- life of 12.3 years and therefore benefits from decay over the groundwater transit time from the exfiltration gallery to eventually Perch Lake, which is greater than 16 years. References: [1] Environmental Risk Assessment of Chalk River Laboratories, ENVP-509220-REPT-003. [2] Gagnaire, B., Gosselin, I., Festarini, A., *et al*. 2020. *Effects of in vivo exposure to tritium : a multi-biomarker approach using the fathead minnow, Pimephales promelas.* Environ. Sci. Pollut. Res. 27: 3612-3623.

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			[3] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3 [4] Near Surface Disposal Facility Effluent Discharge Targets, 232-106499-REPT-002. [5] Canadian Nuclear Safety Commission, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25. [6] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND389	Greenspace Alliance of Canada's Capital (August 17, 2017)	It is our view that the consequences of the potential failure of the proposed solution has not been adequately appreciated. Damage to plant and animal life locally and downstream from the facility has not been fully assessed nor have the risks to the health of the more than 1 million residents downstream from the facility.	The Environmental Assessment (EA) of the NSDF Project has been conducted pursuant to the *Canadian Environmental Assessment Act, 2012*, and is in accordance with relevant standards and codes while also taking into consideration appropriate guidelines including *Operational Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the CEAA, 2012* (CNSC 2015). This is detailed in Section 1.4.2 of the final EIS. The safety features of the components of the NSDF has been thoroughly assessed to ensure that applicable national (federal, CNSC) and international (International Atomic Energy Agency (IAEA)) design and safety requirements are met. This is documented in the Safety Analysis Report (SAR) [1]. As described in Section 7.1 of the final EIS, the EIS Guidelines dictate that the information in Appendix A.3.4 of REGDOC-2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures* be used to assess the potential health and environmental effects from postulated accident and malfunction scenarios. Major hazards and initiating events, and potential scenarios applicable to the NSDF which are used for hazard analysis are listed in Table 7.2.1-1 in the final EIS. The assessment of the key potential radiological accident and malfunction that could occur during the operations of the NSDF Project is detailed in Table 7.3.3-1 of the final EIS and includes mitigation measures and potential health and environmental effects after application of mitigation. Radiological hazards include dropped loads and internal fire in the engineered containment mound (ECM) and wastewater treatment plant (WWTP), contact with contaminants from the WWTP, spill or leakage of wastewater at the WWTP. An assessment of key potential conventional (non-radiological) accidents and malfunctions during construction are detailed in Table 7.4.1-1 of the final EIS. Conventional hazards during the construction of the NSDF include leaks or spills, vehicle collision, overblasting, internal fires. During the operations and closure phases, conventional hazards include impact or collision with vehicles, worker fall, chemical spills or leaks, hazard reaction (causing hazardous chemical reactions), dropped loads. Table 7.3.4-1 of the final EIS summarizes the radiological accidents and malfunctions risk matrix results based on risk (Table 7.2.2-2), frequency (Table 7.2.2-3), and severity (Table 7.2.2-4) ratings. None of the potential accidents or events are predicted to occur beyond the design basis. All potential accidents or events have negligible or tolerable risks and either require no further actions or advice further protective measures which are not essential but should be considered. Mitigation measures for these hazards, as listed in Section 7.4.5 of the final EIS, include administrative mitigation and controls to minimize worker error or failures in human performance, adequate training as well as adherence to these training measures, equipment maintenance and inspection, fire protection screening, worker rest/work cycles and use of spotters at a safe distance during material movement. In any case, if an accident or malfunction situation occurs, CNL has procedures in place that address requirements for immediate response and post-event clean-up or remediation as detailed in CNL's Emergency Preparedness Program which is implemented throughout the CRL site. The NSDF Project Emergency Preparedness Plan and emergency response procedures will be prepared to address any potential

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			emergencies from accidents including internal fires, minor spill, major spill, natural gas/carbon monoxide leak, loss of power, high radiation, radiological contamination, bomb threat/suspicious package, hold and secure and stay-in. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND390	MNO (August 16, 2017)	**5.5.2 Valued Components, Page 5-234** "Fish and fish habitat are recognized as important components of the aquatic environment that may be affected by the NSDF Project and changes to fish and fish habitat could in turn, lead to effects on other VCs, such as land and resource use…" The MNO harvesters have recognized rights to fish in the Project vicinity and therefore have linkages to effects on fish and fish habitat. Without a traditional land use study completed to identify where in the vicinity of the Project harvesters exercise their rights, the assessment of the aquatic environment is incomplete.	The assessment for aquatic biodiversity examined potential changes to fish species that use the Perch Creek basin, including species that may also use shoreline habitat near Point au Baptême in the Ottawa River. Results of the assessment for aquatic biodiversity predicted that effects on fish and fish habitat are negligible. Proven mitigation and environmental design features will reduce, if not eliminate, potential residual effects on aquatic biodiversity. Consequently, the NSDF Project is not predicted to affect the wellbeing of potentially affected Indigenous fisheries, nor is it predicted to affect traditional land and resource use and Indigenous rights and interests, specifically Métis rights and interests. Section 6.2.4 of the final EIS addresses the areas of interest raised during engagement activities that influenced the scope of the traditional land and resource use assessment for the NSDF. As detailed in Table 6.4.1-1, potential effects were raised by multiple Indigenous groups regarding fish and fish harvesting due to concerns of potential contamination or radioactive seepage into Perch Creek, the Ottawa River, and other waterbodies from the NSDF Project. In response, the spatial boundaries of the traditional land and resource use assessment were selected to include consideration of potential effects on water quality and include the aquatics study areas. Canadian Nuclear Laboratories (CNL) continues to monitor the aquatic environment extensively, specifically Perch Creek which drains Perch Lake and discharges to the Ottawa River. The NSDF Project has used recent modelling to understand the potential for effects within the Perch Creek basin and the expanded RSA. Existing traditional land use with regard to fishing is described in Section 6.4.3.4.2.3 while potential effects on relevant VCs are assessed in Section 6.4.4. The final EIS specifies that the NSDF Project occurs within the Mattawa/Lake Nipissing Traditional Harvesting Territory for the MNO Mattawa Metis Council, North bay Metis Council, and Sudbury Metis Council, which is part of MNO Region 5. The MNO has indicated that the CRL site occurs on the border of Region 5 and 6. A Traditional Knowledge and Land Use Study (Section 6.4.3.4.2 of EIS) recently completed by MNO was undertaken specifically for the NSDF and NPD and included a study area encompassing a 50 km radius from the NPD and NSDF Projects but documented use beyond this. The TLKUS found that fishing by Indigenous groups presently occur in their 50 km study area, including fishing on the Ottawa River north of Rolphton as well as in water bodies to the west of the Ottawa River towards Algonquin Park. The LSA and SSA fall within federal lands with restricted access, and fishing within the CRL site is prohibited. Therefore, traditional fishing is not occurring in these areas and has likely not occurred since prior to control of the CRL site by the federal government. On-going environmental monitoring of different environmental media (e.g., surface water, soil) is routinely conducted annually at the CRL site as part of the Environmental Protection Program to ensure CRL operations don't contribute to contamination of the environment resulting in adverse human health or ecological impacts. These include environmental monitoring (i.e., monitoring of the receiving environment), effluent verification monitoring (i.e., monitoring of outputs), and groundwater monitoring. The analyses and evaluation of environmental data is conducted by the Environmental Protection Program and is published in an annual environmental compliance report. This routine monitoring serves to record historical contamination events on the present environment (e.g., legacy waste in waste management areas which have entered the groundwater environment). More specific to the NSDF, the Environmental Assessment Follow Up Monitoring Program (EAFMP) incorporates elements of these existing monitoring at the CRL site. The EAFMP verifies that predicted residual effects are minimized and mitigation measures continue to be effective during NSDF activities. The results of routine EAFMP can be made available to the MNO as part of CNL's commitment to transparency and accountability to its

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Number	Source	**Comment Summary** (all original submissions can be found on the [Canadian Environmental Assessment Registry, reference #80122]) **Synthèse des commentaires** (toutes les soumissions originales se trouvent sur le [Registre canadien d'évaluation environnementale, référence #80122])	**Response (to be completed by CNL)** **Réponse (à remplir par la LNC)**
			Indigenous stakeholders. As part of its initiative to maintain a constructive relationship with Indigenous groups, CNL will continue to engage with the MNO throughout the NSDF Project, especially during its follow up monitoring.
CNL-ND391	MNO (August 16, 2017)	**5.5.4.2.2 Fish Inventory, Page 5-243 and 5-246** Why wasn't an updated inventory of fish within the CRL property completed as part of this assessment? The baseline conditions are meant to characterize the environment how it currently exists, not how it existed 20 years ago. How can accurate monitoring be set-up using such old results?	All previously recorded large-bodied species that is part of the baseline investigations were captured by gill netting in summer 2016. In total, 230 fish were captured in this expedition. A suite of methods to catch fish were deployed in Perch Lake in 2018, including hoop nets, angling and minor traps, capturing 208 fish in total. A dip net method was used to catch small-bodied fish in 2017. These more recent fish surveys were used to update the distributions for focal species in small watercourse and waterbodies at the Chalk River Laboratories (CRL) Site in Table 5.5.4-1 of the final Environmental Impact Statement (EIS). During the 2017/2018 fish survey at the CRL site [1], the weight and length of fish samples were recorded. The objectives of the survey were to: determine fish species present in the lake, take measurements where possible, and collect enough fish biomass samples from each species to conduct the radiological and non-radiological contaminant analyses in tissue. Because fish are not abundant at Perch Lake, the biomass collected to fulfill this need were small. The small population is due to the shallow depth of the lake as well as the colonization of northern pike since the 1980s along with depressed oxygen concentrations in the already shallow water column during the winter. The introduction of the pike led to the virtual extirpation of yellow perch fish while chub, minnows, and pearl dace populations have greatly diminished. Any impairment in the fish community structure in Perch Lake appear to be driven by the combination of these physiohydrological and hydrochemical factors as well as fish population imbalances which are natural stressors (i.e., not attributed to CRL operations). The results of the fish survey at Perch Lake showed no major changes to fish productivity and community structure over time and suggests that the historical effects of past operations on water quality do not endanger the fish community and population at Perch Lake (Section 5.5.4.2.2 in the final EIS). Reference: [1]. Canadian Nuclear Laboratories Characterization of Fish Collected from Perch Lake, 2018 July to 2018 August, 232-121221-401-001.
CNL-ND392	MNO (August 16, 2017)	**5.5.4.2.2 Fish Inventory, Page 5-246** "On-going non-radioactive environmental monitoring results indicate that surface water quality of the Perch Lake basin continue to be affected by past operations of the WMAs; however the potential risk to negatively affecting fish and fish habitat is deemed low (CNL 2015, 2016)." Why are there concluding statements such as this in the description of the environment? Shouldn't the description of the environment simply detail the current conditions with no assessment?	On-going environmental monitoring of different environmental media (e.g., surface water, soil) is routinely conducted at the Chalk River Laboratories (CRL) site as part of the Environmental Protection Program. Specifically, three routine monitoring programs are conducted on an annual basis to ensure CRL operations don't contribute to contamination of the environment resulting in adverse human health or ecological impacts: environmental monitoring, effluent verification monitoring, and groundwater monitoring. The analyses and evaluation of environmental data is conducted by the Environmental Protection Program and is published in an annual environmental compliance report. Environmental, effluent, and groundwater monitoring of the CRL site serves to record the manifestation of historical contamination events on the present environment (e.g., legacy waste in waste management areas which have entered the groundwater environment). The results of these monitoring programs establish the existing conditions in the local and regional areas for the environmental assessment of the NSDF Project; they form the Base Case for the assessment of the aquatic environment. Current effects from the existing CRL facilities and operations which have been historically contaminated, for example, are considered part of the Base Case. The final EIS for the NSDF Project does not include analyses of data gathered from routine environmental monitoring programs; instead, the findings from previous monitoring programs describe the current conditions from which an environmental assessment for the NSDF can be conducted.

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CNL-ND393	MNO (August 16, 2017)	**5.5.5.2.1 No Linkage Pathways, Page 5-253** "The NSDF Project will avoid any impacts to fish and fish habitat through the implementation of set-back distances and by avoiding construction and related blasting activities in waterbodies and watercourses. A detailed Blasting Plan will be developed and will contain contingencies and mitigations to reduce the potential for harm to fish and fish habitat." As per this statement, the detailed Blasting Plan has not been developed yet and the vague reference to set backs have not been defined. The MNO should request involvement in and consultation on the development of the Blasting Plan and also request additional information on the setbacks proposed. Without this information, the effect should not have been deemed as having no linkage. This is premature as the setback has not been defined and the distance required to ensure pressure changes and vibrations do not affect fish mortality and reproduction are unknown.	A blasting plan will be developed by the Contractor as part of the Environmental Protection Plan (EPP) for the NSDF, which will comply with existing guidelines: • OPSS 120, *General Specification for the Use of Explosives* [1]. • *Guidelines for the use of explosives in or near Canadian fisheries waters* [2] Blasting activities will follow industry standard Best Management Practices, applicable federal regulations, and Fisheries and Oceans Canada guidelines for use of explosives (mentioned above). Set-back distances required for blasting will be identified in the blasting plan (as part of the EPP to be developed by the Contractor). The blasting plan and set-back requirements are expected to mitigate the transport of blasting residuals and metals directly into downstream waterbodies, affecting surface water and sediment quality (i.e., fish habitat quality), and fish survival and reproduction. The blasting plan is also expected to mitigate pressure changes and vibrations ("noise") that may affect fish survival and reproduction as a result of site preparation (construction phase). These residual effects pathways are thus not expected to result in a measurable environmental change relative to Base Case values (i.e., no residual effects on aquatic biodiversity – no linkage). Canadian Nuclear Laboratories (CNL) will provide the Blasting Plan to MNO once developed by the construction contractor. References: [1] Ontario Provincial Standard Specification (OPSS) in the document OPSS 120 – General Specification for Use of Explosives, 2014 November. [2] Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian technical report of fisheries and aquatic sciences 2107. DFO, Wright DG, Hopky GE. 1998.
CNL-ND394	MNO (August 16, 2017)	**5.5.5.2.1 No Linkage Pathways, Page 5-253** "As such, discharge of treated domestic wastewater for the NSDF Project to downstream locations (e.g., Ottawa River) is expected to have no linkage to fish and fish habitat." The lack of linkage in this case is primarily due to the scoping of the Project to allow for the Ottawa River (beyond the mouth) to be outside the RSA. It would be interesting to note whether the discharge of treated domestic wastewater would have a linkage if it was within the RSA.	The NSDF Sanitary Sewage Disposal System, as discussed in Section 3.4.4.4 of the final EIS, has been designed to transfer sewage generated by employees who will work at the NSDF Project site. The NSDF sanitary sewage will be managed through a gravity sewer network connected to a septic system on the NSDF site. This system is proposed to service the support facilities during the operation of the NSDF Project (i.e., only domestic type wastewater) and is completely separate from the engineered containment mound (ECM) leachate and other contact water conveyed to the wastewater treatment plant (WWTP). Sewage discharges to the sewage disposal systems will conform to CNL requirements for discharge to septic systems provided in the NSDF Environmental Protection Plan and Acceptability Criteria for Routine and Non Routine Discharge of Liquids procedure [1]. This acceptability criteria has limits for radiological and non-radiological contaminant concentrations which are based on federal and provincial standards for the protection of aquatic biota. These limits are requirements for all treated domestic wastewater discharged to the Ottawa River and is not dependent on spatial boundaries (i.e., whether or not the Ottawa River is included in the RSA for NSDF). Environmental monitoring completed at the CRL site indicates negligible effects to aquatic biodiversity as a result of current sewage discharges from the CRL site to the Ottawa River. Similarly, the proposed NSDF Project sewage disposal system is expected to have a negligible residual effect on aquatic biodiversity in the Ottawa River. Discharge of treated domestic wastewater for the NSDF Project to downstream locations is considered to have no linkage to effects on aquatic biodiversity valued components (VCs). References: [1] Acceptability Criteria for Routine and Non-Routine Discharge of Liquids at CNL Sites, 900-509200-MCP-005.
CNL-ND395	MNO (August 16, 2017)	**5.5.5.2.2 Secondary Pathways, Page 5-257** "All proposed physical works are located within the SSA, affecting a relatively small area (4.1%) of the total contributing basin area for Perch Creek (720 ha; Robertson and Barry 1985). Any changes to existing drainage patterns will largely be restricted to this sub-basin."	This statement has been revised in the final Environmental Impact Statement (EIS) and discussed in Section 5.4.1.6.2.1. The proposed physical works related to the NSDF Project are the engineered containment mound (ECM), wastewater treatment plant (WWTP), operation support facilities, and site infrastructure. All proposed physical works are located within the SSA, the NSDF Project footprint where project activities would be undertaken. As elaborated in Section 5.5.5.2.1 of the final EIS,

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		The calculation of proposed physical works should be calculated from the SSA area rather than the contributing basin area for Perch Creek which does not conform to the SSA. While the effects may extend into this sub-basin, the designation of spatial boundaries is to help characterize effect.	the total land area to be cleared is up to 37.4 ha, of which 35.6 ha is within the boundary of the Perch Creek and Perch Lake Watershed representing 4.8% of the contributing basin area (which is a total of 746 ha). The remaining small footprint (1.8 ha) will overlap with the CRL Built Up Area drainage basin. Any changes to existing drainage patterns will largely be restricted to the Perch Creek and Perch Lake Watershed.
CNL-ND396	MNO (August 16, 2017)	**5.5.5.2.2 Secondary Pathways, Page 5-259** "The primary dust control method will include water spraying or misting techniques (e.g., water trucks). Water application is controlled to avoid generation of free liquids. Fixatives (e.g., chemical suppressant) may also be used for dust control during winter season or shutdown periods, and for use as daily/interim cover. The use of fixatives is reviewed prior to application for potential effects on leachate and surface water runoff generated by the ECM." Please provide additional details on how the dust control methods proposed will not lead to increased effects on fish and fish habitat as this text was copied word for word from previous sections with little amendment for this specific effect.	The NSDF Dust Management Plan proposes several mitigation measures to control dust emissions (e.g., fugitive dust) resulting from Project activities such as vehicle transport on unpaved roadways, excavation areas, and other work areas as needed. Water will be used as the primary spray media or fixative to control fugitive dust. When water cannot be used (e.g., during the winter) or is not preferred for temporary or long-term dust control, other fixatives such as chemicals or crusting agents may be used as alternatives. These chemical fixatives must be approved by Canadian Nuclear Laboratories (CNL) Environmental Protection Program prior to their use to ensure they comply with regulatory standards for environmental contaminants. These may include meeting effluent (airborne and waterborne) targets prior to application such that chemicals that may become waterborne from the application of fixatives for dust mitigation can be verified to meet applicable standards for protection of aquatic biota. The details of fixative application for the purpose of dust management and mitigation measures will be finalized in the NSDF Dust Management Plan upon commencement of the NSDF construction pages. Additionally, the NSDF Environmental Assessment Follow Up Monitoring Program (EAFMP), to be implemented throughout the institutional control period of the NSDF Project, will include provisions for the continuous monitoring of discharged effluents to ensure site derived release limits are met for contaminants of concern for fish and fish habitat. Canadian Nuclear Laboratories (CNL) will provide the NSDF Dust Management Plan to MNO once developed by the construction contractor.
		Environmental Effects – Atmospheric Environment	
CNL-ND397	Cara Rose-Brown, (May 15, 2017) Iana and Carlos Ciatti (May 15, 2017) Ted and Linda Kucharski (May 17, 2017) Jennifer Jimmo (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions.* There is mention in the document that during the construction, the operation and post-closure of this facility radioactive gases and radioactive particles may be released from the waste material. How is this possibly acceptable? If the dose to humans from airborne emissions is calculated only for the operations phase of the NSDF, what of the airborne emissions and disruption to the air quality during the Site Preparation and Construction phases, that I predict will have an adverse effect on the surrounding environment and potentially to public health both in proximity and beyond this NSDF site.	As part of the assessment of alternative means to carry out the project in the final Environmental Impact Statement (EIS) (Section 2.5.2.5), it was mentioned that during operations and post-closure of the Engineered Containment Mound (ECM), radioactive gases (e.g., radon, tritium) and radioactive particles may be released from the wastes within the facility. Specifically for the Near Surface Disposal Facility (NSDF), these airborne emissions can potentially be released during placement of waste by heavy equipment into the ECM. This will occur after the site preparation and construction phases of the NSDF (i.e., the ECM must first be constructed before any waste can be transported to the NSDF). Therefore, there is no anticipated risk of radioactive gas or particle emission coming from waste during the site preparation or construction phases. Effects on air quality during the site preparation and construction phase are limited to fugitive dust emissions and vehicle emissions from construction equipment. These are assessed in Section 5.2.1 of the final EIS and compared to federal or provincial ambient air quality criteria. No adverse effects are predicted. Effects on air quality from NSDF will be monitored to verify EIS predictions.
CNL-ND398	Jennifer Jimmo (August 16, 2017)	There are other potential air quality and airborne emission environmental effects that should be considered: • Air Quality Disruption: There will be "fugitive" (contaminated) dust and debris all about the (contaminated) place, being picked up by the winds and blown off-site to re-settle along the river water surface, the sandy shores and beaches downstream. • Ground & Noise Disturbance: There are also going to be old (radioactive?) AECL buildings torn down at the same time as the entire site is "decommissioned."	Air Quality, fugitive emissions: Fugitive dust (e.g., from unpaved roadways) generated during the construction and operation of the Near Surface Disposal Facility (NSDF) project has been considered in the Air Quality Assessment (Section 5.2.1, summarized in Table 5.2.1-17). The risk of radiological fugitive dust to workers and members of the public during the operations and closure phases is assessed in Section 5.8.6.1 and the Safety Analysis Report (SAR) [1]. Radiological fugitive dust may be created during handling of waste and radioactive gases may be released during storage and disposal of radioactive materials in the engineered containment mound (ECM). Mitigation plans are detailed in the SAR, including a

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		• Ground & Noise Disturbance: Approx. 34h of (radioactive) trees are to be felled. Trees where the leaves are shown to hold a higher radioactive content than the soil around the trunk at the base...these are all coming down. • Air Quality: There will be a number of construction vehicles all operating at the same time with GHG emissions and loud noise that will carry off-site. • Heavy Ground & Noise Disturbance: There will be heavy rock-blasting into both soil and bedrock, and to depths undisclosed in the proponent EIS. Even aside from the mega-mound of engineered waste to be built, massive in size in itself, there are going to be buildings built, including a wastewater treatment plant, as well as two new roads, and many drains and ditches, plus, plus. The proponent has predicted this construction activity will be far enough away from the closest residents so as to say this "ground disturbance" won't have a negative effect on them; but what do you think? If you can hear the emergency test drill sirens chances are you are going to hear and/or feel the construction activities, especially the rock blasting, possibly without even a weekend break in between, and definitely for at least 26 solid months following. I note the Hours of Operation for construction activities are not provided anywhere in the EIS or Executive Summary that I could find. For Example: Will this be a 5 day work week or a 7 day work week? Will the construction of this NSDF Project be following a 9-5 work day schedule or will this be a 24/7 operation to meet the deadline? The closest indicator I could find was in the calculation tables used to measure the amount of greenhouse gas emissions predicted as a result of all the construction vehicles in operation on the site. It is noted the vehicles were calculated at a "continual basis of operation" of such I understand this could very well indicate this will be a 24/7 construction schedule and all-season. This is important to know. Why? Because the environmental *impact* on the living things in the surrounding environment from all this intense construction activity (noise/vibration/exhaust/) crammed into a relatively short time frame, in my view at least, is absolutely going to have a very significant adverse environmental effect on all habitat surrounding, both human and nonhuman, and will for a good distance stretching well beyond the CRL Property fence line simply because sound and vibration travels, especially so by the wind and especially so across water, and especially so beneath the water surface. Overall, the Site Prep and Construction Phase has potential to become a very significant adverse environmental effect on humans and the habitat who place a high value on the peace and quiet in their natural surroundings, and have been enjoying such for the past 10,500 years or so.	Dust Management Plan has been developed which identifies and describes dust control measures to minimize airborne dust at the NSDF site. Ground & Noise Disturbance**:** Canadian Nuclear Laboratories (CNL) acknowledges that old Atomic Energy of Canada Limited (AECL) buildings will be "torn down" as part of decommissioning. The potential effects of decommissioning activities and mitigation measures are evaluated in Section 8.0 (Summary of Cumulative Effects) of the final Environmental Impact Statement (EIS). Assessment of the residual effects of the NSDF Project on terrestrial environment shows that 33 ha of forested areas will be cleared resulting in changes to the distribution of forested habitats and adjacent vegetation community richness (no changes to the distribution of wetlands are anticipated). Measures have been proposed to mitigate these residual effects such as a 30 m buffer along identified wetlands near the NSDF area where the buffer cannot be maintained, appropriate mitigation will be established to address any risk of erosion (see Table 9.0-1 in final EIS). Section 5.7 in the final EIS describes the ambient radioactivity as it relates to human and ecological health. Radionuclide concentrations from the undeveloped forest ecosystem present at the proposed NSDF site are not elevated above local background levels (uncontaminated) and no airborne radioactive emissions from the removal of vegetation during site preparation is predicted. Air Quality, GHG**:** A greenhouse gas (GHG) assessment is described in Section 5.2.2 in the final EIS as well as the Air Quality Assessment technical supporting document [2]. A summary of the GHG emissions estimates from the NSDF Project is provided in Table 5.2.2-7 for the construction phase and in Table 5.2.2-8 for the operations phase. Predicted effects of the GHG emissions form the NSDF Project (e.g., vehicle exhaust) are anticipated to be reversible within the temporal boundary of the assessment. The magnitude of the effects is rated negligible, as the change in GHG emissions is less than a 0.005% increase in total national GHG emissions. Heavy Ground & Noise Disturbance, blasting, vehicles: The evaluation of noise from all project-related activities (blasting and construction) on human receptors is provided in Section 5.10.5 of the final EIS. The nearest resident is 3 km from the NSDF site. Given the 3 km distance from the site, noise and vibrations from blasting activities are not expected to be noticeable to these residents. The increased level of traffic during the construction and operational phase of the NSDF Project is not expected to significantly impact noise levels. There are no sensitive receptors (as defined by O.Reg. 419/05 *Air Pollution – Local Air* Quality) in the vicinity of the NSDF Project that would experience nuisance effects (e.g., noise and vibration) from the construction and operations of the NSDF Project. A discussion of potential indirect effects from noise and vibrations and supporting information is also provided in Sections 5.5 Aquatic Environment and 5.6 Terrestrial Environment of the final EIS. Emergency sirens: Emergency sirens (Hold and Secure, Stay-In, Evacuation) were designed to transmit higher acoustic frequencies that are much louder and can travel farther than daily road or construction noise. Therefore, the noise transmitted by emergency sirens is not comparable to the noise created by construction activities. Hours of operation: The hours of operation for truck transport is typically 6 days per week, with 16-hour days but may vary between 12 and 18 hours per day depending on Project activities. The construction period is expected to be 24 months. Altogether with noise disturbance considerations, the overall increase in transport vehicles is considered negligible in comparison to current traffic levels on the roads (personal vehicle traffic for over 2,000 employees and transport vehicles) to support the operations of the Chalk River Laboratories (CRL) site.

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			Canadian Nuclear Laboratories (CNL) acknowledges the potential environmental impact of the NSDF Project and have conducted a comprehensive environmental assessment or EA (summarized by the EIS). This EA fulfils the requirements outlined in the *Canadian Environmental Assessment Act, 2012.* The proposed NSDF will substantially reduce the risk associated with nuclear liabilities accumulated over more than 70 years of operations. The NSDF is designed to accommodate the waste that will be generated from the decommissioning of outdated buildings and structures which currently pose safety risks at CRL as well as waste from the remediation of contaminated land. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008.
CNL-ND399	Joan Lougheed and Town of Deep River (August 16, 2017)	The passive landfill gas ("LFG") venting system is very briefly summarized (see pg. 3- 61). Further details of this system, as well as the LFG monitoring probes that will be installed around the perimeter of the ECM, are required, as well as further details regarding the frequency of monitoring of the LFG probes.	As part of the Landfill Gas Management Plan [1] for the NSDF Project, a passive landfill gas (LFG) venting system, which includes LFG probes installed around the perimeter of the ECM (mentioned in Section 3.4.1.9.4 in the final EIS), will be constructed along with the final cover of the ECM and will be monitored periodically during the post-closure phase to detect evidence of potential LFG migration away from the ECM. The passive LFG venting system (a set of vertical riser pipes installed across the ECM final cover footprint area, gas venting strops) is designed to vent generated gases to the atmosphere, thus mitigating against the buildup of excessive gas pressure under the low-permeability barrier component of the final cover. In-line sample ports will be installed into vent pipes for use in periodic LFG monitoring and sampling. This will assist in limiting migration of LFG generated within the closed ECM facility laterally from the sides of the closed ECM embankment after cover installation. Periodic air monitoring for methane, carbon dioxide, and other LFGs will be performed throughout the ECM operations and following final closure of the ECM using the passive LFG venting system to detect and document these and other LFG constituents. The conceptual monitoring program for landfill gases is included in Section 11 of the final EIS. An Environmental Assessment Follow-up Monitoring Program (EAFMP) document is in preparation and will provide details on monitoring and frequency. The EAFMP will be available for public review. Reference: [1] Landfill Gas Management Plan, 232-508660-PLA-003.
CNL-ND400	Joan Lougheed and Town of Deep River (August 16, 2017)	At Section 5.2.1.6.1, CNL has developed its own atmospheric dispersion models that have been used historically on-site by the Canadian nuclear industry (and hence familiar to the CNSC) and Federal Departments and Agencies (see pgs. 5-46 to 47). It is advisable to provide the results of dispersion modelling by these tools in addition to those currently shown in the draft EIS. If there are significant differences, the discrepancies should be explained.	The AERMOD dispersion model (Version 16216r) that was used to predict concentrations and deposition rates associated with NSDF Project emissions for suspended particulate matter and non-radiological indicator compounds was developed by the United States Environmental Protection Agency (US EPA) as a replacement to the long-standing Industrial Source Complex model. It is the model recommended by the US EPA for regulatory applications in the United States and has been adopted in Ontario as the regulatory model recommended for permitting and regulatory applications by the Ministry of Environment, Conservation, and Parks (MECP) *Procedure for Preparing an Emission Summary and Dispersion Modelling* [1]. The MECP and other relevant agencies, recommends that five years of hourly data be used in the model to cover a wide range of potential meteorological conditions. A localized pre-processed meteorological dataset for the NSDF Project was requested from the MECP and utilized as inputs for the AERMOD modelling. The reliability of the model as well as uncertainties and sensitivities attributed to its use are discussed in the Air Quality Assessment technical supporting

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			documents (TSD) [2]. A summary of results of average and maximum emission rates estimated using the atmospheric dispersion modelling can be found in Section 5.2.1.6.2 (Table 5.2.1-9 and Table 5.2.1-10) of the final EIS. The predicted concentrations of indicator compounds at the LSA boundary during the construction and operations phases are presented in Table 5.2.1-14. Atmospheric dispersion modelling for radionuclide releases during the operations, closure and post-closure phases was performed using atmospheric dispersion models that have been used historically on-site by the Canadian Nuclear Industry as noted by the reviewer. For example atmospheric dispersion modeling to support the Safety Analysis for the operations phase was completed following CSA N288.2, Guidelines for calculating the radiological consequences to the public of a release of airborne radioactive material for nuclear reactor accidents [3]. References: [1] MECP, Procedure for Preparing an Emission Summary and Dispersion Modelling Report (Guideline A-10), March 2018. [2] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008. [3] CSA N288.2, Guidelines for Calculating Radiation Doses to the Public from a Release of Airborne Radioactive Material under Hypothetical Accident Conditions in Nuclear Reactors. 2013.
CNL-ND401	Joan Lougheed and Town of Deep River (August 16, 2017) William Turner (May 31, 2017) 126.	Annual Greenhouse Gas Emissions have been estimated and summarized for the construction and operations phase (see pgs. 5-75 to 76 and Tables 5.2.2-8 and 5.2.2-9). No such estimates have been provided for the closure and post-closure phases. Given the extensive timeframes associated with these phases, Greenhouse Gas Emissions estimates should also be provided for completeness, together with the assumptions used in calculating these releases. The use of emission rates when evaluating the impact of greenhouse gas emissions is deliberately misleading. It is not the rate at which the gases are emitted, it is the total mas emitted that produces the climate change.	Section 5.2.2.3.2 of the final Environmental Impact Statement (EIS) provides the four (4) phases of the project that were assessed: construction, operations, closure and post-closure. For the purposes of the Greenhouse Gas (GHG) assessment, only the construction and operation phases have been considered. The GHG emissions from operations include the first year after closure, which represents the year where emissions from the decomposition of the waste within the ECM are expected to be at their highest. Therefore, GHG emissions during operations phase are expected to be greater than the GHG emissions from the closure and post-closure phases and represent a bounding scenario. As presented in Section 5.2.2.8.2 of the final EIS, the predicted residual adverse effect of GHG emissions is considered global in nature, and therefore the geographic extent was rated as beyond regional. Predicted effects of GHG emissions from the NSDF Project are anticipated to be reversible within the temporal boundary of the assessment and would occur continuously during operations (Table 5.2.2-12 of final EIS). The magnitude of the effects is rated negligible, as the change in GHG emissions due to the NSDF Project are estimated to be less than a 0.02% increase in total provincial GHG emissions and less than a 0.005% increase in total national GHG emissions. Consequently, the overall residual adverse effect of the Application Case during the construction and operations phases on GHG are determined to be not significant. Only the construction and operation phases have been considered as the emissions from these phases will be higher than those during the closure and post-closure phases. Green House Gas emissions are presented as an annual mass rate of emissions (tonnes per year) for both the construction and operations phases (See Section 5.2.2.6.2 of the final EIS). The federal and provincial reporting program require that GHG emissions be reported on an annual basis. Presenting the emissions on an annual basis allows for the operations and construction GHG emissions from the Project to be compared to the base case and to the Provincial and Federal totals.
CNL-ND402	William Turner (May 31, 2017) 127. 128. 129.	Valued Components 5.2.2.2: How can greenhouses gases be considered a valued component? This suggests that increasing this valued component would be a benefit.	Valued Components (VC): Section 5.1.2 of the final Environmental Impact Statement (EIS) describes VCs as environmental features that may be affected by a project and that have been identified to be of concern by the proponent, scientists, government agencies, Indigenous groups, or the public [1]. Greenhouse gases are considered to be a VC because changes to GHG emissions can have positive or negative effect on climate change. The predicted GHG emissions resulting from the construction and operations phases of the NSDF Project represent an increase from the Base Case. The direction of the

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		Temporal Boundaries 5.2.2.3.2– Since the evaluation of greenhouse gases emissions must be related to the total mass released, the temporal boundary must be expanded to include the closure, pot-closure, and institutional control phase. Table 5.2.2-12 – CNL need to explain why, after the Greenhouse Gases have been released, the predicted residual adverse effects are reversible.	significance assessment was therefore determined to be negative. Temporal Boundaries: As outlined in Section 5.2.2.5.2 of the final EIS and detailed in the Air Quality Assessment technical supporting document (TSD) [2], the GHG emissions were estimated using appropriate modelling equations. Only the construction and operation phases have been considered as the emissions from these phases will be higher than those during the closure and post-closure phases. Section 5.2.2.3.2 of the final EIS clarifies that the GHG emissions from operations include the first year after closure (year 51) where emission from the decomposition of the waste within the Engineered Containment Mound (ECM) are expected to be at their highest. Year 51, therefore, is factored into the GHG emissions estimation for the GHG assessment. Thereafter, gas generation rates are simulated at 50-year intervals up to 300 years after closure. Gas generation increases as the ECM is filled with waste over its 50-year operational period. After the closure of the ECM and construction of the final cover, gas generation decreases as there is reduced availability of moisture and oxygen in waste. Therefore, GHG emission rates were not carried forward in the post-closure period. Reversibility of impact: As described in Section 5.2.2.8.2 of the final EIS, predicted effects of GHG emissions from the NSDF Project are anticipated to be reversible within the temporal boundary of the assessment because the overall change of state in the global atmospheric environment from GHG emissions during construction and operations of the NSDF is not considered permanent. References: [1] The Agency, Determining Whether a Designated Project is Likely to Cause Significant Adverse Effects under the *Canadian Environmental Assessment Act, 2012*– Interim technical Guidance. March 2018. Version 1. ISBN:978-0-660-06385-0 Available at https://www.canada.ca/content/dam/ceaaacee/documents/policy-guidance/significant-adverse-effects-ceaa2012/determining-whether-designatedproject-cause-significant-adverse-environmental-effects.pdf [2] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008.
CNL-ND403	MNO (August 16, 2017)	**Table 5.1.2-1: Valued Components Selected for the Effects Assessment, 5.2 Atmospheric Environment, Page 5-25** A Valued Component for Noise and Visual Quality were not identified. This is problematic as often noise and visual quality effects extend beyond the project footprint and have the potential to impact Métis harvesters and their rights. The MNO harvesters have the potential to be sensitive human receptors in the vicinity of the NSDF Project that could experience nuisance effects from the construction and operation phases of the NSDF Project. Without a traditional land use study completed to identify where in the vicinity of the Project harvesters exercise their rights, the exclusion of a quantitative noise and vibrations assessment is premature.	The valued components (VCs) listed in Table 5.1.2-1 in the final Environmental Impact Statement (EIS) includes quality of life and is defined by project activities which can affect worker and local public quality of life. Changes in air quality, ambient noise, increases in traffic volume, and increase in visual disturbances are assessed as part of quality of life within the socio-economic environment. The results of the socio-economic environment assessment are described in Section 5.10.5.2 in the final EIS and includes the results of an effects pathways analysis of the aspects of the NSDF Project that could affect ambient noise levels due to construction traffic. Section 5.9.4.1.3.5 of the final EIS states that potential disturbance through existing traffic noise to people within the RSA is characterized with low-levels of disturbance identified. A noise effect study specific to the NSDF Project has been conducted so support that the change in long-term high annoyance due to construction activities is between 2.8% at 0.02 km and 0.5% at 0.5 km from the noise source (i.e., from the NSDF site). The effect of increased traffic on noise levels is considered to be a slight but discernible change when compared to existing levels of traffic from current employees and operations at Chalk River Laboratories (CRL) site. As part of mitigation measures, transportation of equipment and construction materials will be scheduled during normal business and daylight hours to the greatest extent possible to limit inconvenience to local residents. In addition, notifications of peak traffic periods will be distributed to local residents in the Village of Chalk River. Through Canadian Nuclear Laboratories' (CNL) engagement process, Indigenous communities and groups have conducted TKLUS to support the NSDF Project EIS and have identified VCs of particular interest to them. Through this engagement process, Indigenous interests have been incorporated into the selection of final VCs for the NSDF Project. The MNO

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			recently completed a traditional knowledge and land use study (TKLUS) that was undertaken specifically for the NSDF and NPD Projects through funding supplied by the Canadian Nuclear Safety Commission (CNSC). The study area used in the TKLUS included a 50 km radius from the NPD and NSDF Projects but documented use beyond that radius. While the study only involved 11 participants, it did document significant use within its study area. Because the study only involved 11 participants, though, the results should not be taken as the only land uses by the MNO citizens in the region. In the MNO TKLUS, it was identified that trapping has been a foundational element of Métis way of life and land use since the genesis of the Métis. Of the 11 participants in the MNO TKLUS, 7 reported participation in trapping although none had trapped within the 50 km study area. Seven of the 11 participants have hunted within the 50 km study area.
CNL-ND404	MNO (August 16, 2017)	**5.2.1.4.1 Methods, Baseline Air Quality Data, Page 5-37** "Although air quality data is provided in the CRL 2015 Effluent Verification Monitoring Report (CNL 2016), the data is based on emission estimates (emission factors), rather than monitored data … Site specific air quality monitoring was not carried out as part of this assessment." The MNO is deeply concerned that site specific air quality monitoring was not carried out as part of this assessment. This monitoring could have produced an accurate baseline for the NSDF by which air quality monitoring, post approval, could be measured against. Without this necessary data, it is unclear what the actual baseline for the site is and what targets CNL should strive for in management.	Section 5.2.1.4.1 Methods (Baseline Air Quality Data) under the Description of the Environment for the Air Quality Assessment from the 2017 EIS Draft is now Section 5.2.1.4.2 Methods in the final EIS. The paragraph quoted by the commenter has been edited: "Although air quality data are provided in report *Effluent Verification Monitoring at Chalk River Laboratories in 2018* [1], the data are based on emission estimates (emission factors), rather than measured data, and represents emissions solely from the Chalk River Laboratories (CRL) main campus. Other industries outside the Local Study Area (LSA) are not considered in the baseline and, therefore, data from monitored data sources was used and is considered to be more representative of background air quality. Site-specific air quality monitoring was not carried out as part of this assessment." Site-specific air quality monitoring was not carried out because there was no measured data available to establish baseline air quality for the applicable air quality parameters within the CRL site. The closest air quality monitoring stations were located in Petawawa and downtown Ottawa a summarized in Table 5.2.1-6. The Air Quality Assessment technical supporting document [2] describes the available non-radiological ambient air quality monitoring data for stations located outside of the Regional Study Area (RSA) selected for the air quality assessment. This was the data used to assess baseline air quality (non-radiological) in the NSDF Project LSA. That being said, CNL has recently deployed high volume air samples within the LSA from which measured data will be gathered and analyzed to establish site-specific baseline air quality and subsequent monitoring. References: [1] Effluent Verification Monitoring at Chalk River Laboratories in 2018, CRL-509254-ACMR-2018. [2] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008.
CNL-ND405	MNO (August 16, 2017)	**5.2.1.4.1 Methods, Baseline Air Quality Data, Page 5-37** "Therefore the background air quality was assessed using observations from the ECC National Air pollution Surveillance Network (NAPS) air quality monitoring stations (ECCC 2013) at locations outside the RSA…" Using locations outside the RSA to establish a baseline for the SSA and LSA is inappropriate as there may be differing atmospheric conditions present at these other locations which would lead to increased/decreased baseline emissions. This is particularly problematic in terms of the Ottawa Downtown Air Monitoring station that is 148 km away from the Project site and would have a much more urban reading than the SSA and LSA.	Site-specific air quality monitoring was not carried out because there was no measured data available to establish baseline air quality for the non-radiological indicator compounds within the Chalk River Laboratories (CRL) site. The closest air quality monitoring stations from which measured data can be collected were located in Petawawa and downtown Ottawa are summarized in Table 5.2.1-6 in the final Environmental Impact Statement (EIS) and described in the Air Quality Assessment technical supporting document (TSD) [1]. As outlined in Section 3.1.2 Applicable Guidelines in this TSD, the relevant air quality criteria used for screening air quality effects in the region include the Ontario criteria (*Ontario's Ambient Air Quality Criteria AAQC*), and federal standards (*Canadian Ambient Air Quality Standards CAAQS)* and objectives (*National Ambient Air Quality Objectives NAAQO)*. The Ontario AAQCs are used for screening the air quality effects in environmental assessments, in studies using ambient air monitoring data, and as assessment of general air quality in a community or across the province. The standards set out by the CAAQs for national targets of indicator compounds for air quality specify that the CAAQS have been achieved if the measured concentrations of indicator compounds within an air zone does not exceed the standards' numerical values. These values are reported based on a series of monitoring stations located in airsheds across Canada. In this context, an "air zone" refers to a local or regional sub-region of the established

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			provincial or territorial airsheds. Currently, Southern Ontario and Southern Quebec are treated as a single airshed (East Central) and Southern Ontario, excluding Hamilton and Sarnia, is designated as a single "air zone". This means that the NSDF Project is within the same air zone as Ottawa and Petawawa. Therefore, using air monitoring stations from these two locations, although they are located outside of the Regional Study Area (RSA), is indeed appropriate for establishing baseline air quality which would comply with mandatory provincial and national standards. Reference: [1] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008.
CNL-ND406	MNO (August 16, 2017)	**5.2.1.4.1 Methods, Baseline Air Quality Data, Page 5-37** "There is no monitoring data available for SPM and PM10 at the Petawawa station, however, an estimate of the background SPM and PM10 concentrations can be estimated from the available PM2.5 monitoring results. PM2.5 is a subset of PM10, and PM10 is a subset of SPM. Therefore, it is reasonable to assume that the ambient concentrations of SPM will be greater than corresponding PM10 levels, and PM10 concentrations will be greater than the corresponding levels of PM2.5. The mean levels of PM2.5 in Canadian locations are found to be about 50% of the PM10 concentrations and about 25% of the SPM concentrations (Brook et al. 2011). By applying this ratio, it is possible to estimate the background SPM and PM10 concentrations for the RSA." This approach is worrisome. Site specific air monitoring should be completed as this ad hoc approach where results are estimated and extrapolated does not instill confidence in the assessment process. This approach is flawed and should be amended to allow not only a fulsome assessment of effects, but to allow for appropriate and accurate ongoing monitoring following Project approval.	In the absence of site specific air monitoring for SPM or PM_{10} within the NSDF Project boundaries, it was necessary to estimate ambient concentrations of these fraction of particulate matter from available $PM_{2.5}$ data from the Petawawa station in order to establish baseline air quality conditions for non-radionuclide particulate matter. Data from Canadian Air and Precipitation Monitoring Network was received from Environment and Climate Change Canada (ECCC) for the station located at the Chalk River Laboratories (CRL) site; however, due to limited data availability at the time of the assessment (either only 2009 to 2011 are available or else only certain indicator compounds), the data were not considered for the air quality assessment. The closest air quality monitoring station otherwise is located in Petawawa; this is where reliable $PM_{2.5}$ data was collected for establishing baseline air quality. That said, analysis of recently measured site specific data for particulate matter (SPM, $PM_{2.5}$, PM_{10}) at the CRL site is presently on-going. This will be used to determine baseline air quality conditions prior to the proposed construction of the NSDF Project.
CNL-ND407	MNO (August 16, 2017)	**5.2.1.4.2 Results, Page 5-41** "Due to proximity and similarity in geographic siting (rural location and distance from the Ottawa River), the Petawawa station is considered to be the most representative station of the RSA…" What are the implications for the baseline data collection that a single station was used as representative for not only the SSA, the LSA but the RSA as well? It is concerning that additional data was not collected as part of the baseline data collection.	For the establishment of baseline air quality data for the NSDF, data from the Canadian Air and Precipitation Monitoring Network was received from Environment and Climate Change Canada (ECCC) for the station located at the Chalk River Laboratories (CRL) site (within the SSA); however, due to limited data availability at the time of the assessment (either only 2009 to 2011 data are available or only certain indicator compounds are reported), the data was not considered for the air quality baseline assessment. Other industries outside the LSA are not considered in the baseline and, therefore, data from monitored data sources was used and is considered to be more representative of background air quality. Hence, the background air quality was assessed using observations from the ECCC National Air Pollution Surveillance Network air quality monitoring stations at locations outside the RSA. The latest data (2009 to 2013) at the time of the baseline assessment was considered representative of the baseline air quality for the NSDF Project site. The closest air quality monitoring station is located in Petawawa but not all indicator compounds are monitored at this station. The next closest air quality monitoring station with additional indicator compounds is the Ottawa Downtown monitoring station. The air flow into the Chalk River area is predominantly from the southeast. The air quality monitoring station in Ottawa Downtown captures this air flow into Chalk River; but it is noted that the station is located approximately 150 km from the NSDF Project. The results can be considered to provide conservative air quality estimates (likely to be greater than the existing conditions in the RSA) given its urban location and proximity to the Canada-US border. That said, Canadian Nuclear Laboratories (CNL) is currently processing data from air quality monitors within the CRL site to establish baseline conditions of air quality prior to construction of the proposed NSDF Project. The monitors will measure key meteorological parameters along with indicator compounds PM_{10}, $PM_{2.5}$, and TSP. The data gathered will be compared to applicable provincial and federal air quality standards and will be used as representative background conditions

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			for the NSDF Project.
CNL-ND408	MNO (August 16, 2017)	**Table 5.2.1-7: Background Air Quality Valued (90th Percentile, Average for Annual Only), Page 5-42** What is proposed to be done about the Indicators which had no monitored data available (C3H4O, Pb [30-Day], H2S [10-minutes and 1-hour], C2H3Cl and Odour [OU/m3])? How can a project assessment be completed when there is no baseline data available to compare values against?	Hydrogen sulfide (H_2S), vinyl chloride (C_2H_3Cl), and odour from decomposition of waste in the ECM, acrolein (C_3H_4O) from combustion gases, and lead (Pb) are included as non-radiological indicator compounds in the air quality assessment of baseline conditions. H_2S, C_2H_3Cl, C_3H_4O, Pb are not routinely monitored at either site where data for other indicator compounds were collected to determine baseline air quality. However, the absence of baseline data does not preclude the assessment of the cumulative effects of these indicator compounds as a result of the NSDF Project. In response to comments and request on the 2017 draft Environmental Impact Statement (EIS), acrolein was included to represent volatile organic compounds (VOCs) from combustion. Emissions from the decomposition of waste are the result of breakdown of waste material within the NSDF Project and are, therefore, included as indicator compounds. The expected emission rates of C_3H_4O were calculated from exhaust of non-road and on-road vehicle while C_2H_3Cl and H_2S coming from the ECM cover and passive vents during the NSDF activities (during construction/operations phases) were estimated. Emission rates were also estimated for odour during the operational phase of the NSDF, while Pb from the operations of the wastewater treatment plant (WWTP) and from various support activities. These values will be used in the Environmental Assessment Follow-Up Monitoring Program (EAFMP) which will be implemented to determine and assess the extent of environmental cumulative effects from NSDF activities.
CNL-ND409	MNO (August 16, 2017)	**5.2.1.5.2 Results, Page 5-44** "Pathways through which all stages of the NSDF Project may interact with and result in changes to concentrations of indicatory compounds is provided in Table 5.2.1-8." It is unclear why Table 5.2.1-8 looks at the NSDF Project Activity rather than the indicator categories listed above in section 5.2.1.1.	Table 5.2.1-8 of the final Environmental Impact Statement (EIS) summarizes the results of a pathways analysis for air quality valued components (VCs). The compounds listed in Section 5.2.1.1 are indicators of air quality for the Air Quality Assessment in the final EIS. Measuring their concentrations determine whether Project activities meet appropriate air quality standards. The pathways analysis, on the other hand, assesses which specific NSDF Project activities (and to what extent) may impact the indicator compounds for the air quality VCs. Section 5.1.5 in the final EIS explains the purpose of assessing potential project interactions and mitigations for the NSDF Project. Interactions (linkages) between Project components or activities and the corresponding potential changes to measurement indicators are identified by a pathway analysis that is then used to focus the residual effects assessment for the VCs. All pathways by which a Project component or activity could cause a potential effect are identified. Project components or activities which result in a detectable change to the measurement indicators and a correspondent effect on a VC are included as effects pathways. Such effects pathways analysis is then used to determine applicable management practices and mitigation actions for the NSDF Project. No pathways are identified as having no linkage to air quality as part of the NSDF environmental assessment. This means that primary pathways were determined for all possible effects pathways (pathways which result in a change in air quality) assessed for the NSDF (summarized in Section 5.2.1.5.2.3 of the final EIS). As a result, the Environmental Assessment Follow Up Monitoring Program (EAFMP) will include air quality monitoring activities which will: • Verify effects predictions, and compare actual with predicted effects; • Confirm effectiveness of mitigation and, in doing so, evaluate if alternate mitigation is required; • Provide information for use in adaptive management to address potential unforeseen effects; and • Demonstrate compliance with regulatory requirements. The EAFMP will be implemented in addition to the existing Chalk River Laboratories (CRL) Radioactive Effluent Verification Monitoring Program which includes airborne effluents verification monitoring that comprises 56 monitoring points. As part of the EAFMP, all NSDF Project components or activities that could cause a potential effect will be monitored (in all environmental disciplines, including air quality). Monitoring environments that have no Project pathways identified means they are unlikely to be affected by NSDF Project activities; that is, a corresponding effect on these

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			environmental VCs is not predicted to experience detectable changes due to NSDF activities. Therefore, pathways that have no linkage to NSDF activities are not monitored. Nevertheless, the EAFMP enables CNL to routinely evaluate whether new mitigation measures are necessary based on the results of monitoring for the NSDF; this includes provisions for mitigation and re-evaluation of changes that occur to effects pathways that previously had no linkage to the NSDF.
CNL-ND410	MNO (August 16, 2017)	**Table 5.2.1-9: Summary of Average Emission Rates during the Construction Phase, Page 5-49, Table 5.2.1-10: Summary of Maximum Emission Rates during the Construction Phase, Page 5-49** How can no values be calculated for Odour (OU/day)? Specifically, for activities such as ECM construction (vehicle exhaust), vehicle exhaust and fugitive road dust and support activities specifically related to combustion and diesel emergency power generators?	Odour is considered an indicator compound as it is produced from the breakdown of waste material within the NSDF Project. Since no waste will be handled or disposed in the NSDF during the construction phase (i.e., the engineered containment mound or wastewater treatment plant has yet to be built or operational), odour compounds are not expected to be produced. Emission rates are, therefore, not estimated for odour during this period.
CNL-ND411	MNO (August 16, 2017)	**Table 5.2.1-13: Emission Sources and Contaminants not included in the Assessment, Page 5-53** "NOx, CO, SO2, SPM, PM10 and PM2.5 emissions from these sources occur seasonally (i.e., do not occur at all times during a year) …" For the assessment to allow for a conservative assessment of effects to the atmospheric environment, and adhere to a precautionary approach – effects, even when not occurring at all times during a year, should be considered.	The rationale summarized in Table 5.2.1-13 for excluding certain contaminants from the Air Quality assessment has been modified in the final Environmental Impact Statement (EIS). Specifically, emissions of CO, SO_2, SPM, PM_{10}, and $PM_{2.5}$ compounds from natural gas combustion for Wastewater Treatment Plant (WWTP) processes and comfort heating other than NO_x/NO_2 were not retained as they are not required to be assessed per the MOECC *Procedure for Preparing an Emission Summary and Dispersion Modelling Report* under *Ontario Regulation 419/05 Air Pollution – Local Air Quality*. NO_x/NO_2 from mobile combustion sources was deemed negligible as it contribute to less than 1% of total emissions; it was, therefore, excluded from the dispersion modelling. Factors which enable conservative estimation of emission of NO_x are accounted for in calculations of emission rates from the WWTP – these are included in the Air Quality Assessment technical supporting document [1]. Table 5.2.1-9 to Table 5.2.1-12 summarize the average and maximum emission rates in kilograms per day for each activity in the NSDF during the construction and operations phase. Maximum emission rates assume the source emits continuously for 24 hours per day. Predictions made in the Air Quality Assessment are based on conservative assumptions around number of heavy-duty vehicles and intensity of use, as well as meteorological conditions. Reference: [1] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008.
CNL-ND412	MNO (August 16, 2017)	**5.2.1.8.2 Determination of Significance, Page 5-59** "…the direction is negative for all indicator compounds as concentrations of emissions are predicted to increase during this phase of the NSDF Project." How can the direction be deemed negative for all indicator compounds when some indicator compounds had no baseline data associated with them? Please advise.	As defined in Table 5.2.1-15 in the final Environmental Impact Statement (EIS), the direction of a residual effect of the NSDF Project to air quality is determined by how it changes relative to the Base Case. Because indicator compounds of air quality increased as a result of NSDF Project activities (i.e., an increase in concentrations in the Application Case compared to the Base Case), residual effects in the negative direction was identified for these compounds (See Table 5.2.1-16 of the final EIS). This does not exclusively mean an increase from existing levels for which background concentration data is available. The Base Case describes existing conditions in the local and regional area and includes the combined effects of previous and existing developments and activities. The Base Case reflects the effects of existing disturbances, such as forestry, transportation, agriculture, mining, and residential and recreational development. Current effects from the existing operations and activities on the Chalk River Laboratories (CRL) site are considered part of the Base Case. For air quality, background concentrations of indicator compounds from monitoring stations contribute to defining the Base Case at the NSDF Project site; however, the absence of background concentration values does not preclude the consideration of indicator compounds into the Application Case. Ultimately, it provides a reference to which residual effects resulting from the NSDF Project (i.e., during the Application Case) can be compared.

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CNL-ND413	Kerrie Blaise, CELA (August 15, 2017)	The Draft EIS report (see Table 4-2) estimates that 4.82 E+15 Bq of tritium will be initially stored at the facility. This is a very large amount of tritium; 4,820,000,000,000,000 Bq of tritium to be exact. Table 7.1 on page 7-7 of the PA report states that in 2070 the tritium emission rate per second will be 12,000 Bq. From this estimate, it can be back-calculated that in 2020, the airborne emission rate of tritium (both tritiated hydrogen gas, HT, and tritiated water vapour, HTO) from the facility will initially be 6.5 E+12 Bq per year. This is a high emission rate, exceeding annual tritium emissions from most nuclear power plants in North America (though not heavy water reactors). However, it is only roughly one thousandth of the above amount of tritium in the facility. In other words, tritium emissions may even be higher than estimated in the PA report. CELA asks if the estimated annual tritium emission rate is correct, given the relatively high temperatures in the facility and the consequent high evaporisation rates of tritium, and given the extreme mobility of tritium? Furthermore, how was the tritium emission estimate in table 7.1 derived? What models and assumptions were used in its derivation? By 2070, and assuming for the purposes of these calculations that no more wastes are added, the amount of tritium in the facility will have decayed to an estimated 2.9 E+14 Bq and the annual amount of tritium emitted to air will have declined to 4.0 E+11 Bq. Again, only about one thousandth of the amount stored is estimated to be emitted each year by 2070.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). As such there have been significant reductions to the proposed radionuclide inventory for the NSDF since the 2017 draft Environmental Impact Statement (EIS). The current total tritium value is calculated to be 8.91E+14 Bq, and this total value is reduced by half every 12 years from radiological decay. The Performance Assessment report was produced in support of the 2017 draft Environmental Impact Statement (EIS), and contained a combination of pre-closure and post-closure analyses and assessments. The report has since been superceded by the Post-Closure Safety Assessment [2], and contains all assessments for the post-closure period. All pre-closure safety assessments are now contained in the Safety Analysis Report [3]. The Reference Inventory, including tritium inventory, was developed through an iterative process between safety assessments and evaluation against dose acceptance criteria. The first step involved the collection of data from CNL waste records, facility decommissioning and environmental remediation projects. This inventory data was screened against the Canadian Standards Association (CSA) [4] and International Atomic Energy Agency (IAEA) [5] guidance for low-level radioactive waste, and further refined via the removal of some waste streams. This data set was then scaled up to represent the projected 1,000,000 m^3 total waste volume of the facility. The proposed total inventory and concentrations were then evaluated through the safety assessments to determine if dose acceptance criteria were met. Where criteria was not being met, or where a greater safety margin between calculated dose and acceptance criteria was desired, reductions were made to the inventory. This processes was repeated until a final Licensed Inventory (Table 3.3.1-2 of the final EIS) was established, which represents the maximum radiological inventory limit for the NSDF. The Engineered Containment Mound (ECM) is not expected to be exposed to significantly high temperatures as to cause contaminant release throughout the 50-year operations period. The ECM is expected to be exposed to ambient (atmospheric) temperatures (i.e., not under "relatively high temperatures"). The waste to be disposed in the NSDF is not heat generating as it is only low-level waste. Airborne tritium emissions from the ECM are presented in Table 5.8.6-3 of the final EIS. The tritium concentration in air estimates (61 Bq/m^3) result in dose rates to workers standing on top of the ECM of 0.000016 mSv/y, which is a tiny fraction of the Derived Release Limit and is well below regulatory dose limit for a member of the public. Tritium is a weak beta emitter, and does not deliver significant radiological dose. A disproportional amount of attention is often directed towards tritium because it can exist in large activity amounts, but its actual radiotoxicity and radiological impact is quite low. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [5] IAEA. Classification of Radioactive Waste. General Safety Guide (GSG)-1. 2009.

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CNL-ND414	William Turner (May 31, 2017) 117. 120.	Spatial boundaries for this assessment do not include the destruction, demolition and dismantling of the over 100 buildings on the CRL site. This will be a much larger source of particulates than anything listed in Table 5.2.1-9. PM10 and PM2.5 are significant and should be included in section 5.2	Environmental remediation of other areas on the Chalk River Laboratories (CRL) site are not within the scope of the NSDF Project [1]. The timelines for the remediation of some of these areas, is over many years (or decades). The remediation process, including the approach for determining remedial options is captured in Canadian Nuclear Laboratories (CNL) Decommissioning and Demolition Program Description Document [2]. As noted above the remediation of other areas would be subject to separate licensing decisions by the CNSC thus discussion of the remediation options has not been included in the final Environmental Impact Statement (EIS). Chalk River Laboratories (CRL) is registered under ISO-14001. Our environmental policy states: "We review the impacts of our activities, facilities, projects, services and products on the environment". For non-routine work, this review is conducted through CNL's environmental review process. Since CRL is located on Federal lands, step 1 of this process is to determine whether the particular project would be subject to a section 82 review under the Impact Assessment Act. Regardless of whether a particular project is subject to the Impact Assessment Act (IAA), the review process is the same. Canadian Nuclear Laboratories (CNL) assesses all potential environmental impacts and implements appropriate mitigation measures. Section 5.1.3.1 in the final EIS describes spatial boundaries as the geographic extent of the study areas for each environmental discipline subjected to the environmental assessment process. As such, the spatial boundaries described in Section 5.2.1.3.1 are physical spaces that were chosen for the air quality assessment for the NSDF Project. The impacts of infrastructure (e.g., demolition of outdated buildings at CRL) on the air quality within the regional study area (RSA) has been assessed as part of reasonably foreseeable developments (RFD) in Section 8.3.1.1 of the final EIS. The airborne emission from decommissioning projects on the CRL site will be assessed as part of the approval process for these projects. Since these are not within the scope of the EA for the NSDF Project, an air quality assessment was not conducted for decommissioning. References: [1] Record of Decision on the Scope of Environmental Assessments for Three Proposed Projects at Existing Canadian Nuclear Laboratories' Facilities, 2017 March 8. [2] Decommissioning and Demolition Program Description Document, 900-508300-PDD-001.
CNL-ND415	William Turner (May 31, 2017) 122.	Tables 5.2.1-9 & 5.2.1 -10 In the first table, the average emission rate (in kg/day) for the particulates for the construction activities is SPM – 3.11, PM10 – 1.56, PM2.5 – 0.23. In the second table, the maximum emission rate (in kg/day) for the same particulates for the construction activities is SPM – 3.11, PM10 – 1.56, PM2.5 – 0.23. Not quite sure how a maximum is equal to the average unless there is only one measurement.	The air quality assessment for the NSDF (Section 5.2.1 in the final Environmental Impact Statement (EIS)) considered emissions from several sources, including the construction of the Engineered Containment Mound (ECM) (emissions from material handling and vehicle exhaust), vehicle exhaust and fugitive road dust, and stockpiles. The emissions from each of these activities were estimated separately. The average emission rates values (Table 5.2.1-9) are the same as maximum emission rates values (Table 5.2.1-10) for some activities, namely material handling during ECM construction and fugitive dust from stockpiles. Maximum emission rates assume the source emits continuously for 24 hours per day during the period of construction. Average emission rates are scaled from the maximum emission rates based on the source's hours of operation. Sources that emit 24 hours per day independent of the hours of operation will have identical maximum and average emission rates.
CNL-ND416	William Turner (May 31, 2017)	5.2.1.7 Prediction Confidence and Uncertainty – The greatest contributor to any prediction confidence and uncertainty is the changes to technology. According to CNL, this facility will be operational for 50	The air quality assessment for the NSDF Project has been conducted using current available knowledge in environmental science, engineering, and technology. The prediction confidence and sources of uncertainty in Section 5.2.1.7 of the final

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	123.	years. Let us consider what that 50-year timeline means to technology changes. If one takes the year 1967 as representative of a starting point to assess the impact of time to technology development, then one can expect that in 50 years from now the available technology will not be the same. Further, changes to that technology will the significantly impact on any releases to the atmosphere. Extrapolating from the previous 50 years to the next 50 years, I expect the greatest impact will be on transportation and heavy equipment use. CNL need to reassess their predictions to include an evaluation of technology change.	Environmental Impact Statement (EIS) are listed because they can quantifiably change the results produced using predictive models (e.g., dispersion models) applied in the air quality assessment. The development of technology, as a sociological concept, does not have any discrete parameters that can be modelled as part of an air quality assessment. Just as predictions of existing technology in 2020 that were made in 1967 would have been speculative, predicting what technology will be available in 2070 would be impractical. The currently projected impact of climate change on the global atmosphere further complicates future predictions of advancements in environmental science and engineering. This is beyond the scope of this EIS or the requirements outlined in the *Canadian Environmental Assessment Act* (CEAA 2012), the CNSC's *Generic Guidelines for Preparing an EIS* [1], and the CEAA's *Technical Guidance for Assessing Cumulative Effects under the Canadian Environmental Assessment Act, 2012* [2]. Currently, the forward-looking future projections for the NSDF environmental assessment does not have the capabilities to forecast which environmental science research or technologies will be in place for which CNL will be required to adapt. It is expected that activities for the NSDF will continue to be evaluated and modified in accordance with CNL's requirements from its regulator as part of its operational licence. As it stands, the compliance of NSDF Project activities to environmental regulations and applicable standards will be verified routinely through the Environmental Assessment Follow-up Monitoring Program (EAFMP), the conceptual outline of which is summarized in Section 11.0 of the EIS. A comprehensive and detailed EAFMP is presently under development and can be made available to interested stakeholders upon its completion. The EAFMP will include environmental, effluent verification, and groundwater monitoring to ensure that releases and subsequent environmental concentrations of potential contaminants are below the relevant guidelines. The EAFMP will follow the systematic informed planning process outlined in Canadian Standards Association (CSA) Standards for environmental (N288.4-10) [3], effluent (N288.5-11) [4], and groundwater monitoring (N288.7-15) [5]. It is expected that regulatory oversight of the EAFMP and its results will be maintained as it becomes pertinent for the duration of the institutional control period of the NSDF Project. The EAFMP will provide an avenue to continuously verify assumptions and predictions while reassessing uncertainties expressed in the EIS. If advancements in technology invalidates any assumptions or modeling predictions made for the NSDF, CNL would follow adaptive management processes and likely re-evaluate and adjust accordingly. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CEAA, Technical Guidance for Assessing Cumulative Effects under the Canadian Environmental Assessment Act, 2012, 2018 March. [3] CSA N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [4] CSA N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [5] CSA N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015.
CNL-ND417	William Turner (May 31, 2017) 124.	5.2.1.10 Conclusions stating that the vehicle exhaust and fugitive dust from unpaved roads is the largest contributor to particulate matter during the project – what about the dumping of wastes and contaminated soils on the mound? Surely the dumping of decommissioning wastes and contaminated soils into the mound is a much larger source of particulates? Further the demolition of the buildings and the cleanup of the contaminated sites is another source of particulates that will be much higher than vehicle exhaust and roads. Not acceptable.	The conclusion in Section 5.2.1.10 in the final Environmental Impact Statement (EIS) specifically indicates "vehicle exhaust and fugitive dust from unpaved roads is the largest contributor to SPM and PM_{10} during both the construction and operations phases." It is mentioned in Section 5.2.1.2 of the final EIS that these are non-radiological indicator compounds (particulate matter) for air quality based on applicable federal and provincial standards. Since waste placement into the Engineered Containment Mound (ECM) will not occur until after its construction, the large contribution of particulate matter from vehicles travelling daily on unpaved roads is conceivable during the construction phase. During the operations phase, depositing of waste and application of daily cover will take place in the ECM. Potential emissions from these activities include particulate matter as a result of the disturbance of material during handling. The predictive emission factors and sample calculations for particulate emissions from material handling in the ECM is detailed in Section 4.3.1.2 of the Air

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			Quality Assessment technical supporting document (TSD) [1]. The predictive equation used to calculate fugitive dust emissions from unpaved roadways are detailed in Section 4.3.1.5 in the same TSD. That being said, radiologically contaminated particulate dust emissions may still be produced from the ECM during the operations phase. Management practices and mitigation actions will be implemented to reduce the risk to human health from contaminated dust in the ECM as described in the Safety Analysis Report [2] and summarized in Section 5.2.1.5.2 (Table 5.2.1-8) of the Final EIS. Infrastructure decommissioning (e.g., demolition of outdated AECL buildings) on the CRL site has been included as part of reasonably foreseeable developments (RFD) within the regional study area (RSA) which will interact with the NSDF Project. This is detailed in Section 8.3.1.1 of the final EIS. The airborne emission from decommissioning projects on the CRL site will be assessed as part of the approval process for these projects. Since these are not within the scope of the EA for the NSDF Project, an air quality assessment was not conducted for decommissioning. References: [1] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
		Environmental Effects – Geological and Hydrogeological Environment	
CNL-ND418	Pravin Shah (April 8, 2017) MNO (August 16, 2017)	Existing condition of Perch Lake is not quite clear from the report, but this and the surrounding area have been under study for decades (possible contamination from plumes emanating from WMA A?). Please describe in more detail, how the Perch Lake basin has been affected by past operations. Specifically, how these past operations have impacted the MNO rights in the area.	Existing surface water quality conditions in Perch Lake basin are provided in Section 5.4.2.4.2 (Non-radiological) and Table 5.7.4-8 of Section 5.7.4.5 (Radiological) of the final Environmental Impact Statement (EIS). Tritium and gross beta concentrations in Perch Lake are elevated above background as a result of contaminant plumes emanating from legacy CRL WMAs. Five year average tritium concentrations and gross beta concentrations at the Perch Lake outlet are 2,138 Bq/L and 12 Bq/L respectively. No environmental effects are expected at these levels. Tritium concentrations are below the 7,000 Bq/L Health Canada guideline for drinking water [1]. Additional characterization of baseline radiological and non-radiological concentrations in Perch Lake and Perch Lake basin was conducted in 2018 to provide a more complete assessment of baseline surface water quality in the basin. The baseline data is included in Section 3 (Tables 3-1 to Table 3-39) of the Technical Support Document, Surface Water Quality Assessment for the Near Surface Disposal Facility [2]. The impacts on Perch Lake basin have been from early waste management practices at the Chalk River Laboratories (CRL) site where wastes were buried in the ground with no engineered barriers. Examples are Waste Management Area (WMA) A, Liquid Dispersal Areas (i.e., Reactor Pit 1, Reactor Pit 2 and the Chemical Pit). Waste Management Area B also includes wastes buried in unlined trenches. With the exception of tritium and Strontium-90, there has been no appreciable migration of radiological contaminants from these facilities. Section 5.3.2.4 of the final EIS has been expanded to provide additional information on groundwater plumes nearest to the NSDF site (Chemical Pit and Reactor Pit 2). The CRL site groundwater monitoring program includes detailed mapping of contaminant plumes, typically on a five year cycle. The plume mapping studies are used to evaluate changes in contamination levels, assess potential impacts, and determine the need for remediation. To date, four groundwater treatment systems have been implemented at CRL, three of these are within the Perch Lake basin.

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			The final EIS has been expanded to include a section specifically addressing Indigenous Interests. Section 6.4 of the final EIS assess impacts of the NSDF Project on traditional land and resource use. Métis rights within the Perch Lake basin have not been affected by past or current operations at the CRL site as access to the site is restricted. Impacts of the NSDF Project on the Ottawa River water quality and aquatic biodiversity are predicted to be negligible. Past operations in combination with the proposed NSDF are therefore not predicted to affect the Métis Nation of Ontario rights in the area. The groundwater treatment system that is outside the Perch Lake Basin has been implemented in the Maskinonge Lake Basin at the CRL Site. The Maskinonge Lake Basin is shown in Figure 5.7.4-7 of the final EIS and is located in the central portion of the CRL site. The purpose of the treatment system is to remediate groundwater that has been contaminated by Strontium-90 as a result of an accidental release of radioactive liquid waste to ground that occurred in the 1950s. Construction of the NSDF will enable remediation of the source of contamination. The groundwater treatment plant was constructed to ensure that groundwater discharging to a downgradient wetland will be protective of the environment. The treatment system is a passive system; the contaminated groundwater is channeled through a curtain of granular material which removes the Strontium-90 from groundwater. The concentration of Strontium-90 in the treated groundwater meets Health Canada guidelines for drinking water. The groundwater monitoring is conducted to confirm that the groundwater treatment system is functioning as intended. The CRL site has remained restricted to all public access, including the establishment of permanent settlements. As a result, no Indigenous settlements or activities have occurred in or near the CRL property boundaries. Canadian Nuclear Laboratories conducts an Environmental Risk Assessment for the CRL site [3] on a five-year cycle. The Environmental Risk Assessment (ERA) examines potential impacts from CRL site operations and is used to guide remediation planning for the CRL site. The results of the ERA determined that contamination from past operations at CRL has not occurred offsite where the rights of Indigenous groups such as the MNO may be impacted (i.e., hunting, gathering, harvesting, etc.). References: [1] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3 [2] Surface Water Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-007. [3] Environmental Risk Assessment of Chalk River Laboratories, ENVP-509220-REPT-003.
CNL-ND419	Michael Milgram (May 16, 2017)	On page ES-ix it is written: "... monitoring of water elevations in the adjacent wetlands is proposed to determine changes from the presence of the engineered containment mound". - Q4-1: What actions are contemplated if changes are observed?	The adjacent wetlands provide habitat for a variety of species. Monitoring of water elevations in the adjacent wetlands will be conducted to confirm that there is no significant change to wetland habitat. Changes to water table elevations may arise from clearing the NSDF site and altering drainage patterns. The change from the forest cover under the existing conditions to the final cover of the engineered containment mound (ECM) will result in decreased infiltration and increased run-off volumes from the footprint of the NSDF Project. Additional groundwater flow modelling has been conducted to evaluate the potential impact of the facility on water elevations in the adjacent wetlands that may arise. These studies are documented in the Groundwater Flow Modelling of the NSDF Project [1] and predict that changes in water table elevations will be localized to the immediate vicinity of the ECM, stormwater management pond discharge locations and the exfiltration gallery where treated effluent will be discharged. A

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			one to two meter rise in water table elevation is predicted at discharge locations. No appreciable changes to water table elevations in the adjacent wetlands is predicted. Action that could be undertaken if there were unforeseen increases to water table elevations in the wetlands are to route all Wastewater Treatment Plant (WWTP) treated effluent discharge to Perch Lake, thus bypassing the adjacent wetlands. The WWTP Effluent Discharge System provides the option for discharging treated effluent to an exfiltration gallery on the NSDF site which returns the treated water to the adjacent East Swamp wetland or directly to Perch Lake. The WWTP Treated Effluent Discharge System is described in Section 3.4.2.6 of the final Environmental Impact Statement. Reference: [1] Groundwater Flow Modelling of the Near Surface Disposal Facility, 232-509249- REPT-001.
CNL-ND420	David Thompson (April 11, 2017)	**Section 5.4.1.4.2.2:** With so much monitoring of the River, how is it the most recent water Ottawa River level data is 15 years old?	The Environmental Impact Statement (EIS) has been updated to provide more recent water level data for the Ottawa River. Table 5.4.1-4 of the final EIS provides a summary of Ottawa River flows at the Des-Joachims Hydroelectric Dam and water level data at Pembroke for the period from 1950-2016. Ottawa River water level data is recorded daily at the Pembroke Station located approximately 36 km downstream of the Chalk River Laboratories (CRL) site. Monthly average water level data for the period from 1950 to 2019 is presented in Appendix 5.4-1 of the final EIS (Ottawa River Elevations Recorded at Pembroke Station between 1950 and 2019).
CNL-ND421	Joan Lougheed and Town of Deep River (August 16, 2017)	In Table 5.3.2-6, and summarized in Section 5.3.2.6.2.2, the non-radiological constituents aluminum, barium, cadmium, iron, manganese and zinc are in exceedance of the risk benchmarks for surface water (see pgs.5-153 and 156). Reference is then made to these contaminants having the "potential to be attenuated in the groundwater flow path between the ECM and Perch Creek". Although it is recognized that the applicable transport modelling has not yet been developed, a best-estimate of the attenuation should be provided with supporting rationale.	Section 5.3.2.6.2.2 of the final EIS has been updated to include the potential effects of releases of non-radiological constituents from the Engineered Containment Mound (ECM) on groundwater quality and ecological receptors. The hypothetical receptor considered is an earthworm exposed to groundwater. Canadian Nuclear Laboratories (CNL) has performed additional site characterization since the 2017 draft EIS and has updated the groundwater modelling [1]. The revised groundwater transit time predications for the flow path from the ECM to Perch Creek is in the final EIS. The groundwater transit time ranges between 5 and 15 years with an average transit time of 7 to 10 years (See Section 5.3.2.6.1.2 of the final EIS). The groundwater flow path from the ECM to Perch Creek (the nearest water course), is via a shallow sandy aquifer and has a distance of approximately 300 m. The predicted migration rate is consistent with observed migration rate observed in other areas in the Perch Lake basin for non-reactive contaminants (i.e., tritium). The CRL site groundwater monitoring program includes monitoring groundwater semi-annually at locations upgradient and downgradient of waste management areas [1]. The groundwater monitoring program indicates that there are no significant releases of the metals identified (i.e., aluminum, copper and iron) from the WMA's in the Perch Lake watershed. Canadian Nuclear Laboratories (CNL) can confirm that ambient concentrations of aluminum, copper and iron that are higher than benchmark concentrations are linked to the geological context of the region and not due to CRL site releases. Canadian Nuclear Laboratories (CNL) is developing a characterization plan to improve our understanding of ambient background concentrations of naturally occurring metals and other non-radiological parameters at the CRL site. The Risk Benchmarks are applied to non-radiological constituents and represent lowest observable effect levels for acute exposure conditions. These values are sourced from Canadian Water Quality Guidelines, Provincial guidelines and the literature. The sources are provided in Table 5.4.2-5 of the final EIS. Exceedance of Risk Benchmarks do not necessarily indicate that effects would occur, but instead indicates the potential for effects.

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			Reference: [1] Groundwater Flow Modelling of the Near Surface Disposal Facility. 232-509249-REPT-001.
CNL-ND422	Joan Lougheed and Town of Deep River (August 16, 2017)	In Section 5.3.2.7, it is noted that four sensitivity simulations were completed with "slight changes to the goodness of fit to model calibration data, though in all cases the results were acceptable" (see pg.5-157). The criteria for defining "acceptable" results is missing and must be provided.	A deterministic approach was used where a 3D numerical (MODFLOW) groundwater model was constructed and calibrated to represent the "best estimate" of groundwater flow conditions based on the conceptual model described above. The model was calibrated through an iterative process where steady-state model runs were completed with adjustments to the model input parameters (within acceptable ranges) until model results provided an acceptable match to observed conditions (groundwater elevations, groundwater flow directions, baseflow estimates, and advective flow paths from the Reactor Pit 2 source area). Additional simulations were completed in order to address the uncertainty associated with the "best estimate" configuration and to examine the sensitivity of model results to some of the key controlling parameters of the hydrogeological system and assumptions made in the development of the conceptual model. A total of ten sensitivity scenarios were evaluated, which addressed potential variation in the hydraulic conductivity of the bedrock and sand units, the recharge distribution, the position of the model boundaries, and various aspects of the ECM design (e.g., the liner, blast zone, cover evapotranspiration and exfiltration gallery flow). Complete details of the model calibration and sensitivity analysis are included in Groundwater Flow Modelling for the NSDF (Section 3.4 and 4.4 respectively) [1]. Criteria for model acceptability is documented in the modelling report (Section 3.4 of [1]), and includes: • Acceptable calibration statistics (low normalized Root Mean Square (nRMS) error and residual mean error). • Visual comparison of groundwater flow directions based on model results and interpretation of head measurements. • Visual comparison of groundwater flow directions based on model results and the trajectory of the tritium plume emanating from Reactor Pit 2. • Reasonable match between simulated and measured basin flows at the East Swamp weir. Reference: [1] Groundwater Flow Modelling of the Near Surface Disposal Facility, 232-509249- REPT-001.
CNL-ND423	Joan Lougheed and Town of Deep River (August 16, 2017)	In Section 5.3.2.8, it is stated that "Initial sampling frequency will likely be twice per year (Spring and Fall) consistent with the existing site groundwater monitoring program" (see pg. 5-157 and Table 5.3.2-9). Since it has already been noted above that there will be several non-radiological exceedances of the risk benchmarks for surface water, it is recommended that sampling be more frequent until evidence of attenuation is achieved.	Canadian Nuclear Laboratories (CNL) has performed additional site characterization since the 2017 draft Environmental Impact Statement (EIS) and has updated the groundwater modelling [1]. The revised groundwater transit time predications for the flow path from the Engineered Containment Mound (ECM) to Perch Creek is in the final EIS. The groundwater transit time ranges between 5 and 15 years with an average transit time of 7 to 10 years (See Section 5.3.2.6.1.2 of the final EIS). The groundwater flow path from the ECM to Perch Creek (the nearest water course), is via a shallow sandy aquifer and has a distance of approximately 300 m. The predicted migration rate is consistent with observed migration rate observed in other areas in the Perch Lake basin for non-reactive contaminants (i.e., tritium). The Chalk River Laboratories (CRL) site groundwater monitoring program includes monitoring groundwater semi-annually at locations upgradient and downgradient of waste management areas (WMA) [1]. The groundwater monitoring program indicates that there are no significant releases of the metals identified (i.e., aluminum, copper and iron) from the WMA's in the Perch Lake watershed. Canadian Nuclear Laboratories (CNL) can confirm that ambient concentrations of aluminum, copper and iron that are higher than benchmark concentrations are linked to the geological context of the region and not due to CRL site releases. Canadian Nuclear Laboratories (CNL) is developing a characterization plan to improve our understanding of ambient background concentrations of naturally occurring metals and other non-radiological parameters at the CRL site.

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			A detailed Environmental Assessment Follow-up Monitoring Plan (EAFMP) for the NSDF Project will be developed and made available for public review. Input such as the monitoring frequency will be considered in the review process. The EAFMP will include parameter identification and monitoring frequency will follow the requirements of CSA N288.4 *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills* [2] and CSA N288.7 *Groundwater protection programs at Class I nuclear facilities and uranium mines and mills* [3]. The current proposed sampling frequency of twice per year for groundwater is based on over 20 years of operational control monitoring experience at CRL. Groundwater monitoring parameters, locations and frequency are currently reviewed on an annual basis and may be adjusted. References: [1] Groundwater Flow Modelling of the Near Surface Disposal Facility. 232-509249-REPT-001. [2] CSA Group. CSA N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [3] CSA Group. CSA N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015.
CNL-ND424	MNO (August 16, 2017)	**Table 5.3.2-4: Pathways Analysis for the Hydrogeology Valued Components, Page 5-145** Effects Pathway of: • leakage of leachate from the ECM may affect groundwater quality during operations and closure phase The identification of this effects pathway as having no linkage highlights the problem with the approach taken. This effects pathway should have been assessed as part of the application. Particularly as there "…will be a need to address pretreatment of surface water ruin-off from the active cells prior to conveyance to the WWTP and a need to establish conveyance mechanisms (gravity and pumping) from the interior of the ECM to the surface water management pools" (5.3.2.5.2.1 No Linkage Pathways).	The definition of a 'no linkage' pathway is that the effect is removed by environmental design features or mitigation such that the Project would not be expected to result in a measurable environmental change relative to Base Case values. Mitigation and environmental design features implemented for the NSDF Project are intended to prevent leakage of leachate from the ECM into groundwater during operations and closure. The base liner system, described in Section 3.4.1.4 of the final Environmental Impact Statement (EIS), serves to contain leachate generated during and following operation of the Engineered Containment Mound (ECM) and includes both primary and secondary liner systems that are designed to have redundancy in case of premature failure in the primary liner. This pathway is therefore assessed as having no residual effect on groundwater. Leakage of leachate from the ECM during the post-closure phase from failure of the cover and base liner system as part of normal evolution is assessed in Table 5.3.2-7 of the final EIS. Section 5.3.2.6.2.2 of the final EIS has been updated to include potential effects on groundwater quality and ecological receptors. No residual effects are predicted. Conveyance systems to transfer leachate and surface water run-off from active cells are described in Section 3.4.2.3 of the final EIS. Leachate and surface water run-off that has come into contact with waste will be conveyed by gravity sewers and pumping stations to the Wastewater Treatment Plant (WWTP) for treatment. There is no need to pre-treat surface water run-off from active cells prior to conveyance to the WWTP. Conveyance systems to transfer clean water (i.e., non-contact water) that has not come into contact with waste to surface water management ponds are described in Section 3.4.4.5 of the final EIS. Non-contact water will be directed by gravity to the surface water management ponds, or to temporary holding points within the ECM and then pumped to the three surface water management ponds.
CNL-ND425	MNO (August 16, 2017)	**5.3.2.6.2.2 Application Case Results, Page 5-156** "Transport modelling to assess the concentrations of nonradiological contaminants in groundwater downstream of the ECM has not yet been developed (AECOM 2016b)." Please provide detail on why transport modelling has not yet been developed.	Groundwater transport modelling for the flow path between the Engineered Containment Mound (ECM) and Perch Creek has been conducted as a part of the revised Post-Closure Safety Assessment (Post SA) [1]. A screening was conducted to identify constituents for potential concern (COPCs) (i.e., non-radiological contaminants) for inclusion in the assessment and is documented in the Ecological Risk Assessment (EcoRA) [2]. Four COPCs were identified, aluminum, copper, lead and uranium. The EcoRA eliminated aluminum and uranium from the assessment on the basis of factors such as negligible concentrations relative to background and limited mobility. Only copper and lead screened into the assessment. For both

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			copper and lead, predicted concentrations in groundwater were below benchmark values and no residual effects are predicted. For the COPCs that screened in (i.e., copper and lead), the exposure assessment concluded no residual effects on ecological receptors. Section 5.3.2.6.2.2 of the final Environmental Impact Statement (EIS) has been updated to provide a summary of the potential effects of non-radiological contaminants on groundwater quality and ecological receptors. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001.
CNL-ND426	MNO (August 16, 2017)	**5.3.2.6.2.2 Application Case Results, Page 5-156** "Each of these contaminants have the potential to be attenuated in the groundwater slow path between the ECM and Perch Creek." The presence of these potential effects highlights the flawed approach to assessment where mitigation is developed prior to the review of the effects. What will be done by CNL to mitigate the potential attenuation of these contaminants?	The revised Post-Closure Safety Assessment (Post SA) [1] includes an assessment of non-radiological contaminants and potential migration from the Engineered Containment Mound (ECM) to Perch Creek via the groundwater pathway. A screening was conducted to identify constituents for potential concern (COPCs) for inclusion in the assessment and is documented in the Ecological Risk Assessment (EcoRA) [2]. Four COPCs were identified, aluminum, copper, lead and uranium. The EcoRA eliminated aluminum and uranium from the assessment on the basis of factors such as negligible concentrations relative to background and limited mobility. Only copper and lead screened into the assessment. For both copper and lead, predicted concentrations in groundwater were below benchmark values and no residual effects are predicted. For the COPCs that screened in (i.e., copper and lead), the exposure assessment concluded no residual effects on ecological receptors. Section 5.3.2.6.2.2 of the final Environmental Impact Statement (EIS) has been updated to provide a summary of the potential effects of non-radiological contaminants on groundwater quality and ecological receptors. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001.
		Environmental Effects – Surface Water Environment	
CNL-ND431	Evelyn Gigantes (May 17, 2017)	Tritium and Strontium 90 obviously have been, and continue to be, significant concerns at the NSDF site area. The EIS does not address this issue in an open, clear and consistent way. Instead, there is vague discussion of sources of the intermediate waste and what would happen to waste on the CNL site which could generate cumulative effects that would breach safety guidelines.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). The final Environmental Impact Statement (EIS) provides baseline description for the NSDF site and surrounding area and combined impact of the base case and impacts from the NSDF for each environmental component. Tritium and Strontium-90 are included in the description of baseline and assessment of impacts from NSDF as described below. As noted in Section 5.3.2.4 of the final EIS, the Base Case environmental impacts are the result of early waste management practices which included burying low-level waste in sand trenches with no engineered barriers. Tritium and Strontium-90

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			are the only contaminants to have migrated appreciable distances from these early waste management areas. Section 5.3.2.4.2.2 of the final EIS provides baseline information on tritium and Strontium-90 plumes in the wetlands downgradient the Strontium-90 plume. Figures 5.3.2-4 and Figure 5.3.2-5 show contour plots of gross beta activity which is representative of Strontium-90 concentrations for legacy waste management areas adjacent to the NSDF site. Groundwater contamination in the Perch Lake wetland is limited to tritium and Strontium-90. Although appropriate risk management actions have taken place (i.e., interception and treatment of Strontium-90 groundwater plumes), large scale remediation of the contamination sources may be necessary to ensure appropriate long-term management of the source of this contamination. The NSDF Project design principles is based on containment and isolation of the low-level waste (LLW) inventory from the environment including engineered barriers such as the base liner system which mitigates impacts to the surrounding groundwater. Therefore, it is anticipated that groundwater quality in the Perch Lake wetland will improve if the NSDF Project is approved and environmental remediation of these historic waste management areas. Potential effects of NSDF Project on surface water and groundwater and ambient radioactivity are assessed in Section 5.3, 5.4 and 5.7 of the final EIS respectively. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. During the operations phase impacts on surface water and groundwater are limited to discharges of treated effluent from the Wastewater Treatment Plant (WWTP) to the Exfiltration Gallery and Perch Lake. With the exception of tritium, all radionuclides will meet Health Canada Drinking Water Guidelines. The effluent discharge target for tritium is 360,000 Bq/L [2]. This discharge target is well below the benchmark for protection of biota and will ensure that tritium concentrations in Perch Creek, which discharges to the Ottawa River, remains below the Health Canada drinking water guideline of 7,000 Bq/L [3]. The tritium discharge target takes into consideration the existing tritium concentration in Perch Creek of approximately 3,500 Bq/L. The 7,000 Bq/L guideline value is several orders of magnitude below the benchmark concentration for tritium for no effects on aquatic biota. The approach is protective of non-human biota and environmentally sound. Tritium releases will be minimized through packaging of high activity tritium waste and mitigation measures to minimize leachate generation such as application of sacrificial liners to minimize precipitation coming into contact with the waste (Section 3.4.2.5.1 and 3.4.1.9.2). The use of the exfiltration gallery as a primary discharge location provides additional retention time for radioactive decay of tritium within the geosphere prior to reaching the biosphere and receptors. Tritium has a relatively short half- life of 12.3 years and therefore benefits from decay over the groundwater transit time from the exfiltration gallery to eventually Perch Lake, which is greater than 16 years. Predicted tritium and gross beta (as Strontium-90) concentrations for surface water bodies in the Perch Lake wetland and the Ottawa River are provided in the Surface Water Quality Assessment [4]. During the post-closure phase it is conservatively assumed that the engineered barriers will fail and contaminants will be released to the environment. The impact of the NSDF on water tributaries and ecological health during the post-closure phase are assessed in Section 5.7.6.1.2.2 of the final EIS. The calculated peak environmental concentrations in water are low in the context of environmental effects. For example, as calculated in the Post-Closure Safety Assessement (PostSA) [5], the peak concentration of tritium in surface water (which will eventually flow to the Ottawa River) during the post-closure phase is 0.000055 Bq/L, as compared to the Maximum Acceptable Concentration of 7,000 Bq/L of tritium in drinking water, confirming that there is no deterioration of the Ottawa River water quality in the medium or long term.

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			Contribution of treated effluent releases out of the NSDF WWTP towards changes in existing baseline conditions will be monitored through effluent verification monitoring and environmental monitoring. Effluent verification monitoring will document radiological and non-radiological releases from the WWTP. Groundwater monitoring will be conducted upgradient and downgradient of the exfiltration gallery to assess impacts on groundwater quality. A groundwater monitoring network has been installed downgradient of the ECM. Baseline data is currently being collected. Groundwater monitoring throughout the operations and post-closure phase will identify any impacts from the ECM including any changes in tritium and Strontium-90 concentrations. The conceptual monitoring program is described in Section 11 of the final EIS. The follow-up monitoring plan is being developed and will be made available for review. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Effluent Discharge Targets, 232-106499-REPT-002. [3] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3 [4] Surface Water Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-007. [5] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND432	MNO (August 16, 2017)	The MNO raise the following questions: Why does the LSA not consider the watersheds for Perch Lake, Perch Creek (i.e., the Perch Lake Watershed) and the adjacent wetlands and swamps? Why does the RSA not consider the Ottawa River beyond the mouth in the vicinity of Perch Creek? These would allow for more accurate boundaries to assess hydrological effects.	The local study area (LSA) for hydrology and surface water quality is shown in Figure 5.4.1-1 of the final Environmental Impact Statement (EIS). The LSA include Perch Lake and Perch Creek and those adjacent wetlands and swamps that are potentially affected by the Project. The Regional Study Area (RSA) for hydrology and surface water quality has been expanded to include the reach of the Ottawa River extending 8 km downstream of the CRL site. The expanded RSA allows for a more complete assessment of effects as recommended by the reviewer and is shown in Figure 5.4.1-1 of the final EIS. The regional study areas for Geology/Hydrogeology, Aquatic Environment, Ambient Radioactivity and Ecological Health, Public Health and Land and Resource use have also been expanded to include the reach of the Ottawa River extending 8 km downstream of CRL.
CNL-ND433	MNO (August 16, 2017)	**5.4.2.4 Description of the Environment, 5.4.2.4.1 Ottawa River, Page 5-196** "Measurable incremental effects on the water quality in the Ottawa River is not expected…" Why are there concluding statements such as this in the description of the environment? Shouldn't the description of the environment simply detail the current conditions with no assessment?	It is acceptable to provide concluding statements on current impacts of CRL operations on the baseline environment. Canadian Nuclear Laboratories conducts an Environmental Risk Assessment [1] on the impacts of site operations on a five year cycle. The Environmental Risk Assessment was most recently updated in January 2019. The Environmental Risk Assessment and on-going monitoring are the basis for conclusions drawn on impacts from current CRL site operations. Canadian Nuclear Laboratories also notes that the description of Ottawa River water quality provided in Section 5.4.2.4.1 of the final Environmental Impact Statement (EIS) has been updated to provide more recent baseline data for the Ottawa River. Reference: [1] Environmental Risk Assessment of Chalk River Laboratories, ENVP-509220-REPT-003.
CNL-ND434	MNO (August 16, 2017)	**5.4.2.6.2.1 No Linkage Pathways, Page 5-205** "There is no discharge of treated domestic sewage into Perch Lake or Perch Creek."	There is no discharge of treated domestic sewage into Perch Lake or Perch Creek tributaries and associated wetlands.

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

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		This section specifies that there is no discharge of treated domestic sewage into Perch Lake or Perch Creek; however, it is silent on discharge into associated tributaries and wetlands. Please confirm.	The strategy for managing domestic sewage generated at the NSDF Site is described in Section 3.4.4.4 of the final Environmental Impact Statement (EIS). Domestic sewage will be managed through a gravity sewer network connected to two septic tanks, one located at the north entrance to the site and the second located at the south entrance. There will also be two leach fields near the north and south entrances.
CNL-ND435	MNO (August 16, 2017)	**5.4.2.6.2.2 Secondary Pathways, Page 5-209** "…the use of explosive for the development of the ECM in the proposed NSDF Project is considered to potentially influence runoff quality with respect to minor increases in nitrate and ammonia concentrations for a short period in the construction phase." Please clarify what is meant by 'minor' increases. How was this quantified? Please clarify what is meant by 'short period in the construction phase'. What time period does this refer to?	A Blasting Plan will be developed by the Contractor and will be prepared in compliance with DFO *Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters* [1]). Additional guidance will be obtained from the Ontario Provincial Standard Specification (OPSS) in the document OPSS 120 – *General Specification for Use of Explosives* [2]. Table 5.2.1-8 of the final Environmental Impact Statement (EIS) summarizes the effects pathways of NSDF construction, including blasting, on air quality Valued Components (VCs). Because blasting may generate dust that can potentially affect air quality, dust monitoring will be included in the Environmental Assessment Follow Up Monitoring Program (EAFMP) as part of verification of air quality assessment results. Minor increases in nitrate and ammonia concentrations may occur in soil quality (i.e., from dust deposition), however, any run-off in contact with blasting residues at the NSDF Project site will be managed according to the Surface Water Management Plan (e.g., directed to surface water management ponds and associated systems to enhance settling of particulates in the ponds) during the construction phase. Although the term minor cannot be exactly quantified, the definition of a minor change is such that the change can be measured and remain below applicable guidelines. With the adherence to the DFO Guidelines and the OPSS Guidelines, changes in water quality would remain below the applicable guidelines for nitrate and ammonia for protection of the aquatic life. Blasting activities and mitigation measures for surface water quality are described in Section 5.4.2.5.2.1 of the final EIS. They have been classified as a no linkage pathway in the final EIS as no residual effects on surface water quality are predicted. With regards to what is meant by 'short period in the construction phase': blasting operations will be limited to the excavation of bedrock at the beginning of construction. The construction phase will occur over a two- to three-year duration. Blasting activities, therefore, will take place during a short period relative to the 50-year operation of the NSDF. The exact duration of blasting activities is not yet known and will be determined by the contractor executing the work. References: [1] Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian technical report of fisheries and aquatic sciences 2107. DFO, Wright DG, Hopky GE. 1998. [2] Ontario Provincial Standard Specification (OPSS) in the document OPSS 120 – General Specification for Use of Explosives, 2014 November.
CNL-ND436	MNO (August 16, 2017)	**5.4.2.7.2.2 Model Results Summary and Discussion, Page 5-227** "The Ottawa River is expected to adequately rapidly assimilate any discharge from the Perch lake Watershed under all scenarios to existing conditions in the river, such that aquatic life and drinking water sources are unlikely to be affected."	The surface water quality modelling assessment has been revised and a technical supporting document Surface Water Quality Assessment for the NSDF [1] issued to provide additional information on data sets, modelling and assumptions. Section 5.4.2.6 of the final Environmental Impact Statement (EIS) provides a description of the updated surface water quality model data, modelling and assumptions. Table 5.4.2-8 to 5.4.2-15 of the final EIS provide the modelling results for a select group of Constituents of Potential Concern (COPCs) based on discernible trends in the results. The surface water

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		It is unclear how this conclusion was reached. Particularly as Cadmium, Mercury and Barium concentrations had BV exceedances during scenarios. There is no detail provided on how the Ottawa river would assimilate the discharge and how this would make aquatic life and drinking water sources unlikely to be affected. More information is needed including the data sets, modelling and the assumptions CNL applied to those models in order to reach the conclusions identified within the EIS.	quality modelling results for each of the screened non-radiological and radiological COPCs are presented in the Surface Water Quality Technical Supporting document. The revised model includes predictions of concentrations in the Ottawa River at a point 8 km downstream of the Chalk River Laboratories (CRL) site under fully mixed conditions. With the exception of parameters such as aluminum and copper which have baseline concentrations exceeding risk benchmark values, predicted concentrations in the Ottawa River are below risk benchmarks (see Section 5.4.2.9 of the final EIS). With regards to cadmium, mercury and barium. Table 3.4.2-3 of the final EIS shows the predicted concentrations of these constituents in wastewater and effluent discharge targets which are the most restrictive of federal and provincial guidelines for protection of aquatic biota. None of barium, cadmium or mercury are expected to exceed discharge targets. Baseline barium concentrations in surface water in the Perch Lake watershed are elevated and exceed guidelines for protection of aquatic life. The elevated baseline concentrations are the reason for elevated predictions of barium by the surface water model (See Section 3.1 of the Technical Support Document for Surface Water Quality [1]). Additional information on surface water modelling is provided below. 1) Release of non-radiological constituents to surface water from the NSDF is limited by the non-radiological inventory. Limits have been placed on non-radiological inventory of the NSDF as per Section 3.3.1.3.1 of the final EIS. As a waste disposal facility, the NSDF will follow the guidelines of Ontario's Regulation 347, *General – Waste Management* [2], for acceptable quantities and concentrations of metals, organics, and chemical compounds to limit the leaching potential of the facility. 2) The effluent discharge targets for non-radioactive constituents are the most restrictive of CCME Guidelines for protection of Aquatic Life or the Ontario Water Quality Objectives. For constituents where CCME or Ontario Water Quality Objectives were not available other provincial or toxicological benchmarks were selected. The effluent discharge target for radiological constituents is the maximum concentration in drinking water with the exception of tritium. The effluent discharge target for tritium is set to ensure that tritium concentration in Perch Creek do not exceed the maximum concentration in drinking water of 7,000 Bq/L. Further information is provided in Section 3.4.2.5.1 of the final EIS. 3) Additional baseline data on surface water quality in the Perch Lake watershed was collected in the summer of 2018 to provide up to current data for all parameters. The baseline data is provided in Tables 3-1 to Table 3-39 of the Technical Support Document [1]. Further the number of non-radiological parameters assessed has been expanded from 13 to 34. 4) For the majority of the non-radiological constituents in the assessment, the maximum projected wastewater concentration was lower than the effluent discharge target (e.g., antimony). Although in this situation targeted treatment of this COPC would not be required prior to discharge, mass loading inputs to the water quality model for the operational discharge scenarios used the effluent discharge target. This approach applied a high level of conservatism to the modelling assessment. 5) Model scenarios have been updated to reflect the revised effluent management strategy. Treated effluent will be directed to the Exfiltration Gallery and to Perch Lake. Section 5.4.2.6.1.2 (Model Scenarios) of the final EIS, describes the two discharge scenarios used in the surface water quality modelling assessment. These are Scenario 1) 50% discharge to Exfiltration Gallery and 50% discharge to Perch Lake and, Scenario 2) 0% discharge to Exfiltration Gallery and 100% discharge to Perch Lake. 6) Potential release of contaminants from the Engineered Containment Mound (ECM) to surface water (i.e., Perch Creek) which during the post-closure phase are assessed in the Post-Closure Safety Assessment [3]. Within the

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			PostSA, Section 5 outlines the models used to represent the scenarios assessment as well as the parameters and values used in these models. Section 5.7.6 of the final EIS provides a summary of potential impacts on surface water quality and aquatic life. No residual effects are predicted. References: [1] Surface Water Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-007. [2] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347 [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND437	Dominique Bherer (August 16, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* D'après la carte des sols de l'Ontario, la composition du sol au site de Chalk River est le sable et le gravier, qui ne sont pas imperméables et ne constituent donc pas un choix souhaité pour une installation comme celle qui est proposée. Cela ne facilite que l'infiltration de contaminants potentiels, non seulement verticalement, mais aussi horizontalement.	Le risque de migration de contaminants échappés du monticule de confinement artificiel (MCA) via l'écoulement des eaux souterraines est évalué dans l'évaluation de la sûreté après la fermeture [1]. L'évaluation de la sûreté après la fermeture envisage la défaillance des barrières artificielles pendant la phase de post fermeture et la propagation de contaminants dans la géosphère compte tenu de leur capacité à s'infiltrer dans les eaux souterraines. Ce scénario est dit scénario d'évolution normale. Sont également évalués les événements perturbateurs comme une érosion excessive de la couverture ou une défaillance localisée de la couverture et du revêtement de base. La section 5 du document présente les modèles employés pour représenter l'évaluation des scénarios ainsi que les paramètres et les valeurs employés dans ces modèles. La section 6 du document est une analyse des résultats et des doses pour les récepteurs humains [1]. La section 5.8.6.1.2.2 de l'Étude d'impact environnemental (EIE) définitive fournit un résumé de ces résultats. On ne prévoit pas d'effets résiduels sur la santé humaine. L'EREco [2] fournit une évaluation quantitative de la dose radiologique selon l'évolution prévue du site et de l'installation et selon d'autres hypothèses d'évolution du site envisagées dans l'évaluation de la sûreté après la fermeture, selon les voies de contamination touchant le biote non humain. Des situations improbables et extrêmes sont aussi envisagées. L'évaluation et les résultats de ces scénarios sont présentés à la section 5.7.6 de l'EIE.Aucun effet résiduel sur la santé humain n'est prédit. Références [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Évaluation des risques écologiques (EREco) liés au projet d'IGDPS, 232-121240-ASD-001.
CNL-ND438	Anna Tilman (August 11, 2017)	Undue reliance is being placed on the proposed Surface Water Management Plan to limit changes to downstream discharge, water levels, and channel/bank stability in Perch Creek. However, there is no indication as to what limits would be considered as acceptable or by whom. Why is the Plan restricted to mitigating the effects of the NSDF Project on the flow of non-contact surface water due to construction and closure? The expectation that this plan is predicted to result in "negligible residual effects" to hydrology is unfounded. Models and forecasts of events such as a 1:1000-year or regional storm events and climate change should be continuously updated. The Surface Water Monitoring Plan should be updated on a regular basis. There is a lack of monitoring plans for excessive storm events, water level elevations.	The surface water management plan has been updated [1]. Surface Water Management of non-contact water is described in Section 3.4.4.5 of the final Environmental Impact Statement (EIS); management of contact water, that is water that has come into contact with waste and treated at the Wastewater Treatment Plant (WWTP), is described in Section 3.4.2 of the final EIS. Potential impacts from the NSDF Project on downstream discharge, water levels and channel bank stability is assessed in Section 5.4.1.6.2 of the final EIS. The assessment of effects addresses all phases of the project: construction, operations and closure/post closure. The surface water management system consists of four main elements: collection; conveyance (i.e., internal ditches, culverts etc.), three stormwater management ponds to treat stormwater; and outlets to receiving wetlands. The design objectives of the surface water management system are to mitigate erosion; control quantity of discharge to maintain pre-development peak flow rates; and to provide treatment of non-contact water to meet requirements of the Ontario Ministry of Environment,

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			Conservation and Parks by facilitating settlement of suspended sediment and ultimately protecting receiving watercourses and water bodies. Limits on Downstream Discharge, Water Levels and Channel Bank Stability in Perch Creek and Assessment of Impacts The stormwater management system is designed to control the quantity of surface water discharge from the NSDF site to maintain pre-development peak flow rates for the NSDF site. The analysis of peak run-off flow rates for the pre-development and post development conditions for 1:2 year through to 1:100 year storm events are provided in Section 5.4.1.6.2 of the final EIS. The analysis is provided for the three stormwater management ponds. Overall flow rates are maintained to meet pre-development levels, preventing erosion rates in receiving water bodies due to increased discharge rates. The three surface water management ponds discharge on the NSDF site. The discharge although on the NSDF site is ultimately to the adjacent wetlands and will be dispersed by level spreaders to achieve even flow distribution to the wetlands. There is no limit with regard to water levels. Groundwater modelling predicts that maximum changes to water levels from stormwater discharges will be approximately 2 m and will be limited to the immediate proximity of the stormwater management ponds (Section 5.3.2.6.1.2 of the final EIS). Water table elevation in the wetlands will be monitored to confirm that the ecological function of the wetlands is maintained. With regards to effects of the NSDF Project on Perch Creek flow rates. The NSDF Project is located within a relatively small area (5.1%) of the total contributing basin area for Perch Creek. Any changes to existing drainage patterns will largely be restricted to this small sub-basin. Because the NSDF Project only affects approximately 5% of the watershed draining to Perch Creek, impacts on Perch Creek flow rates, water levels and bank stability are predicted to be negligible. Surface Water Management of Contact Water The analysis of impacts on management of contact water on water levels is addressed in Section 5.4.1.5.2.2 of the final EIS. Contact water will be treated at the Wastewater Treatment Plant (WWTP). The treated effluent from the WWTP will be discharged to an exfiltration gallery or alternatively directly to Perch Lake when discharge to the exfiltration gallery is not possible because of high seasonal groundwater conditions. The total annual volume of water to be treated is 11,000 m^3 and represents approximately 0.6% of the average total outflow from Perch Creek. Effects on Perch Creek water flows are therefore predicted to be negligible. The exfiltration gallery is located on the NSDF site adjacent to a wetland. The potential impact of the discharge to the exfiltration gallery on water table elevations has been assessed. A localized increase of 1 m compared to current conditions is predicted. Design Basis for the Surface Water Management Infrastructure Different design storms were used as part of the NSDF design analysis to evaluate different design requirements (such as quality control, quantity control and structural integrity), as such there is no single storm event that is used for design analysis of any one feature. All NSDF water collection and conveyance systems, including the final cover, are typically designed to resist erosion, safely convey flows and maintain structural integrity during peak flows generated from various design storms up to a Probable Maximum Precipitation (PMP) storm event. The Surface Water Management Ponds are designed to mitigate storm water peak run-off flows and improve the quality of the run-off (i.e., removal of Total Suspended Sediments [TSS]). The SWMPs are designed to control run-off and attenuate flows to pre-development conditions from each of the:

<table>
<tr><th>Number</th><th>Source</th><th>Comment Summary
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Synthèse des commentaires
(toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)</th><th>Response (to be completed by CNL)

Réponse (à remplir par la LNC)</th></tr>
<tr><td></td><td></td><td></td><td>100-year 24-hour precipitation event,
100-year 24-hour precipitation event with snow melt;
100-year 24-hour event with climate change considered (i.e., increasing 100-year precipitation event by 25%); and
the regional design storm (Timmins Event) to be below that expected during the same event under current site conditions to mitigate impacts downstream such as flooding and erosion.
The SWMPs and upstream conveyance features (including the final cover during the Post-Closure period) are also designed to safely convey water from larger storms (such as the PMP event) without sustaining significant damage. This prevents high TSS loading in the pond influent.

<u>Surface Water Monitoring</u>
The commenter expressed the concern that there is a lack of monitoring for excessive storm events and water level elevations. Canadian Nuclear Laboratories (CNL) has been monitoring groundwater levels in the wetlands for several decades and has a good understanding of variability in water table elevations. Real time continuous water table elevation monitoring has been initiated to provide further information on variability in water level elevations.

The conceptual monitoring and follow-up program is described in Section 5.4.1.8 of the final EIS. The monitoring elements include monitoring of water levels at the Surface Water Management Ponds and monitoring of wetland elevations and surface water flows to verify changes.

The surface water monitoring will be evaluated based on periodic review of monitoring data and modified as necessary following adaptive management principles. .

Reference:
[1] Surface Water Management Plan, 232-508600-PLA-002.</td></tr>
<tr><td>CNL-ND460</td><td>Kerrie Blaise, CELA
(August 15, 2017)</td><td>Section 4.2 of the PA report states that a drinking water limit of 7,000 Bq per litre is used in the assessment. This is extremely lax given the current recommendation of the Ontario Drinking Water Advisory Council (ODWAC) of 20 Bq per litre.5 CELA considers that the safer recommended tritium limit of 20 Bq per litre should be used throughout the proposals.

[Refer to page 21, Table 2 from CELA submission].</td><td>The 7,000 Bq/L value for tritium represents the maximum acceptable concentration of tritium in drinking water recommended by Health Canada [1]. Health Canada's guideline is based on the recommendations of the International Commission on Radiological Protection (ICRP) and the World Health Organization (WHO).

For information on tritium levels and how they are regulated, please visit the Canadian Nuclear Safety Commissioning (CNSC) website at http://nuclearsafety.gc.ca/eng/resources/health/tritium/tritium-in-drinking-water.cfm

Additional information is available through the following CNSC links:
Tritium Fact Sheet
FAQ:Tritium
Other resources are available through the CNSC's tritium studies pages at:
http://nuclearsafety.gc.ca/eng/resources/health/tritium/tritium_studies.cfm

Canadian Nuclear Laboratories (CNL) ensures the criteria for acceptability are based on the current regulatory limits or guidelines.</td></tr>
</table>

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			Reference: [1] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3
		Environmental Effects – Terrestrial Environment	
CNL-ND461	Kitigan Zibi Anishinabeg (May 11, 2017) Jennifer Jimmo (August 16, 2017)	We are also alarmed by the planned destruction of critical habitat for the Blanding's Turtle, which has been identified within the perimeter of the proposed disposal facility. All turtles are culturally very significant for the Anishinabeg people, and the protection of species at risk is highly important to our community.	Blanding's turtle conservation is also highly important to Canadian Nuclear Laboratories (CNL). Since 2009, CNL is conducting Blanding' Turtle survey to better understand the population estimate and movement pattern on the Chalk River Laboratories (CRL) site. This work is building on the work conducted in 2014 and 2015 where several individuals have been tracked to understand their movement over the entire life cycle. The small population of the CRL site has been studied for almost a decade now and we do have a good understanding of movement pattern and habitat use. This species at risk is regulated under the Federal Species At Risk Act (SARA) and, as such, Environment and ECCC and the Canadian Wildlife Service are in discussions with CNL, to determine the best way to avoid all inadvertent harm, harassment or killing of individuals of the population of Blanding's turtles that inhabit the areas around the perimeter of the proposed NSDF site as well as within the entire CRL site. Species at Risk, including the Blanding's Turtle, were exclusion criteria for the overall site selection of the NSDF (Section 2.5.5.3 of final Environmental Impact Statement (EIS)). The preferred East Mattawa Road (EMR) site does not appear to fragment the Blanding's turtle habitat, development at the EMR site may encroach on some portion of the species terrestrial habitat. The Alternate site evaluated as part of the alternative means encroaches on the Blanding's turtles travelling corridor within the CRL site, which would potentially cause a slight fragmentation between habitats and may increase the potential for road mortality. As part of the NSDF Project approximately 37 hectares out of 2,788 hectares of critical habitat present at the CRL site is proposed to be removed (Table 5.6.4-10 of final EIS). The critical habitat is defined in the species' Recovery Strategy (Environment Canada 2018). The definition in the proposed Recovery Strategy is based on average Blanding's turtle home range size in Ontario and Quebec. The proposed NSDF Project site lies within critical habitat as defined in the Recovery Strategy. Blanding's Turtle individuals are known to travel extensively on land to move between wintering sites, nesting sites and summer areas. For this reason, the critical habitat for the species required for its entire life cycle is fairly large. For this reason, CNL has been investigating, the movement patterns and home ranges of the small CRL population. From the data collected since 2009, CNL is confident that the critical habitat proposed to be removed is not a highly use habitat by the species, in fact surveys conducted in the area never detected any Blanding's Turtle individuals or nests in the Project footprint. Although the species has never been observed in this part of the site, CNL is adopting a precautionary approach and is planning on implementing stringent mitigation measures during the construction phase that includes, timing restrictions, exclusion fencing and conservation buffers. These buffers will provide adequate protection during the construction and operation phased of the Project. With the implementation of additional mitigation measures, residual effects on Blanding's turtle are assessed to be not significant. The analysis and determination of significance is provided in Section 5.6.7.8 (Blanding's Turtle) of the final EIS. A summary is provided below. Blanding's Turtle A detailed analysis of the current conditions and the current impact on the CRL Blanding's Turtle population was conducted and determine that the habitat availability at CRL and current traffic conditions at CRL could function as a population sink

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			because turtles are attracted to the abundant habitat on the CRL site but may suffer high rates of road mortality. For this reason, CNL started implementing a detailed Blanding's Turtle Road Mortality Mitigation Plan in 2019, and will continue to implement the plan moving forward. The Blanding's Turtle Road Mortality Mitigation Plan is designed to reduce or eliminate the current turtle road mortality at CRL and increase connectivity among habitats. Among other things, four major culverts will be replaced in the spring of 2020 and converted to proper turtle crossing using large box culverts in three locations and an open-top culvert in another along with proposer fencing and escape ramps. Nesting mounds will also be provided at each of the locations to reduce the need for adult female to travel long distance in search of a suitable nesting habitats. With the implementation of the comprehensive mitigation outlined in the Blanding's Turtle Road Mortality Mitigation Plan, along with monitoring and adaptive management, CNL's activities in the RSA are predicted to have a net neutral or positive effect on the local Blanding's turtle population under the current conditions. That is, the mitigation that is and will be implemented on the CRL site is considered sufficient to limit and offset mortality from previous an existing anthropogenic activities in the RSA. Potential effects associated with critical habitat loss have been identified according to a precautionary approach. The importance of effects may be overestimated because the occupancy of critical habitat identified in the SSA remains unconfirmed despite considerable survey effort. To mitigate these potential effects, CNL will create new nesting mounds on both sides of culverts to be replaced as part of this project. Nest mounds will be monitored weekly during the nesting season and after periods of rain. Maintenance of these mounds (e.g., vegetation removal) will also be completed at this time, if females are not present. The NSDF Project could result in a change in movement patterns at the local scale because the SSA will be surrounded by a fence that will exclude wildlife from accessing the site. The interruption or barrier to Blanding's Turtles moving through the SSA will result in the need to travel longer distances around the SSA in search of resources and could increase their risk of injury or mortality on roads. Potential effects associated with changes to habitat connectivity have been identified according to a precautionary approach. The importance of effects may be overestimated because the main migration corridors will remain intact within the LSA and RSA, and the use of the SSA as a movement route remains undocumented despite considerable survey effort, including a two-year telemetry study. The mortality of adult turtles, specifically mature females, decreases recruitment and long-term sustainability of subpopulations. High adult survivorship rates are a key requirement of sustainable turtle populations. A long-term demographic study of a Blanding's turtle population on the E.S. George Reserve in Michigan indicates that modest increases (2% to 3%) in annual adult mortality are likely more than this species can absorb and still maintain positive population growth rates. Therefore, if this effect goes unmitigated or improperly mitigated and Blanding's turtle mortality increases due to the NSDF Project, then this could have a significant effect on the sustainability of the population that overlaps with the RSA. The increase in traffic related to the NSDF Project and consequently the risk of road injury or mortality will be mitigated through replacing and enhancing habitat at four additional culverts; installing permanent exclusion fencing in reptile hotspots along Plant Road, using a "sentinel" to drive in front of big trucks that travel along Plant Road, ER3 Road, and East Mattawa Road; and completing additional monitoring for turtles along Plant Road during peak traffic hours. The risk of road mortality is predicted to still be present, but road mitigation implemented both before and during the construction of the NSDF Project has the potential to reduce mortality relative to existing conditions, even with increased traffic volume.

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			The weight of evidence suggests that, with mitigation committed to by CNL, effects from the NSDF Project will not jeopardize the survival of the regional Blanding's turtle population. With sufficient mitigation implemented at the CRL site, reductions in Blanding's turtle road mortality are possible, even with increased traffic volumes associated with the NSDF Project. Moreover, critical habitat will be assessed annually to ensure no significant loss at CRL and to highlight compensation measures initiated at CRL or elsewhere (see Section 5.6.8 of the final EIS).
CNL-ND462	Joan Lougheed and Town of Deep River (August 16, 2017)	In Section 5.6.3.1 and Figure 5.6.3-1 the southern portion of the RSA has been limited to the CRL boundary line with Garrison Petawawa. The rationale for excluding the extension of the southern limit into the lands of Garrison Petawawa (comparable to that done for the Aquatic Environment (Section 5.5, Figure 5.5.3-1) is not obvious. The RSA should be extended or a more thorough explanation as to why this is deemed unnecessary must be provided.	The rationale for extending the southern limit of the Aquatic Environment Regional Study Area (RSA) to include the Garrison Petawawa was to capture the spatial extent of the Perch Lake Watershed. This rationale does not apply to the terrestrial assessment. The terrestrial RSA used in the final Environmental Impact Statement (EIS) captures the potential effects of the NSDF Project to terrestrial Valued Components (VCs). The RSA covers all of the Chalk River Laboratories (CRL) Site and is large enough to provide relevant context about the abundance and distribution of habitats available to terrestrial VCs that may be affected by the NSDF Project. Moreover, measurable residual effects on aquatic biodiversity VCs were not predicted as a result of the NSDF Project. The EA process is iterative and, had residual effects on the aquatic environment that has been identified, their potential to interact with terrestrial biodiversity would have been evaluated and a larger RSA would have been considered.
CNL-ND463	Joan Lougheed and Town of Deep River (August 16, 2017) Emma March (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The draft EIS identifies 24 wildlife species at the CRL site as "species at risk" under the Species At Risk Act, S.C. 2002, c 29 ("SARA"). This includes: four species of turtles, four species of bats, song birds, the eastern milk snake, the eastern whip-poor-will, the western chorus frog, and the monarch butterfly (see pg.2-36). Following an assessment of the above referenced species at risk and their environments, the draft EIS concludes "Based on the evaluation, each of the residual adverse effects was assessed to be not significant, with the exception of bats and Blanding's turtle11 (see pg. 11-1). The changes to the bat and Blanding's turtle habitats imposed by the NSDF would appear to have a significant effect on the environment for these species. Specifically, the draft EIS reveals the NSDF would result in a permanent loss of 25 hectares of "high quality maternal roost habitat" for bats (see pg. 8-8,Table 8.0-1), and for Blanding's turtle, a permanent loss of 22 hectares of "critical habitat" as defined in the SARA and a permanent change in movement corridors between Blanding's turtle habitat patches (see pg.8-9, Table 8.0-1) Notwithstanding this permanent loss of critical habitat (pursuant to a permit issued under Section 73 of the SARA), among other adverse effects that are described in the draft EIS, the draft EIS concludes for bats and the Blanding's turtle "significant adverse effects are related to the external conditions for these species and not due to the NSDF project" (see pg. 11-2, para 11.0). In addition, the draft EIS concludes, "the NSDF project will contribute a small increment to existing significant adverse cumulative effects on these [bats and the Blanding's turtle] species" (see pg. 11-2).	Canadian Nuclear Laboratories (CNL) has conducted further studies on the potential impact to bats and Blanding's turtle from the construction of a NSDF, and identified additional mitigation measures. With the implementation of additional mitigation measures, residual effects on bats and Blanding's turtle are assessed to be not significant. The analysis and determination of significance is provided in Section 5.6.7.7 (Bats) and Section 5.6.7.8 (Blanding's Turtle) of the final Environmental Impact Statement (EIS). A summary is provided below. Blanding's Turtle A detailed analysis of the current conditions and the current impact on the Chalk River Laboratories (CRL) site Blanding's Turtle population was conducted and determine that the habitat availability at the CRL site and current traffic conditions at CRL could function as a population sink because turtles are attracted to the abundant habitat on the CRL site but may suffer high rates of road mortality. For this reason, CNL started implementing a detailed Blanding's Turtle Road Mortality Mitigation Plan in 2019, and will continue to implement the plan moving forward. The Blanding's Turtle Road Mortality Mitigation Plan is designed to reduce or eliminate the current turtle road mortality at CRL and increase connectivity among habitats. Among other things, four major culverts will be replaced in the spring of 2020 and converted to proper turtle crossing using large box culverts in three locations and an open-top culvert in another along with proposer fencing and escape ramps. Nesting mounds will also be provided at each of the locations to reduce the need for adult female to travel long distance in search of a suitable nesting habitats. With the implementation of the comprehensive mitigation outlined in the Blanding's Turtle Road Mortality Mitigation Plan, along with monitoring and adaptive management, CNL's activities in the RSA are predicted to have a net neutral or positive effect on the local Blanding's turtle population under the current conditions. That is, the mitigation that is and will be implemented on the CRL site is considered sufficient to limit and offset mortality from previous an existing anthropogenic activities in the RSA. Potential effects associated with critical habitat loss have been identified according to a precautionary approach. The importance of effects may be overestimated because the occupancy of critical habitat identified in the SSA remains unconfirmed despite considerable survey effort. To mitigate these potential effects, CNL will create new nesting mounds on

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		Given the loss of habitat and permanent changes to the habitat distribution because of the NSDF project footprint, CNL's conclusions are not persuasive. As such, notwithstanding the mitigation measures outlined in Table 8.0-1, Deep River encourages the CNSC to consider whether additional measures could be taken by CNL to better protect the bats and Blanding's turtles.	both sides of culverts to be replaced as part of this project. Nest mounds will be monitored weekly during the nesting season and after periods of rain. Maintenance of these mounds (e.g., vegetation removal) will also be completed at this time, if females are not present. The NSDF Project could result in a change in movement patterns at the local scale because the SSA will be surrounded by a fence that will exclude wildlife from accessing the site. The interruption or barrier to Blanding's Turtles moving through the SSA will result in the need to travel longer distances around the SSA in search of resources and could increase their risk of injury or mortality on roads. Potential effects associated with changes to habitat connectivity have been identified according to a precautionary approach. The importance of effects may be overestimated because the main migration corridors will remain intact within the LSA and RSA, and the use of the SSA as a movement route remains undocumented despite considerable survey effort, including a two-year telemetry study. The mortality of adult turtles, specifically mature females, decreases recruitment and long-term sustainability of subpopulations. High adult survivorship rates are a key requirement of sustainable turtle populations. A long-term demographic study of a Blanding's turtle population on the E.S. George Reserve in Michigan indicates that modest increases (2% to 3%) in annual adult mortality are likely more than this species can absorb and still maintain positive population growth rates. Therefore, if this effect goes unmitigated or improperly mitigated and Blanding's turtle mortality increases due to the NSDF Project, then this could have a significant effect on the sustainability of the population that overlaps with the RSA. The increase in traffic related to the NSDF Project and consequently the risk of road injury or mortality will be mitigated through replacing and enhancing habitat at four additional culverts; installing permanent exclusion fencing in reptile hotspots along Plant Road, using a "sentinel" to drive in front of big trucks that travel along Plant Road, ER3 Road, and East Mattawa Road; and completing additional monitoring for turtles along Plant Road during peak traffic hours. The risk of road mortality is predicted to still be present, but road mitigation implemented both before and during the construction of the NSDF Project has the potential to reduce mortality relative to existing conditions, even with increased traffic volume. The weight of evidence suggests that, with mitigation committed to by CNL, effects from the NSDF Project will not jeopardize the survival of the regional Blanding's turtle population. With sufficient mitigation implemented at the CRL site, reductions in Blanding's turtle road mortality are possible, even with increased traffic volumes associated with the NSDF Project. Moreover, critical habitat will be assessed annually to ensure no significant loss at CRL and to highlight compensation measures initiated at CRL or elsewhere (see Section 5.6.8 of the final EIS). Bats Similar to the Blanding's Turtle, CNL had a closer look at the potential impact from the NSDF Project on the CRL bat population in the final EIS. Populations of Little Brown Myotis, Northern Myotis and Tri-colored bats that overlap the RSA are highly sensitive to changes in survival and reproduction because White-Nose Syndrome (WNS) has resulted in dramatic declines of these species across the eastern portions of their Canadian range, which includes the RSA. Because of their rapidly declining populations, these species are more vulnerable to additional threats, including changes in habitat availability, distribution, or other factors affecting the survival and reproduction of the remaining individuals. Therefore, the existing level of pressure on these bat species in the Base Case has likely already exceeded their resilience and adaptability limits. The grouping behaviour shown by bats in maternity roosts also makes them more sensitive to the loss of certain habitat features because the removal of relatively small numbers of habitat features, such as snags, can have a disproportionately large effect on local

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			populations, if large numbers of bats previously congregated in snags that will be permanently removed. However, because WNS is such a strong limiting factor that overrides other potential causes of decline, maternity roosting habitat availability is not likely a limiting factor, at least not in places where such habitat is abundant, such as within the RSA. In the RSA, relatively undisturbed, mature forest stands are available and interspersed with numerous small lakes and wetland areas, which represent high quality and widely available foraging habitat. All three species are inherently resilient to changes in their habitat based on their high degree of mobility, and one of the three species, Little Brown Myotis, is well adapted to human disturbance, commonly using human structures for maternity roosting habitat and confirmed using the bat boxes at the CRL site, including as maternity roosts. Northern Myotis have been recorded to roost in bat boxes (Whitaker et al. 2006) and Tri-colored bats will possibly roost in anthropogenic structures, but not as commonly as Little Brown Myotis. Rapid declines in abundance due to WNS may have already exceeded the resilience and adaptability limits of bats in the Base Case. Therefore, in the Base Case, Little Brown Myotis, Northern Myotis and Tri-colored bat populations that overlap with the RSA are considered unlikely to be self-sustaining or ecologically effective. Consequently, the cumulative effects of existing disturbance and especially the introduced WNS are considered significant in the Base Case. In order to provide appropriate protection it is necessary to understand where roosts are, the number of individuals using these roosts as well as specific habitat requirements. Over the course of two years, 2019 and 2020, CNL will be conducting a research project which will involve mist netting for all three federally listed bat species and affixing radio transmitters to select individuals. These individuals will be tracked to their maternity roosts and these roosts will be monitored for activity levels to determine the size and importance of each roost. In addition to determining the location of maternity roosts, the type of habitat being used for each roost will be assessed. The field work has started in 2019 and resulted in 20 bats being captured and suitable to be fitted with a radio-transmitter. Those bats led to the identification of 15 different roost treed composed mainly of large-tooth aspen (*Populus grandidendata*). This information will not only allow for increased protection of maternity roosts on the CRL site but will also aid in protecting the species at a larger landscape level as the research conducted will increase the knowledge of local specific habitat requirements. With a greater understanding of important biophysical attributes at the landscape scale these elements can be protected which will allow for preservation of important summer roosting habitat. This information will be used for the development of a Sustainable Forest Management Plan at CRL to ensure the maintenance of adequate bat habitat. In the Application Case, the NSDF Project will remove a small amount of roosting habitat. Importantly, because vegetation clearing and blasting will be undertaken outside of the maternity roosting season, no mortality of roosting bats is expected as a result of the NSDF Project and effects of the NSDF Project to survival and reproduction are considered neutral. The SSA will permanently remove 28 ha of potential maternity roosting habitat. This represents approximately 30% of available maternity roosting habitat in the LSA and 1% in the RSA. Additional areas of roosting habitat in the LSA that are immediately adjacent to the SSA may also be avoided due to sensory disturbance during the construction and operations phases of the NSDF Project. The NSDF Project may also result in changes in local movement patterns by widening existing gaps in the forest canopy created by East Mattawa Road and the two hydroelectric corridors, and installation of a six-foot high perimeter fence. These local-scale changes are not expected to alter the extent of populations that overlap with the RSA because bats are highly mobile and capable of long commute distances, well beyond the boundaries of the RSA. The remaining availability of potential maternity roosting habitat in the Application Case is not likely a limiting factor in the RSA, and CNL has committed to mitigation such as bat boxes and a comprehensive Sustainable Forest Management Plan.

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			Therefore, the contribution of the NSDF Project to the existing significant adverse cumulative effect to bats is predicted to be negligible (i.e., no detectable changes to bat populations), and the Project does not contribute to the spread of WNS, which is the primary driver of the existing significant adverse cumulative effect. Overall, the weight of evidence from the analysis of primary pathways predicts that changes to bat habitat availability, habitat distribution, and survival and reproduction in the RSA as a result of the NSDF Project are expected to result in no detectible adverse effect to bat population in the RSA. In addition, CNL had implemented and committed to mitigation that may offset the potential adverse effects of the NSDF Project. Therefore, the contribution of the NSDF Project is not significant, nor is it expected to contribute to potential future adverse effects associated with climate change.
CNL-ND464	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	There are discrepancies regarding species at risk inventories and no detailed plans for mitigation of endangered species such as the Blanding's Turtle. There is more detail in Appendix 2, page 8 of Ottawa Riverkeeper submission.	All SARA-listed species identified in Appendix 5.6-1 of the final Environmental Impact Statement (EIS) with confirmed observation records within the Chalk River Laboratories (CRL) site were considered as potential valued components at the species level. Each species was evaluated to determine whether its presence was likely in the Site Study Area (SSA) or the Local Study Area (LSA) defined for the terrestrial biodiversity assessment (see Section 5.6.3.1 of the final EIS). Species that are unlikely to occur in the LSA, for which habitat was not present in the LSA or for which effects of the NSDF Project were unlikely were excluded as Valued Components (VCs). Rationale for inclusion or exclusion of each species at risk identified during surveys undertaken in the CRL site is presented in Appendix 5.6-1. Canadian Nuclear Laboratories has conducted further studies on the potential impact to Blanding's turtle from the construction of a NSDF, and identified mitigation measures. With the implementation of additional mitigation measures, residual effects on Blanding's turtle is assessed to be not significant. The analysis and determination of significance is provided in Section 5.6.7.8 (Blanding's Turtle) of the final EIS. A summary is provided below. Blanding's Turtle A detailed analysis of the current conditions and the current impact on the CRL Blanding's Turtle population was conducted and determine that the habitat availability at CRL and current traffic conditions at CRL could function as a population sink because turtles are attracted to the abundant habitat on the CRL site but may suffer high rates of road mortality. For this reason, CNL started implementing a detailed Blanding's Turtle Road Mortality Mitigation Plan in 2019, and will continue to implement the plan moving forward. The Blanding's Turtle Road Mortality Mitigation Plan is designed to reduce or eliminate the current turtle road mortality at CRL and increase connectivity among habitats. Among other things, four major culverts will be replaced in the spring of 2020 and converted to proper turtle crossing using large box culverts in three locations and an open-top culvert in another along with proposer fencing and escape ramps. Nesting mounds will also be provided at each of the locations to reduce the need for adult female to travel long distance in search of a suitable nesting habitats. With the implementation of the comprehensive mitigation outlined in the Blanding's Turtle Road Mortality Mitigation Plan, along with monitoring and adaptive management, CNL's activities in the RSA are predicted to have a net neutral or positive effect on the local Blanding's turtle population under the current conditions. That is, the mitigation that is and will be implemented on the CRL site is considered sufficient to limit and offset mortality from previous an existing anthropogenic activities in the RSA. Potential effects associated with critical habitat loss have been identified according to a precautionary approach. The importance of effects may be overestimated because the occupancy of critical habitat identified in the SSA remains unconfirmed despite considerable survey effort. To mitigate these potential effects, CNL will create new nesting mounds on both sides of culverts to be replaced as part of this project. Nest mounds will be monitored weekly during the nesting season

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			and after periods of rain. Maintenance of these mounds (e.g., vegetation removal) will also be completed at this time, if females are not present. The NSDF Project could result in a change in movement patterns at the local scale because the SSA will be surrounded by a fence that will exclude wildlife from accessing the site. The interruption or barrier to Blanding's Turtles moving through the SSA will result in the need to travel longer distances around the SSA in search of resources and could increase their risk of injury or mortality on roads. Potential effects associated with changes to habitat connectivity have been identified according to a precautionary approach. The importance of effects may be overestimated because the main migration corridors will remain intact within the LSA and RSA, and the use of the SSA as a movement route remains undocumented despite considerable survey effort, including a two-year telemetry study. The mortality of adult turtles, specifically mature females, decreases recruitment and long-term sustainability of subpopulations. High adult survivorship rates are a key requirement of sustainable turtle populations. A long-term demographic study of a Blanding's turtle population on the E.S. George Reserve in Michigan indicates that modest increases (2% to 3%) in annual adult mortality are likely more than this species can absorb and still maintain positive population growth rates. Therefore, if this effect goes unmitigated or improperly mitigated and Blanding's turtle mortality increases due to the NSDF Project, then this could have a significant effect on the sustainability of the population that overlaps with the RSA. The increase in traffic related to the NSDF Project and consequently the risk of road injury or mortality will be mitigated through replacing and enhancing habitat at four additional culverts; installing permanent exclusion fencing in reptile hotspots along Plant Road, using a "sentinel" to drive in front of big trucks that travel along Plant Road, ER3, and East Mattawa Road; and completing additional monitoring for turtles along Plant Road during peak traffic hours. The risk of road mortality is predicted to still be present, but road mitigation implemented both before and during the construction of the NSDF Project has the potential to reduce mortality relative to existing conditions, even with increased traffic volume. The weight of evidence suggests that, with mitigation committed to by CNL, effects from the NSDF Project will not jeopardize the survival of the regional Blanding's turtle population. With sufficient mitigation implemented at the CRL site, reductions in Blanding's turtle road mortality are possible, even with increased traffic volumes associated with the NSDF Project. Moreover, critical habitat will be assessed annually to ensure no significant loss at CRL and to highlight compensation measures initiated at CRL or elsewhere (see Section 5.6.8 of the final EIS).
CNL-ND465	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* An ecological risk assessment has not been conducted to estimate whether risks are acute or chronic, to estimate the severity of the effects to a variety of species, the number of organisms that are at risk and the time period over which we can expect the risks to continue. For example, what are the risks to migratory waterfowl that eat fish or amphibians from Perch Lake? Or the risk to the humans who eat the waterfowl who ate the fish who ate the frog? An ecological risk assessment must be completed to adequately assess whether the proposed project will have significant impacts. The Ottawa River must be included in the study area for the assessment of impacts on the aquatic environment. More information regarding the aquatic food chain and food web dynamics will be necessary to conduct an ecological risk assessment.	The Environmental Impact Statement (EIS) assesses the risk to the environment during both the operating phase and the post-closure phase of the project. The regional study area (RSA) was expanded to include the Ottawa River in order to fully assess potential impacts to aquatic life. During the operations phase, the primary interaction between the project and biota is the discharge of treated effluent from the Wastewater Treatment Plant (WWTP) to the Perch Lake basin. The effluent discharge targets for non-radiological contaminants are sourced from federal and provincial guidelines for the protection of aquatic biota (Table 3.4.2-3 of the final EIS). Discharge targets for radionuclides (Table 3.4.2-2 of the final EIS) are the Canadian Drinking Water Guidelines with the exception of tritium for which a site-specific target is developed (Section 3.4.2.5.1). As a result of adhering to these guidelines, there is no expected residual risk, acute or chronic, to aquatic biota during the operational phase of the project. The effect of atmospheric releases during the operational phase is also addressed. The releases of radon, tritium, and Carbon-14 have been calculated to have a negligible impact on a worker inside of the Engineered Containment Mound (ECM), and are therefore also negligible to biota surrounding the facility. Airborne releases from the WWTP have been assessed to be small fractions of the CRL Derived Release Limits, which means a negligible effect to human and biota.

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			An Ecological Risk Assessment (EcoRA) document [1] was prepared for the post-closure phase as a Technical Supporting Document to the final EIS. The EcoRA provides a quantitative assessment of the radiological dose under the expected conditions of evolution of the site and disposal facility as well as for other evolutions of the site assessed within the Post-Closure Safety Assessment (PostSA) [2], which have a pathway to non-human biota. This includes unlikely and extreme conditions. Dose to non-human biota from waterborne emissions during the post-closure phase (including the institutional control period) has been assessed for the same Valued Components (VCs) as the rest of the EIS. The models used in the EcoRA include considerations of the food chain and bioaccumulation (See Section 2.6 and Figure 2-3 of the EcoRA). In addition, the risk to humans (assessed in the Post-Closure Safety Assessment (PostSA) report [2]) also includes the transfer of contaminants from biota to humans via the food chain, with conservative assumptions with respect to how much time biota spend directly on or near the NSDF site. Concentrations of contaminants are calculated for all environmental media, including the Ottawa River. These concentrations are used in the EcoRA to evaluate risk to biota. Calculated concentrations of contaminants in the Ottawa River are below the threshold for additional qualitative analysis, and therefore are considered negligible, and no effect to biota is expected. References: [1] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND466	MNO (August 16, 2017)	**Table 5.6.1-1: Summary of Issues Raised during Engagement Activities that Influenced the Scope of the Terrestrial Biodiversity Assessment** **5.6.2 Valued Components, Page 5-267 and 5-271** **Table 5.6.2-2: Assessment Endpoints and Measurement Indicators for the Terrestrial Biodiversity Assessment** The issues listed in Table 5.6.1-1 are not reflective of the concerns related to terrestrial biodiversity from the MNO's perspective. There is no discussion of hunted or trapped species (see footnote on page 36 of the Appendix A of the submission) of importance or vegetation types typically gathered; or a discussion of the habitat requirements for those species. Migratory birds, bats and blanding's turtles are not representative of species of importance for Metis hunting and trapping. There are no 'fine filter' vegetation community species listed nor are there any vegetation community species listed in Table 5.6.2-2 which are of importance to the MNO. Traditionally harvested plants typically gathered by the MNO should have been considered in this assessment. There are no Valued Components related to hunted or trapped species broadly and no 'fine filter' species identified for further assessment. A Métis specific traditional land use study should be completed to provide CNL insight into the Métis perspective on terrestrial resources.	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. This includes information on Indigenous engagement and Valued Components (VCs). Specifically, Section 6.2.4.4.2 of the final EIS outlines the main topics of interest expressed by the Métis Nation of Ontario, including the selection of valued components. Table 6.3.2-1 summarizes how the VCs were selected by Canadian Nuclear Laboratories (CN) for the NSDF Project, and assessed through Sections 5.2 to 5.10, reflect Indigenous interests. For example, Indigenous communities have identified moose, deer and bear as VCs due to traditional harvesting of these specific biota, while CNL has selected hunting as a VC to protect Indigenous traditional resource use. Selection of VCs for this project was accomplished using a coarse and fine filter approach, which considers rarity, sensitivity, uniqueness, habitat and feeding guild (i.e., species that have similar diets) in the development of a list of VCs potentially on site. The coarse filter approach ensures that a diversity of ecosystem functions is maintained over space and time, which enables an assessment of the effects on broad biodiversity. Whereas, the fine filter approach ensures that the ecological requirements of a particular species or value is considered in the assessment. Combined, the selected coarse and fine filter VCs provide a holistic approach to assessment of the potential effects of the NSDF Project on the environment. Thus, following this process, the selected VCs reflect Indigenous interests raised during the consultation and engagement process. The MNO has completed a Traditional Knowledge and Land Use (TKLUS) specifically for the NSDF and Nuclear Power Demonstration projects through funding supplied by the Canadian Nuclear Safety Commission (CNSC) and CNL. While the study only involved 11 participants, it did document significant use within its study area. Because the study only

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			involved eleven participants, the results should not be taken as the only land uses by MNO citizens in the region. (Section 6.4.3.4.2). Information on traditional land use activities by Indigenous peoples in Section 6.4 of the final EIS has been drawn from the MNO's TKLUS.
CNL-ND467	MNO (August 16, 2017)	Why were no mammals considered as part of the terrestrial assessment?	The exposure risks of mammals to contaminants were assessed in the final Environmental Impact Statement (EIS) (Table 5.7.2-1). A functioning ecosystem involves interactions of multiple species ranging in size and complexity from bacteria to apex wildlife predators. Each species is likely to respond differently to physical disturbances or different levels of contaminants present in their environment or environmental media. As such, the aquatic and terrestrial Valued Components (VCs) assessed in the NSDF Ecological Risk Assessment (EcoRA) [1] (summarized in Section 5.7 of the final EIS) were selected to assess their risk exposures in water and through ingestion of aquatic biota (predation). Wildlife species that receive most of their exposure from ingestion of terrestrial plants and animals were also considered, including mammals (Table 5.7.2-1). In the final EIS bats (mammal) were selected as a VC for the terrestrial assessment because they represent a group of three Federally endangered small mammals with the potential to be affected by the NSDF Project. Indicator Species for Ecological Health Assessment did include meadow vole, white tailed deer, moose, short tailed shrew, black bear and eastern wolf (Table 5.7.2-1). Residual effects are considered to be not significant for all ecological health VCs during the operations and post-closure phases of the NSDF Project. Monitoring and follow-up programs are described in Section 5.7.9 of the final EIS and include implementation of the existing site-wide Effluent Verification Monitoring Program, Groundwater Monitoring Program, and Environmental Monitoring Program. These collectively make up the Environmental Assessment Follow Up Monitoring Program (EAFMP). The EAFMP will verify environmental effects predictions for ecological health as well as evaluating the effectiveness of mitigation measures implemented for the NSDF. Table 5.7.2-2 in the final EIS lists the measurement indicators that were used to assess the ambient radiological dose risks to terrestrial mammals for the NSDF Project. These measurement indicators apply to all taxa assessed in the terrestrial environment, including mammals. Ecological risks to mammals are monitored through measuring concentrations of contaminants of potential concern (radiological and non-radiological) in different environmental media to which they may be exposed (either as part of their habitat or diet). As such, changes to ambient air, groundwater, sediment, surface water, soil, and vegetation quality need to be monitored as part of the Environmental Assessment Follow Up Monitoring Program (EAFMP). For example, concentrations of potential contaminants in surface water (e.g., Perch Lake) will be measured and compared against ecological risk benchmarks as determined in the Ecological Risk Assessment (EcoRA) [1] and summarized in the EIS. Reference: [1] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001
CNL-ND468	MNO (August 16, 2017)	**5.6.5.2.1 No Linkage Pathways, Page 5-353** "Because the SSA contains upland areas known to support a diversity of migratory birds, the general use of nest searches as a form of mitigation is not recommended because it is unlikely that all nests would be successfully located. Furthermore, nest sweeps in complex forested habitat in the SSA would likely identify many active nests with overlapping setbacks where clearing could not take place until young have fledged, resulting in schedule delays and additional costs associated with monitoring nest activity. Therefore, every effort will be made to remove vegetation and top soil prior to the nesting and roosting period to minimize nesting attempts and preclude bat roosting."	Because of their ecological importance and because they are protected by federal legislation (*Migratory Birds Convention Act (MBCA), 1994*, the suite of migratory birds with the potential to be affected by the NSDF Project was included as a terrestrial biodiversity Valued Component (VC). The purpose of including the group of migratory birds together as a VC was to identify appropriate mitigation so that the NSDF Project would comply with the MBCA for all migratory birds. Section 5 of the MBCA prohibits the disturbance, destruction or removal of a nest or related shelter, or egg of a migratory bird, or possession of a live migratory bird, or a carcass, nest or egg of a migratory bird (Section 5.6.2 of final Environmental Impact Statement (EIS)).

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		The weighting of overlapping setbacks against schedule delays and additional costs is inappropriate. Every effort should be made to identify active nests, apply setbacks (whether overlapping or not) and schedule clearing accordingly. However, without implementing these specific measures, the categorization of this pathway as having no linkage, is inappropriate – beyond the inappropriate nature of the methodology in general.	Environment Canada Beneficial Management Practices (BMPs) as outlined on their website (http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=8D910CAC-1), will be implemented. These Beneficial Management practices are identified in Table 5.6.5-1 which indicates that: tree clearing and grubbing in complex forested habitat, will occur before April 8 or after August 31 to avoid effects on nesting birds and bat maternity roosts. If vegetation clearing in small areas with simple habitat (e.g., rights of way) that can be effectively searched for nests could be cleared only after an effective nests search and approval by CNL the Environmental Protection Program. Canadian Nuclear Laboratories (CNL) notes that that the construction of the NSDF Project will result in the destruction of 26 hectares (ha) of critical Blanding's turtle habitat that is defined in the *Species At Risk Act* (SARA) Recovery Strategy for the species [1]. Therefore, CNL will be required to apply for a SARA permit and implement measures to compensate for the removal of this habitat area. Reference: [1] Environment and Climate Change Canada. 2018. Recovery Strategy for the Blanding's Turtle (Emydoidea blandingii), Great Lakes/St. Lawrence population, in Canada. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. viii + 59 pp. Available at: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/plans/rs_blandings_turtle_e_proposed.pdf
CNL-ND469	MNO (August 16, 2017)	**5.6.5.2.1 No Linkage Pathways, Page 5-354** The development of a Blasting Plan does not automatically mitigate effects of fly rock from injuring wildlife. The categorization of this pathway as having no linkage is inappropriate – beyond the inappropriate nature of the methodology in general.	A Blasting Plan will be developed by the Construction Contractor after that contract has been awarded since it is required to be prepared by qualified individuals. The Blasting Plan will be made available to the MNO. The Blasting Plan will follow 'DFO Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters' [1] and 'Ontario Provincial Standard Specification (OPSS) in the document OPSS 120 – General Specification for Use of Explosives (OPS 2014)' [2]. Although the Blasting Plan is not available at this phase of the NSDF Project, Canadian Nuclear Laboratories (CNL) has specified requirements in technical specifications to the Construction Contractor. Examples of standard best management practices is the use of set-back distances, temporarily suspending blasting activities if wildlife are in the area, and minimizing the transport of blasting residuals into downstream waterbodies. The following text is included in Table 5.6.5-1 of the final Environmental Impact Statement (EIS) to describe the plan: • A Blasting Plan will be developed and implemented for the NSDF Project that will follow industry standard Best Management Practices and applicable Federal Regulations. • Additional guidance for the NSDF Project blasting limits will be obtained from the Ontario Provincial Standard Specification (OPSS) in the document OPSS 120 – General Specification for Use of Explosives (OPS 2014). • Set-back distances required for blasting will be identified in the Blasting Plan. • Blasting activities will be temporarily suspended if wildlife are observed in the blasting area. The following secondary pathway has been added to the final EIS (see Section 5.3.1.5.2.2): Storage and use of blasted rock may result in metal leaching and acid rock drainage Overall this section indicates that due to the stable nature of the bedrock constituent minerals it is anticipated that the potential generation of metal leaching, acid rock drainage and any potential adverse effects on water quality are negligible.

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			Bedrock in the vicinity of the NSDF is primarily comprised of quartzofeldspathic and diorite gneiss. Mineralogically, the rocks are comprised of quartz, potassium and plagioclase feldspars, hornblende, clinopyroxene, biotite and garnet as major minerals. These minerals are generally considered to have low potential for acid rock drainage and leachability. References [1] Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian technical report of fisheries and aquatic sciences 2107. DFO, Wright DG, Hopky GE. 1998. [2] Ontario Provincial Standard Specification (OPSS) in the document OPSS 120 – General Specification for Use of Explosives, 2014 November.
CNL-ND470	MNO (August 16, 2017)	**5.6.5.2.2 Secondary Pathways, Page 5-359** "The NSDF Project may increase predation risk by increasing the amount of edge habitat in the LSA. Ground-nesting species are particularly vulnerable to nest predation (Cink 2002) and many predators will use habitat edges as movement corridors (Chalfoun et al. 2002) … Increases in edge habitat are not predicted to affect the maintenance of self-sustaining and ecologically effective bird populations that overlap the RSA." Please provide additional detail on the increases in edge habitat and the potential effects of this increase in the LSA. While it is stated that is will not affect the maintenance of ecologically effective bird populations in the RSA, there is no detail provided for the LSA, where the direct Project effects must be assessed.	This comment refers to the pathway: *Vegetation clearing and grubbing will result in an increase in edge habitat, which could increase predation risk and nest parasitism risk for bird Valued Components (VCs).* This secondary pathway was identified using the precautionary principle that the NSDF Project could increase the amount of edge habitat in the local study area (LSA). However, the final Environmental Impact Statement (EIS) demonstrates that the NSDF Project will actually result in a decrease in edge habitat in the LSA, in part because the NSDF Project will remove the East Mattawa Road (EMR), which is currently fragmenting the site study area (SSA) and creating edge habitat in the Base Case. For example, the decrease in edge habitat is evident in the results of the assessment of changes in Golden-winged warbler habitat. The Golden-winged warbler is an edge-adapted species that relies on early successional habitat. Its nests are often located within 200 m on either side of a forest edge, including edges with anthropogenic disturbance such as roads. Habitat modeling for golden-winged warbler captures changes in both natural and anthropogenic edge habitat due to the NSDF Project, and is an appropriate surrogate for evaluating the potential for the NSDF Project to increase predation risk of bird nests due to an increased amount of edge habitat. Golden-winged warbler habitat (i.e., edge habitat) is predicted to decrease by 24 hectares due to the NSDF Project. Therefore, increased nest predation is not anticipated in the LSA because edge habitat is predicted to decrease as a result of the NSDF Project.
		Environmental Effects – Ambient Radioactivity and Ecological Health	
CNL-ND471	MNO (August 16, 2017)	**Table 5.7.1-1: Summary of Issues Raised During Engagement Activities that Influenced the Scope of the Ecological Health Assessment** The issues listed may not be reflective of the concerns related to ecological health from the MNO's perspective. A Métis specific traditional land use study should be completed to provide CNL insight into the Métis perspective on ecological health.	A Metis specific Traditional Knowledge and Land Use (TKLUS) study has been completed and was submitted to Canadian Nuclear Laboratories (CNL) in February 2019. The Environmental Impact Statement (EIS) has been revised to include a new section, Section 6.0, specific to Indigenous Interests. Findings from the Traditional Knowledge and Land Use Study and the assessment of impacts of the NSDF Project on traditional land use are discussed in Section 6.4.3.4.2 (Traditional Land and Resource Use by Indigenous Peoples) of the final EIS.
CNL-ND472	MNO (August 16, 2017)	**Table 5.7.2-1: Valued Components and Indicator Species for Ecological Health Assessment** If the home range for the white-tailed deer intersect the RSA and LSA, then they should have been included in the assessment as they have the potential for ecological health to be impacted by ambient radioactivity. Either, they should have been included based on the portion of the range that intersects the LSA or RSA; or the LSA and RSA should have been expanded to allow for consideration of this species.	The white-tailed deer is included in the Ecological Risk Assessment (EcoRA) [1] and is representative of large herbivorous mammals as noted in Table 5.7.2-1 of the final EIS. The Ecological Risk Assessment (EcoRA) [1] provides a quantitative assessment of the dose from ambient radioactivity for the Post-Closure phase. Section 2.2.4 of the EcoRA provides assumptions on receptor locations for the exposure assessment. Species with large home ranges such as white tailed deer, moose and black bear are assumed to roam the entire site and to obtain exposures from different areas across the site. Results of the dose assessment are detailed in Section 5 of the EcoRA and summarized in Section 5.7.6.1.2.2 of the final EIS. Predicted doses are well below benchmark values for protection of biota.

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			Reference: [1] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001.
CNL-ND473	MNO (August 16, 2017)	**5.7.3 Assessment Boundaries, 5.7.3.1 Spatial Boundaries, Page 5-447** "The spatial boundaries for ecological health were thus selected to incorporate relevant portions of the study areas for air quality, groundwater quality and surface water quality to evaluate the environmental changes that could contribute to effects on ecological health." "The LSA adapted from the groundwater and surface water RSA and is designated as the spatial extent of the Perch Creek watershed, and includes Perch Lake and its tributaries, and Perch Creek. The Ottawa River in the vicinity of the mouth of Perch Creek is also included in the LSA." The LSA for this VC should have been a combination of the air quality LSA and RSA and the groundwater and surface water LSA and RSA based on the description given for what the spatial boundaries would incorporate.	The site study areas (SSA), local study areas (LSA) and Regional Study Areas (RSA) for the valued components were selected in accordance with Canadian Nuclear Safety Commission (CNSC) Generic Guidelines for the Preparation of an EIS [1]. The guidelines define the LSA as '*that area existing outside the site study area, where measureable changes to the environment resulting from proposed activities from any phase of the project either through normal activities, or from accidents or mal-functions, may be anticipated*'. The LSA for ecological health shown in Figure 5.7.3-1 final Environmental Impact Statement (EIS) is based on the area where measureable changes to the environment are anticipated to occur and is consistent with the LSA for surface water and groundwater. Canadian Nuclear Laboratories (CNL) notes that the RSA for Ecological Health and Air Quality are the same and represent the area where potential effects of the project may interact with the effects of other projects, resulting in the potential for cumulative effects. Increasing the size of the LSA for Ecological Health as recommended by the reviewer would not change the analysis or results of the assessment. The exposure assessment for ecological health is based on conservative assumptions of receptor locations as described in Section 2.2.4 of the Ecological Risk Assessment (EcoRA) [2] and summarized in Section 5.7.6.1.2.2 of the final EIS. No adverse effects on ecological receptors are predicted. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001.
CNL-ND474	MNO (August 16, 2017)	**5.7.4.2 Radioactive Releases from Chalk River Laboratories, Page 5-454** "It is noted that emissions from the B206 stack and cemented molybdenum waste storage are no longer significant as the facility has been shut down (production ceased in 2016)." Have all molybdenum emissions from stack B206 been remediated or sufficiently integrated into the environment to warrant not discussing them in this application? If the emissions contribute to the overall emission load of the environment, they must be discussed in baseline conditions.	Emissions from the Molybdenum Production Facility (B206) and cemented molybdenum wastes were primarily short lived noble gases such as Xenon-133. As a result of shutdown of the facility these emissions have ceased. Updated radiological emissions from the Chalk River Laboratories (CRL) site for the five year period 2014 to 2018 are provided in Table 5.4.7-1 of the final Environmental Impact Statement (EIS). Emissions from the NSDF Project are evaluated in combination with baseline emissions from the CRL Site.
CNL-ND475	MNO (August 16, 2017)	**5.7.4.10 Radioactivity in Terrestrial Foodstuffs, 5.7.4.10.1 Terrestrial Animals, Page 5-497** It is concerning that no monitoring of terrestrial animals is performed. Particularly as elevated levels of radioactivity have been measured in large game animals from within 25 km of the CRL property. Ongoing monitoring for baseline data collection as well as ongoing monitoring post Project approval should be conducted.	Chalk River Laboratories (CRL) monitors radiological contamination in large game such as deer and moose. Typical examples are obtained from animals who succumbed to vehicle collisions on the CRL site or were donated by local hunters from areas within 25 kilometers of the CRL site. Canadian Nuclear Laboratories (CNL) has also begun monitoring for radioactivity in beavers on the CRL Site. On-going monitoring for baseline data collection is conducted and will continue. Table 5.7.4-19 and Table 5.7.4-20 providing radioactivity in flesh and bones of game animals respectively have been updated in the final EIS to provide more recent data for period 2014 to 2018. Section 6.6 of the final EIS provides further discussion on steps taken by CNL and AECL to develop a long term relationship with Indigenous peoples and notes that indigenous participation in environmental monitoring is a topic of interest.

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			In the past, occurrences of animal fatalities have been reported within the CRL site boundaries. Because much of the green space at site provides habitat, hunting, feeding, and nesting grounds for wild animals, an abundant biodiversity can be expected to be mobile within the CRL site boundaries. Part of CNL's effort to protect the environment is to preserve these wildlife habitats and reduce human impact on wild animals. As such, CNL reports any dead animals that staff see at site, this includes any potential vehicle collisions.
CNL-ND476	MNO (August 16, 2017)	**Table 5.7.4-17: Radioactivity in Flesh of Large Game Animals (Bq/kg fresh weight), Page 5-497** Why was there an increase in Tritium from the previous high level in 2012 of 64 Bq/kg to 88 Bq/kg? • Why was there an increase in Organically Bound Tritium from the previous high level in 2012 of 50 Bq/kg to 56 Bq/kg? • Why was there an increase in Gross Beta from the previous high level in 2011 of 131 Bq/kg to 313 Bq/kg? • Why was there an increase in Potassium-40 from the previous high level in 2012 of 163 Bq/kg to 228 Bq/kg? • Why was there an increase in Cobalt-60 from the previous high level in 2011-2014 of <0.2 Bq/kg to <0.4 Bq/kg? • Why was there an increase in Cesium-134 from the previous high level in 2012 and 2014 of <0.2 Bq/kg to <0.3 Bq/kg? • Why was there a significant increase in Cesium-137 from the previous high level in 2012 of 18.7 Bq/kg to 62 Bq/kg?	Fluctuations in the monitoring results from year to year can be expected, as only a small number of animals are collected in any given year, and the age and the size of the animals vary. The variability in radioactivity in flesh is also observed for Potassium-40, a naturally occurring isotope. The monitoring results for radioactivity in flesh have been updated and are provided for period 2014 to 2018 in Table 5.7.4-19 in the final Environmental Impact Statement (EIS). Similar fluctuations in radioactivity are observed over this time period. The data show no trend to increasing concentrations of radioactivity in game flesh. Canadian Nuclear Laboratories (CNL) assesses the radiation dose to the public from ingestion of radioactivity in the flesh of large game animals. The predicted dose to the most exposed member of the public in 2018 from ingestion of large game animals was 0.001 mSv/a, a small fraction of the regulatory dose limit for a member of the public of 1 mSv/a. The dose of 0.001 mSv/a from ingestion of large game animals is a small fraction of the dose from natural background in Canada which ranges from 1.3 mSv/a to 4.1 mSv/a. Further information on radioactivity in the flesh of large game animals is provided in the site-wide Annual Environmental Monitoring Report for 2018 [1]. Reference: [1] Annual Compliance Monitoring in 2018 at Chalk River Laboratories. CRL-509243-ACMR-2018.
CNL-ND477	William Turner (May 31, 2017) 112. 13.	The commenter's understanding of the CNSC guideline is that the packaging at and transportation of the wastes from these sites destined to be disposed of at the proposed disposal facility would be considered "offsite activities". Therefore, the boundaries of the RSA must include the segregation and packaging activities at the Whiteshell, Douglas Point and Gentilly-1 sites, and the associated transportation routes. The boundary of the RSA as provided in the EIS report does not include these "offsite facilities or activities." The RSA must include areas off the CRL site as the RSA is essential to the evaluation of potential impacts to the public. The EIS is not consistent with its various definitions of RSA. Further, these "Beyond Regional Study Area" locations are all within the circular boundary for estimating the site Derived Release Limit (DRL) in accordance with the Site License. By restricting the RSA to this 10 km rectangle (see Figure 5.7.3-1), CNL have deliberately excluded assessing the potential environmental impact to residents that live downstream from the proposed location of the mound. This is unacceptable, since any accidental spill of contaminated liquids will reach Perch Creak and be discharged directly into the Ottawa River. To be consistent with the Site License, CNL must reassess the potential environmental effects of this undertaking to meet the DRL requirements of that license. Since CNL change the definition of the RSA to suit whatever argument they wish to present, it is very difficult to assess the environmental effects of the project. For example, the RSA does not match the region included evaluated in the DRL model (i.e. normal operations at the site).	Segregation and packaging of waste at off-site facilities and transport of these wastes to the Chalk River Laboratories (CRL) site is outside the scope of the NSDF Project [1]. Consolidation of AECL owned waste to the CRL site will occur regardless of the decision for the NSDF Project, as per CNL's Integrated Waste Strategy [2]. This is an on-going activity under the existing site licences. The Regional Study Areas (RSA) for the environmental components have been revised in response to comments received. Regional Study Areas have been expanded in the final Environmental Impact Statement (EIS) for geology/hydrogeology (Section 5.3), hydrology/surface water quality (Section 5.4), aquatic biodiversity (Section 5.5), ambient radioactivity and ecological health (Section 5.7), human health (Section 5.8) and land and resource use (Section 5.9) and now include the reach of the Ottawa River extending 8 km downstream of CRL. Potential environmental impact to residents that live downstream of the NSDF site are assessed. For example, potential effects from accident and mal-function events including assessment of impacts to off-site residents are discussed in Section 7.0 of the final EIS. Potential effects of extreme environment events such as tornados, forest fires, seismic and potential impacts on off-site residents are evaluated in Section 10 of the final EIS. The assessment of potential environmental impacts is not limited to the RSA. Potential effects to residents located beyond regional study area boundaries during the Post-Closure phase are evaluated for the Normal Evolution Scenario in the Post-Closure Safety Assessment (PostSA) [3]. Radiation dose to off-site members of the public in Sheenboro and Ottawa are several orders of magnitude below the regulatory dose limit for a member of the public of 1 mSv/yr (Section 6.3.7 of the

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			PostSA). In Section 14.2.4, the NSDF Safety Analysis Report [4] compares the Derived Release Limits (DRL's) to the radiological consequences from normal operations and concludes the potential off-site emissions from the NSDF airborne and liquid effluents will be a small fraction of the CRL site DRLs. References: [1] CNSC, Record of Decision In the Matter of Applicant Canadian Nuclear Laboratories on the Scope of Environmental Assessments for Three Proposed Projects at Existing Canadian Nuclear Laboratories Facilities, e-Docs 5205376, 2017 March 8 [2] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [4] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
		Environmental Effects – Human Health	
CNL-ND478	Evelyn Gigantes (May 17, 2017) OFWCA (Johanna Echlin) (May 8, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The EIS acknowledges uncertainty about potential human health impacts - what if the uncertainty that exists around human health impacts after closure become a certainty during the Construction, Operation or Institutional Control periods? Given the half-lives of the planned waste storage, how can CNL say the environment and people will be safe?	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The proposed radioactivity in the NSDF will decay very quickly, and begins to approach the natural background concentrations after only 100 years post-closure (See Figure 3.3.1-2 in the EIS). The material that remains in the NSDF after the rapid decay is the longer-lived radionuclides, but in concentrations so low that they do not pose a significant hazard. This is demonstrated by the results of the Post-Closure Safety Assessment (PostSA) [1]. Furthermore, the remaining radionuclides are contained by a multi-barrier engineered facility designed to maintain its structural integrity for at least 500 years. The final Environmental Impact Statement (EIS) assesses the dose and risk to human health during the construction, operations, and institutional control period. Uncertainties are managed by using conservative and pessimistic assumptions when possible during the calculation of dose to receptors. For example, high breathing rates are used for the receptors, which increases how much airborne contamination could be inhaled, which increases dose. During the post-closure period, it is assumed that the on-site receptor has an occupancy factor of 100%, that is, that the receptor never leaves the site for their entire lives. Despite these kinds of conservative assumptions, the calculated doses to all receptors remain well under the regulatory guidelines. The PostSA [1] examines a wide variety of scenarios, many designed to reduce uncertainty and increase confidence in the design and waste inventory. For example, scenarios are run where the barrier fail early, and where the barriers are removed entirely. In all cases, the dose to the receptor meets the regulatory criteria, indicating that even the worst case scenarios are still acceptably safe. Dose consequence results are often presented as a percentage of the natural background radiation, or compared to the regulatory dose limit for a member of the public of 1 mSv/yr to add perspective. For example, the dose to the receptor living on top of the facility during the post-closure phase is 0.015 mSv/y, which is 1.5% of the regulatory dose limit for a member of the public, and less than 1% of the natural background dose. There is a large safety margin between the calculated doses and the regulatory limits, which helps reduce uncertainties in the long-term safety of the facility. Summaries and results of the PostSA are presented in Section 5.8.6.1.2.2 of the final EIS. The commenter draws a relationship between long half-life and safety. To address this concern, a short discussion on radiotoxicity is included here. For more information, please see Section 8.1.1 of the Safety Case document [2].

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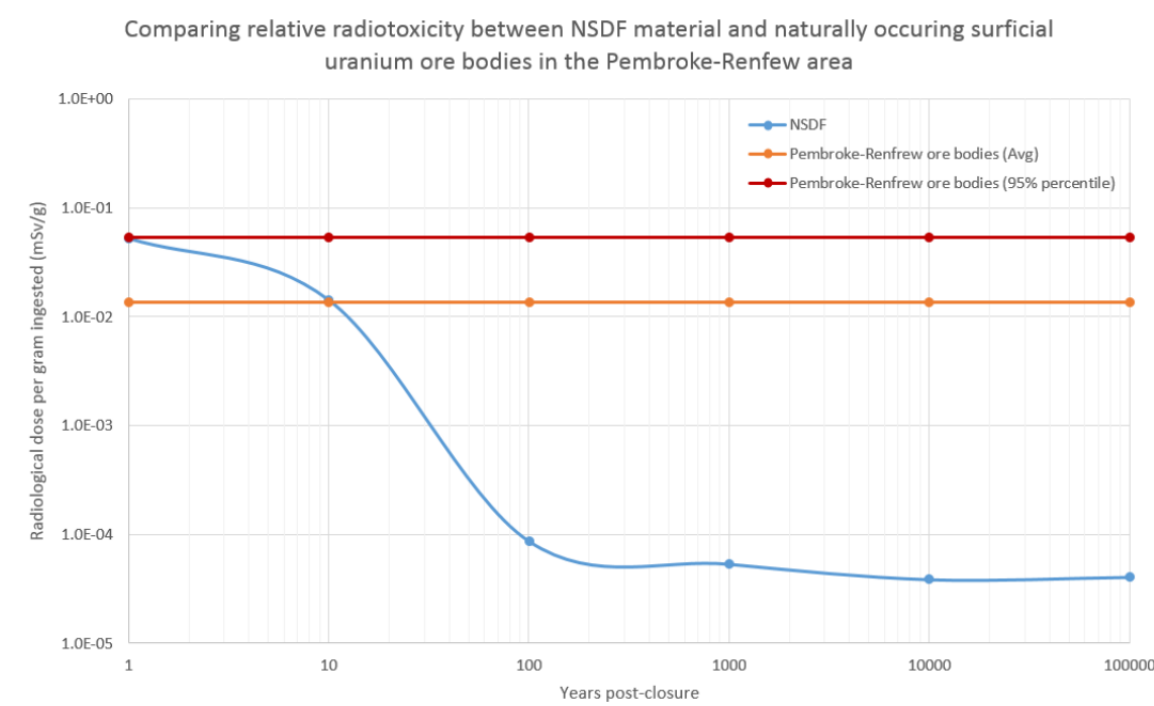
			Materials with long half-lives are present in the environment in low concentrations. In the Pembroke-Renfrew area, there are surface deposits of uranium and thorium ore that have been mined in the past. "Radiotoxicity" is a way to measure and compare the relative dose that a person would receive from ingesting radioactive material. For the purposes of this discussion, radiotoxicity is measured in dose (mSv) per unit mass (gram), which is representative of how much dose a person would get from ingesting 1 gram of material. The radiotoxicity of the naturally occurring ore bodies has been compared to the radiotoxicity of the material in the NSDF in the following plot. As the plot suggests, the material inside the NSDF becomes less radiotoxic than naturally occurring ore bodies in less than 10 years after closure of the facility.  References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Near Surface Disposal Facility Safety Case. 232-03610-SAR-001.
CNL-ND479	Dr. J.R. Walker (May 9, 2017) Concerned Citizens of Renfrew Country (Ole Henrickson) (July 3, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The NSDF EIS proposes only a 300-year period of institutional control (CNL 2017b, p. 1-8), during which the facility "will require regular monitoring and maintenance" (CNL 2017b, p. 3-72). Because long-lived radioactive wastes in the NSDF would remain hazardous far beyond this 300-year period, radiation doses to humans intruding into the wastes would exceed currently allowable limits for hundreds of thousands of years.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]).

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	William Turner (May 31, 2017) 85.	Although the Draft EIS contains almost no information concerning the temporal evolution of the hazard, Table 6.4.4-5 shows that human dose "resulting from inadvertent human intrusion from living and farming on top of the waste" would, for periods exceeding 100,000 years, not only exceed the recommended dose constraint for radioactive waste disposal (0.3 mSv/year) but would also exceed the regulatory limit for effective dose to a member of the public (1 mSv/year). Section 2.5.3.1.1 of the Draft EIS states that the post-closure design life of the ECM is 500 years. Hence, a significant radiological hazard persists long after the ECM has failed.	As a result of the revised reference inventory, the hazardous lifetime of the facility has been decreased to about 100 years. See Figure 3.3.1-2 in the final EIS for a plot of radioactivity in the facility versus time. The radioactivity in the NSDF decays very quickly, and begins to approach the natural background concentrations after only 100 years post-closure. The revised reference inventory was used in the Post-Closure Safety Assessment (PostSA) [2] to determine the dose to receptors in the post-closure phase. In the Normal Evolution Scenario, the resident builds a home on top of the Engineered Containment Mound (ECM), and uses the area to grow food and raise livestock, both of which he/she consumes. The dose to the receptor living on top of the facility during the post-closure phase is 0.015 mSv/y, which is 1.5% of the regulatory dose limit for members of the public, and less than 1% of the natural background dose. There is a large safety margin between the calculated doses and the regulatory limits, which helps reduce uncertainties in the long-term safety of the facility. Summaries and results of the PostSA are presented in Section 5.8.6.1.2.2 of the final EIS. Human Intrusion scenarios were also evaluated as part of the PostSA [2]. Reductions were made to the radiological inventory to ensure that doses to human intruders remain below the regulatory dose limits to members of the public. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 (Disposal of Radioactive Waste) [3] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion (and not rely on institutional controls alone). References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] IAEA, Disposal of Radioactive Waste, SSR-5, 2011.
CNL-ND480	Dr. J.R. Walker (May 9, 2017)	For the purpose of the long-term dose assessment, a representative person located at the failed facility, consuming local food, and using local water supplies, etc., should be considered.	Since the 2017 draft Environmental Impact Statement (EIS) Canadian Nuclear Laboratories has revised its approach to the long-term safety assessment. The Normal Evolution Scenario of the Post-Closure Safety Assessment (PostSA) [1] evaluates the dose to a resident/farmer receptor located on top of the engineered containment mound. The resident builds a home on top of the Engineered Containment Mound (ECM), and uses the area to grow food and raise livestock, both of which he/she consumes. The peak dose to the receptor is 0.015 mSv/y, which is 1.5% of the regulatory dose limit to members of the public, and less than 1% of the natural background dose. Section 5.8.6.1.2.2 of the final EIS presents a summary of the receptor characteristics and scenario descriptions. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND481	Jana Clarke (May 3, 2017)	Plutonium is one of many radioactive by-products of nuclear fission that would be present in significant quantities in wastes disposed of in the NSDF. Inhaling or ingesting plutonium or other radionuclides (e.g., in dust from the waste dump or runoff into the river) would increase risks of cancers of the lung, bones, blood and liver.	The human health exposure assessment summarized in Section 5.8 of the final EIS was performed with consideration all of the plutonium isotopes expected to be in the waste disposed in the NSDF (Plutonium-239, Plutonium -240, Plutonium -241, and Plutonium-242). The conclusion of the safety assessment is that the dose to members of the public is well below the regulatory dose limit for a member of the public of 1 mSv/yr, where the regulatory dose limits are set far below the observed thresholds for increased cancer risk (See Section 8.1.11.1 of the Safety Case [1] for more information on the relationship between radiological dose and cancer risk. The Safety Case can be requested by contacting ermstakeholder@cnl.ca). The full assessment of human health effects from the NSDF Project can be found in the Safety Analysis Report [2] for the pre-closure phase and the Post-Closure Safety Assessment [3] for the post-closure phase.

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			A Dust Management Plan will be in place, this includes control methods for water spraying or misting techniques (e.g., water trucks). Fixatives may also be used for dust control. All excavating, loading, hauling, and dumping operations would be suspended when wind speeds exceed the specified criterion (in accordance with common practices for dust management). References: [1] Near Surface Disposal Facility Safety Case. 232-03610-SAR-001. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004
CNL-ND482	Paulette Demmons (May 9, 2017)	Concerns were also expressed that there had never been a long term independent scientific research study into the health of those who live permanently or part-time along the Ottawa River downstream from Chalk River, thus there is no clear scientific evidence to confirm that the CNL procedures are sufficient…or whether there are safety issues in living near the Ottawa River downstream from the Chalk River facility.	According to Cancer Care Ontario, a Provincial Government agency, the cancer rates in the Renfrew County Public Health Unit's catchment area not statistically different than anywhere else in Ontario, and are often lower than average: https://www.cancercareontario.ca/sites/ccocancercare/files/assets/OCS2018_rev13122018.pdf The commenter has also expressed concerns about radioactivity in the Ottawa River and fish in the river. The site-wide Chalk River Laboratories (CRL) Environmental Monitoring Program includes routine collection and analysis of environmental samples from numerous locations at the CRL site and in surrounding communities, in order to measure the concentrations of contaminants in every significant environmental compartment involved in the migration of contaminants throughout the environment. Monitored environmental media include ambient air, foodstuff (e.g., milk, fish, garden produce, large game, and farm animals), groundwater, Ottawa River water, and other surface waters both on-site and off-site. Monitoring of beach sand, ground surfaces, and meteorological conditions is also performed. Monitoring results demonstrate that dose to the public from CNL operations is a small percentage of typical background radiation dose in Canada. The results of CNL's environmental monitoring program are made publicly available annually on CNL's webpage: https://www.cnl.ca/en/home/environmental-stewardship/performance-report/default.aspx
CNL-ND483	Joan Lougheed and Town of Deep River (August 16, 2017)	Given that Section 5.8.3 deals with Human Health, the RSA should not be limited to the upper portion of Garrison Petawawa. Rather, it would be advisable to extend the RSA further south to a major down-stream community (i.e., Petawawa).	As outlined in Section 5.8.3.1 of the final Environmental Impact Statement (EIS), the Regional Study Area (RSA) is defined as the area within which the potential effects of the NSDF Project may interact with the effects of other existing or reasonably foreseeable projects. Humans in the vicinity of the Engineered Containment Mound (ECM) could be exposed to airborne and waterborne emissions as well as direct gamma radiation from the waste. Therefore, the RSA for human health is a combination of the air quality and aquatic environment RSAs as this is the largest extent of potential cumulative effects on human health. The air quality RSA is defined as an approximate 7.4 kilometre (km) circular radius surrounding the LSA, and the aquatic RSA extends roughly 8 km downstream in the Ottawa River to Harrington Bay. Radiation dose to members of the public living downstream of the RSA in Sheenboro and Ottawa have been calculated for the post-closure phase as part of the Post-Closure Safety Assessment (PostSA) [1]. The peak doses are very low, approximately five orders of magnitude below the regulatory dose limit for a member of the public of 1 mSv/yr (Section 6.3.7 of the PostSA). In Section 14.2.4, the NSDF Safety Analysis Report [2] compares the Derived Release Limits (DRL's) to the radiological consequences from normal operations and concludes the potential off-site emissions from the NSDF airborne and liquid effluents will be a small fraction of the CRL site DRLs. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.

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			[2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND484	Joan Lougheed and Town of Deep River (August 16, 2017)	This section of the EIS contains Table 5.8.6-2, which lists the bounding radionuclide inventory to be placed in the ECM (see pg. 5-551). It is unclear how this inventory is converted to a concentration in Table 5.8.6-4 at year 2400, or whether it is assumed to be over the entire 1,000,000 m3 volume, or whether it is an average concentration, or whether is it a maximum cell concentration (see pg. 5- 554). It is not clear how the volume, which is the design basis, is converted to grams. These important details should be provided. With regard to Table 5.8.6-2, the allowable tritium inventory shown in Note (a) should be decreased accordingly for the reasons noted herein regarding Perch Lake (see pg. 5- 551).	The Reference Inventory Report [1] describes the calculation of inventory volumes, radioactivities, and concentrations in detail. Table 12 of the Reference Inventory Report specifies that the concentration is calculated using a waste mass of 9.57E+08 kg. Concentration values are therefore averaged over the entire waste mass. Tritium concentrations are limited by the Waste Acceptance Criteria (WAC) [2] and ensure the Health Canada Drinking Water Standard concentration (i.e., 7,000 Bq/L) [3] is not exceeded in Perch Creek taking in to account present day concentrations in Perch creek. Leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. Leachate Controlled Waste Packages are discussed in Section 3.3.1.1 and the concentration limits are provided in Table 3.3.3-1 of the final EIS. References: [1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Health Canada. 2019. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. June 2019. Available at https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t3
CNL-ND485	Joan Lougheed and Town of Deep River (August 16, 2017)	Table 5.8.6-13 is incomplete, in that no units are provided in this Table (see pg. 5-563).	Table 5.8.6-13 is Table 5.8.7-6 in the final Environmental Impact Statement (EIS). Units of the health-based guidelines of Table 5.8.6-7 are µg/L. The units are provided in the table.
CNL-ND486	Joan Lougheed and Town of Deep River (August 16, 2017)	At Section 5.8.6.2.1.1, when discussing drinking water quality guidelines and objectives, there is reference to the post-closure and post-institutional control phases being "in the far future" (see pg. 5-564). Regarding the entirety of the project, the post-closure phase is not in the "far future". Consideration must be given to future property owners drawing their potable water from these affected water bodies.	The term "in the far future" is no longer used in the final Environmental Impact Statement (EIS). Canadian Nuclear Laboratories (CNL) followed the guidance of CNSC's REGDOC-2.11.1 *Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management* [1], to determine that a 10,000-year assessment timeframe is appropriate for the facility. This timeframe encompasses the duration of institutional control, the hazardous lifetime of the wastes and the design life of the facility barriers. The NSDF Post-Closure Safety Assessment (PostSA) has been revised to demonstrate that the NSDF long term safety is not reliant on institutional controls in order to meet the dose requirements [2]. Table 5.8.6-5 of the final EIS summarizes the Post-SA receptors and exposure characteristics, which now include an on-site resident/farmer drawing drinking water from a well on the ECM footprint and from Perch Creek. As outlined in Section 5.8.6.1.2.2 of the final EIS, the highest calculated dose rate to any receptor in the Normal Evolution Scenario is 0.015 mSv/y, which is 20 times lower than the dose constraint of 0.3 mSv/yr. This peak dose is received by the on-site resident/farmer adult. The peak occurs around 4,100 years after closure.

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			References: [1] CNSC, Waste Management, Volume III: Assessing the Long-term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND487	Joan Lougheed and Town of Deep River (August 16, 2017)	At Table 5.8.7-1, similar to comments under the Ecological Health heading regarding Table 5.7.7-1, the last parameter in Table 5.8.7-1, Cumulative Effect, states that the contaminated lands from the WMAs and the LDAs would be removed if there is potential for exceeding safety objectives (pg. 5-567). CNL has not identified where these lands and soils will be placed (i.e., the NSDF or an alternative site).	Currently, large-scale environmental remediation of CRL Waste Management Areas (WMAs) are deferred until the proposed NSDF is available to mitigate the need for additional storage capability. Wastes from the WMA's or Liquid Disposal Area that meet the NSDF Waste Acceptance Criteria (WAC) [1] would be transferred to the NSDF. In the event that some of the waste did not meet the NSDF WAC, alternative disposal options would be evaluated for those wastes. For example, hazardous waste as defined by provincial and/or federal regulations would be sent to an off-site licenced waste management service for processing and disposal as described in Section 2.2.1.4 of the final Environmental Impact Statement. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND488	Joan Lougheed and Town of Deep River (August 16, 2017)	Microbial activity on the various components of the NSDF or on the potential release of airborne or water-borne contaminants and radionuclides has not been addressed. This topic should be discussed citing scientific evidence as to the potential role of microbes during the various phases of the project, in particular during the post- closure phases, including experiences from other comparable facilities.	As part of the Post-Closure Safety Assessment (PostSA) [1], microbial degradation of organics was considered as part of the FEPs (Features, Events and Processes). Organic materials (e.g., wood) in the waste or their degradation products, which could be a source of nutrients for microbes, are present in the bulk waste and are accounted for the assessment. Therefore, microbial growth could occur in the bulk waste. However, microbial growth is not explicitly considered in the post-closure safety assessment. Rather, the effects of microbial growth on organic degradation, organic degradation rates and degradation products are implicitly accounted for through the selected values of the concentrations of organic degradation products (Ethylenediaminetetraacetic acid (EDTA) and Isosaccharinic acid (ISA) where conditions are alkaline) that could affect contaminant transport and solubility. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND489	J. P. Unger (August 15, 2017)	Page 4/ES-ii states, "The wastewater treatment plant will treat leachate and wastewater [from the radioactive mound] such that they meet discharge criteria. The effluent from the wastewater treatment plant will be discharged into an infiltration bed, to recharge the groundwater." This can only mean it will be diluting radioactive discharges for dumping into the watershed to supposedly meet "safe levels" –which, by the way, are an arbitrary euphemism; for starters, there simply are no safe levels of radioactive pollution exposure for children and pregnant women. To note, this also means the mound, even if functioning as expected, will continue to leach and pollute long after such questionable mitigation measures have ceased. The EIA presented by the proponent also states (p. 14/ES-xii) first that "uncertainties in the assessment exist" and goes on to say that "Radiological dose to humans may result from waterborne or airborne emissions from the NSDF Project."	The treated effluent will meet Canadian Drinking Water Guidelines for radionuclides with the exception of tritium. Various measures are being put into place to make sure that the tritium concentrations in Perch Creek meet the Canadian Drinking Water Guidelines. For example there will be a small portion of waste which will be required to utilize robust packaging to prevent higher concentrations of specific contaminants in the leachate. Specifically the leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. Leachate Controlled Waste Packages are discussed in Section 3.3.1.1 and the concentration limits are provided in Table 3.3.3-1 of the final EIS. The use of the exfiltration gallery as a primary discharge location provides additional retention time for radioactive decay of tritium within the geosphere prior to reaching the biosphere and receptors. Tritium has a relatively short half- life of 12.3 years and therefore benefits from decay over the groundwater transit time from the exfiltration gallery to eventually Perch Lake, which is greater than 16 years.

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			The use of a water treatment plant to filter water is what is done at most municipalities across Canada. Municipal water treatment plants treat water to meet Canadian Drinking Water Guidelines, and release the treated effluent to nearby water bodies. For example, the Deep River water treatment facility releases treated effluent to the Ottawa River. The removal of radioactive contaminants is no different than the removal of non-radioactive contaminants, with the exception of tritium which was discussed above. Regarding leachate concentrations during the post-closure phase, the final cover to be placed on the Engineered Containment Mound (ECM) during the closure phase will eliminate infiltration into the facility and thereby, reduce leachate volumes generated from the ECM. Leachate generation is expected to stop during the closure phase (i.e., 2070 to 2100). Uncertainties are a normal part of any calculation or modelling process. Uncertainties are managed by using conservative assumptions and inputs when performing long-term modelling or as inputs into the design process, and by evaluating extreme, worst-case, scenarios. Even with conservative inputs, the Post-Closure Safety Assessment (PostSA) [1] results indicate that dose exposures are well below regulatory dose limits for the members of the public. The potential for radiological dose to humans as a result of NSDF operations has been evaluated in the EIS, presented in Section 5.8. Waterborne and airborne emissions from the NSDF are mitigated by the design of the facility and operational procedures. However, emissions may still occur. These small emissions have been quantified, and the resulting dose to the public is very low, far below the natural background dose, and far below regulatory dose limits for members of the public, which ensure the protection of both the public and the environment. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND490	Stan R. Blecher (August 14, 2017)	The commenter states that there is no safe dose of radioactivity or any other DNA damaging agent. The minutest dose of radioactivity can cause damage to DNA, the genetic material. Such damage is called mutation, and mutations cause cancer and other deadly diseases. Recent research published in the world's leading science journal, Nature, indicates that the vast majority of cancers are caused by extrinsic risk factors such as radiation and other mutagens (substances or agents that cause mutation). [Wu et al., Nature 529, 43 (2016)]. The world is in a cancer epidemic. Recent figures are that 1 in 2 people will develop cancer during their lifetime, and as mentioned this epidemic is due to environmental pollution including radiation pollution.	The commenter is correct in stating that (ionizing) radiation can be harmful to DNA, which in turn has a chance at increasing cancer rates. However, the relationship between radiation dose and cancer incident rates are not simple. The assertion that there is no safe dose of radioactivity implies some kind of measureable relationship between very small doses and incidents of cancer. By examining locations on Earth that have varying background doses of radiation, and comparing incidents of cancer in the local population, a better understanding of the effects of very low doses can be achieved. For example, the background dose in Ottawa is 1.8 mSv/y, whereas the background dose in Winnipeg is 4.1 mSv/y [1]. The dose received by the average Winnipeg resident is twice that of an Ottawa resident, largely as a result of the difference in local rock formations and the resulting amounts of radon gas inhaled each year. If all radiation directly increased cancer rates, than the incident rate of cancer in Winnipeg would be twice as high as in Ottawa. This relationship is not apparent. Regulatory dose limits are established to ensure the protection of the public, and to ensure that the risk of cancer are not elevated. More information about the relationship between low doses, cancer risk, and how regulatory dose limits are developed can be found on the CNSC website [2], as well as Section 8.1.11.1 of the Safety Case [3], which can be requested by contacting ermstakeholder@cnl.ca. Radiological dose to the public during operations of the NSDF is discussed in Section 5.8.6.1.2.1 of the final Environmental Impact Statement (EIS), and are calculated to be negligible because planned releases from the site are well below the Derived Release Limits [4]. The peak dose to a human receptor who lives on top of the NSDF during the post-closure period

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			is estimated to be 0.015 mSv/y, which is less than 1% of the natural background dose in the area. The dose from NSDF is well within the "error bar" when calculating a person's annual dose from all sources. References: [1] Natural Background Radiation in Canada. CNSC Website: http://nuclearsafety.gc.ca/eng/resources/maps-of-nuclear-facilities/background-radiation.cfm [2] CNSC, Lincear Non-Threshold Model. http://nuclearsafety.gc.ca/eng/resources/health/linear-non-threshold-model/index.cfm [3] Near Surface Disposal Facility Safety Case. 232-03610-SAR-001. [4] Derived Release Limits for CNL's Chalk River Laboratories. CRL-509200-RRD-001.
CNL-ND491	Michael Dworkind (August 16, 2017)	The commenter expresses their concern about the serious environmental impact of the dumping of nuclear waste so close to the ground water systems of the Ottawa river (see submission for details on credentials). There has been enormous published documentation and research on the cumulative effects of ionizing radiation and cancer. The dose response curve is linear.(BEIR reports).It has been accepted by the research community that ionizing radiation especially as an internal emitter can cause cancer in tiny doses of radiation especially plutonium and other radionuclides, where micrograms inhaled will most certainly cause lung cancer. Even chronic low dose exposure over time in years can have devastating consequences especially looking on a population basis. However, with a long latency period as much as thirty years, the cause and effect can be challenging. This is particularly true of foetal exposure where genetic damage may be extreme, for example, childhood leukemia have been reported as early as five years of exposure in the uterus of mothers exposed to low doses of ionizing radiation (KIKK study).The elderly have a known increased risk as well as woman, to develop all kinds of cancers, with chronic exposure to radiation from the water we drink, the air we breathe and the foods that we eat.	The commenter references BEIR reports, which point to atomic bomb survivor data in order to make the assertion that the dose response curve is linear. It is widely accepted that high, instantaneous doses show a linear response against incidents of cancer. There is a significant difference in biological response towards a high dose delivered instantaneously (i.e., acute exposure) versus a much lower dose, such as the natural background radiation, delivered over the course of a year (i.e., chronic exposure). The BEIR VII report uses a dose of 100 mSv as the "low dose" example, included in the Table on page 3 of the briefing [1]. This dose is about 1000 times higher than the doses relevant to the NSDF operations and long-term safety assessments presented in Section 5.8 of the final EIS. The assertion that there is no safe dose of radioactivity implies some kind of measureable relationship between very small doses and incidents of cancer. By examining locations on Earth that have varying background doses of radiation, and comparing incidents of cancer in the local population, a better understanding of the effects of very low doses can be achieved. For example, the background dose in Ottawa is 1.8 mSv/y, whereas the background dose in Winnipeg is 4.1 mSv/y [2]. The dose received by the average Winnipeg resident is twice that of an Ottawa resident, largely as a result of the difference in local rock formations and the resulting amounts of radon gas inhaled each year. If all radiation directly increased cancer rates, than the incident rate of cancer in Winnipeg would be twice as high as in Ottawa. This relationship is not apparent. This scientific article [3] provides more information on the relationship between background dose and cancer rates. The dose criteria that the NSDF is designed to meet is recommended by the International Commission on Radiological Protection [4], which is adopted by the International Atomic Energy Agency (IAEA) [5], which is a United Nations agency. As Canada is a member state of the United Nations, the Canadian Nuclear Safety Commission tends to adopt the recommendations of the IAEA. Doses to the public during operations of the NSDF are presented in Section 5.8.6.1.2.1 of the final Environmental Impact Statement (EIS) and are calculated to be negligible because planned releases from the site are well below the Derived Release Limits. The peak dose to a human receptor who lives on top of the NSDF during the post-closure period is estimated to be 0.015 mSv/y, which is less than 1% of the natural background dose in the area. The dose from NSDF is well within the "error bar" when calculating a person's annual dose from all sources. References: [1] BEIR VII Briefing, http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/beir_vii_final.pdf

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			[2] Natural Background Radiation in Canada. CNSC Website: http://nuclearsafety.gc.ca/eng/resources/maps-of-nuclear-facilities/background-radiation.cfm [3] Dobrzyński L, Fornalski KW, Feinendegen LE. Cancer Mortality Among People Living in Areas With Various Levels of Natural Background Radiation. Dose Response. 2015;13(3):1559325815592391. Published 2015 Jul 2. doi:10.1177/1559325815592391. [4] International Commission on Radiological Protection, 1990, Recommendations of the International Commission on Radiological Protection, Publication 60, Pergamon Press, Oxford and New York (1991). [5] IAEA, 2011. Specific Safety Requirements (SSR)-5. Disposal of Radioactive Waste.
CNL-ND492	Ole Hendrickson (August 16, 2017)	The EIS should include impacts on workers, noting that a key document in this regard (the NSDF Safety Analysis Report) has not been provided;	The Safety Analysis Report (SAR) [1] can be requested by contacting ermstakeholder@cnl.ca Results of the SAR, including impacts to on-site receptors (workers) are included in Section 5.8 and Section 7 of the final Environmental Impact Statement (EIS). Reference: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND493	MNO (August 16, 2017)	**Table 5.8.1-1: Summary of Areas of Interest Raised during Engagement Activities that Influenced the Scope of the Human Health Assessment, Page 5-534** The issues listed may not be reflective of the concerns related to human health from the MNO's perspective. A Métis specific traditional land use study should be completed to provide CNL insight into the Métis perspective on human health.	The list of issues are based on the results of the engagement activities that had been completed up to 2017 March. The final Environmental Impact Statement (EIS) includes concerns raised by recent engagement activities and the public comments received. The entirety of Section 6.0 of the final EIS is dedicated to Indigenous interests. A Traditional Knowledge and Land Use (TKLUS) study was submitted to Canadian Nuclear Laboratories (CNL) in 2019 February. Findings from the MNO TKLUS study have been incorporated into Section 6.4.4 of the final EIS. In order to ensure that the differences in lifestyle and ingestion rates between Indigenous and non-Indigenous peoples is captured, an additional receptor was added to the Post-Closure Safety Assessment (PostSA) [1]. The Self-Sufficient Indigenous Receptor sensitivity analysis has been designed to assess the dose and risk to a receptor who lives completely off the land. The Self-Sufficient Indigenous receptor: • Obtains 100% of their food from the contaminated area • Hunts wild animals including moose, deer, grouse and ducks. • Drinks water and eats fish from the Ottawa River. • Collects honey from wild bees • Forages for berries and mushrooms • Spends 100% of their time in the area on or near the NSDF, with a higher proportion in the Ottawa River and on the shorelines, than the other receptors. The Self-Sufficient Indigenous Receptor has ingestion rates normalized to the highest category of energy intakes recommended by CSA N288.1-14 [2]. The Indigenous adult diet is set to 4,480 kcal/day, and the Indigenous child consumes 2,879 kcal/day. This is far higher than the surveyed energy intakes presented by the Canadian Standards Association, which are in turn derived from Statistics Canada surveys and studies performed by the International Commission for Radiological Protection. These values are 1,388 kcal/day and 1,165 kcal/day for the adult and child respectively.

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			The Self-Sufficient Indigenous Receptor is modelled with very conservative inputs, and are expected to be bounding of the findings of TKLUS. If a specific TKLUS demonstrates a large misalignment with the conservative assumptions used in the PostSA, the model can be refined. Results of the PostSA indicate that doses to the Self-Sufficient Indigenous Receptor are far below the regulatory criteria, and far below the natural background dose rate. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] CSA Group. CSA N288.1-14. Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents from Normal Operation of Nuclear Facilities. 2014.
CNL-ND494	MNO (August 16, 2017)	**5.8.2 Valued Components, Page 5-535** Public health was broken down into residential and seasonal, however, an additional category of harvesters should be added to capture Métis citizens who may be exercising their rights in the Project vicinity. Further, the rationale for selection should also include ecological exposures such as through country foods.	The list of issues are based on the results of the engagement activities that had been completed up to 2017 March. The final Environmental Impact Statement (EIS) includes concerns raised by recent engagement activities and the public comments received. The entirety of Section 6.0 of the final EIS is dedicated to Indigenous interests. A Traditional Knowledge and Land Use (TKLUS) study was submitted to Canadian Nuclear Laboratories (CNL) in 2019 February. Findings from the MNO TKLUS study have been incorporated into Section 6.4.4 of the final EIS. In order to ensure that the differences in lifestyle and ingestion rates between Indigenous and non-Indigenous peoples is captured, an additional receptor was added to the Post-Closure Safety Assessment (PostSA) [1]. The Self-Sufficient Indigenous Receptor sensitivity analysis has been designed to assess the dose and risk to a receptor who lives completely off the land. The Self-Sufficient Indigenous receptor: • Obtains 100% of their food from the contaminated area • Hunts wild animals including moose, deer, grouse and ducks. • Drinks water and eats fish from the Ottawa River. • Collects honey from wild bees • Forages for berries and mushrooms • Spends 100% of their time in the area on or near the NSDF, with a higher proportion in the Ottawa River and on the shorelines, than the other receptors. The Self-Sufficient Indigenous Receptor has ingestion rates normalized to the highest category of energy intakes recommended by CSA N288.1-14 [2]. The Indigenous adult diet is set to 4,480 kcal/day, and the Indigenous child consumes 2,879 kcal/day. This is far higher than the surveyed energy intakes presented by the Canadian Standards Association, which are in turn derived from Statistics Canada surveys and studies performed by the International Commission for Radiological Protection. These values are 1,388 kcal/day and 1,165 kcal/day for the adult and child respectively. The Self-Sufficient Indigenous Receptor is modelled with very conservative inputs, and are expected to be bounding of the findings of TKLUS. If a specific TKLUS demonstrates a large misalignment with the conservative assumptions used in the PostSA, the model can be refined. Results of the PostSA indicate that doses to the Self-Sufficient Indigenous Receptor are far below the regulatory criteria, and far below the natural background dose rate.

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			References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] CSA Group N288.1-14: Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents from Normal Operation of Nuclear Facilities. 2014.
CNL-ND495	MNO (August 16, 2017)	**5.8.6.1.1.1 Receptor Selection, Page 5-549** There was no consideration in the human health assessment of Métis harvesters who may consume **more** than twice the rates of the lifestyle survey of locally produced and traditionally available food. This approach is flawed and should be amended. Further, data on Métis harvester consumption rates should be collected, potentially through a Project-specific traditional land use study.	The list of issues are based on the results of the engagement activities that had been completed up to 2017 March. The final Environmental Impact Statement (EIS) includes concerns raised by recent engagement activities and the public comments received. The entirety of Section 6.0 of the final EIS is dedicated to Indigenous interests. A Traditional Knowledge and Land Use (TKLUS) study was submitted to Canadian Nuclear Laboratories (CNL) in 2019 February. Findings from the MNO TKLUS study have been incorporated into Section 6.4.4 of the final EIS. In order to ensure that the differences in lifestyle and ingestion rates between Indigenous and non-Indigenous peoples is captured, an additional receptor was added to the Post-Closure Safety Assessment (PostSA) [1]. The Self-Sufficient Indigenous Receptor sensitivity analysis has been designed to assess the dose and risk to a receptor who lives completely off the land. The Self-Sufficient Indigenous receptor: • Obtains 100% of their food from the contaminated area • Hunts wild animals including moose, deer, grouse and ducks. • Drinks water and eats fish from the Ottawa River. • Collects honey from wild bees • Forages for berries and mushrooms • Spends 100% of their time in the area on or near the NSDF, with a higher proportion in the Ottawa River and on the shorelines, than the other receptors. The Self-Sufficient Indigenous Receptor has ingestion rates normalized to the highest category of energy intakes recommended by CSA N288.1-14 [2]. The Indigenous adult diet is set to 4,480 kcal/day, and the Indigenous child consumes 2,879 kcal/day. This is far higher than the surveyed energy intakes presented by the Canadian Standards Association, which are in turn derived from Statistics Canada surveys and studies performed by the International Commission for Radiological Protection. These values are 1,388 kcal/day and 1,165 kcal/day for the adult and child respectively. The Self-Sufficient Indigenous Receptor is modelled with very conservative inputs, and are expected to be bounding of the findings of TKLUS. If a specific TKLUS demonstrates a large misalignment with the conservative assumptions used in the PostSA, the model can be refined. Results of the PostSA indicate that doses to the Self-Sufficient Indigenous Receptor are far below the regulatory criteria, and far below the natural background dose rate. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] CSA Group N288.1-14: Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents from Normal Operation of Nuclear Facilities. 2014.
CNL-ND496	MNO (August 16, 2017)	**5.8.6.1.1.2 Receptor Characterization, Page 5-550** The time spent by Métis harvesters would vary from the 8% identified for cottagers and the 100% for local residents. How was this accounted for?	The list of issues are based on the results of the engagement activities that had been completed up to 2017 March. The final Environmental Impact Statement (EIS) includes concerns raised by recent engagement activities and the public comments received. The entirety of Section 6.0 of the final EIS is dedicated to Indigenous interests.

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			A Traditional Knowledge and Land Use (TKLUS) study was submitted to Canadian Nuclear Laboratories (CNL) in 2019 February. Findings from the MNO TKLUS study have been incorporated into Section 6.4.4 of the final EIS. In order to ensure that the differences in lifestyle and ingestion rates between Indigenous and non-Indigenous peoples is captured, an additional receptor was added to the Post-Closure Safety Assessment (PostSA) [1]. The Self-Sufficient Indigenous Receptor sensitivity analysis has been designed to assess the dose and risk to a receptor who lives completely off the land. The Self-Sufficient Indigenous receptor: • Obtains 100% of their food from the contaminated area • Hunts wild animals including moose, deer, grouse and ducks. • Drinks water and eats fish from the Ottawa River. • Collects honey from wild bees • Forages for berries and mushrooms • Spends 100% of their time in the area on or near the NSDF, with a higher proportion in the Ottawa River and on the shorelines, than the other receptors. The Self-Sufficient Indigenous Receptor has ingestion rates normalized to the highest category of energy intakes recommended by CSA N288.1-14 [2]. The Indigenous adult diet is set to 4,480 kcal/day, and the Indigenous child consumes 2,879 kcal/day. This is far higher than the surveyed energy intakes presented by the Canadian Standards Association, which are in turn derived from Statistics Canada surveys and studies performed by the International Commission for Radiological Protection. These values are 1,388 kcal/day and 1,165 kcal/day for the adult and child respectively. The Self-Sufficient Indigenous Receptor is modelled with very conservative inputs, and are expected to be bounding of the findings of TKLUS. If a specific TKLUS demonstrates a large misalignment with the conservative assumptions used in the PostSA, the model can be refined. Results of the PostSA indicate that doses to the Self-Sufficient Indigenous Receptor are far below the regulatory criteria, and far below the natural background dose rate. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] CSA Group N288.1-14: Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents from Normal Operation of Nuclear Facilities. 2014.
CNL-ND497	Kerrie Blaise, CELA (August 15, 2017)	The International Commission on Radiological Protection (ICRP) has established three principles for all practices involving radiation exposures to the public: justification, optimization and limitation. Justification, according to the ICRP, requires that collective doses arising from the practice have to be evaluated and compared with any benefits accruing from the facility. No attempt has been made in the draft CNL documents to "justify" the radiation exposures to people living nearby from the routine emissions from the proposed facility, for instance, from the proposed annual tritium emissions of 6.5 TBq.	The purpose of the Near Surface Disposal Facility (NSDF) Project is to provide the permanent disposal of current and future low-level waste (LLW) at the Chalk River Laboratories (CRL) site in a manner that is protective of both the public and the environment. The NSDF Project would enable the remediation of historically contaminated lands and legacy waste management areas, as well as the decommissioning of outdated infrastructure to facilitate the CRL site revitalization. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. Section 2.3 of the final Environmental Impact Statement (EIS) has been updated to provide a more accurate description of the overall purpose of the project as it relates to environmental remediation of the Chalk River Laboratories (CRL) site and site revitalization.

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			Radiation exposures from the operations and post-closure phases of the project have been assessed in the Safety Analysis Report [1] and Post-Closure Safety Assessment [2] report, respectively. The maximum dose to members of the public as a result of this project is less than 0.01% of the annual average radiation dose to Canadians. In other words, if the annual dose to local residents due to background radiation is 1.8 mSv/y, the total dose to a resident as a result of the natural background plus NSDF is 1.81 mSv/y. This almost negligible increase in dose is justified in order to improve the current conditions of legacy waste and contamination at the CRL site, consolidate and safely dispose of radioactive waste, much of which originates from the CRL site. Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [3]). As such there have been significant reductions to the proposed radionuclide inventory for the NSDF since the 2017 draft Environmental Impact Statement (EIS). The current total tritium value is calculated to be 8.91E+14 Bq, and this total value is reduced by half every 12 years from decay. Airborne tritium emissions from the engineered containment mound (ECM) are presented in Table 5.8.6-3 of the final EIS. The tritium emission estimates result in dose rates to workers standing on top of the ECM of 0.000016 mSv/y. A member of the public, by virtue of being farther away from the waste, would receive a tiny fraction of the worker dose, which is again, negligible. The regulatory dose limit for a member of the public of 1 mSv/yr is set at a level below what is received by all Canadians due to normal background radiation, and is well below the level at which biological effects are observed in humans. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002
CNL-ND498	Kerrie Blaise, CELA (August 15, 2017)	Because of the high estimated emission rates of tritium to air, tritium intakes (i.e. via inhalation, ingestion, and skin absorption) would be an important health consideration for local people. Tritium doses from air emissions will be much greater than doses from the ingestion of tritiated water leachates. No Bq estimates are made for annual tritium intakes in local residents. These estimates should be carried out. Exposures to workers and local people from organically-bound tritium (OBT) are not mentioned in the documents. These are serious omissions.	The estimated releases of tritium to the air are shown in Section 5.8.6.1 and Table 58.6-3 of the final Environmental Impact Statement (EIS). The total dose from all airborne emissions (including tritium), from all exposure pathways (including inhalation and ingestion) is shown in the same section. The calculated tritium dose to a person working near the waste is 0.000016 mSv/y, which is 62,500 times lower than the regulatory dose limit for a member of the public of 1 mSv/yr, and is therefore considered negligible. A member of the public, by virtue of being farther away from the waste, would receive a tiny fraction of the worker dose, which is again, negligible. With respect to organically-bound tritium, conservative assumptions are always made when calculating tritium dose. The Safety Analysis Report [1] uses the dose coefficient for tritiated water, plus an additional factor of 1.5 to account for skin absorption, for a value of 2.7E-11 Sv/Bq [2]. Instead, if we assume that all tritium is in the form of organically-bound tritium, the dose coefficient would be 4.1E-11 Sv/Bq, which is an increase of about 51%. Therefore, to estimate the dose from organically-bound tritium, we can take 0.000016 mSv/y and increase it by 51%, resulting in 0.000024 mSv/y, which is again, negligible.

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			References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] ICRP 119, Table B. International Commission on Radiological Protection (ICRP), "Compendium of Dose Coefficients based on ICRP Publication 60," ICRP Publication 119. Ann. ICRP 41(s), 2012.
		Environmental Effects – Land and Resource Use	
CNL-ND499	MNO (August 16, 2017)	**Executive Summary – Land and Resource Use Assessment Results** "Traditional access to the Pointe au Baptême site along the Ottawa River will continue to occur and no be restricted because of the project." It is unclear from this statement as to whether other traditional access was assessed as part of the assessment. Please clarify.	Section 6.4.3.4.2.5 of the final Environmental Impact Statement (EIS) recognizes the Pointe au Baptême site along the Ottawa River as a site of significance. The Pointe au Baptême site is not within the footprint of the NSDF Project or the CRL site, but is within the Regional Study Area. The Indigenous Engagement Report [1] states in multiple sections (Section 6.1.5.2.1; 6.1.5.2.2; 6.1.7) that traditional access to the Pointe au Baptême site along the Ottawa River will continue to occur and will not be restricted due to the NSDF Project. A Traditional Knowledge and Land Use (TKLUS) study was submitted to CNL by MNO in 2019 [2] that included MNO perspectives of the Ottawa River Corridor. Findings from the MNO TKLUS study have been incorporated into the new Section 6.0 of the final EIS. Reference: [1] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND500	MNO (August 16, 2017)	There is no Métis specific information in this section. There are no similar descriptions of Métis hunting, trapping, fishing, gathering and cultural resources and ceremonies. In particular, Métis cultural resources and ceremonies do not exclusively take place in areas of archaeological or historical potential. Therefore, a Project-specific traditional land use study should have been undertaken to identify areas of importance to the MNO.	The information on Indigenous Traditional Land and Resource Use is now found in Section 6.4.3.4 of the final Environmental Impact Statement (EIS). This section provides the methodology and results for the traditional land and resource use by Indigenous peoples. This section recognizes the Mattawa/Lake Nipissing Traditional Harvesting Territory for the MNO Mattawa Métis Council, North Bay Métis Council and Sudbury Métis Council which is part of MNO Region 5. In the Métis Nation of Ontario Traditional Knowledge and Land Use Study (MNO TKLUS - Section 6.4.3.4.2.1), it was identified that trapping has been a foundational element of Métis way of life and land use since the genesis of the Métis. Of the eleven participants in the MNO TKLUS, seven reported participation in trapping although none had trapped within the 50 km study area. Engagement with all Indigenous communities to the end of 2019 April, has not resulted in the identification of any Indigenous trappers operating within the Regional Study Area (RSA). Eight of the 11 participants in the MNO TKLUS have fished in the 50 km study area identified in the MNO TKLUS study. This included fishing on the Ottawa River north of Rolphton. There was also other MNO fishing in the study in waterbodies to the west of Ottawa River towards Algonquin Park. There was no fishing reported within 10 km of the CRL site. Section 6.4.3.4.2.5 of the final EIS recognizes the Pointe au Baptême site along the Ottawa River as a site of significance. The Pointe au Baptême site is not within the footprint of the NSDF Project or the Chalk River Laboratories site, but is within the RSA.
CNL-ND501	MNO (August 16, 2017)	**5.9.1 Scope of the Assessment, Page 5-572** There was no baseline data collection exercise undertaken with the MNO. A Project-specific traditional land use study must be completed to supplement the current baseline information and inform this assessment at the local and regional scales.	The information on Indigenous Traditional Land and Resource Use is now found in Section 6.4.3.4 of the final Environmental Impact Statement (EIS). This section provides the methodology and results for the traditional land and resource use by Indigenous peoples. This section also outlines that the area of the NSDF Project is the traditional territory of the Algonquins of Ontario, composed of 10 Algonquin communities. It also recognizes the Mattawa/Lake Nipissing Traditional Harvesting Territory for the MNO Mattawa Métis Council, North Bay Métis Council and Sudbury Métis Council which is part of MNO Region 5. Use of the area around the CRL site by other Indigenous peoples is not certain.

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		The objectives of the meetings between CNL and the MNO must to **first** identify potential effects to the MNO. Then, and only then, can a discussion about potential mitigation measures be undertaken.	The MNO has completed a Traditional Knowledge and Land Use (TKLUS) specifically for the NSDF and Nuclear Power Demonstration projects through funding supplied by the CNSC and CNL. While the study only involved 11 participants, it did document significant use within its study area. Because the study only involved eleven participants, the results should not be taken as the only land uses by MNO citizens in the region. (Section 6.4.3.4.2 of the final EIS). Information on traditional land use activities by Indigenous peoples in Section 6.4 has been drawn from the MNO's TKLUS.
CNL-ND502	MNO (August 16, 2017)	**Table 5.9.2-1: Valued Components for the Land and Resource Use Assessment, Page 5-573** The land and resource Valued Components selected for the assessment was limited to the traditional land and resource use by First Nation and Métis people (i.e., trapping, hunting, fishing, gathering, and cultural resources and ceremonies). The limiting of this Valued Component to traditional land and resource use is contrary to *CEAA, 2012* which states that: (5) (1)with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on i. health and socio-economic conditions, ii. physical and cultural heritage, iii. the current use of lands and resources for traditional purposes, or iv. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance. This means that **all** these aspects must be considered specifically for the MNO. Simply assessing health and socio-economic conditions generally is not sufficient. This must be a separate and distinct consideration with separate and distinct assessment. Several activities must be undertaken by CNL to provide insight into the Métis perspective on this use, including: • scheduled meetings with MNO leadership • scheduled community information sessions • retention by MNO of qualified consultants • a Métis specific traditional land use	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. As outlined in Section 6.4.2 of the final EIS, Valued Components (VCs) for Indigenous traditional land and resource use were selected based on consideration of a number of factors, including the following: • knowledge of traditional land and resource use practices that interact with the environment; • Indigenous and/or treaty rights; • community engagement; and • consideration of other environmental assessments. The VCs selected for assessing potential effects on land and resource use conditions are presented in Table 6.4.2-1. The MNO has completed a Traditional Knowledge and Land Use (TKLUS) specifically for the NSDF and Nuclear Power Demonstration projects through funding supplied by the CNSC and CNL. While the study only involved 11 participants, it did document significant use within its study area. Because the study only involved eleven participants, the results should not be taken as the only land uses by MNO citizens in the region. (Section 6.4.3.4.2 of the final EIS). Information on traditional land use activities by Indigenous peoples in Section 6.4 has been drawn from the MNO's TKLUS. Canadian Nuclear Laboratories presented to the Métis Nation of Ontario (MNO) (Region 5) in July 2016 in the MNO's North Bay office on the NSDF Project. Since this initial presentation, CNL has requested additional engagement opportunities. Meetings were resumed September 2017 in Sudbury, ON and discussions commenced on establishing a Memorandum of Understanding (MOU). MOU discussion meetings continued into 2018 and the representatives from Region 5 toured the Chalk River Laboratories (CRL) site (including Nuclear Power Demonstration (NPD) and NSDF) in June 2018. Since the signing of the MOU (late 2018). Canadian Nuclear Laboratories has met with the MNO on three more occasions regarding the NSDF Project – April 2019 in Sudbury, October 2019 in North Bay, which included a community meeting, and February 2020 in Port Hope. Further meetings aimed at developing a Long Term Relationship Agreement between CNL and the MNO continued virtually in 2020. Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the MNO at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas of the projects. Reference: [1] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND503	MNO (August 16, 2017)	**Table 5.9.2-1: Valued Components for the Land and Resource Use Assessment, Page 5-573** "Trapping, hunting, fishing, and gathering were traditional and modern day land and resource use activities practiced by First Nation and Métis communities in the Ottawa Valley. These activities provide important links to cultural continuity and traditional way of life."	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. The information on Indigenous Traditional Land and Resource Use is now found in Section 6.4.3.4 of the final EIS. This section provides the methodology and results for the traditional land and resource use by Indigenous groups. This section

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		The wording of this rationale for selection minimizes the constitutionally protected Aboriginal rights represented by the MNO. Please amend to more accurately reflect these rights.	also outlines that the area of the NSDF Project is the traditional territory of the Algonquins of Ontario, composed of 10 Algonquin communities. It also recognizes the Mattawa/Lake Nipissing Traditional Harvesting Territory for the MNO Mattawa Métis Council, North Bay Métis Council and Sudbury Métis Council which is part of MNO Region 5. Use of the area around the CRL site by other Indigenous peoples is not certain. As outlined in Section 6.4.2 of the final EIS, Valued Components (VCs) for Indigenous traditional land and resource use were selected based on consideration of a number of factors, including the following: • knowledge of traditional land and resource use practices that interact with the environment; • Indigenous and/or treaty rights; • community engagement; and • consideration of other environmental assessments. The VCs selected for assessing potential effects on land and resource use conditions are presented in Table 6.4.2-1. In the Métis Nation of Ontario Traditional Knowledge and Land Use Study (MNO TKLUS - Section 6.4.3.4.2), it was identified that trapping has been a foundational element of Métis way of life and land use since the genesis of the Métis. Of the eleven participants in the MNO TKLUS, seven reported participation in trapping although none had trapped within the 50 km study area. Engagement with all Indigenous communities to the end June 2020, has not resulted in the identification of any Indigenous trappers operating within the Regional Study Area (RSA). Eight of the 11 participants in the MNO TKLUS have fished in the 50 km study area identified in the MNO TKLUS study. This included fishing on the Ottawa River north of Rolphton. There was also other MNO fishing in the study in waterbodies to the west of Ottawa River towards Algonquin Park. There was no fishing reported within 10 km of the CRL site. Section 6.4.3.4.2.5 recognizes the Pointe au Baptême site along the Ottawa River as a site of significance. The Pointe au Baptême site is not within the footprint of the NSDF Project or the CRL site, but is within the RSA.
CNL-ND504	MNO (August 16, 2017)	With respect to the land and resource use assessment, the use of biophysical components to characterize effects to Métis rights is inappropriate. Biophysical components are only one facet of Aboriginal rights and by focusing on this, key aspects of Métis rights are missed. For example, these components do not allow for Métis attitudes and perceptions to be considered. The MNO considers these aspects to be of importance and have continually requested their assessment through CEAA proceedings as well as through the CNSC. Proponents continued lack of consideration of these aspects highlights the disconnect between the agencies.	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. The information on Indigenous Traditional Land and Resource Use is now found in Section 6.4.3.4 of the final EIS. This section provides the methodology and results for the traditional land and resource use by Indigenous peoples. This section also outlines that the area of the NSDF Project is the traditional territory of the Algonquins of Ontario, composed of 10 Algonquin communities. It also recognizes the Mattawa/Lake Nipissing Traditional Harvesting Territory for the MNO Mattawa Métis Council, North Bay Métis Council and Sudbury Métis Council which is part of MNO Region 5. Use of the area around the Chalk River Laboratories (CRL) site by other Indigenous peoples is not certain. The MNO has completed a Traditional Knowledge and Land Use (TKLUS) specifically for the NSDF and Nuclear Power Demonstration projects through funding supplied by the CNSC and CNL. While the study only involved 11 participants, it did document significant use within its study area. Because the study only involved eleven participants, the results should not be taken as the only land uses by MNO citizens in the region (see Section 6.4.3.4.2 of the final EIS). Information on traditional land use activities by Indigenous peoples in Section 6.4 of the final EIS has been drawn from the MNO's TKLUS. Canadian Nuclear Laboratories (CNL) is of the opinion that the proposed undertaking will not impact Métis traditional use, rights, and interests. As the commenter indicates part of CNL's position is that the project will have a negligible effect on biological resources and therefore that will not translate into any effect on land and resource use and therefore rights.

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			Furthermore, the project is wholly contained within the CRL site where traditional uses do not occur. Therefore, unlike a project that may occur on Crown land and disrupt harvesting, that won't occur with respect to NSDF. The CRL site has remained restricted to all public access, including the establishment of permanent settlements. As a result, no Indigenous settlements or activities have occurred in or near the CRL property boundaries. Canadian Nuclear Laboratories conducts an Environmental Risk Assessment for the CRL site [1] on a five-year cycle. The Environmental Risk Assessment (ERA) [1] examines potential impacts from CRL site operations and is used to guide remediation planning for the CRL site. The results of the ERA determined that contamination from past operations at CRL has not breached into external sites where the rights of Indigenous groups such as the MNO may be impacted (i.e., hunting, gathering, harvesting, etc.). Canadian Nuclear Laboratories (CNL) is aware and sensitive to the fact that some Indigenous groups may have negative perceptions about environmental concerns associated with the CRL operations. While perceived environmental effects are not considered under the *Canadian Environmental Assessment Act* (CEAA) 2012, CNL nevertheless continues to work with all Indigenous groups that have such a concern through further engagement, education, participation, and other activities related to project planning. Canadian Nuclear Laboratories (CNL) has tried to address such concerns through engagements with the MNO. Canadian Nuclear Laboratories (CNL) will continue to engage with Indigenous peoples about the NSDF Project but also more broadly about the CRL site and other projects. CNL is working towards developing long-term relationships with Indigenous peoples that have traditional territories and modern-day interests near its operations. CNL recognizes that such relationships may take a long time to form but believes this is consistent with the Government of Canada's commitment to reconciliation. Engagement with regards to Indigenous interests has demonstrated that Indigenous peoples are also interested in fostering such long-term relationships. As such, CNL, AECL and the Indigenous peoples see their relationships as evolving and beyond the scope of a single regulatory project such as the NSDF Project. Reference: [1] Environmental Risk Assessment of Chalk River Laboratories, ENVP-509220-REPT-003
CNL-ND505	MNO (August 16, 2017)	**5.9.3.3 Assessment Cases, Page 5-579** The base case must reflect the effects existing on traditional land use including existing effects from CRL facilities and operations. Currently, this is not described.	Canadian Nuclear Laboratories (CNL) is of the opinion that the proposed undertaking will not impact Métis traditional use, rights, and interests. As the commenter indicates, part of CNL's position is that the project will have a negligible effect on biological resources and therefore that will not translate into any effect on land and resource use or rights. The NSDF will be wholly contained within the Chalk River Laboratories (CRL) site where traditional uses do not occur. Therefore, unlike a project that may occur on Crown land and disrupt harvesting, that won't occur with respect to NSDF. Canadian Nuclear Laboratories is aware and sensitive to the fact that some Indigenous groups may have negative perceptions about environmental concerns associated with the CRL operations. While perceived environmental effects are not considered under *Canadian Environmental Assessment Act* (CEAA) 2012, CNL nevertheless continues to work with all Indigenous groups that have such a concern through further engagement, education, participation, and other activities related to project planning. Canadian Nuclear Laboratories has tried to address such concerns through engagements with the MNO. The CRL site has remained restricted to all public access, including the establishment of permanent settlements. As a result, no Indigenous settlements or activities have occurred in or near the CRL property boundaries during its past operations. Canadian Nuclear Laboratories conducts an Environmental Risk Assessment [1] for the CRL site on a five-year cycle. The Environmental Risk Assessment (ERA) [1] examines potential impacts from CRL site operations and is used to guide remediation planning for the CRL site. The results of the ERA determined that contamination from past operations at CRL has not breached into external sites where the rights of Indigenous groups such as the MNO may be directly impacted (i.e., hunting, gathering, harvesting, etc.). A new Section 6.0 has been included in the final EIS, to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. The information on Indigenous Traditional Land and Resource Use is now

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			found in Section 6.4.3.4 of the final EIS. This section provides the methodology and results for the traditional land and resource use by Indigenous peoples. As summarized in Section 6.4.3 of the final EIS, the NSDF Project SSA and LSA are located entirely within the CRL site boundary, on federal lands. Therefore, aside from the operations and activities undertaken by CNL, other land uses of the CRL site are prohibited due to restricted public access. The lands of the RSA also extend into Garrison Petawawa, other federal lands with restricted public access. As such, there are limited land and resource use tenures, other registered interests, or outdoor tourism and recreational areas occurring within the RSA that have the potential to be disturbed by the NSDF Project. Land users have been identified as potentially trapping in the southern and western portions of the RSA, which overlaps the land and resource use RSA. However, the NSDF Project is not predicted to have any terrestrial effects beyond the CRL site, and results of the aquatic environment assessment identify that measurable residual effects on aquatic biodiversity VCs are not predicted as a result of the NSDF Project. Therefore, no effects on terrestrial or aquatic species defined as traditional land and resource use VCs are expected. Traditional access to the Pointe au Baptême site along the Ottawa River will continue to occur and not be restricted because of the NSDF Project. Reference: [1] Environmental Risk Assessment of Chalk River Laboratories, ENVP-509220-REPT-003.
CNL-ND506	MNO (August 16, 2017)	**5.9.4.3 Traditional Land and Resource Use by First Nation and Métis Communities, 5.9.4.3.1 Methods, Page 5-596** There is no mention in this section of the traditional harvesting territory of the MNO where this Project is located. It can be assumed from this location that MNO Citizens also continue to practice traditional land use activities throughout this region. Further, the use of existing studies and reports and information from the AOO is not sufficient to characterize the traditional land use activities of the MNO.	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. The information on Indigenous Traditional Land and Resource Use is now found in Section 6.4.3.4 of the final EIS. This section provides the methodology and results for the traditional land and resource use by Indigenous peoples. This section also outlines that the area of the NSDF Project is the traditional territory of the Algonquins of Ontario, composed of 10 Algonquin communities. It also recognizes the Mattawa/Lake Nipissing Traditional Harvesting Territory for the MNO Mattawa Métis Council, North Bay Métis Council and Sudbury Métis Council which is part of MNO Region 5. Use of the area around the CRL site by other Indigenous peoples is not certain. The MNO has completed a Traditional Knowledge and Land Use (TKLUS) specifically for the NSDF and Nuclear Power Demonstration projects through funding supplied by the CNSC and CNL. While the study only involved 11 participants, it did document significant use within its study area. Because the study only involved eleven participants, the results should not be taken as the only land uses by MNO citizens in the region. (Section 6.4.3.4.2 of the final EIS). Information on traditional land use activities by Indigenous peoples in Section 6.4 has been drawn from the MNO's TKLUS.
CNL-ND507	MNO (August 16, 2017)	**Table 5.9.5-1: Pathway Analysis for the Land and Resource Use Valued Components, Page 5-601 and 5-602** We object to every Valued Component related to Métis rights and interests being identified in the pathway analysis as having no linkages. This is a factor of the narrow scope and the narrow spatial parameters applied and has resulted in **no** assessment of potential effects to Métis rights and interests. This assessment is cursory, does not contain the necessary baseline information and overall minimizes the constitutionally protected rights of the Métis. This methodology has allowed for a misrepresentation of Métis in the application and a failure of the proponent to comply with the requirements of CEAA 5(1)(c).	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. The information on Indigenous Traditional Land and Resource Use is now found in Section 6.4.3.4 of the final EIS. Valued Components (VCs) refer to environmental features that may be affected by a project and that have been identified to be of concern by the proponent, scientists, government agencies, Indigenous peoples, or the public. Traditional land and resource use VCs were selected based on the potential for the NSDF Project to interact with the features of the land and resource use environment. In addition, VCs for traditional land and resource use were selected based on a consideration of knowledge of traditional land and resource use practices that interact with the environment, Indigenous and/or treaty rights and community engagement.

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			As summarized in Section 6.4.3 of the final EIS, the NSDF Project Site Study Area (SSA) and Local Study Area (LSA) are located entirely within the Chalk River Laboratories (CRL) site boundary, on federal lands. Therefore, aside from the operations and activities undertaken by Canadian Nuclear Laboratories (CNL), other land uses of the CRL site are prohibited due to restricted public access. The lands of the RSA also extend into Garrison Petawawa, other federal lands with restricted public access. As such, there are limited land and resource use tenures, other registered interests, or outdoor tourism and recreational areas occurring within the RSA that have the potential to be disturbed by the NSDF Project. Land users have been identified as potentially trapping in the southern and western portions of the RSA, which overlaps the land and resource use RSA. However, the NSDF Project is not predicted to have any terrestrial effects beyond the CRL site, and results of the aquatic environment assessment identify that measurable residual effects on aquatic biodiversity VCs are not predicted as a result of the NSDF Project. Therefore, no effects on terrestrial or aquatic species defined as traditional land and resource use VCs are expected. Traditional access to the Pointe au Baptême site along the Ottawa River will continue to occur and not be restricted because of the NSDF Project. There are no effects anticipated to archaeological resources as most mitigation for archaeological resources is applied and completed in advance of ground disturbance activities. The Cultural Resource Management portion of the Environmental Protection Program will be used to identify unanticipated archaeological resources and implement adaptive management. Consequently, the NSDF Project is not expected to affect the traditional land and resource VCs. The MNO and CNL have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the Métis community at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects.
CNL-ND508	Jennifer Jimmo (August 16, 2017)	The fact that no monitoring or follow-up programs specifically identified for human health will be provided leaves me to wonder how on earth both the proponent CNL or the Responsible Authority CNSC can possibly assert to the public these NSDF Project activities will be "safe" towards human or public health? When speaking of potential exposure and doses to different groups, there is no specific consideration or prediction for pregnant women. In my view the proponent CNL or the regulating authority CNSC cannot in any way assure the public these predicted airborne and waterborne dosages are "safe" towards public or human health when it is not known for certain it is safe for the human health of *all* persons, pregnant and otherwise!	As outlined in Section 5.8.9 of the final Environmental Impact Statement (EIS), monitoring of environmental media at the Chalk River Laboratories (CRL) site and surrounding area will proceed through the NSDF Project in alignment with CRL's existing Environmental Monitoring Program. This includes sampling and analysis of surface water, groundwater, sediment, soil, vegetation, ambient air, milk, garden produce, game animals, farm animals and fish. The site-wide CRL's Environmental Monitoring Program includes assessment of dose to members of the public based on emissions monitoring and measurements in environmental media. Additionally, the dose to workers for all operations at the CRL site is continuously monitored. The Annual Safety Report for Environmental Monitoring at CRL is prepared by CRL Environmental Specialists, reviewed by the Environmental Protection Program Manager and approved by the Environmental program Authority. It is then submitted to the CNSC and other interested regulatory agencies. Canadian Nuclear Laboratories' (CNL's) Annual Safety Report for Environmental Monitoring at CRL is made available to the public on the CNL website (www.cnl.ca). In addition to existing environmental monitoring at the CRL site, the EA Follow-up Monitoring Program (EAFMP) will specifically monitor NSDF Project elements during its construction, operations, and closure phases. The EAFMP will include environmental, effluent verification, and groundwater monitoring to ensure that releases and subsequent environmental concentrations of potential contaminants are below the relevant guidelines. Section 11.0 of the EIS presents a framework for the EAFMP aligned with the requirements of the *Generic Guidelines for the Preparation of an EIS* [1]. The EAFMP will follow the systematic informed planning process outlined in Canadian Standards Association (CSA) Standards for environmental (N288.4-10) [2], effluent (N288.5-11) [3], and groundwater monitoring (N288.7-15) [4]. It is expected that regulatory oversight of the EAFMP and its results will be maintained as it becomes pertinent for the duration of the institutional control period of the NSDF Project. The EAFMP will be continuously reviewed and its elements may change in

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			accordance with the normal evolution of the NSDF Project (i.e. through its progression from construction to operations to closure and post-closure phases). Canadian Nuclear Laboratories (CNL) will continue to offer opportunities for the general public to provide feedback as the EAFMP is developed and reviewed by the Canadian Nuclear Safety Commission (CNSC). Specific monitoring activities related to human health will include: • air quality (i.e., dust) monitoring at the study site area (SSA) and air effluent verification monitoring at the wastewater treatment plant (WWTP); • dust samples collected in the high-volume air sampler during construction and operations will be screened for radioactivity; • treated effluent from the WWTP, stormwater pond effluent and surrounding surface water quality will be monitored; • ambient radioactivity will be measured at the SSA; and • groundwater monitoring will be performed surrounding the ECM, to confirm groundwater quality and detect potential releases of constituents from the ECM containment area. The regulatory dose limit for a member of the public are set to be protective of the most at-risk individuals, which specifically includes pregnant members of the public and infants. In fact, when a Nuclear Energy Worker announces their pregnancy to their employer, their maximum allowable dose goes down from 50 mSv/y to 4 mSv/y, for the duration of their pregnancy. Reducing the limit to 4 mSv/y is to reduce risk to the unborn child, and the mother. The regulatory dose limit for a member of the public of 1 mSv/yr is 4 times lower than the 4 mSv/y for a pregnant worker, and is therefore also protective of members of the public who are pregnant. The predicted doses for all exposure groups (Adult, 10 year old child and infant) are a tiny fraction of the regulatory dose limit for a member of the public (Section 5.8.6.1.2 of the final EIS). The CNSC maintains an Independent Environmental Monitoring Program (IEMP) at the CRL site which is a planned sampling program designed to verify that public health and environmental conditions are safe and that CNL's environmental protection programs are working as intended. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CSA Group N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [3] CSA Group N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [4] CSA Group N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015.
		Environmental Effects – Potential Leak Scenarios	
CNL-ND509	OFWCA (Johanna Echlin) (May 8, 2017) Cara Rose-Brown,	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* In the EIS the description of this ECM indicates a number of ways that contaminants will leak into the surrounding area and ultimately into the river (During the post-closure phase with "natural evolution", the	The evolution of the NSDF has been modeled using conservative assumptions for the degradation rates of the barrier materials. The selected degradation rates result in some contaminants being available to be released approximately 450 years after closure of the facility. By 450 years after closure, 99.991% of the radioactivity in the facility has already decayed, and the concentration of radionuclides is comparable to the natural background. In other words, only 0.009% of the radiological inventory exists 450 years into the future, and of that only a tiny percentage is likely to be released. The calculated releases

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	(May 15, 2017) Iana and Carlos Ciatti (May 15, 2017) Ted and Linda Kucharski (May 16, 2017)	covers and liners will ultimately fail and contaminants will leak; Bathtub Effect Overflow Scenario). Additionally, some but not all radioactive contaminants will be removed from the leachate. This leachate is then discharged into the wetlands that drain into the Ottawa River (EIS Table 3.5.3-1 on page 3-23). What happens to all the concentrated contaminants that are removed from the leachate during treatment - where will these concentrated contaminants be placed? The same is true for other toxic substances like PCBs, lead and dioxin. And tritium cannot be removed from water in the WWTP. The EIS states that very high levels of tritium will have to be reduced, but the EIS has left devising the way to do this till some future date. What can be done to mitigate effects from potential leak scenarios that CNL has acknowledged? What if something does happen and a large spill occurs? If the system fails and there is a leak what will CNL do?	meet environmental concentration guidelines and do not pose a risk to the public or environment. For more information regarding the long-term modelling of the NSDF, please see the Post-Closure Safety Assessment (PostSA) [1]. The leachate is treated in the Wastewater Treatment Plant (WWTP) for the removal of contaminants. Treated effluent must meet the discharge criteria before being released, where the discharge criteria is calculated to be protective of the environment. The concentrated contaminants that are removed from the leachate result in solid waste forms, i.e., the dewatered filter press cake, spent granular activated carbon media, and spent ion exchange resin. These waste forms will be packaged in leachate controlled packages to ensure containment of their contents. These waste forms will be placed back into the NSDF for disposal. Higher concentrations of tritium are also placed into leachate controlled waste packages, which are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. Leachate controlled waste packages are discussed in Section 3.3.1.1 and the concentration limits are provided in Table 3.3.3-1 of the final Environmental Impact Statement (EIS). With respect to the control of Polychlorinated Biphenyls (PCB), lead, and dioxin containing waste both the final EIS and the revised WAC [2] have clarified the requirements. • Section 3.3.3.3 of the EIS states that "Waste emplaced in the NSDF will meet the intent of land disposal and leachate requirements specified in the Ontario *Environmental Protection Act*, Regulation 347 [3]." • Section 4.1 of the NSDF Waste Acceptance Criteria (WAC) [2] states that "Materials containing Polychlorinated Biphenyls (PCBs) at a concentration of more than fifty parts per million by weight whether the material is liquid or not, and materials containing PCBs at concentrations less than 50 parts per million by weight that are leachate toxic waste are not permitted for disposal in the NSDF. The NSDF benefits from Chalk River Laboratories (CRL)'s existing environmental monitoring program, which includes groundwater monitoring wells and various radiation detection systems. While the potential for leaking from the base liner system is low, CRL's environmental follow-up program will be able to detect changes in groundwater quality and be able to react accordingly with remediation efforts. Additional spill prevention measures are discussed in the final EIS under: • Section 3.4.2.3 describes the leachate and contact water transfer system including the double-contained piping and leak alarms to address spill (leak) prevention measures. • Section 3.4.2.4 describes the spill prevention (secondary containment) for the storage tanks (referred to as Equalization Tanks in the NSDF Design Description [4]). References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347

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			[4] Design Description 232-503212-DD-001.
CNL-ND510	Robert Shellard (August 14, 2017)	The commenter requests that CNL consider the national security impact the proposed plan (or a possible leak) would have on the Petawawa military facility located downstream from CRL.	The NSDF will contain only low-level waste (LLW). There are no discrete quantities of special nuclear material or any material that is considered a "national security" issue. Any nuclear material proposed within the NSDF inventory are radionuclides that in trace amounts which occur naturally in material (i.e., soils or demolition debris) or is present as residual contamination. The consequences of a leak from the facility have been evaluated. The potential for a leak from the NSDF and impacts on communities downstream of the Chalk River Laboratories (CRL) site are assessed in Section 5.8.6 of the final Environmental Impact Statement (EIS). These groups include the community of Petawawa and by extension the neighbouring Garrison Petawawa Base. Radiological doses to members of the public would be a tiny fraction of the regulatory dose limit for a member of the public of 1 mSv/yr. Section 7 of the final EIS addresses accident and mal-function events including spill and leak scenarios. No impacts on Garrison Petawawa Base are predicted. Furthermore the Garrison Petawawa has invited representation on CRL's Environmental Stewardship Council (ESC). The NSDF Project has been presenting at the ESC since 2015 October and no concerns have been raised directly from the Garrison Petawawa representatives.
		Geotechnical Studies	
CNL-ND511	Pravin Shah (April 8, 2017)	Were any Geotechnical Investigations of various proposed sites were carried out by Golders Associates for location of a NSDF? (Geotechnical investigations are required to obtain information on the physical properties of soil and rock around a site to design earthworks and foundations for proposed structures).	The site selection process is described in Section 2.5.5 of the final Environmental Impact Statement (EIS) and considered 15 sites. Existing information on geology and hydrogeology was sufficient for the site selection process. Geotechnical investigations necessary for the design and construction were carried out for the preferred site which is the East Mattawa Road site. Section 5.3.1.4 of the final EIS provides a summary of geotechnical investigations that were conducted.
		Socio-economic Environment	
CNL-ND512	Janey Bullivant (May 13, 2017) Julie McCann (May 17, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Heather Sanderson (May 12, 2017) David Thompson	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The wellbeing of the environment will have an impact on employment and economic prosperity, while 50 new jobs are needed, there are also concerns that people could lose jobs if the proposal is not accepted, and that people will lose their jobs anyway when the NRU is decommissioned in March 2018.	Canadian Nuclear Laboratories (CNL) continues to maintain its commitment to sustainable socio-economic development through its innovations in nuclear science and technology, including site revitalization. This includes maintaining essential site infrastructure, the decommissioning of aging infrastructure and a significant investment in new, world-class science facilities. The transformation will position CNL to remain a leader in developing peaceful and innovative applications from nuclear technology through its expertise in physics, metallurgy, chemistry, biology and engineering. The new investments at the Chalk River Laboratories (CRL) site will be turned into advances in clean energy, health, safe and secure borders, and a clean and healthy environment. Additionally, the application of environmental management standard ISO 14001, development of the Environmental Protection Program at all CNL sites (CRL, Whiteshell, Port Hope, etc.), and continuous environmental monitoring summarized in Annual Safety Reports are examples of CNL's practice to ensure environmental safety throughout its operations. The rigorous development, continuous revision, and careful scrutiny of this Environmental Impact Statement (EIS) for the NSDF Project demonstrates CNL's commitment to environmental protection and continual enhancement of environmental performance.

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	(April 11, 2017) Robert Shellard (August 14, 2017) Denise Roberge (August 15, 2017 Janice Cunningham and Claude Allard (August 15, 2017)	Furthermore, will people and new companies move to the Valley when they learn of the risk of radioactive contamination and the need for emergency preparedness training? Will tourists still come? People like us who care about our health and wellbeing will NOT come, impacting local businesses. The perception will hang over the Ottawa Valley that it is toxic. A viable future and quality of life in the region greatly depends on a clean and healthy environment in order to attract new young families, businesses, and tourists. The financial implications multi-faceted. Should any of the aforementioned issues (spills, leaks, contamination) occur, how would the communities provide for themselves? How would they sustain the value of their land, their homes, their communities and provide for a future? With the proposed demolition of over 100 buildings on site, it is foreseeable the market value of the property will be lowered and the requisite grant- in-lieu to the municipality reduced. [Français] Le bien-être de l'environnement aura un impact sur l'emploi et la prospérité économique. Alors que 50 nouveaux emplois sont nécessaires, on craint que les gens perdent leur emploi si la proposition n'est pas acceptée, et que les gens perdent leur emploi de toute façon lorsque le réacteur NRU sera déclassé en mars 2018. De plus, les gens et les nouvelles entreprises déménageront-ils dans la vallée lorsqu'ils apprendront le risque de contamination radioactive et la nécessité d'une formation en préparation aux situations d'urgence? Les touristes viendront-ils encore? Les gens comme nous qui se soucient de notre santé et de notre bien-être NE viendront PAS, ce qui aura un impact sur les entreprises locales. La perception selon laquelle la vallée de l'Outaouais est toxique demeurera. Un avenir viable et une qualité de vie dans la région dépendent en grande partie d'un environnement propre et sain afin d'attirer de nouvelles familles, des entreprises et des touristes. Les implications financières sont multiples. Si l'un des problèmes susmentionnés (déversements, fuites, contamination) se produisait, comment les collectivités répondraient-elles à leurs besoins? Comment pourraient-elles maintenir la valeur de leurs terres, de leurs maisons, de leurs communautés et assurer un avenir? Avec la démolition proposée de plus de 100 bâtiments sur le site, il est prévisible que la valeur marchande des propriétés sera réduite et que la subvention en remplacement de la municipalité sera réduite.	The Canadian Nuclear Safety Commission (CNSC) provides independent regulatory oversight over all CNL activities under the respective site licences. Section 5.10 of the final EIS provides a Socio-economic assessment of the project which discuss the project's effects on Valued Components (VCs) of the community such as quality of life and labour market. Measurement indicators for quality of life include air quality, noise and visual disturbances which are relevant to impacts on permanent residents as well as tourism. Measurement indicators for economic development include purchase of goods and services, supplier industries, and household spending. Measurement indicators for the labour market include direct, indirect, and induced employment, income, and development opportunities of new skills and training. Other factors considered include residential housing demand and supply, government revenue, as well as education, health, protective, and emergency services. Section 5.10.5 of the final EIS describes the potential impacts of the NSDF Project on these important socio-economic components – further details are described in Table 5.10.5-1. With respect to employment during the NSDF development and operations, the final EIS states (Section 5.10.7) most workers at the NSDF Project during the operations phase will be employed by CNL. Confidence in the prediction of the effects of the NSDF Project on the socio-economics of the local communities is based on a number of assumptions of future conditions, including the following: • workers' skill requirements will be similar to those existing at CRL; • working conditions (e.g., shift schedules) will be the same; • most workers at the NSDF Project during the operations phase will be employed by CRL; and employees will continue to live in the same communities. Overall, the residual effects from the NSDF Project on the labour market and economic development are predicted to be positive. The effects are predicted to be local, regional, and beyond. For example, construction workforce will be sourced from the areas including Country of Renfrew, and the Ottawa area in Ontario as well as the Region of Outaouais in Quebec. Procurement of goods and services from local and regional sources as well as employment opportunities and income generation are also predicted to be positively affected. The demolition of the buildings on site is part of the revitalization plan for the CRL site. Buildings proposed to be demolished are liabilities for CNL and pose a risk due to, for example, outdated structures. Furthermore, the space created by the demolition of these buildings will be used to build new infrastructure, including modern labs and research facilities that will meet the updated codes and standards, contributing to an increased value of the CRL site and, as implied by the socio-economic assessment of the NSDF Project, a positive impact on local as well as regional communities. **[Français]** Les Laboratoires nucléaires canadiens (LNC) restent engagés à l'égard du développement socioéconomique durable grâce à l'innovation en matière de science et de technologie nucléaires et notamment en matière de revitalisation des sites. Cela englobe l'entretien des infrastructures essentielles des sites, le déclassement des infrastructures vieillissantes et un investissement important dans de nouvelles installations scientifiques de classe internationale. Ces transformations permettront aux LNC de conserver leur position dominante dans l'élaboration d'applications pacifiques et novatrices du nucléaire grâce à leur expertise en physique, en métallurgie, en chimie, en biologie et en ingénierie. Les nouveaux

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			investissements engagés sur le site des Laboratoires de Chalk River (LCR) donneront lieu à des progrès en matière d'énergie propre, de santé, de sûreté des frontières et d'environnement non pollué et sain. De plus, l'application de la norme de management environnemental ISO 14001, l'élaboration du programme de protection de l'environnement pour tous les sites des LNC (LCR, Whiteshell, Port Hope, etc.) et la surveillance permanente de l'environnement que résument les rapports annuels sur la sûreté sont des exemples de pratiques des LNC permettant de garantir la protection de l'environnement dans le cadre de toutes leurs activités. L'élaboration rigoureuse de l'Étude d'impact environnemental (EIE) du projet d'IGDPS, sa révision systématique et son examen scrupuleux attestent l'engagement des LNC à protéger l'environnement et à améliorer constamment ses résultats à cet égard. La Commission canadienne de sûreté nucléaire (CCSN) exerce une surveillance réglementaire indépendante sur toutes les activités des LNC au regard des différents permis qui leur sont accordés. La section 5.10 de l'EIE définitive fournit une évaluation socioéconomique du projet, où sont analysés les effets du projet sur les composantes valorisées (CV) de la collectivité, à savoir, par exemple, la qualité de vie et le marché du travail. Les indicateurs de mesure de la qualité de vie portent entre autres sur la qualité de l'air, les perturbations sonores et les perturbations visuelles qui entrent en ligne de compte dans les répercussions sur les résidents permanents et sur les touristes. Les indicateurs de développement économique portent entre autres sur l'achat de biens et de services, les fournisseurs, et les dépenses des ménages. Les indicateurs du marché du travail portent entre autres sur l'emploi direct, l'emploi indirect et l'emploi induit, le revenu, et les possibilités de formation et d'acquisition de nouvelles compétences. Parmi les autres facteurs pris en compte, signalons la demande et l'offre de logement résidentiel, les recettes gouvernementales, ainsi que l'éducation, la santé, et les services de protection civile et d'urgence. La section 5.10.5 de l'EIE définitive décrit les répercussions éventuelles du projet d'IGDPS sur ces composantes socioéconomiques importantes. D'autres détails sont fournis au tableau 5.10.5-1. Concernant les possibilités d'emploi durant les phases de construction et d'exploitation de l'IGDPS, l'EIE définitive (section 5.10.7) indique que la plupart des travailleurs engagés pour la phase d'exploitation de l'installation seront employés par les LNC. Le degré de certitude des prévisions portant sur les effets du projet d'IGDPS sur les composantes socioéconomiques des collectivités locales s'appuie sur un certain nombre d'hypothèses sur la situation à venir, notamment : • Les compétences exigées des travailleurs seront semblables à celles d'aujourd'hui aux LCR. • Les conditions de travail (p. ex., les horaires de quarts) seront les mêmes. • La plupart des travailleurs engagés pour la phase d'exploitation de l'IGDPS seront employés par les LNC. Et les employés continueront de vivre dans les mêmes collectivités. Dans l'ensemble, les effets résiduels du projet d'IGDPS sur le marché du travail et sur le développement économique devraient être positifs. Et ils devraient se faire sentir à l'échelle locale, régionale et au-delà. Par exemple, la main-d'œuvre engagée pour la construction de l'installation sera sollicitée dans les environs, notamment dans le comté de Renfrew, dans la région d'Ottawa en Ontario et dans la région de l'Outaouais au Québec. L'approvisionnement en biens et services auprès de sources locales et régionales et les possibilités d'emploi et de revenus devraient également connaître une hausse. La démolition de bâtiments fait partie du plan de revitalisation du site des LCR. Les bâtiments que l'on envisage de démolir représentent un passif et un risque attribuable, par exemple, à l'obsolescence des structures. Par ailleurs, l'espace ouvert par

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			la démolition servira à construire de nouvelles infrastructures, dont des installations de recherche et des laboratoires modernes qui seront conformes aux codes et aux normes en vigueur, ce qui contribuera à améliorer la valeur du site des LCR et, comme le laisse entendre l'évaluation socioéconomique du projet d'IGDPS, aura également des répercussions positives sur les collectivités locales et régionales.
CNL-ND513	Joan Lougheed and Town of Deep River (August 16, 2017) William Turner (May 31, 2017) 131.	Table 2.5.1-1does not consider the socio-economic value components associated with a community becoming the home of a radioactive waste disposal facility and the stigma associated therewith, as well as the socio-economic considerations that result from accepting radioactive wastes from other communities. The draft EIS should include a list of the specific questions and discussion lead points used to obtain input into the scope and areas of interest for socio-economic assessment. Deep River's perspective on the information currently included as appendices is that the socio-economic topic was conducted in an ad-hoc manner, rather than as a structured formal process. For example, there was no session held in the various affected communities, including Deep River, that sought input into the areas of interest addressed in this socio-economic assessment. CNL cannot ignore the long-term cumulative effects on the socio-economic environment resulting from the decommissioning of the over 120 buildings on the CRL site. Long-term consequences to the socio-economic environment must be addressed.	Section 5.10 of the final Environmental Impact Statement (EIS) seeks to understand and characterize the potential residual effects of the NSDF Project and previous, existing and reasonably foreseeable developments on the socio-economic environment. The socio-economic assessment follows the overall environmental assessment approach and methods described in Section 5.1 Environmental Assessment Approach. Socio-economic. Valued Components (VCs) were selected based on the potential for the NSDF Project to interact with the features of the socio-economic environment, and consist of: • labour market; • economic development; • government finances; • housing and accommodations; • services and infrastructure; • quality of life; and • public safety. Information and areas of interest raised by the public, communities of interest, and Indigenous peoples during engagement that influenced the scope of the socio-economic assessment are summarized in Table 5.10.1-1 of the final EIS which is around the use of local industries and workers for the project. Thus, the VCs for socio-economics are based on what was of interest to the community. Residual effects from activities that occur during the construction phase have been identified as the primary linkage to potentially affect socio-economic VCs. During the construction phase, NSDF Project activities will result in residual effects from direct and indirect employment requirements, contracting and supplier opportunities, increased pressure on commercial accommodations, changes in demand for community services and increased degradation of public transportation roads. A summary of the predicated residual effects for socio-economics, including associated mitigation, are provided in Table 5.10.10-1 of the final EIS. The Stakeholder Activities Report [1] includes details about specific dates, number of attendees, list of individual attendees, formal public feedback, and meeting agendas at three public information sessions, one technical discussion, one Deep River Town Council meeting, two internal information sessions for CNL employees, as well as two hard copies of the 2017 draft EIS volumes at the Deep River Library and the Town Hall for the Town of Deep River. These activities facilitated valuable feedback for the project to incorporate into future communications and the final EIS. The Stakeholder Activities Report also includes copies of slideshows presented during public meetings as well as comments from the public during public information session. Similar public engagement activities have also been hosted at other affected communities in addition to Deep River. Comments and other forms of feedback continue to be welcome from the general public about the NSDF Project since its initial proposition. Canadian Nuclear Laboratories (CNL) has been working towards increasing and improving public engagement above and beyond that required by CNSC requirements for a formal environmental assessment in response to feedback from the 2017 draft EIS. Section 6.2, and more specifically 6.2.4, of the final EIS is organized to describe engagements the nature of the discussion and feedback received and how CNL continues to engage

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			with each Indigenous community or organization. More details on Indigenous Engagement can be found in the NSDF Indigenous Engagement Report [2]. In including the Application Case and Reasonably Foreseeable Developments Case (described in Section 5.10.3.3 of the final EIS) within the assessment of the socio-economic environment, CNL recognizes the importance of long-term cumulative effects resulting from the NSDF Project on the socio-economic environment within local communities near the Project site and within the province (both Ontario and Quebec). Both cumulative and residual effects have been thoroughly addressed in the final EIS demonstrating a long-term assessment of the potential impact of the NSDF Project on the socio-economic environment. The NSDF is a key factor in supporting the revitalization of the CRL site to ensure the enduring science and technology mission at the site. Reference: [1] Stakeholder Activities Report – Near Surface Disposal Facility, 232-513400-REPT-001. [2] Indigenous Engagement Report, 232-513130-REPT-001.
CNL-ND514	Joan Lougheed and Town of Deep River (August 16, 2017)	Traditionally, property value protection plans and agreements are implemented to provide affected property and business owners with a level of comfort regarding any perceived or real diminution in property values resulting from the proximity to or impacts and stigma associated with a waste management facility of this size and composition. Deep River is of the opinion, in comparing alternatives, specifics regarding waste volumes and the number of truck trips should be detailed in order to measure the full potential impacts on the municipality, its businesses and residents. The presence of a permanent nuclear waste storage facility, its construction and operations along with the impacts associated with the high volume of truck trips on public roads will result in a real and perceived stigma to Deep River properties, businesses and residents within reasonable proximity of the haulroute and the NSDF. Accordingly, those affected individuals should be offered a comprehensive property value protection plan.	Overall, the socio-economic assessment of the NSDF Project can be used to reasonably interpret that the NSDF Project will not have any residual effects on the value of properties in the surrounding community. As such, a property value protection plan and agreement is not proposed as a mitigation measure for the NSDF Project. Any stigma (real or perceived) related to the activities of the NSDF Project will likely be perpetuated by misinformation or else lack of information. To mitigate this, Canadian Nuclear Laboratories (CNL) will engage with the public as part of the Public Information Program regarding NSDF generated traffic and address public concerns which may arise (See Table-11.0-1 Follow-up Monitoring for Socio-Economic of the final Environmental Impact Statement (EIS)). These and other public and Indigenous engagement efforts, which have been on-going since the NSDF's initial proposition, are strongly supported by CNL to communicate the purpose of the NSDF Project while discussing concerns from the general public including the residents of communities near the NSDF Project site (e.g., Chalk River, Deep River). Existing traffic to and from the Chalk River Laboratories (CRL) site was studied in 2017. The morning peak hour inbound traffic was 724 vehicles while the afternoon peak hour outbound traffic was 787 vehicles. Overall, the annual average daily traffic count is calculated to be 8,210 at the existing site for eastbound and westbound traffic. Sections 5.10.5.2.2 and 5.10.6.2.2 of the final EIS, which examines the impact of the NSDF Project on quality of life and housing and accommodations as socio-economic Valued Components (VC), has been updated to reflect the anticipated volume of truck traffic during both the construction and operations phase of the project. The hours of operation for truck transport is typically six days per week, 16 hours per day, but may vary between 12 and 18 hours per day depending on NSDF Project activities. Based on estimates of truck deliveries to the NSDF Project site during the 24-month construction period, it is anticipated there will be approximately an additional 200 shipments per day during the 9-month construction season. This represents an increase of approximately 5% to 6% (assuming each inbound trip results in an outbound trip) over existing traffic volumes on Highway 17 at Deep River. The additional construction personnel requirements are expected to result in an additional 50 inbound and outbound trips to the site daily. It is estimated that there will be 10 trucks per day during operations (i.e., less than 1 truck per hour).

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			Overall, the increase in transport vehicles is considered negligible in comparison to current traffic levels on the roads (personal vehicle traffic for over 2,000 employees and transport vehicles) to support operation of the CRL site. The change in long-term high annoyance is between 6.2% at 15 m and 2.3% at 60 m along Plant Road and 4.7% at 20 m and 2.7% at 60 m along Highway 17. The effect of increased traffic on noise levels at receptors along Highway 17 and Plant Road is considered to be a slight but discernible result in a small but noticeable change when compared to existing levels of traffic from current employees and operations at CRL. The predicted change in %HA is less than 6.5% and as such, this potential project-environment interaction is considered to have a negligible residual effect on quality of life. As a mitigation measure, CNL will coordinate transportation of construction materials during the construction phase to minimize overlap with peak employee traffic times. Moreover, as summarized in Table 5.10.5-1 of the final EIS, the visual aesthetic effect of the NSDF Project site will be limited as the line of sight will be obscured by hilly topography and the surrounding tree line. More specifically, the property owners, businesses, residents and visitors of the towns of Chalk River (approx. 9 km from the NSDF site) and Deep River (approx. 12 km from the NSDF site) will not be able to see the NSDF site or discern the trucks transporting construction materials or else moving during the operations phase of the Project.
CNL-ND515	MNO (August 16, 2017)	**5.10.2 Valued Components, Page 5-609** There is no specific Valued Component related to Métis. This is despite the requirement in CEAA, 2012 5(1)(c) which states: 5(1)(c) with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on (i) health and **socio-economic conditions**, (ii) physical and cultural heritage, (iii) the current use of lands and resources for traditional purposes, or (iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance. [emphasis added]	A new Section 6.0 has been included in the final Environmental Impact Statement (EIS), to consolidate and summarize the major areas of assessment relevant to Indigenous peoples into one single section. As outlined in Section 6.4.2, Valued Components (VCs) for Indigenous traditional land and resource use were selected based on consideration of a number of factors, including the following: • knowledge of traditional land and resource use practices that interact with the environment; • Indigenous and/or treaty rights; • community engagement; and • consideration of other environmental assessments. The VCs selected for assessing potential effects on land and resource use conditions are presented in Table 6.4.2-1 of the final EIS. The MNO has completed a Traditional Knowledge and Land Use (TKLUS) specifically for the NSDF and Nuclear Power Demonstration projects through funding supplied by the CNSC and CNL. While the study only involved 11 participants, it did document significant use within its study area. Because the study only involved eleven participants, the results should not be taken as the only land uses by MNO citizens in the region (Section 6.4.3.4.2 of the final EIS). Information on traditional land use activities by Indigenous peoples in Section 6.4 has been drawn from the MNO's TKLUS. The MNO and CNL have signed a Memorandum of Understanding (MOU). Together the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the MNO at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas of the projects.
		Malfunctions and Accidents	

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		Malfunctions and Accidents - General	
CNL-ND516	Greg Csullog (May 1, 2017) Phyllis Kirby and Rick Bradshaw (May 8, 2017) Dr. J.R. Walker (May 9, 2017) Heather Sanderson (May 12, 2017) Brian Eichstaedt (June 22, 2017) OFWCA (Johanna Echlin) (May 8, 2017) David Herbert (May 2, 2017) Joann McCann (May 2, 2017) Ron and Nancy Vellenga (May 7, 2017) Ronald and Michele Kaulbach (May 8, 2017) Janey Bullivant (May 13, 2017) Sheila Marchant (May 17, 2017) Paul Esslinger (May 17, 2017) Candace Prong (July 24, 2017) Gordon and Karen Lorimer (August 16, 2017) Liz Barett (August 15, 2017) James Hooper (August 15, 2017) Alan Darch, Elizabeth Elliott	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **Comments on Performance Assessment Document (as referenced in EIS): 4.2 Radionuclide Inventory:** What about transportation accidents for wastes from the MAGS and SMAGS storage facilities? Waste in ISO containers in MAGS/SMAGS may not be efficiently packed and actions would have to be taken (the EIS states, "Packaged waste will not include large steel shipping containers unless the void space inside the container is less than 10% of the container volume."). For me this implies opening ISO containers, assessing void space, and possibly reducing void space, which appears to be a candidate for "accident consequence assessment during operations". The distances and busy highways can mean that transport is very hazardous. The transport of waste from other sites in Ontario, Quebec, and Manitoba, to Chalk River Laboratories are not assessed in the Draft EIS; CNL's plan to bring all of Canada's federally owned radioactive wastes from other areas of the country to Chalk River for disposal or storage is unacceptable. Not from Whiteshell, not from Rolphton, not from any other location. Radioactive waste should be dealt with locally and not transported. If it must be transported it should not be sent to a location on a major body of water. A local solution to a local problem seems logical to me. Something must be done soon to mitigate the aging contaminated infrastructure and temporary storage provisions now on site. Trucking this material to a distant location exposes the public to unacceptable risks. Consequently we support a local installation but strongly oppose the plan to ship nuclear wastes from distant sites to this facility. Plans always go wrong at Chalk River, and they will go wrong in the future, particularly by an American-led consortia that is only here for short term profit and with a record of poor performance. What is most obvious from the EIS is a complete lack of institutional history of Chalk River, well let me bring the CNSC up to speed--things always go wrong at Chalk River, they went wrong under the best of conditions, like when the corporation was flush with taxpayer cash they could spend at will, such as in 1952 , the so called biggest nuclear accident in Canada at the NRX or in 1957 and 1959, 1991 and 2007 and 2009/10 at the NRU, and dozens of incidents since including the death of a young man as a result of an explosion a number of years ago and as well, just last year, the suicide of a young engineer. Many have expressed concerns over sabotage since this incident, sabotage of nuclear facilities and sabotage of the facilities supporting the NSDF. Only several weeks ago, a family member of a deranged employee approached the Plant Road toting a gun loaded with ammunition which he waved recklessly at passersby as they drove into work in the morning.	Transportation of waste from other sites is considered outside of scope for the NSDF Project. The transportation of waste to Chalk River Laboratories (CRL) site is an activity covered by Canadian Nuclear Laboratories (CNL) existing site licence [1] for the CRL site and other additional transport regulations. With respect to waste shipments, CNL has been transporting radioactive materials including radioactive wastes safely for over 70 years with no incidence of releasing radioactive material to the environment during transportation operations. This includes routine shipments of material from Whiteshell to CRL. Canadian Nuclear Laboratories maintains a Transportation Program to ensure that all shipments of waste are carried out in accordance with all Canadian regulatory requirements and best industry's practices. The program includes requirements for packaging and size of shipments, security and safety of workers and the public. Transportation of waste is a routine operation for CNL. Emergency response plans and procedures are already in place for malfunctions and accidents relating to transportation of any hazardous waste associated with the CRL site. The repackaging or processing of wastes currently in storage (e.g., in MAGS/SMAGS) is not in the scope of the NSDF Project. The processing of waste is a routine operation at CNL, and is performed in accordance with CNL's existing Radiation Protection Program and Waste Management Program as well as the associated procedures. Accidents and malfunctions in any CNL facility are assessed in their respective Safety Analysis Reports, which are reviewed and accepted by Canadian Nuclear Safety Commission (CNSC) staff. Canadian Nuclear Laboratories (CNL) has full-time security personnel at the CRL site, as required by the site licence [1]. The NSDF is on the CRL site, and is thus covered by the CNL Physical Security Program. There are no known instances of deliberate sabotage of nuclear facilities or systems at CNL sites. Furthermore, the NSDF is a collection of soil and building debris which is contaminated by radioactivity, all of it low-level. Contaminated soil and rubble are not often the target of saboteurs. Reference: [1] CNSC, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25.

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	and Clem Trail Residents Association (August 16, 2017) Owen Gleason (August 16, 2017) Ville de Gatineau (August 15, 2017) Judith Lacroix (August 16, 2017)		
CNL-ND517	Ville de Gatineau (August 15, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* La Ville de Gatineau aimerait mieux comprendre quelles seraient les mesures à prendre en cas de contamination des eaux de la rivière par des substances radioactives, le rôle de Gatineau dans les protocoles d'urgence ainsi que les moyens techniques et l'expertise dont elle devrait disposer pour y faire face.	L'IGDPS ne traitera que des déchets de faible activité (DFA). Ces déchets seront pour la plupart composés de terre contaminée et de débris de démolition. Compte tenu de leur faible radioactivité et de la solidité du monticule de confinement artificiel prévu, les risques sont très faibles pour la rivière des Outaouais. L'IGDPS ne représente pas non plus un risque plus important pour les collectivités voisines. Au cours de la phase d'exploitation, toute l'eau entrant en contact avec les déchets sera acheminée vers l'usine de traitement des eaux usées (UTEU) pour traitement avant d'être rejetée dans le bassin du lac Perch. Les objectifs de rejet d'effluents non radiologiques sont inspirés de directives fédérales et provinciales visant la protection du biote aquatique (tableau 3.4.2-3 de l'Étude d'impact environnemental (EIE)). Les objectifs de rejet de radionucléides (tableau 3.4.2-2 de l'EIE définitive) sont énoncés dans les Recommandations pour la qualité de l'eau potable au Canada, exception faite du tritium, qui est assujetti à un objectif spécifique local (section 3.4.2.5.1). Compte tenu de l'application de ces recommandations, on ne prévoit pas d'effets résiduels sur la rivière des Outaouais. En cas d'accident ou de défaillance, les Laboratoires nucléaires canadiens (LNC) disposent de procédures permettant de répondre aux besoins immédiats et de nettoyer ou d'assainir le site par la suite. Précisons que le Programme de préparation aux situations d'urgence des LNC (décrit à la section 3.5.2.5 de l'EIE définitive) est conçu pour réagir immédiatement aux situations d'urgence. Le programme prévoit les mesures de préparation aux situations d'urgence et la gestion des urgences à l'appui d'activités concernant la sûreté nucléaire, les défaillances de réacteurs, le déclassement, la protection contre les radiations et la protection de l'environnement, la protection contre les incendies, et la santé et la sécurité professionnelles. Après un accident ou une défaillance, le Programme de protection de l'environnement des LNC (voir la section 3.5.2.2 de l'EIE définitive) prévoit des procédures permettant de circonscrire, de traiter et d'assainir les terres contaminées. Les Laboratoires nucléaires canadiens dresseront un plan de préparation aux situations d'urgence propre au projet d'IGDPS, comprenant notamment des procédures d'urgence. Ce plan énoncera des pratiques de gestion de l'environnement sûres et écologiques applicables durant les phases de construction, d'exploitation, de fermeture et de post-fermeture de l'installation. Des procédures d'urgence applicables au projet d'IGDPS seront élaborées dans le but de réagir aux risques d'accident, par exemple des incendies internes, des déversements mineurs, des déversements majeurs, des fuites de gaz naturel ou de monoxyde de carbone, des pannes de courant, une forte radioactivité, une contamination radiologique, des menaces à la bombe, des colis suspects, par la mise en attente et en sécurité des colis et le maintien à l'intérieur du personnel. Des listes de contrôle accompagnent également les plans d'évacuation, et des zones de rassemblement sont prévues.
CNL-ND518	Dr. J.R. Walker (May 9, 2017) Heather Sanderson	CNL need to provide a comprehensive and detailed assessment of the evolution of the proposed facility over the period of time that there is a significant hazard (more than 100,000 years), including the effects of all internal and external events that can be anticipated over that period and the associated consequences of these events.	The proposed inventory for NSDF has been significantly reduced through the removal of any intermediate level waste (ILW) streams. The revised inventory proposed for the NSDF is solid low-level radioactive waste (LLW), which will be controlled through the Waste Acceptance Criteria WAC [1]. The WAC [1] has also been developed in consideration of the Wastewater Treatment Plant (WWTP) to ensure it is capable of treating the contaminants in the leachate at the

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	(May 12, 2017) Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) Anna Tilman (August 11, 2017)	There is insufficient information on how the proponent will reduce the risk of human or animal intrusion into the mound for the thousands of years the mound will remain radioactive and hazardous. 'Accidents' happen. These potentials should be considered in all estimations. The consideration of potential accidents is simplistic at best and the assumptions that radiation doses to nuclear workers, the public and non-human biota are below safety criteria, and that exposure is of short duration are unfounded and unwarranted. EIS requires rationale for these assumptions.	concentrations expected from the waste. Additionally, the WAC [1] applies a graded approach to control leachate radionuclide concentrations during placement of waste. There will be a small portion of waste which will be required to utilize robust packaging to prevent the spread of contamination. Specifically leachate controlled waste packages are intended to provide short-term barriers for wastes with higher radionuclides concentrations during the time the disposal cell is not covered with the final cover system (approximately 5-10 years). Thus more mobile radionuclides, such as tritium, are kept isolated from the environment to minimize liquid effluent releases during the operations phase. This approach to ensure long-term safety is consistent with the safety requirement #20 of the International Atomic Energy Association (IAEA) *Disposal of Radioactive Waste*, SSR-5 [2]. Section 7, Accidents and Malfunctions, of the final Environmental Impact Statement (EIS), has been revised to align with the operational hazards identified in the operational Safety Analysis Report (SAR) for NSDF [3]. The NSDF SAR [3], Section 14.1 contains detailed information on the hazards and potential initiating events associated with the NSDF. Section 7.2 of the final EIS contains summaries of the hazard identification and hazard analysis methodologies. Four hazard analyses were conducted by the NSDF Project to ensure that all possible hazards were identified and assessed. The focus of the hazard analyses was on the potential accident conditions involving the hazards associated with the NSDF design and operations. In general, the hazard analysis process consisted of: • Systematically evaluate hazards, develop accident sequences/scenarios, and identify administrative and engineered controls. • Qualitatively assess the frequency and consequence/severity for the mitigated hazard or event. • The frequency and consequence/severity is combined to determine the risk ranking of the mitigated hazard or event. The hazards and events from the hazard analyses were grouped under the following main headings: • Group A: Anticipated Operational Occurrences. • Group B: Design Basis Accidents. • Group C: Beyond Design Basis Accidents. • Group D: Conventional Health and Safety. The final EIS summarizes safety analyses performed in, SAR [3] and Post-Closure Safety Assessment (PostSA) [4]. The safety analyses performed use a conservative approach to take account of uncertainties in data, and models to provide bounding results. In those cases where scientifically informed knowledge and data is available, realistic assumptions are made. In addition, where measurement data is available, the data is used as inputs to calculations, for performing a comparison between results, or to limiting the range of variants for a scenario. Accompanying each accident analysis scenario and conceptual model is the specific information needed to describe the event. A realistic but conservative approach has been used to define parameters, noting that in many cases there are uncertainties. Where there are high levels of uncertainty, more conservative assumptions are adopted. As such, it is acknowledged that the combined effect of many conservative assumptions can lead to unrealistic consequence estimates. To counteract this, realistic data has been used wherever possible in the safety analyses [3] [4], both during the pre-closure and post-closure phases, and to determine design requirements for the NSDF. The Post SA [4], which supports the human health assessment discussed in Section 5.8 of the final EIS, includes

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			consideration of effects of the NSDF Project for 10,000 years post-closure phase. Additional information on the post-closure phases is available in the Post SA. The purpose of the Post SA [4] is: • to undertake a quantitative assessment of the radiological and non-radiological safety of the NSDF Project during the post-closure phase; • to identify those uncertainties that have the greatest potential effect on the long-term performance of the decommissioned facility; and • to provide necessary information to support an EIS which will address the requirements *of Canadian Environmental Assessment Act* (CEAA, 2012) and REGDOC-2.11.1 Volume III. *Assessing the Long-Term Safety of Radioactive Waste Management* [5] The assessment timeframe for the PostSA is 10,000 years [4]. The timeframe was determined using the criteria within REGDOC-2.11.1 [5]. The 10,000-year assessment timeframe captures the period of peak radioactivity and dose consequence, the design life of the engineered and natural barriers, and takes the 1-in-10,000-year seismic design basis into account. By 100 years post-closure, the radionuclide concentration has begun to approach the natural background levels. The NSDF will achieve containment through multiple passive barriers between the waste and the environment. Isolation of radionuclides is achieved by enveloping the waste between multiple engineered barrier systems, and by maintaining land-use restrictions on the site to make inadvertent human intrusion less likely. The ECM final cover system includes a 0.5 m Intrusion Barrier, a layer of rock aggregate fill. The primary purpose is to deter wildlife from digging holes into the waste. After institutional controls are lost, it is reasonable to suggest that borehole activities or exploratory digging/excavation may take place on the site. The layer of crushed rock in the intrusion barrier is intended to communicate that the area is clearly man-made, and not natural in origin, as only solid rock is expected to be found under the overburden. This may encourage the intruder to stop digging, or seek out more information about the area and its history. The Post SA assesses Human Intrusion scenarios [4]. Human Intrusion scenarios were assessed in previous iterations of the PostSA and related scoping calculations. The PostSA considers the following scenarios involving human intrusion into the waste material: Borehole drilling, and construction of a house with a basement. For the human intrusion events considered, all include deliberate conservatisms to ensure that the dose is overestimated [4]. Human Intrusion scenarios were assessed for both the expected 300 year institutional control period, as well as for 100 year period to demonstrate that the dose is acceptable even without the full duration [4]. The peak dose in the House with a Basement scenario 100 years after closure is 0.04 mSv/year, which is only 4% of the 1 mSv/year dose acceptance criteria largely due to the rapid decay of the inventory in the first 100 years [4]. This demonstrates that the NSDF is not dependant on a long institutional control period. This assessment demonstrates alignment with International Atomic Energy Agency (IAEA) Disposal of Radioactive Waste, SSR-5 [2] where near surface disposal facilities must utilize waste acceptance criteria for assurance of the long-term safety of the public and environment. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA, Disposal of Radioactive Waste, SSR-5, STI/PUB/1449, 2011 April. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [5] CNSC, Waste Management, Volume III: Assessing the Long-term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May.

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CNL-ND519	Greg Csullog (May 1, 2017)	**Section 6.0, Malfunctions and Accidents – 6-1:** Failure of the ECM due to excessive settlement is not listed in Table 6.4.1–1, therefore it is not considered a credible event.	Section 7 -Accidents and Malfunctions has been updated significantly in the final Environmental Impact Statement (EIS). A systematic hazard identification process was used to determine the most probable accident conditions that the NSDF could experience during the construction and operations phase. The specific concern about Engineered Containment Mound (ECM) failure due to excessive settlement is assessed in the Post-Closure Safety Assessment (PostSA) [1]. The PostSA examines a Disruptive Event, "Localized Cover Failure", where a portion of the cover has failed, which allows an increase of precipitation into the waste. The resulting dose to the public from this scenario is only slightly elevated from the Normal Evolution Scenario, and meets the dose criteria by a large safety margin. Additionally, the NSDF Safety Case [2] considers settlement throughout the document. In particular, Section 5.3.3 of [2] (and associated subsections) discusses how the design of the ECM design has been optimized to minimize the potential for excessive settlement. The safety case concludes that the analyses support the conclusion that the ECM will remain stable and experience no significant differential settlement over its design life. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Near Surface Disposal Facility Safety case, 232-03610-SAR-001.
CNL-ND520	Evelyn Gigantes (May 17, 2017)	The assessment of significant "disturbances" at the NSDF site assumes that one incident (for example, a breach in the integrity of the ECM through its cover) would not occur at the same time as another (say, a failure in the bottom and/or side lining of the ECM). A "beyond design" earthquake might accomplish both at one time (not necessarily all separate causes and separate results – should consider cumulative impacts).	An additional seismic analysis was performed to assess the structural function of the berm, cover, and base liner systems if subjected to a beyond design basis 1 in 50,000-year seismic event [1]. The results of this analysis support that scenarios assessed within the Post-Closure Safety Assessment (PostSA) [2], specifically the Series of Landslides scenario, bound the consequences of a more severe seismic event. The calculated dose to the public in this scenario is about 0.1 mSv/y, which is below the regulatory dose limit of 1 mSv/yr. This is largely due to the severe reduction in radioactive inventory through the rapid decay of the inventory in the first 100 years. This scenario demonstrates that the long-term safety of the public and the environment is not entirely dependent on the integrity of the Engineered Containment Mound barriers but reliant on the waste acceptance criteria. References: [1] Seismic Analysis of Beyond Design Basis Event (BDBE) of the ECM under a Severe 1/50,000 year Earthquake, 232-01280-021-000. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND521	Joan Lougheed and Town of Deep River (August 16, 2017)	The draft EIS does not discuss the monitoring and enforcement of radioactive waste at the NSDF. The NSDF is to be managed, operated and maintained by humans. Despite our best intentions and our desire to be optimistic humans are susceptible to negligence and wilful misconduct. The negligent or wilful acceptance of inappropriate forms of radioactive or other waste at the NSDF could have a detrimental impact on the environment and human health.	The development of the NSDF Waste Acceptance Criteria (WAC) [1] was an iterative process completed in conjunction with the development of other safety significant documents. The WAC has been revised to reflect the reduction of inventory to only low-level waste, provide transparency on the basis of the WAC, and incorporate Canadian Nuclear Safety Commission (CNSC) comments during licensing reviews. Compliance to the WAC in managed through the Canadian Nuclear Laboratories (CNL) Waste Management Program which begins with waste characterization and flows down to the Waste Profile where packages are created and accepted in accordance with the waste generator's Waste Management Plan. Waste characterization is an important part of routine CNL operations implemented across the Chalk River Laboratories (CRL) site. Current practices of waste storage at CRL already characterize and segregate waste based on an improved WAC. This WAC is planned to be implemented as part of the NSDF Project operations. As a result, the NSDF is driving improvements and new requirements for the Waste Characterization Program at CNL.

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			Canadian Nuclear Laboratories (CNL) employs a quality management system that requires adherence to processes and procedures. Regular internal audits are performed to ensure procedures are adhered to. In addition, the Canadian Nuclear Safety Commission performs compliance inspections to ensure CNL meets licence requirements. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND522	Joan Lougheed and Town of Deep River (August 16, 2017) William Turner (May 31, 2017) 137.	Using a screening analysis, 13 malfunctions and accidents were considered to be "credible events". A complete description of the screening process, and rationale I results of each hazard evaluation is provided in the Performance Assessment Report for the NSDF Project (CNL 2017). CNL assesses each of these scenarios in different Sections of the draft EIS (see pg. 6-6, Table 6.4.1-1). Generally, CNL's assessments of the credible accident scenarios in the draft EIS are insufficient and lack explanation (i.e., see assessment of the credible event, "criticality" at pg. 6-16, para 6.4.4.5). None of the scenarios consider the effects of a serious accident. For example, with respect to the "credible event" of a fire engulfing radioactive waste packages, CNL develops the following accident scenario for assessment in the draft EIS: • a transportation vehicle carrying ten radioactive waste packages is involved in a postulated fire • the fire lasts for one hour • the nearest public receptors are assumed to be three kilometers away from the scene, which is the distance from the proposed NSDF Project site to the closest cottage residents (see pg. 6-9). This accident scenario is of a minor nature. While many accidents and malfunctions that occur at the NSDF may be of a minor nature, the Town of Deep River expects CNL to anticipate and prepare for serious events. The draft EIS does not give proper consideration to serious malfunction, accident prevention and response planning.	The NSDF Project phases of construction, operation and closure are assessed within the Safety Analysis Report (SAR) [1]. The accident and malfunctions are summarized within Section 7, Accidents and Malfunctions, of the final Environmental Impact Statement (EIS). The scenarios considered in the NSDF SAR [1] are classified as normal operation, anticipated operational occurrences (AOOs), design basis accidents (DBAs) and beyond design basis accidents (BDBAs). The safety analysis objectives of [1] align with REGDOC-2.4.1 *Deterministic Safety Analysis* [2]. The regulatory documentation used during the preparation of the safety analysis includes: • *Nuclear Safety and Control Act* (NSCA) and its Regulations. • REGDOC-2.4.1 *Deterministic Safety Analysis*. [2] • REGDOC-2.11.1 W*aste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management*. [3] Section 7.2 of the final EIS has been expanded to include detail on the systematic and comprehensive approach used to identify the major hazards and postulated initiating events. The SAR [1] has addressed all reasonable AOOs, DBAs and BDBAs for the construction, operations and closure phases. Hazard identification and analyses were conducted and documented in the SAR [1]. The hazard analyses were conducted to ensure that all possible hazards and initiating events were represented and considered. The focus of the hazard analysis is on the potential accident conditions involving the hazards associated with the NSDF design and operations. In general, the hazard analysis process consisted of: • Systematically evaluate hazards, develop accident sequences/scenarios, and identify administrative and engineered controls. • Qualitatively assess the frequency and consequence/severity for the mitigated hazard or event. • The frequency and consequence/severity is combined to determine the risk ranking of the mitigated hazard or event. • Identify mitigation measures or safeguards for the hazard. The hazard analyses assessed hazards/initiating events that have radiological, industrial (conventional) and environmental consequences. The risk matrix, risk ratings, frequency ratings and severity ratings used in the hazard analyses is documented in Section 14 of the SAR [1]. Following this hazard identification and analysis, a systematic and comprehensive approach was used in the SAR to identify and assess the major hazards and potential initiating events associated with the design and operations of the NSDF. The major hazards and potential initiating events are quantitatively and qualitatively assessed including an assessment of the mitigation measures/safeguards (Section 14 of SAR). The hazards and events are grouped under the following headings [1]: • Group A – Anticipated Operational Occurrences

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			• Group B – Design Basis Accidents. • Group C – Beyond Design Basis Accidents • Group D – Conventional Health and Safety. If an accident or malfunction situation occurs, CNL has controls and procedures in place that address requirements for immediate response and post-event clean-up or remediation. Of note, CNL's Emergency Preparedness Program (described in Section 3.5.2.5 of the final EIS) has been designed for immediate response to emergency situations. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] CNSC, *Deterministic Safety Analysis*, REGDOC-2.4.1. [3] CNSC, W*aste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management*, REGDOC-2.11.1.
CNL-ND523	William Turner (May 31, 2017) 138. 139.	6.4.4.2 and 6.5.3.2 Fire in Temporary Waste Accumulation Area – Where is this area defined as I cannot find it in the project description. Since the project description does not identify this area, CNL have not provided a complete description of the undertaking.	Section 3.4.1 of the final Environmental Impact Statement (EIS) confirms that the temporary waste storage pad for staging waste is located inside of the Engineered Containment Mound (ECM) footprint. Section 3.4.2.1 describes the area is being approximately 6,000 m^2. The location of the waste staging area inside the ECM footprint is deliberate, as it ensures that any precipitation that falls onto this waste is collected by the leachate collection system and sent to the Wastewater Treatment Plant (WWTP) for treatment prior to discharge to the surrounding environment.
CNL-ND524	Joan Lougheed and Town of Deep River (August 16, 2017)	Table 6.4.3.1 sets out the dose acceptance criteria for accidents (see pg. 6-7); however, the frequency range calculations are, in some instances, greater than the acceptable dose range. For example, for a frequency range of 3x10-2 - 3x10-1, this is 0.03-0.3/year x 500 years = 15-150 events that may occur during the lifetime of the facility, which is more than "a few times", as noted in the text (see pg. 6-7 in Table 6.4.3-1). Thus, it appears that the criteria developed for the NSDF which requires institutional control for 500 years, is inappropriate.	Table 6.4.3-1 has been revised and is now Table 7.3.1-1 of the final Environmental Impact Statement (EIS). Section 7 of the final EIS identifies accidents and malfunctions, and their potential health and environmental effects that may occur during pre-closure (i.e., construction, operations and closure phases) of the NSDF Project. The *Radiation Protection Regulations,* defines the regulatory limits for exposure to Nuclear Energy Workers and members of the public to ensure that the probability of occurrence of effects is acceptably low. For normal operations, the radiological doses from radionuclide releases and direct radiation exposure must not exceed 50 millisieverts (mSv) annually for Nuclear Energy Workers and 1 mSv annually for members of the public to meet the CNSC regulatory dose limits as outlined in the *Radiation Protection Regulations*. In addition, the CRL Licence Conditions Handbook [1] requires that the dose to the critical group (public), due to the sum of all radioactive releases from CRL in any period of 12 consecutive months, shall not exceed 0.3 mSv. CNL's *Safety Analysis for Decommissioning and Waste Management* defines the dose acceptance criteria for accidents, dependent on the frequency of the event, and is provided in Table 7.3.1-1 of the final EIS. Reference [1] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25.
CNL-ND525	MNO (August 16, 2017)	Did the maximum dose to human receptors consider the consumption of country foods by Métis harvesters? If so, this should be specifically referenced. If not, this should be considered.	An MNO Traditional Knowledge and Land Use (TKLUS) study was submitted to Canadian Nuclear Laboratories (CNL) in 2019 February. Findings from the MNO TKLUS study have been incorporated into the final Environmental Impact Statement (EIS). In order to ensure that the differences in lifestyle and ingestion rates between Indigenous and non-Indigenous peoples is captured, an additional receptor was added to the Post-Closure Safety Assessment (PostSA) [1]. The Self-Sufficient Indigenous Receptor sensitivity analysis has been designed to assess the dose and risk to a receptor who lives completely off the land. The Self-Sufficient Indigenous receptor: • Obtains 100% of their food from the contaminated area • Hunts wild animals including moose, deer, grouse and ducks.

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			• Drinks water and eats fish from the Ottawa River. • Collects honey from wild bees • Forages for berries and mushrooms • Spends 100% of their time in the area on or near the NSDF, with a higher proportion in the Ottawa River and on the shorelines, than the other receptors. The Self-Sufficient Indigenous Receptor has ingestion rates normalized to the highest category of energy intakes recommended by CSA N288.1-14 [2]. The Indigenous adult diet is set to 4,480 kcal/day, and the Indigenous child consumes 2,879 kcal/day. This is far higher than the surveyed energy intakes presented by the Canadian Standards Association, which are in turn derived from Statistics Canada surveys and studies performed by the International Commission for Radiological Protection. These values are 1,388 kcal/day and 1,165 kcal/day for the adult and child respectively. The Self-Sufficient Indigenous Receptor is modelled with very conservative inputs, and are expected to be bounding of the findings of TKLUS. If a specific TKLUS demonstrates a large misalignment with the conservative assumptions used in the PostSA, the model can be refined. Results of the PostSA indicate that doses to the Self-Sufficient Indigenous Receptor are far below the regulatory dose limits for a member of the public, and far below the natural background dose rate. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] CSA Group N288.1-14: Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents from Normal Operation of Nuclear Facilities. 2014.
CNL-ND526	MNO (August 16, 2017)	In the event of an accident or malfunction, the MNO request to be notified to ensure relevant information can be passed on the Métis harvesters in the region.	The public would be informed where necessary of accidents at the NSDF through Canadian Nuclear Laboratories Public Information Program (PIP). Canadian Nuclear Laboratories (CNL) is committed to organizational transparency, ensuring that Indigenous communities, the general public, local communities, elected and appointed government officials and other industry stakeholders are properly informed about activities carried out at Canadian Nuclear Laboratories sites. This commitment is met through CNL's Public Information Program (PIP), a communications program that was developed to build public awareness and trust, and to encourage transparent and proactive communication with its various stakeholders. Canadian Nuclear Laboratories' (CNL's) Public Information Program [1] includes specific communications to stakeholders, public access to information related to routine activities, radiological and non-radiological emissions, and non-routine items or events at the different sites managed by CNL. Canadian Nuclear Laboratories disseminates information to the public in a number of ways: • CNL's corporate website: www.cnl.ca; • Chalk River Information Bulletins; • Press releases and media releases; • Social media; • Webinars;

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			• CONTACT newsletters; • Community meetings; • Community events; and • Public and Indigenous engagement activities. The requirements for public information programs and disclosure protocols are derived from the stated objectives of the Canadian Nuclear Safety Commission (CNSC) in *the Nuclear Safety and Control Act*. Additional guidance on public information programs are given in the CNSC REGDOC 3.2.1 *Public Information and Disclosure* [2]. If an accident or malfunction situation occurs, CNL has procedures in place that address requirements for immediate response and post-event clean-up or remediation. Of note, CNL's Emergency Preparedness Program (described in Section 3.5.2.5 of the final EIS) has been designed for immediate response to emergency situations. The program ensures emergency readiness and emergency management to support programs such as reactor safety/accident management, decommissioning, radiation and environmental protection, fire and occupational health and safety. In terms of post-event clean-up or remediation CNL's Environmental Protection Program (see Section 3.5.2.2 of the final EIS) includes procedures that address the identification, management and remediation of lands that are contaminated. Canadian Nuclear Laboratories will establish a project-specific Emergency Preparedness Plan for the NSDF Project, including emergency response procedures. The NSDF Project Emergency Preparedness Plan will establish practices for safe and environmentally sound management of the facility during the construction, operations, closure and post-closure periods. Emergency response procedures for the NSDF Project will be prepared to address any potential emergencies from accidents including internal fires, minor spill, major spill, natural gas/carbon monoxide leak, loss of power, high radiation, radiological contamination, bomb threat/suspicious package, hold and secure and stay-in. References: [1] Public Information Program for Canadian Nuclear Laboratories (CNL), CW-513430-REPT-001. [2] CNSC, REGDOC 3.2.1, Public Information and Disclosure.
CNL-ND527	William Turner (May 31, 2017) 133.	6.3.2 Identification of Hazards – This section should also include power failures.	Loss of power is considered as a consequence to an initiating event/hazard such as fire, heavy snowfall, and tornado. The NSDF operates on main power (Class IV) and in the event of power failure, all critical systems will operate on back-up power systems. Critical systems and equipment, including essential Wastewater Treatment Plant (WWTP) process loads, essential lighting, fire alarm control panels, security systems, communication system, Supervisory Control and Data Acquisition (SCADA) system, and Building Automation System (BAS) system, are backed up by emergency power from a power generator set. This back-up powerset is also supplied to critical loads including the radiation monitoring system, emergency lighting, exit lighting, security, and critical instrumentation. Consequences to NSDF, such as a power outage, are encompassed by Canadian Nuclear Laboratories' (CNL) existing Emergency Preparedness Program, described in Section 3.5.2.5 of the final Environmental Impact Statement (EIS).
CNL-ND528	William Turner (May 31, 2017) 134.	Table 6.4.1-1 Bounding Hazard Scenario for Assessment – CNL should expand the bounding hazard scenarios to include the offsite hazards – and not only the "onsite" hazards.	The hazard identification includes external hazards and internal hazards. External hazards such as weather and aircraft crash, are considered as "off-site hazards" or external to NSDF, and are documented in Table 7.2.1-1 of the final Environmental Impact Statement (EIS).

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		Malfunctions and Accidents - Criticality	
CNL-ND529	Dr. J.R. Walker (May 9, 2017)	The doses given in Table 6.4.4-5 of the Draft EIS exceed the limits defined by the Nuclear Substances and Radiation Devices Regulations by more than 2 orders of magnitude for periods in excess of 100,000 years. Therefore, the impacts from this proposed engineered containment mound would greatly exceed the impacts that are permissible in Canada at the time of the regulatory decision.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]. The section on Malfunctions and Accidents (now Section 7.0 of the final Environmental Impact Statement (EIS)) has been extensively revised – separating the post-closure phase analysis and now presenting it in Section 5.8 of the final EIS. Section 7.3.4 of the final EIS states: "For the radiological accidents and malfunctions, the dose consequences to the workers and the public meet the dose acceptance criteria for accidents, and the risks are acceptable and low with mitigation in place." Details supporting this conclusion can be found in Section 7.3 of the final EIS. The Post-clousre Safety Assessment (PostSA) [2] considers Human Intrusion scenarios using the revised inventory including Borehole Drilling (acute exposures) and a House With a Basement (chronic exposures). Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control (i.e., 300 years), a variant of this scenario is presented with the doses calculated at 100 years, to see how they would change with a shorter period of institutional control. In all the plausible scenarios, the calculated dose is below the regulatory dose limit for a member of the public of 1 mSv/yr. Thus, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 [3] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. The reduction in the inventory to meet the SSR-5 requirement resulted in the development of the Licensed Inventory, as outlined in Table 3.3.1-2 of the final EIS. The radioactive decay from the time of closure of the engineered containment mound (ECM) is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] IAEA, Disposal of Radioactive Waste, SSR-5, 2011.
CNL-ND530	William Turner (August 22, 2017) 135. 149.	Since the EIS contains a section entitled "Criticality", and the word occurs 34 times in the EIS, CNL must be taking the potential for criticality events seriously. In other words, CNL intends to dispose of fissile materials in their proposed mound. If the wastes to be emplaced in the mound are limited to VLLW, LLW and some ILW, then fissile materials will be excluded. If they are excluded, CNL need to explain how a critically accident can occur.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]. As a result, the inventory of nuclear materials has also been reduced. Recoverable quantities of nuclear materials (i.e., fissionable material) will not accepted for disposal in NSDF. That is, nuclear material that require accounting or inventory

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		This raises a significant issue. It is my understanding that under various treaties and agreements, Canada is obligated to facilitate IAEA Safeguards inspections at all its nuclear facilities. Thus, for the fissile wastes to be emplaced in the Mound, CNL must address these international requirements.	management and reporting through CNL's Nuclear Materials and Safeguards Management Program shall not be accepted for disposal in NSDF (Section 5.3 of NSDF Waste Acceptance Criteria) [2]. Wastes disposed in the NSDF may or may not contain fissionable material. Waste containing fissionable material may originate from disparate waste streams, and are therefore of various isotopes, enrichments, configurations, and chemical and physical forms of special fissionable materials. Natural and depleted uranium as well as thorium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. However, fissile material will also exists in residual unrecoverable amounts, predominately as contaminants on waste equipment, demolished structures and in soil as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Thus, there is a cumulative effect of residual unrecoverable fissile material throughout the waste which requires criticality control in NSDF based on mass fraction limits for fissile radionuclides in waste emplacement (i.e., Uranium-233, Uranium-235, Uranium-238, and Plutonium-239/240). As the total fissionable and fissile material inventory forecasted for NSDF is greater than the regulatory exempted quantities, a nuclear criticality safety document is required to meet Canadian Nuclear Laboratories' (CNL) Nuclear Criticality Safety Program requirements in accordance with Canadian Nuclear Safety Commission (CNSC) guidelines in REGDOC 2.4.3 *Nuclear Criticality Safety* [3]. Since there will be small amounts of fissile material spread through a large volume in the Engineered Containment Mound (ECM), CNL has demonstrated that the risk of inadvertent nuclear criticality is negligible. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] CNSC, Nuclear Criticality Safety, REGDOC-2.4.3.
CNL-ND531	[David Raman](#) (August 3, 2017)	As the proponent intends to emplace significant quantities of Fissionable Materials/Special Fissionable Materials in the NDSF, as part of the EIS, an assessment of the effects made on the environment of a nuclear criticality excursion. Two events are recommended to be considered: a. During the loading phase (minimal shielding) - a burst of 10^{18} fissions, initiated by ingress of light water moderator/reflector caused by a weather event, shutdown by thermal expansion. b. Post institutional control phase - a series of bursts of 10^{18} fissions, (pulsed assembly) initiated by ingress of light water moderator/reflector caused by human incursion, eventual shutdown by thermal expansion. This is in addition to the assessments that would be made for the Nuclear Criticality Safety Document, which is primarily concerned with preventing a nuclear criticality excursion, and is consistent with the evaluations performed over ten years ago for Environmental Assessment the Fuel Packaging and Storage Facility constructed at CRL.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was [formally announced](#) by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). As a result, the inventory of nuclear materials has also been reduced. Recoverable quantities of nuclear materials (i.e., fissionable material) will not accepted for disposal in NSDF. That is, nuclear material that require accounting or inventory management and reporting through CNL's Nuclear Materials and Safeguards Management Program shall not be accepted for disposal in NSDF (Section 5.3 of NSDF Waste Acceptance Criteria) [2]. Wastes disposed in the NSDF may or may not contain fissionable material. Waste containing fissionable material may originate from disparate waste streams, and are therefore of various isotopes, enrichments, configurations, and chemical and physical forms of special fissionable materials. Natural and depleted uranium as well as thorium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental remediation activities or building materials generated from demolition and decommissioning. However, fissile material will also exists in residual unrecoverable amounts, predominately as contaminants on waste equipment, demolished structures and in soil as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX),

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			National Research Universal Reactor (NRU) and other research and development activities). Thus, there is a cumulative effect of residual unrecoverable fissile material throughout the waste which requires criticality control in NSDF based on mass fraction limits for fissile radionuclides in waste emplacement (i.e., Uranium-233, Uranium-235, Uranium-238, and Plutonium-239/240). As the total fissionable and fissile material inventory forecasted for NSDF is greater than the regulatory exempted quantities, a nuclear criticality safety document is required to meet Canadian Nuclear Laboratories' (CNL) Nuclear Criticality Safety Program requirements in accordance with Canadian Nuclear Safety Commission (CNSC) guidelines in REGDOC 2.4.3 *Nuclear Criticality Safety* [3]. Additionally since the safety analysis is specific to low level waste (LLW) disposal, NUREG guidance and assessments have been demonstrated as applicable to the NSDF system thus utilized to demonstrate long-term criticality safety of NSDF. Specifically NUREG/CR-6505 Volumes 1 [4] and 2 [5] as well as NUREG 6626 [6]. Since there will be small amounts of fissile material spread through a large volume in the Engineered Containment Mound (ECM), CNL has demonstrated that the risk of inadvertent nuclear criticality is negligible. As noted above, a criticality accident at the NSDF is not a credible event in its operational or post-closure phases; however, as per REGDOC-2.4.3 [3], CNL has assessed the consequences of a postulated, non-credible, criticality accident and determined that no additional mitigation measures are required for off-site dose consequences due to the postulated accident. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] CNSC, *Nuclear Criticality Safety*, REGDOC-2.4.3. [4] Nuclear Regulatory Commission (NRC), "The Potential for Criticality Following Disposal of Uranium at Low-Level Waste Facilities," NUREG/CR-6505, Vol 1, 1997. [5] Nuclear Regulatory Commission (NRC), "The Potential for Criticality Following Disposal of Uranium at Low-Level-Waste Facilities," NUREG/CR-6505, Vol 2, 1998. [6] Oak Ridge National Laboratory (ORNL), "Emplacement Guidance for Criticality Safety in Low-Level-Waste Disposal," NUREG/CR-6626/ORNL/TM-13765, 2001.
CNL-ND532	David Raman (August 3, 2017)	It is unclear what waste materials the proponent characterizes as "Intermediate Level Waste". If it is intended to emplace Fissionable Materials/Special Fissionable Materials in the NDSF, the following must be demonstrated: a. The proponent will need to explain how they can achieve verifiable sub-criticality over the storage period, when the requirement is for < 1 criticality incident/ 10 6 year for what will be in effect an indefinite period into the future b. The regulator will need to explain how this condition will be regulated when, by definition, once the institutional control period is over the NDSF falls out of their jurisdiction.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). As a result, the inventory of nuclear materials has also been reduced. Recoverable quantities of nuclear materials (i.e., fissionable material) will not accepted for disposal in NSDF. That is, nuclear material that require accounting or inventory management and reporting through CNL's Nuclear Materials and Safeguards Management Program shall not be accepted for disposal in NSDF (Section 5.3 of NSDF Waste Acceptance Criteria) [2]. Wastes disposed in the NSDF may or may not contain fissionable material. Waste containing fissionable material may originate from disparate waste streams, and are therefore of various isotopes, enrichments, configurations, and chemical and physical forms of special fissionable materials. Natural and depleted uranium as well as thorium may be present in fairly significant volumes as it exists inherently, or is caused by anthropogenic activities, in soils generated from environmental

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			remediation activities or building materials generated from demolition and decommissioning. However, fissile material will also exists in residual unrecoverable amounts, predominately as contaminants on waste equipment, demolished structures and in soil as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). Thus, there is a cumulative effect of residual unrecoverable fissile material throughout the waste which leads to criticality control in NSDF based on mass fraction limits for fissile radionuclides in waste emplacement (i.e., Uranium-233, Uranium-235, Uranium-238, and Plutonium-239/240). A Nuclear Criticality Safety Document was prepared in accordance with REGDOC 2.4.3 *Nuclear Criticality Safety* [3] demonstrating the risk of an inadvertent nuclear criticality event is negligible in all cases. Additionally since the safety analysis is specific to low level waste (LLW) disposal, NUREG guidance and assessments have been demonstrated as applicable to the NSDF system thus utilized to demonstrate long-term criticality safety of NSDF. The Nuclear Criticality Safety Document was developed based on results from previous studies performed at Oak Ridge National Laboratories (ORNL) under contract to the US NRC. This is done through the comparison of the detailed analyses performed in NUREG/CR-6505 [4] and [5]) and NUREG/CR-6626 [6]. Volumes 1 [4] and 2 [5] of NUREG-6505, *The Potential for Criticality Following Disposal of Uranium at Low-Level-Waste Facilities*, were developed by a team of experts in hydrology, geology, geochemistry, soil chemistry, and criticality safety who studied mixtures of uranium, water, and waste to determine the concentrations of Uranium-235 at ≤10 wt% enrichments and >10 wt% enrichments required to attain criticality in low level waste disposal. The results from these studies were supplemented with analyses for other fissile nuclides (i.e., Plutonium-239 and Uranium-233) in NUREG/CR-6626 [6] under the same conditions. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] CNSC, *Nuclear Criticality Safety*, REGDOC-2.4.3. [4] Nuclear Regulatory Commission (NRC), "The Potential for Criticality Following Disposal of Uranium at Low-Level Waste Facilities," NUREG/CR-6505, Vol 1, 1997. [5] Nuclear Regulatory Commission (NRC), "The Potential for Criticality Following Disposal of Uranium at Low-Level-Waste Facilities," NUREG/CR-6505, Vol 2, 1998. [6] Oak Ridge National Laboratory (ORNL), "Emplacement Guidance for Criticality Safety in Low-Level-Waste Disposal," NUREG/CR-6626/ORNL/TM-13765, 2001.
CNL-ND533	David Raman (August 3, 2017)	Nuclear Criticality Safety - While it is possible that very small quantities of actinides (gram quantities) may be entrained in the waste i.e. not easily separated, nuclear criticality safety should be a non-issue in a near surface facility. Fissionable Materials/Special Fissionable Materials should be no closer to the biosphere than a Shallow Rock Cavity, due to their undesirable chemical properties as heavy metals.	Canadian Nuclear Laboratories (CNL) agree that inadvertent nuclear criticality events are not an issue for the NSDF. In accordance with REGDOC 2.4.3 *Nuclear Criticality Safety* [1], a Nuclear Criticality Safety Document was prepared for the NSDF demonstrating the risk of an inadvertent nuclear criticality event is negligible in all plausible scenarios. Mobility of fissionable materials (i.e., uranium, plutonium and thorium) in the environment is modeled and their chemical toxicity is assessed as part of the Post-closure Safety Assessment (PostSA) [1]. The PostSA demonstrates the negligible quantities of uranium, plutonium and thorium that eventually migrate into the environment during the post-closure phase do not pose a significant hazard to the environment or public (i.e., environmental concentration are very small and below environmental quality guidelines). The Ecological Risk Assessment (EcoRA) [2] also demonstrates that there were no adverse ecological effects due to uranium as a non-radiological hazard. Plutonium as a non-radiological hazard was

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			screened out and not assessed due to how negligible the quantities in the environment were. The EcoRA also demonstrated that there were no adverse effects due to uranium or plutonium as radiological hazards. References: [1] CNSC, *Nuclear Criticality Safety*, REGDOC-2.4.3. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Ecological Risk Assessment (EcoRA) for the NSDF Project. 232-121240-ASD-001.
CNL-ND534	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* L'ÉIE n'examine jamais l'hypothèse où le dépotoir serait physiquement démantelé et où les déchets les plus radioactifs seraient non seulement privés de leur « blindage de déchets » et de leur emballage spécialisé, mais physiquement distribués/éparpillés dans l'environnement. L'hypothèse peut sembler outrancière, mais elle ne requiert aucun acte terroriste. Il suffit d'imaginer que la société des prochains siècles doive faire face à des pénuries de matières premières qui, par exemple, augmenteraient énormément la valeur de recyclage des métaux et alliages nucléaires spécialisés qu'on veut aussi enfouir dans le dépotoir. Sans la moindre protection de roc ou de béton, le dépotoir suscitera la convoitise des recycleurs peu scrupuleux, un peu comme les pyramides d'Égypte ont autrefois attiré les pilleurs de tombes. Le Ralliement contre la pollution radioactive demande au promoteur qu'il analyse l'impact environnemental de scénarios d'intrusion humaine plus pertinents et qu'il considère s'il serait préférable d'exclure de ce dépotoir tous les matériaux susceptibles d'acquérir une importante valeur de revente d'ici un siècle ou deux. *Veuillez référer aux pages 13 et 14 de cette soumission, qui contient ainsi des détails pertinents reliés à ces commentaires.*	L'évaluation de la sûreté après la fermeture [1] envisage un scénario (excavation massive) semblable à celui que décrit le commentateur, dans lequel tous les déchets et les matériaux de confinement sont excavés, mélangés et déposés à la surface 300 ans après la fermeture. Un résident ou un fermier construit une maison directement sur le mélange de déchets et de matériaux de confinement. La dose maximale dans ce cas serait de 0,43 mSv/an pour le fermier adulte et elle serait conforme au seuil réglementaire prévu de 1 mSv/an pour un être humain. Ce scénario est une situation extrême et représente une probabilité si faible qu'il est de l'ordre de l'hypothétique. Par conséquent, la sûreté à long terme de l'IGDPS ne dépend pas de la gestion active de l'installation, mais du fait que la radioactivité des déchets se rapproche, moins de 100 ans après la fermeture de l'installation, des concentrations naturelles de fond. Cette perspective est conforme à la norme SSR-5 [3] de l'Agence internationale de l'énergie atomique (AIEA), selon laquelle les installations de gestion des déchets près de la surface doivent appliquer des critères d'acceptation des déchets pour limiter les conséquences d'une éventuelle intrusion humaine. Il convient de préciser que les déchets destinés à l'IGDPS sont en grande majorité des matériaux et débris de construction et de la terre contaminée. Très peu de ce qui sera stocké pourrait présenter un intérêt économique. Références [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] AIEA, Stockage définitif des déchets radioactifs, norme de sûreté SSR-5, 2011.
		Malfunctions and Accidents - Emergency Protection Plan	
CNL-ND535	Joan Lougheed and Town of Deep River (August 16, 2017) Denise Roberge (August 15, 2017	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* When considering the assessment of a credible spill accident scenario at the NSDF, CNL states: "An Emergency Protection Plan will be developed to provide rapid and competent response to spills that may occur from the NSDF Project" [Emphasis added] (see pg. 6- 17). CNL has not developed an Emergency Protection Plan to respond to spills at the NSDF. One of CNL's first considerations during the development of the proposal for the NSDF should have been an Emergency	Design safeguards to mitigate leaks and spills are discussed in the final Environmental Impact Statement (EIS) under the following sections: • Section 3.4.2.3 describes the leachate and contact water transfer system including the double-contained piping and leak alarms to mitigate spill (leak) • Section 3.4.2.4 describes the spill/leak mitigation safeguard (secondary containment) for the storage tanks (referred to as Equalization Tanks in the NSDF Design Description [1]). The NSDF Design Description [1], provides more in-depth details on the Leak Detection System (LDS). Specifically:

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		Protection Plan that anticipates a spill and details the measures in place to protect the environment and the community. Similar to the Fire Protection Program, the Emergency Protection Plan should be prepared and outlined in the draft EIS for review and comment by the public. The malfunction and accident prevention strategies and analysis as they are outlined in the draft EIS are insufficient for the following reasons: Deep River has not been consulted with respect to malfunction and disaster response; CNL has not properly addressed the potential for a serious accident or disaster to occur; the apathetic manner in which accident scenarios have been addressed; the absence of an Emergency Protection Program; the lack of detail regarding the Fire Protection Program; and the unknown reasons why CNL believes that the current Fire Protection Program sufficiently addresses the new risks posed by the NSDF.	• Sections 2.3.1.4 and 2.3.1.5 provide details on the Leachate Collection System (LCS) and LDS and how the leachate from the LCS or LDS is transferred to the WWTP. • Section 2.3.1.5 also describes the additional spill (i.e., leak) mitigation design features provided when transferring the leachate between the Engineered Containment Mound (ECM) and the WWTP. • Section 2.3.2.1.1 describes the spill/leak mitigation design features for the Equalization (storage) tanks and transfers to and from the tanks. Section 7.0 of the final EIS, Accidents and Malfunctions, includes the assessment of potential accidents and malfunctions and mitigation measures for leaks/spills related to the NSDF Project. If an accident or malfunction situation occurs, CNL has controls and procedures in place that address requirements for immediate response and post-event clean-up or remediation. Having an effective response to spills is facilitated through Canadian Nuclear Laboratories (CNL) Emergency Preparedness Program (Section 3.5.2.5 Emergency Preparedness Program of the final EIS) and the Fire Protection Program (Section 3.5.2.9 Fire Protection Program of the final EIS). The controls and safeguards that are in place to prevent fires and or to limit the consequences of a fire in the ECM includes the full time staffing of the CRL Fire Department, NSDF Fire Water Pump Station, vehicle/equipment maintenance and portable fire extinguishers on the vehicles. Fire water is stored in the Fire Water Pump Station. In the event of a fire, work will be immediately stopped and placed into a safe state, if possible. The NSDF Emergency Procedure will be followed. The Fire Department will be notified as well as others working in the area. References: [1] Design Description 232-503212-DD-001. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND536	Great Lakes and St. Lawrence Cities Initiative (August 15, 2017) Anna Tilman (August 11, 2017) City of Laval (September 15, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* The commenters request that CNL ensure coordination among the relevant authorities so that emergency response teams have sufficient training, benefit from information sharing and are able to respond quickly in case of disaster, as well as to ensure adequate compensation for the costs engendered by dealing with a potential environmental incident. It is noted in the EIS that "CNL will establish an NSDF Project-specific EPP, including emergency response procedures" (p. 6-24). The commenters insist that all municipal bodies, including those in the MRC Pontiac, be informed and involved in the implementation of the Emergency Preparedness Program	Emergency response is coordinated through individual municipalities and the Provincial government. Canadian Nuclear Laboratories (CNL) has longstanding relationships with these government bodies, and with different agencies within the federal government, to ensure that emergency resources are properly deployed in the unlikely event of an incident related to CNL activities, or to any other nuclear incident in Canada. Canadian Nuclear Laboratories works closely with regional municipalities and relevant Provincial and Federal agencies to develop complementary emergency preparedness programs, through regular meetings and simulation exercises, to ensure that its emergency practices and standards are aligned with those of its partners. Since most of the waste that is planned for disposal in the proposed NSDF is already stored at its CRL site, either in the waste management areas, or as the physical structures that are scheduled for demolition, the NSDF Project does not introduce new or increased risk to the Chalk River Laboratories (CRL) site or the surrounding areas. The required NSDF facility-specific emergency preparedness plan would be integrated into CNL's existing emergency preparedness plan for the CRL site. Canadian Nuclear Laboratories (CNL) nuclear response capabilities and personnel, offer vital support to Canada's broader network for emergency preparedness in the form of training, drills and knowledge sharing. Both CNL's staff and facilities are recognized internationally.

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		and the Fire Protection Program, the associated emergency response/planning exercises, and receive the necessary training and equipment. The Cities Initiative recommends that the EIS describe how CNL will ensure integration with local emergency services in the prevention, preparation and response to a major leakage or other event, as well as evaluate its Project-specific EPP. In addition, CNL should deliver, on an annual basis, emergency response training and detailed information sessions regarding its disposal facility to conservation authorities, regional and local municipal staff, and emergency services personnel for all communities, and sharing the materials for the above with the public for a thorough review and assurance the plan is in place and ready for immediate commissioning in case of a spill. In particular, the City of Laval requests that CNL add the following elements to the project: 1) Provision of training to emergency response teams and required equipment. In particular, the managers, supervisors, and operators of the drinking water plants and of the water supply network should be informed of the risks with respect to the various radioactive substances and the precautions to be taken according to the concentrations involved. The knowledge transfer must also include the early warning/notification protocol and the resources available to respond to radioactive contamination. 2) Full compensation for the costs incurred in providing alternative supplies of drinking water, hygiene solutions and incentives, as well as decontamination of drinking water plants and of the water supply network. In particular, the amount allocated to each budget item in the event of a disaster should be included in the EIS so that the public can see the rigor of the estimate provided by CNL. [Français] Les commentateurs demandent que les LNC assurent la coordination entre les autorités compétentes afin que les équipes d'intervention d'urgence reçoivent une formation suffisante, bénéficient du partage de renseignements et soient capables de réagir rapidement en cas de catastrophe, et assurent une compensation adéquate des coûts engendrés par un incident environnemental potentiel. Il est mentionné dans l'étude d'impact environnemental (EIE) que « les LNC établiront un Plan de protection de l'environnement (PPE) conçu spécialement pour le projet d'installation de gestion des déchets près de la surface (IGDPS), qui comprendra des procédures d'intervention d'urgence » (p. 6-29). Les commentateurs insistent pour que tous les organismes municipaux, y compris ceux de la MRC Pontiac, soient informés de la mise en œuvre du Programme de mesures d'urgence et du Programme de protection contre les incendies, et y participent. L'Alliance des villes recommande que l'EIE décrive comment les LNC assureront l'intégration avec les services d'urgence locaux pour ce qui est de la prévention, de la préparation et de l'intervention relative à une fuite majeure ou à un autre événement. Elle recommande également que l'EIE évalue le PPE propre au projet d'IGDPS. De plus, les LNC devraient fournir chaque année une formation en intervention d'urgence et des séances d'information détaillées sur leur installation de gestion des déchets aux organismes de conservation, au personnel municipal régional et local et au personnel des services	[Français] Les mesures d'urgence sont coordonnées par le biais des municipalités et du gouvernement provincial. Les Laboratoires nucléaires canadiens (LNC) ont des relations de longue date avec des administrations gouvernementales et avec divers organismes fédéraux, qui permettent de déployer correctement les ressources au cas improbable où se produirait un accident dans le cadre des activités des LNC ou tout autre incident nucléaire au Canada. Les Laboratoires nucléaires canadiens collaborent étroitement avec les municipalités et les organismes provinciaux et fédéraux compétents pour élaborer des programmes complémentaires de préparation aux situations d'urgence grâce à des réunions régulières et des exercices de simulation, afin que leurs pratiques et leurs normes d'urgence soient alignées sur celles de leurs partenaires. Comme les déchets destinés à l'IGDPS proposée sont déjà entreposés sur le site des LCR, soit dans les zones de gestion des déchets, soit dans des structures physiques vouées à la démolition, le projet d'IGPDS n'ajoute pas de risques ni ne les augmente sur le site des Laboratoires de Chalk River (LCR) ou dans les environs. Le plan de préparation propre à l'IGDPS qu'il faudra développer sera intégré au plan actuel des LNC pour le site des LCR. La capacité de réaction à une urgence nucléaire et le personnel des Laboratoires nucléaires canadiens (LNC) représentent un appui vital au réseau plus général de la protection civile au Canada en matière de formation, d'exercices de simulation et de partage d'information. La valeur du personnel et des installations des LNC est reconnue à l'échelle internationale.

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		d'urgence de toutes les collectivités. Les LNC devraient aussi communiquer au public tous les documents relatifs à ces installations, afin que le public puisse effectuer un examen approfondi et s'assurer que le plan est en place et prêt à être mis en service immédiatement en cas de déversement. En particular, la ville de Laval demande que les LNC ajoutent les éléments suivant au projet : • Formation des équipes d'intervention d'urgence et fourniture du matériel requis. Les cadres, superviseurs et operateurs des usines de traitement et du réseau de distribution devraient être informés des risques inhérents aux diverses substances radioactives et des précautions à prendre selon les concentrations en cause. Le transfert de connaissances doit aussi inclure le protocole d'alerte et les ressources disponibles pour répondre à une contamination radioactive. • Indemnisation complète des dépenses encourues pour assurer l'approvisionnement alternatif en eau potable, en solutions d'hygiène et en protection incendie, ainsi que la décontamination des usines de traitement et du réseau de distribution. En particulier, le montant attribué à chaque poste budgétaire du fonds de prévoyance en cas de sinistre devrait être inclus à l'ÉIE, afin que le public puisse constater la rigueur de l'estimation réalisée par les LNC.	
CNL-ND537	William Turner (May 31, 2017) 150.	Section 6.6 - In the list of procedures and programs listed in this section, there is one glaring omission. Which of these programs are set up to respond transportation accidents in some of the remote locations through which the wastes will be transported? CNL must address the potential for offsite transportation accidents and malfunctions.	Transportation of waste from other sites is considered outside of scope for the NSDF Project. The transportation of waste to Chalk River Laboratories (CRL) site is an activity covered by Canadian Nuclear Laboratories (CNL) existing site licence [1] for the CRL site and other additional transport regulations. With respect to offsite waste shipments, CNL has been transporting radioactive materials including radioactive wastes safely for over 70 years with no incidence of releasing radioactive material to the environment during transportation operations. This includes routine shipments of material from Whiteshell to CRL. Canadian Nuclear Laboratories maintains a Transportation Program to ensure that all shipments of waste are carried out in accordance with all Canadian regulatory requirements and best industry's practices. A discussion of CNL's Transportation of Dangerous Goods Program is in section 3.5.2.12 of the final Environmental Impact Statement. Reference: [1] CNSC, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25.
		Malfunctions and Accidents - Human Intrusion	
CNL-ND538	Concerned Citizens of Renfrew Country (Ole Henrickson) (July 3, 2017)	The International Atomic Energy Agency cautions against haste in developing a radioactive waste disposal project. It says that "development of a disposal facility usually involves an extensive programme of research, design and assessment work that may last for several years or decades" (IAEA 2012, p. 7). Careful assessment of the risks of human intrusion, particularly following closure and abandonment of a proposed facility, is of particular importance: Some parts of the safety case and assessment for a near surface disposal facility may even need more effort than for geological disposal facilities. An example is assessment of human intrusion, which may be considered an event of low significance for a well sited geological disposal facility but may be considered almost inevitable for a near surface disposal facility. (IAEA 2012, p. 69).	The section on Malfunctions and Accidents (now Section 7.0 of the final Environmental Impact Statement (EIS)) has been extensively revised – separating the post-closure phase analysis and now presenting it in Section 5.8 of the final EIS. The Post-Closure Safety Assessment (PostSA) [1] considers Human Intrusion scenarios including Borehole Drilling (acute exposures) and a House With a Basement (chronic exposures). These Human Intrusion scenarios are presented in Section 5.8.6.1.2.2 of the final EIS but also summarized below: • Borehole Driller: This scenario assesses the potential of humans drilling, extracting and examining a core sample from the facility, potentially leading to internal or external exposures. The peak dose to the driller is calculated to be 0.00078 mSv, which is less than 0.1% of the regulatory dose limit for a member of the public of 1 mSv/yr.

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			• House with a Basement: The resident's house on the engineered containment mound has a basement. The soil/waste excavated from the basement is spread over the garden area. The peak dose to the on-site resident is 0.039 mSv, which is well under the regulatory dose limit for a member of the public of 1 mSv/yr. Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control (i.e., 300 years), a variant of this scenario is presented with the doses calculated from 100 years, to see how they would change with a shorter period of institutional control. In all the plausible scenarios, the calculated dose is below the regulatory dose limit for a member of the public of 1 mSv/yr. Thus, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 [2] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. The reduction in the inventory to meet the SSR-5 requirement resulted in the development of the Licensed Inventory, as outlined in Table 3.3.1-2 of the final EIS. The radioactive decay from the time of closure of the engineered containment mound (ECM) is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011.
CNL-ND539	CAPE (April 18, 2017)	The storage design for the radioactive wastes is so superficial that one can access the waste by means of a simple shovel.	The cover system of the Engineered Containment Mound (ECM) is about 2 meters thick. In other words, there are 2 meters of clean material separating the environment from the lightly contaminated soil and building debris that make up the majority of the material inside the NSDF, which will only contain low-level radioactive waste. Section 3.4.1.9.3 (and Figure 3.4.14-8) of the final Environmental Impact Statement (EIS) describes the final cover system. The cover system includes: • 150 mm of topsoil. • 600-1200 mm of sandy loam. • 200 mm of a granular filter layer (small crushed rock). • 500 mm of Intrusion Barrier Rockfill (larger crushed rock). • 300 mm sand cushion. • A high-density polyethylene geomembrane with an expected service life of over 500 years. • A geosynthetic clay liner. • 300 mm of sand. Several of these layers are known to be resistant to a human with a shovel, especially the rock layers and the high-density polyethylene (HDPE) geomembrane liner. Above all else, the NSDF is located on the Chalk River Laboratories (CRL) site, which is a restricted area with a full-time physical security presence and program. Following closure of NSDF, institutional controls will be in place to limit the probability of human intrusion into the NSDF site as outlined by Section 3.2.4.2 of the final EIS. Institutional controls are

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			important in helping to protect engineered barrier systems by providing a means to ensure that the barriers remain effective, are not showing signs of degradation, and continue to limit the potential for being vandalized or damaged by outside elements (natural or human) in any way. The NSDF Project is designed to promote safety through passive means during the post-closure phase but is complemented by active measures taken by Canadian Nuclear Laboratories (CNL), such as maintenance, security and surveillance. The NSDF Project site security features will include signage, markers, fencing and gate. A chain-link fence will deter intruders and animals from site access. Lastly, CNL has utilized the NSDF Waste Acceptance Criteria [1] to limit the consequences to a member of the public should human intrusion activities occur in the future. This principle is consistent with requirements in International Atomic Energy Agency (IAEA) Disposal of Radioactive Waste, SSR-5 [2]. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011 April.
CNL-ND540	Dr. J.R. Walker (May 9, 2017)	Table 6.4.4-5 shows that doses to a farm resident from chronic exposure would, for periods exceeding 100,000 years, not only exceed the recommended dose constraint for radioactive waste disposal (0.3 mSv/year) but would also exceed the regulatory limit for effective dose to a member of the public (1 mSv/year) [10]. These doses to a farm resident in the future (Table 6.4.4-5) appear in a section of the Draft EIS concerned with Human Intrusion (Section 6.4.4.4). In Section 6.4.3 of the Draft EIS, CNL paraphrase some of the safety criteria (criteria "c", "d", and "e") from IAEA Specific Safety Requirements SSR-5, Disposal of Radioactive Waste and state that "neither the legal dose limit of 1 mSv/yr nor the licensing dose limit of 0.3 mSv/yr to members of the public apply to doses resulting from inadvertent human intrusion." This statement is incorrect with respect to a future farm resident, since the criteria for inadvertent human intrusion are inappropriate in reference to a future farm resident.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available. As a result of this change, the Human Intrusion scenarios have significantly smaller dose consequences. Essentially CNL has utilized the NSDF Waste Acceptance Criteria [1] to limit the consequences to a member of the public should human intrusion activities occur in the future. This principle is consistent with requirements in International Atomic Energy Agency (IAEA) Disposal of Radioactive Waste, SSR-5 [2]. The section on Malfunctions and Accidents (now Section 7.0 of the final Environmental Impact Statement (EIS)) has been extensively revised – separating the post-closure phase analysis and now presenting the assessment of Human Intrusion scenarios is summarized in Section 5.8.6.1.2.2 of the final EIS. The Post-Closure Safety Assessment (PostSA) [3] considers Human Intrusion scenarios including Borehole Drilling (acute exposures) and a House With a Basement (chronic exposures). These Human Intrusion scenarios are presented in Section 5.8.6.1.2.2 of the final EIS but also summarized below: • Borehole Driller: This scenario assesses the potential of humans drilling, extracting and examining a core sample from the facility, potentially leading to internal or external exposures. The peak dose to the driller is calculated to be 0.00078 mSv, which is less than 0.1% of the regulatory dose limit for a member of the public of 1 mSv/yr. • House with a Basement: The resident's house on the engineered containment mound has a basement. The soil/waste excavated from the basement is spread over the garden area. The peak dose to the on-site resident is 0.039 mSv, which is well under the regulatory dose limit for a member of the public of 1 mSv/yr. Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control (i.e., 300 years), a variant of this scenario is presented with the doses calculated from 100 years, to see how they would change with a shorter period of institutional control. In all the plausible scenarios, the calculated dose is below the regulatory dose limit for a member of the public of 1 mSv/yr. Thus, the long term safety of the NSDF is not

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			reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing For more detail on all post-closure modelling, please see the Post-Closure Safety Assessment [3]. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 011 April. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND541	Anna Tilman (August 11, 2017)	The EIS concludes that adverse effects to human and non-human biota due to the acute intrusion scenario are not expected. There is no basis for this.	The section on Malfunctions and Accidents (now Section 7.0 of the final Environmental Impact Statement (EIS)) has been extensively revised – separating the post-closure phase analysis and now presenting it in Section 5.8 of the final EIS. The Post-Closure Safety Assessment (PostSA) [1] considers Human Intrusion scenarios including Borehole Drilling (acute exposures) and a House With a Basement (chronic exposures). These human intrusion scenarios are presented in Section 5.8.6.1.2.2 of the final EIS but also summarized below: • Borehole Driller: This scenario assesses the potential of humans drilling, extracting and examining a core sample from the facility, potentially leading to internal or external exposures. The peak dose to the driller is calculated to be 0.00078 mSv, which is less than 0.1% of the regulatory dose limit for a member of the public of 1 mSv/yr. • House with a Basement: The resident's house on the engineered containment mound has a basement. The soil/waste excavated from the basement is spread over the garden area. The peak dose to the on-site resident is 0.039 mSv, which is well under the regulatory dose limit for a member of the public of 1 mSv/yr. Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control (i.e., 300 years), a variant of this scenario is presented with the doses calculated from 100 years, to see how they would change with a shorter period of institutional control. In all the plausible scenarios, the calculated dose is below regulatory dose limit for a member of the public of 1 mSv/yr. Thus, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 [3] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. The reduction in the inventory to meet the SSR-5 requirement resulted in the development of the Licensed Inventory, as outlined in Table 3.3.1-2 of the final EIS. The radioactive decay from the time of closure of the Engineered Containment Mound (ECM) is illustrated on Figure 3.3.1-2 of the final EIS - the radioactivity concentration decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. For non-human biota, an entire Ecological Risk Assessment (EcoRA) [4] was produced, which assesses the same scenarios as the PostSA. The EcoRA examines the environmental concentrations as a result of the NSDF Project and determines if these concentrations will have an effect on non-human biota. Due to the very low environmental concentrations expected as a result of the NSDF Project, the only exposure effects to biota were considered to be negligible. Discussion of the results of the EcoRA are presented in Section 5.7 of the final EIS.

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			References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [4] Ecological Risk Assessment (EcoRA) for the NSDF Project, 232-121240-ASD-001.
CNL-ND542	William Turner (May 31, 2017) 140.143.	6.4.4.4 0 The two intrusion events described in this section are not credible. All one has to do is to compare the human activities at the Chalk River location about 300 years ago, (i.e. in the year 1700) with those occurring today. Extrapolating from today to 300 years from now is essentially the same process only in reverse. It is not for me to speculate on what will be the situation at the mound site 300 years from now, but it is extremely unlikely that it will be drilling or farming as we know it today. I suggest that a farmer may not be the appropriate representative person. Since this is a mound, I suggest that one occupation that would be more attracted to a waste mound is the archeologist. That occupation would be excavating the mound for historic artefacts. CNL need to consider potential exposures to other credible occupations such as an archeologist. Note any intrusion by an archeologist will be intentional.	The section on Malfunctions and Accidents (now Section 7.0 of the final Environmental Impact Statement (EIS)) has been extensively revised – separating the post-closure phase analysis and now presenting it in Section 5.8 of the final EIS. Furthermore the approach to the long term safety assessment has been revisedand presented in the Post-Closure Safety Assessment (PostSA) [1] which is a technical supporting document of the final EIS. The PostSA uses the International Atomic Energy Agency (IAEA) Safety Assessment Methodologies for Near Surface Disposal Facilities (ISAM) [2] approach in the development of the scenarios and long-term modelling. Through the Features, Events, and Processes (FEPs) screening, the behaviour of the wastes, and the facility itself, are captured and accounted for within the models. A summary of the Human Intrusion scenarios included in the PostSA, and results thereof, can be found in Section 5.8.6.1.2.2 of the final Environmental Impact Statement (EIS). Previous iterations of PostSA modelling included an archeological exploration. This scenario, along with the construction of a highway through the facility, are now bounded by the current Mass Excavation scenario presented in the PostSA [1]. The Mass Excavation scenario is bounding because it uses the same exposure pathways, includes a larger source term, and involves longer exposure times. In this scenario assessed, the entire mass of the NSDF is excavated and dispersed in surface soils which are subsequently used for cultivating food, thereby maximizing the number of exposure pathways to the receptor. The peak calculated dose from this extreme scenario is 0.4 mSv/y, which meets the regulatory dose limit for a member of the public of 1 mSv/y. More details on the scenario inputs and calculation can be found in the PostSA. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] IAEA. Safety Assessment Methodologies for Near Surface Disposal Facilities. 2004.
CNL-ND543	William Turner (May 31, 2017) 141. 142.	6.4.4.4.2 *Chronic Exposure from Living in a House and Farming on Top of the Engineered Containment Mound "In the event of an inadvertent human intrusion from living and farming on top of the ECM during the Post-Institutional Control period (i.e., after the year 2400), …"* How does an "inadvertent … intrusion" result in a chronic exposure? As I understand the term "inadvertent", this is an accidental event resulting in an acute exposure. The use of the term "inadvertent" in this context is deliberately misleading. This section must be revised – intrusions can only be "inadvertent" during the period when access to the site is controlled.	The adjective "inadvertent" is referring mostly to the act of coming into contact with radiological material, and not necessarily of the intrusion itself. For example, a human may be purposefully trespassing (intruding) on the NSDF site, but the use of radioactive material in their garden is considered "inadvertent". The result of this inadvertent intrusion (ingestion of produce from this garden) results in a chronic exposure. The International Atomic Energy Agency (IAEA) Safety Glossary [1] discusses the term "potential exposure", and includes the following explanatory text which may help guide the commenter's understanding: *Potential exposure includes prospectively considered (i.e. hypothetical or postulated) exposures due to a source in an event or sequence of events of a probabilistic nature, including exposures resulting from an accident, equipment failures, operating errors, natural events or phenomena (such as hurricanes, earthquakes and floods) and* ***inadvertent human intrusion (such as a human intrusion into a near surface disposal facility after institutional control is removed)*** [emphasis added].

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			Reference: [1] IAEA Safety Glossary. Terminology Used in Nuclear Safety and Radiation Protection. 2018 Edition. https://www-pub.iaea.org/MTCD/Publications/PDF/PUB1830_web.pdf.
CNL-ND544	William Turner (May 31, 2017) 146. 147.	Table 6.4.4-5 Are these estimated exposures As Low As Reasonably Achievable (ALARA)? I doubt it. To meet the ALARA principle I would expect to see CNL propose some credible mitigation measures. None of the listed "passive" mitigation measures will last 10 years let alone the hundreds to thousands of years listed in the table. In other words, this is not ALARA. None of these will result in any reduction in an exposure. Maybe if CNL were serious in ensuring exposures to this hypothetical farmer are ALARA, then they be addressing the required protection up front. Since the WAC for the facility are not yet defined, CNL can address predicted emissions and exposures by ensuring the WAC address the long-term safety of persons beyond the institutional control period. Other ways to ensure the hypothetical farmer does not receive a dose above the public dose limit would be to extend the "Institutional Control" period to a time in which that dose limit would not be exceeded. However, from the table, that period would have to exceed 100,000 years. An institutional control period beyond several hundred years is just not credible. Before this facility can be licensed, then CNL must revisit their proposed undertaking and implement appropriate mitigation measures to ensure the public dose limit is met beyond the period when access to the site is no longer controlled.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available. As a result of this change, the Human Intrusion scenarios have significantly smaller dose consequences. Essentially CNL has utilized the NSDF Waste Acceptance Criteria [1] to limit the consequences to a member of the public should human intrusion activities occur in the future. This principle is consistent with requirements in International Atomic Energy Agency (IAEA) Disposal of Radioactive Waste, SSR-5 [2]. The Post-Closure Safety Assessment (PostSA) [3] considers Human Intrusion scenarios including Borehole Drilling (acute exposures) and a House With a Basement (chronic exposures). These Human Intrusion scenarios are presented in Section 5.8.6.1.2.2 of the final EIS but also summarized below: • Borehole Driller: This scenario assesses the potential of humans drilling, extracting and examining a core sample from the facility, potentially leading to internal or external exposures. The peak dose to the driller is calculated to be 0.00078 mSv, which is less than 0.1% of the regulatory dose limit for a member of the public of 1 mSv/yr. • House with a Basement: The resident's house on the engineered containment mound has a basement. The soil/waste excavated from the basement is spread over the garden area. The peak dose to the on-site resident is 0.039 mSv, which is well under the regulatory dose limit for a member of the public of 1 mSv/yr. Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control (i.e., 300 years), a variant of this scenario is presented with the doses calculated from 100 years, to see how they would change with a shorter period of institutional control. In all the plausible scenarios, the calculated dose is below the regulatory dose limit for a member of the public of 1 mSv/yr. Thus, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing Furthermore examples of the application of ALARA during the post-closure phase can be found in the PostSA [4] through the investigated dose optimization scenarios; specifically one examined the reduction of radon at the surface of the ECM through attention to waste placement. Waste disposed to the NSDF will include materials that generate radon gas. These radon generating materials will be present in the select waste, and within the bulk waste layers [4]. This case, the Radon Optimization through Waste Placement scenario examines the potential for dose optimization in the post-closure phase by placing radon generating waste deeper in the ECM or limiting concentrations of radon generating radionuclides in upper layers of the ECM [4]. For more detail on all post-closure modelling, please see the Post-Closure Safety Assessment [3]. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.

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			[2] IAEA, Disposal of Radioactive Waste, SSR-5, STI/PUB/1449, 2011 April. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND545	William Turner (May 31, 2017) 148.	General Comment – All doses exceed the licensing limit of 0.3 mSv.year and the public dose limit of 1 mSv.year – 1. What are the expected does before the site is released from control? Given the 500 years of radioactive decay that would occur before that release, I suspect they would likely be higher. 2. Over the period listed here, there is an increase in dose to a maximum occurring after 66,000 years. The only sources for these doses is the wastes within the mound. Since there is only once source, what would be the cause of this increase? 3. CNL state that this facility is designed to accept LLW with a small volume of ILW. From the IAEA definition of LLW, this waste consists of primarily radionuclides with relatively short half-lives. The total activity from these nuclides should have decayed away to much lower than the public dose limit by the time access to the site is no longer controlled. Yet, the doses are increasing. This suggests to me that this "small volume" of ILW is actually a large source of long-lived radioactive nuclides	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available. As a result of this change, all long-term doses have been significantly reduced and meet the regulatory dose limits for a member of the public. Section 5.8 of the final Environmental Impact Statement (EIS) summarizes the calculated doses to the public in the post-closure phase. A Post-Closure Safety Assessment (Post SA) [1] for the NSDF has been prepared and utilizes the revised inventory at closure (i.e., 2070) to predict radiological dose to members of the public. The approach to the PostSA ensures the assessment is performed to demonstrate that the NSDF long-term safety is not reliant on institutional controls in order to meet the dose requirements. The PostSA considers a resident farmer on the Engineered Containment Mound (ECM) as a Normal Evolution Scenario as well as various Human Intrusion scenarios. Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control (i.e. 300 years), a variant of this scenario is presented with the doses calculated from 100 years, to see how they would change with a shorter period of institutional control. In all these scenarios, the dose is calculated to be below the regulatory public dose limit. The reason that the doses increase after a long period of time is the result of the natural uranium decay chain of wastes within NSDF, and the associated ingrowth of radon. In the revised approach to the long term safety, radon is assessed separately from the total radiation dose given its source as a naturally occurring radioactive material. Instead the predicted radon concentrations for relevant scenarios (i.e., within the house on the disposal facility) were compared against the Health Canada guideline for radon in household air (200 Bq/m^3) [2]. As summarized in Section 5.8.6.1.2.2 of the final EIS, the maximum concentration of radon in a house potentially built on top of the ECM is 2.9 Bq/m^3, thus far below the Health Canada guideline and implying there are negligible residual effects expected on human health due to radon buildup associated with the NSDF Project. It should also be noted that the total emplaced Uranium-238 content under the revised inventory is equivalent to about 6,000 kg, or about 6 tonnes, with an average concentration of about 0.08 Bq/g. This is extremely close to the average natural background concentration of 0.07 Bq/g quoted by the Health Physics Society [3] (Although it is noted that this value varies widely depending on the local geology). Uranium-238 occurs naturally in soil and rock all over the Earth, and is currently in equilibrium with its decay products. Any ingrowth of radon occurring in the NSDF is occurring in the surrounding natural environment as well. This phenomenon is not unique to the NSDF. As mentioned above, CNL has revised the proposed inventory removing ILW and the NSDF will ONLY accept LLW which effectively limits the concentrations of long-lived radionuclides. The concentrations of long-lived radionuclides that are proposed in the NSDF Licensed inventory (Table 3.3.1-2 of EIS) are in limited activity concentrations consistent with CSA Group (CSA) [3] and International Atomic Energy Agency (IAEA) guidance [4]. The substantial decrease of radioactivity concentrations in the first 100 years after the facility has been closed (as shown in Figure 3.3.1-2 of the final EIS) is the result of the decay of the shorter-lived radionuclides. The remaining radioactivity present in the NSDF after the 300-year Institutional Control period is the limited inventory of long-lived radionuclides. The risk of the presence of these long-lived radionuclides has been studied in detail in the PostSA [1]. The calculated dose consequence and environmental concentrations meet the dose acceptance criteria and environmental quality standards, respectively, thus do not pose an unacceptable risk to the public or environment.

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			References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Health Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM) - Revised 2011. https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewhsemt/alt_formats/pdf/pubs/contaminants/norm-mrn/norm-mrn-eng.pdf [2] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf [3] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [4] IAEA General Safety Guide – 1, Classification of Radioactive Waste.
		Malfunctions and Accidents - Fire Protection Program	
CNL-ND546	Joan Lougheed and Town of Deep River (August 16, 2017)	Further evidence that CNL has not given real consideration to the disaster and accident planning issue is found in the casual manner in which the draft EIS proposes to respond to some of the accident scenarios. For example, with respect to the fire engulfing radioactive waste packages discussed above, the draft EIS states: *CNL has a Fire Protection Program for the CRL site designed to prevent fire losses, provide responsible fire protection management, and demonstrate compliance to applicable fire protection codes and standards. Fire detection and suppression systems are also included in the NSDF Project design. Further details of this program are provided in Section 3.13.2.9. (see pg. 6-8).* Section 3.13.2.9 consists of one paragraph that is four sentences in length (see pg. 3- 80).There are no other portions of the draft EIS that provide substantive detail regarding the Fire Protection Program. The description of CNL's Fire Protection Program and its application to potential accidents and disasters at the NSDF is wholly inadequate.	Having an effective response to fires is facilitated through Canadian Nuclear Laboratories (CNL) Emergency Preparedness Program (Section 3.5.2.5 of the final Environmental Impact Statement (EIS)) and the Fire Protection Program (Section 3.5.2.9 of the final EIS). The Fire Protection Program is dedicated to the delivery of a compliant Fire Protection Program that will provide the highest level of fire and life safety to all CNL employees and facilities. The objectives of the Fire Protection Program include preventing fire losses, providing responsible fire protection management, demonstrating compliance with applicable fire protection codes and standards, and providing reliable facilities from a fire protection perspective. The Fire Protection Program provides services including developing fire prevention processes and conducting fire safety inspections. Fire hazard analyses, code compliance reviews and fire protection screenings are also conducted as part of the program. Consequences of a fire, such as a power outage, are encompassed by CNL's Emergency Preparedness Program. The CNL Fire Protection Program (and more specifically the Chalk River Laboratory (CRL) site Fire Department) meets the requirements of CSA N393 *Fire Protection for Facilities that Process, Handle, or Store Nuclear Substances*, which dictates the fire response team shall be capable of performing effective and sustained intervention through implementation of fire attack plan within 15 minutes of being notified of fire incident. The controls and safeguards that are in place to prevent fires and or to limit the consequences of an Engineered Containment Mound (ECM) fire event include CRL Fire Department, NSDF Fire Water Pump Station, vehicle/equipment maintenance and portable fire extinguishers on the vehicles. Fire water is stored in the Fire Water Pump Station. In the event of a fire, work will be immediately stopped and placed into a safe state, if possible. The NSDF Emergency Procedure will be followed. The CRL Fire Department will be notified as well as others working in the area. As part of the Safety Analysis Report [1], an assessment of the consequences of a fire during the Operations phase at the NSDF Project site, caused by a forest fire, lightning strike or other means, was completed. A scenario was developed to assess the dose consequences of a fire in the ECM's Temporary Storage Waste Receiving and Processing Area (TSWRPA) involving 800 m^3 of bulk waste and packaged waste. The affected waste volume represents approximately 0.08% of the total inventory of bulk and packaged waste to be emplaced at the ECM. This fire results in the atmospheric dispersion of radioactive contaminants from the waste burning.

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			The radiological consequences of a fire in the TSWRPA are limited to the radiological source term stored in the TSWRPA. The dose consequence to the on-site receptors located at the NSDF and Building 700 are 2.4 mSv and 5.2E-02 mSv, respectively [1]. The dose consequences to the off-site receptors located at the cottage location, 3 km away are 2.1E-02 mSv for the adult receptor and 1.4E-02 mSv for the infant, 1 year old child [1]. The primary radionuclide contributing to the inhalation dose consequence is Cobalt-60 [1]. The dose consequences to on-site and off-site receptors meet the design basis accident dose acceptance criteria (as defined in Table 3-4 and Table 7.3.1-1 of the final EIS) for the TSWRPA fire scenario. The Design Basis Accident (DBA) dose acceptance criteria is 5 mSv to 50 mSv for on-site personnel and 0.5 mSv to 20 mSv for the off-site public. Reference: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND547	Joan Lougheed and Town of Deep River (August 16, 2017)	The fire engulfing radioactive waste packages accident scenario does not confirm that the doses calculated are bounding and it does not use the worst-case scenarios for waste packages or types, with the most restrictive radionuclide for the impact on a receptor. Also, the ten waste packages are not clearly identified (see pg. 6- 9). An appropriate assessment of this accident scenario would describe the subject waste packages as well as provide a specific time in the operations phase when this maximum peak dose would occur.	Fire is evaluated during the operations phase, which is when the inventory is much greater (due to lack of decay period). The bounding fire scenario and assessment of consequences is described Appendix G of the Safety Analysis Report (SAR) [1] and summarized in Section 10.2 of the final Environmental Impact Statement (EIS). The fire is initiated by a forest fire, lightning strike or other means. A scenario was developed to evaluate the effects of assess the dose consequences of a fire in the Engineered Containment Mound (ECM) Temporary Storage Waste Receiving and Processing Area (TSWRPA) involving 800 m^3 of bulk waste and packaged waste. The affected waste volume represents approximately 0.08% of the total inventory of bulk and packaged waste to be emplaced at the ECM. This fire results in the atmospheric dispersion of radioactive contaminants from the waste burning. The radiological consequences of a fire in the TSWRPA are limited to the radiological source term stored in the TSWRPA. The dose consequence to the on-site receptors located at the NSDF and Building 700 are 2.4 mSv and 5.2E-02 mSv, respectively [1]. The dose consequences to the off-site receptors located at the cottage location, 3 km away are 2.1E-02 mSv for the adult receptor and 1.4E-02 mSv for the infant, 1 year old child [1]. The primary radionuclide contributing to the inhalation dose consequence is Co-60 [1]. The dose consequences to on-site and off-site receptors meet the Design Basis Accident (DBA) dose acceptance criteria (as defined in Table 3-4 and Table 7.3.1-1 of the final EIS) for the TSWRPA fire scenario. The DBA dose acceptance criteria is 5 mSv to 50 mSv for on-site personnel and 0.5 mSv to 20 mSv for the off-site public. The evaluation concludes radiological doses to workers and member of the public are below regulatory limits and meet safety objectives for the NSDF Project. Reference [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND548	Joan Lougheed and Town of Deep River (August 16, 2017)	CNL believes that no changes to the current Fire Protection Program that has been developed for the CRL site will be required to address any accidents or malfunctions at the 1,000,000 m3 NSDF (see pg. 6-22). In Deep River's opinion, there is insufficient reason and explanation in the draft EIS to substantiate CNL's position with respect to whether the current Fire Protection Program is suitable for the NSDF. The NSDF is a new use of the CRL lands and an appropriate assessment as to whether the current Fire Protection Program is sufficient to protect users of the CRL lands, the local environment, and the neighbouring communities must be made.	Canadian Nuclear Laboratories (CNL), as part of a mandatory and due diligence review process, conducted a number of assessments including a Code Compliance Review and a Fire Hazard Assessment. The Code Compliance Review concluded that the NSDF is in compliance with National Building Code and National Fire Code fire safety requirements. The Fire Hazard Assessment concluded that CNL's fire protection and emergency preparedness programmatic measures are adequate to address the risk posed by NSDF in accordance with CSA N393 *Fire Protection for Facilities that Process, Handle, or Store Nuclear Substances* [1] which is the fire protection standard that applies to the Chalk River Laboratories (CRL) site.

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			Reference: [1] CSA Group N393 – Fire Protection for Facilities that Process, Handle, or Store Nuclear Substances. 2013.
CNL-ND549	Joan Lougheed and Town of Deep River (August 16, 2017)	It is unclear whether the Fire Protection Program applies throughout the post-closure phase of institutional control (see pg. 9-6). It is also unclear how in the case of a large scale forest fire, the scenario of the fire burning for only an hour is determined to be bounding. One could envisage other facilities that may be impacted by a forest fire which could be a higher priority for the fire fighters, thus the one hour limit may not be applicable.	The application of the Fire Protection Program throughout the post-closure phase of the project will be determined closer to the start of the post-closure phase. Note that as licenced nuclear facility, all phases of the NSDF's life cycle (construction, operations, closure etc.) are regulated and subject to the CNSC commission proceedings. A wildland/forest fire is assessed in Section 14.4.1.2 of the NSDF Safety Analysis Report (SAR) [1]. During daylight hours, a wildland fire in proximity to the NSDF would be rapidly detected by Chalk River Laboratories (CRL) site personnel at the NSDF or people travelling on Plant Road. During off-hours, security personnel would likely detect any significant wildland fires during security patrols of the site. The CRL Fire Department has a procedure for responding to an emergency incident involving wildland/forest fire fighting in areas having potential radiological contamination. The CRL Fire Department possesses the equipment to fight wildland fires and may also request support from adjoining municipal fire departments and the Ontario Ministry of Natural Resources. Access to the site of the fire would be provided by a number of roads and fire trails extending throughout the Supervised Area. The CRL Fire Department meets the requirements of CSA N393 *Fire Protection for Facilities that Process, Handle, or Store Nuclear Substances* [2], which dictates the fire response team shall be capable of performing effective and sustained intervention through implementation of fire attack plan within 15 minutes of being notified of fire incident. The controls and safeguards that are in place to prevent fires and or to limit the consequences of an Engineered Containment Mound (ECM) fire event include CRL Fire Department, NSDF Fire Water Pump Station, vehicle/equipment maintenance and portable fire extinguishers on the vehicles. Fire water is stored in the Fire Water Pump Station. In the event of a fire, work will be immediately stopped and placed into a safe state, if possible. The NSDF Emergency Procedure will be followed. The Fire Department will be notified as well as others working in the area. Wildland/forest fires are not expected to affect [1]: • Waste within the ECM since the ECM perimeter berm is approximately 45 m from the NSDF perimeter fence and the forest edge is 4 m beyond the NSDF fence line. • Waste placed in disposal cells - the use of a daily soil cover and interim cover over the emplaced waste in the disposal cell, minimizes the risk of the waste catching on fire. • Buildings because they are constructed of non-combustible materials and are equipped with fire detection systems. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] CSA Group N393 – Fire Protection for Facilities that Process, Handle, or Store Nuclear Substances. 2013.
		Malevolent Acts	
CNL-ND550	Cara Rose-Brown, Iana and Carlos Ciatti	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.*	The long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 (Disposal of Radioactive Waste) [1] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. The radioactive decay from the time of closure of the ECM is illustrated on

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	(May 15, 2017) Ted and Linda Kucharski (May 16, 2017) Concerned Citizens of Renfrew Country (Ole Henrickson) (July 3, 2017)	1,000,000 cubic meters of toxic radioactive waste will be protected by a chain link fence and a security guard. It will be dug into the ground to stop turtles from entering but how will that protect our city from a very obvious target from those interested in harming our Nation's Capital? How would saboteurs be stopped from infiltrating?	Figure 3.3.1-2 of the final EIS - the radioactivity concentration decreases about 2,000 times in the first 100 years, and begins to approach background levels of concentration shortly thereafter. A Post-Closure Safety Assessment (Post SA) [2] for the NSDF has been prepared and utilizes the reference inventory [3] at closure (i.e., 2070) to predict radiological dose to humans and contaminant concentrations in the environmental media. The approach to the PostSA ensures the assessment is performed to demonstrate that the NSDF long-term safety is not reliant on institutional controls in order to meet the dose requirements. The revised PostSA considers Human Intrusion scenarios including Borehole Drilling (acute exposures) and a House with a Basement (chronic exposures). Although in the Normal Evolution Scenario these events are restricted from occurring until the end of the period of institutional control, a variant of this scenario is presented with the doses calculated from 100 years, to see how they would change with a shorter period of institutional control. In all these scenarios, the dose is calculated to be below the regulatory public dose limit. As the owner of the CRL site and associated liabilities, AECL (a federal Crown corporation) will continue to put in place measures to ensure that the site is managed and controlled (restricting the land use of the NSDF Project footprint) for as long as necessary. References: [1] IAEA, Disposal of Radioactive Waste, SSR-5, STI/PUB/1449, 2011 April. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
		Cumulative Effects	
CNL-ND551	Heather Sanderson (May 12, 2017)	What is the cumulative effect of radioactive particles to our city water processing plants and cisterns? Do they accumulate in the bottom? Do they radiate the vessel our pipes? Do we test for this? Will we implement testing? Who will pay? If we don't monitor and people get sick, who is responsible?	Canadian Nuclear Laboratories (CNL) is committed to both studying and continuously reducing the impact of our operations on the environment. The CNL Environmental Protection Program maintains a comprehensive effluent and environmental monitoring program of more than 400 sampling locations with approximately 30,000 analyses performed each year throughout the CRL site. Monitoring involves all releases to the Ottawa River including those from groundwater plumes and various outfalls. In addition, water is monitored at multiple locations in the Ottawa River extending from Rolphton located 28 km upstream of Chalk River Laboratories (CRL) to Pembroke located approximately 28 km downstream of the Chalk River Laboratory (CRL) site. Ottawa River water quality monitoring results at the nearest water treatment system, in Petawawa, show most contaminants are below detection at that location. The presence of tritium over the last few years has been well below acceptable limits: the average concentrations in the river water are <4 Bq/l compared to the drinking water limit of 7,000 Bq/l. CNL's environmental monitoring program also includes routine monitoring of radioactivity at downstream beaches and shorelines and in fish at locations downstream and upstream of the CRL site. A summary of effluent and environmental monitoring activities and results is provided in Section 5.7.4 of the final Environmental Impact Statement (EIS). Based on CNL's effluent and environmental monitoring activities, there is no build-up of radioactive particles in water processing plants downstream of the CRL Site. Canadian Nuclear Laboratories (CNL) will continue to monitor effluent released from the CRL Site and Ottawa River water quality.
CNL-ND552	Concerned Citizens of Renfrew	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions. Please note that a portion of this comment was submitted in French, and therefore a response in both official languages will be provided.*	For the cumulative effects assessment, decommissioning projects at the Chalk River Laboratories (CRL) site are assessed as a grouped activity rather than by individual projects. Decommissioning activities are summarized in Section 8.2.1 and Table 8.2-1 of the final Environmental Impact Statement (EIS) and include decommissioning of over 100 building and structures

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	Country (Ole Henrickson) (May 15, 2017) Anna Tilman (June 22, 2017) Dr. J.R. Walker (May 9, 2017)	It is not evident that the EIS has appropriately addressed or considered the significance of cumulative environmental impacts of this proposed project in conjunction with decommissioning projects at CRL that have undergone environmental assessments, and the cumulative environmental impacts with other activities at the Chalk River Laboratories (CRL), including: • Clean-up of Two Legacy Landfill Areas at the CRL site – 22196. • Decommissioning and Dismantlement of Buildings in built-up area – 40302. • Proposal from Atomic Energy of Canada Limited to decommission a plutonium recovery laboratory – 6503. • Proposal from Atomic Energy of Canada Limited to decommission a plutonium tower building at Chalk River Laboratories – 6513. • Proposal from Atomic Energy of Canada Limited to decommission a waste water evaporator located at the Chalk River Laboratories – 6517. • Proposal from Atomic Energy of Canada Limited to Decommission the NRX Ancillary Buildings – 27095. It is also reasonable to foresee projects to decommission the NRU nuclear reactors, and the construction of a new small modular reactor (announced by Canadian Nuclear Laboratories on 2017 April 26). Information regarding these impacts, including the wastes that would be generated, is vital for the proposed project. [Français] Il n'est pas évident que l'EIE ait traité ou pris en compte de manière appropriée l'importance des impacts environnementaux cumulés de ce projet proposé en liaison avec les projets de déclassement des LCR qui ont fait l'objet d'évaluations environnementales, et les impacts environnementaux cumulés avec d'autres activités des Laboratoires de Chalk River (LCR), notamment : • Nettoyage de deux anciennes décharges sur le site des LCR - 22196. • Déclassement et démantèlement des bâtiments dans la zone bâtie - 40302. • Proposition d'Énergie atomique du Canada limitée de déclasser un laboratoire de récupération du plutonium - 6503. • Proposition d'Énergie atomique du Canada limitée visant à déclasser un bâtiment à tour de plutonium aux Laboratoires de Chalk River - 6513. • Proposition d'Énergie atomique du Canada limitée visant à déclasser un évaporateur d'eaux usées situé aux Laboratoires de Chalk River - 6517. • Proposition d'Énergie atomique du Canada limitée visant à déclasser les bâtiments annexes du NRX - 27095. Il est également raisonnable de prévoir des projets de déclassement du réacteur nucléaire NRU, et la construction d'un nouveau petit réacteur modulaire (annoncé par les Laboratoires nucléaires canadiens le 26 avril 2017).	and include both nuclear laboratories and conventional buildings. National Research Universal (NRU) reactor decommissioning, although not specifically mentioned, is a foreseeable project and the assessment of effects broadly addresses potential effects from NRU decommissioning. The decommissioning projects identified by the reviewer are in various stages of completion. For example the Plutonium Tower Decommissioning has been initiated and will be finalized once NSDF is available for disposal of waste material from decommissioning the facility. Decommissioning activities will generate a significant volumes of low-level wastes (LLW). The NSDF will provide capacity for disposal of decommissioning wastes and enable decommissioning projects to proceed. The estimated waste volumes from decommissioning activities are included in the waste volume estimates projected for NSDF. Table 3.3.1-1 of the final EIS provides the estimated volume of bulk and packaged waste expected to be disposed of in the NSDF. The volumes were established by extrapolating waste already currently in storage, as well as waste forecasts from environmental remediation projects and decommissioning projects data to an assumed total volume of the NSDF at time of closure. Proposed decommissioning of infrastructure at the CRL site is authorized separately though the conditions of the CRL licence [1]. The approval process includes review of environmental impacts of decommissioning activities. Section 8.3 of the final EIS provides a summary of the cumulative effects of decommissioning activities by environmental component. Examples of impacts identified include dust generation and potential releases of airborne or liquid effluents. Cumulative effects will be minimized through implementation of mitigation measures. The cumulative effects assessment, Section 8.0 of the final EIS, has been updated to include Small Modular Reactors (SMR) as a reasonable foreseeable project and potential cumulative effects. Section 8.2.1.1 provides a description of the SMR proposal. Potential cumulative effects by environmental component are discussed in Section 8.3 of the final EIS. Reference: [1] CNSC, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25. [Français] Dans le cadre de l'évaluation des effets cumulatifs, les projets de déclassement des Laboratoires de Chalk River (LCR) sont évalués à titre d'activité groupée plutôt qu'à titre individuel. Les activités de déclassement sont résumées à la section 8.2.1 et au tableau 8.2-1 de l'Étude d'impact environnemental (EIE) et recouvrent le déclassement de plus de 100 bâtiments et structures qui sont aussi bien des laboratoires nucléaires que des bâtiments ordinaires. Le déclassement du réacteur NRU (National Research Universal), bien qu'il ne soit pas précisément cité, est un projet prévisible, et l'évaluation des effets cumulatifs tient compte, de façon générale, des effets éventuels de ce déclassement. Les projets de classement cités par le commentateur en sont à divers stades d'achèvement. Par exemple, le déclassement de la Tour d'extraction de plutonium a commencé et se terminera lorsque l'IGDPS sera apte à traiter les déchets provenant du déclassement de cette installation.

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		Les informations concernant ces impacts, y compris les déchets qui seraient générés, sont essentielles pour le projet proposé.	Les activités de déclassement produiront de grandes quantités de déchets de faible activité (DFA). L'IGDPS sera apte à traiter les déchets produits par les activités de déclassement et permettra de donner suite aux projets de déclassement. Les quantités estimatives de déchets produits par les activités de déclassement sont incluses dans les volumes estimatifs de déchets destinés à l'IGDPS. Le tableau 3.3.1-1 de l'EIE définitive fournit le volume estimatif de déchets en vrac et de déchets emballés destinés à l'IGDPS. Les quantités ont été calculées par extrapolation des volumes de déchets actuellement entreposés et à partir de données prévisionnelles sur les quantités de déchets produits par des projets d'assainissement et de déclassement pour en arriver à un volume total hypothétique à la fermeture de l'IGDPS. Le projet de déclassement d'infrastructures sur le site des LCR fait l'objet d'une autorisation distincte sous la forme des conditions au permis [1]. Le processus d'approbation comprend l'examen des effets des activités de déclassement sur l'environnement. La section 8.3 de l'EIE définitive fournit un résumé des effets cumulatifs des activités de déclassement par composante environnementale. Les effets examinés sont, par exemple, la production de poussière et la propagation éventuelle d'effluents liquides. Les effets cumulatifs seront réduits grâce à des mesures d'atténuation. La section 8.0 de l'EIE définitive (évaluation des effets cumulatifs) a été mise à jour pour englober les petits réacteurs modulaires (PRM), dont le déclassement est un projet prévisible susceptible de produire des effets cumulatifs. La section 8.2.1.1 est une description de cette proposition. Les effets cumulatifs éventuels par composante environnementale sont analysés à la section 8.3 de l'EIE définitive. Référence [1] CCSN, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, révision 1, en vigueur le 25 février 2019.
CNL-ND553	Joan Lougheed and Town of Deep River (August 16, 2017)	CNL intends to request expressions of interest from vendors of Small Modular Reactors ("SMRs"), who may wish to do site demonstrations at CRL (a Request for Expressions of Interest on SMRs, was issued by CNL on June 1, 2017). Given this CNL initiative, inclusion of SMRs in Table 7.2-1 would be appropriate with reference to this being associated with a timeframe of "Potential project post 2020". Also, the draft EIS, refers to the need for an ILW solution (see pgs. 2-5 and 2-19). The draft EIS also states that studies have concluded that the geology of the CRL site would be appropriate for an ILW repository (see pgs. 2-5 and 2-19 again). If there is any intention to construct an ILW repository on the CRL lands, same should be included in Table 7.2-1 under the heading Timeframe (see pg. 7-2). Both of these initiatives would be major projects on-site and, hence, are sufficiently noteworthy to be included here.	Cumulative effects of Reasonably Foreseeable Projects are assessed in Section 8.0 of the final Environmental Impact Statement (EIS). Small Modular Reactors (SMRs) have been identified as a Reasonable Foreseeable Project (Table 8.2-1) and potential impacts in combination with NSDF evaluated in Section 8 of the final EIS. The Environmental Assessment process for the construction of a SMR at Chalk River Laboratory (CRL) site was initiated in 2019. Further information on the project is available at the CEAA Registry website: https://iaac-aeic.gc.ca/050/evaluations/exploration?projDocs=80182 The current strategy for AECL's intermediate level waste (ILW) (managed by CNL) is that it will be disposed in a geological repository. The type and location of the ILW facility is is not yet defined (Section 2.2.2.1 of the final EIS). It is therefore not included as a Reasonable Foreseeable Project in the cumulative effects assessment for the NSDF. A program of work is planned to assess the options and decide on a path forward for the ILW facility. Future work will follow all applicable regulatory processes.
CNL-ND554	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions* Cumulative impacts have not been adequately addressed. There is already significant groundwater pollution at the site and the EIS clearly states that contaminated leachate will be released into the nearby	The effects of existing groundwater and surface water contamination at the Chalk River Laboratories (CRL) site are taken into consideration as part of baseline conditions. Existing groundwater and surface water contamination in the Perch Lake watershed is provided in the description of the environment for groundwater (Section 5.3.1.4) and surface water (Section 5.4.1.4) of the final Environmental Impact Statement (EIS). Section 5.3.2.4.2.2 (Groundwater Quality) of the final EIS has been expanded to provide additional information on

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

Number	Source	**Comment Summary** (all original submissions can be found on the Canadian Environmental Assessment Registry, reference #80122) **Synthèse des commentaires** (toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)	**Response (to be completed by CNL)** **Réponse (à remplir par la LNC)**
		surface water that is directly connected to the Ottawa River. More details Appendix 2, pages 11-14 of the Ottawa Riverkeeper submission. There is no consideration given to the existing groundwater and surface water contamination at the site, which is critical for assessing cumulative effects of the NSDF on Perch Lake, Perch Creek and the Ottawa River.	groundwater contaminant plumes that are downgradient of the NSDF site. Additional sampling and analysis of surface water quality in the Perch Lake watershed was conducted in 2018 to provide better characterization of existing radiological and non-radiological parameters and is included in the final EIS. The assessment includes the effects of existing conditions in combination with the effects of the NSDF Project. Effects on groundwater quality are assessed in Section 5.3.2.6.2 of the final EIS and are predicted to be negligible. No adverse impacts on ecological receptors are predicted. Effects on surface water quality are assessed in Section 5.4.2.6 of the final EIS. No adverse effects on water quality are predicted for the Perch Lake and Perch Creek Watershed and the Ottawa River. Cumulative effects are also assessed which assess potential impacts from reasonably foreseeable projects in combination with the NSDF Project and existing conditions. Cumulative effects are assessed in Section 8.0 of the final EIS. The NSDF Project will enable remediation of the historic Waste Management Areas (WMAs) in the Perch Lake watershed. Some of these historic WMAs do not provide engineered containment. Transfer of these wastes to the NSDF site which provides engineered containment will have a positive effect on groundwater and surface water quality in the Perch Lake watershed. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS.
CNL-ND555	AANTC (August 14, 2017)	Cumulative impacts of decommissioning and remediating activities at the site must be considered along with construction and operation activities.	Cumulative effects of decommissioning and remediation activities in combination with NSDF construction and operations activities are evaluated in Section 8.0 of the final Environmental Impact Statement (EIS). The Chalk River Laboratories (CRL) site decommissioning and remediation activities considered in the cumulative effects assessment are described in Section 8.2.1 of the final EIS. Decommissioning activities include removal of more than 100 buildings at the CRL site, both nuclear laboratories and conventional buildings. Remediation activities will include remediation of historic waste management areas and contaminated lands. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. The cumulative effects assessment is performed by environmental component and summarized in Section 8.3 of the final EIS. Cumulative effects on the following environmental components are assessed: Atmosphere; Geology and Hydrogeology; Surface Water; Aquatic Biodiversity; Terrestrial Biodiversity; Ambient Radioactivity and Ecological Health; Human Health; Land and Resource Use; and Socio-economics. Decommissioning and remediation activities are predicted to have a positive effect on groundwater and surface water quality at the CRL site. Decommissioning of nuclear facilities that are no longer in use removes potential risk of contaminant releases to the environment from these facilities. Early waste management practices at CRL included burying low-level waste (LLW) in sand trenches with no engineered barriers thus impacting the surrounding soils as well as the groundwater. Although appropriate risk management actions have taken place (i.e., interception and treatment of strontium-90 groundwater plumes), large scale remediation of the early waste management areas (WMAs) is required to eliminate contaminant releases to groundwater. The NSDF Project will enable remediation of the waste management areas and placement of waste into a facility providing appropriate containment and isolation. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking

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			place, thus discussion of the remediation options have not been included in the final EIS.
CNL-ND556	Judith Lacroix (Aug 16, 2017)	NSDF is only 300 meters away from Waste Management Area "A", this is where Chalk River's darkest secrets are kept, and 600 meters away from Waste Management Area "B", where more toxic wastes are stored. The proponent lacks institutional knowledge and has failed to consider how this project 'piles on' more toxicity only a short distance from Waste Management Area "A", where poor practices of past legacy waste of the past are stored, and also only approximately 600 meters from Waste Management Area "B", another trench lined area of very toxic waste. Both these areas are characterized by underground plumes of waste migrating to Perch Lake and Perch Creek. How much more waste can the environment process and handle before impacts become more severe? They may be below action levels today, but they won't when the complete decommissioning of Chalk River is undertaken and the NSDF becomes operational.	The NSDF is an engineered disposal facility designed to contain and isolate the waste emplaced in it; it is the long-term permanent disposal destination for legacy low-level waste (LLW) such as contaminated land/soil from the Chalk River Laboratories (CRL) site (e.g., Waste Management Areas (WMAs)). It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. The design of the facility and features to ensure containment of waste are described in Section 3.4.1 of the final Environmental Impact Statement (EIS). Key design features to contain and isolate the waste include: • a base liner system consisting of primary and secondary liner systems to contain and isolate the waste; • a final cover that isolates the waste from the environment and human intrusion; and • a perimeter berm, which provides further containment of the waste and isolates the waste from the environment and human intrusion. Canadian Nuclear Laboratories has studied contaminant migration from early waste management areas such as WMA A and B for several decades and assessed the impact of releases to ground. The findings from environmental monitoring of these contaminated sites have been published and submitted to the Canadian Nuclear Safety Commission (CNSC) – these Annual Compliance Monitoring Reports are publicly available on the Canadian Nuclear Laboratories (CNL) website (www.cnl.ca). Groundwater treatment systems have been installed at both WMA A and WMA B to intercept and treat contaminated groundwater plumes at these impacted sites. The effects of existing groundwater and surface water contamination arising from past waste management practices are considered as part of baseline conditions for the NSDF Project. Existing groundwater and surface water contamination in the Perch Lake watershed is provided in the description of the environment for groundwater (Section 5.3.1.4) and surface water (Section 5.4.1.4) of the final EIS. Section 5.3.2.4.2.2 (Groundwater Quality) of the final EIS has been expanded to provide additional information on groundwater contaminant plumes that are in proximity to the NSDF site. Additional sampling and analysis of surface water quality in the Perch Lake watershed was conducted in 2018 to provided better characterization of existing radiological and chemical and metal constituents and is included in the EIS. The existing baseline conditions for Perch Lake and Perch Creek include impacts from past waste management practices such as Waste Management Area A and Waste Management Area B. The NSDF Project will enable remediation of the historic Waste Management Areas at the CRL site. Transfer of waste and contaminated soils from Waste Management Areas and emplacement in the NSDF which provides engineered containment will have a positive effect on groundwater and surface water quality in the Perch Lake watershed. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS.

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

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CNL-ND557	Great Lakes and St. Lawrence Cities Initiative (August 15, 2017) City of Laval (September 15, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] As a condition to its approval by the CNSC, the Cities Initiative, requests that the IES conduct a comprehensive risk assessment study on the possibility of a significant leakage reaching the Ottawa River, a major water way located in close proximity (less than 1 kilometer) to the facility, including response time depending on the importance of the incident. The study needs to address the impact of a worst case scenario accident. The Cities Initiative acknowledges the fact that thorough risk analysis have been performed and that relevant mitigation measures have been integrated into the design of the facility. The effects of possible malfunctions and accidents, along with natural hazards (i.e., extreme weather events, forest fires, and seismic events) and climate change on the NSDF Project have been subject to an objective evaluation, using relevant safety standards. Nevertheless, subsequent to the results of the different risks analyses, we request that the CNL consult with local and regional water protection staff and relevant departments responsible for the supply of drinking water to identify possible threats and how to optimize response plans collaboratively. All extreme meteorological scenarios (floods, glaciations) and geological (earthquakes, erosion) are considered to be taken into account in the design of the proposed NSDF by engineers. Even a well-designed work may fail. In addition, uncertainty about future meteorological conditions is high. A precipitation event of a frequency of once in a 100 years will not have the same intensity in 10, 100 or even in a 1000 years. Thus, it would be useful for the City of Laval to obtain the order of magnitude of the concentration of the various radioactive substances that would end up in the Ottawa River in the event of a flood carrying the entire waste facility in the river. The analysis of this scenario, including the estimation of alert times, would be highly relevant from the point of view of public health. [Français] Afin que l'EIE soit approuvée par la Commission canadienne de sûreté nucléaire (CCSN), l'Alliance des villes demande que soit menée une étude d'évaluation des risques complète sur la possibilité d'une fuite importante atteignant la rivière des Outaouais, un grand cours d'eau situé à proximité (moins de 1 kilomètre) de l'installation, étude qui abordera notamment le délai d'intervention en fonction de l'importance de l'incident. L'étude doit tenir compte de l'impact du pire scénario d'accident possible.	Canadian Nuclear Laboratories (CNL) has conducted further analysis of features, events and processes that could affect the long-term performance of the Near Surface Disposal Facility to ensure that impacts of a worst case scenario are evaluated. The Post-Closure Safety Assessment (PostSA) provides the updated analysis of features, events and processes (FEPs) that could result in the release and transport of contaminants from the Engineered Containment Mound (ECM) [1]. The FEPs lists are developed by an international group of subject matter experts through a program of the Nuclear Energy Agency. The analysis of FEPs is documented in Appendix B of the PostSA and is for the complete 10,000 year assessment time frame. Events that have a high probability of occurring during the 10,000 year assessment time frame are included as part of the Normal Evolution Scenario. The Normal Evolution Scenario is a description of the most likely, expected, evolution of the ECM and its surrounding environment. The Normal Evolution Scenario accounts for the expected degradation of the engineered barriers over the post-closure phase. Events having a lower probability of occurring are assessed and classified as disruptive events. These include Human Intrusion, Enhanced Erosion of the cover the disposal facility, Localized Failure of engineered barriers, and damage to the berm. These failure scenarios reflect the type of failures that could result from seismic events and extreme meteorological conditions. A summary of normal and disruptive scenarios assessed is provided in Section 5.8.6 of the final EIS. The maximum radiation dose for the Normal and Disruptive Event scenarios is for a family assumed to live on or adjacent to the ECM. The calculated radiation doses are well below regulatory dose limits for a member of the public. Radiation doses to members of the public living in communities downstream of the ECM on the Ottawa River are reduced further and are several orders of magnitude below regulatory dose limit of 1 mSv/y (See Section 6.3.7 of the PostSA[1]]). Predicted doses for selected failure scenarios are provided in Section 5.8.6.1.2.2 (post-closure phase) of the final Environmental Impact Statement (EIS). Potential impacts and mitigation measures for extreme weather conditions, flooding and seismic events, are summarized in Section 10 of the final EIS. The ECM design has been optimized to withstand seismic hazard characteristics of the NSDF site. The design of the ECM incorporates ground improvement technique (i.e., excavate and replace), to avoid potential liquefaction (See Section 10.3 of the final EIS). With regard to worst case scenarios, the Post SA includes 'What-If?' scenarios [1]. The "What-If?" scenarios represent a deliberately extreme set of assumptions that can be used to understand the absolute limits of safety performance. These have been identified as potentially of interest in the same way as other scenarios, but discounted from the main set of assessment calculations on the basis that their extreme nature makes their occurrence very unlikely. Nevertheless, they inform the bounding limitations to post-closure safety and, as such, provide valuable perspective. 'What-If?' scenarios include mass excavation of the ECM and farming of the excavated soil. The maximum dose for the scenario is still less than regulatory dose limit of 1 mSv/y. The timeframe and consequences of glaciation is discussed in Section 10.5 of the final EIS. The assessment timeframe for the post-closure safety analysis is 10,000 years and captures the period of peak radioactivity and dose consequence. The next glacial event is not predicted to occur before 100,000 years into the future at which time the radioactivity concentrations of the ECM are very close to natural background concentrations. As glaciation would occur far beyond the timeframe that the facility is hazardous, the dose consequences would be negligible.

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		L'Alliance des villes reconnaît le fait qu'une analyse approfondie des risques a été effectuée et que des mesures d'atténuation pertinentes ont été intégrées dans la conception de l'installation. Les effets d'éventuels accidents et défaillances, d'aléas naturels (événements météorologiques extrêmes, incendies de forêt et séismes) et des changements climatiques sur le projet d'IGDPS ont fait l'objet d'une évaluation objective, suivant les normes de sûreté pertinentes. Néanmoins, à la suite des résultats de différentes analyses de risques, nous demandons aux LNC de consulter le personnel local et régional de la protection des eaux et les services pertinents responsables de l'approvisionnement en eau potable afin de cerner les menaces potentielles et d'optimiser la collaboration relative aux plans d'intervention. Tous les scenarios météorologiques extrêmes (inondations, glaciations) et géologiques (séismes, érosion) sont considérés comme pris en compte dans le désign du dépotoir par les ingénieurs. Or, même un ouvrage bien conçu peut faillir. De plus, l'incertitude quant aux conditions météorologiques futures est grande. Un évènement de précipitations d'une fréquence de 1 fois dans 100 ans n'aura pas la même intensité dans 10, 100, voire I 000 ans. Ainsi, il serait utile pour la Ville de Laval d'obtenir l'ordre de grandeur de la concentration des différentes substances radioactives qui aboutiraient dans la rivière des Outaouais advenant qu'une inondation emporte l'ensemble du dépotoir dans la rivière. L'analyse de ce scenario, incluant l'estimation des délais d'alerte, serait fort pertinente d'un point de vue de santé publique.	Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [Français] Les Laboratoires nucléaires canadiens (LNC) ont procédé à une analyse plus approfondie des caractéristiques, événements et processus susceptibles d'avoir un effet sur le rendement à long terme de l'installation de gestion des déchets près de la surface afin d'évaluer l'impact de la pire situation possible. L'évaluation de la sûreté après la fermeture fournit une analyse actualisée des caractéristiques, événements et processus (CEP) susceptibles de donner lieu à une fuite et à une propagation de contaminants provenant du monticule de confinement artificiel (MCA) [1]. Les listes de CEP sont élaborées par un groupe d'experts international dans le cadre d'un programme de l'Agence internationale de l'énergie atomique. L'analyse des CEP est présentée à l'annexe B de l'évaluation de la sûreté après la fermeture et porte sur la période complète de 10 000 ans. Les événements à forte probabilité d'occurrence au cours de la période d'évaluation de 10 000 ans font partie du scénario d'évolution normale. Le scénario d'évolution normale décrit l'évolution la plus probable du MCA et de ses environs. Il rend compte de la dégradation prévisible des barrières artificielles au cours de la période de post-fermeture. Les événements à plus faible probabilité d'occurrence sont évalués et considérés comme des événements perturbateurs, par exemple l'intrusion humaine, l'érosion excessive de la couverture de l'installation, des défaillances localisées des barrières artificielles et la dégradation de la berme. Ces scénarios rendent compte des défaillances susceptibles de découler de phénomènes sismiques et de conditions météorologiques extrêmes. La section 5.8.6 de l'EIE définitive résume les conditions d'évolution normale et les situations perturbatrices. La dose d'irradiation maximale dans le scénario d'évolution normale et dans le scénario d'événements perturbateurs correspond à celle qui serait absorbée par une famille qui vivrait sur le MCA ou à proximité. Les doses calculées sont bien inférieures aux seuils réglementaires applicables à la population. Les doses absorbées par la population des collectivités situées en aval du MCA au bord de la rivière des Outaouais seront encore plus réduites et sont inférieures de plusieurs ordres de grandeur au seuil réglementaire de 1 mSv/an (voir la section 6.3.7 de l'évaluation de la sûreté après la fermeture [1]]). Les doses prévisionnelles découlant de certaines défaillances sont fournies à la section 5.8.6.1.2.2 (phase de post-fermeture) de l'Étude d'impact environnemental (EIE) définitive. Les effets potentiels et les mesures d'atténuation de conditions météorologiques extrêmes, d'inondations et de phénomènes sismiques sont résumés à la section 10 de l'EIE définitive. La conception du MCA a été optimisée pour résister aux risques associés à des phénomènes sismiques sur le site de l'IGDPS. Elle intègre une technique d'amélioration du sol (excavation et remplacement) destinée à éviter le risque de liquéfaction (voir la section 10.3 de l'EIE définitive). L'évaluation de la sûreté après la fermeture envisage, parmi les pires situations, des scénarios hypothétiques [1]. Ces derniers renvoient à une série d'hypothèses délibérément extrêmes permettant de comprendre les seuils absolus de rendement en matière de sûreté. On estime qu'ils sont tout aussi intéressants que d'autres scénarios, mais ils ont été écartés des principaux calculs en raison de leur très faible probabilité. Ils permettent cependant d'éclairer les limites de la sûreté après la fermeture et, de ce fait, offrent une perspective utile. Les scénarios hypothétiques englobent l'excavation massive du MCA et la mise en culture de la terre excavée. La dose maximale dans ce cas reste inférieure au seuil réglementaire de 1 mSv/an.

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			La période et les conséquences de la glaciation sont analysés à la section 10.5 de l'EIE définitive. La période d'évaluation couverte par l'analyse de la sûreté après la fermeture est de 10 000 ans et englobe la période de radioactivité maximale et les doses qui s'ensuivent. La prochaine glaciation ne devrait pas se produire avant 100 000 ans, et les concentrations de radioactivité dans le MCA seront alors très proches des concentrations naturelles de fond. Étant donné que la glaciation se produira bien après que l'installation présentera un danger, les doses seront négligeables. Référence [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004
CNL-ND558	Johnathan Blake (July 19, 2017)	I am certain that qualified and experienced professionals have carried out a risk assessment for potential events such as flooding or earthquakes including detailed quantitative analysis of the probability of such events compromising the NSDF resulting in contaminated leakage entering the Ottawa River. What cannot be accounted for are the potential "Unknown, Unknowns", or several of the known risks materializing concurrently. Once we have made the decision to locate the facility near the river we cannot undo that decision.	The Post-Closure Safety Assessment (Post SA) [1] provides analysis of the long term performance of the engineered containment mound. The PostSA used the International Atomic Energy Agency (IAEA) Safety Assessment Methodologies for Near Surface Disposal Facilities (ISAM) [2] approach in the development of the scenarios and long-term modelling. Through the Features, Events, and Processes (FEPs) screening, the behaviour of the wastes, and the facility itself, are captured and accounted for within the models for the entire 10,000-year assessment timeframe of the facility. The 10,000 year assessment time frame captures the peak radioactivity and peak dose consequences from the facility. In addition to evaluation of Normal Evolution Scenario which accounts for expected degradation of engineered barriers over the post-closure phase, and Disruptive Event scenarios, which evaluate low probability events, the PostSA also considers "What-If?" Cases, Defence-in-Depth Cases and Sensitivity Analysis Cases. These scenarios account for 'unknown, unknowns', or several of the known risks materializing concurrently and are described below. • "What-If?" Cases represent a deliberately extreme set of assumptions that can be used to understand the absolute limits of safety performance. These scenarios inform on the underlying bounds to post-closure safety and, as such, provide valuable perspective. • Defence-in-Depth Cases are aimed at building confidence in the performance of the NSDF after closure. These cases examine the extent to which the NSDF depends on key engineered barriers and what would happen if those barriers were not present. This group of scenarios therefore involves hypothetical combinations in order to analyze the barriers in the system. Each scenario involves a change in one or more parameters related to a particular barrier; by comparing the results to those of the Normal Evolution Scenario, the influence of the barrier is shown. • Sensitivity Analysis Cases are used to directly examine the effect of important uncertainties in the models and data used to represent the system. As many modelling aspects can in practice be expressed through parameter values, sensitivity cases focus on using alternative parameter value choices. The alternative parameter values that are assigned need not represent specific bounds on uncertainty (as in some cases these cannot easily be established); in other words, the alternative parameters need not necessarily be the 'highest' or 'lowest' possible values. Rather, they are used to test the effect of uncertainty; for example, if parameter x is increased by a factor of 10, by what factor does the dose increase? These cases serve to illustrate the importance of facility design features, address uncertainty in model parameters and provide perspective on the limits of safety performance. The specific scenarios are described in the PostSA and predicted doses and exposure groups provided in Section 7 of the PostSA. While the vast majority of scenarios resulted in dose rates with a large safety margin against the regulatory dose limits for members of the public, there was a single "What-If?" Human Intrusion scenario which initially had exceeded the 1 mSv/y public dose limit. Reductions were made to the radiological inventory to ensure that doses to human intruders remain below the regulatory dose limits. This approach is consistent with International Atomic Energy Agency (IAEA) SSR-5 [3] where near surface disposal facilities must utilize

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			waste acceptance criteria to limit the consequences of human intrusion (and not rely on institutional controls alone). The inventory reductions resulted in the Licensed Inventory, as outlined in Table 3.3.1-2 of the final EIS. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] IAEA. Safety Assessment Methodologies for Near Surface Disposal Facilities. 2004. [3] IAEA. Disposal of Radioactive Waste. Specific Safety Requirements (SSR)-5.
CNL-ND559	William Turner (May 31, 2017) 151.	Section 7.3.1 – Atmospheric Environment - This paragraph is misleading. For example it states that the RSA is limited to within 10 km of the site, except in assessment of Greenhouse gas emissions, Section 5.2.2.3.1 states: *The spatial boundaries for the GHG assessment are considered to be beyond regional as the predicted residual adverse effect of GHG emissions is considered global in nature*.	Section 5.2.2.3.1 has been improved and revised in the final Environmental Impact Statement (EIS). The spatial boundaries for the greenhouse gas assessment is beyond any Regional Study Area (RSA) boundaries because the impact of greenhouse gases is global. Section 5.2.2 of the final EIS is the assessment of residual environmental effects (i.e., the effects on the atmospheric environment that can be reasonably expected as a result of NSDF activities) whereas Section 8.3.1 of the final EIS (previously Section 7.3.1) summarizes cumulative environmental effects (i.e., the combined effects of the baseline or present day, NSDF activities, and reasonably foreseeable developments). The method of assessment of cumulative effects is similar to those of residual effects but cumulative effects are those which are likely to result from the designated project (NSDF) in combination with the environmental effects of other physical activities that have been or will be carried out. Section 8.3.1 in the final EIS has been updated to better clarify the cumulative effects from the development of the NSDF Project and future reasonably foreseeable developments at Chalk River Laboratories (CRL) site and the surrounding area.
CNL-ND560	William Turner (May 31, 2017) 152.	Section 7.3.9 – Socio-economic - The focus this cumulative effects assessment is on the short-term impacts of this project on the socio-economics of the local region (see Comment 131 above). This is totally inadequate. Further, the only "reasonably foreseen development" case considered is the NPD project. Not quite sure why, since in Table 7.2-1, this is only one of the six projects listed. CNL need to ensure that all RFD projects are assessed for their cumulative effects to the socio-economics of this locality.	The number of workers employed and demand for resources will be greatest for the construction and operation phases of the project. The focus of the cumulative effects assessment for socio economics, provided in Section 8.3.9 of the final Environmental Impact Statement (EIS), is therefore on the short term (i.e., construction and operations phases) as opposed to longer term closure and post-closure phases. Activities during closure phase from 2070 to 2100 will be limited to decommissioning of NSDF site infrastructure that is no longer required (e.g., infrastructure and support facilities), long term monitoring and maintenance. During the 300 year institutional control period following closure, activities will be limited to site surveillance, maintenance and monitoring activities. These activities will require limited human resources and therefore socio-economic impacts on Valued Components (VCs) are predicted to be less than during construction and operations phases. Section 3.2.3 and 3.2.4 of the final EIS provides further details on closure and post-closure phases. Cumulative effects assessment for socio-economics has been expanded to include additional projects and activities that are anticipated to overlap with the NSDF Project. These include: • new research and development facilities proposed for the Chalk River Laboratories (CRL) site; • construction and operation of the Small Modular Reactor (SMR); • on-going decommissioning and environmental remediation activities on the CRL site; and, • the Nuclear Power Demonstration (NPD) Closure Project. Potential effects on labour and economic development, service and infrastructure and housing are assessed in Section 8.3.9 of the final EIS. A positive cumulative effect is identified on employment opportunities and income generation. No significant effects on service and infrastructure and housing are predicted.
		Assessment of Effects of the Environment on the Project	

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		Assessment of Effects of the Environment on the Project - General	
CNL-ND561	Pravin Shah (April 8, 2017) Kirk Groover (May 15, 2017) OFWCA (Johanna Echlin) (May 8, 2017) James Holden (July 10, 2017) City of Ottawa (August 4, 2017) AANTC (August 14, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017) Anna Tilman (August 11, 2017) William Turner (May 31, 2017) 154.	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] Will the Engineered Containment Mound (ECM) and Wastewater Treatment Plant (WWTP) along with other structures at the site designed to meet with Environment Conditions (such as Tornadoes, Thunderstorms, very cold weather, heavy snow and design seismic events)? There is no discussion of high winds impacting the WWTP (see pg. 9-5 and 9-6). In the event of major damage, repair may be extensive and time-consuming. Accordingly, temporary alternative means to store and process wastes, including waste leachate, should be considered and prepared for. What techniques are proposed to limit the amount of run-off so that the WWTP is not overwhelmed during an extreme storm event? What techniques are proposed to divert run-off from storm events during the waste emplacement phase? During the operational phase of the "open" storage facility, there is concern over the handling of storm water. Given the increased frequency of extreme weather events, the City of Ottawa requests that the facility be designed to handle 1-in-100 year storm events as a minimum in order to safely contain, transport and process the liquid effluents that accumulate. Consideration should be given in the EIS to the management of water flows associated with a major storm event after the bottom liner is installed. Leachate poses a significant hazard and is essential that it be properly treated before being released back into the environment. As it is now, the current facility does not take sufficient precautions in the event for excessive rainfall or snowmelt, which could result in too much leachate for the catchment system, resulting in overflow and contamination of the surrounding wetlands and the Ottawa River. Relying on building codes (based on 1 in 100 year extreme storm events) of today cannot quality as assuring protection against extreme weather.	The Engineered Containment Mound (ECM) and Waste Water Treatment Plant (WWTP) and other NSDF structures are designed to meet environmental conditions such as tornadoes, thunderstorms, very cold weather, heavy snow and design seismic events. The NSDF Project design will comply with all relevant federal and provincial regulations, guidelines, acts, standards and codes, including standard industry practice. Section 10 of the final Environmental Impact Statement (EIS) describes the adverse effects of extreme environmental events on the NSDF. This included an evaluation of how climate change, severe weather and other environmental events may interact with and potentially alter the condition and function of the NSDF Project compromising environmental and public safety. Due to the recognized long timeframe of the NSDF Project as a permanent disposal facility for low-level waste, the EIS describes and assesses the magnitude and severity of natural hazards such as extreme weather, flooding (Ottawa River), tornados, forest fires, seismic events and glaciation. High winds are discussed in Section 10.1.4 of the final EIS. Severe winds or tornadoes are primarily a concern during the construction and operations phases related to worker safety, performance of facilities and loss of production, and are already encompassed by Canadian Nuclear Laboratories (CNL) Emergency Preparedness Program [1]. The risks associated with severe winds or tornadoes are managed through design criteria and management practices described above. Facilities are designed according to the appropriate codes, such as the National Building Code of Canada [2]. The design basis tornado event for the Chalk River Laboratories (CRL) site was reviewed in 2018 after a series of tornados occurred in the Ottawa Valley. The current choice of an upper EF2 (enhanced Fujita Scale) tornado for the CRL site remains appropriate. The maximum wind speed for an EF2 tornado event is 220 km/hr. The WWTP collection tanks (Equalization Tanks), located outdoors, are designed to API-650 [3] and designed to withstand a design basis tornado for the CRL site. Consequences of potential tornadoes, such as a power outage, are encompassed by CNL's Emergency Preparedness Program [1]. The storage capacity and maximum flow rate of the WWTP was based on two back-to-back 24-hour long, 100-year event. The WWTP has three large collection tanks (Equalization Tanks), designed for a capacity of 5,700 m^3 (1,500,000 gallons) of water. In normal operations, the average flow rate into the WWTP is expected to be 27.5 m^3 per day. The WWTP is designed for redundancy and high reliability. The WWTP has two redundant wastewater treatment process trains and can operate on a single train if the other train is out of service for maintenance or repairs. A single train can treat 11.36 m^3/hour, and is therefore much more than capable to treat the average daily flow rate. Interconnections between the treatment trains also allow flow to be diverted between trains at each major process step. Section 3.4.4.5 of the final EIS documents the Surface Water Management Collection, Conveyance, Treatment and Discharge systems to control non-contact water including limiting surface water from uncontaminated areas discharging into contaminated areas. Within the ECM features such as drainage, ditches, culverts and surface water management ponds have been designed appropriately for peak flow. The management of surface water run-off from the ECM has both a contact and non-contact component: design of the contact component uses run-off volumes to address WWTP requirements and uses back-to-back 100-year storm events as the design criteria; the non-contact component uses peak flows from the 100-year+ climate change event to address run-off from the ECM cover in down-chute design and run-off volumes from the 100-year event to address storage and pumping requirements within the ECM for those areas not covered. The ditches can convey the 100-year + climate change flow and for most cases they can also convey the probable maximum precipitation design flow.

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		The EIS demonstrates a complete failure to consider potential consequences of accidents, malfunctions, intrusions, as well as extreme weather events such as climate instability, earthquakes, and other yet unknown disrupting factors that defy premature predictions, especially over the very long term. Although forest fires are a rare event, over the life-time of the project (300 to 500 years depending on the timeframe chosen, see Comment 12 above), that rare event becomes a certainty. Therefore, at least one of those events will be similar to the wildfire at Fort McMurray. [Français] Les structures du site, notamment le monticule de confinement artificiel (MCA) et l'usine de traitement des eaux usées (UTEU), seront-elles conçues pour répondre aux conditions environnementales (p. ex., tornades, orages, temps très froid, neige abondante et séismes)? Il est indéniable que les vents violents ont un impact sur l'UTEU (voir pages 9-6 et 9-7). En cas de dommages importants, la reconstruction peut être considérable et longue. En conséquence, des solutions de rechange temporaires pour stocker et traiter les déchets, notamment les déchets de lixiviat, devraient être envisagées et préparées. Quelles techniques sont proposées pour limiter le ruissellement, de sorte que l'UTEU ne soit pas submergée lors d'un orage extrême? Quelles techniques sont proposées pour détourner les eaux de ruissellement des orages pendant la phase de mise en place des déchets? Pendant la phase d'exploitation de l'installation de stockage « ouverte », la gestion des eaux pluviales pose problème. Compte tenu de la fréquence accrue des phénomènes météorologiques extrêmes, la Ville d'Ottawa demande que l'installation soit conçue pour gérer au moins les tempêtes qui surviennent une fois par 100 ans afin de contenir, transporter et traiter en toute sécurité les effluents liquides qui s'accumulent. L'EIE devrait tenir compte de la gestion des débits d'eau associés à un orage majeur après l'installation du revêtement de base. Le lixiviat représente un danger important et il est essentiel qu'il soit correctement traité avant d'être rejeté dans l'environnement. À l'heure actuelle, l'installation ne prend pas suffisamment de précautions en cas de précipitations excessives ou de fonte des neiges, ce qui pourrait entraîner une trop grande quantité de lixiviat pour le système de captage, entraînant un débordement et une contamination des milieux humides environnants et de la rivière des Outaouais. On ne peut s'appuyer sur les codes du bâtiment actuels (basés sur les tempêtes extrêmes 1:100 ans) pour garantir la protection contre les conditions météorologiques extrêmes. L'EIE démontre une incapacité totale à prendre en compte les conséquences potentielles d'accidents, de défaillances, d'intrusions et de phénomènes météorologiques extrêmes tels que l'instabilité climatique, les tremblements de terre et d'autres facteurs perturbateurs encore inconnus qui défient les prédictions prématurées, surtout à très long terme.	The surface water management pond footprints reflect the overall storage required to control post-closure flows to predevelopment levels for the 2-year through to 100-year rainfall events at the site (Section 3.4.4.5.2 of final EIS). Flooding of the Ottawa River as well as nearby creeks and wetlands has been taken into consideration in the siting of the NSDF Project. The base of the proposed NSDF is located approximately 160 metres above sea level (m ASL) which is approximately 50 metres above the current water levels of the Ottawa River. Other design features provide additional mitigation to flooding including the topographical slopes of the ECM. The National Building Code of Canada [2] was used to design the buildings and the other conventional structures, however the ECM design basis does not rely on the building code. The ECM is designed to contain and isolate the wastes from the environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. Section 10.3 of the final EIS documents the seismic design basis of the building and the other conventional structures, the seismic design basis of the ECM. The design of buildings and other conventional structures for the NSDF Project was based on a NBCC [2] design basis earthquake with a 2,475-year frequency of occurrence. However, the seismic design of the ECM was based on a design basis earthquake with a 10,000-year frequency of occurrence as defined by Canadian Standards Association Standard N289.1-18 [4]. The ECM seismic design is an example that environmental events over the safety timeframe have been incorporated into the design. The WWTP building is designed to National Building Code of Canada (NBCC – 2015 edition) [2]. There are standard provisions in the NBCC for structural resiliency if the building subjected to high wind events (e.g., in order to minimize roof damage and to ensure adequate anchorage of building frames to foundations). While there may be some minor exterior damage caused by a tornado, the WWTP can be returned to service within the time frame enabled by the storage capacity of the Equalization Tanks. The Equalization Tanks (which store the wastewater) are specified for the CRL site Design Basis Tornado which defines the maximum design parameters for wind speed, atmospheric pressure drop, and for a spectrum of tornado generated projectiles. The NSDF generator set (which provides Class III power) is specified for maximum design parameters for wind speed and atmospheric pressure drop consistent with Design Basis Tornado. The WWTP building is assigned a "high" NBCC importance category (i.e., NBCC 2015 Table 4.1.8.5 [2]) for purposes of seismic (earthquake) design. This importance category increases the design safety factor for the seismic capacity of the WWTP building. The effects of a forest fire are discussed in Section 10.2 in the final EIS. The potential for a forest fire to affect the NSDF Project is limited through meeting minimum distances between the NSDF Project and the forest edge. At its closest point the top of the ECM perimeter berm is approximately 45 m from the NSDF fence line and the forest edge is 4 m beyond the NSDF fence line. This is in compliance with the National Fire Protection Association 1144, "Standard for Reducing Structure Ignition Hazards from Wildland Fires" [5]. In the post-closure phase, the ECM is covered by the final cover and a forest fire or wildland fire would only effect the vegetation on the surface of the ECM final cover. The ECM final cover, over the disposed waste, has a minimum thickness of 2.05 m. The NSDF Project incorporates design features to minimize its effect on the environment during facility operation as well as into the post-closure phase thus, residual effects from the effects of the environment on the NSDF Project are not significant. References: [1] Emergency Preparedness Program Description Document, 900-508730-PDD-001.

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		Bien que les incendies de forêt ne surviennent que rarement, sur la durée de vie du projet (300 à 500 ans, selon le délai choisi, voir le commentaire 12 ci-dessus), cet événement rare devient une certitude. Par conséquent, au moins un de ces événements sera comparable à l'incendie de forêt de Fort McMurray.	[2] NRCC (National Research Council Canada). 2015. National Building Code of Canada 2015. NRCC 56190. Available at: https://nrc.canada.ca/en/certifications-evaluations-standards/codes-canada/codes-canada-publications/national-building-code-canada-2015. [3] API (American Petroleum Institute). 2013. API Standard 650: Welded Tanks for Oil Storage. 12th Edition. March 2013. [4] CSA Group N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants. 2018. [5] National Fire Protection Association, Standard for Reducing Structure Ignition Hazards from Wildland Fire, NFPA 1144, 2013 edition. [Français] Le monticule de confinement artificiel (MCA) et l'usine de traitement des eaux usées (UTEU), ainsi que d'autres structures de l'IGDPS, sont conçus pour résister à des phénomènes météorologiques comme les tornades, les orages, les grands froids, les tempêtes de neige et les séismes éventuels. L'IGDPS proposée sera conforme à l'ensemble des règlements, directives, lois, normes et codes fédéraux et provinciaux, ainsi qu'aux pratiques en vigueur dans le secteur nucléaire. La section 10 de l'Étude d'impact environnemental (EIE) définitive décrit les effets néfastes de phénomènes météorologiques extrêmes sur l'IGDPS. Cela comprend une évaluation des interactions entre les changements climatiques, les phénomènes météorologiques extrêmes et d'autres phénomènes environnementaux, d'une part, et l'IGDPS, d'autre part, ainsi qu'une analyse des altérations éventuelles de son état et de son fonctionnement qui seraient susceptibles de compromettre la sécurité de la population et de l'environnement. Compte tenu de la longue durée de vie de l'IGDPS, qui sera une installation permanente de gestion des déchets de faible activité, l'EIE décrit et évalue l'ampleur et la gravité de dangers naturels comme les conditions météorologiques extrêmes, les inondations (crue de la rivière des Outaouais), les tornades, les feux de forêt, les séismes et la glaciation. Le phénomène des vents violents est analysé à la section 10.1.4 de l'EIE définitive. Les vents violents et les tornades sont surtout une préoccupation pendant les phases de construction et d'exploitation puisqu'ils peuvent avoir des conséquences sur la sécurité des travailleurs, sur le rendement des installations et sur la productivité. Ces éventualités sont déjà envisagées dans le Programme de préparation aux situations d'urgence [1] des Laboratoires nucléaires canadiens (LNC). Les risques associés aux vents violents et aux tornades font l'objet des critères de conception et des pratiques de gestion susmentionnés. Les installations sont conçues conformément aux codes en vigueur, comme le Code national du bâtiment du Canada [2]. La tornade de référence sur le site des Laboratoires de Chalk River (LCR) a été analysée après la série de tornades qui se sont produites dans la vallée de l'Outaouais en 2018. Le type de tornade EF2 (sur l'échelle de Fujita améliorée) reste applicable au site des LCR. La vitesse maximale du vent, dans une tornade EF2, est de 220 km/h. Les réservoirs de collecte de l'UTEU (réservoirs d'égalisation), qui sont situés à l'extérieur, sont conçus conformément à la norme API-650 [3] et résisteront à une tornade de référence sur le site des LCR. Les conséquences des tornades éventuelles, par exemple une panne de courant, sont envisagées dans le Programme de préparation aux situations d'urgence des LNC [1]. La capacité d'entreposage et le débit maximal de l'UTEU sont fonction de deux tempêtes centennales successives de 24 heures. L'UTEU comprend trois grands réservoirs de collecte (réservoirs d'égalisation) dont la capacité est de 5 700 m^3 (1 500 000 gallons) d'eau. En temps normal, le débit moyen dans l'UTEU devrait être de 27,5 m^3 par jour. L'UTEU comporte des éléments redondants et se caractérise par une haute fiabilité. Elle comprend deux chaînes de traitement des eaux usées redondantes et peut fonctionner avec l'une d'elles seulement si l'autre est hors service parce qu'elle doit faire l'objet d'un entretien ou de réparations. Une seule chaîne permet de traiter 11,36 m^3/heure, et elle est donc plus qu'apte à

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			traiter le débit moyen quotidien. Les raccordements entre les deux chaînes permettent également de détourner le débit de l'une à l'autre à chaque étape importante du processus. La section 3.4.4.5 de l'EIE définitive explique les systèmes de collecte, d'acheminement, de traitement et de rejet des eaux de surface qui permettent de contrôler l'eau sans contact, notamment en évitant que les eaux de surface de zones non contaminées soient déversées dans des zones contaminées. Dans le MCA, le système de drainage (fossés, ponceaux et bassins de gestion des eaux de surface) est conçu en fonction de débits maximums. La gestion du ruissellement des eaux de surface sur le MCA s'applique à l'eau sans contact et à l'eau de contact. Dans le cas de l'eau de contact, les volumes de ruissellement sont calculés en fonction des besoins de l'UTEU, et les critères de conception renvoient à des tempêtes centennales successives. Dans le cas de l'eau sans contact, les débits associés à des phénomènes climatiques centennaux servent à mesurer le ruissellement de la couverture du MCA en cas de défaillance et de ruissellements associés au phénomène centennal pour déterminer les besoins d'entreposage et de pompage dans les zones non couvertes du MCA. Les fossés permettent d'acheminer le débit associé à un phénomène climatique centennal, et, le plus souvent, ils peuvent aussi acheminer la quantité d'eau maximale probable d'un débit de référence. Les empreintes des bassins de gestion des eaux de surface traduisent l'entreposage global nécessaire au maintien des débits post-fermeture aux niveaux antérieurs au projet des précipitations prévues dans un délai de 2 à 100 ans sur le site (voir la section 3.4.4.5.1 de l'EIE définitive). Les crues de la rivière des Outaouais, ainsi que des ruisseaux et des terres humides voisines, ont été envisagées dans le choix de l'emplacement de l'IGDPS proposée. La base de l'installation est située à environ 160 mètres au-dessus du niveau de la mer (mANM), soit environ 50 mètres au-dessus du niveau d'eau actuel de la rivière des Outaouais. D'autres éléments de conception ajoutent des mesures d'atténuation en cas d'inondation, notamment les pentes topographiques du MCA. Le Code national du bâtiment du Canada [2] a servi de base à la construction des bâtiments et des autres structures classiques, mais ce n'est pas le cas du MCA, qui, lui, est conçu pour confiner et isoler des déchets pendant 550 ans, après quoi leur radioactivité aura baissé à des niveaux proches des concentrations naturelles de fond. La section 10.3 de l'EIE définitive explicite la conception parasismique des bâtiments et autres structures classiques et du MCA. La conception des bâtiments et autres structures classiques du projet d'IGDPS s'appuie sur un séisme de référence à occurrence de 2 475 ans selon le CNBC [2]. Cependant, le séisme de référence applicable au MCA est un séisme à occurrence de 10 000 ans, conformément à la norme N289.1-18 du groupe CSA [4]. La conception parasismique du MCA est un exemple d'intégration de phénomènes environnementaux dans la sûreté de l'installation pour toute sa durée de vie. Le bâtiment de l'UTEU est conçu conformément au Code national du bâtiment du Canada (édition 2015) [2]. Le Code prévoit des normes de résilience structurelle au cas où les bâtiments seraient exposés à des vents violents (p. ex., pour réduire au minimum les dégâts sur les toitures et pour garantir l'ancrage des charpentes dans les fondations). Une tornade pourrait faire quelques dégâts mineurs à l'extérieur, mais l'UTEU pourra être remise en service dans le délai permis par la capacité des réservoirs d'égalisation. Ces réservoirs (où sont stockées les eaux usées) sont conçus en fonction d'une tornade de référence propre au site des LCR, qui définit les paramètres maximums de référence applicables à la vitesse du vent, à la baisse de pression atmosphérique et à une série de projectiles soulevés par la tornade. Les génératrices de l'IGDPS (qui fournissent une alimentation en électricité de catégorie III) correspondent aux paramètres maximums de référence applicables à la vitesse du vent et à la baisse de pression atmosphérique caractéristiques d'une tornade de référence. Le bâtiment de l'UTEU est considéré comme un bâtiment de « haute » importante en vertu du CNBC (tableau 4.1.8.5 de l'édition 2015 du Code [2]) du point de vue de la conception parasismique (résistance aux tremblements de terre). Ce classement augmente le facteur de sûreté dans la conception de la capacité parasismique du bâtiment.

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			Les conséquences des feux de forêt sont expliquées à la section 10.2 de l'EIE définitive. Le risque qu'un feu de forêt atteigne l'IGDPS est limité grâce aux distances minimales prévues entre l'installation et l'orée de la zone forestière. Au point le plus rapproché, le sommet de la berme entourant le MCA se trouve à environ 45 m de la clôture de l'IGDPS, et l'orée de la zone forestière se trouve à 4 m de cette clôture. Ces limites sont conformes à la norme de sécurité incendie no 1144 de la National Fire Protection Association (« Standard for Reducing Structure Ignition Hazards from Wildland Fires » [5]). Durant la phase de post-fermeture, le MCA sera protégé par la couverture définitive, et un feu de forêt ou un feu de végétation ne toucherait que la végétation ayant poussé à la surface de la couverture définitive du MCA. La couverture définitive du MCA qui protège les déchets stockés aura une épaisseur d'au moins 2,05 m. La conception de l'IGDPS comprend des éléments permettant de réduire au minimum les effets de l'installation sur l'environnement durant les phases d'exploitation et de post-fermeture, de sorte que les effets résiduels des effets de l'IGDPS sur l'environnement sont jugés négligeables. Références [1] Emergency Preparedness Program Description Document, 900-508730-PDD-001. [2] CNRC (Conseil national de recherches du Canada), Code national du bâtiment – Canada 2015, CNRC 56190F. Voir : https://nrc.canada.ca/fr/certifications-evaluations-normes/codes-canada/publications-codes-canada/code-national-batiment-canada-2015. [3] API (American Petroleum Institute), norme API 650 : Welded Tanks for Oil Storage, 12e édition, mars 2013. [4] Groupe CSA, norme N289.1-18 : Exigences générales relatives à la conception et à la qualification parasismiques des centrales nucléaires, 2018. [5] National Fire Protection Association, Standard for Reducing Structure Ignition Hazards from Wildland Fire, NFPA 1144, édition 2013.
CNL-ND562	Pravin Shah (April 8, 2017)	Has a laboratory model on a shake table (of site topography with embedded model of the proposed facility) been considered? This would assess the impact to the site environment, to Perch Lake, Wetland and downstream pathways from the possible impact of design rainfalls in the area, of design seismic events and also the impact of the melt of mounds of snow cover over the facility (melt during or after the winter season).	The surface water management plan has been updated. Surface Water Management of non-contact water is described in Section 3.4.4.5 of the final Environmental Impact Statement (EIS). More information about water management and the models used to perform the technical assessment can be found in Section 5.4.2.6.1 of the final EIS. Shake table testing of an Engineered Containment Mound (ECM) scale model would not provide representative results, due to scale effects. Seismic analysis of the ECM was performed using numerical methods. The ECM is designed to withstand the forces associated with a 1-in-10,000 year seismic event at the Chalk River Laboratories (CRL) site. This design has been validated using dynamic 3D modelling software (FLAC-3D) to simulate the behaviour of the ECM during seismic events. The use of a 3D computer model allows for the designers to make changes to any of the properties (density, stress, strain, magnitude of the seismic event, etc.) without the need to build a new physical model.
CNL-ND563	Heather Sanderson (May 12, 2017)	What will be the impact of factors such as Extreme Drought? Will this concentrate leachate contamination? Will water born pollutions also concentrate? Will contaminated soils blow around in the wind?	The commenters concerns are regarding impacts of climate change during the post-closure phase. The Environmental Impact Statement (EIS) includes an assessment of climate change (See Section 10.4 of the final EIS). The prediction is for a small increase in precipitation over the period 2100 to 3000. The final cover of the facility includes over 2 meters of clean barrier material including high-density polyethylene, geosynthetic clay, rock, sand, and soil. The 2 meters of clean barrier material is below a layer of topsoil and vegetation. Drought conditions are not expected to adversely affect the integrity of the cover system. The high density polyethylene layer is particularly resistant against wind erosion, and is expected to continue containing the waste, preventing winds from moving around the soil underneath.

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			In addition, the Post-Closure Safety Assessment (PostSA) [1] assumes that the cover degrades and erodes away with time, so the effect of a drought on the cap has been effectively included in the assessment. The final cover system is expected to limit leachate generation for the 550 year design life of the facility, as described above (and illustrated on Figure 3.4.1-8 of the final EIS). The infiltration into the facility after the barriers eventually degrade is fully modelled and assessed in the PostSA [1]. In only 100 years after the closure of the facility, most of the radioactivity has decayed away, leaving a concentration similar to the natural background. By 550 years, even less radioactivity remains. The leachate that is generated this far out into the future has very low concentrations of radionuclides. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND564	Joan Lougheed and Town of Deep River (August 16, 2017)	Section 9.1.2 discusses extreme rainfall events, snowmelts and flooding (see pgs. 9-2 and 9-3). In CNL's discussion of these events and their impact on the NSDF, they have not provided examples of existing near surface disposal facilities and how these design standards have actually "stood the test of time" during extreme rainfall or flooding. Of particular interest is the operation of the WWTP and the water management handling facilities, as well as slope stability of the ECM.	Section 10 of the final Environmental Impact Statement (EIS) describes the adverse effects of extreme environmental events on the NSDF Project. This included an evaluation of how climate change, severe weather and other environmental events may interact with and potentially alter the condition and function of the NSDF compromising environmental and public safety. Due to the recognized long timeframe of the NSDF Project as a permanent disposal facility for low-level waste (LLW), the final EIS includes an appropriate magnitude and severity of natural hazards such as extreme weather, flooding (Ottawa River), tornados, forest fires, and seismic events which were all assessed. As discussed in Section 3.0 of the final EIS, the NSDF Project incorporates design features to minimize its effect on the environment during facility operation and after facility closure. To ensure the effects on the environment are minimized, the design basis of the NSDF accounts for the expected environmental conditions of the site. Canadian Nuclear Laboratories (CNL) has conducted benchmarking activities to a number of operational waste management and disposal facilities in Canada, the USA and Europe. Canadian Nuclear Laboratories has constructed, and is operating, two Wastewater Treatment Plants (WWTP) and long-term waste management facilities in Port Hope and Port Granby, Ontario. Lessons learned from benchmarking activities and operation of the Port Hope and Port Granby facilities have been incorporated into the design of the NSDF.
		Assessment of Effects of the Environment on the Project - Flooding	
CNL-ND565	David Thompson (April 11, 2017) Evelyn Gigantes (May 17, 2017) Ken Flack (April 14, 2017) Evelyn Gigantes (May 17, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* Section 9.1.2 describes the NSDF site being 5 meters higher than the 100-year flood elevation. And that: "*The low point of the ECM has an elevation of approximately 160 metres above sea level (masl), while the 100-year flood elevation for the portion of the Ottawa River adjacent to the CRL property is 155 masl. Therefore, the ECM is above the Ottawa River flood level"* A five-metre height difference does not seem a reliable safety margin in the context of a "100-year" flood, given that the facility is supposed to be receiving waste for about 50 years, then be in a state of "closure activities" for the following 30 years, followed by "institutional control" for a further 300 years.	The statement in the 2017 draft Environmental Impact Statement (EIS) that "the low point of the ECM has an elevation of approximately 160 meters above sea level (m ASLl), while the 100-year flood elevation of the portion of the Ottawa River adjacent to the CRL property is 150 m ASL" was a typographical error. Section 10.1.2 of the final EIS has been corrected to indicate that the 100-year flood elevation for the portion of the Ottawa River adjacent to the Chalk River Laboratories (CRL) site is 115 m ASL. The proposed NSDF site is located far above the maximum calculated Ottawa River flood levels for the area, even in the event of dam failure. Specifically, the lower point of the ECM is at 160 metres above sea level (m ASL), while the maximum flood level due to upstream dam breaks is calculated to be about 122 m ASL (Section 10.1.2 of final EIS). Therefore, flooding of the Ottawa River cannot adversely affect the integrity of the NSDF or its barriers as the NSDF site is 48 m above the maximum flood level.

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	Joan Lougheed and Town of Deep River (August 16, 2017) Valerie Needham (August 15, 2017) Patrick Galligan (August 15, 2017) Irene Boland and Mark Barnes (August 15, 2017) Janice Tokaryk (August 14, 2017)	Since a 100-year flood level is considered, there is a significant probability the Ottawa River will flood during the lifetime of the ECM. The consequences of such an event need further explanation and the impacts on the environment need to be described and mitigation approaches identified. It is imperative that the ECM is above the Ottawa River floodplain. The site will be vulnerable to breach if the flood causes the NSDF containment to fail. The site will also be vulnerable to breach if one, possibly two, dams on the Ottawa River upstream from the NSDF are breached. The EIS seems to overlook the possibility of flooding caused by an upstream dam failure scenario and the possible effects; this should be explored in further detail. The EIS does not appropriately assess the possibility of dams breaching, flooding (bathtub scenario), or flooding causing failure, but they are very real possibilities.	The Post-Closure Safety Assessment (PostSA) [1] assesses the effects of the "bathtub scenario" or "overtopping" due to final cover failure of the ECM. The original assessment assumed instant failure of the engineered barriers at the end of institutional control. The "bathtubbing" of the NSDF in the post-closure phase is no longer considered as a specific scenario, but as a natural process potentially occurring in all scenarios, dependent on the water balance of the specific scenarios assessed. Additionally the revised modelling recognizes the 550 year design life as well as represents the gradual degradation of the base liner and final cover systems. However, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND566	PCWO (August 16, 2017)	Why does the CNL project proposal downplay the risks of seasonal flooding and the possibility of a catastrophic flood should the Tamiskaming dam give way?	The risk of seasonal flooding is assessed in Section 10.1.2 Extreme Rainfall Events, Snowmelts and Flooding of the final Environmental Impact Statement (EIS). The EIS has been revised to include the dam failure scenario. The water level in the Ottawa River along the Chalk River Laboratories (CRL) site is controlled by a set of rapids at Cotnam Island located approximately 40 km downstream, and by adjustments to the discharge rate at the Des Joachims hydroelectric dam approximately 30 km upstream of the CRL site. As of 2002 June, the Ottawa River water levels measured at the CRL site have ranged from 110.6 metres above sea level (m ASL) to 113.6 m ASL. Canadian Nuclear Laboratories has evaluated the Ottawa River flood level at CRL for complex events including failure of both upstream dams during a period of severe precipitation. This dam failure flood level has been determined to be 122 m ASL, which includes a 2 m added safety margin. Ground surface elevations at the NSDF site range from a low of 156 m ASL near the north side of Perch Lake, to a high of 197 m ASL at the crest of the ridge that separates Perch Lake and Ottawa River drainage basins. Therefore, flooding of the Ottawa River due failure of the upstream dams will not affect the NSDF. At a very minimum, the elevation difference between highest dam break flood elevation and the NSDF site lowest point is 34 m.
CNL-ND567	Heather Sanderson (May 12, 2017) Kathy Eisner (May 12, 2017) Karen Keon (May 7, 2017) Lisa Kelly (May 12, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English]	The risk of seasonal flooding is assessed in Section 10.1.2 Extreme Rainfall Events, Snowmelts and Flooding of the final Environmental Impact Statement (EIS). The dam failure scenario has been assessed but was not documented in the 2017 draft EIS. The EIS has been revised to include the dam failure scenario. Pertinent information is provided below. The water level in the Ottawa River along the Chalk River Laboratories (CRL) site is controlled by a set of rapids at Cotnam Island located approximately 40 km downstream, and by adjustments to the discharge rate at the Des Joachims hydroelectric dam approximately 30 km upstream of the CRL site on the Ottawa River. As of 2002 June, the Ottawa River water levels measured at the CRL site have ranged from 110.6 m ASL to 113.6 m ASL. Canadian Nuclear Laboratories (CNL) has evaluated the Ottawa River flood level at the CRL site for complex events including failure of both upstream dams during a period of severe precipitation This dam failure flood level has been

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	Martin Lalinec-Michaud (May 16, 2017) Anne Watelet (May 17, 2017) David Herbert (May 2, 2017) Karen Keon (May 7, 2017) Lisa Kelly (May 12, 2017) Lucy King (May 12, 2017) Martin Lalinec-Michaud (May 16, 2017) Valerie Needham (August 15, 2017) Gordon and Karen Lorimer (August 16, 2017)	The recent flooding in the Ottawa River watershed is a reminder of how powerful and unpredictable nature can be and of how fallible our technological controls can be. Luckily OPG was able to keep the site from flooding, through upstream damming and downstream releasing of spring melt and runoff waters. The unusual high water levels and flooding from the recent weeks could become more usual and frequent (higher rainfall, higher water levels) with climate change. Storing nuclear waste in a near surface disposal unit next to water is high risk because of contact with water (water table and surface runoff), altering the storage site and causing water pollution. How long is OPG contracted to regulate the river? How long will our dams be effective? We need to consider climate change and more regular flooding occurrences, and take into account all of the unknowns. The proposed project will not be able to be exempt from leaks (leak-free site not guaranteed, roofs need to be maintained, not to mention the onset of climate change, extreme weather, floods). Re: floods, what makes you think that water will not go through the 2 m cover of the waste site, or remove it over the next 300 years? As PM Trudeau stated recently, we should be expecting extreme weather changes, and the potential for flooding every decade, instead of every 100 years. Setting aside the potential for a massive flooding issue, due to a dam breach or new record high rains, we need to consider surface water and run-off as a 10,000 years+ problem. Microbursts are also a lived reality for property owners along the river. Many have experienced loss of trees and cars and damage to buildings from severe storms in 1999, 2006 and 2013. It took days after each of these storms for Hydro Quebec to restore power and millions of dollars of damage resulted from the storms (refer to Valerie Needham's submission from August 15, 2017 for more information). [Français] La récente inondation dans le bassin versant de la rivière des Outaouais rappelle à quel point la nature peut être imprévisible et puissante et à quel point nos contrôles technologiques peuvent être faillibles. Heureusement, grâce à la construction de barrages en amont et la libération en aval des eaux de fonte et des eaux de ruissellement, Ontario Power Generation (OPG) a réussi à empêcher l'inondation du site. Les changements climatiques pourraient faire en sorte que les niveaux d'eau exceptionnellement élevés et les inondations des dernières semaines deviennent plus habituels et plus fréquents (plus de précipitations, niveaux d'eau plus élevés). Le stockage des déchets nucléaires dans un dépôt de stockage à proximité immédiate de l'eau présente un risque élevé en raison du contact avec l'eau (nappe phréatique et ruissellement), ce qui détériore le site de stockage et provoque la pollution de l'eau. Depuis combien de temps OPG est-elle chargée du contrôle de la rivière? Pendant combien de temps nos barrages seront-ils efficaces? Nous devons tenir compte des changements climatiques, des inondations plus régulières et de tous les éléments inconnus.	determined to be 122 m ASL, which includes a 2 m added safety margin. Ground surface elevations at the NSDF site range from a low of 156 m ASL near the north side of Perch Lake, to a high of 197 m ASL at the crest of the ridge that separates Perch Lake and Ottawa River drainage basins. Therefore, flooding of the Ottawa River due to failure of the upstream dams will not affect the NSDF. The Ottawa River Regulation Planning Board was established in 1983 by the Governments of Canada, Quebec, and Ontario to ensure integrated management of the principal reservoirs of the Ottawa River Basin. The goal of this integrated management is to provide protection against flooding along the Ottawa River and its tributaries, particularly in the Montreal Region, and at the same time maintain the interests of the various users particularly in hydro-electric energy production. The final multi-layer cover system is designed to perform effectively over a 500-year post-closure design life. After operations phase, there is a 300 year institutional control period. Visual inspection of the disposal cells will be performed during the institutional control period to ensure settlement/subsidence is not causing grade reversal or depressions in the final cover, burrowing animals are not present, and perimeter fence lines are intact and properly maintained. Although 300 years of institutional control is used for planning and modelling purposes, the low-levels of radioactivity contained in the facility decay very rapidly in the first 100 years. That is, the concentration of radionuclides approaches the natural background only 100 years after closure of the facility, meaning that the sustained risk from the NSDF's presence is limited. The hazard of high winds has been assessed in Section 10.1.4 of the final EIS. High winds during the operations phase has the potential to cause power outages and projectiles, which have been evaluated and can be mitigated. During the post-closure phase, the facility is covered by over 2 meters of a clean cover system, which is designed to be resistant to both precipitation and wind erosion effects. [Français] Le risque d'inondations saisonnières est évalué à la section 10.1.2 (Pluies extrêmes, fonte des neiges et inondation) de l'Étude d'impact environnemental (EIE) définitive. L'éventualité d'une rupture de barrage a été envisagée, mais n'était pas analysée dans la version provisoire de l'EIE de 2017. Le document a été révisé pour inclure ce scénario. Les données utiles sont fournies ci-après. Le niveau d'eau de la rivière des Outaouais le long du site des Laboratoires nucléaires canadiens (LNC) est contrôlé par une série de rapides, autour de l'île Cotnam, située à une quarantaine de kilomètres en aval, et par des ajustements du débit au barrage hydroélectrique de Rapides-Des-Joachims, situé à une trentaine de kilomètres en amont du site des LCR sur la rivière des Outaouais. En juin 2002, le niveau d'eau de la rivière des Outaouais mesuré le long du site des LCR variait de 110,6 à 113,6 mANM. Les Laboratoires nucléaires canadiens (LNC) ont évalué le niveau de crue sur le site des LCR dans le cas de phénomènes complexes, dont une défaillance des deux barrages en amont au cours d'une période de précipitations intenses. Selon les calculs, la crue serait alors de 122 mANM, dont une marge de sécurité supplémentaire de 2 m. L'altitude des différentes zones du site de l'IGDPS varie de 156 mANM du côté nord du lac Perch à 197 mANM sur la crête qui sépare le bassin du lac Perch de celui de la rivière des Outaouais. Par conséquent, une crue de la rivière des Outaouais en raison d'une défaillance des barrages en amont n'aura pas d'effet sur l'IGDPS.

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		Le projet proposé ne pourra pas être exempt de fuites (site sans fuite non garanti, les recouvrements doivent être entretenus, sans parler des changements climatiques, des conditions météorologiques extrêmes, des inondations, etc.). En ce qui concerne les inondations, qu'est-ce qui vous fait penser que l'eau ne passera pas à travers la couverture de 2 m sur le site, ou ne l'enlèvera pas complètement au cours des 300 prochaines années? Comme l'a déclaré récemment le premier ministre Trudeau, nous devrions nous attendre à des conditions météorologiques extrêmes et à des inondations potentielles tous les dix ans, et non tous les 100 ans. Au-delà du potentiel d'un grave problème d'inondation, dû à une rupture de barrage ou à de nouveaux records de pluie, nous devons considérer les eaux de surface et les eaux de ruissellement comme un problème survenant tous les 10 000 ans ou plus. Les microrafales sont également une réalité vécue par les propriétaires riverains. Les fortes tempêtes de 1999, 2006 et 2013 ont causé beaucoup des pertes d'arbres et de voitures, et endommagé les propriétés. À la suite de ces tempêtes, il a fallu des jours à Hydro-Québec pour rétablir le courant et des millions de dollars de dommages ont été enregistrés (pour plus d'information, se référer au mémoire du 15 août 2017 de Valérie Needham).	Créée en 1983 par les gouvernements du Canada, du Québec et de l'Ontario, la Commission de planification de la régularisation de la rivière des Outaouais est chargée de veiller à la gestion intégrée des principaux réservoirs du bassin de la rivière des Outaouais. Cette gestion intégrée a pour but d'assurer une protection contre les crues de la rivière des Outaouais et de ses affluents, notamment dans la région de Montréal, tout en veillant aux intérêts des divers utilisateurs, notamment pour la production d'énergie hydroélectrique. La couverture définitive à plusieurs revêtements est conçue pour fonctionner efficacement pendant les 500 ans suivant la post-fermeture. La phase d'exploitation sera suivie d'une phase de contrôle institutionnel de 300 ans. Les cellules du monticule seront inspectées visuellement au cours de cette période afin d'éviter que l'affaissement ne cause d'inversion du nivellement ou de dépressions dans la couverture définitive, de vérifier qu'il n'y a pas d'animaux fouisseurs, et de s'assurer que les clôtures d'enceinte sont intactes et bien entretenues. La phase de contrôle institutionnel s'étend sur 300 ans pour les besoins de la planification et de la modélisation, mais les déchets de faible activité placés dans l'installation se désintégreront très rapidement au cours des 100 premières années. Autrement dit, les concentrations de radionucléides seront proches des concentrations naturelles de fond au bout de seulement 100 ans après la fermeture de l'installation, c'est-à-dire que les risques associés à la présence de l'IGDPS sont limités dans le temps. Les risques associés aux vents violents sont évalués à la section 10.1.4 de l'EIE définitive. Au cours de la phase d'exploitation, des vents violents pourraient provoquer des pannes de courant et soulever des projectiles, et ces effets ont été évalués et feront l'objet de mesures d'atténuation. Au cours de la phase de post-fermeture, l'installation sera recouverte par une couverture non contaminée de plus de 2 mètres, conçue pour résister aux effets d'érosion de la pluie et du vent.
CNL-ND568	Pravin Shah (April 8, 2017)	Is the flushing of Perch Lake (from inadvertent overflow of the proposed facility combined with heavy rain) possible?	As noted in Section 7.3.3.1 of final Environmental Impact Statement (EIS), a spill of wastewater in the Wastewater Treatment Plant (WWTP) results in a localized effect that is readily remediated. Tank overflows occurring in the WWTP will drain into the active drain system flowing back to the Equalization Tanks. A spill at the WWTP has no linkage pathway to the public or non-human biota as effects are localised (on-site) and would be contained within the building and the active drain system. For the Engineered Containment Mound (ECM), calculations were performed to demonstrate that a worst case Probable Maximum Precipitation (PMP) event will be contained within the ECM perimeter berm and have no release to the environment. The most conservative scenario to demonstrate a worst case event is for a PMP event to occur at the beginning of Phase 1 operations (i.e., Day 1). Day 1 would provide the largest ECM open capture area for stormwater. At this time all cells (within Phase 1) can collect stormwater as none of the cells have received a final cover to direct stormwater outside the ECM. Aside from Cell 1, all cells within Phase 1 have a sacrificial liner installed and most of the stormwater collects at the top of the baseliner system elevation. The configuration at the beginning of Phase 1 is: • Cell 1 is receiving waste; • Cell 2 has a sacrificial liner installed, Temporary Storage and Waste Receiving and Processing Area (TSWRPA), and contact water pond; and • The remaining cells (Cell 3 through to Cell 6) are inactive, have a sacrificial liner installed and non- contact water ponds. The area of Phase 1 (cells 1 to 6 south of the ECM road) equals to approximately 45,360 m^2. Using the selected 12-hour 570 mm PMP event across the Phase 1 area gives a water from precipitation volume of 25,855 m^3 (45,360 m^2 x 0.570 m).

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			This volume corresponds to an elevation in the ECM just below the 170 m contour. The volume of the water pool would need to reach an elevation of 171.5 m to overtop the perimeter berm at the low point along the south edge of the ECM. The flushing of Perch Lake from inadvertent overflow of the proposed WWTP or ECM is not a credible accident.
		Assessment of Effects of the Environment on the Project – Seismic Events	
CNL-ND569	David Thompson (April 11, 2017) OFWCA (Johanna Echlin) (May 8, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* Measuring the number of Becquerel's per litre as described in Table 5.7.4-8 is of vital importance, but it is beyond the comprehension of even the most learned in society. While seismic activity is addressed in Section 9.3, it is too technical for the average reader. CNL indicates that the risk of an earthquake is low - but if there is an earthquake of 6 or higher with the epicentre near or at Chalk River - what is the probability of a leak(s) in NSDF? In one paragraph, in terms the public can understand, what happens to the NSDF site if there is a major earthquake?	Canadian Nuclear Laboratories (CNL) acknowledges that it is challenging to communicate a technical topic with a range of public audiences. One Becquerel describes the rate at which one radionuclide (radioactive nucleus) decays per second. The use of the Becquerel (Bq) unit in the Environmental Impact Statement (EIS) is based on the standardized International System of Units (SI) that is internationally recognized to represent the activity of radioactive materials. The Becquerel replaced the alternative "curie" unit of measurement; one curie is equivalent to $3.7x10^{10}$ radioactive decays per second – less intuitive and more technical. Radionuclides could also be reported in a mass per volume, such as grams per liter (g/L) or parts per million/billion (ppm or ppb). However, Becquerels may be a preferable unit of measurement because there is a communicable link between Becquerels and risk. A mass concentration (g/L), expressing only the amount of radionuclide present, do not provide any indication of risk because different radionuclides decay faster than others so some radioactive elements may carry a greater health risk than others. Section 10.3 in final EIS describes the hazard of earthquakes from seismic events. To support the design of the NSDF Project, a probabilistic seismic hazard analysis (PSHA) [1] was prepared, which outlines the site-specific seismic conditions and discusses applicable seismic design criteria. To characterize the seismic hazard, the peak horizontal ground acceleration at the site is determined using seismic information from the seismic hazard maps developed for the NBCC [2] in 2015. The peak ground acceleration at the NSDF Project site is comparable to typical high seismic zones in North America. The design of buildings and other conventional structures for the NSDF Project was based on a National Building Code (NBCC) [2] design basis earthquake with a 2,475-year frequency of occurrence. However, the seismic design of the Engineered Containment Mound (ECM) was based on a design basis earthquake with a 10,000-year frequency of occurrence as defined by Canadian Standards Association (CSA) Standard N289.1-18 [3]. In comparison, most homes in Canada are built using provincial building codes which are based on the National Building Code [2] which considers a local earthquake with a 2,475-year frequency of occurrence. Section 10.3 of the final EIS, describes how the ECM could be compromised during an earthquake. Should a large seismic event occur at or near the NSDF Project site, this could lead to a rupture of soil material beneath the ECM and the potential failure of the perimeter berm and final cover system. The vibrations in the subsurface from the earthquake can also damage the ECM liners and the leachate collection system. This could result in the exposure of radioactive waste at the surface and flow of leachate into the groundwater without treatment. Liquefaction of unconsolidated (loose) subsurface may also occur due to intense underground vibrations; during liquefaction, loose sediments can act like a liquid causing anything sitting atop the sediment to sink into the ground. Based on the conclusions of a seismic analysis completed on the NSDF Project design and with the incorporation of the liquefaction mitigation described above, the ECM is expected to remain functional under the 10,000-year design seismic event scenario. References:

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			[1] Probabilistic Seismic Hazard Analysis, 232-10170-REPT-001. [2] National Research Council of Canada (NRCC), National Building Code of Canada (NBCC), 2015. [3] CSA Group N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants. 2018
CNL-ND570	Kathy Eisner (May 12, 2017) Sir Patrick and Lady Diana Gillam (April 17, 2017) David Herbert (May 2, 2017) Karen Keon (May 7, 2017) Phyllis Kirby and Rick Bradshaw (May 8, 2017) Jake Deacon (Petawawa Point Cottagers Association) (May 16, 2017) Kirk Groover (May 15, 2017) Evelyn Gigantes (May 17, 2017) Janet Still and Benedykt Syposz (May 22, 2017) Concerned Citizens of Renfrew Country (Ole Henrickson) (May 15, 2017) Karen Keon (May 7, 2017) James Holden (July 10, 2017); Heather Sanderson (May 12, 2017) Candace Prong (July 24, 2017) Valerie Needham (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* Much of the Chalk River Laboratories (CRL) property occupies an island in the Ottawa River. Surrounding channels formed along major geological fault lines which are at least 600 million years old and remain seismically active. The bedrock underlying the 40 square kilometer CRL property is metamorphosed and highly fractured, with rapid movement of groundwater into the Ottawa River. The entire CRL property is completely unsuitable for long-term management of radioactive waste. The geography of the area is not conducive to the storage of materials that have such potentially hazardous effects to the surrounding environment. The site will be vulnerable to breach if the Western Quebec (Temiskaming) Seismic Zone becomes active. No more wastes should be brought to this area adjacent to the Ottawa River, due to water protection and risk of seismic activity. Seismic activity could directly affect the integrity of any structure let along a structure designed to warehouse radioactive material. One commenter wanted to understand what Richter measurement the facility is designed to withstand. According to Natural Resources Canada, a small earthquake occurs, on average, every five days in this area. IAEA states that proposed facilities must consider "characterization of the geological aspects has to include activities such as the investigation of: long term stability, faulting and the extent of fracturing in the host geological formation; seismicity…" CNL claims that the mound will be engineered for earthquakes up to 6.0 on the Richter Scale. However, seismic events far greater than this are possible in the next few hundred years as shifting continues between tectonic plates.	Site characterization contributes to the safety of the system by reducing uncertainties associated with site characteristics or potential hazards associated with the site. An extensive multidisciplinary site characterization survey was completed at the NSDF site. Through site characterization and evaluation, Canadian Nuclear Laboratories (CNL) has submitted the NSDF Safety Case [1] to the Canadian Nuclear Safety Commission (CNSC) that supports the Chalk River Laboratories (CRL) site being suitable for long-term management of the proposed low-level waste (LLW) inventory in the near surface design. The NSDF Safety Case has taken into consideration guidance from International Atomic Energy Agency (IAEA) Safety Documents including Disposal of Radioactive Waste, IAEA SSR-5 [2] and Near Surface Disposal Facilities for Radioactive Waste, IAEA SSG-29 [3]. IAEA SSR-5 [2] provides specific safety requirements on the disposal of radioactive waste and the NSDF Safety Case [1], Appendix B, contains a concordance table that maps the disposal safety requirements in SSR-5 [2] to the NSDF documentation. The design and site characterization uses approaches outlined in IAEA SSG-29 [3]: probabilistic and deterministic approaches; as well as conservative and realistic assessments. As documented in Section 8, Safety Arguments of the NSDF Safety Case [1], the proposed site is appropriate for the NSDF based on: • The surrounding area has been impacted by previous waste management practices. As a result, decades of study has been performed on the Perch Lake basin, giving a comprehensive characterization of the site, including how contaminants migrate in the environment, and hydrogeological & geotechnical properties of the host environment. • The design is robust and will survive significant seismic events for which there is evidence have never occurred within the region. • The site benefits from the existing Canadian Nuclear Laboratories programs and management systems, such as security, emergency response, and environmental protection. The final Environmental Impact Statement (EIS) Executive Summary states that potential effects of the NSDF Project on the environment are limited because the NSDF Project has been designed in consideration of site-specific characteristics and to be suitable for the proposed inventory, the vast majority of which are comprised of impacted soils and demolition debris. The engineered containment mound is designed to contain and isolate the wastes from the environment for 550 years. Since the NSDF only accepts LLW and most of the radioactivity, thus, the hazard, decays in the first 100 years after closure, the design of the NSDF is commensurate with the hazard. The safety of the NSDF during post-closure is provided by means of passive features (e.g., berm, base liner and cover systems) that will end the need for active management, in alignment with regulatory requirements and international nuclear industry guidance. All predicted effects for human health are well below regulatory criteria during the operation of the NSDF Project, and including post-closure phase. The maximum estimated dose during the operations period for an on-site worker is 5 times lower than the regulatory limit of 50 mSv/y and for the public is almost 50 times lower than the regulatory dose limit of 1 mSv/y. During post-closure, the maximum estimated dose associated with the most likely future state of the facility is more than 60 times lower than the regulatory dose limit of 1 mSv/y. Residual effects on Ottawa River water quality are determined to be negligible during operations and post-closure phases and may result in a net benefit due to remediation of legacy waste storage areas. The CRL site is located within the Central Gneiss belt of the Grenville Structural Province of the Canadian Shield. Structurally, the CRL site is located within the Ottawa-Bonnechere Graben or rift valley, which trends from northwest to southeast from Lake Nipissing to the St. Lawrence River, occupying a 60 km-wide by 70 km-long area. The Ottawa River

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	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) Grand Council Chief Madahbee (Anishinabek Nation) (Aug 16, 2017)		occupies the eastern bounding fault of the rift valley, with the CRL site located on the western edge of the river. Bedrock in the area consists of highly altered gneissic rock (coarse grained metamorphic rock) and felsic igneous rock of late Precambrian-early Paleozoic age. Bedrock at the CRL site has been grouped into three main assemblages as shown on Figure 5.3.1-2 of the final EIS. The bedrock within the Perch Lake basin and the Site Study Area (SSA) has been mapped as quartz monzonitic, monzonitic and monzodioritic gneisses of Assemblage B. Assemblage C (composed of granitic, granodioritic and leucodioritic gneisses) has been mapped at the bedrock surface under the eastern portion of the SSA, while a mafic dyke has been mapped near the northwest corner of the SSA. Two main fracture or faulting zones are present at the CRL site: the Mattawa Fault, which lies below the Ottawa River and consists of the northeast boundary of the property, and the Maskinonge Lake lineament in the southwest area of the property. Within the Perch Lake basin, a moderate probable fracture zone extends approximately east–west through the upper portion of the basin. Bedrock within the Perch Lake Basin and surroundings is primarily composed of quartz monzonitic, monzonitic and monzodioritic gneisses with some occurrence of granitic-granodioritic and leucodioritic gneisses. The potential for fault reactivation in the vicinity of the NSDF Project exists, but the effects are expected to be minimal on the existing fault system. Evidence from bedrock fractures that have been subjected to historical tectonic stresses and glacial loading and unloading indicates that the rock is inherently stable (from the final EIS Section 5.3.1.4.2.2). A site-specific Probabilistic Seismic Hazard Assessment (PSHA) [4] was performed to determine the seismic level corresponding to the NSDF site for the ECM design. The PSHA [4] considered: past seismic data in the vicinity of the NSDF site; assessment of geologic site conditions; regional seismo-tectonic conditions; development of a seismic source model; and calculation of earthquake ground motions. The PSHA [4] utilized the current methodology developed by the Geological Survey of Canada and complied with the 2015 NBCC [5]. A summary of the PSHA [4] and the seismic performance criteria used to design the ECM is documented in Section 5.3.2.1 of the NSDF Safety Case [1]. The ECM seismic performance criteria were defined according to CSA N289.4-12, Testing Procedures for Seismic Qualification of Nuclear Power Plant Structures, Systems, and Components [6]. An independent third party review by a subject matter expert from an academic institution, confirmed the suitability of the PSHA results to develop the ECM detailed design at the NSDF site in Chalk River, Ontario. The effects of seismic events on the NSDF Project are discussed in Section 10.3 of the final EIS. The design of buildings and other conventional structures for the NSDF Project was based on a NBCC [5] design basis earthquake with a 2,475-year frequency of occurrence. However, the seismic design of the ECM was based on a design basis earthquake with a 10,000-year frequency of occurrence as defined by Canadian Standards Association Standard N289.1-18[7]. The ECM DBE has a design peak horizontal ground acceleration is 0.55 g. Based on the conclusions of a seismic analysis completed on the NSDF Project design and with the incorporation of the liquefaction mitigation, the ECM is expected to remain functional under the 10,000-year design basis seismic event scenario. During operations phase and through to the institutional control phase of the NSDF Project, the consequences of any damage to the perimeter berm or the ECM final cover system from a beyond-design earthquake would be mitigated as required. The perimeter berm is constructed on bedrock from free-draining embankment fill (non-liquefiable soil). This construction ensures that no liquefaction will take place, and that the berm will continue to perform its containment and isolation function during and after the design basis earthquake (See Section 3.4.1.5 of the final EIS). The Richter scale is used to rate the magnitude of an earthquake that has occurred -- the amount of energy the earthquake released. The seismic design of the NSDF ECM is not designed to a specific Richter Scale event, however is designed to withstand a DBE with peak horizontal ground acceleration is 0.55 g. For comparison, the NSDF seismic design uses a peak

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			ground acceleration value of 0.55 g, and the peak ground acceleration at Fukushima during the seismic event was 0.56 g. The NSDF is designed to withstand a magnitude of earthquake that has not been observed in this area of the Earth, because Ontario is not on a major tectonic plate border. References: [1] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [3] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [4] Probabilistic Seismic Hazard Analysis, 232-10170-REPT-001. [5] National Research Council of Canada (NRCC), National Building Code of Canada (NBCC), 2015. [6] CSA Group N289.4-12: Testing Procedures for Seismic Qualification of Nuclear Power Plant Structures, Systems, and Components. 2017 [7] CSA Group N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants. 2018.
CNL-ND571	Dr. J.R. Walker (May 9, 2017)	CNL note that soil liquefaction is an issue at the site during a seismic event (Section 9.3 of the Draft EIS) and that mitigative measures are required. These mitigative measures are not described in the Draft EIS. CNL need to provide a detailed description of the proposed mitigative measures and explain how these measures will protect members of the public and the environment for the period that the inventory of the engineered containment mound remains a hazard. CNL must demonstrate that the proposed mitigative measures will be effective beyond the design life of the facility.	The analysis of a seismic event has been updated since the 2017 draft Environmental Impact Statement (EIS) as well as a change in design to address the liquefaction potential. As per Section 10.3 of the final EIS the design of buildings and other conventional structures for the NSDF Project was based on a NBCC [1) design basis earthquake with a 2,475-year frequency of occurrence. However, the seismic design of the Engineered Containment Mound (ECM) was based on a design basis earthquake with a 10,000-year frequency of occurrence as defined by Canadian Standards Association (CSA) Standard N289.1-18 [2]. An analysis of liquefaction potential was completed and indicated that the 10,000-year design seismic event scenario may cause liquefaction in the saturated native sand to silty sand soils underlying the ECM resulting in unacceptable vertical and horizontal displacements. Based on this, Canadian Nuclear Laboratories has added additional mitigation to limit the potential for liquefaction. Overburden soils beneath the ECM perimeter berm will be excavated down to the top of the bedrock, extending horizontally from beneath the perimeter berm to a distance at which the slopes of the perimeter berm intersect the bedrock surface. The removed overburden soils then can be replaced with backfill material in multiple lifts. Each lift can be compacted to the desired density using vibratory roller compactors. The edges of excavation can be sloped back temporarily to provide stability. Dynamic compaction could also be used in select areas of the construction site where the existing grade is relatively flat and in the limited areas where proximity of the existing wetlands would require the use of sheet piling or other temporary excavation support. This excavation and replace method can produce a high-quality ground mass with high density and desired permeability. Based on the conclusions of a seismic analysis completed on the NSDF Project design and with the incorporation of the liquefaction mitigation described above, the ECM is expected to remain functional under the 10,000-year design seismic event scenario. During operations through the institutional control phases of the NSDF Project, the consequences of any damage to the engineered berms or the ECM final cover system from a beyond-design earthquake would be mitigated as required. As noted in Section 3.4.1.5 of the final EIS the perimeter berm is constructed on bedrock from free-draining embankment fill (non-liquefiable soil). This construction ensures that no liquefaction will take place, and that the perimeter berm will continue to perform its containment and isolation function during and after the design basis earthquake.

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			References: [1] National Research Council of Canada (NRCC), National Building Code of Canada (NBCC), 2015. [2] CSA Group N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants.
CNL-ND572	Dr. J.R. Walker (May 9, 2017)	CNL use the assessed doses to a future farm resident (Table 6.4.4-5) and the IAEA criteria concerning inadvertent human intrusion to justify the acceptability of doses to the public following large seismic events. Section 9.3 of the Draft EIS discusses the possibility of a large earthquake causing damage to the engineered containment mound. This is incorrect, since seismic events are not the result of inadvertent human intrusion. Seismic events are natural processes and the doses arising from natural processes are subject to the dose limit (1 mSv/year) and dose constraint (0.3 mSv/year). Hence, CNL have not demonstrated that a large seismic event would lead to acceptable doses to members of the public.	The post-closure phase assessment has been significantly revised since the 2017 draft Environmental Impact Statement (EIS). As noted in Section 10.3 of the final EIS in the post-closure phase the consequence of a significant seismic event is evaluated through a number of disruptive events (e.g., failure of the berm, cap and liner). The dose consequences of these post-closure scenarios are within the regulatory dose limit for a member of the public (1 mSv/yr). The Post-Closure Safety Assessment (PostSA) [1] considered Disruptive Event scenarios and "What-If?" cases, which examine the potential effects of unlikely disruptive events that lead to possible penetration of barriers and abnormal degradation and loss of containment. These post-closure Disruptive Event and "What-If?" scenarios are designed to test the robustness of the NSDF Project and are not considered accidents and malfunctions. In the post-institutional control period, there will be no workers or activities on-site, and as such there is no possibility for accidents or malfunctions to occur. As captured in Section 10.3 of the final EIS the design of buildings and other conventional structures for the NSDF Project was based on a National Building Code of Canada (NBCC) [2] design basis earthquake with a 2,475-year frequency of occurrence. However, the seismic design of the ECM was based on a design basis earthquake with a 10,000-year frequency of occurrence as defined by Canadian Standards Association (CSA) Standard N289.1-18 [3]. Based on the conclusions of a seismic analysis completed on the NSDF Project design and with the incorporation of the liquefaction mitigation described above, the ECM is expected to remain functional under the 10,000-year design seismic event scenario. During operations through the institutional control phases of the NSDF Project, the consequences of any damage to the engineered berms or the ECM final cover system from a beyond-design earthquake would be mitigated as required. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] National Research Council of Canada (NRCC), National Building Code of Canada (NBCC), 2015. [3] CSA Group N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants. 2018
CNL-ND573	Dr. J.R. Walker (May 9, 2017)	CNL need to explain what is the largest seismic event that can be anticipated in 100,000+ years, its effect on the engineered containment mound, and the subsequent radiological exposures to people and the environment.	As captured in Section 10.3 of the final Environmental Impact Statement (EIS), the design of buildings and other conventional structures for the NSDF Project was based on a National Building Code of Canada (NBCC) [1] design basis earthquake with a 2,475-year frequency of occurrence. However, the seismic design of the Engineered Containment Mound (ECM) was based on a design basis earthquake with a 10,000-year frequency of occurrence as defined by Canadian Standards Association (CSA) Standard N289.1-18[2]. 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. During operations through the institutional control phases of the NSDF Project, the consequences of any damage to the engineered perimeter berm or the ECM final cover system from a beyond-design earthquake would be mitigated as required. Section 3.4.1.5 of the final EIS notes the perimeter berm is constructed on bedrock from free-draining embankment fill (non-liquefiable soil). This construction ensures that no liquefaction will take place, and that the berm will continue to perform its containment and isolation function during and after the design basis earthquake.

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			An additional seismic analysis was performed to assess the structural function of the perimeter berm, final cover, and base liner systems if subjected to a 1 in 50,000-year seismic event [3]. The results of this analysis support that scenarios assessed within the Post-Closure Safety Assessment (PostSA) [4], specifically the "Series of Landslides" scenario, bound the consequences of a more severe seismic event. The calculated dose to the receptor in this scenario is about 0.1 mSv/y, which is below the public dose criteria of 1 mSv/y. This is largely due to the severe reduction in radioactive inventory, and the rapid decay of the inventory in the first 100 years. This scenario demonstrates that the safety of the public and the environment is not entirely dependent on the integrity of the ECM barriers. References: [1] NRCC (National Research Council Canada). 2015. National Building Code of Canada 2015. NRCC 56190. Available at: https://nrc.canada.ca/en/certifications-evaluations-standards/codes-canada/codes-canada-publications/national-building-code-canada-2015. [2] CSA Group N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants. 2018 [3] Seismic Analysis of Beyond Design Basis Event (BDBE) of the ECM under a Severe 1/50,000 year Earthquake, 232-01280-021-000. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND574	Evelyn Gigantes (May 17, 2017) Martin Flood (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* There are contradictions on the topic of major earthquake - it is not reasonable or acceptable to suggest, as the text in the EIS appears to do, that a nuclear waste facility constructed in a major seismic zone will probably only experience a severe earthquake once in 10,000 years. Geology is not a predictive science. If a major seismic event leads to a failure of containment at the NSDF in the Chalk River Lands area, it will not make any difference whether the site chosen is the EMR site or the "Alternate" CRL site. Has CNL adequately considered the risks of possible earthquakes in this part of the Ottawa Valley?	As discussed in Section 10.3 of the final Environmental Impact Statement (EIS), major seismic events (i.e., earthquakes) are related to movements at tectonic plate boundaries. The Chalk River Laboratories (CRL) site is located in the Ottawa-Bonnechere Graben geologic feature and adjacent to the Western Quebec Seismic Zone. This region of the country has continued to experience minor to moderate seismic activity, and within this zone, several earthquakes were documented. These include the following: • Timiskaming, Quebec, earthquake of 1935 (6.2 on the Richter Scale and epicentre over 100 km away); • Cornwall, Ontario, earthquake of 1944 (5.6 on the Richter Scale and epicentre over 200 km away); and • Val-des-Bois, Quebec, earthquake of 2010 (5.0 on the Richter Scale and epicentre over 137 km away). Most recently, an earthquake with a magnitude of 3.7 on the Richter Scale occurred on October 15, 2015, approximately 40 km from the NSDF Project site, and an earthquake with a magnitude of 3.5 occurred on May 14, 2016, approximately 10 km from the NSDF Project site, 6 km north of Petawawa, Ontario. The design of buildings and other conventional structures for the NSDF Project was based on a National Building Code of Canada (NBCC) [1] design basis earthquake with a 2,475-year frequency of occurrence. However, the seismic design of the ECM was based on a design basis earthquake with a 10,000-year frequency of occurrence as defined by Canadian Standards Association Standard (CSA) N289.1-18 [2]. To support the design of the NSDF Project, a probabilistic seismic hazard assessment was prepared, which outlines the site-specific seismic conditions and discusses applicable seismic design criteria. To characterize the seismic hazard, the peak horizontal ground acceleration at the site is determined using seismic information from the seismic hazard maps developed for the NBCC in 2015. The peak ground acceleration at the NSDF Project site is comparable to typical high seismic zones in North America.

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			Based on the conclusions of a seismic analysis completed on the NSDF Project design and with the incorporation of the liquefaction mitigation, the Engineered Containment Mound (ECM) is expected to remain functional under the 10,000-year design seismic event scenario. During operations through the institutional control phases of the NSDF Project, the consequences of any damage to the engineered berms or the ECM final cover system from a beyond-design earthquake would be mitigated as required. In the post-closure phase the consequence of a significant seismic event is evaluated through a number of disruptive events (e.g., failure of the berm, cap and liner). The dose consequences of these post-closure scenarios are within the regulatory dose limits for members of the public and dose acceptance criteria. As noted in Section 3.4.1.5 of the final EIS, the berm is constructed on bedrock from free-draining embankment fill (non-liquefiable soil). This construction ensures that no liquefaction will take place, and that the berm will continue to perform its containment and isolation function during and after the design basis earthquake. References: [1] NRCC (National Research Council Canada). 2015. National Building Code of Canada 2015. NRCC 56190. Available at: https://nrc.canada.ca/en/certifications-evaluations-standards/codes-canada/codes-canada-publications/national-building-code-canada-2015. [2] CSA Group N289.1-18: General Requirements for Seismic Design and Qualification of Nuclear Power Plants. 2018
		Assessment of Effects of the Environment on the Project – Glaciation	
CNL-ND575	OFWCA (Johanna Echlin) (May 8, 2017) Heather Sanderson (May 12, 2017) William Turner (May 31, 2017) 155.	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* The EIS analyzes severe abnormal situations (e.g. glaciation, a seismic event much larger than the very conservative design basis earthquake) that could give rise to the failure of NSDE, and demonstrates that under these circumstances, people and the environment will be protected. - Wouldn't this NSDF be destroyed by glaciation (especially with this NSDF's height being 25 metres) causing widespread contamination if the NSDF contains radionuclides with half-lives of thousands of years? CNL state that the cover will fail in 300 years (see Comment 12 above). At that point, the wastes will no longer be contained in the mound. Thus, any assessment of glaciation events beyond this date are meaningless, unless the wastes within the mound exceed clearance levels. However, according to the footnote on Page 3-14, that is exactly what CNL state.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available. As a result of this change, the amount of radioactivity in the facility has been significantly reduced. In fact, after only about 100 years after closure of the facility, the radionuclide concentration has begun to approach the natural background levels. Current estimates place the next glaciation as occurring sometime between 60,000 and 100,000 years from now. As discussed in Section 10.5 of the final Environmental Impact Statement (EIS) by 10,000 years post-closure, the radioactivity concentration in the Engineered Containment Mound (ECM) is very close to natural background concentrations. As such, if glaciation occurs 100,000 years into the future, this is far beyond the timeframe that the facility is hazardous thus not assessed further. The EIS does not state that the cover will fail in 300 years. The cover system is designed to last at least 500 years after the closure of the facility. This design life is supported by an independent academic and laboratory study by Queens University, and is available to the public [1]. However, when developing the models and assessments in the Post-Closure Safety Assessment (PostSA) [2], it is conservatively assumed that the cover starts to degrade before the end of its 550 year design life. This allows the assessment to pessimistically model what happens if water infiltrates the facility. The fact that the NSDF contains only LLW, most of which has decayed in the first 100 years, means that the consequences of a degraded cover system are minimal. References:

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			[1] Rowe, R. K. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories (CNL) 232-503212-REPT-024. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
		Assessment of Effects of the Environment on the Project – Tornados	
CNL-ND576	Dr. J.R. Walker (May 9, 2017) Valerie Needham (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* CNL need to explain what is the largest tornado strike that can be anticipated in 100,000+ years, its effect on the engineered containment mound, and the subsequent radiological exposures to people and the environment. A tornado followed a path about 150 km long from near Deep River, Ontario, to near Mont Laurier, Quebec, causing severe damage at Nicabong (pop. 90) and Blue Sea Lake (pop. 280), Quebec, and also caused damage at Lac Cayamant (pop, 260) near Blue Sea Lake. One person died and thirty were injured at Blue Sea Lake, eight people were injured at Nicabong and two at Lac Cayamant. There was approximately $2 million damage. Maximum wind speeds of 160 km/h were estimated by Environment Canada. Roughly three tornadoes a year occur in the Eastern Ontario/Western Quebec region. Approximately once every two years, these tornadoes cause extensive property damage, injuries and sometimes loss of life (refer to Valerie Needham's submission from August 15, 2017 for more information).	High winds and tornadoes are discussed in Section 10.1.4 of the final Environmental Impact Statement (EIS). The Design Basis Tornado (DBT), for the Chalk River Laboratories (CRL) site is an upper category EF2, (enhanced Fujita Scale), with maximum wind speed of 140 miles per hour, (225 km per hour). The design basis tornado event for the CRL site was reviewed in 2018 after a series of tornadoes occurred in the Ottawa Valley. The current choice of an upper EF2 tornado for the CRL site remains appropriate. Severe winds or tornadoes are primarily a concern during the construction and operations phases related to worker safety, performance of facilities and loss of production, and are already encompassed by Canadian Nuclear Laboratories (CNL) Emergency Preparedness Program. The risks associated with severe winds or tornadoes are managed through design criteria and management practices described above. Facilities are designed according to the appropriate codes, such as the National Building Code of Canada (NBCC) 2015 [1]. Consequences of potential tornadoes, such as a power outage, are encompassed by CNL's Emergency Preparedness Program. High winds could also cause soil erosion on the Engineered Containment Mound (ECM) final cover system, leading to water infiltration into the waste. In addition to the mitigation described in Section 10.1.2 of the final EIS, the final cover system will be vegetated to enhance evapotranspiration and reduce the potential for soil erosion from wind and water. The vegetation will be limited to grass species that are drought resistant. Trees will not be allowed to establish on the final cover system as they may cause considerable damage to the topsoil and soil cover layers, as well as exposing the intrusion barrier if uprooted due to heavy winds (Section 3.4.1.9.3 of the final EIS). Bare or eroded areas will be rolled, regraded, replanted and remulched, and treatments will be applied as required to keep grass and soil free of pests and pathogens or disease. In addition to the calculations for the operational period, the Post-Closure Safety Assessment (PostSA) [2] assesses the consequences of erosion in both the Normal Evolution Scenario and the disruptive event of "Enhanced Erosion". The dose consequences from these scenarios are within the dose acceptance criteria and far below the regulatory dose limit for a member of the public. References: [1] NRCC (National Research Council Canada). 2015. National Building Code of Canada 2015. NRCC 56190. Available at: https://nrc.canada.ca/en/certifications-evaluations-standards/codes-canada/codes-canada-publications/national-building-code-canada-2015. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
		Monitoring and Follow-up Programs	
CNL-ND577	Anne Watelet (May 17, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on*	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal,

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	CAPE (April 18, 2017) Dr. J.R. Walker (May 9, 2017) Ronald and Michele Kaulbach (May 8, 2017) Janey Bullivant (May 13, 2017) Heather Sanderson (May 12, 2017) Janet Still and Benedykt Syposz (May 22, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) J. P. Unger (August 15, 2017)	*this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The proposed dump has a lifetime of 50 years, while radioactive waste of medium activity remains radioactive for tens of thousands of years. During the 50+ years, the waste would be exposed to rain and snow. Failure of the proposed sewage treatment plant could result in rapid contamination of the Ottawa River. This dump is scheduled to be operational until 2070, but it is also stated that any monitoring activity may cease in 2100, even though the radioactivity at this site will last for thousands of years. The effect of the environment on the project over the time period that the radiological inventory remains a hazard is not adequately discussed; The effect of the project on the environment following facility failure at the end of the design life (500 years post-closure) is not adequately discussed. What happens after 2070? How can it be sufficient to recommend a 100 year environmental monitoring system? Or even to plan the construction of a mound with a design life of 550 years when some of the radioactive materials to be stored in it have a half-life that runs into the hundreds of thousands of years? Who will monitor this? How? How does a near surface nuclear waste site weather 10,000 years? CNL need to discuss how the engineered containment mound fails and how the failed facility will protect people and the environment for the subsequent 100,000+ years; Furthermore, as the NSDF will contain hazardous materials for hundreds of years, the draft EIS should advise how the composition of the waste may change over time, particularly with respect to the radioactive content. This would provide important context for the assessment of the engineered barriers over time. The fact that there is an expectation of "monitoring" the site for only a few decades, yet the radioactivity and danger to the watershed and source of drinking water would continue for several centuries while the site inevitably deteriorates, should be considered nothing less than a criminal disregard for future generations. [Français] La durée de vie de la décharge proposée est de 50 ans, tandis que les déchets radioactifs de moyenne activité restent radioactifs pendant des dizaines de milliers d'années. Pendant 50 ans ou plus, les déchets seraient exposés à la pluie et à la neige. Une défaillance de l'usine de traitement des eaux usées proposée pourrait entraîner une contamination rapide de la rivière des Outaouais.	provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The NSDF will only contain solid LLW. The Engineered Containment Mound (ECM) is designed to contain and isolate the wastes from the environment for 550 years, after which, the radioactivity has decreased to levels close to the natural background concentrations. The updated inventory is described in Section 3.3.1.3 of the final EIS. The radioactive decay to near background levels over the first 100 years is shown in Figure 3.3.1-2 of the final EIS. Reponses to comments on the Wastewater Treatment Plant (WWTP), closure of the ECM, monitoring during the post-closure phase and the long-term performance of NSDF are provided below. Throughout the construction, operation, closure, and post-closure periods of the NSDF, environmental monitoring will be conducted as per the Environmental Assessment Follow-up Monitoring Program (EAFMP) with the primary purpose of verifying the predictions made in the EIS related to environmental effects. Specifically, monitoring will be conducted to ensure residual environmental effects (those which cannot be mitigated by preventative actions) are minimized and to evaluate the effectiveness of mitigation measures committed to in the EIS. Wastewater Treatment During the 50 year operations period, all efforts will be made to minimize the contact of precipitation with the contaminated waste thus leachate production. The operation of the ECM is limited to one cell at a time in order to limit the surface area of waste that is exposed to the environment (i.e., precipitation) at any given time. As a cell is constructed, interim covers are placed over waste to limit infiltration of precipitation and promote surface water run-off. As each disposal cell is completed the final cover system is installed over the filled disposal cell. Other operational practices to limit contact with precipitation include grading and compaction of the waste fill to promote surface water run-off. Furthermore, any water that makes contact with (or is suspect of contacting) the contaminated waste will be collected by the leachate collection system and treated to remove contaminants in the WWTP prior to controlled release into the environment. Treated effluent discharge targets are established to be protective of human and non-human biota health. Additional details on wastewater quantity and mitigation measures to minimize these are provided in Section 3.4.2.1 of the final EIS. Section 3.4.2.4 of the final EIS describes the WWTP, the treatment processes and design features of the plant. The storage capacity and maximum flow rate of the WWTP is based on two back-to-back 24 hour long, 100-year storm events. The WWTP is designed for redundancy and high reliability. The WWTP has two redundant wastewater treatment process trains and can operate on a single train if the other train is out of service for maintenance or repairs. Interconnections between the treatment trains also allow flow to be diverted between trains at each major process step. To provide assurance that the WWTP will meet effluent discharge targets, CNL has performed pilot testing of the proposed wastewater treatment process utilizing simulated wastewater representative of what we expect to collect and treat when the NSDF is in operation. Wastewater quality was predicted taking into consideration the WWTP flow rates, waste inventory and the design and behaviour of the ECM. The wastewater quality is managed by controlling what wastes are placed in the ECM. The NSDF Waste Acceptance Criteria (WAC) [2] were developed to ensure only waste with acceptable physical, radiological, and chemical characteristics will be placed in the ECM (see Section 3.3.3 of final EIS).

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		Cette décharge serait opérationnelle jusqu'en 2070, mais il est également précisé que toute activité de surveillance pourrait cesser en 2100, même si la radioactivité sur ce site durera des milliers d'années. L'effet de l'environnement sur le projet au cours de la période pendant laquelle l'inventaire de contaminants radiologiques reste un danger n'est pas suffisamment traité; l'effet du projet sur l'environnement suite à une défaillance de l'installation à la fin de sa durée de vie (500 ans après sa fermeture) n'est pas suffisamment traité. Qu'arrivera-t-il après 2070? Comment peut-il être suffisant de recommander un système de suivi environnemental de 100 ans? Ou même de planifier la construction d'un monticule d'une durée de vie de 550 ans, alors qu'une partie des matières radioactives qui y seront stockées ont une durée de vie de plusieurs centaines de milliers d'années? Qui se chargera d'effectuer le contrôle? Comment? Comment un site de stockage de déchets nucléaires en surface peut-il résister pendant 10 000 ans? Les LNC doivent discuter des vulnérabilités du monticule de confinement artificiel et de la manière dont l'installation protégera les personnes et l'environnement pendant 100 000 ans et plus, malgré ces vulnérabilités. En outre, comme l'IGDPS contiendra des matières dangereuses pendant des centaines d'années, l'ébauche de l'EIE devrait préciser comment la composition des déchets pourrait évoluer avec le temps, en particulier en ce qui concerne le contenu radioactif. Cela pourrait être très utile pour l'évaluation des barrières artificielles au fil du temps. Le fait que l'on s'attend à « surveiller » le site pendant quelques décennies seulement, alors que la détérioration de celui-ci est inévitable, et que la radioactivité ainsi que le danger pour le bassin versant et la source d'eau potable seront présents pendant plusieurs siècles, devrait être considéré comme un mépris criminel pour les générations futures.	Closure of the NSDF from 2070 to 2100 Closure activities are expected to start in 2070 and continue through to 2100. The closure phase is described in Section 3.2.3 of the final EIS. Closure activities will include installation of any remaining components on the final cover of the ECM, decommissioning of infrastructure and support facilities (with the exception of the ECM and surface water management systems) and on-going long-term performance monitoring. Leachate generation will rapidly decline during the closure phase as there will be no more precipitation coming into contact with waste. Decommissioning of the WWTP and all associated structures will be performed after the leachate quantity is able to be treated using a different technique or it becomes more cost-effective to send leachate to an alternate off-site facility. Post-Closure Phase and Monitoring (2100 and beyond) The post-closure phase will extend from year 2100 onward and is defined by two distinct periods: institutional control and post-institutional control. For planning purposes, the institutional control period is assumed to last 300 years, however, the institutional control period will continue as long as necessary as determined by regulatory agencies. During institutional control, inspection and surveillance activities will verify the integrity of the disposal facility system. The environmental monitoring activities of the EAFMP will verify that the performance continues to demonstrate compliance with the environmental assessment predictions. Groundwater monitoring through the EAFMP will verify that the ECM is containing waste and that there is no deterioration of groundwater or surface water. The ECM has been designed to withstand extreme environmental conditions such as extreme precipitation, tornadoes and seismic events so that the isolates and contains the waste over its hazardous life. An assessment of potential climate change has also been completed. The assessment of extreme environmental events and potential consequences are described in Section 10 of the final EIS. Long-Term Performance of the NSDF Engineered barriers of the ECM are conservatively assumed to fail at the end of the 550 year design life of the facility in the Post-Closure Safety Assessment (PostSA) [3]. Failure scenarios include failure of the final cover with the baseliner systems intact and failure of both the cover and baseliner leading to release of contaminated water to ground. These are referred to as Normal Evolution Scenarios that are expected to occur after a long period of time (hundreds of years) and dose consequence to public is assessed in the PostSA [3]. Disruptive Event Scenarios such as human intrusion into the mound, enhanced erosion of the cover, damage to the engineered berm and doses to the public are also assessed in the PostSA [3]. The scenarios assessed are summarized in Section 5.8.6.1 of the final EIS and dose consequences summarised in Section 5.8.6.1.2.2. Predicted dose consequences to the public are well below the regulatory dose limit of 1 mSv/yr. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [Français] Les Laboratoires nucléaires canadiens (LNC) ont examiné l'inventaire de déchets destinés à l'IGDPS et y ont apporté des

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			modifications. L'IGDPS ne traitera que des déchets de faible activité (DFA). La décision a été prise compte tenu des commentaires de représentants fédéraux et provinciaux et de la population et elle a été officiellement annoncée par les LNC le 27 octobre 2017. Les déchets de moyenne activité (DMA) inclus dans l'inventaire de 2017 ne seront PAS traités dans l'IGDPS et seront conservés dans un dépôt sûr jusqu'au moment où une solution sera trouvée pour le stockage pernament des DMA (section 2.2.2.1 de l'EIE définitive; section 3.4.2 de la Stratégie de gestion intégrée des LNC [1]). L'IGDPS ne pourra contenir que des déchets solides de faible activité (DFA). Le monticule de confinement artificiel (MCA) est conçu pour contenir les déchets et les isoler de l'environnement pendant 550 ans, après quoi leur radioactivité aura diminué pour atteindre des niveaux proches des concentrations naturelles de fond. L'inventaire mis à jour est décrit à la section 3.3.1.3 de l'EIE définitive. La désintégration radioactive jusqu'à des concentrations proches des concentrations naturelles de fond au cours des 100 premières années est illustrée à la figure 3.3.1-2 de l'EIE définitive. Les réponses aux commentaires portant sur l'usine de traitement des eaux usées (UTEU), sur la fermeture du MCA, sur la surveillance exercée au cours de la phase de post fermeture et sur le rendement à long terme de l'IGDPS sont fournies ci après. Durant les phases de construction, d'exploitation, de fermeture et de post fermeture de l'IGDPS, la surveillance de l'environnement sera effectuée conformément au Programme de surveillance et de suivi de l'évaluation environnementale (PSSEE), principalement dans le but de confirmer les prévisions de l'EIE concernant les effets environnementaux. Plus précisément, la surveillance visera à veiller à ce que les effets environnementaux résiduels (ceux qui ne pourront pas être atténués par des mesures préventives) soient réduits au minimum et à évaluer l'efficacité des mesures d'atténuation prévues dans l'EIE. Traitement des eaux usées Au cours des cinquante années de la phase d'exploitation, tout sera fait pour réduire au minimum le contact entre l'eau de pluie et les déchets contaminés et, par conséquent, la production de lixiviat. Le fonctionnement du MCA est limité à une cellule à la fois pour circonscrire la superficie de déchets exposés à l'environnement (précipitations) en tout temps. Pendant la construction d'une cellule, les déchets sont recouverts provisoirement pour limiter les infiltrations d'eau et favoriser le ruissellement en surface. Lorsqu'une nouvelle cellule est terminée, une couverture définitive est placée sur la cellule qui vient d'être remplie. D'autres moyens techniques permettent de limiter le contact avec les eaux de pluie, par exemple le nivellement et le compactage des déchets enfouis pour favoriser le ruissellement en surface. Par ailleurs, les eaux qui entrent en contact (ou dont on soupçonne qu'elles entrent en contact) avec les déchets contaminés seront recueillies grâce à un système de collecte du lixiviat et traitées dans une usine de traitement des eaux usées (UTEU) pour en enlever les contaminants avant d'être libérées de façon contrôlée dans l'environnement. Les objectifs de rejet d'effluents traités permettent de protéger la santé du biote humain et du biote non humain. D'autres détails sur la quantité d'eaux usées et sur les mesures d'atténuation visant à réduire cette quantité sont fournis à la section 3.4.2.1 de l'EIE définitive. La section 3.4.2.4 de l'EIE définitive décrit l'UTEU, les procédés de traitement et les caractéristiques de l'usine. La capacité d'entreposage et le débit maximum de l'UTEU sont calculés en fonction de deux tempêtes centennales successives de 24 heures. L'UTEU comprend deux chaînes de traitement des eaux usées redondantes et peut fonctionner avec l'une d'elles seulement si l'autre est hors service parce qu'elle doit faire l'objet d'un entretien ou de réparations. Les raccordements entre les deux chaînes permettent également de détourner le débit de l'une à l'autre à chaque étape importante du processus.

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			Pour s'assurer que l'UTEU respectera les objectifs de rejet d'effluents prévus, les LNC ont effectué un essai pilote du procédé de traitement des eaux usées proposé en employant des eaux usées représentatives de ce qu'on s'attend à recueillir et à traiter lorsque l'IGDPS sera en exploitation. La qualité des eaux usées a fait l'objet de prévisions compte tenu du débit de l'UTEU, de l'inventaire de déchets et de la conception et du comportement du MCA. Sa gestion passe par le contrôle des déchets qui sont placés dans le MCA. Les critères d'acceptation des déchets de l'IGDPS (CAD) [2] ont été élaborés pour veiller à ce que seuls des déchets aux caractéristiques physiques, radiologiques et chimiques acceptables soient placés dans le MCA (voir la section 3.3.3 de l'EIE définitive). Fermeture de l'IGDPS de 2070 à 2100 Les activités liées à la fermeture de l'installation commenceront en 2070 et se poursuivront jusqu'en 2100. La phase de fermeture est décrite à la section 3.2.3 de l'EIE définitive. Elle comprendra l'installation des dernières composantes de la couverture définitive du MCA, le déclassement des infrastructures et des installations de soutien (à l'exception du MCA et des systèmes de gestion des eaux de surface) et la surveillance continue du rendement à long terme. La production de lixiviat diminuera rapidement au cours de la phase de fermeture puisque l'eau de pluie n'entrera plus en contact avec les déchets. Le déclassement de l'UTEU et de toutes les structures connexes sera effectué après que le lixiviat puisse être traité par d'autres moyens ou s'il devient plus rentable d'acheminer le lixiviat à une installation hors site. Phase de post fermeture et surveillance (2100 et au delà) La phase de post fermeture commencera en 2100 et se composera de deux périodes distinctes : la période de contrôle institutionnel et la période post contrôle institutionnel. Pour les besoins de la planification, la période de contrôle institutionnel est censée couvrir 300 ans, mais elle se poursuivra aussi longtemps que les organismes de réglementation l'estimeront nécessaire. Au cours de la période de contrôle institutionnel, des mesures d'inspection et de surveillance permettront de vérifier l'intégrité de l'installation de gestion. Les mesures de surveillance environnementale prévues dans le PSSEE permettront de s'assurer que le rendement reste conforme aux prévisions de l'évaluation environnementale. La surveillance des eaux souterraines dans le cadre du PSSEE permettra de s'assurer que les déchets restent confinés dans le MCA et qu'on n'observe pas de détérioration des eaux souterraines ou des eaux de surface. Le MCA est conçu pour résister à des phénomènes extrêmes comme des précipitations extrêmes, des tornades et des séismes et pour isoler et contenir les déchets face aux dangers. On a également procédé à une évaluation des changements climatiques éventuels. L'évaluation de certains phénomènes extrêmes et de leurs conséquences éventuelles fait l'objet de la section 10 de l'EIE définitive. Rendement à long terme de l'IGDPS Selon les prévisions prudentes de l'évaluation de la sûreté après la fermeture [3], les barrières artificielles composant le MCA devraient perdre de leur efficacité au terme des 550 années de vie utile théorique de l'installation. Il est possible, entre autres, que la couverture s'abîme sans que le revêtement de base soit atteint ou que les deux perdent de leur étanchéité et que de l'eau contaminée s'infiltre dans le sol. Ces possibilités font partie du scénario d'évolution normale au bout d'une longue période (des centaines d'années). Les conséquences en termes de doses à la population sont estimées dans l'évaluation de la sûreté après la fermeture [3]. Les scénarios d'événements perturbateurs, comme l'intrusion humaine dans le monticule, une érosion excessive de la couverture, la détérioration de la berme artificielle sont analysés, avec leurs conséquences en termes de doses absorbées par la population, dans l'évaluation de la sûreté après la fermeture [3]. Les scénarios envisagés sont

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			résumés à la section 5.8.6.1 de l'EIE définitive, et les conséquences en termes de doses absorbées par la population sont résumées à la section 5.8.6.1.2.2. Selon les prévisions, les doses susceptibles d'être absorbées par la population sont largement inférieures au seuil réglementaire de 1 mSv/an. Références [1] Stratégie de gestion intégrée des déchets des Laboratoires nucléaires canadiens, CW-508600-PLA-002. [2] Critères d'acceptation des déchets de l'installation de gestion des déchets près de la surface, 232-508600-WAC-003. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND578	Pravin Shah (April 8, 2017) Anna Tilman (June 22, 2017) Joan Lougheed and Town of Deep River (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* How will monitoring of the site and related facilities be carried out? Type, extent, manner, for example. Will the Ottawa River be monitored to give peace to downstream communities? Do the monitoring systems include how future generations will do the monitoring? Are the existing CRL licence requirements even good enough, adequate or even appropriate over the long-term? Is it expected that these current requirements would remain the same and not be made more stringent? The Town of Deep River recognizes that, among other topics discussed herein, monitoring procedures for the acceptance of waste and enforcement measures may be addressed more completely during the licensing process. Nonetheless, the draft EIS must provide the framework for the monitoring and enforcement procedures and permit public comment thereon, as these are critical to the protection of the near-proximity environment and human health. Deep River, as the host municipality, requires CNL to provide sufficient detail so that Deep River can understand what waste monitoring and enforcement mechanisms will be in place to protect the environment and human health.	Monitoring of the NSDF site and related facilities will be conducted under the Environmental Assessment Follow-up Monitoring Program (EAFMP). The EAFMP will apply the existing Chalk River Laboratories (CRL) site comprehensive effluent verification and environmental monitoring programs as well as groundwater monitoring. The EAFMP includes both on-site (within NSDF site boundaries) and off-site (for example, throughout the CRL site) locations including multiple locations along the Ottawa River both upstream and downstream of the CRL site. Results of previous CRL site-wide environmental monitoring results are available on CNL's website: http://www.cnl.ca/site/media/Parent/CRL-509243-ASR-2016.pdf. A conceptual EAFMP outline is summarized in Section 11 of the final Environmental Impact Statement (EIS). Table 11.0-1 of the final EIS describes the conceptual follow-up monitoring program and covers all phases of the project from construction through to and including post-closure. The purpose of the follow-up monitoring program is to verify EA predictions and confirm the effectiveness of mitigation measures. An EAFMP is in preparation and will detail environmental media to be monitored, monitoring locations, parameters and frequency of monitoring. The program will meet the requirements of applicable CSA standards and will be shared with the public for review. Canadian Nuclear Laboratories (CNL) will submit the EAFMP to support the licence application. The program will be reviewed periodically with the CRL site licence and updated as necessary. The monitoring program will be available upon request. With regards to procedures for waste acceptance and enforcement, all waste intended to be emplaced in the NSDF, including legacy waste, shall have sufficient characterization data to ensure compliance with the NSDF Waste Acceptance Criteria (WAC) [1]. Section 3.3.2 of final EIS states that for waste to be accepted for disposal in the ECM, the waste generator will need to characterize the waste, complete and submit a Waste Profile Record for review and approval, and apply for and receive approval to transport the waste to the Project NSDF site. As part of the waste acceptance process, the NSDF-bound waste will be verified against the submitted documentation. The verification may include: • visual inspection of waste; • visual inspection of waste package; • non-destructive assays (e.g., inspection or evaluation); and/or • destructive sampling and analysis. Section 11.0 of the final EIS recognized that the WAC is fundamentally a verification program to ensure that all waste received for disposal is in compliance with the design and safety basis of the facility [1]. The control and tracking of the waste inventory into the facility allows for the verification of the assumptions used in the EIS (e.g., pathways analysis modelling is based on the reference inventory proposed to be disposed in the ECM). The WAC ensures the wastes placed within the NSDF do not exceed the Licensed Inventory, which is a modified reference inventory, and represents a maximum radiological inventory limit for the NSDF.

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			Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND579	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017)	What are the CNL's specific plans for how they will address problems that monitoring indicates exist or are arising for each of the "valued components." As examples: (i) if the NSDF's liner or leachate collection system shows signs of deterioration, what action will CNL take? (ii) if monitoring indicates that water or air conditions are deteriorating or are under threat of deteriorating, what actions will CNL take? (iii) if monitoring indicates deterioration of biota, what actions will CNL take? (Page 11-12)	In response to the concerns from the commenter on what actions will be taken for the scenarios identified, Canadian Nuclear Laboratories (CNL) provides the following: i) Deterioration of NSDF base liner or leachate collection system: The base liner system is described in Section 3.4.1.4 of the final Environmental Impact Statement (EIS) and consists of primary and secondary composite liners. A leak detection system will indicate deterioration of the primary liner system. In the event that monitoring indicated deterioration of the liner systems, there will be increased monitoring to assess the area of impact and extent of any releases to ground. The above grade design enables access to the Engineered Containment Mound (ECM) and installation of additional engineered barriers such as a replacement cover. A replacement cover would eliminate water ingress into the facility and any releases through the base liner system. ii) Monitoring indicates that water or air conditions are deteriorating or are under threat of deteriorating: CNL's evaluation process for monitoring data includes environmental performance criteria that are based on statistical measures and ecological health and human health benchmarks. In the event that monitoring indicates any deterioration of conditions, further investigations would be conducted to assess the area of impact and corrective actions identified. Deteriorating Water/Groundwater Conditions: Examples of corrective actions in the event of unplanned releases from the ECM are discussed in Section 11.2 of the final EIS. These include repair and or replacement of the engineered containment mound cover in the event of localized or widespread breaches to the cover. Deteriorating Air Conditions: The ECM will only accept low-level radioactive waste. As a land disposal facility, the NSDF will follow the guidelines of Ontario's Regulation 347, General – Waste Management [1], for acceptable quantities and concentrations of metals, organics, and chemical compounds (See Section 3.3.1.3.1 of the final EIS). The limits on both radiological and chemical inventory of the ECM will limit the potential for airborne releases from the facility. During the construction and operations phase dust mitigation measures will be implemented to minimize release of dust. These mitigation measures are summarized in Table 5.2.1-8 of the final EIS and include dust suppression through use of water spraying or misting techniques. Corrective actions in the event of deteriorating air conditions include postponing work activities likely to cause dust in the event of wind speeds in excess of 40 km/hr. iii) Monitoring Indicates Deterioration of Biota: The NSDF Environmental Assessment Follow-up Monitoring Program (EAFMP) will include groundwater and surface water monitoring as described in the conceptual follow-up monitoring plan in Section 11 of the final EIS. The environmental monitoring program includes trigger levels identifying abnormal conditions. These trigger levels are set well below benchmarks at which potential effects on biota could occur. In the event that deteriorating groundwater and surface water conditions are identified, remediation measures would be implemented to ensure there is no risk to biota. The ECM is designed with a multiple engineered barriers to support the long-term containment and isolation requirements. These are summarized in Section 3.1.1.1 of the final EIS. In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm, the high density polyethylene (HDPE) geomembrane cover system, and the double HDPE geomembrane liner system supported by a

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			compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment. Following facility closure, during the post-closure phase, basic monitoring and inspections of the site will periodically occur to confirm that the facility is performing as expected (e.g., ensuring settlement is complete). The conceptual monitoring plan to verify that mitigation measures are effective and the environment is protected is provided in Section 11 of the final EIS. A detailed follow-up monitoring plan is in preparation and will be made available to the public for review. The site of the ECM is in the Perch Creek and Perch Lake watershed, which has well-understood hydrogeological properties that lead to a good understanding of how any radionuclides released from the ECM after the design life will move in the environment. Reference: [1] Ontario Regulation 347 - GENERAL - WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347.
CNL-ND580	Paulette Demmons (May 9, 2017) City of Ottawa (August 4, 2017) Ottawa Public Health (August 4, 2017) City of Laval (September 15, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] Concerns about the waste water system safety measures, sampling and result reporting system, as well that results are not published in a timely manner – especially when not deemed catastrophic. Although results are posted annually, commenter was unable to find timely reporting of the sampling test results. Several commenters requested a formal early warning/notification protocol for any potential spill or impact to the Ottawa River so that downstream users, such as the City of Ottawa and the City of Laval, can be notified and activate city emergency response plans, as required. The commenters urged that CNL establish, maintain and update the notification protocol annually regularly for transparent and timely notifications, even after the post-closure of the NSDF. The protocol should include relevant and up-to-date details, such as contact information. [Français] Les préoccupations concernant les mesures de sûreté relatives au système de traitement des eaux usées, l'échantillonnage et le système de compte rendu des résultats ainsi que les résultats ne sont pas publiées en temps opportun – en particulier lorsque la situation n'est pas jugée catastrophique. Bien que les résultats soient publiés chaque année, le commentateur n'est pas en mesure de trouver rapidement des rapports sur les résultats des tests d'échantillonnage. Plusieurs commentateurs demandent un protocole officiel d'alerte rapide pour tout déversement ou impact potentiel concernant la rivière des Outaouais afin que les utilisateurs en aval, comme la Ville d'Ottawa et	The Engineered Containment Mound (ECM) is designed with a multiple engineered barriers to support the long-term containment and isolation requirements. These are summarized in Section 3.1.1.1 of the final Environmental Impact Statement (EIS). In accordance with the defence-in-depth principle, the safety performance of the NSDF Project is not dependent on any single safety function. The perimeter berm, the high-density polyethylene (HDPE) geomembrane cover system, and the double HDPE geomembrane liner system supported by a compacted clay liner contain individual components of natural and synthetic materials designed to work together to mitigate the release of contaminants into the environment. Following facility closure, during the post-closure phase, basic monitoring and inspections of the site will periodically occur to confirm that the facility is performing as expected (e.g., ensuring settlement is complete). The conceptual monitoring plan to verify that mitigation measures are effective and the environment is protected is provided in Section 11 of the final EIS. A detailed follow-up monitoring plan (EAFMP) is in preparation and will be made available to the public for review. The site of the ECM is in the Perch Creek and Perch Lake watershed, which has well-understood hydrogeological properties that lead to a good understanding of how any radionuclides if released from the ECM after the design life will move in the environment. Canadian Nuclear Laboratories (CNL) effluent monitoring and reporting system is conducted in accordance with the requirements of Canadian Standards Association (CSA) Standard N288.5-1 *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills* [1]. Effluent monitoring results for the Chalk River Laboratories (CRL) site are reported annually to the Canadian Nuclear Safety Commission (CNSC) as part of compliance program reporting [2]. Section 11 of the final EIS provides the conceptual EAFMP for the NSDF Project. Requirements for environmental incident reporting are documented in the CNL Environmental Incident Reporting, Investigation and Mitigation [3] document. This document applies to all environmental incidents regardless of severity or magnitude and is available upon request by contacting ermstakeholder@cnl.ca. Spill incident reporting and notification of regulatory authorities is done in accordance with external legal requirements including the *Nuclear Safety Control Act*, *Fisheries Act* and *Canadian Environmental Protection Act*. Canadian Nuclear Laboratories also provides an update on spill events to the CNSC in the Annual Effluent Verification Monitoring Report [2]. Canadian Nuclear Laboratories (CNL) provides quarterly updates on environmental performance including any spill events on the CNL web site. The 2019 December update is provided at the website address below.

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		la Ville de Laval, puissent être informés et mettre en œuvre les plans d'intervention d'urgence de la ville, au besoin. Les commentateurs insistent pour que les LNC établissent, maintiennent et mettent à jour régulièrement le protocole d'alerte chaque année, afin d'assurer la transparence et la rapidité des alertes, même après la fermeture de l'IGDPS. Le protocole doit inclure des détails pertinents et à jour, tels que les coordonnées de personnes-ressources.	https://www.cnl.ca/site/media/Parent/Performance-2019_December.pdf Additionally, CNL is committed to organizational transparency, ensuring that Indigenous communities, the general public, local communities, elected and appointed government officials and other industry stakeholders are properly informed about activities carried out at CNL sites. This commitment is met through CNL's Public Information Program (PIP), a communications program that was developed to build public awareness and trust, and to encourage transparent and proactive communication with its various stakeholders. Canadian Nuclear Laboratories PIP [4] includes specific communications to stakeholders, public access to information related to routine activities, radiological and non-radiological emissions, and non-routine items or events at the different sites managed by CNL. Canadian Nuclear Laboratories (CNL) disseminates information to the public in a number of ways: • CNL's corporate website: www.cnl.ca; • Chalk River Information Bulletins; • Press releases and media releases; • Social media; • Webinars; • CONTACT newsletters; • Community meetings; • Community events; and • Public and Indigenous engagement activities. The requirements for public information programs and disclosure protocols are derived from the stated objectives of the CNSC in the *Nuclear Safety and Control Act*. Additional guidance on public information programs are given in the CNSC REGDOC 3.2.1 *Public Information and Disclosure* [5]. If an accident or malfunction situation occurs, CNL has procedures in place that address requirements for immediate response and post-event clean-up or remediation. Of note, CNL's Emergency Preparedness Program (described in Section 3.5.2.5 of the final EIS) has been designed for immediate response to emergency situations. The program ensures emergency readiness and emergency management to support programs such as reactor safety/accident management, decommissioning, radiation and environmental protection, fire and occupational health and safety. In terms of post-event clean-up or remediation CNL's Environmental Protection Program (see Section 3.5.2.2 of the final EIS) includes procedures that address the identification, management and remediation of lands that are contaminated. Canadian Nuclear Laboratories will establish a project-specific Emergency Preparedness Plan for the NSDF Project, including emergency response procedures. The NSDF Project Emergency Preparedness Plan will establish practices for safe and environmentally sound management of the facility during the construction, operations, closure and post-closure periods. Emergency response procedures for the NSDF Project will be prepared to address any potential emergencies from accidents including internal fires, minor spill, major spill, natural gas/carbon monoxide leak, loss of power, high radiation, radiological contamination, bomb threat/suspicious package, hold and secure and stay-in. References: [1] CSA Group N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [2] Effluent Verification Monitoring at Chalk River Laboratories in 2018, CRL-509254-ACMR-2018. [3] Environmental Incident Reporting, Investigation and Mitigation, 900-509200-STD-005.

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			[4] Public Information Program for Canadian Nuclear Laboratories (CNL), CW-513430-REPT-001. [5] CNSC, REGDOC 3.2.1, Public Information and Disclosure. [Français] Le monticule de confinement artificiel (MCA) est composé de plusieurs revêtements répondant aux besoins de confinement et d'isolement à long terme des déchets. Ces données sont résumées à la section 3.1.1.1 de l'Étude d'impact environnemental (EIE). Conformément au principe de défense en profondeur, le rendement de l'IGDPS du point de vue de la sûreté ne dépend pas que d'une seule mesure de protection. La berme d'enceinte, la géomembrane de polyéthylène haute densité (PEHD) de la couverture et le double revêtement de géomembrane PEHD, soutenus par une couche d'argile compactée, sont composés de matériaux naturels et synthétiques dont l'effet conjugué vise à atténuer la propagation de contaminants dans l'environnement. Après la fermeture de l'installation, au cours de la période de post-fermeture, des mesures de surveillance et d'inspection régulières du site permettront de confirmer le rendement de l'installation tel que prévu (p. ex., en veillant à ce que l'affaissement soit terminé). Le plan de surveillance nominal visant à vérifier que les mesures d'atténuation sont efficaces et que l'environnement est bien protégé est présenté à la section 11 de l'EIE définitive. Un plan détaillé de surveillance et de suivi (PSSEE) est en cours d'élaboration et sera rendu public pour commentaires. Le site du MCA se trouve dans le bassin du ruisseau Perch et du lac Perch, dont on connaît bien les propriétés hydrogéologiques, ce qui permet de comprendre comment les fuites éventuelles de radionucléides du MCA après sa durée de vie nominale se propageront dans l'environnement. Le système de surveillance et de suivi des effluents des Laboratoires nucléaires canadiens (LNC) est conforme à la norme N288.5-1 du groupe CSA intitulée *Programmes de surveillance des effluents aux installations nucléaires de catégorie I et aux mines et usines de concentration d'uranium* [1]. Les résultats de la surveillance des effluents sur le site des Laboratoires de Chalk River (LCR) sont présentés tous les ans à la Commission canadienne de sûreté nucléaire (CCSN) dans le cadre du compte rendu des programmes de vérification de la conformité [2]. La section 11 de l'EIE définitive explique le PSSEE théorique qui s'appliquerait au projet d'IGDPS. Les exigences applicables au signalement des incidents environnementaux sont énoncées dans le document des LNC sur le signalement des incidents environnementaux et sur les enquêtes et mesures d'atténuation connexes [3]. Applicable à tous les incidents environnementaux, quelle que soit leur gravité ou leur ampleur, ce document peut être obtenu sur demande à l'adresse suivante : ermstakeholder@cnl.ca. Le signalement des cas de déversement aux organismes de réglementation est effectué en application d'exigences juridiques externes, notamment de la *Loi sur la sûreté et la réglementation nucléaires*, de la *Loi sur les pêches* et de la *Loi canadienne sur la protection de l'environnement*. Les Laboratoires nucléaires canadiens fournissent également un bilan des cas de déversement à la CCSN dans le cadre du rapport annuel sur le suivi et la vérification des effluents [2]. Ils publient également sur leur site Web des bilans trimestriels sur le rendement environnemental et notamment sur les cas de déversement. Le bilan de décembre 2019 est fourni à l'adresse ci-dessous : https://www.cnl.ca/site/media/Parent/Performance-2019_December.pdf Par ailleurs, les LNC se sont engagés à rendre leur organisation transparente, en veillant à ce que les Autochtones, la population générale, les collectivités locales, les élus et les fonctionnaires, ainsi que d'autres parties prenantes du secteur

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			privé, soient suffisamment informés des activités qui se déroulent sur les sites des LNC. Cet engagement est respecté grâce au programme d'information publique (PIP) des LNC, qui est un programme de communication élaboré dans le but de sensibiliser la population et de gagner sa confiance, et de favoriser des relations transparentes et proactives avec les diverses parties prenantes. Le PIP des Laboratoires nucléaires canadiens [4] prévoit des communications spécifiques à destination des parties prenantes et un accès public à l'information concernant les activités régulières, les émissions de contaminants radiologiques et non radiologiques et les événements particuliers sur les différents sites administrés par les LNC. Les Laboratoires nucléaires canadiens (LNC) diffusent de l'information par divers moyens : • Site web des LNC : www.cnl.ca. • Bulletins d'information de Chalk River. • Communiqués de presse et communiqués aux médias. • Réseaux sociaux. • Webinaires. • Bulletin d'information CONTACT. • Assemblées communautaires. • Événements communautaires. • Activités de participation de la population. Les exigences applicables aux programmes d'information publique et les protocoles de divulgation découlent des objectifs fixés à la CCSN dans la *Loi sur la sûreté et la réglementation nucléaires*. D'autres directives concernant les programmes d'information publique sont énoncées dans le REGDOC 3.2.1 de la CCSN, intitulé *L'information et la divulgation publiques* [5]. S'il se produit un accident ou une défaillance, les LNC disposent de procédures permettant de réagir immédiatement et de nettoyer et d'assainir par la suite. Rappelons que le Programme de préparation aux situations d'urgence (décrit à la section 3.5.2.5 de l'EIE définitive) est conçu pour réagir immédiatement aux situations d'urgence. Le programme comporte des mesures de préparation et de gestion à l'appui d'activités comme la gestion de la sûreté des réacteurs et la gestion des accidents, le déclassement, les radiations et la protection de l'environnement, les incendies, la santé et la sécurité au travail, et la sûreté. Pour ce qui est des activités postérieures de nettoyage et d'assainissement, le Programme de protection de l'environnement des LNC (voir la section 3.5.2.2 de l'EIE définitive) comprend des procédures permettant de circonscrire, de gérer et d'assainir les sols contaminés. Les Laboratoires nucléaires canadiens dresseront un plan de préparation aux situations d'urgence propre au projet d'IGDPS, qui comprendra notamment des mesures d'urgence. Ce plan énoncera les pratiques de gestion sûres et écologiques applicables à l'installation au cours des phases de construction, d'exploitation, de fermeture et de post-fermeture. Des mesures d'urgence applicables au projet d'IGDPS seront élaborées dans le but de faire face aux urgences éventuelles que sont les incendies internes, les déversements mineurs, les déversements majeurs, les fuites de gaz naturel et de monoxyde de carbone, les pannes de courant, les fortes radiations, la contamination radiologique, les menaces à la bombe et les colis suspects, et pour organiser la mise à l'abri et la mise en attente du personnel et du matériel. Références [1] Groupe CSA, norme N288.5-11 : Programmes de surveillance des effluents aux installations nucléaires de catégorie I et aux mines et usines de concentration d'uranium, 2011. [2] Effluent Verification Monitoring at Chalk River Laboratories in 2018, CRL-509254-ACMR-2018. [3] Environmental Incident Reporting, Investigation and Mitigation, 900-509200-STD-005.

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			[4] Programme d'information publique des Laboratoires nucléaires canadiens (LNC), CW-513430-REPT-001. [5] CCSN, REGDOC 3.2.1, L'information et la divulgation publiques.
CNL-ND581	Joan Lougheed and Town of Deep River (August 16, 2017)	In Section 3.9, the draft EIS states: "Leachate samples will be collected three times per year from the LCS [Leachate Collection System] and once annually from the LDS [Leachate Disposal System] and be analyzed for constituents of concern" (see pg. 3-61). It is uncertain why CNL would limit the sampling regime to these minimal specifications. A more robust sampling regime should be considered.	The sampling regime for the Engineered Containment Mound (ECM) leachate collection and leak detection system has been updated and is provided in Section 3.4.1.12.3 of the final Environmental Impact Statement (EIS). The ECM leachate will be routinely sampled and analysed during the operation of the NSDF in order to collect further baseline information to determine the profile for liquid that will be transferred to the Wastewater Treatment Plant (WWTP) for treatment. The sampling frequency will allow for changes in leachate quality through time to be identified. The results of leachate sampling and analysis will be used to inform and update the groundwater monitoring program for the ECM.
CNL-ND582	Great Lakes and St. Lawrence Cities Initiative (August 15, 2017)	Data should be made publicly available and easily accessible in a timely fashion, for example on the CNL website. This should be added to the EIS in Section 10.1 - Data Management. Also, all monitoring programs should be periodically updated following upgrades to the CSA Standards. This should be specifically mentioned in the EIS, Section 10.2 - Adaptive Management.	The Environmental Assessment Follow-up Monitoring Program (EAFMP, as conceptualized in Section 11 of the final Environmental Impact Statement (EIS)) is presently under development and will serve to verify all predictions made related to residual environmental effects in the EIS. The EAFMP will include details of leachate monitoring – such as sampling frequency – which will allow for changes in leachate quality through time to be identified. The results of leachate sampling and analysis will be used to inform and update the groundwater monitoring program for the Engineered Containment Mound (ECM) and will be summarized in the EAFMP. Environmental monitoring is routinely conducted throughout the Chalk River Laboratories (CRL) site and elements of existing programs will be integrated into the EAFMP and modified specifically for NSDF Project activities. Summary reports of Annual Environmental performance at the CRL site are provided on the Canadian Nuclear Laboratories (CNL) website. The CNL Environmental Performance website page is provided below: https://www.cnl.ca/en/home/environmental-stewardship/performance-report/default.aspx The results of the EAFMP for the NSDF will be submitted in a report annually to the CNSC. Canadian Nuclear Laboratories (CNL) recognizes the need to engage with the public and Indigenous peoples on the NSDF Project including follow-up programs as discussed in Section 11. 3 of the final EIS. Canadian Nuclear Laboratories (CNL) will engage with the public on how best to make monitoring results available. The existing Effluent Verification and Environmental Monitoring as well as Groundwater Monitoring programs at the CRL site are compliant with Canadian Standards Association (CSA) standards [1-3]. Canadian Nuclear Laboratories (CNL) reviews and updates monitoring programs for compliance with revisions to CSA standards. These will be implemented for the NSDF EAFMP. References: [1] CSA Group N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [2] CAN/CSA Group N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [3] CSA Group N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015.
CNL-ND583	David Raman (August 3, 2017)	Verification by random sampling is not an acceptable practice for a facility that by its nature requires a high degree of assurance that compliance is being met.	The approach for verification of compliance with NSDF Waste Acceptance Criteria (WAC) [1] is described in Section 3.3.2 of the final Environmental Impact Statement (EIS). Waste will be verified against the submitted documentation accompanying the waste shipment. Verification activities may include [2]: • The waste identification labels are recorded and cross-referenced to the Waste Package Data Form and supporting documentation. • Off-site waste – The waste identification labels are recorded and cross-referenced to the waste manifest completed

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			by the off-site generator. • Physical inspection of waste packages for damage or non-compliance with the WAC [1] packaging requirements. • Visual inspection of the bulk waste against the bulk waste physical requirements in the WAC [1]. • Visual inspection of the waste packages or transportation containers against the supporting documentation. • Radiological monitoring of the waste packages or transportation containers for external radiation and contamination, and assessment against radiation limits in the WAC [1]. • Non-destructive assays (e.g., inspection or evaluation). • Destructive sampling and analysis. Procedures on waste verification will be developed as part of the licensing process. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND584	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017) City of Laval (September 15, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The draft EIS is deficient when it comes to providing details for the required multi-faceted monitoring plan. The monitoring plan is severely deficient in details. There is no explicit timeline for monitoring and no budget. See Appendix 1 of the Ottawa Riverkeeper submission for more details. Ottawa Riverkeeper is in favour of long-term monitoring at the disposal site. As long as humans inhabit this region the monitoring should continue. Clearly that will be an expensive, yet necessary component of this project that will require adaptive management and transparent public reporting. Long-lived radionuclides in the NSDF will be highly vulnerable to human intrusion throughout the post-closure period. We believe it is important to have a detailed plan for how the proponent will prevent human intrusion into the engineered containment mound. Nuclear waste should never be abandoned; any proposal to permanently dispose of nuclear waste must be accompanied by a robust and continuous monitoring plan. Detailed recommendations for monitoring are found in Appendix 1, section 10 of the Ottawa Riverkeeper submission. There is also the concern raised that the assessment of human intrusion scenarios in post-closure phase is incomplete. For example, in the scenario of the well drilled into the mound by the farmer, the only	A description of the conceptual monitoring plan for the NSDF Project is provided in Section 11 of the final Environmental Impact Statement (EIS). The environmental assessment follow-up monitoring program (EAFMP) covers all phases of the project from construction through to and including post-closure. Monitoring will continue through the post-closure phase until deemed no longer necessary by the regulatory authority (i.e., cessation of institutional control). A detailed EAFMP is in preparation and will be made available for review by interested stakeholders and the general public. The EAFMP will be designed in accordance with the requirements of CSA N288 standards for Environmental Monitoring (CSA N288.4) [1], Effluent Verification Monitoring (CSA N288.4) [2] and Groundwater Protection/Groundwater Monitoring (CSA N288.7) [3]. The follow up monitoring program will include details on monitoring locations, parameters, frequency, and trigger levels which, if exceeded, will trigger action by CNL to implement contingency measures. Follow-up monitoring results will be reported annually to the CNSC and made available to the public. The project life cycle cost for the NSDF is provided in Section 2.5.2.2.2 of the final EIS and is approximately $750 million. The cost of monitoring is anticipated to be a small percentage of the project life-cycle cost. The land use designation for the NSDF Project site is as a waste disposal facility. Upon closure, controls will be in place to limit land usage including recognition on the property title or deed to ensure the appropriate zoning restrictions and including buffer or attenuation zones. As the enduring federal entity, and owner of the assets and liabilities of Canadian Nuclear Laboratories (CNL), AECL is committed to controlling and restricting the land use of the NSDF footprint for as long as necessary. While other areas of the Chalk River Laboratories (CRL) site may be reused, the NSDF Project site will continue to be restricted as a waste disposal facility. The post-closure phase will include a reference 300 year Institutional Control period where monitoring, maintenance and surveillance activities will be conducted and access to the site restricted. The 300 year period is a reference period for planning purpose. The Institutional Control period and monitoring will continue as long as deemed necessary by the regulatory authority. Adaptive management will be a component of the long-term management of the NSDF. Section 11.2 of the final EIS discusses adaptive management and identifies mitigation measures that could be implemented in the event that monitoring indicated that the NSDF is not performing as predicted. Part of the objective of the EAFMP is to evaluate to whether mitigation measures are working to reduce residual environmental effects from NSDF activities. Examples of mitigation

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		concern raised is the impact on the farmer's health. The possibility that such a breach would remain open for years in the post-closure phase (absence of monitoring after the period of institutional control) should have been studied. This breach could affect the water quality of the Ottawa River. [Français] L'ébauche de l'EIE ne comprend pas les détails concernant le plan de surveillance à plusieurs volets requis. Le plan de surveillance présente de graves lacunes en ce qui a trait aux détails. Il n'y a ni calendrier explicite ni budget liés à la surveillance. Voir l'annexe 1 de la soumission de Garde-rivière des Outaouais. Garde-rivière des Outaouais est favorable à une surveillance à long terme sur le site de gestion des déchets. Tant que les humains habiteront cette région, la surveillance devra se poursuivra. Il s'agit manifestement d'une composante coûteuse, mais nécessaire de ce projet qui exigera une gestion adaptative et des rapports publics transparents. Les radionucléides à longue période de l'IGDPS seront très vulnérables à l'intrusion humaine après la fermeture du site. Nous croyons qu'il est important de prévoir un plan détaillé sur la façon dont le promoteur empêchera toute intrusion humaine dans le monticule de confinement artificiel. Les déchets nucléaires ne devraient jamais être abandonnés; toute proposition d'élimination permanente des déchets nucléaires doit être accompagnée d'un plan de surveillance solide et continu. Des recommandations détaillées à propos de la surveillance se trouvent à la section 10 de l'annexe 1 du mémoire de Garde-rivière des Outaouais. Il y a également l'inquiétude que l'examen des scénarios d'intrusion humaine dans la phase de post-fermeture est incomplète. Par exemple, dans le scénario du puits foré dans le monticule par un intrus, la seule préoccupation soulevée est l'impact sur la santé de l'intrus. L'éventualité qu'une telle brèche demeure ouverte pendant des années en phase de post-fermeture (absence de surveillance après la période de contrôle institutionnel) aurait dû être étudiée. Cette brèche pourrait notamment affecter la qualité de l'eau de la rivière des Outaouais.	measures include installation of additional monitoring wells to confirm abnormal monitoring results and repair of the Engineered Containment Mound (ECM) cover and/or replacement of the cover. Groundwater and surface water monitoring will be conducted as part of the EAFMP in order to confirm that the ECM is performing as predicted and that there are no impacts on Ottawa River water quality. The Post-Closure Safety Assessment (PostSA) has been expanded to provide a more complete assessment of potential exposure scenarios [4]. Potential effects from human intrusion scenarios on Ottawa River water quality have been assessed and are predicted to be negligible. Monitoring of the NSDF site will continue until deemed no longer necessary by the regulatory authority. References: [1] CSA Group N288.4-10: Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2010. [2] CSA Group N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011. [3] CSA Group N288.7-15: Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2015. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [Français] La section 11 de l'Étude d'impact environnemental (EIE) fournit une description du plan de surveillance nominal du projet d'IGDPS. Le programme de surveillance et de suivi de l'évaluation environnementale (PSSEE) couvre toutes les phases du projet, depuis la construction jusqu'à la post-fermeture inclusivement. La surveillance se poursuivra pendant la phase de post-fermeture jusqu'à ce que l'organisme de réglementation ne la juge plus nécessaire (c'est-à-dire jusqu'à la cessation du contrôle institutionnel). Un PSSEE détaillé est en cours d'élaboration et sera rendu public pour obtenir les commentaires des parties prenantes et de la population. Il sera conçu conformément aux exigences énoncées dans la série de normes N288 applicables à la surveillance environnementale (CSA N288.4) [1], au suivi et à la vérification des effluents (CSA N288.5) [2] et à la surveillance et la protection des eaux souterraines (CSA N288.7) [3]. Le programme de surveillance et de suivi comprendra des données sur les lieux de suivi, les paramètres, la fréquence et les seuils à partir desquels des mesures d'urgence seront prises par les LNC. Les résultats de surveillance et de suivi seront communiqués à la CCSN et rendus publics. Le coût du cycle de vie du projet d'IGDPS est fourni à la section 2.5.2.1.2 de l'EIE définitive, soit environ 750 millions de dollars. Le coût de la surveillance devrait représenter un faible pourcentage du coût du cycle de vie. Le site de l'IGDPS est destiné à une installation de gestion des déchets. À la fermeture de l'installation, des mesures de contrôle seront appliquées pour limiter l'usage du site, notamment sous la forme d'un titre de propriété ou d'un acte notarié garantissant les restrictions de zonage applicables et les zones tampon ou zones d'atténuation. À titre d'entité fédérale durable et de propriétaire de l'actif et du passif des Laboratoires nucléaires canadiens (LNC), EACL s'est engagée à contrôler et à limiter l'utilisation du site représentant l'empreinte de l'IGDPS aussi longtemps qu'il le faudra. D'autres zones du site des Laboratoires de Chalk River (LCR) pourront être réutilisées, mais le site de l'IGDPS restera réservé.

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			La phase de post-fermeture comprendra une période de contrôle institutionnel de référence de 300 ans, pendant lesquels des mesures de suivi, de surveillance et de maintenance seront prises et l'accès au site sera réservé. La période de 300 ans n'est qu'une période de référence pour les besoins de la planification. Elle se poursuivra, en fait, aussi longtemps que l'organisme de réglementation le jugera nécessaire. Les principes de gestion adaptative feront partie de la gestion à long terme de l'IGDPS. La section 11.2 de l'EIE définitive explique ce qu'est la gestion adaptative et circonscrit les mesures d'atténuation susceptibles d'être appliquées si la surveillance révèle que l'IGDPS ne fonctionne pas comme prévu. Le PSSEE permet, entre autres, de déterminer si les mesures d'atténuation parviennent à réduire les effets résiduels des activités de l'IGDPS sur l'environnement. Les mesures d'atténuation sont, par exemple, l'installation de puits de surveillance supplémentaires pour confirmer des résultats de surveillance anormaux ou la réparation de la couverture du monticule de confinement artificiel (MCA) ou son remplacement. La surveillance des eaux souterraines et des eaux de surface sera effectuée dans le cadre du PSSEE afin de confirmer que le MCA fonctionne comme prévu et qu'il n'y a pas de répercussions sur la qualité de l'eau de la rivière des Outaouais. L'évaluation de la sûreté après la fermeture a été élargie pour fournir une analyse plus complète des scénarios d'exposition éventuels [4]. Après analyses, les conséquences potentielles de diverses formes d'intrusion humaine sur la qualité de l'eau de la rivière des Outaouais ont été jugées négligeables. La surveillance du site de l'IGDPS se poursuivra jusqu'à ce que l'organisme de réglementation ne la juge plus nécessaire. Références [1] Groupe CSA, norme N288.4-10 : Programmes de surveillance de l'environnement aux installations nucléaires de catégorie I et aux mines et usines de concentration d'uranium, 2010. [2] Groupe CSA, norme N288.5-11 : Programmes de surveillance des effluents aux installations nucléaires de catégorie I et aux mines et usines de concentration d'uranium, 2011. [3] Groupe CSA, norme N288.7-15 : Programmes de protection des eaux souterraines aux installations nucléaires de catégorie I et aux mines et usines de concentration d'uranium, 2015. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND585	Ottawa Riverkeeper (August 15, 2017) Deborah Powell (August 16, 2017)	Given the significant groundwater pollution existing today at the proposed site it will be important to have reliable baseline information to understand the changes that will occur once contaminated leachate is released into the nearby surface water that is directly connected to the Ottawa River.	Canadian Nuclear Laboratories (CNL) has been monitoring contaminant migration from adjacent historic waste management areas at the Chalk River Laboratories (CRL) site for many decades providing reliable baseline data on existing groundwater contamination. The groundwater monitoring program for the CRL site includes semi-annual monitoring at groundwater monitoring wells along the perimeter of the waste management areas to evaluate performance of these areas. Groundwater monitoring results are presented in the Annual Environmental Monitoring Report which is submitted to the Canadian Nuclear Safety Commission (CNSC). A summary of the Annual Environmental Monitoring Report is posted on CNL's external webpage under 'Performance Reporting'. Where there has been contaminant migration from waste management areas resulting in contaminated groundwater plumes, contaminant plumes are mapped and assessed on a five to 10 year cycle. Groundwater monitoring has guided remediation planning. Four groundwater treatment systems have been installed on the CRL site, two of these are within the Perch Lake Basin. Baseline radionuclide concentrations in soil, vegetation and groundwater at the NSDF footprint has been thoroughly characterized. Levels do not exceed local background (i.e., non-impacted). The areas affected by releases from historic waste management areas are located downgradient of the NSDF site. Section 5.3.2.4.2.2 (Groundwater Quality) of the final Environmental Impact Statement (EIS) has been expanded to provide additional information on groundwater contaminant

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			plumes that are downgradient of the NSDF site. All leachate will be collected and treated at the NSDF Wastewater Treatment Plant (WWTP) prior to release. The treated effluent will meet federal and provincial guidelines for protection of the environment and public health. Further information on effluent discharge targets is provided in Section 3.4.2.5 of the final EIS. Effluent verification monitoring will be conducted to confirm that effluent discharge targets are met and will ensure only effluent meeting effluent discharge targets is released. The NSDF Project will enable remediation of the historic waste management areas in the Perch Lake Basin. Some of these historic waste management areas do not provide engineered containment. Transfer of these wastes to the NSDF site which provides engineered containment will have a positive effect on groundwater and surface water quality in the Perch Lake watershed. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS.
CNL-ND586	MNO (August 16, 2017)	**3.7.1 Surface Water Management Ponds, Page 3-57** "For each surface water management pond, the water level will be sampled continuously from May through November inclusive to estimate the inflow and outflow of each pond." The MNO requires more information related to the surface water management ponds. Including, why there is no continuous sampling through December to April? What is meant by 'continuous' (e.g., daily, weekly, monthly)?	The description of the surface water management ponds has been updated in Section 3.4.4.5.2 of the final Environmental Impact Statement (EIS). The three surface water management ponds are a key part of the surface water management system for the site. They serve to control surface water run-off from the site and facilitate settling of suspended settlement to protect receiving watercourses and waterbodies. The surface water management ponds are designed to meet water quality objectives provided by Ministry of the Environment, Conservation and Parks Ontario Ministry of the Environment, Conservation and Parks in their Stormwater Management Planning and Design Manual. The manual suggests a 60% total suspended solids (TSS) removal guideline during basic water quality treatment for discharge to a receiving wetland. Surface water management pond 1 will provide 80% TSS removal, surface water management pond 2 will provide 76% TSS removal and surface water management pond 3 will provide 60% TSS removal. Section 11 of the final EIS provides the conceptual environmental assessment follow-up monitoring program (EAFMP) which will verify the predictions made in the EIS as well as evaluating the effectiveness of mitigation measures as committed to in the EIS. This includes monitoring the surface water management ponds which will be part of overall surface water monitoring for the NSDF. Monitoring will be done in accordance with requirements of the CSA N288.5 Effluent monitoring programs at Class I Nuclear Facilities and Uranium Mines and Mills [1]. The EAFMP is presently under development and will include details such as the frequency of sampling, type of sampling conducted, and provisions to change sampling methods as the Project progresses (e.g., from construction to operations phases). Generally, sampling from December to April is not anticipated because the surface water management ponds will be frozen during this time (i.e., water samples cannot be collected when frozen). Reference: [1] CSA Group N288.5-11: Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills. 2011.
CNL-ND588	CELA (May 19, 2017)	CNL did not provide sufficient detail about the post-closure phase to give the public confidence in the long-term safety of the proposed NSDF project. At this juncture in the EA process CNL has an opportunity to incorporate the concept of 'rolling stewardship' in planning for the long-term monitoring and safety of the NSDF.	Additional information on monitoring, surveillance and institutional controls that will be in place to ensure the long term safety of the NSDF Project have been provided in Section 3.2.4 (Post Closure Phase) of the final Environmental Impact Statement (EIS). An overview of monitoring and surveillance plans for the post closure and how concepts of rolling stewardship are applied is described below.

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		Provide in-depth plans for the long-term monitoring of the NSDF during the post- institutional control phase. Provide a description of how the concept of rolling stewardship will be applied in all phases of monitoring for the NSDF.	The post-closure phase has two discrete periods: institutional control and post-institutional control. The institutional control period includes implementation of controls throughout 2100 to 2400 (i.e., 300 years). The 300 year duration for the institutional control period is a reference period for planning purposes. The institutional control phase will extend as long as the regulator at the time deems necessary. The NSDF will accept only low-level waste (LLW). Thus radionuclide concentrations of the Engineered Containment Mound (ECM) will approach background concentrations within 100 years after closure as shown in Figure 3.3.1-2 of the final EIS. The main components and activities associated with the post-closure phase of the NSDF Project include: • on-going long-term monitoring to verify facility performance during the institutional control period as long as the appropriate regulatory agency deems necessary; and • surveillance and inspection activities to verify integrity of the facility as long as the appropriate regulatory agency deems necessary. The NSDF Project will be maintained during the institutional control period to meet the following performance requirements: • prevent unacceptable dispersal of radioactive materials through environmental pathways (e.g., protecting groundwater from leachate); • detect release of radioactivity early; • confirm the final cover system can withstand damage from degradation over the design life; • confirm the vegetated topsoil of final cover system does not erode at an unacceptable rate; • maintain the final cover at an appropriate slope to mitigate the effects of settlement and achieve positive • drainage off the ECM surface to limit infiltration, erosion, sediment transport and maintain cover stability; • confirm that safety is provided by passive means (i.e., no active intervention necessary) during the post-closure phase; • execute applicable environmental requirements with regard to monitoring, and surface water management systems and drainage features; and • provide records for facility closure and for regulatory review. Reporting requirements are subject to change based on changing conditions and regulatory requirements. Changes will primarily be made based on the extent that monitoring data confirms that the site and facilities are performing as projected and as required. In the unlikely event that the monitoring during the institutional control period showed leakage from the facility, corrective actions could be undertaken. Examples include repair or installation of a replacement cover to the ECM; installation of passive groundwater treatment system to remediate contaminated groundwater similar to groundwater treatment systems implemented at legacy waste management sites at CRL. Institutional controls also include methods to preserve knowledge and to inform current and future generations of potential hazards and risks. Such administrative or legal controls help to reduce the potential for human exposure to contamination. The land use designation for the NSDF Project site is as a waste disposal facility. Upon closure, controls will be in place to limit land usage including recognition on the property title or deed to ensure the appropriate zoning restrictions and including buffer or attenuation zones. As the enduring federal entity, and owner of the assets and liabilities of the Chalk

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			River Laboratories (CRL) site, AECL is committed to controlling and restricting the land use of the NSDF footprint for as long as necessary. Section 11.0 of the final EIS describes the conceptual monitoring program for the NSDF Project including the reference 300 year institutional control period. Proposed monitoring for the institutional control period includes groundwater monitoring to confirm that the ECM is containing waste and that there is no deterioration of groundwater or surface water. A detailed Environmental Assessment Follow-up Monitoring Program (EAFMP) is in preparation and will be made available for public review. The post-institutional control period is distinct from the institutional control period during the post-closure phase.
		EIS Deficiencies	
CNL-ND589	David Thompson (April 11, 2017)	- The map in Section 1.0 refers to the site being located in Chalk River, Ontario. The site is within the municipal boundary of the Town of Deep River. All subsequent maps will require correction. - In Section 1.2, there are more current census numbers available. In addition, the surrounding Townships are described as being Rolphton, Buchanan, Wylie and McKay…when in fact they are Rolph, Buchanan, Wylie and McKay. -In Section 2.3…the word Canadian is spelled incorrectly. -In Section 5.9.4.1.2.1 it states "The NSDF project falls within the Township of Laurentian Hills." It would be more accurate to state "is adjacent to".	The project location clearly states that the Chalk River Laboratories (CRL) site is located within the boundaries of the Corporation of the Town of Deep River, which is clearly outlined in Figure 1.2-1. Section 5.10.4.2 (Results of Socio community Characteristics) was updated to include the most recent and current data available since the 2017 draft Environmental Impact Statement (EIS). For example, in the 2017 draft EIS, Table 5.10.4-1 (Population and Demographic Characteristics of the LSA, RSA and the Province of Ontario) included population data from Statistics Canada for 2006 and 2011. In the final EIS, Table 5.10.4-1 was updated to include population data from Statistics Canada for 2011 and 2016 (i.e., the last national census was completed in 2016). Canadian Nuclear Laboratories (CNL) acknowledges that the Township of Rolph, Buchanan, Wylie and McKay is identified incorrectly in the 2017 draft EIS, which will be corrected in the final EIS. The text in Section 2.3 of the final EIS has been modified. The typographical error has been removed. Section 5.9.4.1.2.1 of the final EIS now states "The Town of Laurentian Hills is directly adjacent to the CRL site boundary (see Figure 3 in Appendix 5.9-1)."
CNL-ND590	Dr. J.R. Walker (May 9, 2017) Michael Stephens (August 14, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **1.0 Introduction:** The Draft EIS [1] and the associated project proposal contain numerous deficiencies. The extent and gravity of these deficiencies preclude a conclusion that the project is unlikely to cause significant adverse environmental effects, taking into consideration the implementation of mitigation measures. For example: a) The proposal employs inadequate technology and is problematically located b) The proposal does not meet regulatory requirements with respect to the health and safety of persons and the protection of the environment c) CNL have failed to meet the requirements of the *Canadian Environmental Assessment Act*, 2012.	The Environmental Assessment (EA) for the NSDF Project was conducted in accordance with the Generic Guidelines for the preparation of an Environmental Impact Statement [1] and Canadian Nuclear Safety Commission (CNSC) REGDOC 2.9.1 [2]. A concordance table provided in Appendix 1.0-1 of the final Environmental Impact Statement (EIS) lists the requirements detailed in the Generic EIS Guidelines and in REGDOC-2.9.1, and the location of the corresponding information in the EIS. Section 5.1 of the final EIS outlines the Environmental Assessment Approach applied to disciplines to determine significance of effects (if any). Thus, a systematic process was followed to complete the assessment. Since the 2017 draft EIS, a number of technical studies were completed, to provide further scientific evidence/inputs for the NSDF Project. The method followed to assess Alternative Means for carrying out the NSDF Project is found in Section 2.5 of the final EIS. The assessment of alternatives for the NSDF Project is consistent with the CNSC *Generic Guidelines for the Preparation of an EIS* and the Canadian Environmental Assessment Agency Operational Policy Statement: Addressing the "purpose of" and "Alternative Means" under *CEAA*, 2012 (2015). For the NSDF Project, The consideration of alternatives is presented for each category in three steps: • identification of technical and economically feasible alternative means;

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			• identification of effects on Valued Components (VCs); and • application of criteria and completion of a comparative evaluation to identify the preferred option. Each alternative is assessed and the most preferable option is selected after a systematic consideration of technical feasibility, economic feasibility and environmental effects. Public and Indigenous engagement is a key aspect of the decision-making process. Through the EIS, CNL has identified a preferred solution for the disposal of low-level waste (LLW), which is ultimately considered for a decision on the project proceeding. Canadian Nuclear Laboratories (CNL) has considered alternatives for Facility Type, Facility Design, Facility Location, and Site Selection. Evaluation Criteria included environmental, technical and economic factors (see Section 2.5.1 of the final EIS). To determine the preferred or most favourable means of developing a disposal facility, each alternative is evaluated first for its technical feasibility. For those alternatives deemed technically feasible, a comparison of economic feasibility (i.e., cost) and the likely environmental effects is completed. Criteria for evaluating each of the alternatives are summarized in Table 2.5.1-1, with further rationale provided in the following sections. Section 2.4 of the final EIS "Project Design Principles" states that any nuclear facility designed, constructed and operated at the Chalk River Laboratories (CRL) site is required to satisfy the CRL licence requirements [3] and CNL Management Systems thus are not carried into the alternative means assessment. Canadian Nuclear Laboratories (CNL) has utilized CNSC and International Atomic Energy Agency (IAEA) design principles which ensure the safety of radioactive waste long-term waste management or disposal facilities. These principles are essential elements in the design and development of a disposal facility and were used to inform the definition of evaluation criteria in Section 2.5.1 (Alternative Means Assessment) of the final EIS. The alternative selected as the preferred or most favourable means of developing a disposal facility must meet the design principles and requirements discussed in Sections 2.4.1 (CNSC) and 2.4.2 (IAEA). References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CNSC, Environmental Principles, Assessments and Protection Measures, REGDOC 2.9.1, 2020 September. [3] CNSC, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25.
CNL-ND591	David Thompson (April 11, 2017)	One commenter indicates that the priorities of the EIS are misplaced given that the Terrestrial Environment in section 5.6 is covered by 173 pages, versus only 37 pages to address human health in Section 5.8.	The number of pages in each section do not quantify the relative importance of any of the disciplines that were subjected to the Environmental Assessment in Section 5. The final Environmental Impact Statement (EIS) addresses all of the requirements of Guidelines for Preparing an Environmental Impact Statement, REGDOC 2.9.1 *Environmental Principles, Assessments and Protection Measures* [1]. The same Environmental Assessment approach were applied fairly to all disciplines included in the EIS – specifically, the 8 steps of defining valued components, spatial and temporal boundaries, describing baseline conditions, evaluating project interaction and mitigation, presentation of methods and results of the residual effects analysis, describing the level of certainty and management of uncertainty, classifying and determining significance of predicted residual effects, identifying monitoring and follow-up procedures, and presenting a consolidated summary of conclusions. Furthermore, the topic of human health was also explored deeply in the technical support documents, which served to support the summary of human health that was provided in Section 5.8 of the final EIS.

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			There was a greater number of areas of interests or issues raised during public and Indigenous engagement activities for the Human Health Assessment (Section 5.8) compared to the Terrestrial Biodiversity Assessment (Section 5.6). The major attributes of Section 5.6, which contributed to its disproportionate length compared to Section 5.8, are described below: • The Terrestrial Environment includes those animals (not human) and other wildlife surrounding the NSDF site which rely heavily on the balance of their ecosystems. The great diversity of these individual organisms necessitated their own detailed descriptions. • The "Terrestrial Environment" is broader than "The Human Environment" necessitating more bulky discussions to distinguish each of these aspects. For example, during the selection of the Valuable Components (VC) (Section 5.6.2 of the final EIS), separate paragraphs were needed to discuss terrestrial vegetation, wildlife species and habitat, and migratory birds because they each affect and effect their surrounding terrestrial ecosystem differently. • More detailed definition of legislation that was more relevant to VCs of the Terrestrial Environment was conducted (e.g., *Migratory Birds Convention Act*, *Species at Risk Act*). Because of the requirements of these legislation, a more detailed Description of The Environment and discussion of individual protected species (e.g., bird species, frogs) was necessary for clarification. The characteristics of these protected animals as well as their vegetation communities (habitat availability and distribution, migration patterns, population distribution, roosting nests) were also discussed in detail. Overall, the amount of discussion that contributed to the bulk of Section 5.6 is not always directly relevant to Section 5.8; nevertheless, it does not make the human health aspect of this EIS less valuable. Reference: [1] CNSC, Environmental Principles, Assessments and Protection Measures, REGDOC 2.9.1, 2020 September.
CNL-ND592	Joan Lougheed and Town of Deep River (August 16, 2017)	In Section 2.5.2.1.1, the draft EIS states: "The NSDF is expandable by design and is being developed on a Greenfield site" (see pg. 2-18). Elsewhere in the document, there is reference to the site being "associated within a brownfield area" (Section 2.5.5.4, see pg. 2-49). This contradiction must be clarified. The activities and precautions required to establish the site will be considerably different depending on the nature of the site.	The statement that the NSDF is expandable by design and is being developed on a greenfield site has been removed from the final Environmental Impact Statement (EIS). Canadian Nuclear Laboratories (CNL) will responsibly manage the NSDF and consider all waste diversion options to ensure optimization and efficient use of the NSDF. The intention is for the NSDF to be the only disposal facility for low-level waste (LLW) required at the Chalk River Laboratories (CRL) site. The NSDF site cannot be easily expanded. The maximum amount of waste material that can disposed of on the NSDF site is 1,000,000 m^3. If, as part of future developments in the Canadian nuclear industry, more LLW requiring disposal cannot be accommodated in the NSDF, a different disposal solution will be required. It is in CNL's best interest to treat the capacity of the NSDF as an asset and to use it efficiently. Detailed waste characterization and the use of exemption/clearance levels will be utilized to maximize the NSDF's capacity for LLW. The NSDF site is in proximity to areas impacted by past Chalk River Laboratories (CRL) site operations and is therefore no longer referred to as a greenfield site. Sampling and analysis of soils on the NSDF site footprint have confirmed that the NSDF site is free of radiological contamination (Section 5.3.1.4.2.4 of the final EIS). The NSDF site is located within the Perch Creek and Perch Lake Watershed, which has been impacted by groundwater plumes emanating from the Waste Management Area (WMA) A and the Liquid Dispersal Areas. For this reason the NSDF site is described as being in close proximity to brownfield sites (Section 2.5.5.3 of the final EIS). Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the Near Surface Disposal Facility (NSDF) and made

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			changes. The NSDF will accept only LLW. This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). Section 3.3.1 of the final EIS has been updated to state that the NSDF will contain only LLW as defined in CSA N292.0-19 (*General principles for the management of radioactive waste and irradiated fuel*) [2] and the International Atomic Energy Agency (IAEA) General Safety Guide-1 (*Classification of Radioactive Waste*) [3]. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste.
CNL-ND593	Great Lakes and St. Lawrence Cities Initiative (August 15, 2017)	The mechanical activities associated with the emplacement of materials in the NDSF, as described, is a straightforward operation (back the truck to the tip face, use a crane to move the package to position, etc.) and represents the easy part of operating a nuclear facility. The more difficult and challenging activities that need to be better described involve how wastes are accepted and routed, how errors and non-conformances are discovered and rectified, how the information generated by surveillance activities performed by different groups are integrated by the operating group in order to effectively manage the facility. • A suggestion would be to prepare a series of flow charts to show the processes, for example how waste is identified as a candidate for the NDSF, how this is verified, how chain-of-custody of information is maintained, what happens to non-compliances and where does it go, etc. • The means for verification of compliance with waste acceptance criteria by procedural methods alone is not satisfactory. • A search of this document for any reference to "Training" reveals only generic statements and very little in the way of what may be considered operator training for a prototype nuclear facility. The term itself appears most commonly in the map label "Petawawa Range and Training Area".	The NSDF Waste Acceptance Criteria (WAC) [1] ensures Canadian Nuclear Laboratories (CNL) meets it responsibility as the licensee; that all waste received for disposal is in compliance with the design and licensing basis for the facility (i.e., only low-level waste (LLW) is emplaced in the engineered containment mound (ECM)). The WAC has been revised to specify the requirements for accepted packages for receipt/emplacement in the NSDF; these provisions are discussed in Section 3.3.3 of the final Environmental Impact Statement (EIS). All waste shall comply with all of the criteria in the WAC to be considered acceptable for disposal in the engineered containment mound (ECM). The WAC describes physical, chemical, and radiological waste properties acceptable for the NSDF. While no specific flow charts show the step-by-step procedure for waste acceptance, the WAC defines the processes and methods of waste identification and verification along with provisions for tracing waste sources from the waste generator to the NSDF through administrative requirements (Section 6.0 of WAC [1]). Aside from visual inspection of waste (bulk or packaged) and verification of supporting waste acceptance documentation, verification of waste against all of the requirements of the WAC may include: physical inspection of waste, non-destructive assays (chemical sampling), and destructive sampling and analysis. The approach for verification of compliance with the NSDF WAC [1] is described in Section 3.3.2 of the final EIS. Waste will be verified against the submitted documentation accompanying the waste shipment. Verification activities may include [2]: • The waste identification labels are recorded and cross-referenced to the Waste Package Data Form and supporting documentation. • Off-site waste – The waste identification labels are recorded and cross-referenced to the waste manifest completed by the off-site generator. • Physical inspection of waste packages for damage or non-compliance with the WAC [1] packaging requirements. • Visual inspection of the bulk waste against the bulk waste physical requirements in the WAC [1]. • Visual inspection of the waste packages or transportation containers against the supporting documentation. • Radiological monitoring of the waste packages or transportation containers for external radiation and contamination, and assessment against radiation limits in the WAC [1]. • Non-destructive assays (e.g., inspection or evaluation). • Destructive sampling and analysis.

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			Procedures on waste verification and procedures for the operation of the NSDF will be developed as part of the licensing process. Training, procedures, and oversight of employees and contractors during the construction phase of the NSDF are in place by CNL to reduce conventional occupational hazards that are anticipated to be typical of major construction projects that are controlled by human performance. Canadian Nuclear Laboratories (CNL) procedures include provisions to achieve as low as reasonably possible (ALARA) accident and malfunction rates. If an accident or malfunction situation occurs, CNL has procedures in place that address requirements for immediate response and post-event clean-up remediation. With respect to the normal operations of the NSDF (operations phase), training procedures will be developed as it becomes necessary for all hired personnel and once details of the daily operation and logistics of the NSDF are finalized (i.e., after licence approval by Canadian Nuclear Safety Commission (CNSC)). Operating Staff members will be trained and qualified to perform the duties of operating positions in the NSDF Facility. Training requirements will be determined as part of the NSDF Staffing and Training Plan, developed according to CNL's Training and Development Program [3]. Specific training is required for all personnel to operate and maintain equipment within each NSDF Facility, which includes continuing training appropriate to their positions and qualifications. Facility specific training is provided to support staff to enable them to perform assigned tasks effectively and safely. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [3] Training and Development, 900-510200-PDD-001.
CNL-ND594	David Raman (August 3, 2017)	The mechanical activities associated with the emplacement of materials in the NDSF, as described, is a straightforward operation (back the truck to the tip face, use a crane to move the package to position, etc.) and represents the easy part of operating a nuclear facility. The more difficult and challenging activities that need to be better described involve how wastes are accepted and routed, how errors and non-conformances are discovered and rectified, how the information generated by surveillance activities performed by different groups are integrated by the operating group in order to effectively manage the facility. • A suggestion would be to prepare a series of flow charts to show the processes, for example how waste is identified as a candidate for the NDSF, how this is verified, how chain-of-custody of information is maintained, what happens to non-compliances and where does it go, etc. • The means for verification of compliance with waste acceptance criteria by procedural methods alone is not satisfactory. • A search of this document for any reference to "Training" reveals only generic statements and very little in the way of what may be considered operator training for a prototype nuclear facility. The term itself appears most commonly in the map label "Petawawa Range and Training Area".	The NSDF Waste Acceptance Criteria (WAC) [1] ensures Canadian Nuclear Laboratories (CNL) meets it responsibility as the licensee; that all waste received for disposal is in compliance with the design and licensing basis for the facility (i.e., only low-level waste (LLW) is emplaced in the engineered containment mound (ECM)). The WAC has been revised to specify the requirements for accepted packages for receipt/emplacement in the NSDF; these provisions are discussed in Section 3.3.3 of the final Environmental Impact Statement (EIS). All waste shall comply with all of the criteria in the WAC to be considered acceptable for disposal in the engineered containment mound (ECM). The WAC describes physical, chemical, and radiological waste properties acceptable for the NSDF. While no specific flow charts show the step-by-step procedure for waste acceptance, the WAC defines the processes and methods of waste identification and verification along with provisions for tracing waste sources from the waste generator to the NSDF through administrative requirements (Section 6.0 of WAC [1]). Aside from visual inspection of waste (bulk or packaged) and verification of supporting waste acceptance documentation, verification of waste against all of the requirements of the WAC may include: physical inspection of waste, non-destructive assays (chemical sampling), and destructive sampling and analysis. The approach for verification of compliance with the NSDF WAC [1] is described in Section 3.3.2 of the final EIS. Waste will be verified against the submitted documentation accompanying the waste shipment. Verification activities may include [2]: • The waste identification labels are recorded and cross-referenced to the Waste Package Data Form and supporting documentation.

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			• Off-site waste – The waste identification labels are recorded and cross-referenced to the waste manifest completed by the off-site generator. • Physical inspection of waste packages for damage or non-compliance with the WAC [1] packaging requirements. • Visual inspection of the bulk waste against the bulk waste physical requirements in the WAC [1]. • Visual inspection of the waste packages or transportation containers against the supporting documentation. • Radiological monitoring of the waste packages or transportation containers for external radiation and contamination, and assessment against radiation limits in the WAC [1]. • Non-destructive assays (e.g., inspection or evaluation). • Destructive sampling and analysis. Procedures on waste verification and procedures for the operation of the NSDF will be developed as part of the licensing process. Training, procedures, and oversight of employees and contractors during the construction phase of the NSDF are in place by CNL to reduce conventional occupational hazards that are anticipated to be typical of major construction projects that are controlled by human performance. Canadian Nuclear Laboratories (CNL) procedures include provisions to achieve as low as reasonably possible (ALARA) accident and malfunction rates. If an accident or malfunction situation occurs, CNL has procedures in place that address requirements for immediate response and post-event clean-up remediation. With respect to the normal operations of the NSDF (operations phase), training procedures will be developed as it becomes necessary for all hired personnel and once details of the daily operation and logistics of the NSDF are finalized (i.e., after licence approval by Canadian Nuclear Safety Commission (CNSC)). Operating Staff members will be trained and qualified to perform the duties of operating positions in the NSDF Facility. Training requirements will be determined as part of the NSDF Staffing and Training Plan, developed according to CNL's Training and Development Program [3]. Specific training is required for all personnel to operate and maintain equipment within each NSDF Facility, which includes continuing training appropriate to their positions and qualifications. Facility specific training is provided to support staff to enable them to perform assigned tasks effectively and safely. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [3] Training and Development, 900-510200-PDD-001.
CNL-ND595	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* [English] On several occasions, the EIS cites (at the present time) all sorts of policies, programs, protocols, procedures, standards, objectives, requirements (and others) that frame the activities of the proposed facility, which should presumably reassure us. If the reader tries to consult these innumerable normative frameworks, they will often discover ... that they do not exist! And even when they exist, they are not available or their content is described only vaguely.	The final Environmental Impact Statement (EIS) contains an updated reference list for all literature cited in the EIS document, including public (federal and provincial) documents pertaining to environmental policies, programs, protocols, procedures, standards, objectives, requirements, frameworks, and other relevant documents. Section 13.0 list all documents cited in the EIS organized by section. All Canadian Nuclear Laboratories (CNL) documents that can be made available to the public are continuously update as necessary. Some documents may need to be requested via email from CNL (ermstakeholder@cnl.ca). [Français] L'Étude d'impact environnemental (EIE) comprend une bibliographie mise à jour, composée de tous les ouvrages spécialisés cités dans le corps du texte, dont des documents publics (fédéraux et provinciaux), des documents relatifs à des

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		[Français] À plusieurs reprises, l'ÉIE cite (au présent) toutes sortes de politiques, de programmes, de protocoles, de procédures, de normes, d'objectifs, d'exigences (et autres) qui encadrent les activités du futur dépotoir de déchets radioactifs et qui devraient présumément nous rassurer. Si le lecteur tente de consulter ces innombrables cadres normatifs, il découvrira souvent ...qu'ils n'existent pas! Et même quand ils existent, ils ne sont pas disponibles ou leur contenu n'est décrit que vaguement.	politiques, des programmes, des protocoles, des procédures, des normes, des objectifs, des exigences, des cadres de référence et autres documents utiles. La section 13.0 énumère tous les documents cités dans l'EIE selon un classement par section. Tous les documents des Laboratoires nucléaires canadiens (LNC) qui peuvent être rendus publics sont systématiquement mis à jour au besoin. Certains documents ne peuvent être obtenus que par courriel, sur demande adressée aux LNC (ermstakeholder@cnl.ca).
CNL-ND596	MNO (August 16, 2017)	Through the completion of a Métis and Project specific traditional knowledge and land use study ("TKLUS") the identification of species that are of importance to the MNO, potential perceptive effects of the Project on Métis harvesters, and the socio-economic conditions specifically related to MNO Citizens may be identified and incorporated into CNL's overall assessment. Baseline information may also be collected to supplement the gaps in the EIS' description of the environment. To have all of this information collected and applied to the Project's Final EIS, it is imperative that a Project-specific TKLUS undertaken by the MNO be completed.	Information on traditional land use activities by Indigenous groups/communities has been drawn from existing studies and reports, an MNO Traditional Knowledge and Land Use Study (TKLUS), formal and informal consultation activities (including comments received on the 2017 draft Environmental Impact Statement (EIS)), and general knowledge of the region and the Algonquin's of Ontario (AOO). The MNO completed a TKLUS (Section 6.4.3.4.2 of the final EIS) that was undertaken specifically for the NSDF and NPD Projects through funding supplied by the CNSC. Through formal comments received on the EIS, the MNO main topics of interest are outlined in Section 6.2.4.4.2 of the final EIS. Table 6.3.2-1 in the final EIS summarizes how the Valued Components (VCs) were selected by Canadian Nuclear Laboratories (CNL) for the NSDF Project and assessed through Sections 5.2 to 5.10 of the EIS, reflect Indigenous interests. For example, species that are of importance to the MNO are represented in the VCs chosen for the NSDF. The MNO TKLUS documented that the collection of plants (fiddleheads, medicinal plants, tea plants), berries (raspberries, blueberries, choke cherries), wood, and other natural materials (for crafts and canoe making, maple syrup) occur within the 50 km study area. The study noted that gathering or collection activities can be the main reason for a trop or be a secondary reason. The MNO harvesting in this 50 km study area is generally located closer to Deux Riveries but there is harvesting closer to the Chalk River Laboratories (CRL) site as it appears harvesting has occurred along and near the Highway 17 corridor. While no Indigenous organizations have indicated that gathering occurs within the Regional Study Area (RSA), it is possible that the activity is or has been undertaken by some individuals in the past. The potential effects on fish and fish harvesting due to concerns of potential contamination or radioactive seepage into Perch Creek, the Ottawa River, and other waterbodies from the NSDF Project. Therefore, the spatial boundaries of the traditional land and resource use assessment were selected to include consideration of potential effects on water quality and include the aquatics study areas. Canadian Nuclear Laboratories (CNL) continues to monitor the aquatic environment extensively, specifically Perch Creek. The NSDF Project has used recent modelling to understand the potential for effects within the Perch Creek basin and the expanded RSA. Existing traditional land use with regard to fishing is described in Section 6.4.3.4.2.3 of the final EIS. Potential effects on these VCs are assessed in Section 6.4.4 of the final EIS. Traditional land use with respect to trapping and hunting are also considered in the EIS. Land use activities have been identified to potentially include trapping in the southern and western portions of the RSA, which overlaps the land and resource use RSA. However, the NSDF Project is not predicted to have any terrestrial effects beyond the CRL site, and results of the aquatic environment assessment identify that measurable residual effects aquatic biodiversity VCs are not predicted as a result of the NSDF Project. Therefore, no effects on terrestrial or aquatic species defined as traditional land and resource use VCs are expected. As a technical supporting document, the Indigenous Engagement Report (IER) outlines CNL's approach to Indigenous engagement to support the environmental assessment process for the NSDF Project and includes specific concerns from the MNO regarding traditional land and resource use (hunting, trapping, and fishing). The results of the socio-economic environment assessment are described in Section 5.10.5.2.2 in the final EIS. Overall, the NSDF Project may result in small positive effects to local Indigenous peoples through potential contracting or employment

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			opportunities. Indigenous peoples have expressed an interest in potential opportunities and CNL will continue to engage with Indigenous peoples on potential employment and contracting opportunities for the NSDF Project.
CNL-ND597	CELA (May 19, 2017)	Unfortunately, typographical errors, incorrect statements, scientific inaccuracies and omissions have impeded the ability of CELA to intelligibly comment on the draft EIS. The EIS and accompany Performance Assessment should be rechecked by CNL and published for a second review before the final EIS version is published. Provide an explanation in response to the following omissions: - precise nature of the heat-generating wastes - estimated maximum heat emission rates and maximum temperatures in the proposed facility - estimates of collective doses to nearby populations - estimates of annual tritium uptakes by local population, and specific activity limits - detailed geological, hydrogeological and geotechnical information that justifies the Chalk River location for the proposed NSDF, and - proposals to remediate the existing groundwater pollution at Chalk River.	The Performance Assessment has been superseded by the Safety Analysis Report (SAR) [1] and the Post-closure Safety Assessment (PostSA) [2] as technical supporting documents (TSD). The SAR identifies the hazards, describes how hazards are controlled and/or mitigated, and describes the management system in place to ensure the controls are effectively and consistently applied. It focuses on the operations phase of the NSDF Project. On the other hand, the PostSA evaluates the safety of the NSDF including projections of future conditions of the facility after it closes and how people might interact with the facility in the post-closure phase; the PostSA also assessed the impacts of radioactivity to demonstrate that the post closure acceptance criteria can be achieved. More specifically: • The wastes to be placed within NSDF are low-level wastes (LLW) that will have minimal to no capacity for heat generation. Therefore, thermal processes are negligible within the NSDF wastes or engineered barriers. • The PostSA screened heat production and transfer from chemical processes and biological sources affecting waste packages in the Engineered Containment Mound (ECM) during the post-closure phase. Feasible chemical reactions within the ECM after closure and attainment of reducing conditions are endothermic (i.e., will not generate heat). Any organic degradation in the ECM would occur under anaerobic conditions which generate 20 times less heat than degradation under oxidizing conditions. Consequently, much of the organic debris in the ECM waste inventory will be derived from wood (e.g., demolition debris) which is minimally organically degraded under anaerobic conditions and would thus, generate very little heat. A simple conservative thermal balance model enabled the estimation of temperature rise to be about 0.5℃ in the center of the facility. This temperature rise is small and would not affect the performance of the facility. Hence, the effects of heat generation in the facility due to biological processes can be neglected. • Estimated dose rates to on-site (workers) during the normal operations and closure phases of the Project are summarized in Table 5.8.6-6 in the final EIS. Dose rates were also estimated for the nearest off-site (general public) receptors who are located at Quebec cottages, approximately 3 km from the Chalk River Laboratories (CRL) site, and Chalk River, approximately 7 km west of the CRL site. The dose consequences to these off-site receptors during normal operations of the NSDF Project are expected to be much lower than the 0.3 mSv/year constraint thus, negligible residual effects are expected on human health from radioactivity associated with the NSDF Project during the operations and closure phases. Section 5.8.6.1.2.2 of the final EIS outlines the criterion of the methodology used to calculate the highest dose rate to any receptor in the normal evolution scenario as well as disruptive event scenarios during the post-closure phase of the NSDF. • A special adjustment for the discharge target for tritium (described in Section 3.4.2.5.1 of the final EIS and the Effluent Discharge Targets [3]) is made due to the lack of treatment technologies and its propensity to disperse rapidly in the environment. The site-specific discharge target of 360,000 Bq/L for tritium is based on maintaining tritium concentrations in Perch Creek which discharges to the Ottawa River, below the drinking water guideline of 7,000 Bq/L. During normal operations, only the discharge of treated effluent meeting the effluent discharge targets for tritium and other radionuclides will be expected from the Wastewater Treatment Plant (WWTP) of the NSDF. Ingestion dose rates for nearby population (off-site) receptors are expected to be below the 0.3 mSv/year limit. • The geological, hydrogeological, and geotechnical factors that may influence facility design alternatives for the NSDF were evaluated to justify the technical feasibility of the CRL site, the results of which are summarized in Table 2.5.4-1 in the final EIS. Subsurface investigations on the CRL site summarized in detail in Sections 3.1 and 5.2 of the NSDF Safety Case [4], have concluded that the geology on-site is acceptable for the construction and operation of an ECM. Exclusion criteria (Section 2.5.5 of the final EIS) which focused on physical, cultural, and

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			biological features were used to eliminate a location from the list of potential sites because development is either not permitted or poses a risk for the intended use/project. Two of the exclusion criteria used to screen the CRL site include its location within the Ottawa River Floodplain and geotechnical characteristics (outcrops and organic content within proposed siting area, liquefaction potential and active fault lines). Based on the exclusion criteria, the rationale for exclusion or inclusion of alternative sites for the NSDF are summarized in Table 2.5.5-1 and evaluated in Table 2.5.5-2 of the final EIS. The NSDF site is located in Perch Creek and Perch Lake Watershed where hydrogeological properties are well-understood. This enables the confident hydrogeological modelling of the fate and transport of radionuclides released from the ECM throughout the Project's post-closure phase. • Two treatment facilities are present close to the proposed NSDF site as a method of remediation of existing groundwater pollution: the Chemical Pit and South Swamp groundwater treatment facilities. The Chemical Pit groundwater treatment facility is a pump and treat system which intercepts a groundwater Strontium-90 plume before groundwater discharges to East Swamp Stream (it has been in operation since 1995). The South Swamp groundwater treatment facility is a funnel and gate treatment system which intercepts a beta-activity contaminant plume via three reactive media gates before groundwater discharges to South Swamp (it has been operating since 2013). These are continuously operated and monitored through CNL's Environmental Protection Program and do not depend on the NSDF Project activities. To ensure errors are minimized and quality information is presented, CNL follows a rigorous internal review and comment process prior to issuing formal documents such as the EIS. Relevant subject matter experts review for technical considerations and CNL management provide an overall review for formatting, accuracy and the appropriate integration of the technical details. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [3] Near Surface Disposal Facility Effluent Discharge Targets, 232-106499-REPT-002. [4] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001.
CNL-ND598	Kerrie Blaise, CELA (August 15, 2017)	The CNL reports do not contain estimates of collective doses, that is population doses, arising from the facility for the people living in or near Chalk River, Ontario. These are also serious omissions.	A radiological dose assessment was conducted for the operations and closure phases of the NSDF Project as summarized in Section 5.8.6.1.1.1 of the final Environmental Impact Statement (EIS). Radiological dose to members of the public from the NSDF Project may result from waterborne or airborne emissions. Dose rate estimates for the nearest off-site (members of the public) receptors who are located at Quebec cottages, approximately 3 km from the Chalk River Laboratories (CRL) site, and Chalk River, approximately 7 km west of the CRL site, are collective doses that is population-based. Dose to members of the public from waterborne emissions is assessed during the operations and post-closure phases. The dose consequences to these off-site receptors during normal operations of the NSDF Project are expected to be much lower than the 0.3 mSv/year constraint thus, negligible residual effects are expected on human health from radioactivity associated with the NSDF Project during the operations and closure phases. The dose rate to off-site receptors (general public) is confirmed to be acceptable by meeting the air and water release limits as prescribed in the CRL Licence Conditions Handbook [1] and by the criteria set out in the Derived Release Limits (DRL) for CNL's Chalk River Laboratories. The NSDF Project is designed so that the potential release of radionuclides during normal operation is less than a target of 1% of the corresponding release limits and DRL. There is no public access to the CRL site including the Perch Creek and Perch Lake Watershed where treated effluent is discharged. Radionuclide releases

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			from the treated effluent discharges will be negligible compared to the site DRL. Radiation doses to off-site members of the public located downstream of the CRL site will be below the regulatory dose limits for members of the public. The maximum concentrations of radionuclides in treated effluent is listed in Table 5.8.6-2 of the final EIS. During operations, the Engineered Containment Mound (ECM) may emit airborne radionuclide releases (i.e., due to radioactive dust released during handling of bulk materials and gaseous emissions from storage and disposal of radioactive material). The expected gaseous radionuclides that may be released include tritium (as tritium oxide), gases containing Carbon-14, and Radon-222. The estimated exposure dose rate to on-site workers are listed in Table 5.8.6-3. Doses to off-site receptors (public) would be several orders of magnitude less, due to the separation distance of a few kilometers. There will also be airborne emissions from the Wastewater Treatment Plant (WWTP). The emission rates for radionuclides were calculated in the Safety Analysis Report (SAR) [2]. The highest emission rates were for Americium-241, Cobalt-60, and tritium, at about 0.04% of the CRL DRL. The rest of radionuclides were below 0.001% of the DRL. The dose to members of the public is therefore predicted to be well below regulatory limits. It is assumed that during the institutional control period (year 2100 to 2400), the base liner and cover will be functional and no leachate will seep through the base liner. However, other migration pathways of contaminants are taken into account in the pathways analysis. This assumption is consistent with the 550-year design life of the engineered barriers (i.e., the synthetic high density polyethylene (HDPE) geomembrane of the ECM base liner and final cover systems). In the Post-Closure Safety Assessment (PostSA) [3], members of the public have been modeled to live and grow food directly on the ECM. These members of the public also raise livestock to consume, of which graze on the potentially radiologically impacted lands. The members of the public are modeled to be exposed to radiation through ingestion of foodstuffs that were grown on the land, livestock that feed off the land, from inhalation of the air, and externally from direct exposure to soil and water. The characteristics of and methods of exposure to these members of the public are summarized in Table 5.8.6-5. Section 5.8.6.1.2.2 of the final EIS outlines the criterion of the methodology used to calculate the highest dose rate to any receptor in the Normal Evolution Scenario as well as Disruptive Event scenarios during the post-closure phase of the NSDF. In all scenarios, the dose to the members of the public living on top of the ECM remains well under the regulatory dose limit. For example, the Normal Evolution Scenario has a peak dose of 0.015 mSv, which is 1.5% of the regulatory dose limit to members of the public. References: [1] Canadian Nuclear Safety Commission, Licence Conditions Handbook, NRTEOL-LCH-01.00/2028, CRL-508760-HBK-002, Revision 1, Effective 2019 February 25. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND599	Kerrie Blaise, CELA (August 15, 2017)	The draft EIS contains little information on geotechnical and hydrogeological site characterization. This is required to demonstrate that optimum site selection, site evaluation, and surface and sub-surface drainage issues have been investigated at the selected location. Only one reference (on page 5-168 of the EIS) is given to any site investigation and this only contains an outline summary with little detail.	As part of the evaluation of alternative means to carry out the project, CNL conducted assessments of its site geology on the CRL site – this is elaborated in Section 2.5.4.1.1 of the final Environmental Impact Statement (EIS), and Sections 3.1 and 5.2 of the NSDF Safety Case [1]. A subsurface geotechnical survey has been conducted to help develop groundwater and soil profiles, and to address any seismic requirements for the candidate locations chosen for the NSDF Project. Information derived from characterization activities was used to define bedrock structures on both macroscopic and mesoscopic scales. A descriptive hydrogeological model of the CRL site was developed, outlining the hydrogeological properties and 3D spatial distribution of all important hydrogeological units and features within the bedrock of the CRL site. These subsurface investigations at CRL have concluded that the on-site subsurface characteristics (geology) are acceptable for the construction and operation of an engineered containment mound (ECM) for a NSDF as an example of best available

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			technology. Geotechnical surveys were also used in characterizing the alternative sites which were considered to potentially host the NSDF Project. Two alternative sites were thoroughly evaluated as described in Section 2.5.5 of the final EIS and supported by the Site Selection Report [2]: East Mattawa Road (EMR) (Section 2.5.5.1) and the Alternate Site (Section 2.5.5.2). The EMR site was characterized with relatively low-lying, flat terrain north of Perch Lake; a higher ridge rises in the eastern section. Surface elevations range from approximately 160 to 196 m above sea level (m ASL) with groundwater levels ranging from approximately 0.5 m to more than 11.4 m from surface. Overall, the ground surface follows the contours of the bedrock which is exposed at the surface in the south along EMR and is covered by more than 10 m of overburden in the northern section. The second alternative site, the Alternate Site, was characterized as having an undulating ground surface with elevations ranging from approximately 115 to 172 m ASL with groundwater levels ranging from 0.5 to >9 m from surface. Overall, the ground surface slopes to the west with good drainage expected in the southwestern section and low-lying areas with seasonal accumulations of surface water in the central portion. Geotechnical characteristics were used as exclusionary criteria for the NSDF site selection process. Exclusionary criteria were applied during the site selection process [2] where potential project sites were excluded because development is either not permitted or poses a risk for the intended use/project. The EMR site was further evaluated and eventually chosen as the NSDF Project site partly because it passed exclusionary criteria related to geotechnical characteristic. Specifically, the EMR is located within an area with outcrops and organics less than 20% of the proposed siting area, the Ottawa Valley wherein the CRL site is located is an area of minor seismic activity, and the unsaturated sands and glacial tills encountered at the subsurface are not considered to be susceptible to liquefaction under seismic disturbance. A hydrogeological assessment, described in the Safety Case informed the selection of the EMR based on acceptable groundwater transit times. The groundwater transit time from the EMR site to the nearest surface water body is calculated to be 5 to 15 years with an average transit time of approximately 7 years. As described in Section 2.5.7.1.1 of the final EIS, the NSDF exfiltration gallery (a low impact water management approach to replenish and maintain surface and groundwater levels) was initially located downhill from the Wastewater Treatment Plant (WWTP; this serves to treat contaminants in leachate sourced from the ECM). However, hydrogeological conditions at the location of the NSDF Project are such that the local soils and groundwater regime do not have capacity to accept peak flows from the WWTP at all times. The average WWTP discharge rate is higher than the infiltration capacity of the hosting soils, and the problem is amplified during storm events (this may lead to floods or overland flows). Therefore, the current design of the exfiltration gallery is not technically feasible on its own in the event that WWTP discharge exceeds maximum flow rates (i.e., during a storm). As an alternative, other design options which involve discharge to the surrounding environment were evaluated to be combined with the exfiltration gallery; specifically, co-discharge with NSDF Stormwater System and Discharge to Ground (Section 2.5.7.3 of the final EIS), and Discharge to Ground and Direct Discharge to Surface Water (Section 2.5.7.4 of the final EIS). Based on consideration of technical, environmental (informed partially by geotechnical and hydrogeological surveys), and economic factors, the preferred discharge method is a combination of an exfiltration gallery and discharge to Perch Lake with a submerged diffuser (Section 2.6 of the final EIS). References: [1] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001. [2] Near Surface Disposal Facility Site Selection Report, 232-10300-TN-001.

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CNL-ND600	Kerrie Blaise, CELA (August 15, 2017)	In table 3.2.1-1 on page 3.8 of the EIS report, CELA seeks clarification as to the entries in the last two lines and whether they are correctly positioned (i.e. should they be swapped?). In addition, in table 4-2 of the PA report, is the activity figure for U-238 (1.24E+13 Bq) correct? If so, this would imply about 1,000 tonnes of uranium-238 in the proposed facility.	Table 3.2.1-1 in the previous revision of the Environmental Impact Statement (EIS) refers to waste types and the corresponding volumes that would make up the inventory that is proposed to be disposed in the NSDF and is part of the discussion in Section 3.3.1.2 Waste Volumes. This has been revised to Table 3.3.1-1 in the final EIS with modifications to more clearly show the estimated volume of each type of waste expected to be disposed of at the NSDF Project and is part of the discussion in Section 3.3.1.2 Waste Volume. Waste Types 1, 2, 3, 4, and 6 have been grouped together in the table as they constitute bulk unpackaged waste which will make up approximately 87% of the waste volume by type. Waste Type 5 will be packaged waste and will make up approximately 13% of the remaining waste volume by type. Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available. As a result of this change, the amount of radioactivity in the facility has been significantly reduced including the amount of Uranium-238. The total emplaced Uranium-238 content under the revised waste inventory for the NSDF is equivalent to about 6,000 kg (6 tonnes) with an average concentration of about 0.08 Bq/g. This is very close to the average background concentration of 0.07 Bq/g that exists in the natural environment [1]. It is noted, however, that this value varies widely depending on the local geology where the radioactive activity of U-238 is derived. It should be noted that uranium isotopes are naturally occurring radioactive material thus inherently present within soils or demolition debris within the proposed NSDF inventory, but may also exist as contaminants in general waste as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities). The NSDF proposed inventory is now Table 3.3.1-2 and discussed in Section 3.3.1.3 in the final EIS. The proposed inventory is established by extrapolating waste already currently in storage at the Chalk River Laboratories (CRL) site, as well as waste forecasts from environmental remediation projects and decommissioning projects data to an assumed total volume of the NSDF at time of closure. Reference: [1] Uranium Fact Sheet. Health Physics Society. December 2018. https://hps.org/documents/uranium_fact_sheet.pdf.
CNL-ND601	William Turner (May 31, 2017) 11.	As pointed out in Comment 10 above, CNL have not provided sufficient detail regarding the physical activities of the project, specifically those activities identified by CNL. But what about those physical activities CNL have not identified? The following is a list of several obvious omissions. This list is not intended to be complete. It provides several examples where the lack of information in EIS report make it impossible to evaluate the impact on the environment from the implementation of the proposed undertaking. 1. CNL provide some information about the impact of transporting the wastes around the site. However, they do not provide any information about transporting wastes to the site from the other locations (Whiteshell, Douglas Point, NPD, Gentilly-1, etc.),	The Environmental Impact Statement (EIS) has been revised to provide comprehensive results of the Environmental Assessment (EA) of the NSDF Project as required by the federal review process (Section 1.4.1 of the final EIS). The EIS has also been revised to describe all NSDF activities that are within the Project's scope and responsibilities. The concerns raised by the commenter related to waste transportation, generation, inventory, and acceptance criteria that is within the NSDF Project's scope are discussed in Section 3.3.2 of the final EIS and summarized as follows: 1. Transportation of waste from other sites is considered outside of scope for the NSDF Project. The transportation of waste on and to the Chalk River Laboratories (CRL) site is an activity covered by the existing CRL site licence [1] and other additional transport regulations. At present, CNL has existing procedures for safely transporting waste from off-site locations to the CRL site which is coordinated in the Transportation of Dangerous Goods program that meets the federal requirements outlined in the Transportation of Dangerous Goods Regulations and the CNSC Packaging and Transport of Nuclear Substances Regulations. AECL, and now CNL, has been transporting waste

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		2. Somewhat strange to me, is that information is provided about waste transportation, but no information is given about how these wastes will be generated. As CNL state, these wastes will be generated from the decommissioning of more than 120 buildings, and the cleanup of contaminated sites around CRL. Therefore, here are several issues related to how these wastes are generated and moved. - How do these wastes end up in the transportation vehicles? The physical activity of putting the wastes into these vehicles must be an integral part of the transportation process. (At least CNL recognize that removing the wastes from these vehicles is a physical activity within the scope of the project. I do not understand why putting the wastes into the vehicles is not.) - As with any transportation process, some the items to be transported will not meet the criteria for transfer. So what will be done with these wastes? The physical activities associated with managing these "rejected" wastes must be an integral part of the transportation process. - One cannot separate the problem (managing the wastes generated from decommissioning and site cleanup) from its proposed solution (the mound). CNL state that the purpose of this facility is to dispose of these "problem" wastes. Therefore, the physical activities associated with waste generation must be included within the project scope. 3. CNL state that waste characterization is an essential aspect of this project (see Comment 63 below). But no information is provided. As an essential activity, it must be within the scope of the project. 4. No information is provided on waste volume reduction activities, and yet several guidance documents cited by CNL require wastes to be volume reduced as much as possible. It is also included in the "Waste Hierarchy", Figure 5 in the IWS summary document, Page 3-6.	safely and without incident from off-site locations for over 50 years. Transportation has been demonstrated to be safe and this activity will be carried out in accordance with all Canadian regulatory requirements and best practice to minimize risk to humans and the environment. It is expected that these established waste transport procedures and oversight will continue and be applicable for the NSDF Project as it becomes integrated into CRL's site-wide operations. 2. The NSDF Project will function as a permanent disposal facility for low-level waste (LLW) generated at the CRL site or other off-site sources. Much of this waste (approximately 90%) will come from within the CRL site and generated from the decommissioning of buildings and structures and the remediation of contaminated land (soil). That is, the majority of the waste is not generated within the NSDF and the specific physical activities associated with waste generation are thus, outside the scope of the NSDF Project or detailed discussion in the EIS. It is the responsibility of individual generators to disclose the method in which waste was generated; it is, however, within the scope of responsibility of the NSDF Project operators to review and approve the Waste Profile Record that is submitted by the waste generator. The Waste Profile Record will document any necessary information to confirm that waste accepted for disposal at the NSDF complies with the NSDF WAC [2], including whether the waste is characterized within the acceptable waste type classifications (see Section 3.3.1.1 of the final EIS). 3. All waste shall comply with all of the criteria in the WAC to be considered acceptable for disposal in the ECM [2]. This will be ensured through waste characterization which screens waste based on their physical, radiological, and chemical characteristics as discussed in Section 3.3.3 of the final EIS. The physical characteristics (Section 3.3.3.1) that acceptable waste must meet include: physical form of bulk materials (e.g., demolition debris), and contained in packages sufficient for contamination control and radiation shielding. The radiological characteristics (Section 3.3.3.2) that acceptable waste must meet include: meeting radionuclide concentration limits for bulk waste, non-leachate controlled package waste, and leachate controlled package waste. The chemical characteristics (Section 3.3.3.3) of acceptable waste must meet the intent of land disposal and leachate requirements specified in Ontario's *Regulation 347, General – Waste Management* [3]. 4. Canadian Nuclear Laboratories adheres to Canadian Standards Association (CSA) N292.0-19 [4], which specifies to minimize the generation of radioactive waste to the minimum practicable level. Waste minimization, as per CNL Waste Management Program documentation, is performed through the waste hierarchy and the main mechanism is through identification, characterization and segregation of waste materials. The specific details, such as minimizing actions, are currently detailed through individual waste management plans or supporting documentation. It is important to note that Chalk River Laboratories site-wide activities that may interact with the NSDF may be outside the scope of the environmental assessment (EA) of the NSDF Project. This does not, however, imply that these related activities are not important. References: [1] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Ontario Regulation 347 – GENERAL – WASTE MANAGEMENT, under the Environmental Protection Act, R.S.O. 1990, c. E.19. https://www.ontario.ca/laws/regulation/900347. [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019
CNL-ND602	William Turner (May 31, 2017)	In about 24 places, CNL state that the design life of the mound is 500 years post- closure period. Yet in approximately 27 other places in the document, CNL state that the cover will fail in the year 2400, that is,	The Environmental Impact Statement (EIS) does not state that the cover will fail in 300 years. The cover system is designed to last at least 500 years after the closure of the facility. This design life is supported by an independent academic and

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	12.	300 years after the Institutional Control period. In other words, there is a discrepancy of 200 years between the failure of the cover and the design life. CNL need to provide their rationale for their decision to use the 500-year design life, when the cover will fail within 300 years. Further, from the quotation above, CNL admit the wastes will exceed clearance levels after 500 years, therefore after that 500-year time period there will still be a need for institutional control.	laboratory study by Queens University, and is available to the public [1]. However, when developing the models and assessments in the Post-Closure Safety Assessment (PostSA) [2], it is conservatively assumed that the cover degrades before the end of its design life. This allows the assessment to model what happens if water infiltrates the facility. The fact that the NSDF contains only low-level waste (LLW), most of which has decayed in the first 100 years, means that the consequences of a degraded cover system are minimal. References: [1] R. Kerry Rowe Inc. 2019. Near Surface Disposal Facility Geomembrane Relative Performance Report – Public Version (Redacted). Canadian Nuclear Laboratories Document No. 232-503212-REPT-024. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND603	William Turner (May 31, 2017) 49.	I cannot find the reference "Argonne National Laboratory 2011" in the list of references in Section 12.	A 2011 publication by the Argonne National Laboratory is included in the list of references in Section 13.2 of the final Environmental Impact Statement (EIS) and is cited in the bibliography as: Argonne National Laboratory, 2011. International Low Level Waste Disposal Practices and Facilities. Prepared for US Department of Energy Used Fuel Disposition Campaign by Mary Finster and Sunita Kamboj, Argonne National Laboratory. ANL-FCT-324. October 2011. Available at http://www.ipd.anl.gov/anlpubs/2011/12/71232.pdf
CNL-ND604	William Turner (May 31, 2017) 52.	2.5.3.1.1 and 3.1.1 – There are inconsistencies with the proposed design life for the facility.	Section 2.5.3.1.1 of the Environmental Impact Statement (EIS) discusses the technical feasibility of the engineered containment mound (ECM), whereas Section 3.1.1 provides a general overview of the functions of major components of the NSDF Project which includes the ECM. Both sections have been modified in the final EIS in order to provide a concise and organized description that is consistent with other sections of the EIS, as well as to support the engineering and design of the NSDF. More in-depth specifications of the design of NSDF components are supported by the Design Description [1] technical supporting document. Reference: [1] Design Description 232-503212-DD-001.
CNL-ND605	CCNR (August 16, 2017)	The Age of Nuclear Power is on the decline in North America and Western Europe, but the Age of Nuclear Waste is just beginning. It is quite likely that neither AECL nor CNSC nor CNL will exist in 100 or 200 years, but the nuclear waste will still be here and will require on-going monitoring and maintenance. Future generations must be endowed with the necessary knowledge, resources, organizational tools and authority to look after these dangerous materials for the indefinite future. The EIS does not even address this question.	The NSDF is a suitable engineered disposal method for low-level waste (LLW). Consistent with International Atomic Energy Agency (IAEA) *Classification of Radioactive Waste* (GSG-1) [1], LLW contains primarily short-lived radionuclides and restricts the amount of long-lived radionuclides thus requiring isolation and containment for periods of time up to a few hundred years. Furthermore, the long term safety of the NSDF is not reliant on active management of the facility, but the fact that inventory decays to near background levels within 100 years of the facility closing. This approach is consistent with IAEA SSR-5 [2] where near surface disposal facilities must utilize waste acceptance criteria to limit the consequences of human intrusion. As the owner of the Chalk River Laboratories (CRL) site and of the associated liabilities, Atomic Energy of Canada Limited (AECL) – a federal Crown corporation – will ensure that the site is safely managed and controlled for as long as necessary. As outlined in Section 3.2.4 of the final EIS, Canadian Nuclear Laboratories (CNL) has used an institutional control period of up to 300 years as a planning basis. A period of 300 years of institutional control is generally used internationally for near surface disposal facilities [3]. This is largely due to the half-lives of Cesium-137 and Strontium-90, which are about 30 years. By 300 years, these radionuclides have decayed to less than 0.1% of their initial radioactivity levels. The 300 year

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			period of institutional control also aligns with the CRL site Comprehensive Preliminary Decommissioning Plan [4], and the institutional control period proposed for the overall site. Institutional controls work by limiting land or resource use by providing information to modify or guide human behaviour at the site. As specified in Section 3.2.4.2 of the final EIS, the institutional control period will include methods to preserve knowledge and to inform current and future generations of potential hazards and risks through administrative and legal controls. The land use designation for the NSDF Project site is as a waste disposal facility. Upon closure controls will be in place to limit land usage including recognition of the property title or deed to ensure the appropriate zoning restrictions and including buffer or attenuation zones. As the enduring federal entity, and owner of the assets and liabilities, AECL will continue to control and restrict the land use of the NSDF footprint for as long as necessary. References: [1] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [2] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [3] SKB International AB. International perspective on repositories for LLW. Ulla Bergstrom, Karin Pers, Ylva Almen. 2011 December. [4] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001.
CNL-ND606	Cody Cuthill (August 4, 2017)	The impact statement has failed to look at other geological disposal facilities such as those used in the oil and gas industry for long lived radionuclides. These being salt caverns which are located over a km into the ground (below ground water tables). These facilities are licensed up to 300 Bq/g per isotope from the Uranium 238 and Thorium 232 decay series.	A geological disposal facility has been evaluated as an alternative facility type to carry out the disposal project at the Chalk River Laboratories (CRL) site, the details of its technical and economic feasibility are included in Sections 2.5.2.2.1 and 2.5.2.2.2 in the final Environmental Impact Statement (EIS), respectively. The NSDF Project has been specifically designed as a permanent solution to reduce environmental risk and achieve isolation and containment of the sources of contamination for a sufficiently long period for LLW, according to the requirements set forth in the International Atomic Energy Agency (IAEA) standard document, *Disposal of Radioactive Waste Specific Safety Requirements No. SSR-5* [1]. The limits for Uranium 238 and Thorium 232 in the NSDF Waste Acceptance Criteria [2] are 100 Bq/g for bulk waste and non-leachate controlled package waste, and 400 Bq/g for leachate controlled package waste, thus adhering to the guidance in IAEA General Safety Guide GSG-1 [3] and CSA N292.0-19 [4] for the classification of low-level waste. References: [1] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [4] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019.
CNL-ND607	John Hilborn (August 21, 2017)	Quote from the EIS Section 6.4.4.2 gives correct distance of 3 km from the NSDF proposed location to nearest residences, but notes only a cottage residence, not the Hilborn business (see maps from John Hillborn's August 21 submission, and excerpts on p. 2-5). This error is repeated in sections 5.8.6.1.1 and 5.8.6.1.1.1, which quotes only seasonal cottages at 3km.	In Section 5.10.5.2.2 of the final Environmental Impact Statement (EIS), specifically recognizes that in accordance with Ontario Ministry of Environment and Climate Change guideline NPC 300 [1], dwellings include permanent and/or seasonal residences. Communities in the vicinity of the NSDF Project site are shown in Figure 5.10.3-1 of the final EIS, which includes the nearest residences on the Quebec side of the Ottawa River, approximately 3 km from the NSDF Project site. The scenarios in which nearest residents (both permanent and seasonal) may interact with the NSDF Project activities and may have potential residual effects involve the construction and operations phase. Specifically, potential noise pollution which may cause disturbance and annoyance to the nearest residents (Section 5.10.5.2.2 of the final EIS). The potential impact of noise was evaluated for all human receptors near the NSDF Project site, regardless of mode of settlement (i.e., whether permanent residents, cottagers, or local business employees/owners).

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			With respect to the radiological dose assessment during the operations and closure phases (Section 5.7.6.1.1.1 in the final EIS), the dose constraint for the general public is achieved by ensuring that off-site radionuclide releases are well below Derived Release Limits (DRL) for Chalk River Laboratories. Similar to the evaluation of the impact of noise, the impact of radiological dose assessed for the general public does not discriminate based on the type of residents off-site; all off-site individuals who are either permanent or temporary residents in the local area are considered a member of the general public and an environmental receptor regardless of their exact distance to the NSDF site. The NSDF Project is designed so the potential release of radionuclides during normal operations is less than a target of 1% of the corresponding release limits and DRL. Reference: [1] MECP, Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (NPC-300), August 2013.
CNL-ND608	Northwatch (August 16, 2017)	As a general observation, we found the draft environmental impact statement submitted by Canadian Nuclear Laboratories in March 2017 to be of poor quality and inadequate to the task of describing and providing an evidentiary basis and technical defence of the CNL proposal.15 Northwatch provides examples of the deficiencies in their submission, on pages 14-18, included throughout this table, resulting from their review of the draft environmental impact statement.	The Environmental Impact Statement (EIS) has been revised in response to comments from the public and federal and provincial agencies including the Canadian Nuclear Safety Commission (CNSC), an independent federal regulator providing oversight over all routine and non-routine Canadian Nuclear Laboratories (CNL) activities. Since the 2017 draft EIS, CNL has improved the EIS to include modifications to the proposed NSDF Project based on feedback received from federal and provincial review agencies, the public and indigenous groups as per the *Canadian Environmental Assessment Act, 2012.* While the EIS serves to summarize the NSDF Project elements and its Environmental Assessment (EA), greater detail of technical concepts, baseline studies, and analyses are elaborated in technical supporting documents (TSDs). These documents support technical engineering and design of all aspects of the NSDF Project such as (but not limited to): • The Air Quality Assessment TSD [1] includes a comprehensive assessment of data included (e.g., meteorological data from the Ministry of Environment, Conservation, and Parks) and approaches used to conduct the non-radiological air dispersion modelling as part of the air quality impact assessment. • The Design Description TSD [2] describes the individual features of the NSDF Project such as the Engineered Containment Mound (ECM), Wastewater Treatment Plant (WWTP), and supporting facilities. Results of pilot-scale testing on the specific components and processes of these features are used to discuss their expected performance. • The Safety Analysis Report [3] demonstrates to the CNSC that designed elements of the NSDF Project conform to regulatory requirements and guidance (from CNSC and International Atomic Energy Agency IAEA) and will provide for safe operation on the designated site over the proposed operational facility life. The full copy of the final EIS can be found on the CNL website (www.cnl.ca/nsdf) and technical supporting documents, which include evidence-based technical assessments and studies by industry professionals and academia, are available to all stakeholders and interested members of the public by contacting ermstakeholder@cnl.ca . References: [1] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008. [2] Design Description 232-503212-DD-001. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.
CNL-ND609	Northwatch (August 16, 2017)	The document is not identified as the draft environmental impact statement; DRAFT EIS, reference protocol, referred to as being the draft of the environmental impact statement; the EA protocol, the public registry and other sources accurately identify it as a draft document, but the document itself does not.	Canadian Nuclear Laboratories acknowledges the specific word "draft" was not used in the 2017 Environmental Impact Statement (EIS) document. However, CNL and Canadian Nuclear Safety Commission (CNSC), an independent federal regulator conducting the federal review process of the NSDF Project, understands that the NSDF Project as a proposed

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			designated project under the *Canadian Environmental Assessment Act, 2012* is subject to revisions until the finalization of the proposal/acceptance of the Project; that is, all documents are effectively drafts and does not necessarily need to be explicitly described as a "draft". The Appendix A to the Administrative Protocol [1] for the NSDF Project specifies the deliverables and activities that are part of the CNSC federal review of the NSDF Project. For example, prior to the submission of a final EIS, CNL must respond to any federal and provincial information requests and comments. This must be submitted to and reviewed by the CNSC. The same process must be conducted for information requests and comments from the general public. Following submission of a final EIS, a federal and provincial review of the final EIS is required to verify that information requests/comments on the 2017 draft EIS have been addressed. The final EIS will only be accepted when it has been deemed to adequately address comments to the satisfaction of the CNSC. To the extent possible, any information gaps or clarifications needed, will be identified and communicated to CNL as early as possible in the review process. Reference: [1] CNSC, Appendix A to the CNL-CNSC Administrative Protocol, Revision 4, December 2019, e-Doc 6030203.
CNL-ND610	Northwatch (August 16, 2017)	The document, regrettably, emphasises what CNL characterizes as "business opportunities" in which CNL includes the "revitalization" of the Chalk River property; this conflicts with the public interest priority, which is the remediation of the CNL site and the containment and control of radioactive contamination in the most protective manner possible.	Section 2.3 of the final Environmental Impact Statement (EIS) clarifies the purpose of the NSDF Project as it relates to remediation of current and future low-level waste (LLW) from the Chalk River Laboratories (CRL) site and other AECL-owned sites in a manner that is protective of both the public and the environment. The discussion recognizes that early waste management practices included burying low-level waste (LLW) in sand trenches with no engineered barriers. The proposed NSDF will enable the remediation of historically contaminated lands resulting from these previous practices as well as the decommissioning of outdated infrastructure by providing a safe permanent disposal solution using modern engineered technology. In doing so, Canadian Nuclear Laboratories (CNL) will be transforming the CRL site through the revitalization of essential site infrastructure, the decommissioning of aging infrastructure and a significant investment in new, world-class science facilities. This includes new laboratories to continue exploring radioisotope therapy, such as Targeted Alpha Therapy using Actinium-225, hydrogen isotope technology and providing the footprint for federal initiatives like Small Modular Reactors (SMR). The safety features of the NSDF Project apply multiple safety functions, containment and isolation of radioactive waste, and surveillance and control of passive safety features.
CNL-ND611	Northwatch (August 16, 2017)	The definitions and descriptions of waste types, characterization and volumes are inconsistent internally within the document, as well as across documents (For example, the definitions of waste types and categories are different than those commonly put forward by the Canadian Nuclear Safety Commission and CNSC staff).	The definitions and descriptions of waste types, characterization, and volumes (Table 2.2.1-1) apply throughout the final Environmental Impact Statement (EIS) is aligned with the Canadian Nuclear Safety Commission (CNSC) definitions of the major classes of radioactive waste. In particular, the low-level waste (LLW) waste definition and description accepted by the CNSC is outlined by the Canadian Standards Association (CSA) standard for the nuclear industry: *N292.0-19 General Principles for the Management of Radioactive Waste and Irradiated Fuel* [1] and International Atomic Energy Agency (IAEA) general safety guide *GSG-1* [2]. Section 3.3.1 of the final EIS describes the waste types, volumes, and inventory and defines the LLW waste classification which will be used to characterize waste that is acceptable for the NSDF. The different waste types planned to be disposed in the NSDF are described in detail in Section 3.3.1.1. Canadian Nuclear Laboratories identifies and tracks several hundred waste streams in its waste tracking database. Wastes are categorized into six waste types based on physical characteristics as needed by the design basis. The six waste types are independent of their radiological and chemical characteristics but necessary to categorize to ensure the waste can be safely and compliantly placed as set out by the requirements of the Waste Placement and Compaction Plan [3]. Table 3.3.1-1 of the final EIS shows the estimated volume of each of these types of waste expected to be disposed of in the proposed NSDF. All waste intended to be emplaced in the NSDF, including legacy

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			waste, shall have sufficient characterization data to ensure compliance with the NSDF Waste Acceptance Criteria (WAC) [4]. References: [1] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019. [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste. [3] Waste Placement and Compaction Plan, B1550-508600-PLA-001. [4] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND612	Northwatch (August 16, 2017)	Descriptions throughout the draft EIS are overly generalized and lack the specificity and technical basis to be useful in understanding or evaluating the project design and implementation; for example, the descriptions of the base liner system and the cover system are extremely general and are written more in the language of objectives – to "limit" the release of contaminated water or rain water infiltrating to the waste, but lacks the specifics necessary to evaluating likelihood of performance success.	Section 3 of the final Environmental Impact Statement (EIS) has been revised to include information from the detailed design compared to the 2017 draft EIS which used the conceptual design bases. All phases of the NSDF Project in specific detail are described in Section 3 to allow prediction of potential adverse environmental, economic, social, and health effects and to address concerns rom interested parties. Components of the project and related activities such as infrastructure that will be developed as part of the NSDF Project are also included in this section. The Design Description [1] details the NSDF features, assemblies, and structures, as well as the functions and behaviour of system components during modes of operation of the systems and subsystems associated with the four design elements of the NSDF: • The engineered containment mound (ECM) • The wastewater treatment plant (WWTP) which treats leachate, contact water, and process wastewater generated during the course of facility operations, including decontamination water and laboratory wastewater • Various support facilities that enable operation of the ECM/NSDF facilities • Site infrastructure facilities and components The technical basis of much of these project components and activities are also discussed throughout their respective sections in the final EIS (supported by clearly labeled schematic diagrams) including the specific components of the base liner of the Engineered Containment Mound (ECM) in Section 3.4.1.4 of the final EIS. Section 3.4.1.4 clearly describes and illustrates the design specifications and characteristics of geotextile filters and textured high density polyethylene (HDPE) geomembranes which are synthetic materials designed to control and limit the infiltration of leachate into the subsurface below the ECM. With respect to how the base liner and cover system limit the release of contaminated water or rain water infiltrating through the waste, some specifics are discussed below. During waste placement (operations phase), operational practices minimize the water (i.e., precipitation) with the contaminated waste in the ECM which could produce leachate. The operation of NSDF is limited to one cell at a time in order to limit the surface area of waste that is exposed to the environment (i.e., precipitation) at any given time. As a cell is constructed, interim covers are placed over waste to limit infiltration of precipitation and promote surface water run-off. As each disposal cell is completed (the maximum volume of waste for that cell are emplaced), the final cover system is installed over the filled disposal cell. Other operational practices to limit contact with precipitation include grading and compaction of the waste fill to promote surface water run-off (diverting precipitation away from waste and potential leachate generation). Furthermore any water (including precipitation) that makes contact with (or is suspected to be in contact with) the contaminated waste will be collected by the leachate collection system (LCS) and treated to remove contaminants in the WWTP prior to controlled release into the environment. Canadian Nuclear Laboratories engaged Subject Matter Experts from industry and academic institutions to design the NSDF liner systems and to conduct a series of testing programs demonstrating the long-term integrity of the geomembrane (GMB)

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			which is part of the base liner and cover system of the ECM. The performance and likelihood of success of the ECM – specifically, the integrity of the GMBs – with regard to its interaction with precipitation (e.g., rain) has been evaluated as part of the NSDF design. The performance of the geomembrane will be monitored through the leachate quantity observed in the Leachate Collection System (LCS) and Leak Detection System (LDS) that were part of the base liner system. All leachate (including precipitation) will be collected and treated. It is possible to repair any defect in the GMB if detected. Furthermore, an additional cover can be placed over the ECM if the GMB was defective and found to be leaking. Design criteria takes into account recognized leakage rates across membranes and acceptable fluxes. Through regular monitoring of the ECM, any exceedances of the design criteria will be assessed and the need for intervention will be determined. Overall, the performance success of the ECM to prevent precipitation from interacting with emplaced waste and generating further contaminants are ensured by a combination of operational practices and protective engineered barriers. This NSDF Design Description is available to the public upon request at ermstakeholder@cnl.ca. Reference: [1] Design Description, 232-503212-DD-001.
CNL-ND613	Northwatch (August 16, 2017)	**1.1** - Statements such as "The environmental monitoring systems will monitor air, surface water and groundwater consistent with existing CRL licence requirements"17 provide no information about the project, its likely performance, of even about the monitoring program; it is simply a statement of the obvious. Northwatch Information Request #7: The draft EIS implies that no additional monitoring regime will be put in place specific to the NSDF, should it be constructed. Describe what – if any – monitoring programs and regimes will be developed and implemented specific to the NSDF.	The specific quote "environmental monitoring systems, which will monitor air, surface water, and groundwater consistent with existing CRL licence requirements" is listed as a component objective of the NSDF Project in Section 1.1 – it is an obvious and true statement. Section 1.1 of the final Environmental Impact Statement (EIS) is the Project Overview of the proposed NSDF Project and is a subsection of the introductory chapter. The introductory chapter's objective is to provide an overview of the NSDF Project as well as the regulatory framework the NSDF Project will follow and an outline of the organization of the EIS document. It serves to introduce the reader to the document. The rest of the EIS, Section 2 through Section 10, when read carefully, describes the specifics of the NSDF Project including "information about the project, its likely performance, and the role of routine monitoring programs currently implemented throughout the CRL site" as requested by the commenter. The final EIS does not imply that no additional monitoring procedure will be put in place that is specific to NSDF. The success of the proposed NSDF Project relies on monitoring programs currently implemented as part of the Canadian Nuclear Laboratories (CNL) Environmental Protection Program. To this end, the NSDF Environmental Assessment Follow-up Monitoring Program (EAFMP) will include routine monitoring to address the uncertainties associated with the effects predictions and the performance of mitigation, verify the effects predictions, identify any unanticipated effects and provide for the implementation of adaptive management to limit these effects. Table 11.0-1 of the final EIS summarizes the elements of the EAFMP that were developed from the results of environmental assessments of different environmental disciplines as detailed from Sections 5.2 through 5.10 and Section 6.0 of the final EIS. Results of the NSDF EAFMP will be made available to the public and CNL will be available to discuss the results with any interested party.
CNL-ND614	Northwatch (August 16, 2017)	Related to statements from various commenters related to time and cost concerns regarding this project, Northwatch highlights that multiple indications in the draft EIS that the private sector's profit motivations are the driving force behind the project's development in aspects ranging from development timelines to design to standards of care; for example, the draft EIS states: *Protective measures against the hazards of ionizing radiation will be considered to be optimized when further reductions in radiation doses are outweighed by the additional efforts and costs required for their implementation. This principle applies throughout the life cycle of the NSDF*	Section 2.0 in the Environmental Impact Statement (EIS) has been updated to provide a more accurate description of the overall purpose of the Project as it relates to environmental remediation of Chalk River Laboratories (CRL) site including. Section 2.3 in the final EIS has been updated to remove reference to "reducing costs over a 10 year period". Section 2.4 in the final EIS has also been updated to clearly outline the NSDF Project safety requirements incorporated into the design of NSDF elements. This includes provisions to maintain all exposures as low as reasonably achievable ALARA [1] which has been (and always will be) implemented for all CRL activities and contributes to maintain safety culture and reduce, as much as possible, employee exposure to ionizing radiation; it is not exclusive to the NSDF and does not indicate that the NSDF Project (or any CRL activity) is motivated by cost savings or profit. This includes discussion of a primary driver for the

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		Project, from design to decommissioning, and is a particularly important consideration when developing the operational procedures.24 This statement conveys an intent on the part of the proponent to take a least cost / least care approach, and while it is not our objective at this stage in the review to argue the merits of the project (or lack thereof) this particular statement illustrates a mighty failure on the part of the draft EIS to present a project which is consistent with federal laws and policies, society's expectations, or a reasonable standard of care.	NSDF Project which is to safely and responsibly dispose of radioactive low-level waste (LLW) as required in Canadian Nuclear Safety Commission (CNSC) *REGDOC-2.11.1 Waste Management, Volume I: Management of Radioactive Waste* (currently under development) [2]. The Environmental Assessment (EA) for the NSDF Project follows federal requirements mandated under the *Canadian Environmental Assessment Act, 2012* for which the CNSC is the Responsible Authority. The federal review process conducted by CNSC of the NSDF Project requires that the proposed Project demonstrates compliance with mandatory standards, codes, and guidelines all of which are listed in Section 1.4.2 of the final EIS. The careful independent federal review process ensures Canadian Nuclear Laboratories (CNL) does not take a "least cost/least care approach" in its proposal of the NSDF Project. The design of the NSDF provides for worker health and safety by maintaining occupations exposures ALARA as outlined in CNL's Safety Policies and Objectives (Section 3.5.1.2 of the final EIS) and upheld through existing CNL health, safety, security, and environmental programs which will be implemented during all phases of the NSDF Project (Section 3.5.2 of the final EIS). As with other activities conducted by CNL at the CRL site, the safety and security of all employees and the public is paramount in the success of the proposed NSDF Project. While CNL works to make its objectives clear with the proposal of the NSDF Project, it is still possible to misinterpret any statement made in the EIS or any publicly available published content. With this in mind, CNL has successfully improved the final EIS to clearly and unambiguously communicate the NSDF Project in a language and terms that are accessible to the public. References: [1] Near Surface Disposal Facility ALARA Assessment, 232-508740-ASD-001. [2] CNSC, Waste Management, Volume I: Management of Radioactive Waste, REGDOC-2.11.1, Draft, 2019 March.
CNL-ND615	Northwatch (August 16, 2017)	The development of this project needs to be more clearly placed in the context of overall activities and conditions at the Chalk River Laboratory property, including remediation requirements, decommissioning plans, and broader timelines and anticipated milestones.	The purpose of the NSDF Project, as outlined in Section 2.3 of the final Environmental Impact Statement (EIS), is to provide the permanent disposal of current and future low-level waste (LLW) at the Chalk River Laboratories (CRL) site in a manner that is protective of both the public and the environment. The practice of continuing to build additional temporary storage systems at the CRL site for low-level waste (LLW) is not consistent with modern nuclear waste management principles. Further, the NSDF Project would enable the remediation of historically contaminated lands and legacy waste management areas, as well as the decommissioning of outdated infrastructure to facilitate the CRL site revitalization. This includes new laboratories to continue exploring radioisotope therapy, such as Targeted Alpha Therapy using Actinium-225, hydrogen isotope technology and providing the footprint for federal initiatives like Small Modular Reactors (SMR). It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. Activities related to CNL's Long-Term Strategy (10-Year Integrated Plan) will include reasonably foreseeable developments (RFDs), many of which will interact either directly or indirectly with NSDF activities (evaluated in Section 8.2 of the final EIS). RFDs are listed in Table 8.2-1 in the final EIS and includes broad timeframes for anticipated CNL milestones. The CRL Site Comprehensive Preliminary Decommissioning Plan (CPDP) [1] was revised in 2018 March to align the AECL's strategy to reduce nuclear liabilities through the decommissioning of outdated buildings at the Chalk River site. The key change that allows large-scale site remediation and hazard reduction to occur is the advancement of a low-level waste disposal facility (proposed NSDF) from the previous timeframe of 2035. Specifically, the changes to the waste disposal strategy have a corresponding effect on the timing of decommissioning and environmental remediation activities. Large-scale remediation projects have been brought forward to align with the proposed initiation of NSDF operations. Many

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			decommissioning activities have also been brought forward, not only as a result of planned disposal facilities, but also because of the renewed science and technology mission for the site. Section 2.2 of the final EIS summarizes AECL and CNL's strategies and solutions for waste management of the entire life cycle of all waste classifications including LLW, ILW, high level waste (HLW), hazardous waste and clean (non-radiological) waste, consistent with the CNL Integrated Waste Strategy [2]. The Integrated Waste Strategy is based on CNL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. The NSDF is currently planned to be the only disposal facility for the low-level waste (LLW). Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [2]). References: [1] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001. [2] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND616	Northwatch (August 16, 2017)	**2.4.1.2 -** The draft EIS states: "The ALARA principle is that the residual risk associated with a particular design feature or operational procedure shall be as low as reasonably achievable. This principle is applicable to justifying risks from radiological hazards during routine operation and takes economic factors into consideration." The draft EIS lacks sufficient support in terms of documentation and technical information and policy and programs in support of the project. CNL's ALARA program is briefly references and summarized, but in insufficient detail to be meaningful. Northwatch Information Request #24: Provide a copy of CNL's ALARA program.	Section 2.4 has been revised to focus on the safety requirements Canadian Nuclear Laboratories (CNL) has utilized Canadian Nuclear Safety Commission (CNSC) and International Atomic Energy Agency (IAEA) design principles which ensure the safety of long-term nuclear waste management or disposal facilities. The statement quoted by the commenter has been removed in the final Environmental Impact Statement (EIS). Canadian Nuclear Laboratories (CNL) recognizes that the environmental assessment (EA) for the NSDF Project be conducted in accordance with relevant standards and codes while also taking into consideration appropriate guidelines. The Environmental Assessment (EA) and the corresponding EIS are being developed in a manner consistent with directions outlined in applicable federal legislation such as *Canadian Environmental Assessment Act* (CEAA) 2012 and the *Nuclear Safety and Control Act* as well as its associated regulations – each critical requirement is listed in Section 1.4.2 of the final EIS. Canadian Nuclear Laboratories (CNL) Radiation Protection Program (Section 3.5.2.1 in final EIS) incorporates ALARA and is designed and implemented so that CNL complies with, or exceeds, the level of radiation safety objectives required by the relevant regulations pursuant to the *Nuclear Safety and Control Act*. As outlined in the ALARA standard [1], the principle of ALARA optimizes protection of workers so that the magnitude of individual doses, number of people exposed, and risk of unplanned exposures are as low as reasonably achievable with economic and social factors taken into account. The design process of the NSDF Project provides for worker health and safety by maintaining occupations exposures ALARA including the assessment of alternatives to carry out the project. ALARA is incorporated into CRL operations management system and is a protective measure for all CNL workers participating in any activity involving radiation exposure; it is not exclusive to the NSDF Project. Documents of interest to the commenter can be requested at ermstakeholder@cnl.ca Reference: [1] As Low As Reasonably Achievable, 900-508740-STD-013.
CNL-ND617	Northwatch (August 16, 2017)	**2.4.1.2** - The draft EIS states: Protective measures against the hazards of ionizing radiation will be considered to be optimized when further reductions in radiation doses are outweighed by the additional	The statement quoted by the commenter, which was discussed as part of the As Low As Reasonably Achievable (ALARA) principle interpreted into the NSDF Project, has been removed in the final Environmental Impact Statement (EIS). An

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		efforts and costs required for their implementation. This principle applies throughout the life cycle of the NSDF Project, from design to decommissioning, and is a particularly important consideration when developing the operational procedures." This is perhaps one of the most significant statements in the draft EIS, but given its characteristically vague and unqualified nature, it is difficult to assess its implications in operational terms. Northwatch Information Request #25: Provide additional detail in both qualitative and quantitative terms, supported by case studies / actual examples of how CNL has operationalized this philosophy to date, and detailed scenarios of how this philosophy would apply real-case examples during design, operation and decommissioning of the proposed ECM.	improved Section 2.4 in the final EIS clearly outlines the NSDF Project safety requirements incorporated into the design of NSDF elements. This includes discussion of a primary driver for the NSDF Project which is safe and secure management of the disposed radioactive low-level waste (LLW) as required in Canadian Nuclear Safety Commission (CNSC) REGDOC-2.11.1 *Waste Management, Volume I: Management of Radioactive Waste* (currently under development) [1]. The final EIS is supported by technical supporting documents which includes technical information about the design, engineering, and assessments of various environmental disciplines related to the safety assessment of the NSDF Project in greater detail than summarized in the EIS document including (but not limited to): • NSDF Design Description [2] – e.g., Protection barriers for workers; waste is covered following placement into ECM; radioactive contamination control, Radiation Protection aspects (dose control, dosimetry). • Near Surface Disposal Facility Safety Analysis Report [3] – e.g., *Nuclear Safety and Control Act* as well as its regulations and CNL ALARA Program ensures appropriate radiation protection and provides a system of dose limitation. • Post-Closure Safety Assessment [4] – e.g., human health criteria requires reasonable assurance that doses are ALARA for workers. Canadian Nuclear Laboratories applies the ALARA principle in all activities involving the use of ionizing radiation. All radiation doses to personnel or members of the public must be justified, in accordance with the ALARA principle and be maintained below regulatory limits. The ALARA principle is a process of optimization to manage exposure situations. The ALARA principle is applied to activities involving radiation exposure to ensure that the magnitude of individual exposures, the number of people exposed, and the risk of unplanned exposures, are kept ALARA and economic and social factors are taken into account [3]. As Low As Reasonably Achievable is achieved in the development of the NSDF through integration of design and safety activities. The NSDF development follows an iterative design process, whereby, results of the safety analysis are taken into account in the development of the design to ensure adherence to ALARA. The ALARA principle in the NSDF is achieved by implementing zoning and access control measures, by providing adequate shielding for structures and waste packages with high radiation fields, by providing process equipment segregation, radiation alarms in place, continuous monitoring, and worker training and approved procedures [3]. Further reduction in operating staff doses is achieved by minimizing releases through periodic inspection and preventive maintenance of equipment [3]. Radiological protection of persons, radiological protection of the environment, and protection of persons and the environment from hazardous substances are also long term safety requirement as required in CNSC's REGDOC 2.11.1 *Assessing the Long-Term Safety of Radioactive Waste* [5]. Canadian Nuclear Laboratories (CNL) applied the following requirements on the NSDF Project to ensure that these safety requirement are met [3]: • Radiation exposure within the NSDF and any release of radioactive material from the NSDF and its associated operation activities, shall be kept ALARA. • Radiation doses to the public and to site personnel shall be ALARA. Any radiation exposure shall be below the established regulatory limits. These dose limits are prescribed for normal operations, although provisions must be in place to mitigate the potential exposure resulting from an accident. • There shall be no significant adverse effects on the environment for all NSDF operational states and those accident

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			scenarios accounted for in the design; the impact resulting from accident scenarios beyond the design basis, shall be mitigated to the extent practicable. The priorities with respect to releases of radiological substances to the environment will be prevention first, then mitigation, and then accommodation such that exposures are minimized and ALARA. • Exposure of personnel to hazardous substances in the workplace shall be kept ALARA taking economic and social factors into consideration, but under no circumstance shall exposure to a hazardous substance exceed the Threshold Limit Values adopted by the American Conference of Governmental Industrial Hygienists. The following are some examples of the application of ALARA during the operations phase [3]: • Radiation protection requirements must be considered and radiation exposures must be kept ALARA to personnel who handle the waste [3]. The ALARA principle was used to develop the dose rates limits applied to the bulk and packaged waste, and the means of handling and transferring the waste to ensure that the NSDF worker dose is ALARA during the handling and transferring of the waste. • When possible, wastes with higher dose rates (waste having gamma dose rates approaching or equal to 2 mSv/h near contact or 0.1 mSv/h at 1 m) are placed in the lower portions of the disposal cells and covered with waste having lower dose rates or fill materials to provide shielding from radiation and worker protection [3]. This waste placement aspect ensures that workers doses are ALARA and that the public dose in the post-closure phase is ALARA. • Radiological Work Assessments and planning are used in combination with Dose Control Points (DCPs) to limit doses to workers [3]. Additionally, significant deviations from the DCP will trigger an ALARA assessment [3]. An example of the application of ALARA during the post-closure phase can be found in the Post-Closure Safety Assessment [4] through the dose optimization scenarios investigated; specifically one examining the reduction of radon at the surface of the ECM through attention to waste placement. Waste disposed to the NSDF will include materials that generate radon gas. These radon generating materials will be present in the select waste, and within the bulk waste layers [4]. This case, Radon Optimization through Waste Placement, examines the potential for dose optimization in the post-closure phase by placing radon generating waste deeper in the ECM or limiting concentrations of radon generating radionuclides in upper layers of the ECM [4]. References: [1] CNSC, Waste Management, Volume I: Management of Radioactive Waste, REGDOC-2.11.1, Draft, 2019 March. [2] Design Description, 232-503212-DD-001. [3] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [4] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [5] CNSC, Waste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May.
CNL-ND618	Jennifer Jimmo (August 16, 2017)	On the Executive Summary: I note there is no requirement mentioning or clear wording provided in clear context for the proponent to provide an overview or summarize the "significant adverse environmental effects" of this project and how such will be mitigated. No Glossary of Terms or FAQs provided for the public to learn about what such things as the "key components" are exactly or what "residual environmental effects" means or includes. Content and structure (subsections) are out of sync with main body text of the EIS which makes cross-referencing from the ES to the EIS too difficult and confusing.	The purpose of the Executive Summary of the final Environmental Impact Statement (EIS) is to concisely explain the scope, purpose, and elements of the proposed NSDF Project; it is written to provide a short summary relative to the extensively detailed EIS document similar in effect to the Abstract section of research literature. At the same time, the Executive Summary provides an overview of the methodology and results of the Environmental Assessment (EA) which was required to demonstrate that the NSDF Project will not have significant adverse residual effects to the surrounding environment. Extensive detail of the comprehensive EA, including the Valued Components (VC) of different environmental disciplines

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		Content and structure (text) looks to be jumbled mix of a cut-and-paste job of EIS sections 7.0 SUMMARY OF CUMULATIVE EFFECTS & 8.0 SUMMARY OF SIGNIFICANCE OF RESIDUAL EFFECTS. No Hours of Operation are provided anywhere in this document (or the EIS). This executive summary misses the opportunity to present CNL as a strong and capable business leader in the field of nuclear energy and in my view certainly fails on all counts to present the problem at hand, or explain the urgency behind it or the timely need to fix that problem, or why it is CNL is the proponent best suited to do so. As a result, this subpar executive summary fails to build my public trust and confidence in the proponent CNL as a professional business leader, manager, or operator in the field of Nuclear Energy and Nuclear Waste Management.	assessed, are addressed thoroughly in the rest of the main text. When read carefully, the sections included in the Executive Summary are organized in a reasonable structure and are ordered similar to the main text of the EIS. Since the 2017 draft EIS, the document sections have been reorganized to improve flow and structure of discussion of all the topics necessary to communicate the results and outcomes of the NSDF environmental assessment. This also enabled the addition of points of discussion that were missing from the previous EIS draft. For example, a new section, Section 6.0 in the final EIS, is dedicated to Indigenous interests and is intended to consolidate and summarize the major areas of assessment relevant to Indigenous peoples. Therefore, the organization and discussion points in the Executive Summary have also changed accordingly. Bounding or conservative assumptions have been made in the final EIS with respect to the hours of operation. The hours of operation for truck transport can be expected to be typically 6 days/week, 16 hours/day, but may vary between 12 to 18 hours/day depending on the Project activities. For the purpose of defining assumptions made for the air quality and greenhouse gas (GHG) emissions assessment [1], the hours of operation for the operations of non-road equipment of the Engineered Containment Mound (ECM) are assumed to be during the daytime only between 7:00AM to 7:00PM during the construction and operations phases. For the annual hours of operation of each vehicle manned for handling waste materials (for the purpose of estimating exhaust on the road) during the operations phase of the NSDF [1], it is assumed that each truck remains at the facility for 1 hour while it drops off its waste, 260 days per year. The Wastewater Treatment Plant (WWTP) is conservatively assumed to operate 24 hours per day (i.e., worst case scenario) [1]. Note that the final EIS includes the details of a Project that has not yet been built. This means the exact details of its operation such as the amount of traffic and precise hours of operation along with various facility logistics will be developed as more information becomes available should the Project successfully undergo federal approval. The EIS, therefore, provides only what can be reasonably expected from the operation and performance of the Project based on the most recent information available. Reference: [1] Air Quality Assessment for the Near Surface Disposal Facility, 232-03710-REPT-008.
		EIS Terminology and Definitions	
CNL-ND619	Greg Csullog (May 1, 2017) William Turner (May 31, 2017)	**2.3 Purpose of the Project – 2-6**: "Direct waste disposal", assuming the IAEA definition is not being used, may be possible for much of the wastes, especially for decommissioning and remediation wastes, but in some cases storage may still be needed for practices like decay-storage. In this case, there may truly be interim storage. If the NSDF proponents want to conform to IAEA guidance, then they also have to ensure conformance with IAEA terminology.	In the 2017 draft Environmental Impact Statement (EIS), the use of "direct waste disposal" was made in the context of making a comparison to "interim waste storage", and how the NSDF would allow some decommissioning projects to skip the interim storage step, and proceed directly with disposal. Nevertheless, to avoid confusion as defined by the International Atomic Energy Agency (IAEA) Radioactive Waste Management Glossary of 2003 [1], the final EIS no longer uses the term "direct waste disposal". In the development of the NSDF, Canadian Nuclear Laboratories (CNL) has followed both Canadian and International requirements and guidance. This includes the Canadian Nuclear Safety Commission (CNSC) guidance such as REGDOC 2.11.1 Volume III Management of Radioactive Waste; Assessing the Long-Term Safety of Radioactive Waste Management [2] and IAEA Safety Standards for Disposal of Radioactive Waste (SSR-5) [3], Near Surface Disposal Facilities for Radioactive Waste (SSG-29) [4], Safety Case and Safety Assessment for the Disposal of Radioactive Waste (SSG-23) [5]. References:

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			[1] IAEA, 2003. Radioactive Waste Management Glossary. [2] CNSC, Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [3] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [4] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [5] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012.
CNL-ND620	Greg Csullog (May 1, 2017) Joan Lougheed and Town of Deep River (August 16, 2017) Cody Cuthill (August 4, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **2.5 Alternative Means for Carrying out the Project – 2-17:** The IAEA definition of ILW is waste that … need a greater degree of isolation from the biosphere than is provided by near surface disposal. "Short-lived ILW" is confusing and, in addition, high-activity, short lived waste like Co-60 sources actually have levels of Ni-59 and Ni-63 that may preclude disposal in an NSDF. The NSDF Project seems to be considering LLW with high levels of short-lived radionuclides, like Co-60 and Cs-137) and not short-lived ILW. Despite the acceptance of LLW and ILW being a principle theme of the draft EIS, these terms are not defined by the draft EIS, leaving the reader with no understanding of the radionuclide content of either. The impact statement outlines that only 15% of materials will have high radionuclide content but does not properly classify waste as it does not advise what high radionuclide content is or differentiate between long lived radionuclides and that of short lived. The closest instance of a definition of LLW and ILW offered by CNL in the draft EIS is reference to a discussion paper on Radioactive Waste Management and Decommissioning (DI S-16-03) where the definitions are considered (see pg. 2-11 of the draft EIS and pgs. 5 and 6 of DIS-16-03). This discussion paper proposes characterizations of LLW and ILW and may play a role in the selection and development of the regulatory framework that will ultimately define these waste types. However, it is unknown when the waste type classifications will become effective and whether the recommendations in DIS-16-03 will be adopted. As such, at the time of publication of these comments, it is not clear to the public (and presumably CNL, the CNSC and the Canadian government) what the exact meanings of LLW and ILW are. The Town of Deep River, in support of all stakeholders, requires a definitive and comprehensive definition of the types of wastes that are to be permanently stored at the NSDF.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The intermediate level waste (ILW) that had been proposed as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]). The text in Section 3.3.1 of the final Environmental Impact Statement (EIS) has been updated to confirm that the NSDF will contain only LLW as defined in CSA N292.0-19 [2] as well the International Atomic Energy Agency (IAEA) Classification of Radioactive Waste (GSG-1) [3]. Section 3.3.1.3 of the final EIS provides a summary of the waste inventory proposed for the NSDF. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [3] IAEA General Safety Guide (GSG)-1. Classification of Radioactive Waste.
CNL-ND621	Greg Csullog (May 1, 2017)	**3.2.1 Waste Types and Volumes – 3-6:** The NSDF proponents need to explain the difference, if any, between demolition wastes and decommissioning wastes, that is, why is a distinction made at all? I understand that a facility can be decommissioned in the context of its current activities and repurposed without demolishing it. So, does this statement cover the decommissioning of some facilities without their demolition and others with their demolition? In one case, the "contents" of the building would be waste and in the other case, the "contents" and the building itself would be waste (except whatever can be reused or recycled).	As a waste stream, there is no difference between demolition and decommissioning waste. As outlined in Section 3.3.1.1 of the final Environmental Impact Statement (EIS), **Type 4 – Decommissioning and Demolition Waste,** Type 4 wastes include typical materials used in construction such as wood, concrete, masonry, asphalt, glass, structural steel, pipe, process equipment, and other building materials resulting primarily from Chalk River Laboratories (CRL) decommissioning and demolition activities.

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		The phrase, "demolition of existing and future buildings" does not include the term decommissioning (page 3-7).	As outlined in the Glossary of the final EIS, decommissioning relates to the administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility.
CNL-ND622	Greg Csullog (May 1, 2017)	**3.6.1.1.1:** How does "review the generator's waste processes, profile and operations" apply to waste generated in the past from a variety of generators and for waste that is not be adequately profiled? Does "generator's waste processes" mean the processes that give rise to the generator's waste (I am not sure what a waste process is)?	The Waste Approval, Verification and Acceptance section of the Environmental Impact Statement (EIS) has been revised (Section 3.3.2 in the final EIS). The statement "review the generator's waste processes, profile and operations" is no longer used in the EIS. Waste generators will be approved through Canadian Nuclear Laboratories (CNL) Waste Management Program prior to acceptance of waste for disposal in NSDF. For waste to be accepted for disposal in NSDF, the waste generator will need to characterize the waste, complete and submit a Waste Profile Record for review and approval, and apply for and receive approval to transport the waste to the facility. Initial discussions between the waste generator and NSDF operations personnel regarding the waste will be essential to ensure that the waste profiling process is accurate, complete and meets NSDF Project requirements. As part of the waste acceptance process, CNL will verify the NSDF-bound waste against the submitted documentation. The verification may include: • visual inspection of waste; • visual inspection of waste package; • non-destructive assays (e.g., inspection or evaluation); and/or • destructive sampling and analysis. Waste that is successfully verified will then be permitted to proceed to the unloading zone. Waste characterization is an important part of routine CNL operations implemented across all CNL sites. Current practices of waste storage at the Chalk River Laboratories (CRL) site already characterize and segregate waste based on an improved Waste Acceptance Criteria (WAC) [1]. This WAC will be implemented as part of NSDF operations. As a result, the NSDF is optimizing requirements for the waste characterization at CNL. Wastes in storage which may not be adequately characterized must be fully characterized in order to be compared to the WAC, before they can be accepted to NSDF for disposal. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND623	Greg Csullog (May 1, 2017)	**3.6.1.1.1:** What is a waste profile – is it the average characteristics of a waste stream or waste block where the variance from the average is specified? Is it the specific characteristics of a specific waste item? **Note from Commenter:** (e.g., waste contains Cs-137 = 1E6 Bq/m3 +/- 30%, Am-241…)	Section 3.3.2 of the final Environmental Impact Statement (EIS) indicates that a Waste Profile will be completed and submitted for review and approval to transport to the NSDF. The Waste Profile summarizes the properties of the waste gathered from process knowledge, destructive analysis and non-destructive analysis. The Waste Profile allows for confirmation that the waste stream(s) are acceptable for the disposition route (i.e., processing, storage and/or disposal). This then permits the establishment of any handling requirements of the waste (e.g., packaging specifications, operational controls required, processing) that are documented in the Waste Management Plan. Generally, the Waste Profile Form is completed by a Waste Characterization Subject Matter Expert.

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			The completed and approved Waste Profile documents the following key information: • The waste streams that are included in the waste profile. • The lifecycle disposition route of the waste (i.e., processing, storage and/or disposal). • The specific or average and acceptable range of physical, chemical, and radiological properties of the waste stream(s). • The acceptable packaging for the waste. All radionuclides identified greater than Minimum Detectable Activity (MDA) are recorded in the Waste Profile Form. For radionuclides, the upper concentration (Bq/g) and average concentration (Bq/g) are recorded in the Waste Profile form. As well, if scaling factors are used, the scaled radionuclides are identified.
CNL-ND624	Greg Csullog (May 1, 2017)	**6.6 Emergency Preparedness – 6-21:** 'Retained waste' is a term defined in IAEA INFCIRC 153 (Corr.) as "nuclear material generated from processing or from an operational accident, which is deemed to be unrecoverable for the time being but which is stored." This also applies to nuclear material for which the conditions of termination are not met, but for which the State has no desire to recover the material for further use. This would typically apply to DU metal no longer useful and emplaced into a disposal facility.	As outlined in Section 5.3 of the NSDF Waste Acceptance Criteria (WAC) [1], quantities of Special Fissionable Material (SFM) exist in residual, unrecoverable amounts, predominately as contaminants on waste equipment, demolished structures and in soil as a result of nuclear fuel cycle activities (e.g., operation of National Research Experimental Reactor (NRX), National Research Universal Reactor (NRU) and other research and development activities), and must be limited in the NSDF to ensure nuclear criticality safety. The NSDF Criticality Safety Document defines the limits and restrictions including recoverable quantities of Special Fissionable Material (SFM) are not accepted for disposal in NSDF. That is, nuclear material that requires accounting or inventory management and reporting through CNL's Nuclear Materials and Safeguards Management Program, shall not be accepted for disposal in NSDF. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND625	Greg Csullog (May 1, 2017) OFWCA (Johanna Echlin) (May 8, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* **2.2.2.1 Near Surface Disposal Facility – 2-5:** The EIS States: "Table 2.2-1, ILW Planned Disposition: - Interim storage until a final disposal facility is available - Limited quantities of ILW may be suitable for disposal in the NSDF Project (see Section 2.2.2.1)…" The use of "final disposal" should be discouraged since disposal itself means end point disposition. **Table 2.2-1, ILW Planned Disposition – 2-2:** The use of "final disposal" should be discouraged since disposal itself means end point disposition.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final Environmental Impact Statement (EIS); Section 3.4.2 of CNL Integrated Waste Strategy [1]). The term "final disposal" is no longer used in the final EIS. Reference: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
CNL-ND626	Greg Csullog (May 1, 2017) Kerrie Blaise, CELA (August 15, 2017)	Document 232-509240-ASD-001 cites the IAEA and the CSA for the definition of LLW but no citation is provided for ILW. It is very odd that the IAEA GSG-1 [30]description of LLW is cited but not the GSG-1 description of ILW, which states ''Intermediate level waste is defined as waste that contains long lived radionuclides in quantities that need a greater degree of containment and isolation from the biosphere than is provided by near surface disposal. Disposal in a facility at a depth of between a few tens and a few hundreds of metres is indicated for ILW". Instead, document 232-509240-ASD-001 cites the classic, day-to-day operational ILW description for handling this waste, not for its long-term management.	Canadian Nuclear Laboratories (CNL) has reviewed the waste inventory proposed for the NSDF and made changes. The NSDF will accept only low-level waste (LLW). This was based on consideration of federal, provincial and public comments and was formally announced by CNL on 2017 October 27. The intermediate level waste (ILW) that had been proposed in 2017 as part of the NSDF inventory will NOT be disposed in the NSDF and instead be kept in safe storage until a disposal solution for ILW is available (Section 2.2.2.1 of the final EIS; Section 3.4.2 of CNL Integrated Waste Strategy [1]).

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		The following questions must therefore be answered:
		- What are the estimated heat production rates (kW per m3) when the facility starts (i.e. with 450,000 m3 in place) and ends (i.e. with 1,380,000 m3 in place)?
		- What is the maximum temperature envisaged within the engineered containment mound (ECM)?
		- What is the safe temperature limit?
		- What controls are in place to ensure that temperatures within the facility do not exceed the safe limit?
		- What provisions are made for cooling and ventilation?
		  • What specific fire risks are envisaged?
		  • What specific provisions are made for fire prevention and fire control?
		
		Unless sufficient assurances can be given on heat rates, maximum temperatures and fire risks within the facility, the proposed project should not proceed.
			The reference to heat generating waste has been removed from the final Environmental Impact Statement (EIS). Limits on heat generating waste were previously included due to the definition of ILW in CSA N292.0-19 (*General principles for the management of radioactive waste and irradiated fuel)* [2]. Low-level waste is not heat generating waste.
			
			Section 3.3.1 of the EIS has been updated to state that the NSDF will contain only LLW as defined in CSA N292.0-19 [2] and the International Atomic Energy Agency (IAEA) General Safety Guide-1 [3].
			• The facility is only accepting LLW, which is not heat generating waste.
			• The maximum temperature in the facility will be similar to the temperature of the surrounding environment (i.e., ambient temperature).
			• Temperature is not a safety concern in the facility.
			• No temperature controls are necessary in the facility.
			• There are no plans to include a cooling and ventilation system for facility made of mostly soil and building debris.
			• Fire risk and prevention is managed by CRL's Fire Protection Program, which includes full-time firefighters and fire-fighting equipment on the CRL site.
			
			References:
			[1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002.
			[2] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019
			[3] IAEA General Safety Guide (GSG)-1. Classification of Radioactive Waste.

CNL-ND627	John Jackson (Nuclear Waste Watch and OFWCA) (May 15, 2017);	The EIS says that the CNL's program is aimed at providing "wide accessibility of fact-based information to the public and First Nation and Métis communities …" [Section 4.1, p. 4-1]. - Please provide us with CNL's definitions of "fact-based" and "non fact-based" information.	Canadian Nuclear Laboratories (CNL) is required to ensure that project information is made available to local and host communities, and stakeholder groups, through a variety of mechanisms to ensure accessibility of information. The information provided is prepared from technical and other supporting scientific documents with the support of subject matter experts. Canadian Nuclear Laboratories (CNL) also does utilize a "detect and correct" media relations (i.e., letters to the editor aimed at correcting inaccurate statements in articles, disseminating factual information) to ensure the public has access to factual project information.
CNL-ND628	Anna Tilman (June 22, 2017)	With regards to Radionuclides, what are considered "limited amounts"? An examination of the reference inventory indicates a preponderance of radionuclides of very long half-lives (hundreds, thousands, millions of years, etc.). How does this square with the statement that the waste to be emplaced has "limited amounts of long-lived activity"? How does CNL reconcile this long-term activity and bioavailability of some of these radionuclides with its plans for active versus passive surveillance for just a few hundred years?	Canadian Nuclear Laboratories (CNL) acknowledges that the proposed inventory for NSDF includes limited amounts of several long-lived radionuclides as shown by Table 3.3.1-2 of the final Environmental Impact Statement (EIS). Long-lived radionuclides are included in the NSDF inventory as they are intrinsically part of the radiological fingerprints of waste streams at CRL and other CNL sites. The concentrations of long-lived radionuclides that are proposed in the NSDF reference inventory are in concentrations consistent with Canadian Standards Association and International Atomic Energy Agency (IAEA) guidance for LLW (CSA N292.0-19 [1] & IAEA GSG-1 [2], Sections 2.2(4) and 2.24, for example). The substantial decrease of radioactivity concentrations in the first 100 years after the facility has been closed (as shown in Figure 3.3.1-2 of the final EIS) is the result of the decay of the shorter-lived radionuclides. The remaining radioactivity present in the NSDF after the 300 year Institutional Control period is the limited inventory of long-lived radionuclides. The risk of the presence of these long-lived radionuclides has been studied in detail in the Post-Closure Safety Assessment (PostSA) [3]. The calculated dose consequence and environmental concentrations meet the dose acceptance criteria and environmental quality standards, respectively, thus do not pose an unacceptable risk to the public or environment.

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			References: [1] CSA Group. CSA N292.0-19: General principles for the management of radioactive waste and irradiated fuel. 2019 [2] IAEA General Safety Guide (GSG)-1. Classification of Radioactive Waste. [3] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND629	Northwatch (August 16, 2017)	**1.2 -** The EIS repeatedly uses subjective terms which are unclear in their meaning and so lack meaning; for example, in the description of the project location included in the draft EIS, CNL stated that *"The nearest area of considerable agriculture and dairy farming is 15 km southeast on the Quebec side of the Ottawa River and 35 km southeast on the Ontario side"*;18 the first question this raises is with respect to what "considerable" may mean; the second question is around the reliability of the statement and its estimate of distances; while it is not Northwatch's practice to provide evidence while commenting on draft EIS documents, in this instance we bring forward two specific information pieces as a means of reflecting back on the reliability of statements in the draft EIS on even the most basic of information items, such as project location: CNL's draft EIS statement is that the nearest area of "considerable" agriculture and dairy farming is 15 km southeast on the Quebec side, but a simple check via Google Earth indicated that there is a farming area only ten kilometres away on the Quebec side; CNL's draft EIS statement is that the nearest area of "considerable" agriculture and dairy farming is 35 km southeast on the Ontario side but according to the CNSC's Independent Environmental Monitoring Program (IEMP) there were food samples from approximately 10 km away on the Ontario side.19 The draft EIS statements with respect to the proximity of the project to agricultural production are unclear and potentially erroneous. Northwatch Information Request #8: Provide a definition of what the report author means by "considerable" agriculture, and the basis for their distance estimates.	Section 1.2 in the final Environmental Impact Statement (EIS) describes the NSDF Project's physical location to provide an overview of the context of its place relative to current Canadian Nuclear Laboratories (CNL) activities and operations within the Chalk River Laboratories (CRL) site. The socio-economic context of the NSDF Project is also described here using its position relative to existing localities (e.g., population centers). The term "considerable" in Section 1.2 was used as a descriptive term to characterize land use around the NSDF Project location; specifically, it describes local areas where some form of foodstuff (e.g., produce) or livestock (e.g., beef) is produced for consumption by local residents. The term "considerable" is a simple adjective and is not an empirical unit of measure; it is merely used in the EIS to help contextualize land use in the area. Based on the annual environmental monitoring at the CRL site in 2018, the closest population centers on the Quebec side of the river are combined into the communities of Fort Williams and Sheenboro which are approximately 15 km downstream [1]. However, the closest beef farm from the CRL site is in Sheenboro located approximately 10.6 km SE of the National Universal Research (NRU) reactor on the Quebec side relative to the Ottawa River. This is based on Derived Release Limits (DRL) for the CRL site which represent release rates that correspond to critical group exposures at the public dose limit. The Sheenboro beef farm is modelled using a beef farm potential critical group which combines two types of farming receptors, small-scale mixed farming (hobby farming) and commercial-scale beef farming. These two types are combined because they have similar activities and corresponding exposure pathways, contaminated food fractions, and geographic distribution around the CRL site. Produce from private gardens and farm animal flesh and bone are collected from Sheenboro as environmental samples for the CRL site routine Environmental Monitoring Program. Canadian Nuclear Laboratories (CNL) publishes its Annual Compliance Monitoring Report (ACMR), which are submitted to the Canadian Nuclear Safety Commission (CNSC) as a requirement based of the CRL site licence [2]. The ACMR summarizes the results of its routine Environmental Monitoring Program and includes results of analyses of potential radiological contamination of foodstuffs (garden produce) and meat samples. Canadian Nuclear Laboratories (CNL) plans to continue to implement routine environmental monitoring throughout the proposed NSDF Project including the nuance of describing the surrounding agricultural practices surrounding the CRL site. The annual environmental monitoring reports are available to the public through the Canadian Nuclear Laboratories (CNL) website (www.cnl.ca). References: [1] Annual Compliance Monitoring in 2018 at Chalk River Laboratories. CRL-509243-ACMR-2018. [2] CNSC, CRL Licence Conditions Handbook, NRTEOL LCH-01.00/2028, Revision 1, Effective 2019 February 25.
CNL-ND630	Northwatch (August 16, 2017)	**1.0 -** The draft EIS makes several references to "revitalization" of the CRL property in the document, but the document is unclear about the relationship between remediation objectives and revitalization (reference Northwatch's IR list, p.1).	Activities and projects related to the remediation and revitalization of the Chalk River Laboratory (CRL) site is outside the scope of the NSDF Project. However, Canadian Nuclear Laboratories (CNL) ten-year integrated plan to transform the CRL site including the revitalization of site infrastructure is described in Section 8.2.1 in the final EIS as part of the assessment of cumulative effects from the NSDF Project.

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		Northwatch Information Request #2: Provide a definition of revitalization and of remediation and discuss each in relationship to the proposed NSDF	Revitalization, within the context of the CRL site, will include a large-scale transformation of essential site infrastructure, the decommissioning of aging infrastructure and a significant investment in new facilities for CNL to conduct its on-going science and technology mission. The NSDF Project will be the permanent disposal site for many of the waste created from decommissioned infrastructure at the CRL site which will make footprint available for these new facilities. In this way, the NSDF will enable CNL to continue to move forward with site revitalization and remediation of the CRL site. Remediation is any measure that may be carried out to reduce the exposure from existing contamination through actions applied to the contamination itself (the source) or to the exposure pathways to humans. At the CRL site, historically contaminated lands and legacy waste management areas will be remediated. This may include the excavation or mechanical removal of impacted (contaminated) soils and legacy waste – this is anticipated to generate large volumes of low-level waste (LLW). At present, large-scale environmental remediation of contaminated lands of the CRL site is deferred until the proposed NSDF is available to mitigate the need for additional interim storage capacity**.** It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS.
CNL-ND631	Northwatch (August 16, 2017)	Northwatch Information Request #5: The draft EIS states: "The base liner system includes a primary and secondary liner to contain the waste and to limit the potential release of contaminated water (i.e., leachate) to the subsurface and groundwater. The surface water management system will control clean surface water on-site, while preventing contact with contaminated areas. The final cover system (i.e., cap for the mound) will be designed to eliminate exposure due to direct contact with waste, and provide gamma radiation shielding. It will also limit the infiltration of precipitation to the waste, thereby limiting leachate generation." Provide an explanation as to how the report authors are using the term "limit" in this context.	The Environmental Impact Statement (EIS) has been updated to provide a clear and accurate description of how Engineered Containment Mound (ECM) components including the base liner (Section 3.4.1.4) system and surface water management system (Section 3.4.4.5) will mitigate leachate generation during NSDF operations. The statement quoted by the commenter has been removed in the final EIS. To limit the potential release of contaminated water (i.e., leachate) to the subsurface means to reduce, as much as possible, the infiltration of contaminated leachate potentially produced within the ECM after waste placement into the underlying subsurface beyond the base of the ECM. The base liner system of the ECM will include impermeable barriers which will enable this. Any water (e.g., rain, snow) that makes contact with (or is suspected of contacting) the contaminated waste will be collected by the leachate collection system and treated to remove contaminants in the Wastewater Treatment Plant (WWTP) prior to controlled release into the environment. Treated effluent discharge targets are established to be protective of human and non-human biota health. To limit the infiltration of precipitation to the waste is to reduce, as much as possible, the amount of precipitation coming from external sources (e.g., the sky as rain or snow) that can enter the ECM. Precipitation entering the ECM can potentially generate leachate if it interacts with the emplaced waste. During waste placement operations, all efforts are made to minimize the contact of precipitation with the contaminated waste thereby producing leachate. The operation of NSDF is limited to one cell at a time in order to limit the surface area of waste that is exposed to the environment (i.e., precipitation) at any given time. As a cell is constructed, interim covers are placed over waste to limit infiltration of precipitation and promote surface water run-off. As each disposal cell is completed (i.e., the volume of low-level waste (LLW) acceptable for that cell has reached maximum capacity) the final cover system is installed over the filled disposal cell. The final cover system will be composed of similar engineered materials as the base liner system of the ECM in order to enable limiting the infiltration of precipitation. Other operational practices to limit contact with precipitation include grading and compaction of the waste fill to promote surface water run-off. The word "limit" does not confer a technical definition and is not an empirical measure in this context**.**
CNL-ND632	Northwatch (August 16, 2017)	**2.2.2.3** - The draft EIS states: "Sewage sludge is generated at the CRL Sanitary Sewage Treatment Plant and considered to be very low-level waste (VLLW). For the foreseeable future, the sludge will continue to	Section 2.2.2.3 has been removed in the final Environmental Impact Statement (EIS).

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	William Turner (May 31, 2017)	be placed in the CRL Bulk Material Landfill which is an engineered mound with leachate collection system (CNSC 2010)." No additional information is provided about sewage sludge, or its levels of radioactivity, volume, or associated hazards. Northwatch Information Request #14 - 15: Provide a definition of "foreseeable future" and describe any circumstances or conditions under which CNL would consider placing the sludge in the ECM. Indicate current projected volumes of this waste, and levels of hazards associated with the sewage sludge. Please provide the WAC for the CRL Bulk Material Landfill.	The Chalk River Laboratories (CRL) site Bulk Material Landfill and associated Waste Acceptance Criteria is not part of the proposed NSDF Project; wastes managed using the Bulk Material Landfill (including sewage sludge) are outside of the scope of waste proposed for the NSDF.
CNL-ND633	Northwatch (August 16, 2017)	**2.3 (2-6) -** The draft EIS states: "Canadian Nuclear Laboratories will continue to accept waste on a commercial basis (e.g., medical waste from hospitals)." The descriptions of waste sources and types in the draft EIS are overly general and require additional detail and description. Northwatch Information Requests 18 and 19: Provide a definition of "commercial basis". Provide a description of the volumes of medical waste from hospitals, including volume, contracts, volumes already received and projections for future receipt.	Section 2.3 in the final Environmental Impact Statement (EIS) describes the overall purpose of the proposed NSDF Project. The description of waste sources and types to be disposed in the EIS is general in this section because the description of waste sources and types is more elaborately described in a different section. For the purpose of organization and flow of the Project topics discussed in the EIS, waste types, volumes, and inventory are described in Section 3.3 (Waste Strategy) of the final EIS. The majority of low-level waste (LLW) proposed for the NSDF is currently located on the Chalk River Laboratories (CRL) site, with a small percentage of the waste volume coming from offsite locations (i.e., approximately 10% by volume). The sources of waste propose for the NSDF by percentage are as follows: • 90 percent (%) waste from CRL – past, present and future (waste owned by AECL); • 5% from commercial waste Canadian sources such as universities and hospitals; and • 5% waste from decommissioning at Whiteshell Laboratories in Manitoba and other AECL nuclear liabilities. Over the last 10 years, Canadian Nuclear Laboratories (CNL) has received an average 100 m^3 per year from small generators, such as universities and hospitals. There is approximately 2,500 m^3 of LLW in storage that has been received from commercial sources since 1995, that could be considered for disposal in the NSDF, if it is found to comply with the NSDF Waste Acceptance Criteria [1]. Reference: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003.
CNL-ND634	Kerrie Blaise, CELA (August 15, 2017)	CELA requests the definitions used for "long-lived" and "short-lived" nuclides and the actual activity limits used by CNL. These explanations and activity limits are not cited in the existing documents provided to date.	International Atomic Energy Agency (IAEA) Safety Standard Guide GSG-1 *Classification of Radioactive Waste* [1] describes the following: "In terms of radioactive waste safety, a radionuclide with a half-life of less than about 30 years is considered to be short lived. It is beneficial to make such a distinction between waste containing mainly short lived radionuclides and waste containing long lived radionuclides because the radiological hazards associated with short lived radionuclides are significantly reduced over a few hundred years by radioactive decay." Canadian Nuclear Laboratories adopts the IAEA definition of short-lived to mean a radionuclide with a half-life of about 30 years or less, and by extension, long-lived means half-life greater than about 30 years. Reference: [1] IAEA Safety Standard Guide (GSG)-1. Classification of Radioactive Waste.

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CNL-ND635	Northwatch (August 16, 2017)	Northwatch Information Request #1: Provide a detailed explanation as to what is being meant by "business locations", including and specifically whether these business locations include the business locations of the member companies of the CNEA consortium.	The NSDF Project will enable the remediation of contaminated lands and legacy waste management areas (WMAs), and decommissioning of outdated infrastructure at the Chalk River Laboratories (CRL) site and other AECL-owned sites managed by Canadian Nuclear Laboratories (CNL). Specifically by "business locations", CNL means other AECL-owned sites that are management by CNL which specifically includes: • Whiteshell Laboratories (MB) • Port Hope Area Initiative (Port Hope, Port Granby, ON) • Douglas Point (ON) • Gentilly-1 (QC) Business locations does not include member companies of the CNEA consortium. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS.
CNL-ND636	William Turner (May 31, 2017) 15.	CNL must be consistent when describing this undertaking. Since the facility cannot be considered "near surface", CNL must change all references in the EIS report, related to describing this as near surface, and all abbreviations (such as NSDF) to what the facility really is, an Engineered Containment Mound or ECM. Describing the facility as an NSDF is not consistent with international terminology and guidance that define an NSDF. To ensure all communications regarding this undertaking are not misleading, these changes must extend to all CNL's future communications with respect to this project. This includes the website, fact sheets, public engagement activities, correspondence, etc.	The International Atomic Energy Agency (IAEA) Safety Guide SSG-29 *Near Surface Disposal Facilities for Radioactive Waste* [1] describes the term 'Near Surface Disposal' as follows: *The term 'near surface disposal' is used in this Safety Guide to refer to a range of disposal methods, including the emplacement of solid radioactive waste in earthen trenches, above ground engineered structures, engineered structures just below the ground surface and rock caverns, silos and tunnels excavated at depths of up to a few tens of metres underground. This Safety Guide provides general guidance for the development, operation and closure of facilities of this type that are suitable for the disposal of VLLW and LLW.* Canadian Nuclear Laboratories' use of term NSDF is consistent with IAEA's description. Reference: [1] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014.
CNL-ND637	William Turner (May 31, 2017) 83.	3-13 – Missing reference should be cited in Section 12 – "IAEA Technical Considerations in the Design of Near Surface Disposal Facilities for Radioactive Waste (2001).	The missing reference has been added to the final Environmental Impact Statement (EIS) in Section 13.2 applicable to Section 2.0 "Purpose of the Project and Project Alternatives".
CNL-ND638	William Turner (May 31, 2017) 91. 109. 116. 119. 121. 130. 136. 144. 145. 156.	The commenter states that this document fails to meet simple quality assurance standards. A few examples follow: • The list of references in Section 12 is incomplete. For example, CNL's document describing the Integrated Waste Strategy is missing. (see also Comment 49 above). • The format used for the references is inconsistent • Design life for the mound is inconsistent • The Section 3.3.1, Design Requirements does not cite the IAEA design document, although it is cited as a reference elsewhere (see Comment 83 above). • Appendix 4.1 is missing	The following has been updated for the final Environmental Impact Statement (EIS): • References have been confirmed for Section 13. • The format used for references has been confirmed for consistency. • The design life for the Engineered Containment Mound (ECM) is 550 years. Checks have been made within the final EIS to ensure that a design life of 550 years is consistently used for the ECM. • Section 2.5.2.2.1 makes reference to the International Atomic Energy Agency (IAEA) *Technical Considerations in the Design of Near Surface Disposal Facilities for Radioactive Waste* (2001). • There is no Appendix 4.1. Appendix 4.0-1 Poster Boards was provided in the 2017 draft EIS however the final EIS has been re-organized. This information is now captured in the Stakeholder Engagement Report which is a

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		• The lack of basic modelling QA demonstrating that the models chosen are appropriate for this project (such as in Section 5.1.7) • Inappropriate use of significant figures (Such as Table 5.2.1-5) • Depictions of the project footprint differ among the figures (See Figure 5.7.4-11 vs. 5.7.4-7) • Some references are wrong (see, section 6.4.3 – reference provided (IAEA 2012) is wrong – should be IAEA 2011) • 6.4.4.4.2 The reference document, Performance Assessment, 232-509240-ASD-001, lacks even simple QA (see Comment 144). • 6.4.4.4.2 The Performance Assessment document contains circular references to the EIS (see Comment 145 below) • Page 10-1 is missing from both the hard-copy and electronic versions of the EIS (see Comment 156 below). • 5.15 - A simple parsing of Table 5.1-1-1: Project Interactions with Valued Components – Biophysical Environment and Human Health from Appendix 5.1-1 suggests at least two omissions. - first, the Site Security in the column Key Project Component/Activity is only related to one project phase, Construction. My understanding is that Site Security has to be in place throughout the complete project up until the end of Institutional Control - second, the table does not include the phase, post institutional control. This is a critical aspect of considering residual effects, since that is the eventual end-state of the facility In other words, CNL have not considered all potential interactions. As such, the identification of mitigation measures is unlikely to be complete. Since the identification of mitigation measures is incomplete, the overall conclusions of the EIS are questionable.	technical supporting document of the final EIS. The EIS has been checked and references to Appendix 4.1 removed. • Models used are described fully in the relevant sections or in associated appendices and/or referenced documents. • Use of significant figures have been confirmed. • The modelling figures have been updated to reflect the full footprint. This does not however, change the conclusions of the EIS as the modelling was done based on the full footprint. • References have been confirmed. • The Performance Assessment has been superseded by the Post-Closure Safety Assessment (PostSA) [1], and is available to the public upon request by contacting ermstakeholder@cnl.ca. • The 2017 draft EIS was reissued on 2017 May 25, on the Canadian Environmental Assessment Agency's website to include the missing page from Section 10. • As outlined in Section 3.4.4.3 of the final EIS, the NSDF security will adhere to the CNL Physical Security Program. Access to the NSDF Project site will be exclusively from within the CRL site boundary and access to the CRL site is strictly controlled by security personnel. In addition, a security fence will be installed around the entire perimeter of the NSDF Project site to prevent unauthorized personnel from entering, and limit animal injury and contact during construction and waste placement operations. Security during institutional control is outlined in Section 3.2.4.2 of the final EIS. The NSDF Project is designed to promote safety through passive means during post-closure but is complemented by active measures taken by CNL, such as maintenance, security and surveillance. The NSDF Project site security features will include signage, markers, fencing and gate. A chain-link fence will deter intruders and animals from site access. A control gate will be located on the north side of the NSDF Project site to allow personnel access for required maintenance and observation. As described in the final EIS, the post-closure phase has two discrete periods: Institutional Control (IC) and post-Institutional Control. As a planning basis or reference assumption, the Institutional Control period is from 2100 to 2400 (i.e., 300 years). The Post-institutional Control period occurs after year 2400 and continues indefinitely. Post-institutional control is therefore considered as part of the post-closure phase. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
		EA Expertise	
CNL-ND639	Pravin Shah (April 8, 2017) Northwatch (August 16, 2017)	Many public commenters have concerns about who has provided the "Expert analysis" consulted in the report, whether it is objective analysis provided by independent professionals, or CNL contributors – the sources of this information are not clearly highlighted in the report, and conclusions seem broad-based. The document does not identify its authors or provide their credentials or areas of expertise.	'Expert Analysis' for preparation of the Environmental Impact Statement (EIS) report and technical supporting documents was provided by Canadian Nuclear Laboratories (CNL) staff, consultants and Queen's University. Independent third party review was conducted at several stages in the development of supporting documents to reduce uncertainties and increase confidence in the analysis. The EIS was authored by Golder Associates. Golder is an international consulting firm and has broad experience in preparation of Environmental Impact Statements. Golder was part of the consultant team responsible for the preparation of the Environmental Impact Statement for the proposed Ontario Power Generation Deep Geological Repository for low and intermediate level radioactive waste. Golder has technical expertise across all environmental disciplines including but not limited to Air Quality, Climate Change, Hydrology, Surface Water Quality, Radiation, Aquatic and Terrestrial Environment, Human Health and Socio-economics.

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			The Post-Closure Safety Assessment (PostSA) [1] and Ecological Risk Assessment (EcoRA) [2] are key supporting documents for the EIS. The PostSA and EcoRA document the studies conducted to demonstrate that the NSDF will be protective of human health and the environment over duration of the Post-Closure phase. The results of these studies are summarized in Section 5.7 (Ambient Radioactivity and Ecological Health), Section 5.8 (Human Health) and Section 10 (Effects of the Environment on the Project) of the final EIS. The PostSA and EcoRA were prepared by Arcadis Consultants. Arcadis has broad experience in conducting safety assessments in the nuclear industry. Key Arcadis staff (formerly with Senes Consultants) performed the Post-Closure Safety Assessment for the Ontario Power Generation Deep Geological Repository. The company's areas of expertise include Performance Assessments, Ecological Risk Assessments, Safety Analyses, and Radiation Analyses. The development of the NSDF EIS, PostSA and EcoRA was done in collaboration with CNL staff with expertise in the environmental sciences, safety analysis, performance assessments, and environmental and ecological risk assessments. Golder, Arcadis and CNL technical staff having key roles in the preparation of the EIS and supporting documents typically have advanced degrees at the Masters or PhD level along with one to three decades of industry experience. Canadian Nuclear Laboratories partnered with Queen's University to perform a comprehensive testing and evaluation program of the geomembrane that is a key component of the cover and baseliner system of the engineered containment mound (Section 3.1.1.1 of the final EIS). The studies were conducted to provide assurance that the geomembranes would meet the 550 year design life of the facility. The studies were led by Professor Kerry Rowe who is a Barrington Batchelor Distinguished University Professor and Canada Research Chair. Professor Rowe's credentials are available at the Queen's University website: https://civil.queensu.ca/Research/Geotechnical/R-Kerry-Rowe1/. To reduce uncertainties and increase confidence in the NSDF safety assessments, several third party reviews were performed at various stages in the Project lifecycle. Third-party reviewers were identified based on experience with LLW Facilities around the world. The findings and recommendations of the third-party reviewers were considered during the iterative development of the design and safety assessments for the project. An international expert panel led by the U.S. Department of Energy (DOE) was formed to provide an independent third party review of the NSDF safety case and the supporting safety assessment documents PostSA and Safety Analysis Report. The review conducted from 2019 June 24 through 2019 November, consisted of document reviews, an on-site visit, activity observations, webinars, and interviews. The review scope was bounded by the EIS and Safety Case document, and the Post-Closure Safety Assessment with all the referenced underpinning documents. The international expert panel evaluated the documents consistent with the non-binding expectations for a safety case and safety assessment from the International Atomic Energy Agency (IAEA) Specific Safety Requirements on Disposal of Radioactive Waste (SSR-5) [3], the IAEA Specific Safety Guide on The Safety Case and Safety Assessment for the Disposal of Radioactive Waste (SSG-23) [4] and U.S. DOE Directives. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Ecological Risk Assessment (EcoRA) for the NSDF Project, 232-121240-ASD-001. [3] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [4] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012.
CNL-ND640	John Jackson (Nuclear Waste	NSDF Inventory Request 1: Please provide us a list of CNL of the EIS Report and their qualifications and experience in doing radiological environmental assessments.	The Environmental Impact Statement (EIS) and supporting documents were prepared by CNL staff and subject matter experts as well as consultants/contractors and researchers from Queens University. Independent third party review was

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	Watch and OFWCA) (May 15, 2017)		conducted at several stages in the development of supporting documents to reduce uncertainties and increase confidence in the analysis. The EIS was authored by Golder Associates. Golder is an international consulting firm and has broad experience in preparation of Environmental Impact Statements. Golder was part of the consultant team responsible for the preparation of the Environmental Impact Statement for the proposed Ontario Power Generation Deep Geological Repository for low and intermediate level radioactive waste. Golder has technical expertise across all environmental disciplines including but not limited to Air Quality, Climate Change, Hydrology, Surface Water Quality, Radiation, Aquatic and Terrestrial Environment, Human Health and Socio-economics. The Post-Closure Safety Assessment (PostSA) [1] and Ecological Risk Assessment (EcoRA) [2] are key supporting documents for the EIS. The PostSA and EcoRA document the studies conducted to demonstrate that the NSDF will be protective of human health and the environment over duration of the Post-Closure phase. The results of these studies are summarized in Section 5.7 (Ambient Radioactivity and Ecological Health), Section 5.8 (Human Health) and Section 10 (Effects of the Environment on the Project) of the final EIS. The PostSA and EcoRA were prepared by Arcadis Consultants. Arcadis has broad experience in conducting safety assessments in the nuclear industry. Key Arcadis staff (formerly with Senes Consultants) performed the Post-Closure Safety Assessment for the Ontario Power Generation Deep Geological Repository. The company's areas of expertise include Performance Assessments, Ecological Risk Assessments, Safety Analyses, and Radiation Analyses. The development of the NSDF EIS, PostSA and EcoRA was done in collaboration with CNL staff with expertise in the environmental sciences, safety analysis, performance assessments, and environmental and ecological risk assessments. Golder, Arcadis and CNL technical staff having key roles in the preparation of the EIS and supporting documents typically have advanced degrees at the Masters or PhD level along with one to three decades of industry experience. Canadian Nuclear Laboratories partnered with Queen's University to perform a comprehensive testing and evaluation program of the geomembrane that is a key component of the cover and baseliner system of the engineered containment mound (Section 3.1.1.1 of the final EIS). The studies were conducted to provide assurance that the geomembranes would meet the 550 year design life of the facility. The studies were led by Professor Kerry Rowe who is a Barrington Batchelor Distinguished University Professor and Canada Research Chair. Professor Rowe's credentials are available at the Queen's University website: https://civil.queensu.ca/Research/Geotechnical/R-Kerry-Rowe1/. To reduce uncertainties and increase confidence in the NSDF safety assessments, several third party reviews were performed at various stages in the Project lifecycle. Third-party reviewers were identified based on experience with LLW Facilities around the world. The findings and recommendations of the third-party reviewers were considered during the iterative development of the design and safety assessments for the project. An international expert panel led by the U.S. Department of Energy (DOE) was formed to provide an independent third party review of the NSDF safety case and the supporting safety assessment documents PostSA and Safety Analysis Report. The review conducted from 2019 June 24 through 2019 November, consisted of document reviews, an on-site visit, activity observations, webinars, and interviews. The review scope was bounded by the EIS and Safety Case document, and the Post-Closure Safety Assessment with all the referenced underpinning documents. The international expert panel evaluated the documents consistent with the non-binding expectations for a safety case and safety assessment from the International Atomic Energy Agency (IAEA) Specific Safety

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			Requirements on Disposal of Radioactive Waste (SSR-5) [3], the IAEA Specific Safety Guide on The Safety Case and Safety Assessment for the Disposal of Radioactive Waste (SSG-23) [4] and U.S. DOE Directives. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Ecological Risk Assessment (EcoRA) for the NSDF Project, 232-121240-ASD-001. [3] IAEA, Disposal of Radioactive Waste, SSR-5, 2011. [4] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012.
CNL-ND641	Pravin Shah (April 8, 2017)	While Golders Associates are a recognized Consultant firm, all the sketches/drawings in the EIS bear signatures represented by typed initials only (2 capitals). This hides the professionals who worked in designing and producing the sketch/drawing, who would make sure that qualified people were engaged in this important and a complex Facility. Does verification of credentials of the designers and expert need to be confirmed?	The drawings are prepared by drafting professionals and are verified by the senior professionals responsible for that particular study component. Golder's quality management system, which includes the conduct and documentation of senior review of deliverables by qualified individuals, is compliant with ISO 9001. Golder is regularly independently audited as part of ISO recertification, most recently in 2019. Golder's Quality Assurance /Quality Control (QA/QC) process is embedded in how they deliver projects. The qualified technical leads/specialists provide and oversee the technical review process. In the case of a technical report that covers work performed involving multiple technical areas and disciplines, the technical review may involve more than one person depending on the technical nature of a project and the services being provided. The Project Manager is responsible for maintaining communication with the client and overseeing the QA/QC activities. This includes managing deliverables to confirm all draft and final versions issued to the client underwent a technical and senior review.
CNL-ND642	Joan Lougheed and Town of Deep River (August 16, 2017)	At Table 5.8.7-1 under the column "Conservatisms and Assumptions" for the parameter "Source term", with respect to airborne tritium and to a lesser extent C-14 releases, it is uncertain whether the effect of water radiolysis has been included (see pg. 5-566). This could contribute to increased airborne releases. The same comments are applicable to Table 5.8.6-6, (see pg. 5-557). Under the parameter "Cumulative Effect" in Table 5.8.7- 1, uncertainties arise regarding the lands and soils associated with the WMAs and LDAs, where they will be disposed of and what technology will be employed to contain these hazards (see pg. 5-567).	Currently, large-scale environmental remediation of the Chalk River Laboratories (CRL) Waste Management Areas (WMAs) are deferred until the proposed NSDF is available to mitigate the need for additional storage capability. However, wastes from the WMA's or Liquid Disposal Area would only be transferred to NSDF should it meet the NSDF Waste Acceptance Criteria (WAC) [1]. It should be noted that remediation of the WMAs would be subject to a separate environmental review and would also require review and approval by the Canadian Nuclear Safety Commission (CNSC) prior to any work taking place, thus discussion of the remediation options have not been included in the final EIS. Radiolysis is considered in the Features, Events, and Processes (FEPs) portion of the Post-Closure Safety Assessment (PostSA) [2]. While it is considered, its effect is largely screened out of the assessment for the following reasons: • The waste is low-level, and thus the dissociation of molecules by ionizing radiation is limited, and its effect is not expected to influence the waste characteristics. • The radiolysis rate of water would be low and, so, hydrogen and oxygen would be formed at low rates by radiolysis of water. Any oxygen formed would be rapidly consumed by degradation reactions (e.g., corrosion of metal wastes) and hydrogen formed would move upwards into the unsaturated zone and would eventually migrate through the cover and disperse into the atmosphere. The PostSA [2] already considers tritium vapour as an airborne dose pathway, and includes its contribution during the institutional control period. • The full tritium inventory is assumed to be available for release in water and also in gas, i.e., the tritium inventory is "double-counted" in the PostSA, which fully considers any additional tritium vapour that could be generated and

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Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

Number	Source	**Comment Summary** (all original submissions can be found on the Canadian Environmental Assessment Registry, reference #80122) **Synthèse des commentaires** (toutes les soumissions originales se trouvent sur le Registre canadien d'évaluation environnementale, référence #80122)	**Response (to be completed by CNL)** **Réponse (à remplir par la LNC)**
			released as a result of radiolysis. Waste generated through remediation of WMAs and LDAs will be disposed of at the NSDF provided that these meet the WAC [1]. Waste that does not meet the NSDF WAC would be managed at an alternative site. For example chemically hazardous wastes would be sent to an off-site licensed waste management service for processing and/or disposal as per CNL's Integrated Waste Management Strategy (Section 2.2.1.4 of the final EIS). References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
		Credibility	
CNL-ND643	David Herbert (May 2, 2017) Cara Rose-Brown, Iana and Carlos Ciatti (May 15, 2017) Jake Deacon (Petawawa Point Cottagers Association) (May 16, 2017) Kathy Eisner; Kirk Groover (May 15, 2017) Mark Jennings (May 12, 2017) Ted and Linda Kucharski (May 15, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Martin Lalinec-Michaud (May 16, 2017) Ronald and Michele Kaulbach (May 8, 2017) Cara Rose-Brown (May 15, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] Many of the commenters had concerns about the credibility of the process, given that private corporations could have a conflicting interest in profit. The following points are examples of concerns raised by commenters: • Though the Chalk River site remains federal property under the ownership of Atomic Energy Canada Limited (AECL), it is now managed and operated by private companies. It is "government-owned, contractor-operated". Private companies tend to be interested in their bottom line and making short term profits. Their contract to manage CNL ends in 2025 – that is only five years after the opening of the proposed disposal facility - totally out of line with the physical lifetime of the project and with the enduring externalities to which the community is exposed – and thus have no long term responsibility or investment. • Can we seriously believe that a multinational conglomerate of corporations will be responsible for ensuring the safety of Ottawa, Montreal and everyone along the Ottawa River, the St. Laurence and the Atlantic for the next 300 years? Especially when long term oversight will have a negative impact to the corporate bottom line? • How can I rely on the evaluation paid for by the person/company/ministry/government that benefit from having a cheaper disposition center? I propose that an independent party, including environmental organism work on a solution that will be better suited and safer than this one. • I'm worried too many corners are being cut on this proposal just to save money. Canada is not and	Atomic Energy of Canada Limited (AECL), a Federal Crown Corporation, owns the Chalk River Laboratories (CRL) site and all of its radioactive waste. Atomic Energy of Canada Limited has contracted Canadian Nuclear Laboratories (CNL) to manage and operate its sites under a Government owned Contractor operated model (GoCo). It is AECL's role as a federal Crown corporation to be the stewards of its assets and liabilities, and Canada's interest, including the long-term protection of the environment. The NSDF is an important component of the plan to effectively address AECL's environmental responsibilities. As part of the GoCo model, CNL will continue to manage and operate the AECL's sites, including the NSDF, through this and subsequent contracts with AECL. Indeed CNL is meant to be an 'enduring entity', meaning that it will remain as the operator of the CRL site even if or when a new contractor is selected. As such, CNL will continue to monitor and assess performance of the NSDF under the oversight of the Canadian Nuclear Safety Commission (CNSC). As the waste liabilities remain the responsibility of AECL, AECL will continue to fund any on-going costs associated with the NSDF. The NSDF design was developed based on the codes and standards set by the International Atomic Energy Agency (IAEA), federal regulators, and provincial authorities. It built on the large base of experience for similar facilities that exists in the US, Europe, and Canada. Codes and standards are themselves underpinned by technical studies. Canadian Nuclear Laboratories is the proponent for the NSDF Project environmental assessment and the licensee for Chalk River Laboratories (CRL) site. Canadian Nuclear Laboratories (CNL) has engaged a highly-experienced engineering consulting firm to prepare the design. Canadian Nuclear Laboratories also engaged independent third parties to review the designs produced by the engineering consulting firm to ensure that all the analysis underpinning the design are robust and in compliance with the codes and the standards. The NSDF Project is subject to a federal, and very public, environmental assessment process led by the Canadian Nuclear Safety Commission (CNSC), Canada's independent nuclear regulator. In order to proceed with the NSDF Project, CNL must first secure an environmental assessment decision and authorization from the CNSC. Additional information on regulatory requirements can be found in Section 1.4 of the final Environmental Impact Statement (EIS).

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	Rri Povey (May 11, 2017) Martin Lalinec-Michaud (May 16, 2017) Sheila Marchant, Paul Esslinger (May 17, 2017) Ted and Linda Kucharski (May 16, 2017) Candace Prong (July 24, 2017) CCNR (August 16, 2017) Vals Osborne (August 16, 2017 Michael Stephens (August 14, 2017) Laurie Wagner (August 15, 2016) Robert Shellard (August 14, 2017) Judy Sauvé (August 15, 2017) Sylvie Pilon-Tiden (August 15, 2017) Douglas Nichols (August 14, 2017) Tony Reddin (August 14, 2017) Jacqueline Scott (August 14, 2017) Tobin Gibson (August 16, 2017) Mary Myles (August 16, 2017) Alex Thomson (August 16, 2017) Harold Sheehan (August 16, 2017) Andrew Harper (August 16, 2017)	should never be a place where profits are allowed to come before public safety. • As a tax paying property owner, we need the government to protect us and our environment not just for the immediate future but for generations to come. • As a physician, I have heard over the last 30 years numerous lies by serious companies, drug companies, tobacco companies, automobile industry. How can I rely on the evaluation paid for by the person/company/ministry/government who benefits from having a cheaper disposition centre, and who will not be there when my and his children will feel sorry for a decision taken in 2017. • CNL is owned by a consortium of five multinational corporations, operating under a time-limited contract overseen by a vastly diminished crown corporation, Atomic Energy of Canada Limited (AECL). However the wastes are owned by the Government of Canada through AECL. CCNR finds it unacceptable that CNL, a private contractor, should be accepted as the proponent for this project. The consortium cannot be held accountable for the performance of the facility over the very long-term. • AECL and the Federal Government should be co-Proponents of the project. • AECL should be responsible for the legacy of their waste. • The Canadian government should be making the major decisions about radioactive waste storage, not a consortium of for-profit business entities. [Français] Conscients que des sociétés privées peuvent avoir des intérêts contradictoires relativement aux profits, beaucoup de commentateurs sont préoccupés par la crédibilité du processus. Les points suivants sont des exemples de préoccupations soulevées par les commentateurs : • Bien que le site de Chalk River demeure une propriété fédérale appartenant à EACL, il est maintenant géré et exploité par des sociétés privées. Il s'agit d'« un organisme gouvernemental exploité par un entrepreneur ». Les entreprises privées ont tendance à s'intéresser à leurs résultats nets et à réaliser des bénéfices à court terme. Leur contrat de gestion des LNC prend fin en 2025 – soit seulement cinq ans après l'ouverture de l'installation de gestion des déchets proposée. Cela est totalement inadéquat vu la durée de vie physique du projet et les effets externes persistants auxquels la communauté est exposée. Ces entreprises n'ont donc aucune responsabilité ou investissement à long terme. • Pouvons-nous sérieusement croire qu'un conglomérat multinational d'entreprises sera responsable d'assurer la sécurité d'Ottawa, de Montréal et de tous ceux qui vivent le long de la rivière des Outaouais, du fleuve Saint-Laurent et de l'océan Atlantique pour les 300 prochaines années? Surtout quand le contrôle à long terme aura un effet négatif sur les résultats nets de l'entreprise? • Comment puis-je compter sur une évaluation payée par une personne, une entreprise, un ministère ou un gouvernement qui profitera d'un centre de gestion des déchets moins coûteux? Je propose qu'une partie indépendante, comme un organisme de protection de l'environnement, travaille à une solution mieux adaptée et plus sûre que celle-ci. • Je crains que trop d'éléments importants ne soient négligés par souci d'économie d'argent. Le Canada n'est pas et ne devrait jamais être un lieu où les profits sont autorisés au détriment de la sécurité publique. • En tant que propriétaire foncier qui paie des impôts, je crois que nous avons besoin que le	[Français] Énergie atomique du Canada Ltée (EACL), société d'État fédérale, est propriétaire du site des Laboratoires de Chalk River (LCR) et de tous ses déchets radioactifs. Elle a confié aux Laboratoires nucléaires canadiens (LNC) le soin de gérer et d'exploiter ses sites en vertu du modèle OGEE (organisme gouvernemental exploité par un entrepreneur). Il incombe à EACL, dans son rôle de société d'État fédérale, d'assumer la gérance de son actif et de son passif et de veiller à la protection des intérêts du Canada, et notamment de la protection à long terme de l'environnement. L'IGDPS est un élément important du plan permettant à AECL d'assumer ses responsabilités environnementales d'EACL. Dans le cadre du modèle OGEE, les LNC continueront de gérer et d'exploiter les sites d'EACL, dont celui de l'IGDPS, au moyen du contrat actuel et de contrats ultérieurs avec EACL. De fait, les LNC sont censés être une « entité durable », c'est-à-dire qu'ils resteront l'exploitant du site des LCR même si un nouvel entrepreneur était retenu. À ce titre, les LNC continueront de surveiller l'IGDPS et d'en évaluer le rendement, sous la surveillance de la Commission canadienne de sûreté nucléaire (CCSN). Étant donné que le passif nucléaire demeure la responsabilité d'EACL, l'organisme continuera d'assumer les coûts associés à l'IGDPS. L'IGDPS est conçue conformément aux codes et aux normes établis par l'Agence internationale de l'énergie atomique (AIEA), par les organismes de réglementation fédéraux et par les autorités provinciales. Sa conception s'appuie sur une vaste expérience acquise au sujet d'installations semblables construites aux États-Unis, en Europe et au Canada. Les codes et les normes sont eux-mêmes étayés par des études techniques. Les Laboratoires nucléaires canadiens sont le promoteur de l'évaluation environnementale du projet d'IGDPS et le titulaire du permis applicable au site des Laboratoires de Chalk River (LCR). Ils ont confié la conception du projet à une entreprise d'ingénieurs-conseils très expérimentés. Ils ont également confié à des tierces parties indépendantes le soin d'examiner les propositions des ingénieurs-conseils afin de s'assurer que toutes les analyses étayant la conception sont solides et conformes aux codes et aux normes en vigueur. Le projet d'IGDPS est assujetti à un processus fédéral, et très public, d'évaluation environnementale dirigé par la Commission canadienne de sûreté nucléaire (CCSN), qui est un organisme de réglementation nucléaire indépendant du Canada. Pour donner suite au projet d'IGDPS, les LNC doivent d'abord obtenir une décision de la CCSN concernant l'évaluation environnementale, puis son autorisation. D'autres détails sur les exigences réglementaires sont fournis à la section 1.4 de l'Étude d'impact environnemental (EIE).

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	Virginia MacLatchy (August 16, 2017) Ken Sproule (August 16, 2017) Jake Deacon (August 16, 2017) Patrick Miller (August 16, 2017) Durham Nuclear Awareness (August 16, 2017) Owen Gleason (August 16, 2017) John Almstedt (August 16, 2017) Linda Gasser (August 16, 2017) OFWCA (August 15, 2017) PCWO (August 16, 2017) Angela Bischoff (August 16, 2017) Ralliement contre la pollution radioactive (August 3, 2017) Martine Ouellet (Bloc Québécois) (August 14, 2017)	gouvernement nous protège, nous et notre environnement, non seulement pour l'avenir immédiat, mais pour les générations à venir. • Au cours des 30 dernières années, j'ai entendu, en tant que médecin, de nombreux mensonges de la part d'entreprises sérieuses – des entreprises pharmaceutiques, des fabricants de tabac, l'industrie automobile. Comment puis-je compter sur une évaluation payée par une personne, une entreprise, un ministère ou un gouvernement qui profitera d'un centre de gestion des déchets moins coûteux et qui ne sera pas là lorsque mes enfants et moi-même pleurerons une décision prise en 2017. • Les LNC appartiennent à un consortium de cinq sociétés multinationales dont les activités sont régies par un contrat à durée limitée supervisé par une société d'État grandement réduite, soit EACL. Cependant, les déchets appartiennent au gouvernement du Canada par l'intermédiaire d'EACL. Le Regroupement pour la surveillance du nucléaire (RSN) juge inacceptable que les LNC, un entrepreneur privé, soient acceptés en tant que promoteur de ce projet. Le consortium ne peut être tenu responsable du rendement de l'installation à très long terme. • EACL et le gouvernement fédéral devraient être les co-promoteurs du projet. • EACL devrait être responsable de ses déchets hérités. • Le gouvernement canadien devrait prendre les décisions importantes concernant le stockage des déchets radioactifs, et non un consortium d'entités commerciales à but lucratif.	
CNL-ND644	Ish Theilheimer (May 16, 2017) OFWCA (Johanna Echlin) (May 8, 2017) Ronald and Michele Kaulbach (May 8, 2017) Jeff Kelly (August 15, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* CNL's proposal and its promotional literature downplay the risks. Their ads and interviews are deceptive. CNL's strategy is to persuade their audience that all is proven and safe. CNL presents the disposal facility through rose coloured glasses (ads, interviews and elsewhere – all is proven, safe, only a tiny amount of intermediate-level waste will go in, only a very small amount of radioactive waste will come from other areas etc.). The illustration of the mound itself makes it look like a golf-course, or a nice flat grassy place to have a picnic.	Canadian Nuclear Laboratories (CNL) has been transparent in representing the NSDF Project and its various aspects. Materials have been prepared directly from project references and with the support of project subject matter experts. Canadian Nuclear Laboratories has presented project information with clarity and have worked hard to make the information accessible to a variety of audiences and information needs. Canadian Nuclear Laboratories also recognizes that there is always room for improvement and every effort has been made to address the information gaps. CNL.ca has a dedicated page for up to date content and information on the NSDF Project, including a number of technical support documents. Additionally, supporting information products have ranged from quick facts, infographics, factsheets, poster boards, presentation materials, and written responses to detailed questions etc. CNL has made the various revisions of the Environmental Impact Statement (EIS), including the 2019 revised draft EIS, as well as some often requested supporting technical documents, publicly available for openness and transparency regarding this submission as part of CNL's public and Indigenous engagement. When the final EIS is issued to the Canadian Nuclear Safety Commission, CNL will post it on the NSDF Project's webpage at www.cnl.ca/nsdf. Technical supporting documents

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	Matt D. (August 14, 2017) Kevin Costello (August 16, 2017)	I used to work in advertising, and what I have observed is a very skillful avoidance of information on the part of CNL, There has been a very crafty, slow release of their exact plans: a clever use of words and very strategic timing. They never give the whole picture up front, not even when specific questions were asked. This is deceptive and manipulative. This is a sure way to seduce the public into accepting and approving the project. Their glossy posters make the mound look like "a grassy outcrop". It is definitely not a way to build up trust, which is sorely needed in a case like this. CNL claims that they "understand the movement of radioactive materials", and that they "are taking responsibility for nuclear waste" at Chalk River, but also from elsewhere in Canada.	are listed on the CNL NSDF webpage and are available upon request by contacting ermstakeholder@cnl.ca. Canadian Nuclear Laboratories continues to engage the public to provide clarification of details of the NSDF Project. Beginning in October 2018, webinar sessions were introduced in order to increase accessibility and to disseminate information to the public and answer their questions. Topics addressed by the webinars have included the NSDF Design, Waste Inventory, Post-Closure Safety Assessment, and Application of International Atomic Energy Agency Standards. Further, bi-monthly (every other month) Breakfast Briefings for alumni and the public were introduced in April 2019 in our host community (Deep River, ON) to provide project updates, presentations on technical topics and provide an opportunity for public input. In response to public requests, in February 2020, a second community location (Pembroke, ON) was added to our bi-monthly Breakfast Briefings to ensure all interested public within the Ottawa Valley have an opportunity for updates and input. Canadian Nuclear Laboratories will work to continue to keep the public informed through www.cnl.ca/nsdf, continuing to provide updated information materials, and presentations to stakeholders and the public enabling opportunities for input and discussion.
CNL-ND645	PCWO (August 16, 2017)	Does the proponent have a good track record in the construction and management of such a unique near-surface mound nuclear waste facility? Or, is it relying on AECL, which owns the site, or the staff of the regulatory agency CNSC for their expertise to guide the process?	Presently, Canadian Nuclear Laboratories (CNL) is constructing and operating two Near Surface Facilities at Port Hope and Port Granby, Ontario, for the long term management of approximately 1,700,000 m^3 of low-level waste (LLW). The Port Hope and Port Granby Near Surfaces Facilities are a key element of the Port Hope Area Initiative (PHAI), which represents the Government of Canada's commitment to clean-up and remediate LLW that resulted from radium and Uranium processing in Port Hope between 1933 and 1988. Canadian Nuclear Laboratories (CNL) is constructing and operating the facilities in accordance with the requirements of the Waste Nuclear Substance Licence from the Canadian Nuclear Safety Commission (CNSC). The design of the Port Hope and Port Granby Near Surface Disposal and scale of the facilities are similar to the NSDF proposed for the Chalk River Laboratories site. Both are Engineered Containment Mounds (ECM) with leachate collection systems and include Wastewater Treatment Plants (WWTP) to treat leachate. The total volume of waste proposed for the NSDF (1,000,000 m^3) is comparable to those proposed for the PHAI since the combined volume of waste for the Port Hope and Port Granby facilities is 1,700,000 m^3.
CNL-ND646	Northwatch (August 16, 2017)	As illustrated by the many failings of the draft EIS identified in this (Northwatch's) submission and in the submissions of many other intervenors and review participants, the proponent and their consultants have failed to produce a credible environmental impact statement and set of supporting documents; the documents simply do not provide the basis for proceeding in the environmental assessment process. There are several potential causes for this failure; we offer three: • The proponent is seeking to avoid the scrutiny that would come from a rigorous assessment process by simply starving the process of necessary information • The project is not sufficiently developed to provide an adequate description with sufficient supporting information The project is simply not viable, and evidence in its support cannot be presented due to the fundamental flaws with the project concept and design	In response to comments received from the review of the Environmental Impact Statement (EIS) by the Canadian Nuclear Safety Commission (CNSC), federal departments, the public and Indigenous groups, CNL has made changes to the project design of the Near Surface Disposal Facility (NSDF), collected additional environmental baseline data, and updated the EIS, Safety Assessments and underpinning technical supports. A number of NSDF documents are available to the public through the CNL website (www.cnl.ca/nsdf) or any document related to the NSDF Project can be requested at ermstakeholder@cnl.ca. To disseminate technical information to the public, beginning in 2018 January, CNL has provided quarterly webinar sessions/updates where subject matter experts have made presentations on various topics such as the design, waste inventory, application of International Atomic Energy Agency (IAEA) Standards and the post-closure safety assessment. CNL continues to use a variety of formats to make information available to the public. These include • Presentations to regional municipalities in Ontario and Quebec

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			• Environmental Stewardship Council meetings and tours of the NSDF sites • Non-Government Organization (NGO) site visits (Northwatch, CELA, CCRC, etc.) • Employee information sessions • Public and Industry open houses • Project updates to federal and provincial officials • Technical meetings and site visits with CNL Alumni and other stakeholders • Interactive webinars CNL remains available to provide a community based public information session when there is an expressed interest from stakeholders. A comprehensive summary of engagement activities conducted for the NSDF is provide in Section 4.0 of the final EIS. The Near Surface Disposal Facility (NSDF) Project is subject to a federal environmental assessment process which facilitate public consultation. Canadian Nuclear Laboratories (CNL) broadly advertises its project meetings and has been open and transparent about all aspects of the proposed facility. The Environmental Assessment for the NSDF Project was conducted in accordance with the Generic Guidelines for the preparation of an Environmental Impact Statement [1] and Canadian Nuclear Safety Commission (CNSC) REGDOC 2.9.1 *Environmental Protection: Environmental Principles, Assessments and Protection Measures* [2]. The NSDF design is now at the detailed design stage. The design was developed based on the codes and standards set by the IAEA, Federal regulators and Provincial authorities. It built on the large base of experience for similar facilities that exists in the US, Europe, and Canada. Codes and standards are themselves underpinned by technical studies. Canadian Nuclear Laboratories (CNL) has engaged a highly-experienced engineering consulting firm to prepare the design. Canadian Nuclear Laboratories has also engaged independent third parties to review the designs produced by the engineering consulting firm to ensure that all the analysis underpinning the design are robust and in compliance with the codes and the standards. Near surface disposal facilities with designs similar to the NSDF for low-level radioactive waste (LLW) have been licenced and are operating in Canada and in many other countries of the world. Examples include the Port Hope and Port Granby Near Surface Disposal facilities in Ontario which have a similar design and scale; combined the two facilities will contain 1,700,000 m^3 of low-level radioactive waste. A listing of similar facilities in the USA is provided in Section 2.5.2.2 of the final EIS. To demonstrate viability of the NSDF, reduce uncertainties and increase confidence in the safety assessments performed in support of the NSDF, several third party reviews were performed at various stages in the Project lifecycle. Third-party reviewers were identified based on experience with LLW Facilities around the world. The findings and recommendations of the third-party reviewers were considered during the iterative development of the design and safety assessments for the project. An international expert panel led by the U.S. Department of Energy (DOE) was formed to provide an independent third party review of the NSDF safety case and the supporting safety assessment document. The review conducted in 2019, prior

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Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

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			to CNL releasing a revised 2019 draft EIS, consisted of document reviews, an on-site visit, activity observations, webinars, and interviews. The review scope was bounded by the Environmental Impact Statement and Safety Case document, and the Post-Closure Safety Assessment, with all the referenced underpinning documents. The international expert panel evaluated the documents consistent with the non-binding expectations for a safety case and safety assessment from the IAEA Specific Safety Requirements on Disposal of Radioactive Waste (SSR-5) [3], and the IAEA Specific Safety Guide on The Safety Case and Safety Assessment for the Disposal of Radioactive Waste (SSG-23) [4]. References: [1] CNSC, Generic Guidelines for the Preparation of an Environmental Impact Statement pursuant to the Canadian Environmental Assessment Act, 2012, 2016 May. [2] CNSC, Environmental Protection: Environmental Principles, Assessments and Protection Measures, REGDOC-2.9.1, 2020 September. [3] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements, Safety Standards Series No. SSR-5, STI/PUB/1449, 2011 April. [4] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012.
		Roles and Responsibilities	
CNL-ND647	Karen Keon (May 7, 2017) Phyllis Kirby and Rick Bradshaw (May 8, 2017) David Raman (August 3, 2017) David Prentice (August 16, 2017) Emma March (August 15, 2017) Valerie Needham (August 15, 2017) Michael Nogas (August 15, 2017) Virginia MacLatchy (August 16, 2017) Martine Ouellet (Bloc Québécois) (August 14, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* [English] The facility will be in use for 50 years, during which time it is very likely there will be a change of ownership and oversight. CNL is a private sector company with a ten year contract with the Federal Government. When this agreement ends the governance of the site could go to another business or even another country, with no vested interest in the environmental impact of such a facility. • Who is responsible for the entire life span of the NDSF? • Who will be responsible for monitoring and assessing its performance over this period? • Who will be responsible for the site after the 100-year monitoring period? • Who will be responsible for the site after the 50 years of filling? • Who will be responsible for interception and/or remedial activities, and where will the funds for such activities come from? • Who will be responsible for the site after the 10-year mandate?	Atomic Energy of Canada Limited (AECL) - a federal Crown corporation responsible for managing safely and effectively the Government of Canada's radioactive waste liabilities and owner of the Chalk River Laboratories (CRL) site and of the associated liabilities - will ensure that the CRL site is safely managed and controlled for as long as necessary. AECL has contracted Canadian Nuclear Laboratories (CNL) to manage and operate its sites under a Government owned Contractor operated (GoCo) model. Canadian Nuclear Laboratories (CNL) will continue to manage and operate AECL's sites, including the NSDF, through this and subsequent contracts with AECL. Canadian Nuclear Laboratories (CNL) is meant to be an 'enduring entity', meaning that it will remain as the operator of the Chalk River site even if or when a new contractor is selected. This structure is outlined in Section 1.3.2 (Management Structure) and illustrated in Figure 1.3-1 (GoCo Model) of the final EIS. Therefore: • In its capacity of responsibly managing the Government of Canada's radioactive waste liabilities, AECL is responsible for the entire life cycle of the NSDF. • CNL, as the enduring entity as well as the licencee, will continue to monitor and assess performance of the NSDF for the full life cycle. Additionally the Canadian Nuclear Safety Commission (CNSC) provides independent oversight of licenced activities as the federal nuclear regulator. • The institutional control period includes implementation monitoring for at least 300 years. The post-institutional control period occurs after year 2400 and continues indefinitely (Section 1.1. of final EIS). As mentioned above, CNL is responsible for the full life cycle of the NSDF Project, including the post-closure phase. • CNL, as the enduring entity, will be continue to be responsible for the closure phase, expected to last 30 years after the operational phase (50 years). • CNL, as the enduring entity will be responsible for interception/remedial activities with funding from AECL. • CNL, as the enduring entity, will continue to operate the Chalk River Laboratories (CRL) site after the 10-year

CNL Table: Consolidated Public and Indigenous Groups' Comments on the Near Surface Disposal Facility Project Draft EIS

Tableau pour la LNC: Commentaires consolidés du public et des groupes autochtones sur l'ébauche de l'EIE du Projet d'installation de gestion des déchets près de la surface

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		• Who will do the waste classification? • Will future repairs and upkeep be the responsibility of taxpayers? CNL proposes oversight for a few decades, at which point they say that it becomes the responsibility of the government, nowhere near the few hundred years cited above. Canada is a member of IAEA and as such, has an obligation to follow their standards and protocols. [Français] L'installation sera utilisée pendant 50 ans, au cours desquels il y aura très probablement un changement de propriétaire et de contrôle. Les LNC sont une entreprise du secteur privé liée au gouvernement fédéral par un contrat de dix ans. Lorsque cet accord prendra fin, la gouvernance du site pourrait être relayée à une autre entreprise, voire à un autre pays, n'ayant pas d'intérêt direct pour l'impact environnemental d'une telle installation. • Qui est responsable pour la durée de vie de l'IGDPS? • Qui sera responsable pour la surveillance et de l'évaluation de sa performance durant cette période? • Qui sera responsable du site après la période de surveillance de 100 ans ? • Qui sera responsable du site après la période de 50 ans de remplissage ? • Qui sera responsable des activités d'interception et / ou de restauration, et d'où viendront les fonds pour de telles activités? • Qui sera responsable du site après le mandat de 10 ans ? Qui fera le classement des déchets? Les réparations et l'entretien futurs seront-ils la responsabilité des contribuables?	mandate under GoCo, regardless whether there is a change in contractor or not. • CNL will conduct waste characterization/classification. Waste characterization is an important part of routine CNL activities implemented across the Chalk River Laboratories (CRL) site. Current practices of waste storage at the CRL site already characterize and segregate waste based on the NSDF Waste Acceptance Criteria (WAC) [1]. This WAC [1] is implemented as part of the NSDF Project operations. As a result, the NSDF is driving improvements and new requirements for waste characterization at CNL. Waste characterization is subject to the oversight and inspection activities by the Canadian Nuclear Safety Commission (CNSC). • Funding will continue to be provided by AECL, until the end of the institutional control phase to ensure the long-term safety of the NSDF and the safety of people and the environment. Based on International Atomic Energy Agency (IAEA) standards for the management of radiological hazards and radioactive wastes, the design of the NSDF Project is commensurate with the hazard. In the development of the NSDF, CNL has followed both Canadian and International requirements and guidance. This includes the CNSC Guidance such as REGDOC-2.11.1 (*Waste Management Volume III; Assessing the Long-Term Safety of Radioactive Waste Management*) [2] and IAEA Safety Standards for Disposal of Radioactive Waste (SSR-5) [3], *Near Surface Disposal Facilities for Radioactive Waste* (SSG-29) [4], Safety Case and Safety Assessment for the Disposal of Radioactive Waste (SSG-23) [5]. References: [1] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [2] CNSC, Waste Management, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [3] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements, Safety Standards Series No. SSR-5, STI/PUB/1449, 2011 April. [4] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [5] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012. [Français] Énergie atomique du Canada Ltée (EACL) – société d'État fédérale chargée de la gestion sûre et efficace du passif nucléaire du gouvernement du Canada et propriétaire du site des Laboratoires de Chalk River (LCR) et des déchets qui y sont entreposés – veillera à ce que le site des LCR soit géré de façon sûre et contrôlée aussi longtemps que ce sera nécessaire. EACL a confié aux Laboratoires nucléaires canadiens (LNC) la gestion et l'exploitation de ses sites dans le cadre du modèle OGEE (organisme gouvernemental exploité par un entrepreneur). Les Laboratoires nucléaires canadiens (LNC) continueront de gérer et d'exploiter les sites d'EACL, dont l'IGDPS, conformément à ce contrat et aux contrats ultérieurs conclus avec EACL. Ils sont censés être une « entité durable », c'est-à-dire qu'ils resteront l'exploitant du site de Chalk River même si un nouvel entrepreneur était retenu. Cette structure est expliquée à la section 1.3.2 (Structure de gestion) et illustrée à la figure 1.3-1 (Modèle OGEE) de l'EIE définitive. Par conséquent : • En sa qualité de gestionnaire responsable du passif nucléaire du gouvernement du Canada, EACL assume la responsabilité de tout le cycle de vie de l'IGDPS. • À titre d'entité durable et de titulaire du permis, les LNC continueront de surveiller et d'évaluer le rendement de l'IGDPS durant tout son cycle de vie. Par ailleurs, à titre d'organisme fédéral chargé de la réglementation des

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			activités nucléaires, la Commission canadienne de sûreté nucléaire (CCSN) exerce une surveillance indépendante des activités autorisées. • La période de contrôle institutionnel comprend une période de surveillance d'au moins 300 ans. La période post-contrôle institutionnel part de l'année 2400 et se poursuivra indéfiniment (voir la section 1.1 de l'EIE définitive). Rappelons que les LNC sont responsables de tout le cycle de vie de l'IGDPS, y compris de la phase de post-fermeture. • À titre d'entité durable, les LNC seront également responsables de la phase de fermeture, qui s'étendra sur 30 ans après la phase d'exploitation (50 ans). • À titre d'entité durable, les LNC seront responsables des activités d'interception/d'assainissement grâce au financement fourni par EACL. • À titre d'entité durable, les LNC continueront d'exploiter le site des Laboratoires de Chalk River (LCR) après l'échéance du mandat de 10 ans de l'entente actuelle selon le modèle d'OGEE, qu'un nouvel entrepreneur soit retenu ou non. • Les LNC procéderont à une caractérisation et à un classement des déchets. La caractérisation des déchets est un élément important des activités régulières exercées sur tout le site des Laboratoires de Chalk River (LCR). Les pratiques actuelles d'entreposage des déchets sur le site supposent déjà une caractérisation et une ségrégation des déchets en fonction des critères d'acceptation des déchets (CAD) de l'IGDPS [1]. Ces CAD [1] sont appliqués dans le cadre de l'exploitation de l'IGDPS. Celle-ci est donc l'occasion d'améliorer ce processus et d'ajouter de nouvelles exigences aux LNC. La caractérisation des déchets est assujettie à des mesures de surveillance et d'inspection relevant de la Commission canadienne de sûreté nucléaire (CCSN). • EACL continuera de fournir des ressources financières jusqu'à la fin de la période de contrôle institutionnel pour garantir la sûreté à long terme de l'IGDPS et la protection de la population et de l'environnement. Selon les normes de gestion des risques radiologiques et des déchets radioactifs établies par Énergie atomique du Canada Ltée (EACL), la conception de l'IGDPS est proportionnée aux risques. Pour élaborer l'IGDPS, les LNC se sont appuyés sur des directives et des critères canadiens et internationaux. Ils ont notamment pris en compte le REGDOC-2.11.1 (*Gestion des déchets, Tome III : Évaluation de la sûreté à long terme de la gestion des déchets radioactifs* [2]) de la CCSN et les normes SSR-5 (*Normes de sûreté, Stockage définitif des déchets nucléaires* [3]), SSG-29 (*Near Surface Disposal Facilities for Radioactive Waste* [4]) et SSG-23 (*Safety Case and Safety Assessment for the Disposal of Radioactive Waste* [5]) de l'AIEA. Références [1] Critères d'acceptation des déchets de l'installation de gestion des déchets près de la surface, 232-508600-WAC-003. [2] CCSN, Gestion des déchets, Tome III : Évaluation de la sûreté à long terme de la gestion des déchets radioactifs REGDOC-2.11.1, mai 2018. [3] AIEA, Stockage définitif des déchets radioactifs, Prescriptions de sûreté particulières, norme de sûreté SSR-5, STI/PUB/1449, avril 2011. [4] AIEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [5] AIEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012.
CNL-ND648	[William Turner](#) (May 31, 2017)	I note approval by AECL is not included in Figure 6, Integrated Waste Strategy Interaction with Other CNL Strategies and Plans (Page 3-7 of the Summary).	The Near Surface Disposal Facility (NSDF) Project is based on the mandate of Atomic Energy of Canada Limited (AECL) to substantially reduce the risks associated with the waste and to create conditions for the revitalization of the Chalk River

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	5.	This leads to several questions: • Does this strategy in any way fulfill AECL's responsibility for decommissioning and waste management? • If so, who within AECL approved this strategy? • If not, what does it represent? It cannot be a CNL strategy since their responsibilities are limited to operations and management. • What are the other "CNL strategies and plans" which interact with this strategy? • Who within AECL approves those?	Laboratories (CRL) site. AECL is focused on environmental remediation and is taking steps to accelerate this work to enhance the protection of the environment, reduce risks and not burden future generations. As outlined in Section 2.2 of the final Environmental Impact Statement (EIS), Canadian Nuclear Laboratories (CNL) and AECL are working actively at strategic and operational levels to identify strategies and solutions for waste management of the entire life cycle of all waste classifications including low-level waste (LLW), intermediate level waste (ILW), high level waste (HLW), hazardous waste and clean (non-radiological) waste. Aligned to this, Canadian Nuclear Laboratories (CNL) has developed an Integrated Waste Strategy [1] that concisely details a cradle to grave approach for all CNL-managed waste classifications, from generation to disposal. The Integrated Waste Strategy is based on AECL's waste inventory and forecast data and built on the fundamental principles of waste avoidance, minimization and reuse. The Integrated Waste Strategy was approved by the Vice-President, CNL Environmental Remediation Management. AECL, in its capacity as the federal organization responsible for the long-term stewardship of its sites and waste, does review and accept CNL's strategic plans. For example, CNL's long-term plans (5- and 10-year plans) are accepted by AECL, as is the Annual Program of Work and Budget. Other key plans are subject to extensive review and comment by AECL's experts to ensure that they are aligned with AECL's overall responsibilities, direction and priorities. This was the case for the Integrated Waste Strategy. Canadian Nuclear Laboratories' (CNL's) 10 Year Plan sets out priorities and plans across all of CNL's missions: science and technology, capital, and decommissioning and waste management [2]. Canadian Nuclear Laboratories will implement safe, cost-effective environmental remediation (ER) and waste management strategies. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Canadian Nuclear Laboratories 2016-2026 10-Year Integrated Plan Summary, CRL-502000-PLA-001.
CNL-ND649	Joan Lougheed and Town of Deep River (August 16, 2017) Michael Stephens (August 14, 2017)	*Concerns on this topic were expressed by more than one commenter, and comments have either been summarized, or included as excerpts from commenter submissions.* CNL has not approached the Town of Deep River regarding the potential financial exposure, impacts, commitments and liabilities to Deep River resulting from the NSDF's near and long term operations and closure and post closure obligations. Specifically, there has been no agreement or discussion as to what would happen and who would be required to fill a void if CNL were to default on its obligations. There has been no agreement or discussion regarding compensation to the Town of Deep River , or any third parties, who incur damages due to polluting or other activities giving rise to a claim and for any decommissioning, clean up, rehabilitation, long term monitoring and perpetual care facilities requiring the Town of Deep River or third parties to act. Accordingly, long-term financial assurances need to be in place. Financial assurances should be provided in the form of cash deposits, surety bonds, negotiable securities guaranteed by the Federal Government, or irrevocable letters of credit in favour of the Town of Deep River.	Canadian Nuclear Laboratories (CNL)/ Atomic Energy of Canada Limited (AECL) have had on-going working group engagements with the Town of Deep River and these will continue. The Mayor of Deep River and CNL's President and CEO have also met on numerous occasions to discuss areas of mutual interest, including CNL's project activities and a host community agreement. AECL, a federal Crown corporation, owns the Chalk River site and all of its radioactive waste. AECL is responsible for discharging its radioactive waste liabilities and to look out for the best interests of Canadians in the short and long run. Under the Government-owned, Contractor-operated model, AECL oversees the activities of CNL from the perspective of value to Canada, including the proposed Near Surface Disposal Facility (NSDF). The NSDF is an important component of the plan to effectively address the AECL's environmental responsibilities through the remediation of contaminated lands on the Chalk River site and the decommissioning of aging infrastructure. This work contributes to the revitalization of the Chalk River Laboratories, which provides employment to approximately 3 000 employees, the majority of which live in Renfrew County. As per the *Nuclear Safety and Control Act*, as outlined in Canadian Nuclear Safety Commission (CNSC) REGDOC 3.3.1 (*Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities*) [1], licensees are required to make adequate provision for the safe decommissioning of existing or proposed nuclear facilities by ensuring that

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		In addition, there must be provision for compensating Deep River for impacts associated with having a near surface disposal facility for radioactive waste in its community. The Town of Deep River recognizes that requisite financial assurance and compensation may be addressed during the licensing of the NSDF, nevertheless the Town of Deep River is of the opinion that this is an important matter worthy of pre-emptive discussion.	sufficient financial resources are available to fund all approved decommissioning activities should the licensee be not able to fulfill its obligations. This financial guarantee has been provided for the Chalk River site, by the Government of Canada. Section 5.10 of the final Environmental Impact Statement (EIS) seeks to understand and characterize the potential residual effects of the NSDF Project and previous, existing and reasonably foreseeable developments on the socio-economic environment. The socio-economic assessment follows the overall environmental assessment approach and methods described in Section 5.1 Environmental Assessment Approach. Positive residual effects to the socio-economic environment were identified, primarily from activities that occur during the construction phase, because the NSDF Project could provide employment of personnel in the region, provide contracting and supplier opportunities to local and regional businesses, and some use of services such as commercial accommodations. Therefore, residual effects of the NSDF Project on the labour market, economic development, and housing and accommodation are positive, and significance is not determined. Reference: [1] CNSC, REGDOC 3.3.1 - Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities (will supersede G-206 – Financial Guarantees for the Decommissioning of Licensed Activities).
CNL-ND650	Great Lakes and St. Lawrence Cities Initiative (August 15, 2017)	Regarding the *Nuclear Liability and Compensation Act*, the EIS should estimate the financial costs associated with damages to people and businesses, and compare this estimate to the liability limit, in full transparency. Note, the law requires operators of a nuclear power plant to pay up to $1 billion for civil damages resulting from an accident at that plant. The liability amount is deemed proportional to the level of risk posed by each class of nuclear installation. For some of the Canadian Nuclear Laboratories waste disposal installation, the liability limit has been fixed to only 1 million dollars. Several options to finance and manage an adequate emergency situation contingency fund should be presented for further consideration.	The liability of all operators under the *Nuclear Liability and Compensation Act* is $1 billion; however the legislation contemplates that some installations may not be required to purchase the full limit (in insurance, or a combination of insurance and alternate security) due to the nature of the facilities and/or activities at the installation. Although all nuclear power plants are subject to the $1 billion limit other installations, such as Chalk River Laboratories (CRL) site, have a limit that has been set based on the relative risk. The limit of insurance required for the CRL site is $180 million. For Canadian Nuclear Laboratories (CNL) sites there is a separate indemnity agreement with the Government of Canada to cover the difference between the established insurance limit and the $1 billion total liability limit. Therefore, the CRL site is covered in total for the $1 billion limit, with part of that coverage being provided by insurance (as set by the act) and the remainder being covered under the indemnity agreement with the Government of Canada. The NSDF Project, being a facility within the CRL site and under the CRL licence [1], will not present an elevated risk as such there is no change contemplated for the limit of insurance required for the CRL site.
CNL-ND651	Northwatch (August 16, 2017)	EIS fails to provide is any contingency plans or alternate planning scenarios in the event that the Canadian Nuclear Energy Alliance does not continue to have a management role beyond the current contract; for example, there is no description of how management would transition to a different consortium, what the role of Atomic Energy of Canada Limited is in project definition and direction under the current model and what AECL's role would be in transitioning to a different contracted operator, and how such transitions would impact project implementation at each of its various stages through construction, operation and closure	As the owner of the Chalk River Laboratories (CRL) site and of the associated liabilities, Atomic Energy of Canada Limited (AECL) - a federal Crown corporation – is responsible for managing the Government of Canada's radioactive waste liabilities. AECL is the owner of the Chalk River Laboratories site, and thus the NSDF is approval is granted and construction/operation proceeds. AECL delivers its mandate through a Government-owned, Contractor-operated model, whereby the management and operation of its sites is under the responsibility of Canadian Nuclear Laboratories (CNL). The Government owned Contractor operated (GoCo) model has been set up for CNL to be an enduring entity, meaning that AECL could award a new contract for the management and operation of CNL to a different consortium, and CNL would remain responsible for the management and operation of AECL's sites. While the ownership of CNL may change (Canadian National Energy Alliance is the current owner of CNL), CNL will remain the operator and licensee. Canadian Nuclear Laboratories continues to have all of the necessary skills, expertise and qualifications to continue to function under any scenario. This structure is outlined in Section 1.3.2 (Management Structure) and illustrated in Figure 1.3-1 (GoCo Model) of the final Environmental Impact Statement (EIS).

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CNL-ND652	Northwatch (August 16, 2017)	Related to Northwatch Information Request #2 (p. 1 of Northwatch's IRs), provide a description with supporting documentation of how the contractual arrangements between CNEA, CNL and AECL set priorities and targets with respect to a) site remediation and b) site revitalization (IR #3).	Canadian Nuclear Laboratories (CNL) is a private-sector company that is contractually responsible for the management and operation of AECL's sites, facilities and assets. AECL, in its capacity as the federal organization responsible for the long-term stewardship of its sites and waste, reviews and accepts CNL's strategic plans, which include site remediation and site revitalization direction and priorities. For example, CNL's long-term plans (5- and 10-year plans) are accepted by AECL, as is the Annual Program of Work and Budget. Other key plans are subject to extensive review and comment by AECL's experts to ensure that they are aligned with AECL's overall responsibilities, direction and priorities. With respect to the NSDF Project specifically, AECL reviewed and accepted CNL's recommendations for LLW disposal. Canadian Nuclear Laboratories' (CNL's) 10 Year Plan sets out priorities and plans across all of CNL's missions: science and technology, capital, and decommissioning and waste management [1]. Canadian Nuclear Laboratories (CNL) will implement safe, cost-effective environmental remediation (ER) and waste management strategies to support site revitalization. The Chalk River Laboratories (CRL) Site Comprehensive Preliminary Decommissioning Plan (CPDP) [2] was revised in 2018 March to align with AECL's strategy to reduce nuclear liabilities through the decommissioning of outdated buildings at the Chalk River site. As outlined in Section 2.1 of the CPDP, the 10 year plan for the period 2016-2026 provides the accelerated timeframes for site cleanup. The key change that allows large-scale site remediation and hazard reduction to occur is the advancement of a low-level waste disposal facility (proposed Near Surface Disposal Facility (NSDF)) from the previous timeframe of 2035. Specifically, the changes to the waste disposal strategy have a corresponding effect on the timing of decommissioning and environmental remediation activities. Large-scale remediation projects have been brought forward to align with the proposed initiation of NSDF operations. Many decommissioning activities have also been brought forward, not only as a result of planned disposal facilities, but also because of the renewed Science and Technology mission for the site. References: [1] Canadian Nuclear Laboratories 2016-2026 10-Year Integrated Plan Summary, CRL-502000-PLA-001. [2] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001.
CNL-ND653	Ralliement contre la pollution radioactive (August 3, 2017)	*Please note that this comment was submitted in French, and therefore a response in French will be provided.* *Veuillez noter que ce commentaire a été soumis en français, et une réponse sera donc fournie en français.* Ce projet escamote les responsabilités du gouvernement à l'égard de ses déchets radioactifs historiques. Il semble avoir été conçu en catastrophe uniquement pour permettre la construction de laboratoires plus modernes à Chalk River. Comment notre gouvernement a-t-il pu accorder la priorité à ce projet de dépotoir qu'on dit destiné aux déchets les moins risqués alors qu'il recevra aussi des déchets radioactifs dont la durée de désintégration est bien supérieure à celle du dépotoir ? L'intervenant est de l'avis que les LNC semblent surtout coincé dans les échéances absurdes de modernisation des laboratoires et les critères d'économie imposé par le gouvernement du Canada.	Énergie atomique du Canada Ltée (EACL), société d'État fédérale, est propriétaire du site des Laboratoires de Chalk River (LCR) et de tous ses déchets radioactifs. Elle doit assumer la gestion du passif nucléaire et veiller aux intérêts des Canadiens à court et à long termes. En vertu du modèle OGEE (organisme gouvernemental exploité par un entrepreneur), EACL supervise les activités des LNC dans la perspective de leur valeur pour le Canada, et cela comprend le projet d'installation de gestion des déchets près de la surface (IGDPS). L'IGDPS est un élément important du plan permettant à EACL de remplir efficacement ses responsabilités environnementales au moyen de l'assainissement des sols contaminés du site de Chalk River et du déclassement des infrastructures vieillissantes. L'objectif est d'assainir l'environnement, d'en améliorer la protection, de réduire les risques et de ne pas alourdir le fardeau des générations à venir. Les Laboratoires nucléaires canadiens (LNC) sont une entreprise privée chargée sous contrat de la gestion et de l'exploitation des sites, des installations et des actifs d'EACL. En sa qualité d'organisme fédéral responsable de la gérance à long terme de ses sites et de ses déchets, EACL examine et accepte les plans stratégiques proposés par les LNC, lesquels

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		L'intervenant exprime également leur inquiétude que la CCSN elle-même prenne ses ordres du même gouvernement.	comprennent des mesures d'assainissement et de revitalisation des sites, assorties de directives et de priorités. Il accepte par exemple les plans à long terme des LNC (quinquennaux et décennaux), ainsi que leur programme de travail et leur budget annuels. D'autres plans importants sont assujettis à l'examen approfondi et aux commentaires d'experts d'EACL pour s'assurer qu'ils sont conformes aux responsabilités, aux orientations et aux priorités de l'organisme. Concernant plus précisément le projet d'IGDPS, EACL a examiné et accepté les recommandations des LNC concernant le stockage des DFA. À l'heure actuelle, les déchets accumulés sur les sites des LNC sont temporairement conservés dans des systèmes d'entreposage conformément aux conditions du permis actuel qui protègent les travailleurs, la population et l'environnement. Cependant, le fait de continuer à construire des systèmes d'entreposage temporaire pour les déchets de faible activité (DFA) sur le site des LCR n'est pas conforme aux principes modernes de gestion des déchets. Selon la *Politique-cadre du Canada en matière de déchets radioactifs*, les producteurs et les propriétaires de déchets radioactifs doivent financer, organiser, gérer et exploiter les installations requises pour les stocker. La gestion responsable des déchets nucléaires comprend une gestion du cycle de vie complet, de la production au stockage. L'IGDPS proposée a pour but de stocker à titre permanent des DFA actuels et à venir sur le site des LCR, de façon à protéger la population et l'environnement. Par ailleurs, le projet permettrait d'assainir des terres et des zones de gestion des déchets contaminées depuis longtemps et de déclasser les infrastructures vieillissantes pour faciliter la revitalisation du site des LCR. Il convient de noter que l'assainissement des ZGD ferait l'objet d'un examen environnemental distinct et nécessiterait également un examen et une approbation de la Commission canadienne de sûreté nucléaire (CCSN) avant tout travail, de sorte que la discussion des options d'assainissement n'a pas été incluse dans de l'EIE definitive. La conception de l'IGDPS a été révisée pour réduire l'inventaire aux SEULS déchets de faible activité. Les barrières artificielles de l'installation garantiront donc le confinement des déchets pendant les quelques centaines d'années nécessaires à la décroissance de l'inventaire. L'inventaire radiologique diminuera de trois ordres de grandeur au cours des 100 premières années, comme l'illustre la figure 3.3.1-2 de l'EIE définitive. L'évaluation environnementale (EE) et le processus d'attribution du permis sont structurés de façon que tout projet d'installation nucléaire soit assorti de mesures garantissant la protection de la population et de l'environnement. Comme la réglementation est ultimement du ressort de la Commission canadienne de sûreté nucléaires (CCSN), c'est à elle qu'il incombe de donner le feu vert aux projets. La Commission approuve des projets seulement s'il est prouvé qu'ils sont sûrs et qu'ils protègent l'environnement. L'échéancier actuel du projet d'IGDPS, en attendant son approbation réglementaire, est présenté à la section 1.1 de l'Étude d'impact environnemental (EIE). La phase de construction, qui comprend la période de préparation du site, devrait commencer en 2021 ou aussitôt que les permis et autorisations nécessaires auront été obtenus. La phase d'exploitation devrait commencer en 2024 et se terminer vers 2070 (soit environ 50 ans). Cette phase comportera les deux périodes décrites plus haut. La phase de fermeture comprendra surtout l'installation de la couverture définitive du monticule de confinement artificiel (MCA), la suite du traitement du lixiviat résiduel et une surveillance continue de l'environnement. La phase de fermeture devrait commencer en 2070 et se prolonger jusqu'en 2100, après quoi l'IGDPS passera à la phase de post-fermeture.
CNL-ND654	Martin Flood (August 16, 2017) PCWO (August 16, 2017)	CNL has stated that under their contract with AECL, CNL has no liability for any future problems that may arise following the construction of the Disposal Facility. What specific steps will AECL take to ensure that the construction of the Disposal Facility is carried out to rigid engineering standards?	The Government owned Contractor operated (GoCo) management structure is outlined in Section 1.3.2 (Management Structure) and illustrated in Figure 1.3-1 (GoCo Model) of the final EIS. Atomic Energy of Canada Limited (AECL), a federal Crown corporation, owns the Chalk River site and all of its radioactive waste. AECL is responsible for discharging its radioactive waste liabilities and to look out for the best interests of Canadians

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	Northwatch (August 16, 2017)	What are the distinct roles and responsibilities of AECL, CNL and the various business partners like SNC Lavalin? **1.0 -** Northwatch Information Request #4: As noted in the draft EIS *"Canadian Nuclear Laboratories (CNL) is proposing to carry out the designated NSDF Project on land that is held in the name of AECL, which is property of the Crown. As such, CNL is the proponent for the development of the NSDF Project and associated infrastructure"*16; The draft EIS is silent on how authority over project directions and design are exercised by AECL and/or shared between AECL and CNEA/CNL and/or exercised solely by CNEA/CNL. Provide a description with supporting documentation of how, within the contractual arrangements between CNEA, CNL and AECL, decision making is exercised by AECL with respect to NSDF project and/or shared between AECL and CNEA/CNL.	in the short and long run. Under the Government-owned, Contractor-operated model, AECL oversees the activities of CNL from the perspective of value to Canada, including the proposed Near Surface Disposal Facility (NSDF). Canadian Nuclear Laboratories (CNL) is a private-sector company that is contractually responsible for the management and operation of AECL's sites, facilities and assets. The GoCo model has been set up for CNL to be an enduring entity, meaning that AECL could award a new contract for the management and operation of CNL to a different consortium, and CNL would remain responsible for the management and operation of AECL's sites. While the ownership of CNL may change (Canadian National Energy Alliance is the current owner of CNL), CNL will remain the operator and licensee. Atomic Energy of Canada Limited, in its capacity as the federal organization responsible for the long-term stewardship of its sites and waste, reviews and accepts CNL's strategic plans, which include site remediation and site revitalization direction and priorities. For example, CNL's long-term plans (5- and 10-year plans) are accepted by AECL, as is the Annual Program of Work and Budget. Other key plans are subject to extensive review and comment by AECL's experts to ensure that they are aligned with AECL's overall responsibilities, direction and priorities. With respect to the NSDF Project specifically, AECL reviewed and accepted CNL's recommendations for LLW disposal. All of CNL's activities are subject to the rigorous oversight of the Canadian Nuclear Safety Commission (CNSC), including construction of the NSDF.
		Document Requests	
CNL-ND655	Brian Ahearn (May 15, 2017)	The commenter requests to see the engineering details of the facility as they become available and have them explained to the project stakeholders.	Section 3 of the final EIS (Project Description) has been revised to provide a more comprehensive description of the main features of the NSDF and identifies the components (e.g., physical infrastructure such as the disposal facility and roads) and activities (e.g., placement of waste) related to the site preparation and construction, operations, closure, and post-closure phases. The NDSF Design Description [1] provides more detailed information on the engineering. The Design Description is available by request to ermstakehoder@cnl.ca. Reference: [1] Design Description, 232-503212-DD-001.
CNL-ND656	OFWCA (Johanna Echlin) (May 8, 2017)	The Safety Analysis and the Performance Assessment (included in the EIS) will be important to see and to be evaluated.	The Safety Analysis Report [1] and Post-Closure Safety Assessment [2] are available by request to ermstakehoder@cnl.ca. References: [1] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002. [2] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND657	Joan Lougheed and Town of Deep	Considerable reference is made throughout the document to the WAC and the Integrated Waste Strategy ("IWS") yet neither document has been released. The WAC, as currently summarized in the draft EIS, insufficiently describes the criteria for waste inclusion in the NSDF. A WAC document with the	The Canadian Nuclear Laboratories (CNL) Integrated Waste Strategy [1] and Near Surface Disposal Facility (NSDF) Waste Acceptance Criteria (WAC) [2], as well as other regularly requested NSDF supporting documents, are available on the CNL website (www.cnl.ca/nsdf). Other technical supporting documents are available upon request by contacting

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	River (August 16, 2017) Northwatch (August 16, 2017)	requisite bounding information on type of waste, radionuclide concentration I total content, and chemical characterizations / concentrations, with associated techniques to confirm as to how the WAC will be met and overall ECM inventory managed, must be issued before the EIS is finalized and in advance of the CNSC Public Hearing for consideration of the EA. This is required to demonstrate that the safety objectives can be met in an integrated manner - waste inventory, facility design and environmental I geographical characteristics. **3.2.2** - The draft EIS states: "The WAC, along with adequate waste characterization, are essential for ensuring only waste with acceptable physical, radiological, and chemical characteristics is emplaced in the ECM" and "The development of the WAC is an iterative process that occurs in parallel with the development of the safety analysis, performance assessment, facility design, and the environmental assessment process. The development of the WAC is based on the interpretation and application of IAEA guidelines, relevant regulations and WAC documents from other approved similar waste disposal sites. In addition, the WAC are based on Canadian Standards Association (CSA) standards, and CNL's strategic planning and stakeholder workshops." According to several statements in the draft EIS the WAC is of central importance to the performance and safe operation of the proposed ECM, but the descriptions are very limited and the document is not provided. Northwatch Information Request #30: Provide a copy of the document, titled "Waste Acceptance Criteria 232- 508600-WAC-002, Deliverable 1.1, Revision 2 and a detailed discussion of how it informs, supports or challenges design as currently developed for the ECM.	ermstakeholder@cnl.ca. Canadian Nuclear Laboratories (CNL) is available to discuss these or any other documents. The development of the NSDF Waste Acceptance Criteria (WAC) [2] was an iterative process completed in conjunction with the development of other safety significant documents. The Waste Acceptance Criteria has been revised to reflect the reduction of inventory to only low-level waste, provide transparency on the basis of the WAC, and incorporate Canadian Nuclear Safety Commission (CNSC) comments during licensing reviews. The waste generator has the primary responsibility to have their waste characterized and profiled, and is able to be assisted in this task by Waste Programs personnel, if required. The Waste Stream Profile documents the physical properties, chemical and radiological characterization data, radiological surveys of the waste, the hazardous waste status, estimated waste volume, and the identification of any unique properties of the waste, for the purpose of establishing handling, transportation, processing, storage and/or disposal requirements. Since the announcement of the NSDF Project, the Waste Programs department at CNL have revised their procedures and requirements for Waste Characterization of all waste streams. For example, the radionuclides presented as part of the Reference Inventory [3] must be fully characterized in order to maintain accurate accounting of total radionuclide content in the NSDF. Waste characterization is an important part of routine CNL operations implemented across the Chalk River (CRL) site. Current practices of waste storage at CRL already characterize and segregate waste based on an improved WAC. This WAC is planned to be implemented as part of the NSDF Project operations. As a result, the NSDF is driving improvements and new requirements for waste characterization at CNL. Section 11.0 of the final Environmental Impact Statement (EIS) recognized that the WAC is fundamentally a verification program to ensure that all waste received for disposal is in compliance with the design and safety basis of the facility. The control and tracking of the waste inventory into the facility allows for the verification of the assumptions used in the EIS (e.g., pathways analysis modelling is based on the reference inventory proposed to be disposed in the ECM). The WAC ensures the wastes placed within the NSDF do not exceed the reference inventory used to inform the EIS or various Technical Supporting Documents. References: [1] Canadian Nuclear Laboratories Integrated Waste Strategy, CW-508600-PLA-002. [2] Near Surface Disposal Facility Waste Acceptance Criteria, 232-508600-WAC-003. [3] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003.
CNL-ND658	MNO (August 16, 2017)	The MNO should take this opportunity to formally express their interest in all materials related to this Project, moving forward. The MNO should also request all comprehensive study results, data and modelling (used by CNL to reach their conclusions) of the NSDF site previously provided which were not disclosed to the MNO.	Canadian Nuclear Laboratories (CNL) is committed to transparency with regard to the technical basis for the NSDF to the extent possible. The following documents are available to the public by request and/or available to download (ermstakeholder@cnl.ca and/or www.cnl.ca/nsdf). 2019 Revised draft Environmental Impact Statement (EIS) • Executive Summary • Revised NSDF 2019 draft EIS • Appendices to support revised 2019 draft EIS Technical Support Documents

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			• Air Quality Assessment for the NSDF Project • Climate Change Assessment for the NSDF Project • Design Description • Ecological Risk Assessment for the NSDF Project • Environmental Assessment Stakeholder Activities Report – NSDF & NPD Closure Projects • Groundwater Flow Modelling of the NSDF Project • Indigenous Engagement Report for the NSDF Project • Post-Closure Safety Assessment 3rd Iteration for the NSDF Project • Safety Analysis Report for the NSDF Project • Site Selection Report for the NSDF Project • Stage 4 Archaeological Assessment • Stakeholder Activities Report for the NSDF Project • Stakeholder Engagement Report • Surface Water Quality Assessment for the NSDF Project Other Supporting Documents • 2019 CNL Integrated Waste Strategy • NSDF Project Effluent Discharge Targets • NSDF Project Geomembrane Relative Performance Report • NSDF Project Inventory of Constituents of Potential Concern (COPC) • NSDF Project Reference Inventory Report • NSDF Project Waste Acceptance Criteria The MNO and CNL have signed a Memorandum of Understanding (MOU). Together, the two organizations have agreed to a mutually beneficial, on-going working relationship and to provide a process to which CNL can engage with the MNO at the local and regional levels in order to better understand any Métis Rights and Interests that may be impacted in the general and surrounding areas around the projects. Canadian Nuclear Laboratories (CNL) is willing to share with the MNO any studies specifically requested to the extent possible.
CNL-ND659	Northwatch (August 16, 2017)	**3.2.2 -** The draft EIS states: "Six separate criteria were considered in selecting WAC, as defined by a group of subject matter experts. Ultimately, only the following two criteria were determined to be essential in defining radiological limits for NSDF WAC: 1) Meeting Performance Assessment Safety objectives, and 2) Proven technology" as well as including numerous other references to the performance assessment. "Performance assessment" is referred to repeatedly in the draft EIS but the performance assessment was not presented or even summarized in the draft EIS, the document is not included in the appendices, and is not available on-line through the public registry, through the CNL web site, or through a general search. It is listed in the references.	Section 3.2.2 (Waste Acceptance Criteria (WAC)) from the 2017 draft Environmental Impact Statement (EIS) is now Section 3.3.3 in the final EIS. The statement regarding the six criteria has been removed in the final EIS. In 2017, the NSDF Project had a single "Performance Assessment' that covered all phases of the NSDF Project. This has now been divided into two documents –the Post-Closure Safety Assessment (PostSA) [1] and the NSDF Safety Analysis Report (SAR) [2]. The Post-Closure Safety Assessment represents the long-term performance analysis for NSDF and is summarized in both Sections 5.7 (Ambient Radioactivity and Ecological Health) and 5.8 (Human Health) of the final EIS. The PostSA [1] and SAR [2] available by request to ermstakehoder@cnl.ca. References: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004. [2] Near Surface Disposal Facility Safety Analysis Report, 232-508770-SAR-002.

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		Northwatch Information Request #31: Provide a copy of "CNL. 2016c. Performance Assessment for Near Surface Disposal Facility to support the Environmental Impact Statement, 232-509240-ASD-001 Revision R0. 2017."	
CNL-ND660	Northwatch (August 16, 2017)	As found in sections 1.1, 2.4.2.1, 3.1.1, 3.2.2, 3.2.2.2, 3.10.1, 5.1.3.2, 5.4.2.3.2, 5.8.3.2, 5.9.3.2, 5.10.3.2, 6.3.1, 10.0 - There are numerous references to the "safety case" in the draft EIS, throughout several sections. All references and descriptions are brief and very generally, with the common theme of referencing the "safety case" as being integral to the performance of the proposed ECM. For example, in Section 2.4.2.2 the draft EIS states "Canadian Nuclear Laboratories considered these CNSC's guidance documents in developing the design and safety case for the NSDF" and numerous aspects of the operation are described in the draft EIS as having to "demonstrate compliance with the safety case assumptions" The "safety case" is a foundational piece of the project development process for a radioactive waste management facility, comprised of the set of technical arguments which, in combination, make the case for the long term safety and performance of a proposed facility. An assessment of the safety case is integral to the evaluation of the project – in this case the ECM – which has been developed to support. Northwatch Information Request #32: Provide a copy of the report(s) that present the safety case, and its development and technical basis, along with all related and supporting documents. *See original submission by Northwatch for page numbers.*	The Near Surface Disposal Facility (NSDF) Project has prepared the NSDF Safety Case [1] as a standalone document to support the licensing of the NSDF. The NSDF Environmental Impact Statement (EIS) supports the environmental assessment process. The following International Atomic Energy Agency (IAEA) and Canadian Nuclear Safety Commission (CNSC) documents establish the framework for the NSDF Safety Case: • CNSC, Assessing the Long-Term Safety of Radioactive Waste Management (REGDOC-2.11.1, Volume III) [2]. • IAEA, The Safety Case and Safety Assessment of Disposal of Radioactive Waste (SSG-23) [3]. • IAEA, Near Surface Facilities for Radioactive Waste (SSG-29) [4]. • IAEA, Disposal of Radioactive Waste (SSR-5) [5]. The NSDF Safety Case document is available by request to ermstakehoder@cnl.ca. References: [1] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001. [2] CNSC, Waste Management, Volume III: Assessing the Long Term Safety of Radioactive Waste Management, REGDOC-2.11.1, 2018 May. [3] IAEA, The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, SSG-23, 2012. [4] IAEA, Near Surface Disposal Facilities for Radioactive Waste, SSG-29, 2014. [5] IAEA, Disposal of Radioactive Waste, Specific Safety Requirements, Safety Standards Series No. SSR-5, STI/PUB/1449, 2011 April.
CNL-ND661	Northwatch (August 16, 2017)	The purpose of the project as set out in the draft EIS22 is to "enable CNL to move from its current practice of interim waste storage and to direct waste disposal" and "to meet the requirements established by Atomic Energy of Canada Limited (AECL), on behalf of the Government of Canada…" but it is unclear from the presentation whether the "revitalization of the CRL property" is an obligation under the contract between CNL and AECL or if it is an expression of ambition on the part of CNL; like so many other key areas and key documents, the details and the support documents have been omitted from the draft EIS package.	Section 2.3 of the final Environmental Impact Statement (EIS) has been updated to provide a more accurate description of the overall purpose of the project as it relates to environmental remediation of the Chalk River Laboratories (CRL) site and site revitalization. The Near Surface Disposal Facility (NSDF) is designed to be a permanent solution which will reduce the risk associated with temporary waste storage at the CRL site because the facility has the appropriate design life to contain and isolate the inventory until it is sufficiently decayed to levels that do not present a risk to the public and environment. The facility has been designed so that the wastes will be safely managed long term without a need for retrieval. Atomic Energy of Canada Limited (AECL) is investing $1.2 billion to renew the science and technology mission including new supporting infrastructure at the CRL site. The objective is to revitalize the site and transform it into a world-class, state of-the-art nuclear science and technology campus. The transformation will position Canadian Nuclear Laboratories (CNL) to remain a leader in developing peaceful and innovative applications from nuclear technology through its expertise in physics, metallurgy, chemistry, biology and engineering. Canadian Nuclear Laboratories is committed to transparency with regard to the technical basis for the NSDF to the extent possible. All technical supporting documents to the EIS, as well as a number of other technical documents, other are either

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			available to the public by request and/or available to download (ermstakeholder@cnl.ca and/or https://www.cnl.ca/en/home/environmental-stewardship/near-surface-disposal-facility/nsdf-documents.aspx).
CNL-ND662	Northwatch (August 16, 2017)	**2.4.1.3** - The draft EIS states: "Canadian Nuclear Laboratories has adopted the Institute of Nuclear Power Operations' (INPO) nuclear safety culture definition (2004): "Nuclear safety culture is defined as the core values and behaviors resulting from a collective commitment by leaders …" CNL has described "safety culture" as one of the three design principles. As such, it is presumably central to the design and operation of the proposed ECM. Northwatch Information Request #26: Provide CNL's policy / program which operationalizes CNL's adoption of the Nuclear Power Operations' (INPO) nuclear safety culture definition (2004), and any additional documentation of CNLs safety culture and how CNL would apply this safety culture to the ECM.	Section 2.4.1.3 (Nuclear Safety Culture) from the 2017 draft Environmental Impact Statement (EIS) is no longer included in the final EIS as a Project Design Principle. However, information on Canadian Nuclear Laboratories' (CNL's) Human Performance Management is available in Section 3.5.2.11 of final EIS, and Appendix A of the Near Surface Disposal Facility (NSDF) Safety Case [1]. The CNL Human Performance Program, an element of the Performance Assurance Program [2], supports the implementation of and promotes the CNL Nuclear Safety Policy and the Institute of Nuclear Power Operations Traits of a Healthy Nuclear Safety Culture. The Human Performance Program assists all employees to anticipate, manage, and monitor the effects of variability in human performance on organizational outcomes. References: [1] Near Surface Disposal Facility Safety Case, 232-03610-SAR-001. [2] Performance Assurance, 900-514000-PDD-001.
CNL-ND663	Northwatch (August 16, 2017)	**2.5.2.2.2** - The draft EIS states: "The costs associated with constructing a GWMF are considerably higher than a NSDF. Similarly, the operating costs for a GWMF would also be greater than that of the NSDF due to the need for additional waste packaging and handling of all waste. For example, the total waste volume to be disposed in OPG's DGR Project is 200,000 m3 of LLW and ILW (OPG 2011a). The estimated capital costs for this project are $1,000 M (OPG 2011a). Annual operating costs are estimated at $25 M (Golder 2004). Using these values, the inferred lifetime expenditure for a GWMF with a total waste volume of 1,000,000 m3 and 50-year operational phase could be greater than $10,000 M, which is more than 36-times greater than the cost of the NSDF alternative." The sections of the EIS dealing with the GWMF are poorly organized, poorly written and unsupported by references and technical documents. In some instances statements are inaccurate and/or outdated. The assessment of alternatives is an important element of environmental assessment, and must be clearly thought out, clearly set out, and well supported with technical assessments and public engagement. Northwatch Information Request #28: Provide reports and findings of research conducted in support of the statements in the draft EIS with respect to a potential GWMF.	Section 2 – Alternative Means for Carrying out the Project - of the final Environmental Impact Statement (EIS) has been updated to provide more transparency in the overall alternative means process. This section is representative of the findings of research conducted in support of Canadian Nuclear Laboratories (CNL) conclusions for the alternative means assessment. As part of the Alternative Means assessment in Section 2.5.2.3 of the final EIS, CNL evaluated the Facility Type of Geological Waste Management Facility (GWMF) technically, economically and environmentally. Both the Near Surface Disposal Facility (NSDF) and GWMF alternatives meet CNL's overall need and are environmentally feasible options. However, the GWMF does have substantially higher life cycle costs, which are potentially an order of magnitude higher than for an NSDF, based on estimates from Ontario Power Generation's proposed Western Waste Management Facility [1]. Although a GWMF would provide increased barriers for potential releases to the environment in the long-term, the nature of the waste (i.e., low-level waste (LLW)), the majority of which is impacted soils and demolition waste, does not warrant the need for these barriers. Low-level waste requires isolation and containment for periods of time up to a few hundred years, consistent with International Atomic Energy Agency (IAEA) classification of radioactive waste (GSG-1) [2]. A GWMF also requires additional waste handling for waste placement whereas LLW does not require shielding during handing or interim storage. GWMFs are most typically proposed for high level radioactive waste (HLW) and intermediate level radioactive waste (ILW), which are not within the scope of the NSDF Project. Near surface disposal facilities, as proposed for the NSDF Project, have been demonstrated globally to be an effective disposal solution for LLW. Therefore, a NSDF is the most feasible and most favourable alternative. Table 2.5.2-2 provides a summary of the evaluation of alternatives. References: [1] Golder Associates. Independent Assessment of Long-Term Management Options for Low and Intermediate Level Wastes at OPG's Western Waste Management Facility. 2004 February (https://www.opg.com/strengthening-the-economy/our-projects/the-deep-geologic-repository/background-information/) [2] IAEA General Safety Guide – 1, Classification of Radioactive Waste.

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CNL-ND664	Northwatch (August 16, 2017)	**2.5.2.3** - The draft EIS indicates that (CRL 2011) is the reference for the study on conditions for a GWMF at the CRL, but no such reference in included in the references section of the draft EIS. Northwatch Information Request #29: Provide the report, reports and/or document of findings of the study referenced in Section 2.5.2.3 of the draft EIS described as having investigated the bedrock conditions at CRL and their suitability for a GWMF.	Section 2.5.2.3 indicated the reference "(CRL 2011)" which was not listed in the References section (Section 12). In the final EIS, Section 2.5.2.3 has been revised to improve the clarity of the results of assessing the environmental effects (particularly on groundwater) of a Geologic Waste Management Facility (GWMF) design [1]. The complete report of the GWMF assessment can be made available upon request to ermstakeholder@cnl.ca Reference: [1] Geologic Waste Management Facility Integrated Geosynthesis Report: Phase I. 361101-10260-REPT-004.
		Remediation of Contaminated Areas at CRL Site	
CNL-ND665	Evelyn Gigantes (May 17, 2017)	It is not very heartening to be informed: *"Canadian Nuclear Laboratories is developing an appropriate environmental remediation concept for contaminated areas. The decision-making process is based on radiological impacts. It is expected that, if there is any potential to have cumulative effects exceeding safety objectives, then contaminated land from WMAs and LDAs will be removed prior to the NSDF closure."* This is not an "Impact Statement"; this is a "We promise we will develop a plan" statement. The EIS depends very much on such probabilistic speculations and future design developments for the NSDF. Postponement of crucial elements into the future is an example of a "moving target" element manifest in several parts of the regulatory approval(s) process being undertaken by CNL.	The effects assessment includes a discussion of uncertainties as described in the description of the assessment methodology, Section 5.1.7 of the final Environmental Impact Statement (EIS). Uncertainties in future developments of the Chalk River Laboratories (CRL) site are therefore included in the EIS. As with any proposed project that has not yet been built, these are several uncertainties that Canadian Nuclear Laboratories (CNL) has addressed in the design of the NSDF Project. The intent of Table 5.8.7-1 in the final EIS was to provide the rationale for how conservatism, along with reasonable assumptions, will be incorporated into the NSDF design to address uncertainties such as the cumulative effects during post-closure (when the NSDF site has already been closed after its 50 year operation in the future, the outcomes of which are obviously unknown). As the project continues through the construction and operations phases, more information will be become available about the as-built condition of the facility. In addition, more environmental monitoring data will have been collected, which can be used to further understand if the assumptions made in the initial modelling were accurate or conservative from a contaminant transport point of view. For example, as more information is obtained, the Post-closure Safety Assessment [1] will be updated to reflect the most up-to-date design and environmental data. Reference: [1] Post-Closure Safety Assessment 3rd Iteration to the NSDF Project, 232-509240-ASD-004.
CNL-ND666	Kathy Eisner (May 12, 2017) AANTC (August 14, 2017) Regroupement national des conseils régionaux de l'environnement du Québec, de la Fondation David Suzuki et d'Équiterre (August 16, 2017)	*Concerns on this topic were expressed by more than one commenter and comments have either been summarized, or included as excerpts from commenter submissions. Given that there were comments on this topic submitted in both English and French, the comment summary below is provided in both official languages, and a response in both official languages will also be provided.* *Des préoccupations à ce sujet ont été exprimées par plus qu'un intervenant et les commentaires ont été résumés ou inclus sous forme d'extraits de commentaires. Étant donné que les commentaires sur ce sujet ont été soumis en anglais et en français, le synthèse des commentaires ci-dessous est fourni dans les deux langues officielles et une réponse dans les deux langues officielles sera également fournie.* The current contamination problems at the Chalk River facility should be dealt with before we start bringing more waste to the area. As the EIS shows, radioactive contamination of the Perch Creek and Perch Lake are already considerably elevated. As such, it is imperative that any developments at the Chalk River site effectively remediate the damage that has already been done over the last 60 decades to this land, and not put the local ecosystem under any further risk.	The NSDF is required in order for environmental remediation of the Chalk River Laboratories (CRL) site to proceed. Remediation of contaminated lands will generate large volumes of low-level radioactive waste as impacted soils and legacy waste. Currently, large-scale clean-up of CRL contaminated lands is deferred until the proposed NSDF is available. Section 2.3 of the final EIS provides further discussion on the role of NSDF in environmental restoration of the CRL site. With regard to waste from off-site sources: approximately 90% of the waste will originate at the CRL site, with 5% of the waste coming from decommissioning at Whiteshell Laboratories in Manitoba and other Atomic Energy of Canada Limited (AECL) nuclear liabilities, and 5% from other Canadian sources, such as universities and hospitals. Canadian Nuclear Laboratories (CNL) has accepted waste from off-site sources such as universities and hospitals for decades as a service to Canada. Of the waste generated at CNL, approximately 50% of this waste will be generated by environmental remediation activities [1]. With regards to radioactive contamination in Perch Creek and Perch Lake: radionuclide concentrations in Perch Lake and Perch Creek are elevated for Tritium and Strontium-90. Concentrations for both these radionuclides are well below ecological risk benchmarks which represent a potential impact on aquatic biota. Reference:

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		[Français] Les problèmes de contamination actuels de l'installation de Chalk River devraient être réglés avant que nous commencions à ramener plus de déchets dans la région. Comme le montre l'EIE, la contamination radioactive du ruisseau Perch et du lac Perch est déjà considérable. À ce titre, il est impératif que tout développement sur le site de Chalk River remédie efficacement aux dommages déjà causés au cours des 60 dernières années sur ce territoire et ne constitue pas un risque supplémentaire pour l'écosystème local.	[1] Near Surface Disposal Facility Reference Inventory Report, 232-508600-REPT-003. [Français] Le projet d'IGDPS est nécessaire à l'assainissement du site des Laboratoires de Chalk River (LCR). L'assainissement des sols contaminés du site produira de grandes quantités de déchets radioactifs de faible activité composés de terre contaminée et de déchets hérités du passé. À l'heure actuelle, le nettoyage à grande échelle des sols contaminés du site des LCR est reporté jusqu'à ce que l'IGDPS proposée soit utilisable. La section 2.3 de l'EIE définitive fournit des détails sur le rôle de l'IGDPS dans le rétablissement de l'environnement du site des LCR. Concernant les déchets provenant de l'extérieur du site, il faut savoir que 90 % des déchets viendront du site des LCR, tandis que 5 % seront produits par le déclassement du site des Laboratoires de Whiteshell, au Manitoba, et d'autres centrales nucléaires d'Énergie atomique du Canada Ltée (EACL) et 5 % proviendront d'autres sources au Canada, comme des universités et des hôpitaux. Les Laboratoires nucléaires canadiens (LNC) acceptent les déchets de sources extérieures comme des universités et des hôpitaux depuis des décennies. Environ 50 % des déchets produits par les LNC proviendront des activités d'assainissement de l'environnement [1]. Concernant la contamination radioactive du ruisseau Perch et du lac Perch, les concentrations de radionucléides dans l'un et l'autre sont plus élevées dans le cas du tritium et dans celui du strontium 90. Les concentrations dans les deux cas sont très inférieures aux seuils de risque écologique représentant un impact potentiel sur le biote aquatique. Référence [1] Rapport sur l'inventaire de référence de l'IGDPS, 232-508600-REPT-003.
CNL-ND667	Kerrie Blaise, CELA (August 15, 2017)	The CNL's documents do not consider the need for remediation of the massive groundwater contamination nearby on the Chalk River site. Neither do the CNL's documents discuss the radiation exposures to local populations from this existing contamination and annual releases at Chalk River. It appears that CNL is proposing to add to these problems rather than deal with them. Therefore remediation of these areas, with proper containment and treatment of leachates (which continue to be generated) should be discussed in the CNL's reports.	Remediation of groundwater contamination on the Chalk River Laboratories (CRL) site is outside of the scope of the NSDF Project and is therefore not discussed in detail in the Environmental Impact Statement (EIS) [1]. The impact of legacy groundwater contaminant plumes from waste management areas (WMAs) on the CRL site has been assessed in the *Environmental Risk Assessment of Chalk River Laboratories* [2]. There are localized exceedances of dose benchmarks for protection of biota. These exceedances are localized and are therefore, unlikely to be important at the population level. Groundwater plumes on the CRL site are monitored and potential impacts evaluated on an on-going basis. Four groundwater treatment systems have been installed to remediate contaminant plumes on the CRL site. Three of these are in the Perch Lake Basin. A groundwater treatment system was installed in 2013 to treat the Strontium-90 contaminant plume emanating from WMA A. Two groundwater treatment facilities are in place to treat a contaminant plumes emanating from the Chemical Pit, located adjacent to WMA A and WMA B. The impact of existing contaminant plumes are considered in the final EIS under baseline conditions (See Section 5.7.4.5 Radioactivity in Surface Water and Section 5.7.4.6 Radioactivity in Groundwater). The EIS provides an assessment of the combined impact of baseline conditions and the NSDF Project (Section 5.7) which has been expanded in the final EIS. Annual radiological liquid effluent releases from the CRL Site are provided in Table 5.7.4-1 of the final EIS. Liquid releases include releases associated with contaminated lands. Predicted doses to members of the public from CRL site releases are well below regulatory limits. Canadian Nuclear Laboratories annual compliance monitoring report 'Effluent Verification Monitoring at Chalk River Laboratories in 2018'[3] provides monitoring results for all effluent streams and is available upon request by contacting ermstakeholder@cnl.ca.

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			Section 8.3.3 of the final EIS summarizes the cumulative effects on the surface water environment. It concludes that residual effects on Ottawa River water quality are determined to be negligible during operations and post-closure phases and may result in a net benefit due to remediation of legacy waste storage areas. The NSDF Project will enable site remediation by providing a permanent and isolating disposal capacity for contaminated low-level waste thereby, resulting in a positive effect on groundwater and surface water quality on the CRL site. References: [1] CNSC, Record of Decision In the Matter of Applicant Canadian Nuclear Laboratories on the Scope of Environmental Assessments for Three Proposed Projects at Existing Canadian Nuclear Laboratories Facilities, e-Docs 5205376, 2017 March 8. [2] Environmental Risk Assessment of Chalk River Laboratories, ENVP-509220-REPT-003. [3] Effluent Verification Monitoring at Chalk River Laboratories in 2018, CRL-509254-ACMR-2018.
CNL-ND668	Kerrie Blaise, CELA (August 15, 2017)	The CNL reports reviewed do not mention the two major nuclear accidents which occurred at Chalk River in the 1950s and their ensuing wastes. CELA reminds the Commission of the partial meltdown which occurred in 1952 at the National Research Experimental reactor operated by Atomic Emergency of Canada Limited (AECL) and of the second event in 1958, involving a fuel rupture and fire in the National Research Universal (NRU) reactor building. It is likely that highly radioactive debris from these accidents still exist given the long half-lives of the nuclides involved. CELA asks that information on the nuclear wastes from these accidents be given in the Draft EIS.	The scope of the NSDF Project for the purpose of the Environmental Assessment (EA) is defined in the Canadian Nuclear Safety Commission (CNSC) *Commission decision on the Scope of Environmental Assessments for Three Proposed Projects at Existing Canadian Nuclear Laboratories* [1]. The scope of the NSDF Project is the construction and operation of the engineering containment mound, wastewater treatment plant and supporting infrastructure. Information on the National Research Experimental Reactor (NRX) Accident in 1952 and National Research Universal (NRU) reactor in 1958 is not included in the Environmental Impact Statement (EIS) as the decommissioning of these facilities and any associated remediation is outside the scope of the NSDF Project. The cumulative effects of decommissioning and remediation activities on the CRL site in combination with the NSDF Project are assessed in Section 8.0 of the final EIS. Reference: [1] CNSC, Record of Decision In the Matter of Applicant Canadian Nuclear Laboratories on the Scope of Environmental Assessments for Three Proposed Projects at Existing Canadian Nuclear Laboratories Facilities, e-Docs 5205376, 2017 March 8.
CNL-ND669	Anna Tilman (June 22, 2017)	How does CNL plan to carry out remediation and revitalization of contaminated lands? What are the criteria being used for remediation? According to AECL's Comprehensive Preliminary Decommissioning Plan (CPDP), "remediation planning is based on a strategy of deferring remediation projects generating large volumes of waste until after a disposal facility is available, so as to minimize interim waste storage costs."1 That does not clarify anything regarding remediation. What does revitalization entail? Reference 1: CPDP: COMPREHENSIVE PRELIMINARY DECOMMISSIONING PLAN (CPDP-508300-PDP-001) Revision 2 2014 Executive Summary	Remediation planning, criteria for remediation and site revitalization are described below. Remediation of contaminated land will be carried out by removal of contaminated soil and placement in engineered disposal facilities for long term management. The Near Surface Disposal Facility (NSDF) is designed as a disposal site for the low-level waste generated from these activities. The Chalk River Laboratories (CRL) plan for remediation of the site is for any contaminated or otherwise unacceptable hazardous infrastructure, soil, sediments, surface water and groundwater to meet risk-based clean-up criteria allowing most areas of the site to be classified for industrial use with some areas qualifying for unrestricted use. Environmental remediation planning will follow the process based on CSA N294-09 *Decommissioning of Facilities Containing Nuclear Substances* [1]. The CRL site has been divided into 11 Management Units which are areas of contamination or potential contamination within a specified boundary. Examples of management units are the developed area along the shoreline and waste management areas in the outer area of the CRL site.

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			For each management unit, potential end uses will be defined. Examples of end-uses are industrial, residential, recreational and agricultural. Remediation criteria for radiologically contaminated areas will be based on dose objectives to ensure protection of human health and aquatic and terrestrial biota. For non-radiological contaminants (chemicals and metals), the Ontario Ministry of the Environment, Conservation and Parks (MECP) standards for contaminated sites and the Canadian Environmental Quality Guidelines developed by the Canadian Council of Ministers of the Environment (CCME) are recommended for use as remediation criteria. These non-radiological contaminant values have been developed considering the protection of both human and environmental receptors. Site Revitalization The term site revitalization as used in Section 1 and 2 of the final EIS refers to modernization of the CRL site to support the CNL's mission to develop innovative applications from nuclear technology. Decommissioning of nuclear laboratories and conventional buildings that are no longer in use is a key aspect of site revitalization. The Near Surface Disposal Facility will provide disposal capacity for low-level radioactive waste generated from site revitalization. Canadian Nuclear Laboratories notes that the Comprehensive Preliminary Decommissioning Plan [2] cited by the reviewer has been revised. Revision 4 of the document was issued in 2018 March and is available upon request by contacting ermstakeholder@cnl.ca. References: [1] CSA Group N294.0-19: Decommissioning of facilities containing nuclear substances. 2019. [2] Comprehensive Preliminary Decommissioning Plan, CPDP-508300-PDP-001.