Annex 1

Federal Indigenous Review Team (FIRT) - Information Requirements for the Wheeler River Environmental Impact Statement

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-01	English River First Nation (ERFN)	Current use of lands and resources for traditional purposes	General	**Context:** Denison has not gone far enough in terms of learning from and incorporating information from ERFN provided in the *Traditional Knowledge Study and Health and Socio-Economic Study Report*. It appears Denison put a disproportionate amount of reliance on the views and interests of one ERFN land user. While we applaud the efforts of Denison to seek feedback from ERFN land users directly and to work closely with such land users, ERFN's rights and interests in the region of the Project (and the potential of the Project to adversely impact such rights and interests) extend well beyond that of just one land user. **Rationale**: It is important for the proponent and regulators to understand that while the rights and interests of individual ERFN members are important to consider, the Elders and elected leaders of ERFN represent the collective rights and interests of ERFN as a Nation. The results of the scoping study indicated that ERFN holds firmly established rights to the area where the planned project is located. Numerous studies conducted over several decades have examined ERFN's relationship and connection to land use and occupancy of the region where the proposed mine is located from traditional land use, subsistence harvesting, ecological, and sociocultural and economic perspective.	The draft EIS should be revised to reflect the totality of ERFN TK and land use information. Denison and CNSC must continue to work with ERFN to ensure that impacts on ERFN rights are appropriately and fully considered, mitigated, and accommodated.	
IR-02	Canadian Nuclear Safety Commission (CNSC)	Mitigation Measures	General Appendix 16-C	**Context:** Denison's 2019 Wheeler River Terms of Reference states: "The EIA will also discuss the monitoring programs required to demonstrate regulatory compliance and compliance with the commitments Denison has made to its Indigenous and non-Indigenous Stakeholders." The CNSC's Generic Guidelines for the Preparation of an Environmental Impact Statement (EIS), also state: "The EIS will then describe mitigation measures that are specific to each environmental effect identified. Measures will be written as specific commitments that clearly describe how the proponent intends to implement them and the environmental outcome the mitigation is designed to address. **Rationale:** The EIS and the Summary of Monitoring and Follow-up Programs provided in Appendix 16-C contains very high-level information. It is not clear which monitoring programs will be	CNSC staff expect Denison to provide a comprehensive list of commitments along with the next version of the EIS, including any commitments made to Indigenous Nations and communities and other stakeholders (As committed in the Wheeler River Terms of reference, and as noted in the November 28th, 2022 email from CNSC staff to Denison: *Future Submission of a Commitments Table for Wheeler River EIS*).	

[1] Unless otherwise stated, the section noted refers to the draft EIS.
[2] Where IR contents note "See also related IR(s)", responses from Denison may be similar or provided in a single detailed response, but it was preferred to keep original IRs distinct.

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				employed to demonstrate regulatory compliance, and compliance with the commitments Denison has made to its Indigenous and non-Indigenous Stakeholders.		
IR-03	CNSC	Site preparation	Section 1.3.2 Temporal Boundaries Appendix 10-A (ERA)	**Context:** The EIS and TSD-ERA provide assessment on the project timeframe, including construction, operation, and decommissioning phases. **Rational**: The site preparation phase is not included in the timeframe (EIS and TSD-ERA). As per REGDOC 2.9.1, the sub-section 4.1.1 Complexity of the environmental risk assessment requirements states that "The applicant or licensee shall identify facility characteristics and activities that may interact with the environment during the relevant phase of the facility or activity's lifecycle (for example, site preparation, construction, operation, and decommissioning."	Please provide an assessment of those facility characteristics and activities that may interact with the environment during the site preparation phase, along with an assessment of their potential effects, in order to reflect the entire lifecycle or provide a rationale for its exclusion.	
IR-04	Environment and Climate Change Canada (ECCC)	Fish and fish habitat	Section 2, Project Description Section: Glossary	**Context:** The Proponent defines 'clean waste rock' as "Waste rock generated as sandstone cuttings and core from drilling activities associated with well and freeze hole development that does not have uranium containing materials". ECCC notes that the use of the term "Clean Waste Rock" could be misunderstood to mean that the waste rock is devoid of any contaminant. Even when the waste rock referred to as "clean waste rock" does not contain uranium materials, it could contain other metals or contaminants that could have adverse environmental effects. It is also not clear whether the "clean waste rock" is characterized for Acid Rock Drainage/Metal Leaching (ARD/ML) given that some portion of the basement rock is to be drilled out to anchor the freeze walls and may have ARD/ML potential. **Rationale:** The current definition of 'clean waste rock' in the draft EIS could lead to inappropriate handling and disposal if it is assumed to be devoid of any metals or other contaminants that might negatively affect the environment.	Provide a clear and more detailed definition of the term 'clean waste rock'.	
IR-05	CNSC	Change to an environmental component due to hazardous contaminants	Section 2.2.1.2	**Context:** Water volumes for mud/diamond drilling is listed as minimal as the mud will be re-used. The mud is identified as a mixture of water, clay, and environmentally friendly polymers that clean out the cuttings and help to keep the drilling bit cool. **Rationale:** Although the mud for drilling will be re-used, there could be environmental impacts should there be an accident while drilling.	Please identify the components of the environmentally friendly polymers for the drilling mud and potential environmental impacts should the mud not be recovered.	
IR-06	CNSC	Geology and groundwater	Section 2.2.1.4, Wellfield for In Situ Recovery Mining	**Context:** This Section of the EIS indicates that a tracer test was completed in 2021 and a feasibility field test was initiated in 2022. No information from these tests is included in the EIS and no reporting	1. Please provide a summary of the results of field tests (i.e., tracer tests, wellfield leach tests, and remediation trials) in the EIS, or provide a technical supporting	

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				timelines are provided. **Rationale:** Guidance from the IAEA (2001) and best practices highlighted by regulatory regimes in other countries such as the United States (IAEA, 2016) and Australia (Geoscience Australia, 2010) indicates that single and multi-well trial (feasibility) testing for mining and remediation techniques should be carried out before a licence for full-scale operations can be granted. This is part of the requirement for proponents to demonstrate to government authorities that all potential risks have been considered during the life of operation and post-remediation of the mine. Additionally, Section 8.5.2 of the Generic EIS Guidelines states: "Units may be characterized as aquifers or aquitards, and unit descriptions should include their geochemical characteristics, vertical and lateral permeabilities, transport mechanism (diffusion versus advection) and the directions of groundwater flow", And that "The applicant or licensee should present a conceptual and numerical hydrogeological model that discusses the hydrostratigraphy and groundwater flow systems". Outcomes from the tracer test inform model parameters such as effective porosity (see IR-78), dispersion, and dispersivity (see IR-96). The wellfield leach tests and remediation trails ultimately inform environmental monitoring during site activities, and the source term for the groundwater model. This source term represents the contaminants which flow through the desilicified zone into Whitefish Lake, which represents a source of contamination considered in the ERA. **References**: [1] International Atomic Energy Agency (IAEA). 2001. Manual of Acid in Site Leach Uranium Mining Technology. IAEA-TECDOC-1239. Vienna. 283 p. [2] International Atomic Energy Agency (IAEA). 2016. In Situ Leach Uranium Mining: An Overview of Operations. IAEA Nuclear Energy Series No. NF-T-1.4. Vienna. 76 p. [3] Commonwealth of Australia (Geoscience Australia). 2010. Australia's in situ recovery uranium mining best practice guide. ISBN 978-1-921672-95-8. Canberra. 33 p.	document with this information, and ensure the documentation is appropriately referenced in the EIS. 2. Please indicate how outcomes from these field tests inform the design of In Situ Recovery. This information should include: • feasibility of meeting remediation targets. • groundwater flow conditions and validation of flow models. • mobilization of contaminants (e.g., Al, Se or V). • potential for free gas evolution/two-phase flow. • identifying composition of lixiviant and production solutions. • success despite presence of >2% carbonate minerals (siderite, FeCO3) in the ore zone (see Table 4-3 of Appendix 7-A). • site-specific data to parameterize, validate, and refine solute transport models (hydraulic conductivity, effective porosity, dispersivity, diffusion, etc.). 3. Please provide further information of proposed operations including % recovery, uranium concentrations, optimal liquid/solid ratios, anticipated reagent consumption, etc.	
IR-07	ECCC	Fish and fish habitat	Section 2.2.1.4.2, Wellfield Operation Section 2.2.1.4.2.2, Secondary Containment of	**Context:** The description in Sections 2.2.1.4.2 and 2.2.1.4.2.2 refer to the differential rates of injection and withdrawal, which implies that more solution will be withdrawn through the recovery well than volume of mining solution injected. According to the description of the site, a freeze wall will create a barrier between the uranium deposit to be mined and outside the isolated area to prevent inflow of	Clarify where the extra groundwater will come from to sustain this differential rate of injection and withdrawals during operation and if this extra water has been accounted for in the model and the amount of water that ends up in the receiving environment.	

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			Mining Solution – Pumping	groundwater from the sandstone outside the freeze wall. Secondly, it was indicated that the basement rock below the uranium deposit will prevent infusion of groundwater from below. The Proponent stated that inward hydraulic gradient will be created by recovering more solution than is being injected. In general, the wellfield will operate to draw a minimum of 1% more solution out of the wellfield compared to solutions injected in. This will help avoid increased subsurface pressures from injection pressure build up within the deposit. **Rationale:** It is not clear where the extra groundwater will come from that will sustain this differential rate of injection and withdrawals as the freeze wall and bedrock basement will isolate the injection well from groundwater. If it is assumed that there is limited amount of groundwater present in the sandstone layer above the uranium deposit, that amount of groundwater in the sandstone layer is finite and will be exhausted at some point. Therefore, it is not clear where the extra groundwater will come from. If the extra volume of water is not accounted for in the modelling, that would ultimately affect the volume of water that ends up in the receiving environment and likewise the amount of contaminants contained.		
IR-08	ECCC	Change to an environmental component due to radiological contaminants	Section 2.2.1.4.2.2 Project Description	**Context:** This section describes how an inward hydraulic gradient will be created within the mining area as a secondary containment method for control of mining solution. While the process is described, there is no information on contingency measures in place for pump failure or system maintenance solutions. There is also no information on how quickly the hydraulic gradient, and therefore secondary containment, would be compromised if any pumps stopped working. It is also unclear how primary containment (i.e., well design) failure, such as physical/mechanical issues compromising casings, would affect the creation of the hydraulic gradient and secondary containment as well. **Rationale:** It is important to have contingency planning in place in the event that there are any issues with the hydraulic gradient and secondary containment system for control of the acidic mining solution. There is no information in this section on how the hydraulic gradient (i.e., secondary containment) would be maintained if a well or pump (i.e., Primary containment) experienced problems.	Provide further information regarding how the inward hydraulic gradient system functions, with particular focus on how the hydraulic gradient and secondary containment will be maintained if any wells or pumps were compromised.	

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IR-09	CNSC	Geology and Groundwater	Section 2.2.1.4.2.2	**Context:** This section indicates that mining solution within the mining area can primarily be controlled by maintaining an inward hydraulic gradient. The inward hydraulic gradient will be created by recovering more solution than is being injected. **Rationale**: If, for some reason, the recovered solution is much more than that being injected, an excessive drawdown could be created. If, by accident, mining solution is leaking into the upper sandstone aquifer through crack in injection/recovery well casing at the same time, it would be challenging to remediate the upper sandstone aquifer in dry conditions (due to excessive drawdown).	Please clarify if any measure will be implemented to avoid excessive drawdown and develop contingency measures to address such accident.	
IR-10	ECCC	Fish and fish habitat	Section 2.2.1.4.2.3, Tertiary Containment of Mining Solution - Freeze Wall	**Context:** The Proponent stated that as a tertiary means of containment for the mining area, the uranium deposit is proposed to be surrounded by a freeze wall that extends from the surface to the basement rock, isolating the mining area from regional groundwater. Current plans are for the freeze wall to be a minimum of 10 m thick, be installed 25 m away from the uranium deposit, and extend 30 m into the basement rock (Figure 2.2-6). As explained in Section 2.2.1.4.2.2, mining solution will be injected into the ore zone under pressure and will likely react, not just with the uranium in the ore zone, but also the binding or cementing material in the sandstone. This means that some portion of the sandstone above the uranium layer and perhaps some portions of the freeze wall will dissolve, thereby creating more void than just the thickness of the uranium layer or horizon. The void may affect the integrity of the freeze wall as containment. **Rationale:** It is not clear how the Proponent will monitor the freeze wall to verify whether portions of the freeze wall are being dissolved in the mining process and how it plans to verify the integrity of the freeze wall as a containment for the mining solution. In addition, if the dissolution reaction of the uranium ore is exothermic, then the heat generated may also affect the integrity of the freeze wall.	1. Explain how the integrity of the freeze wall will be maintained as a means of containment that prevents migration of the mining solution out of the ore zone into the receiving environment. 2. Demonstrate that the mining solution injected under pressure will not compromise the integrity of the freeze wall as a containment. 3. Demonstrate how both exothermic and chemical reactions of the mining solution used to dissolve the uranium ore will not compromise the integrity of the freeze wall as a containment. **Technical Discussion Required**: Yes. ECCC would like to better understand the chemical constituents that compose the mining solution and the chemical reactions that it will cause.	
IR-11	ECCC	Change to an environmental component due to hazardous contaminants	Section 2.2.3 Project Description	**Context:** It is unclear how much contact water may be produced during the drilling of the mine well field during the construction phase of the proposed Project. Figure 2.2-14 indicates that no water will be produced during the drilling process in the construction phase. In Section 2.2.1.2 both mud rotary drilling and diamond drilling are proposed for the creation of wells. Both processes require water, however only mud rotary drilling produces liquid mud that is then reused in the drilling process. **Rationale:** It is unclear if the liquid mud produced during drilling can be reused indefinitely with further water additions, or if this	Provide further information on potential wastewater produced during the construction phase from drilling processes, and if proposed infrastructure can contain any water produced.	

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				eventually becomes the clean sand grain cutting and how it will be disposed of (i.e., liquid or solid waste). If the mud produced from drilling is classified as liquid waste and disposed of as contact water, it is not clear if this is accounted for in the site water management plan and water balance during the construction phase. Contact water from well drilling during the construction phase has not been quantified or accounted for in Figure 2.2-1, and therefore it is unclear if proposed infrastructure during the construction phase has the capacity to contain this waste stream in addition to the waste streams currently outlined in Figure 2.2-1.		
IR-12	ECCC	Change to an environmental component due to hazardous contaminants	Section 2.2.3, Project Description	**Context:** There is not enough information provided within the draft EIS and site water infrastructure designs to determine if the infrastructure will sufficiently contain mine site contact and non-contact water runoff. It is unclear how water management will occur during all proposed Project stages at the Project airstrip, which is located away from the main Project site. No information has been provided regarding water that may come into contact with fuels and oils from machinery on the air strip, how and where that contaminated water will be treated, and how surface runoff around the airstrip will be managed. Additionally, it is unclear if contaminants from heavy machinery on roads have been considered during runoff collection plans throughout the mine Project site. Water management at the airstrip and roads can have impacts on surface water quality and sediment quality and contaminants (e.g., Hydrocarbons) from these sources should be considered in overall site water management plans. In Section 2.2.3.1 a site drainage plan for contact and non-contact water has been provided in Figure 2.2-17, and water balances have been provided for the different Project phases in Figures 2.2-14 to 2.2-16. In Section 2.2.3.4 a volume of 30,000m3 for the process water pond is provided, and it is stated that the process water pond has the capacity to contain Probable Maximum Precipitation (PMP) event estimated to be 483.3mm while allowing for 1.0m of freeboard. However, there are no estimates on the total volume of water that may be drained from the overall site infrastructure (i.e., the well field, processing areas, etc.) during a 24-hr PMP event. Additionally, in Figure 2.2.17 culvert locations are provided, however there is no further information on culvert designs, flow ratings and capacity for PMP events. **Rationale:** In order to be able to understand site water management and flood risk potential, more information needs to be provided regarding the site water infrastructure designs and capture volumes during PMP events. This information will aid ECCC in understanding how contact and non-contact water will be conveyed throughout the	1. Provide information on how contact and non-contact water from the site airstrip will be managed. Include information on potential contaminant characterization and loadings and an assessment of risk to the environment. 2. Provide further information on how potential contaminants in runoff from roads have been considered in the site water management. Include information on potential contaminant characterization and loadings and an assessment of risk to the environment. 3. Provide estimated volumes of water to be drained from overall site infrastructure (such as the mine terrace, airstrip, camp area etc.), during a 24-hr PMP event. 4. Provide additional information on culvert designs and conveyance capacity for PMP events.	

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				site. Runoff from roads and the site airstrip will contain contaminants from vehicles, heavy machinery, aircrafts and de-icing practices. Additional information on the runoff collection systems and expected contaminant concentrations for the site airstrip and roads is needed to determine if the receiving environment and aquatic and terrestrial receptors are protected.		
IR-13	ECCC CNSC	Fish and fish habitat	Section 2.2.4, Waste Management Section 2.2.7.7, Borrow Area Section 2.3.1.3 Site Preparation and Earthworks	**Context:** The Proponent indicates that a borrow area is planned for an area northeast of the processing plant. The borrow material or overburden will be used during construction for roads, airstrip, pads, and in the batch plant for concrete production needs, during Operation for ongoing maintenance of various Project components and during decommissioning for fill and cover material. Suitable construction fill material will be sourced from the proposed borrow area and any suitable clean sandstone generated during freeze wall and well drilling (Section 2.2.7.7). It was also noted in Sections 2.2.1.3 and 2.2.14 that the freeze wall will be established by drilling over 300 vertical holes from surface to the basement rock. The freeze holes will extend 30 m into the basement rock and will produce waste rock from basement rock (Figure 2.2-6). However, there is no information whether the waste rock from basement rock would potentially be acid generating and/or metal leaching. This means that all the extra 30 m of basement rock should also be characterized for potential ARD/ML to determine use or appropriate disposal. **Rationale:** ECCC notes that the Proponent did not indicate whether the borrow material and the drill out part of the sandstone layers and basement rock will be tested for Acid rock drainage/metal leaching (ARD/ML) potential before they will be used during construction, operation and decommissioning. ARD/ML is an environmental hazard that will have an adverse effect on waterbodies frequented by fish. Potential acid generating and metal leaching waste rock could pose negative impacts on the environment if they are not managed adequately.	Please provide: 1. Information on whether the waste rock from the basement rock is potentially acid generating and metal leaching; a. Confirm that any borrow material to be used for construction will be characterized for potential ARD/ML. b. Confirm that the part of waste rock recovered from the basement rock, will also be tested for potential ARD/ML. 2. Criteria for segregating the potential acid generating and metal leaching waste rock, if it exists, from clean waste rock; and, 3. A plan to manage the potential acid generating and metal leaching waste rock, if it exists.	
IR-14	CNSC	Wastes and Decommissioning	Section 2.3.3.1.3 Decontamination, Demolition, and Disposal (p. 2-82) Table 4.3-2: Key Issues and Concerns from English River First Nation (p. 4-33)	**Context:** The EIS states “Concrete foundations will be left in place. Any portions of concrete foundations remaining above grade will be levelled and rebar will be cut-off at grade. Large slabs will be perforated on a 2-m grid to permit drainage. Concrete slabs will be covered with 0.5 m of development rock or locally stockpiled till.” (p. 2-82) Further, Denison notes that “Concern about responsible authority for restoring the environment, including contaminants when mining	How has the proposal to leave these foundations in place been received by the Indigenous Nations and communities during engagement sessions? Have engagement activities influenced Denison’s planned decommissioning approach? Describe in additional detail how the comment from p. 4-33 has been addressed and how this has been received by those who expressed this concern?	

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				concludes. How long will it take to have the environment fully restored and, if Denison is no longer the operator, how will this be completed?" (p. 4-33). This comment status is noted as *Complete*. **Rationale:** Permanent structures will remain following decommissioning, according to the excerpt above. It's unclear how engagement activities influenced Denison's planned decommissioning approach, or how the comment above has been addressed or received.		
IR-15	ECCC	Fish and fish habitat	Section 2.2.3.4 Project Description Section 8.1.3.4.2, Aquatic Environment	**Context:** In Section 2.2.3.4 it is stated that the estimated PMP event for Project infrastructure planning is 483.3mm. In Section 8.1.3.4.2 it is stated that the PMP is 489.3 mm. **Rationale:** It is unclear which value is the correct PMP value and if Project infrastructure has been planned correctly.	Provide the correct PMP value and verify that Project infrastructure has been designed utilizing the correct value.	
IR-16	CNSC	Human health with respect to hazardous contaminants	Section 2.2.3.8	**Context:** The EIS and technical supporting documents do not provide sufficient justification for the selection of the proposed wastewater treatment systems for the industrial wastewater treatment plant or the domestic wastewater treatment plant. In addition, it is not clear how the upper bound of the industrial wastewater treatment plant effluent quality was obtained. **Rationale:** Draft REGDOC-2.9.2 formally documents the CNSC's expectations to licensees for controlling releases to the environment. For proposed new facilities, these expectations include conducting a best available technology and techniques, economically achievable (BATEA) Assessment, and determining key parameters necessary to support the EIS. These include identifying: • environmental release targets to inform the design of wastewater treatment systems to constrain the quantity and concentration of contaminants and physical stressors released into the environment, • the best available technology and techniques through an options analysis; and • the anticipated influent characteristics, overall treatment efficiencies, and maximum predicted design release as the output of the assessment. Consideration of the principle of pollution prevention and BATEA is also a requirement of REGDOC-2.9.1. CNSC staff have met with Denison to discuss the expectations in draft REGDOC-2.9.2.	Please provide a summary of the BATEA assessment to justify the selection of the wastewater treatment plant system. As part of the summary, please identify the anticipated environmental release targets used to inform the design, as well as the maximum predicted design release concentrations and loadings to the receiving environment. The maximum predicted design releases should be used in the ERA to demonstrate protection of people and the environment.	

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IR-17	CNSC	Human health with respect to hazardous contaminants	Section 2.2.3.8	**Context:** It is also acknowledged that Denison stated in meetings with CNSC staff that Denison intends to propose final release targets to the CNSC as part of the licence application submission. **Rationale:** It is not clear in the submission whether Denison has considered whether any applicable technology-based performance standards exist in Canada or internationally, and would be relevant as effluent discharge targets, in order to ensure principles of pollution prevention are applied. Consideration of this would help ensure that the proposed effluent discharge targets harmonize with existing federal, provincial/territorial, and/or municipal requirements. For example, there are release limits for radium-226, TSS, and pH outlined in the federal Metal and Diamond Mining Effluent Regulations, which have been demonstrated to be achievable in the uranium mine and mill industry. In addition, countries like the United States, where in-situ recovery has been conducted in the past, have specific technology-based limits. These are known as New Source Performance Standards and are identified in US Code of Federal Regulations (US CFR) 40, Chapter 1, Subchapter N, Part 440 - Ore Mining and Dressing Point Source Category. It is not clear whether these have been considered in Denison's assessment. These should be considered when identifying suitable achievable technologies.	Denison should harmonize their proposed Effluent Release Targets with the technology-based performance standards that exist in the Metal and Diamond Mining Effluent Regulations where applicable, or other suitable international regulations.	
IR-18	ECCC	Change to an environmental component due to hazardous contaminants	Section 2.2.3.9, Project Description Appendix 8-E	**Context:** In Table 2.2-1 the upper bound Industrial Wastewater Treatment Plant (IWWTP) effluent quality final discharge targets for Constituents of Potential Concern (COPCs) are provided. General parameters (e.g., temperature, pH, etc.), and several Schedule 4 Substances with maximum authorized concentrations (lead, nickel, suspended solids, and un-ionized ammonia) under the Metal and Diamond Mining Effluent Regulations (MDMER) have not been provided in this table. There are several COPCs (aluminum, mercury, iron, nitrate, thallium, phosphorus and manganese) for effluent characterization under Schedule 5 Section 4 of the MDMER that have not been provided in this table. Additionally, no information on water quality guidelines has been provided in this table. Furthermore, it is stated that the final effluent quality discharge target for uranium is 0.057 mg/L. However, the Canadian Council of Ministers of the Environment (CCME) water short term (acute) water quality guidelines for the protection of aquatic life is 0.033 mg/L. The proposed effluent discharge target for uranium exceeds the acute water quality guidelines, indicating effluent may pose the risk of being acutely lethal to aquatic biota at end-of-pipe. **Rationale:** ECCC requests the Proponent include the general water	1. Update Table 2.2-1 and Appendix 8-E to include all general parameters required for environmental effects monitoring: pH, temperature, hardness, alkalinity, and conductivity. 2. Update Table 2.2-1 and Appendix 8-E to include missing Schedule 4 Substances under the MDMER with maximum authorized concentrations: lead, nickel, suspended solids, and un-ionized ammonia. 3. Update Table 2.2-1 and Appendix 8-E to include missing Schedule 5 Section 4 parameters required for effluent characterization under the MDMER: aluminum, mercury, iron, nitrate, thallium, phosphorus and manganese. 4. Include all acute and chronic water quality thresholds for each parameter in Table 2.2-1 and Appendix 8-E. 5. Describe additional mitigation measures that can be considered to minimize impacts to aquatic biota from uranium concentrations in effluent.	

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				quality parameters that influence water quality thresholds, parameters in Schedule 4 and Schedule 5 Section 4 of the MDMER, and their respective water quality guidelines for consideration and transparency. Discharges from the proposed Project will alter water quality in the immediate receiving area, and this may include some sublethal effects on aquatic biota, which must be minimized. It remains the Proponent's responsibility to adhere to the MDMER to ensure that effluent at the end-of-pipe from all final discharge points be non-acutely lethal and meet requirements for prescribed deleterious substances under Schedule 4 of the regulations.		
IR-19	ECCC	Change to an environmental component due to radiological contaminants	Section 2.2.4 Project Description	**Context:** In this section, it is proposed that the IWWTP precipitate pond will have a single geosynthetic composite liner system, which is used for ponds/pads that only store non-radioactive materials. However, from Section 2.2.3.9 on industrial wastewater treatment, it is unclear if the precipitates from the stage three neutralization process that are pumped to the IWWTP precipitates pond will have any residual radioactivity. **Rationale:** For the protection of the surrounding environment, it is important that any ponds/pads that are expected to store radiological contaminants be designed to have proper controls (i.e., liners with monitoring systems) in place.	1. Confirm the characterization of the precipitates that are to be stored in the IWWTP precipitate pond. 2. If radiological constituents are expected within those precipitates, update the draft EIS to ensure the proposed geosynthetic liner system for the IWWTP precipitate pond will be adequate to ensure the protection of the surrounding environment.	
IR-20	NRCan	Fish and fish habitat	Section 2.3.3.1.1 Appendix 7-C	**Context**: The proponent's objective for mining area remediation is to restore the groundwater within the confines of the freeze wall to an acceptable remediation target (EIS, sec. 2.3.3.1.1). The proponent's acceptable decommissioning objectives for groundwater quality are provided in EIS Table 2.3-3 and in Table 3-5 of Appendix 7-C. These objectives were based on laboratory core flood tests performed by flushing samples of ore with groundwater and groundwater amended with sodium hydroxide or sodium bicarbonate. The composition of the remediated groundwater observed in the core flood tests serves as the source term for the post-decommissioning reactive transport modeling presented in section 4 of Appendix 7-C. **Rationale**: In NRCan's opinion, it is important for reviewers to be able to assess the level of remediation achieved in order to reach the proponent's decommissioning groundwater quality objectives. Therefore, the proponent should provide complete water quality data for the pregnant lixiviant that remains in the ore zone after the end of mining and prior to any remediation.	NRCan requests that the proponent revise Table 3-5 of Appendix 7-C to show the water quality in lixiviant remaining in the ore zone at the end of mining, prior to remediation activities.	

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IR-21	ECCC	Change to an environmental component due to hazardous contaminants	Section 2.3.3.1.3, Project Description	**Context:** The decommissioning process for the wellfield and associated infrastructure is discussed, however there is no information provided on the potential risk for subsidence of the ground above the depleted uranium deposit. After the uranium has been dissolved and pumped to the surface, a cavity will be formed in the area where the uranium used to exist. This could destabilize the overlying substrates, causing the ground at the surface to sink in the future. There is currently no information regarding this risk, and how it may alter the overlying environment, surface water features, runoff, or existing nearby waterbodies. **Rationale:** From a surface water and sediment quality perspective, it is important to understand how potential subsidence in the future post-decommissioning may affect the existing environment. It is currently unclear if there is any risk to the aquatic environment if subsidence were to occur and alter existing waterbodies, create new surface water features, or if there will be any risk to the decommissioned onsite industrial landfill and industrial wastewater treatment plant precipitate pond.	Provide further information on the potential risks from subsidence including the probability of occurrence, how it may affect surface water features, and if there exists any risk to the planned decommissioning of waste management infrastructure.	
IR-22	NRCan	Fish and fish habitat	Section 2.10 Appendix 2-C, section 1.1.1.4	**Context**: With respect to the choice of In-Situ Recovery (ISR) mining solution, two alternatives were assessed: alkaline and acidic lixiviants (Appendix 2-C, sec. 1.1.1.4). In the consideration of technical and economic feasibility of the alternatives (Table 2, Appendix 2-C), the proponent concludes that: Option 1 (alkaline) is not technically feasible based on the uranium deposit geochemistry. Option 2 (acidic) is technically and economically feasible based on the uranium deposit geochemistry and ability to dissolve uranium. Accordingly, the alkaline alternative was not carried forward into the Environmental Assessment (EIS, Table 2.10-1; Appendix 2-C, Table 3). While acidic ISR solutions are widely used internationally (e.g., Kazakhstan), in the United States, where the environmental regulatory regime is more strict, alkaline solutions have been used exclusively since 1970. **Rationale**: In NRCan's opinion, the proponent should provide a more thorough technical justification for adopting an acidic ISR lixiviant.	In the Alternative Means Assessment (Appendix 2-C), NRCan requests that the proponent provides a more thorough technical justification for selecting an acidic ISR lixiviant rather than a less environmentally problematic alkaline leach used exclusively in the USA.	
IR-23	CNSC	Alternative Means	Section 2.10.2 Alternative Means Appendix 2-A PD Engagement Tables	**Context:** There are multiple rows in the Indigenous Tables for Appendix 2-A where comments and concerns raised by Indigenous Nations and communities and other members of the public were taken into consideration in the Alternative Means Assessment. However, it is unclear how these were considered. A few examples:	Please explain how comments and concerns collected during Denison's engagement sessions were considered or influenced the alternative means assessment. Please include this information in the EIS and/or it's appendices.	

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			Appendix 2-C Alternative Means Assessment (p. 3)	• 16-EN-DesNd-101.1: Interested in any future business opportunities that may be available as Denison advances their Wheeler River Project. • 16-EN-ERFN-100.15: In that territory near the Wheeler River there are a lot of spawning and calving areas for moose, caribou; those creeks are for whitefish spawning. There's lots of heavy muskeg there. A lot of us have been there, and we'd like to know there'll still be access to the area. • 6-EN-ERFN-100.17: Today because of climate change, things are starting to happen that normally didn't happen. Even the permafrost is now further down. In the Wheeler River area, where there's some permafrost, have your environment guys seen a change? Will there be a change? These are some of the questions that need to be answered in order to come out with a positive spin. **Rationale**: Appendix 2-C, Alternative Means assessment, states (p.3): "Engagement with Interested Parties naturally included alternatives means and the engagement input was included in the evaluation of alternative means. Refer to the references list below and *Appendix 2-A Engagement Database Summary – Project Description* for details of engagement information referenced in this alternative means assessment." It is unclear in section 2.10.2 of the EIS, Appendix 2-A or Appendix 2C how the comments documented by Denison have been considered or influenced the alternative means assessment.		
IR-24	CNSC	Alternative Means	Section 2.10.2 Alternative Means	**Context:** While Appendix 2-C (Alternative Means Assessment) is detailed and includes all aspects of the Alternative means assessment that are required, the summary of the analysis and conclusions in Section 2.10.2 of the EIS lacks the level of detail required to understand the methodology used, and how Denison arrived at these conclusions. **Rationale**: As noted in the Agency's Operational Policy Statement on Addressing "Purpose of" and "Alternative Means" under the CEAA 2012: "If a preferred means is selected, the analysis and the rationale for the choice should be explained from the perspective of the proponent, and be documented in the EIS in sufficient detail to provide context for public and technical comment periods during the project EA, and ultimately to allow the decision maker to understand the choice."	Please summarize the analysis of the alternative means assessment within the body of the EIS, in sufficient detail that a reader of the EIS has adequate information to understand the methodology used, and how Denison arrived at these conclusions. *Note: In addition to the adding text to summarize, Table 6 in Appendix 2-C could be useful to understanding table 2.10.1 in the EIS.	
IR-25	CNSC	Current use of lands and resources for	Section 3, Sections 4, Section 5,	**Context:** The EIS states that Denison is currently negotiating an agreement with MN-S and no traditional land use information is included throughout the EIS given no agreement was signed or	Please update the revised Draft EIS to reflect the integration of the Métis Use and Knowledge Study in the	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
		traditional purposes	Section 11 (and all other applicable once Métis Knowledge Use Study is completed)	Traditional land use information was shared at the time the EIS was being drafted. As noted in the EIS Denison has committed that: "As information becomes available from the agreed-upon process between the Métis Nation – Saskatchewan and Denison, it will be incorporated into the final EIS." (p. 11-36) **Rationale:** More information is required to better understand the issues and concerns, valued components, and current use of lands and resources for traditional purposes by MN-S near the project area. Requirements are detailed in CNSC's Generic EIS Guidelines, section 8.9: Indigenous land and resource use.	Draft EIS where applicable, when this study is completed and provided to Denison. In addition, please include an updated Issues and Concerns table that includes relevant information from the MN-S as a result of engagement activities and relevant MN-S studies in the next version of the EIS, as appropriate. Should this information not be made available to Denison at the time of revising the draft EIS, the next version of the EIS and the response to this IR should provide a status update on discussions and engagement with MN-S and next steps.	
IR-26	CNSC	Precautionary principle and approach	Section 3.4.8 Lands Taken Up from an Indigenous Perspective (p. 3-14)	**Context**: Denison states: "Discrepancies among IK and western scientific information provide an opportunity for Denison to take a precautionary approach. Examples of concrete actions to address uncertainty in cases where IK and LK have differing conclusions on predicted Project effects include addressing uncertainty through monitoring and follow-up programs and communicating results of those monitoring and follow-up programs to demonstrate they have been responsive to the IK shared." (p. 3-14) **Rationale:** CNSC's Generic Guidelines for the Preparation of an EIS state: "In documenting the analyses included in the EIS, the proponent will demonstrate that all aspects of the project have been examined and planned in a careful and precautionary manner in order to avoid significant adverse environmental effects. A document by Canada's Privy Council Office, *A Framework for the Application of Precaution in Science-based Decision Making About Risk, sets out guiding principles for the application of precaution to science-based decision making*." (Section 2.5)	Please clarify how the precautionary principle, and the Privy Council Office's, *A Framework for the Application of Precaution in Science-based Decision Making About Risk, sets out guiding principles for the application of precaution to science-based decision making* has been considered and incorporated into the EA described in the EIS.	
IR-27	CNSC	Cumulative Effects Analysis	Section 3.4.8	**Context:** During an outreach and engagement trip by CNSC in October 2022, an abandoned exploration camp adjacent to the proposed Wheeler River site was observed. This site has not been identified within the EIS as part of the cumulative effects assessment. As noted in section 3.4.8, KML has also raised concerns with Denison related to abandoned camps and industrial waste left with no programs for clean-up. **Rationale:** Section 9.4.3 of CNSC's Generic Guidelines for the Preparation of an EIS states that "The applicant shall assess any residual adverse environmental effects of the project in combination	Please specify why abandoned exploration camps and industrial waste aren't taken into consideration when completing cumulative effects assessment.	

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				with other past, present or reasonably foreseeable projects and/or activities within the study area."		
IR-28	CNSC	Current use of lands and resources for traditional purposes	Section 4, IER and engagement appendices, including: Appendix 2-A Appendix 6-B Appendix 7-B Appendix 8-A Appendix 9-A Appendix 10-B Appendix 11-A Appendix 12-A Appendix 13-A Appendix 14-B	**Context:** The summary of issues tables do not appear to include all of the key issues identified by the Indigenous Nations and communities. For example, some Indigenous Nations and communities have shared concerns with respect to accident prevention and overall safety on the Key Lake road (Highway 914) due to increased traffic, impacts on treaty rights and section 35 rights due to cumulative impacts, and decommissioning, that were not captured in the issues and concerns and summary tables in Section 4.3.2 and in the IER. The tables in the engagement appendices include a column titled "Response (From Denison)". The "Response" column does not include responses, but instead points the reader to where this comment or concern was considered. When navigating to the sections referenced, it is often unclear how this information was considered or influenced the assessment. **Rationale:** Additional detail is required in order to ensure the key issues are all identified and to understand the status of validation for each issue raised and the response provided.	1. Update the summary of issues and concerns tables to include all relevant issues and concerns raised by each of the Indigenous Nations and communities to date, including concerns raised in the Indigenous Knowledge studies provided, additional engagement, and Draft EIS comments. 2. Please include a column in the issues and concerns tables to clearly articulate the specific mitigation/monitoring measures that Denison have committed to, or any other measures, in order to address the concerns raised by each Indigenous Nation and community during the engagement process to date. 3. Denison must demonstrate that each Indigenous Nation and community has validated that the summary of issues and concerns table reflects their understanding or agreement, and/or a path forward to complete the validation throughout the EIS and the updated IER. Validation must be complete by the time the technical review is complete, prior to submission of a final EIS. Should Denison not be able to fully address issues, concerns or feedback raised by any Indigenous Nation or community, through mitigation and monitoring measures, this should be documented, and a rationale provided. 3. Update the response column of the Engagement tables to describe how these were considered in the sections referenced. Consider renaming this column to reflect the nature of the content (i.e., how the information was considered).	
IR-29	CNSC	Current use of lands and resources for traditional purposes	Section 4.3.2 and IER	**Context:** In this section, Denison includes the engagement with BNDN and includes a summary of issues and concerns table for the Nation. Within the history of interactions (Section 4.3.3.2.1). **Rationale**: Denison states that they have been providing information on the project to BNDN in 2019, 2021 and again in 2022 and that Denison and BNDN have not responded to date in order to advance further engagement and dialogue.	Please ensure updated information of any additional engagement activities that Denison has completed with BNDN related to understanding their current and traditional land use and potential interests near the proposed project is provided.	
IR-30	CNSC	Indigenous physical and cultural heritage	Section 4.3.2.1.3, Table 4.3.2	**Context:** Concerns were raised during engagement sessions that "Elders are not being consulted as most of the engagement has been through online means and without a translator".	How has Denison adapted engagement with Elders from the ERFN since receiving this comment on March 31, 2021?	

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				Rationale: There's no indication that a translator has been employed to engage with Elders since 2021 in the engagement Table 4.3.2.		
IR-31	CNSC	Indigenous Engagement	Section 4.4.2.1.3, Key Engagement Activities (p. 4-88)	**Context and Rationale:** Regarding the following: "An open house for the general public was planned to be hosted in 2022 on preliminary effects and mitigation, but due to concerns identified by MN-S about hosting a public open house in a community with a significant Métis population, this meeting was postponed by Denison. Denison looks forward to rescheduling the meeting in collaboration with the MN-S." (p. 4-88)	Please provide an update on the evolution or progress of this engagement with local communities, following collaboration with MN-S (or otherwise).	
IR-32	CNSC	Current use of lands and resources for traditional purposes	Section 5.3 Section 9.0 Terrestrial Environment	**Context:** Some sections of the EIS (such as Fish and Fish Habitat, Indigenous Lands and resource use) indicate that Indigenous and/or local knowledge was considered when defining the spatial boundaries. However, this is not included in other sections, such as Terrestrial Environment. **Rationale:** Section 5.2.2 of CNSC's Generic EIS Guidelines require that spatial boundaries be defined by considering, but not limited to, the following criteria: Community and Indigenous traditional knowledge, ecological and technical considerations.	Please provide any additional details about how any comments or concerns raised were considered in defining the spatial boundaries with Indigenous Nations and communities with respect to spatial boundaries, for the Terrestrial Section and which specific Indigenous Nations and communities were engaged on these topics and how their input and knowledge was incorporated into the EIS. If already presented in the EIS text body, please indicate where this information can be found or link to Section 4 of the EIS or in the IER.	
IR-33	CNSC	Residual Effect Characterization	Section 5.8.1, Definitions for Residual Effects Characterization and Significance Section 5.8.1.1, Residual Effects Characteristics Section 8, Table 8.3-9: Fish and Fish Habitat - Surface Water Quality	**Context:** Denison uses specific criteria (Residual Effect Characteristics: Direction, magnitude, geographic extent, duration, frequency, reversibility, context and likelihood) and associated ratings (e.g., adverse/positive, low/moderate/high) for the predicted effects assessment. However, it is unclear whether an aggregation method was used in order to determine whether impacts will be significant or not significant, depending on the combination of rating categories (i.e., weightings that were calculated, use of decision rules). For example, medium term and long term are both used to represent the same time category: "Effects are expected to last between 3 to 38 years (i.e., effects expected during Construction through to the end of post-Decommissioning)." (See table 8.4-13 on p. 8-200 compared to table 8.4-12 on p. 8-199 and table 8.5-9 on p. 8-246). **Rationale:** The Generic Guidelines state: "The method used to describe the level of the adverse effect should be transparent and reproducible." In Table 8.3-11, duration was moderate, but again uses same rationale. There is no 'moderate' in Table 8.3-8, and by the same rationale, this should be medium-term to be consistent with definitions provided and summary Table 8.3-12.	If an aggregation method was used and ratings (e.g., High, medium, low) were weighted, what weightings were used, how were these calculated? Please also describe any decision rules that informed the determination of significance. If no aggregation was used, how did Denison ensure that results were consistent, given the varying rankings for each of the key criteria, and varying combination? Regarding inconsistencies in ratings, please use consistent terminology for same rating.	

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				It was noted that all three tables should be deemed medium-term based on definitions of ratings outlined in Table 8.3-8. Frequency was also showing up as "continuous" and "continuously" in these tables.		
IR-34	CNSC	Cumulative Effects Analysis	Section 5.9.2.2 (p. 5-41)	**Context:** Denison identifies the Gryphon deposit as a project that is not reasonably foreseeable. The direct quote from the EIS indicates that the "Development of the Gryphon deposit as an underground mine was evaluated at the prefeasibility level in 2018 but has not advanced to feasibility study or EA. Denison has not announced an intent to proceed with the development of the Gryphon deposit." (p. 5-41) **Rationale:** The guidance Assessing Cumulative Environmental Effects under the CEAA, 2012 defines *Reasonably Foreseeable* as a "physical activity [that] is expected to proceed, e.g. the proponent has publicly disclosed its intention to seek the necessary EA or other authorizations to proceed." In a press release by Denison Mines (2018: Denison announces decision to advance Wheeler River Project following positive PFS results), Denison publicly disclosed intention to seek the necessary EA for Gryphon to proceed: "After careful consideration of the risks and opportunities associated with permitting and concurrent advancement of project engineering activities, the Company has decided to submit a PD and initiate the EA process in early 2019 for the Phoenix ISR operation, and to bring the Gryphon operation forward, at a later date, as required to achieve the PFS plan of Gryphon first production by 2030." Further, Denison's Wheeler River Webpage references a "start of pre-production activities for the Gryphon operation in 2026"	Please update the cumulative effects assessment in the EIS to include the Gryphon deposit as a Present or Reasonably Foreseeable Project.	
IR-35	CNSC	Change to an environmental component due to hazardous contaminants	Section 6, Chemicals of Potential Concern	**Context:** The use of petroleum products (e.g., propane, gasoline, and diesel) at the Denison Mines Wheeler River site is associated with vehicles and periodic operational testing of emergency generators as well as stationary pumps for emergency power or fire water systems. Thus, the air emissions will contain acrolein. **Rationale:** This chemical of potential concern (COPC) poses potential risks to human health via inhalation, but acrolein appears to have been missed or deemed insignificant. However, its consideration in the assessment will provide information on the significance of the associated risk.	Please consider acrolein in the assessment or provide a rationale for its exclusion.	

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IR-36	CNSC	Other	Section 6, Table 6.1-11 Baseline External Gamma Monitoring	**Context:** For one of the exposures in the summary table for baseline external gamma monitoring (Table 6.1-11), the cell states "Destroyed in Field". **Rationale:** No rationale or indication as to why or how it was destroyed is provided.	Please provide any additional info available as to how equipment was destroyed.	
IR-37	CNSC	Air Quality	Section 6.1.1.1, CALPUFF model	**Context:** "The Saskatchewan Ministry of Environment (SK MOE) has developed the Saskatchewan Air Quality Modelling Guideline (SK MOE 2012a) to assist proponents in conducting air dispersion modelling assessments in a consistent manner. The guideline defines the recommended approach for dispersion modelling assessments in Saskatchewan, including model selection, emission source characterization, and the determination of compliance criteria to apply." **Rationale:** Saskatchewan air quality guideline requires consultation on use of CALPUFF model, where it states" The ministry acknowledges that there will be situations where specialized air dispersion models such as CALPUFF, CALQ3HCR and others may be applicable. The use of specialized models requires consultation with the ministry" OR "Pre-consultation with the ministry must be undertaken prior to the facility conducting specialized modelling (p. 3)." It is not clear if Denison Mines consulted with Saskatchewan MOE on use of CALPUFF model. Noted that Section 6.1.4.2 is again referring to Saskatchewan MOE guidance for justification, but no indication that they consulted with them (a requirement).	Please confirm and provide a summary of the consultation with the Saskatchewan MOE on the use of CALPUFF model for the Wheeler River EIS as per provincial air quality guidelines.	
IR-38	ECCC	Change to an environmental component due to hazardous contaminants	Section 6.1.4.1, Potential Interactions Between the Project and Valued Component / Key Indicators	**Context:** In this section, the Proponent identifies primary interactions between Project activities and air quality valued components and their associated key indicators. These primary interactions may result in an adverse effect on the valued component. Among the primary interactions are the use of emergency generators in a backup role should there be an interruption of the provincial electrical grid. However, it is not evident what is the anticipated frequency and duration of interruption to grid power. **Rationale:** The Proponent states in the conservative operation scenario that while the site will be powered from the provincial grid at the operations stage, the back-up power generators were assumed to be operating under emergency conditions as a worst-case scenario. ECCC acknowledges the positive impact of extending the electrical grid to the Project site with resultant reduction in generator emissions. The impact of an interruption in grid power would be greatest during the winter months when energy use would be greatest and surface-	Provide an evaluation of a worst-case scenario of grid power interruptions (i.e., average aggregate length of power outages) during the winter months for this section of the electrical power grid.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				based temperature inversions, which vertically trap emissions, would be strongest.		
IR-39	ECCC	Change to an environmental component due to hazardous contaminants	Section 6.1.4.2, Potential Project-Related Effects	**Context:** In this section, the Proponent discusses the approach taken for air dispersion numerical modelling. Using their CALMET data set, the Proponent's CALPUFF model runs indicated exceedances for 24-hour total suspended particulates, 24-hour particulate matter (PM10), 1-hour nitrogen dioxide, and 24-hour uranium concentrations. However, there is no mention of possible diurnal and seasonal occurrences of the exceedances. **Rationale:** Adequate assessment of the modelling results requires knowledge of the temporal characteristics for the exceedances. For example, wintertime exceedances may be due to strong temperature inversions, especially during the overnight to morning hours. These strong inversions are challenging for numerical models to capture. Exceedances during warmer months may be due to specific wind directions, which transport emissions directly to downwind receptors.	Provide additional information on any diurnal and seasonal influences of the modelled exceedances.	
IR-40	CNSC	Air Quality	Section 6.1.6.2.1, Air quality significance determination	**Context:** Significance determination was not conducted for air quality due to interconnectedness with other assessment endpoints. **Rationale**: It is not clear where and how these air quality assessment endpoints were factored into the assessment.	Please provide additional information to demonstrate where and how these air quality assessment endpoints were factored in.	
IR-41	CNSC	Air Quality	Section 6.1.6.2.2, Background concentrations	**Context:** The EIS states that "Conservative regional background concentrations from the Saskatchewan Air Quality Modelling Guideline (SK MOE 2012a) and based on the La Loche monitoring station were used for particulate matter, NO2, SO2, and CO. The La Loche monitoring station is located near anthropogenic sources, while the Project is in a remote area removed from anthropogenic sources." **Rationale:** If La Loche monitoring station is located near anthropogenic sources and the project is not, use of this data is not a conservative or realistic representation of background. For a realistic approach, background data considered should be upper 95th percentile (or max if n<10) from an area representative of project location For a conservative approach, background data from an area located even further from anthropogenic sources (if this exists) should be used, or an upper limit of background less than upper 95th should be applied as the background. Upper limit of background is used to screen out COPCs or often subtracted from total to ascertain relative contribution / impact from	Please provide additional rationale to justify the appropriateness of La Loche monitoring station concentrations as background for project location.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				source, so using a higher upper limit may result in COPCs screening out or appear to have a lower relative contribution. If background was added to source, then approach used would be conservative. If this is the case, confirmation and reference to where this is discussed in methodology should be provided.		
IR-42	Health Canada (HC)	Physical stressors (noise and vibration)	Section 6.2.4.2.2, (p. 6-66) Section 6, Section 6.2.9, (p. 6-72)	Nighttime noise impacts are not adequately considered for human receptors. **Context:** The EIS states in Section 6.2.9 that, "While the predicted sound levels were less than the guideline values, the increase from baseline was predicted to be noticeable" (p. 6-72). No information is provided on individual noise events occurring during the nighttime period**.** **Rationale:** While the increase from baseline is predicted to be noticeable, it is important to also consider that changes to the characteristics of the sound from baseline (e.g., a change in frequency, changes in sound modulation, increased impulsiveness or tonality, or a shift in noise from the daytime to being more at night) may cause noise to be even more noticeable. Consult ANSI S12.9-2005/Part 4, clause A.1.3 for further information. In particular, consideration should be given to potential impacts on sleep, where adverse impacts are reported to begin when sound levels inside bedrooms exceed 30 dBA for continuous noise sources and 45 dBA LAmax for discrete noise events (WHO, 1999).	1. Provide a description of the project- related nighttime noise sources that may impact human receptors as well as a qualitative discussion of the resulting potential impacts on perception considering not only changes in sound levels but also sound characteristics (e.g., tonality, impulsivity). 2. Confirm whether individual nighttime noise events exceeding 45 dBA LAMax outdoors (or 30 dBA indoors) are expected to occur more than 15 times over the nighttime period at any nearby potentially noise-sensitive human receptor location(s). This may be of particular concern if some construction and/or operations activities occur during sleeping hours.	
IR-43	HC	Physical stressors (noise and vibration)	Section 6.2.5, (p. 6-66) Section 6.2.5, (p. 6-71)	Mitigation measures for project-related noise were not identified for the Construction phase. **Context:** The mitigation measures provided in Section 6.2.5, including a complaint management system is also to be implemented as part of the EMS, are only proposed for the operations phase. However, construction activities are predicted to last more than one year. Construction noise will involve the use of equipment operating at the site, construction of surface facilities, drilling, and partial operation of the freeze plant. It will also include regular truck trips and air traffic for personnel changes. **Rationale:** It is unclear if listed mitigation measures also apply to the construction phase (or only to the operations phase).	1. Clarify whether mitigation measures and the proposed EMS apply to the Construction phase. If not, identify mitigation measures for noise impacts related to Construction phase activities, and consider applying the EMS to the Construction phase and implementing the community complaints and response procedure from the beginning of construction activities. 2. Health Canada suggests that construction noise lasting longer than 1 year be assessed as operational noise, and that noise mitigation measures be applied also to the construction phase. Special consideration should be given to mitigation measures for construction noise that occurs at night, in order to minimize impacts on sleep (i.e., avoiding tonal or impulsive noise sources at night). **Suggestions for mitigation and follow-up measures:** Health Canada recommends use of Appendix H of Health Canada (2017), which identifies additional construction	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
					noise mitigation measures that could also be considered to reduce project- related noise.	
IR-44	HC	Physical stressors (noise and vibration)	Section 6.2.8, (p. 6-71)	The noise complaints resolution and response procedure is not sufficiently described in the EIS. **Context:** Section 6.2.8 discusses Monitoring and Follow- up. The proponent indicates: "The EMS will also include a community complaints and response procedure" (p. 6-71). **Rationale:** Details have not been provided regarding how the complaints would be received, addressed or what the timelines will be for providing a response or resolution. It is important to provide information to potentially affected communities in advance of particularly noisy activities. Community consultation and advanced notification of noisy activities has been shown to reduce complaints (see Health Canada, 2017).	1. Provide the details of the noise complaints resolution and response procedure as per Health Canada (2017). 2. Consider conducting community consultations and/or implementing an advanced community notification system to pro-actively reduce the probability noise-related impacts and complaints.	
IR-45	HC	Change to an environmental component due to hazardous contaminants	Section 6 Air Quality Technical Supporting Document Section 6.3.1	The carcinogenic risks of diesel exhaust from the project should be assessed. **Context:** Section 6.3.1 discusses modelled predictions of exceedances for Particulate Matter (PM). TSD p. 22 states: "concentrations of 24-hour PM2.5 are also elevated around the standby generators at the freeze plant, which emit fine particulate matter from combustion of diesel fuel". However, diesel particulate matter is not evaluated for the whole project in the air quality model or the air quality assessment. **Rationale:** Health Canada has determined that diesel exhaust is carcinogenic in humans which is consistent with the conclusion of the International Agency for Research on Cancer (IARC), and that diesel exhaust is associated with significant population health impacts in Canada. To characterize the carcinogenic risk of diesel exhaust from a project, HC has published a report (2022)1 which provides a quantitative assessment of the relationship between ambient PM2.5 exposure and lung cancer risk. Specifically, this report quantifies the increase in risk of lung cancer mortality (over the baseline rate in the Canadian population) due to PM2.5 exposure. This quantitative assessment is considered appropriate to characterize risks from diesel PM given the contribution of diesel exhaust to ambient PM2.5 in Canada, and that the carcinogenicity of diesel exhaust has generally been evaluated based on the respirable PM fraction1,2,3.	1. Evaluate the carcinogenic risk of all potential diesel exhaust from the project based on the approach proposed by Health Canada (2022). Additional guidance ("Additional Lung Cancer Mortality from PM2.5: Recommended Approach and Sample Calculation") is provided as an appendix to this comment table.[i]	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				References: [1] HC. 2022. Lung Cancer and Ambient PM2.5 in Canada: A Systematic Review and Meta-analysis. Available at: https://publications.gc.ca/site/eng/9.907038/publication.html [2] HC. 2016. Human Health Risk Assessment for Diesel Exhaust. Available at: http://publications.gc.ca/collections/collection_2016/sc-hc/H129-60-2016-eng.pdf [3] IARC. 2013. IARC monographs on the evaluation of carcinogenic risks to humans. Volume 109. Outdoor air pollution. https://publications.iarc.fr/Book-And-Report Series/Iarc-Monographs-On-The-IdentificationOf-Carcinogenic-Hazards-To-Humans/Outdoor Air-Pollution-2015		
IR-46	HC	Physical stressors (noise and vibration)	Appendix 6-A Table A-1	Low-frequency noise and associated potential human health effects were not assessed. **Context:** Some equipment that may emit low-frequency noise (LFN) have been listed in Table A-1: Assessment Scenarios and Sound Level Data (Section 6 Appendix A); however, no information describing potential impacts of this type of sound on nearby human receptors are presented. **Rationale**: Low frequency noise can be associated with the introduction of noticeable vibrations and rattles in nearby structures. Research indicates that annoyance related to noise is greater when low-frequency noise is present (ISO 1996-1:2003). As sound environments are usually characterized using A-weighted decibel levels (dBA) that reflect the frequencies most audible to the human ear, the impacts of low- frequency noise may need to be assessed separately.	1. Clarify whether any project-related activities (construction, operation and/or decommissioning) may produce LFN that could impact off-site human receptors. Evaluate LFN in the noise assessment, if and where applicable. See Appendix C of Health Canada (2017) for a discussion of LFN.	
IR-47	ECCC	Air Quality	Appendix 6-A, A.1	**Context and Rationale:** Verification of the following calculation is required for assessing predicted emissions of dust from general construction. It appears the result of 0.70 ton/acre/month is incorrect and should instead be 0.314 ton/acre/month. Appendix 6-A, Appendix A, A.1 (p. A4) TSP Emission Factor for General Construction: $$EF\ (TSP) = 0.11 \frac{\frac{ton}{acre}}{month} \times 1.2 \frac{\frac{ton}{acre}}{month} \div 0.42 \frac{\frac{ton}{acre}}{month}$$ $$= 0.70 \frac{\frac{ton}{acre}}{month}$$	Explain how the emission factor total suspended particulates (EF (TSP)) result was obtained or rectify if it is incorrect and update the draft EIS to reflect the correction.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-48	HC	Physical stressors (noise and vibration)	Appendix 6-E, Figure 6.2.3, p. 6-57	Noise-sensitive receptors are not included on noise contour maps. **Context:** Noise-sensitive receptors are identified in the acoustic model report in Section 6 Appendix 6-E but not presented on any maps in the atmospheric and acoustic sections of the main report (Figure 6.2-3). **Rationale:** The noise assessment typically includes a map illustrating modelled noise levels from the project at receptor locations in the study area. Certainty regarding the presence of human receptors in the regional study area is also recommended in order to assess cumulative impacts.	1. For more clarity, identify noise-sensitive receptors on Figure 6.2-3: Noise Assessment Study Area as well as on contour maps showing the baseline and predicted noise levels.	
IR-49	HC	Physical stressors (noise and vibration)	Appendix 6-E, 4.0 Table A.1	The Noise Source Characterization is incomplete. **Context:** Section 3.0 of the Draft EIS Section 6 Appendix 6- E discusses Source Characterization. There is no detail regarding potential tonal or impulsive noise sources in Section 3.0. **Rationale:** The draft EIS should include a description of sound source characteristics (e.g., tonal, impulsive, highly impulsive) in order to properly inform the quantitative noise assessment and which assumptions/adjustments need to be applied and to properly evaluate impacts of project noise on health of affected receptors.	1. Identify any tonal, regularly impulsive, highly impulsive, or high-energy impulsive noises likely to be produced during project activities that could be audible at noise sensitive receptors. Furthermore, describe the timing (e.g., hours of night-time activities), frequency and duration of noise events, and their sound characteristics, including frequency spectrum. See Health Canada (2017) for details.	
IR-50	HC	Physical stressors (noise and vibration)	Appendix 6-E, 4.0 Table A.1	The description of noise modelling does not document or justify the use of sound level adjustments**.** **Context:** ISO Standard 9613-2 has been used for the sound level modelling; however, it is unclear if all applicable adjustments have been considered as per ISO 1996-1:2016 (Table A.1). **Rationale:** When modelling techniques are used to estimate present (baseline) or future (construction and operational) sound levels, these techniques and any accompanying assumptions, including the use of sound level adjustments, it is important to provide appropriate documentation and justification. Note that in situations where more than one source characteristic adjustment is applicable (e.g., impulsive or tonal), only the higher of the adjustments is used. However, all time-of-day adjustments and the quiet rural area adjustment are to be added to the highest of the applicable source adjustments.	1. Clarify whether ISO-1996-1:2016 has been considered in the modelling to account for any applicable sound level adjustments. Adjustments should be considered when calculating Ln (night- time sound level) and Ldn (day-night sound level). In addition, if applicable, adjustments can be applied depending on the noise characteristic (impulsive, highly impulsive, etc.), and because the project location is considered to be in a quiet rural area. See: ISO 1996-1:2016 and Health Canada (2017) for details.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-51	CNSC	Geology and Groundwater	Section 7, Figure 7.8-1 Appendix 7-C	**Context:** Figure 7.8-1 (p. 7-107, main EIS report) shows monitoring well cluster outside of the freeze wall. **Rationale**: It is not clear what the targeted hydro-stratigraphic units of each monitoring well cluster are. In addition, it is not clear how the establishment of the freeze wall and any leakage from the brine solution will be monitored. If there is any "window" within the freeze wall (i.e., the freeze wall is not continuous), is there any way to identify that?	Please clarify the targeted hydro-stratigraphic units of each monitoring well cluster in Figure 7.8-1 (p. 7-107, main EIS report). Please clarify how the establishment of a continuous freeze wall will be monitored.	
IR-52	ECCC	Fish and fish habitat	Section 7, Geology and Groundwater Appendix 7	**Context:** According to the Proponent, ''an acidic or low pH mining solution will be used to leach uranium ores from the ground. Mining solution may be a mixture of sulphuric acid, hydrogen peroxide, ferric sulphate, and freshwater (from shallow groundwater well or surface waterbody) or recycled water. Wellfield will consist of a combination of injection and recovery wells, in the general the arrangement of one recovery well in the centre surrounded by four injection wells (5-spot pattern) with about 5 to 10 m between wells. The final wellfield is expected to include approximately 300 wells over an area measuring 90 m wide x 750 m long''. As the components/contaminants mentioned in the description of the hyrogeologic contaminant transport processes above may be transported to Whitesfish Lake through groundwater, the injection and recovery wells should be included in the model. **Rationale:** The hydrogeologic contaminant transport processes described above are an important part of the proposed Project and it is not clear why numerical modelling results and a sensitivity analysis for the above processes was not presented.	1. Explain why 3D hydrogeology and contaminant transport numerical modelling of the injection and extraction wells was not presented. 2. Alternatively, provide simulation results and a sensitivity analysis for the injection and extraction of the acidic solution in the mining area.	
IR-53	CNSC	Geology and Groundwater	Section 7.3, Table 7.3.-2 Appendix 7-C	**Context:** The field-based hydraulic conductivity values (referred to as K values hereafter) in Table 7.3-2 (p. 7-32, main EIS report) indicate that the K value ranges of upper and lower sandstone aquifers have a significant overlap with those of the intermediate sandstone aquitard. However, the calibrated K value in Table 2-2 (p. 2.7, Appendix 7-C)) for the intermediate sandstone aquitard is close to the lower end of the field-based K value range, while the calibrated K values for the upper and lower sandstone aquifers are close to the upper end of the field-based K value range. **Rationale:** It is not clear how representative the calibrated K values are of the field-based K values for each hydro-stratigraphic unit, and if the significant difference between the K values for the upper and	Please provide additional information to support the representativeness of the calibrated K values (for example, use graph to present the measured K values and the calibrated K values).	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				lower sandstone aquifers and those for the intermediate sandstone aquitard is supported by the geological properties of the corresponding stratigraphy units. It is stated in the report (p. 7-36, main EIS report) that "Vertical fracture or fault zones that hydraulically connect the Local (upper) and Semi-Regional (lower) groundwater flow regimes are present throughout the Athabasca Basin". But fractures and fault zones are not explicitly considered in the model. There is possibility that these features could increase the hydraulic connection between the upper and lower sandstone aquifer.		
IR-54	CNSC	Geology and Groundwater	Section 7.3.1	**Context:** EIS states: "The most important associated topographic features in the region are the northwest to southeast trending drumlins and eskers…." This is not the trend shown on the provided maps, nor described elsewhere in the report, e.g., Section 7.3.2.1 **Rationale:** Inaccurate information in the EIS	Please update the EIS where required to accurately describe the topographical features.	
IR-55	NRCan	Fish and fish habitat	Section 7.3.3.1; Appendix 7-A, sections 3.4, 3.5, 3.8, 4.2; Appendix 7-C, section 2.8	**Context**: According to the proponent's conceptual hydrogeological model (EIS, sec 7.3.3, Figure 7.3-7, Table 7.3-2; Appendix 7-A, sec. 3.4, Table 3-4), the horizontal hydraulic conductivity of the Intermediate Sandstone (Iss) aquitard is 8.4 E-09 m/s based on field measurements. The proponent further assumes a 10:1 anisotropy ratio for the unit (Appendix 7-A, sec. 3.5.1) such that its estimated vertical conductivity is 8.4 E- 10 m/s. Based on this information, structural geology and groundwater quality data, the proponent concludes that the connectivity between the Upper sandstone aquifer and the Intermediate Sandstone aquifer (sic) is limited (EIS sec. 7.3.3.3; Appendix 7-A, sec. 4.4). While acknowledging the paucity of conductivity data and the proponent's attempt to mitigate this by leveraging collateral information on fracture frequency and clay content (Appendix 7-A, sec. 3.3.1), NRCan considers that the hydraulic conductivity assigned to the Iss aquitard is unrealistically low and inconsistent with the following lines of evidence: a) The conductivity value for the Iss is based on the geometric mean of 18 field measurements, 12 of which are from the same borehole (WR-695) located in the Gryphon zone, beyond the domain of the numerical model (Appendix 7-A, Appendix C, Table C-1). If the conductivity data were weighted equally, with one value per borehole, the geometric mean would be approximately 1.5 E-07 m/s, or two orders of magnitude higher; b) The proponent notes that vertical fracture or fault zones that hydraulically connect Upper and Lower aquifer systems are present throughout the Athabasca Basin including in the Phoenix area (EIS, sec. 7.3.3.2.2; Appendix 7-A, sec.3.8.1); c) The proponent notes that groundwater chemistry data (major ions) corroborate the presence of structurally controlled vertical hydraulic	In the "Parameter Uncertainty Assessment" for the numerical groundwater flow model (Appendix 7-C, sec. 2.8), NRCan requests that the proponent develop a calibrated numerical model with an alternate conceptualization of the Intermediate sandstone as a "leaky" aquitard with a horizontal hydraulic conductivity on the order of 1 E-07 m/s and a much lower anisotropy ratio. This should involve modifying the model lateral boundary conditions to allow for groundwater inflow/outflow across the entire thickness of the Athabasca Sandstone Group rather than just the Lower Sandstone aquifer.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				connections between the Upper and Lower aquifer systems (EIS, sec. 7.3.3.2.2, sec. 7.3.3.3; Appendix 7-A, 4.3.3); d) Groundwater chemistry data (Appendix 7-A, sec. 4.2, Table 4-1) also indicate the presence of detectable levels of "bomb" tritium (indicating recharge waters < 50 years old) in the Lower Sandstone Aquifer (GWR-025, GWR-008, GWR-033) and in the Iss (GWR-009, GWR-034), outside the area of U mineralization. This is also evidence of vertical hydraulic connection through the Iss. In summary, whereas the proponent conceptualizes the Iss as a very low-permeability unit with localized vertical hydraulic connection (WS Shear), NRCan interprets the Iss as a "leaky" aquitard with pervasive fracture-controlled and much higher vertical hydraulic conductivity. **Rationale**: The significance of NRCan's alternative interpretation of the Iss hydrostratigraphic unit is that deep groundwaters, including mining-impacted waters, may represent a greater proportion of baseflow discharge to Whitefish Lake than the 1% currently estimated in the proponent's groundwater flow model (EIS, sec. 7.4.2.1, p.7-51; Appendix 7-C, sec. 2.6.3).		
IR-56	CNSC	Geology and Groundwater	Section 7.3.3.2	**Context:** It is stated in Section 7.3.3.2 (p. 7-37, main EIS report) that "Exploration boreholes drilled in the Phoenix area, where left unplugged, have the potential to provide preferential flow paths between the Overburden and Upper and Lower Sandstone Aquifers. Exploration holes were reportedly grouted approximately 10 to 20 m above and below the ore zone, resulting in open holes remaining throughout the overlying materials. These portions of the open holes may act as open conduits for groundwater flow through the 400 m of Athabasca Group Sandstone." **Rationale:** It is not clear why the exploration boreholes have not been decommissioned.	Please clarify why the exploration boreholes have not been decommissioned and the timeline to decommission the boreholes according to appropriate guidelines/procedures. If it is not decommissioned before the ISR operation, what is the potential impact of the unplugged boreholes on the mining solution migration?	
IR-57	NRCan	Fish and fish habitat	Section 7.3.3.2 Appendix 7-A, sections 3.1.2 and 3.7 Appendix 7-C, section 2.5.2	**Context**: The proponent's conceptual model of groundwater flow in the Local Study Area (EIS, sec 7.3.3, Figure 7.3-7) involves an unconfined Upper system hosted by overburden and the Upper sandstone aquifer, and a Lower confined system hosted by the Lower Sandstone Aquifer. The Intermediate Sandstone aquitard acts as a confining unit. Vertical heads gradients are directed downwards west of the Phoenix deposit and upwards beneath surface water receptors including Whitefish Lake (EIS, sec. 7.3.3.2). Using head data from nested monitoring wells (Appendix 7-A, sec. 3.1.2, Table 3-1) the proponent calculates upward gradients in cluster WR-607, between the Lower Sandstone aquifer and the Upper Sandstone aquifer. In cluster LA-5, an upward gradient is calculated between the Upper Sandstone and the overburden unit (Appendix 7-	In section 2.5.2 of Appendix 7-C (Calibration Results), the proponent should demonstrate that the numerical groundwater flow model reproduces quantitatively or at least qualitatively the vertical head gradients calculated from observations in the nested monitoring well clusters (Appendix 7-A, Table 3-1).	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				A, Table 3-5). In areas west and south-west of the Phoenix deposit, groundwater is estimated to flow downward under a vertical gradient of approximately 0.015 m/m (Appendix 7-A, p.3-15). **Rationale**: In NRCan's opinion, the proponent's interpretation of vertical head gradients in the LSA is not fully accurate. For the "Up-Gradient" monitoring well cluster, the tabulated head data (Appendix 7-A, Table 3-1) and data logger hydrographs (Appendix 7-A, Appendix B) indicate a downward gradient (0.014 m/m) from the overburden unit to the Intermediate Sandstone and an upward gradient (0.056 m/m) from the Lower Sandstone to the Intermediate Sandstone. Head data from the "NW" monitoring well cluster indicate a similar pattern of downward (0.016 m/m) and upward (0.014 m/m) gradients converging in the Intermediate Sandstone. In the "Downgradient" and "SE" monitoring well clusters, head observations and data logger hydrographs indicate downward gradients from the shallow aquifer system but essentially equal heads in the Intermediate and Lower Sandstones. This more complex picture of groundwater flow systems in the LSA does not appear to have been captured in the proponent's conceptual model. Given the importance of the baseline hydrogeological regime for predicting the transport and fate of COPCs in the post-decommissioning period, the proponent needs to demonstrate that the numerical groundwater flow model accounts for observed vertical head gradients.		
IR-58	ECCC	Fish and fish habitat	Section 7.3.2.4, Ore Deposit	**Context:** The Proponent states that the Phoenix ore bodies are long and narrow (approximately 25 to 50 m wide) and are located within or near a graphitic pelite unit. Hydrothermal alteration associated with the ore zone is a discontinuous envelope of clay alteration and a sulphide-cemented rock zone that extends into the overlying sandstone and the underlying basement (Figure 7.3-3). This black, clay-rich zone is approximately 3 m thick on average and locally hydraulically isolates the ore zone from the overlying sandstones and underlying weathered basement rock. **Rationale:** As indicated by the Proponent, a 3 m black clay rich zone isolates the ore zone from the overlying sandstones and underlying weathered basement rock. It is, however, unclear whether this discontinuous clay layer will prevent downward migration of uranium-bearing solution into the Paleo-weathered basement rock or horizontal flow along the unconformity surface to escape into the environment. Escape of uranium-bearing solution into the environment will have a negative effect on the receiving environment.	1. Verify that there will be no downward migration of mining solution into the paleo- weathered basement rock or that there is no flow along the unconformity surface. 2. If downward migration of the mining solution occurs, explain how it will be mitigated.	
IR-59	CNSC	Fish and fish habitat	Section 7.4 Assessment of Project-related	**Context:** Figure 7.4-2: Simulated Change in Groundwater Discharge and Flow through Whitefish Lake Over the Life of the Project appears to be missing information.	Please update this Figure to ensure it is complete, and that features are properly indicated in the legend.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
			Effects, Figure 7.4-2 (p. 7-56)	**Rationale:** Legend is included below the image, but the Legend box is blank. The green dotted line is not represented by anything in the legend.		
IR-60	NRCan	Fish and fish habitat	Section 7.4.2.1 Appendix 7-C, section 5.2.1, Appendix B	**Context:** In the discussion of the limitations of the numerical groundwater flow model (Appendix 7-C, sec. 5.2.1), the proponent invokes the well known modeling principles of "Occam's razor" and "Parsimony" which guided the parametrization of hydraulic conductivity in model layers. The proponent states that hydrogeologic property values were applied uniformly for, among other units, the Lower Sandstone aquifer beyond the immediate area of desilicified materials. However, in the layer parametrization for the Lower Sandstone aquifer (Appendix 7-C, Appendix B, Figure B-5), NRCan notes a large zone of enhanced conductivity (1 E-05 m/s) extending south from Kratchkowsky Lake, which contrasts with the value (2 E-07 m/s) assigned elsewhere outside the desilicified zone. NRCan also notes the extremely detailed parametrization of hydraulic conductivity in the clay cap overlying the ore zone where borehole control is dense (Appendix 7-C, Appendix B, Figure B-6). **Rationale**: In NRCan's opinion, these model features appear to violate the principle of "Parsimony" and require greater justification supported by field observations.	NRCan requests that the proponent provide justification based on field evidence for the multiple hydraulic conductivity zones assigned to the Lower Sandstone aquifer and the clay cap above the ore zone.	
IR-61	CNSC	Geology and Groundwater	Section 7.4.2	**Context:** There is no discussion of potential induced seismicity from mining processes. **Rationale:** Induced seismicity may lead to a loss of process as identified for natural seismicity.	Please provide information on the potential mining-induced seismicity.	
IR-62	ECCC	Fish and fish habitat	Section 7.4.2, Potential Project-related Effects	**Context:** The Proponent indicates that the mining area includes: • the 'active mining area', which is the target ore zone; • a zone extending between 11 and 13 m above the active mining area that represents the maximum vertical height over which the injected mining fluids will migrate upwards from the ore zone during active mining; and • a zone extending 50 m vertically upwards from the active mining area (that incorporates the active mining area and the 11 to 13 m zone defined in the previous bullet) that was selected to account for potential upset conditions. **Rationale:** It is not clear to ECCC how the Proponent would be able to limit the mining solution migration within 11 & 13 m above active mining as the maximum vertical height over which the injected mining fluid will migrate. As the mining fluid will be injected under pressure into zones with possible presence of fractures, the pressure may also cause additional fractures and given that the solution is warm/hot will	1. Explain plans to limit the upward migration of mining solution into the overlying layer to 11 and 13m above the ore zone. 2. Explain what impacts will occur if the mining solution migrates beyond the predicted height.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				possibly dissolve the other cementing material in the sandstone above, making it difficult to accurately predict where the solution will migrate to.		
IR-63	CNSC	Geology and groundwater	Section 7.4.2.1, Potential Effect #1: Groundwater Quantity – Construction to Decommissioning Appendix 7-C, Section 2.7, Groundwater Conditions During Mine Operations	**Context:** The numerical groundwater model described was calibrated to observed water level and stream baseflow data. Table 7.4-3 in the EIS indicates that Denison recognizes the potential for freeze wall operation to impact groundwater quantity. To simulate this impact, the model was adapted to reduce recharge (to 50%) within the freeze wall area, reduce hydraulic conductivity associated with the vertical freeze walls, and simulate pumping within the freeze wall area. Recovery from pumping and effects on discharge to groundwater discharge to Whitefish Lake are discussed in the potential effects section. **Rationale:** Although this assessment considered drawdown of the water table and discharge to Whitefish Lake, the discussion did not address the potential effects of operating the freeze wall on the local and semi-regional groundwater regimes. What would the pathway be for groundwater to pass around the freeze wall? What is the basis for the parameters selected, e.g., 50% recharge and lower hydraulic conductivity for freeze well? These factors need to be considered when evaluating the potential impacts of freeze well operations on groundwater flow conditions and corresponding receptors.	Please provide a more fulsome discussion on the impact of freeze wall operations on local and semi-regional groundwater regimes and potential receptors. Please provide the rationale for assumptions made for key model parameters (e.g., selection of 50% recharge, hydraulic conductivity value used to represent freeze wall). In addition, please discuss the potential pathways for groundwater flow around the freeze wall, complete with figures demonstrating these pathways.	
IR-64	ECCC CNSC	Fish and fish habitat	Section: 7.4.2.2, Potential Effect #2: Terrain Morphology and Stability – Operation Appendix 7-A, Appendix K (p. 12)	**Context:** The Proponent stated that the geological assessment predicted maximum vertical displacement in altered sandstone immediately above the mining area (17.5 cm). A very minor change in elevation at ground surface (of less than 7.5 cm) was predicted within a discrete and localized area overlying the ore body. The modelling work is considered to provide a worst-case bounding scenario. If subsidence were to occur over the lifetime of the Project, or in the years following mining, the extent of vertical displacement is not expected to exceed that predicted in the modelling, which is based on an assumed volume extraction. **Rationale:** ECCC notes that the thickness of the ore zone has an average thickness of 5 m with a range of 2 to 17 m, and is 25-50 m wide and that the overburden rock above the ore zone measures about 400 m. Therefore, it is not clear how the Proponent determined that the surface expression of a subsidence on the surface if it occurs will be limited to 7.5 cm and localized. A subsidence greater than 7.5 cm, implies that the void in the ore zone will be narrower, and will affect the amount of water migrating through the zone.	Explain: • Will this be revisited with updated data based on extraction feasibility results? • How will the surface expression of a subsidence will be limited to 7.5 cm and localized? **Suggestions for mitigation and follow-up measures:** ECCC recommends that the Proponent consider implementing remediation measures immediately after mining to prevent subsidence from occurring in the first place.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				It was the recommendation of the consultant who conducted the work in Appendix K that more accurate material properties should be used for future modelling.		
IR-65	CNSC	Geology and Groundwater	Section 7.4.2.2	**Context:** It is stated the maximum subsidence is 7.5cm based on modeling with an assumed volume extraction. Has subsidence from dewatering/pumping and from lack of inflow of groundwater due to freeze wall been considered? **Rationale:** Surface facilities and wells may be impacted if there is unaccounted for subsidence.	Please provide additional details for any dewatering/pumping induced subsidence.	
IR-66	CNSC	Geology and Groundwater	Section 7, Table 7.5-1, Row 1, Column 6	**Context:** Column 6 in Table 7.5-1 indicates the mitigation measures for a valued component. For Row 1, Geology, there is no description of mitigation measures but only that contingency plans will be developed if based on monitoring. **Rationale:** Subsidence may impact wells and surface infrastructure.	Please provide additional details on monitoring and contingency plans related to the geological environment (e.g., subsidence), including triggers for implementing such plans.	
IR-67	CNSC	Geology and groundwater	Section 7.6.2.1 (Remediation Objectives)	**Context:** Metallurgical testing, including batch reaction, coreflood testing and column tests are mentioned frequently throughout Sections 2 and 7 of the EIS. Outside of the composition of restored solutions from coreflood tests #2B and 3C, results from these various tests are not reported in the EIS or any associated Appendices. **Rationale:** The results from metallurgical testing are important to a number of items discussed in the EIS, including (but not limited to): evolution of hydrochemistry during remediation, source of salts in Lower Sandstone Aquifer porewaters, process plans, industrial wastewater treatment, estimating composition and volume of process precipitates, and composition of mining fluids and leachate. In particular, the EIS posits that mining area decommissioning objectives are achievable based on metallurgical testing and provides these objectives in Table 2.3-3. CNSC staff need to understand the specifics of this metallurgical testing, given its importance for the development and justification for mining and remediation activities. Denison must also provide information demonstrating that the proposed restoration actions and remediation targets are As Low As Reasonably Achievable (ALARA).	1. Please provide a summary of the results and the analysis of results of the metallurgical tests within the EIS, or provide the technical supporting document with this information, and ensure the documentation is appropriately referenced in the EIS. This should include sample information for cores (e.g., mineralogy, location, U content, depth), test conditions (e.g., duration, # of iterations, column length, flow rate, temperature, pressure, sample frequency, influent/effluent composition), as well as results and how they are pertinent to the development of ISR activities. 2. Please provide further clarification/justification on how results from two singular coreflood tests (i.e., Coreflood #2B and Coreflood #3C) can justify large-scale remediation activities and targets following solution mining. 3. Please provide material demonstrating that the proposed restoration actions and remediation targets are ALARA.	
IR-68	NRCan	Fish and fish habitat	Section 7.6.2.2.3 Appendix 7-C, sections 3.3, 4.1, 4.4.4 and 4.7	**Context**: Sources terms for the COPCs considered in 3D reactive transport modeling are given by the composition of "Restoration Solution #1", which the proponent believes is representative of groundwater quality in the ore zone after remediation at decommissioning (Appendix 7-C, sec. 3.3, Table 3-5; sec 4.0). The proponent considers COPC source terms as "initial conditions" for groundwater quality in the ore zone at the start of the model simulation period. During the simulation, no	NRCan requests that the proponent's reactive transport prediction uncertainty analysis (Appendix 7-C, sec. 4.7) consider extended source release periods for additional COPCs.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				additional mass of COPCs is transferred to groundwater in the ore zone. **Rationale**: In NRCan's opinion, this representation of COPC sources is not conservative as it fails to account for various long-term slow mass release processes. These processes could include redissolution of secondary phases formed during ISR mining (e.g., radium-bearing gypsum or barite, jarosite, alunite) and migration of unrecovered lixiviant or restored solution from low-permeability regions or stagnant zones that were not fully swept during mining or remediation. NRCan notes that scenario #2 in the proponent's transport prediction uncertainty analysis (Appendix 7-C, sec. 4.7) does consider an extended source release period for protons (desorption from chlorite). However, in NRCan's opinion, additional modeling scenarios should consider extended-release periods for other COPCs as well.		
IR-69	NRCan	Fish and fish habitat	Section 7.6.2.2.3 Appendix 7-C, sections 3.1 and 3.2	**Context**: For hydrogeological and geochemical assessments in support of ISR projects, the proponent identifies two aspects of primary importance (Appendix 7-C, sec. 3.1). These are a) groundwater remediation (Appendix 7-C, sec. 3.1.1); and b) the assimilative capacity of host rocks downgradient from the ore zone (Appendix 7-C, sec. 3.1.2). According to the proponent, the objective of groundwater remediation at decommissioning is to achieve water quality in the mined zone that does not pose a risk to receptors at the point of exposure. Assimilative capacity refers to the ability of groundwater-rock reactions to naturally sequester or attenuate COPCs migrating from the ore zone during the post-decommissioning period. **Rationale:** However, in NRCan's opinion, the proponent has neglected to mention the most fundamental aspect for hydrogeological and geochemical assessments in support of ISR projects. That aspect is the choice of ISR lixiviant and its effects on the mineralogy and hydrogeochemistry of the ore zone during mining operations. The proponent provides information on the pre-mining mineralogy (Appendix 7-C, sec. 3.2.1) and hydrogeochemistry (Appendix 7-C, sec. 3.2.2) but no information on their expected changes as a result of ISR mining. This Information is important when considering source terms in reactive transport modeling.	NRCan requests that the proponent provide a detailed description of the expected mineralogical and hydrogeochemical changes occurring within the ore and barrier zones as a result of the injection of acidic lixiviant.	
IR-70	CNSC ECCC	Fish and fish habitat Geology and groundwater	Section 7.6.2.2.3, Evaluation of Geochemical Reactive Transport Appendix 7-C, Section 4.4.2, Sub-Domain	**Context:** The EIS indicates that "changes to hydrogeological conditions within the mining area were considered during development of the 3D sub-domain model. Dissolution of ore within the active mining area is expected to enhance … hydraulic conductivity". In Section 4.7 (Prediction Uncertainty Analysis), predictive uncertainty scenarios are provided. For scenario 7, the hydraulic conductivity (K)	Please provide a more fulsome discussion on the anticipated impacts of mining on permeability of the ore zone due to mining activities in the EIS or in an Appendix. The value used for scenario 7 of the prediction uncertainty analysis should be provided. The scientific rationale for the use of a K value only a factor of five greater than the value assumed for the ore zone in the 3D regional model should	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
			Model Hydrogeologic Parameters	of the ore zone was increased even further than initial model assumptions. The value used is not indicated in the text. **Rationale:** A hydraulic conductivity (K) value of 5x10-6 m/s, which is a factor of five (5) greater than the value assumed for the ore zone, was applied in the base case numerical model to account for this impact. It is unclear from the information provided in Section 7 of the EIS or associated Appendices what the basis of this five-fold increase in K value for the ore zone, and how this was judged to be conservative, or to adequately represent anticipated conditions. This parameter is important as it impacts the rate at which contaminants flow from the ore zone following mining activities. Due to of the dissolution of uranium, larger voids will likely be created, and the hydraulic conductivity may increase by more than a factor of 5 compared to pre-project material. Therefore, a variation of at least one or two orders of magnitude for hydraulic conductivity should be used in the sensitivity analysis. Having a representative, conservative value for hydraulic conductivity is essential for understanding groundwater as a pathway of contaminant transport to Whitefish Lake and potential impacts to aquatic life. The K value used in the predictive uncertainty analysis should be reported.	be provided, alternatively, provide simulation results for a more conservative scenario. Specifically, this discussion should address the potential effects of mechanical permeability enhancement with tools, dissolution of ore, gas plugging, chemical plugging, plugging due to ion exchange, and mechanical plugging.	
IR-71	CNSC	Geology and groundwater	Section 7.7.1, Climate Change Considerations	**Context:** The report states that in a scenario of increased precipitation and decreased/constant evaporation, climate change may result in greater flows in the Wheeler River drainage system and increased recharge to groundwater, which would correspond to increased groundwater discharge to Whitefish Lake. Additionally, it is also stated that climate change was evaluated qualitatively. **Rationale:** It is not clear why the impacts of increased evapotranspiration associated with higher average temperatures were not considered, even though these are likely outcomes of temperature increases due to climate change in areas such as the Prairies (Climate trends and projections - Canada.ca). It is also not clear why climate change considerations were not assessed quantitatively.	Please provide a discussion on potential effects of increased evapotranspiration, as well as decreased groundwater recharge for the study area. Provide justification for performing qualitative assessment of impacts of climate change rather than a quantitative one.	
IR-72	CNSC	Geology and groundwater	Section 7.8.2, Groundwater Monitoring	**Context:** Monitoring seems to consider COPCs from surface facilities, and excursion of pumped mine fluid in the Lower Sandstone Aquifer. There does not appear any discussion on how the proposed monitoring program considers potential excursions of brine from freeze wells. **Rationale:** It is unclear how potential excursions of brine from freeze wells will be monitored. Would this be through the fiber optic cables installed within the freeze well network? Or would it be achieved in the monitoring well clusters? If this is the case, how would an	Please provide further information regarding how potential excursions of brine from freeze wells will be monitored as part of the proposed groundwater monitoring program.	

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				excursion of brine from a freeze well be differentiated from an excursion of mining solution?		
IR-73	CNSC	Geology and groundwater	Section 7.8.2.2, In Situ Recovery Mining Area Appendix 7-A, Appendix C	**Context:** The EIS recommends that a follow-up study be carried out to supplement available data on hydraulic conductivity in the Desilicified Zone (DSZ). **Rationale:** Appendix C (Summary of Hydraulic Testing Data and Conductivity Values) of Appendix 7A indicates that only n = 6 hydraulic conductivity values are available for the DSZ, one of which appears unreliable due to a problem with packer sealing. This is relatively few values compared to the Intermediate and Lower Sandstones. Additionally, limited hydraulic head data from boreholes screened in the DSZ is available (GWR-037, GWR-012 and GWR-014; See Figures 16/17 in Appendix 7-A) – most information appears to originate from open core holes. The information presented in its current form is insufficient considering the importance of this zone as a preferential pathway for contaminants following remediation activities, and the heterogeneity of the unit due to intense hydrothermal alteration and fracturing. Further information regarding hydrogeological properties and groundwater flow would aid greatly in validating and refining the numerical groundwater model.	As per the EIS recommendations, please provide additional information to supplement available data on hydraulic conductivity in the DSZ. Please provide the following information as part of the follow-up study: 1. identification of the vertical conductivity (KV) as there is an upward flow component (isotropy was assumed in DSZ for numerical model, this assumption must be verified) 2. quantification of the horizontal and vertical flow gradients in the DSZ; and 3. identification and mapping of any structures with the potential to influence groundwater flow in the DSZ, such as fracture/fault zones.	
IR-74	CNSC	Geology and Groundwater	Section 7.8.2.3	**Context:** It is stated in Section 7.8.2.3 (p. 7-113, main EIS report) that, at the Post-Decommissioning Stage, “Excursion are signaled by a change in water quality that is outside of that bounded by modelling predictions”, and “The model predictions spatiotemporally bound COPC concentrations in the subsurface that do not pose a risk to the receiving environment. Water quality that is outside of this bounding is defined as representing a material increase over a meaningful period compared to the predicted values either in rate of change or magnitude of change of COPC concentrations.” **Rationale**: It is not clear in which locations (e.g., is it in the mining area, or downstream of the mining area, or anywhere else?) the water quality is used to compare with the model predictions to determine if excursion occurs.	Please clarify in which locations the water quality data is used to compare with the model predictions to determine if excursion occurs.	
IR-75	CNSC	Geology and Groundwater	Appendix 7-A, Appendix K	**Context:** The geomechanical study showed that the stability of the remnant ore zone and surrounding rock mass is highly sensitive to the magnitude of the material properties. To quantify this risk, the proponent conducted a sensitivity analysis to assess the influence that material properties have on the stability of key stratigraphic layers. The results of the sensitivity analyses suggest that small variations in the cohesion magnitude and angle of internal friction may significantly influence the stability of the altered sandstone, ore zone, and upper and lower clays.	Please provide a plan to implement recommendations for further detailed geomechanical studies to reduce the uncertainties and risks in association with the stability and deformation analyses of ore zone rock matrix and its overlying rock mass formations and assess their impacts on the mine operation.	

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				Rationale: By considering the potential uncertainties and risks in association with the geomechanical study and the empirically derived rock mass strength parameters and the non-site specific physical parameters of different rock formations used for the modeling, the proponent's consultant suggests to define a laboratory testing program to address data gaps in the current geotechnical data and increase confidence in the material properties, and use more accurate material properties to model the phased extraction of uranium-enriched rock and assess the associated risks for cavity collapse and failure in the steel casing. CNSC staff concurs with these suggestions.		
IR-76	CNSC	Geology and Groundwater	Appendix 7-A, Appendix K (p. 12)	**Context:** Based on the consultant's report, the modeled vertical strain is approaching or exceeding the tensile and compressive yield limits for steel casing. **Rationale:** Failure of steel casing may result in process loss or alter groundwater flow and quality.	Please provide additional details on how casing integrity will be monitored and potential effects mitigated.	
IR-77	CNSC	Geology and Groundwater	Appendix 7-A, Appendix K Results of a Geomechanical Study Investigating the Influence of Uranium Extraction on Mining-Cavity Stability for the Wheeler River Uranium Project (Revision 1)	**Context:** It is reported in the appendix K report, within Appendix 7-A, that both phase I scoping analysis and phase II detailed strip model were investigated by numerical modelling. The analysis discussed influence on host rock stability as a result of incremental increase in volumetric extraction and graded conservative treatment of material properties. **Rationale:** As critical components of a numerical geomechanical simulation, initial and boundary conditions are crucially important to the confidence and reliability of the modelling results. However, this information is absent from the current report. In-situ principal stresses largely affects the stability of the excavated host rock, and the vertical strain and surface subsidence. This information is also absent in current form.	Please provide details on the boundary and initial conditions applied on stress loading and strain for the numerical analysis. In particular, the in-situ principal stresses, which are critical to correct understanding of the excavation disturbance to the host rock, should be provided and justified as appropriate.	
IR-78	CNSC ECCC	Fish and fish habitat Geology and groundwater	Appendix 7-A, Section 3.5.2, Porosity Appendix 7-C, Section 2.3.2.1, Porosity Values	**Context:** This section of the report outlines the estimated/assumed effective porosity values. The only reference provided is for permeameter testing on rock core samples (Scibek, 2019). Additionally, the report states that "As tracer test results to estimate effective porosity were unavailable at the time of modelling, effective porosity values for the sandstone bedrock and basement units were sourced from literature values", where literature values are effective porosities from the Cigar Lake study (AECL, 1994), situated approximately 40 km NE of Wheeler River. No on-site Wheeler River field data was used to justify this value. Additionally,, in the Cigar Lake study, the authors reported that, because results from tracer tests and pumping tests were unavailable, "a practical approach was adopted,	1. Please provide the reference for the data substantiating the assumed effective porosity values reported in Appendix 7-A, and used in the numerical model in Appendix 7-C. 2. Please provide information on how the site-specific effective porosity values from tracer tests or pumping tests, were considered in the numerical models. Section 2.2.1.4 of the EIS asserts that tracer tests were carried out in 2021 – this information should thus be available for improving/updating models. Alternatively, provide a sensitivity analysis for the effective porosity in the	

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				i.e., to use the porosity values obtained from laboratory measurements made on core samples, and to assume that those numbers were close to the average field kinematic (effective) porosity values". **Rationale:** The source of reported effective porosity values is unclear from Section 3.5.2 in Appendix A (e.g. literature review, field work, laboratory work). In Section 2.3.2.1 of Appendix 7-C, there is a lack of clarity regarding the effective porosity data used in the numerical model. It appears that no site-specific data derived from tracer tests or pumping tests is used in the numerical model. Given the that effective porosity directly correlates to seepage velocity and by extension transport time and distribution of COPCs in groundwater, it is an important parameter. Given its relative importance for contaminant fate and transport, effective porosity should be based on field measurements, or at the very least accounted for in the sensitivity analysis.	Desilicified Zone, or contaminant transport simulation results with more conservative effective porosity values.	
IR-79	CNSC	Geology and groundwater	Appendix 7-A, Section 4, Groundwater Chemistry	**Context:** Table 4-1 in Section 4 of Appendix 7-A provides groundwater monitoring results from sampling activities carried out at 26 monitoring wells in 2019, 2020, and 2021. The majority of these wells were only sampled once (n = 8) or twice (n = 17). In some cases (Lower Sandstone Aquifer/Intermediate Sandstone Aquitard), the variability of results between sampling events is quite high. Data for the Paleoweathered Zone is sparse. **Rationale:** Insufficient information is presented in the EIS and associated Appendices to concretely define baseline groundwater chemistry for the different hydrostratigraphic units. As defined in the CNSC's Generic Guidelines for the Preparation of an EIS: "Based on the scope of the project, the EIS will present sufficiently detailed baseline information to determine the effects the project could have on the VCs and analyze those effects". This is particularly important given certain features of the study area (i.e., presence of zones of thermal alteration/desilicification, as well as hydraulically active fractures/faults), and the need to adequately characterize baseline conditions in the Desilicified Zone downgradient from the proposed mining area. As an example, the US Nuclear Regulatory Commission (NRC) typically requires a minimum of four (4) quarterly samples from (i) surficial aquifers, (ii) production aquifers, (iii) overlying aquifers, and (iv) underlying aquifers to characterize preoperational groundwater quality (E. Striz, pers. comm.).	Please provide the statistical basis (number of samples and variability) by which "baseline" is defined and the justification that the current information is sufficient to adequately characterize groundwater quality. In order to ensure sufficient baseline information is collected, further iterations of sample collection for groundwater monitoring wells in all defined hydrostratigraphic units may be required. In addition, groundwater quality downgradient from the proposed mining area should be further characterized to assess spatial influence of alteration and hydraulically active features,	
IR-80	CNSC	Geology and groundwater	Appendix 7-A, Section 4.3.3, Hydrochemistry	**Context:** This section provides data for groundwater samples collected during the Cigar Lake analogue study and Millennium Project for further regional context. The previous studies are heavily referenced	Please provide additional clarity to and interpretation of Figure 26 in Appendix 7-A, including a revision to the Figure to allow for easier interpretation. This could include	

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			by Hydrostratigraphic Unit	to support interpretations made for the conceptual site model. **Rationale:** The Piper Plots in Figure 26 are difficult to interpret (many overlapping circles with variegated colors), and Cigar Lake samples plot predominantly as Na/K-Cl/SO4 groundwater facies. Conversely, samples collected as part of the Phoenix Project (current), plot either as Ca-HCO3 or Ca-SO4/Cl groundwater facies. No explanation is provided for the observed hydrogeochemical differences between groundwater from the Phoenix project and the Cigar Lake analogue study/Millenium Project.	clear identification of end members, as well as arrows indicating proposed evolution of groundwater chemistry. Further discussion should be provided describing observed differences between groundwater chemistry at the Phoenix project compared to Millenium/Cigar Lake.	
IR-81	CNSC	Geology and groundwater	Appendix 7-A, Section 4.3.3, Hydrochemistry by Hydrostratigraphic Unit	**Context:** The report states in the description of hydrochemistry of the Lower Sandstone Aquifer that, "On the basis of groundwater chemistry and tritium values in that groundwater, the authors (of the Cigar Lake analogue study in 1994) concluded that the groundwater reflected a younger water component that had penetrated to depth along hydraulically active fractures/faults. The same conclusion is made here (in the Wheeler River EIS) for the Phoenix study area – meaning that fracture/fault conditions are such that some areas of the MFa are characterized by younger/recharge groundwaters". **Rationale:** Tritium results for most wells in the Lower Sandstone Aquifer (MFa) reported in Table 4-1 of Appendix 7-A exhibit tritium concentrations <15 Bq/L for the 2020 sample, and 0.1 or <0.1 Bq/L for the 2021 sample. Tritium in modern precipitation typically varies from 1 – 3 Bq/L. Conclusions made in the text are not supported by data, especially given that tritium values are not reported in the EIS for local precipitation or surface water. This is important in reinforcing the assumption from the conceptual model that modern meteoric water circulates at depth in the Lower Sandstone Aquifer.	Provide a further discussion on the interpretation of tritium in groundwater, rather than echoing conclusions from the Cigar Lake analogue study. Consideration should be given to the assertion that modern meteoric water circulates at depth in the Lower Sandstone Aquifer. Collection and analysis of stable isotope (e.g., δ2H, δ18O) samples is a cost-effective solution which would greatly improve understanding of groundwater hydrology and support the development of a conceptual model.	
IR-82	CNSC	Geology and groundwater	Appendix 7-A, Section 4.3.3, Hydrochemistry by Hydrostratigraphic Unit Appendix 7-C, Section 3.5	**Context:** A. In-field measurements of Oxidation-Reduction Potential (ORP) for three (3) out of twenty-six (26) groundwater samples are presented in Table 4-1 of Appendix 7-A. Although sparse, these values are also used to characterize redox conditions for representative groundwaters in Table 3-5 of Appendix 7-C. B. In Section 3.5.5 of Appendix 7-C it is stated that groundwaters in the PHREEQC model were allowed to equilibrate with atmospheric concentrations of oxygen, resulting in oxidizing subsurface conditions. In Section 3.7 of Appendix 7-C it states that input files for 3D reactive transport were generated based on outcomes for PHREEQC modelling. However, in reading Section 4 of Appendix 7-C, it is unclear whether this assumption (equilibration with atmospheric oxygen) was carried forward for the 3D model. C. As per p. 3.49 of Appendix 7-C, "A small amount of reactive pyrite	1. Provide further discussions and information (i.e., ORP measurements or analytical data for redox couples) on redox conditions at the Phoenix site. Particular focus should be given to the spatial heterogeneity of redox processes. Tools such as the reference provided [2] below provide an example of simplified framework for characterizing redox conditions in aquifers. 2. Clarify assumptions regarding initial redox conditions for the 3D solute transport model. 3. Provide the % reactive pyrite by weight assumed for models in the text. Justification for proportions used, such as analytical data, should also be provided.	

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				was assumed for the first 500 m of transport away from the ore zone in the model, primarily in the desilicified sediments of the Lower Sandstone Aquifer, and deeper portion of the Intermediate Sandstone Aquitard". **Rationale:** A. Given the importance of redox conditions for U mobilization and precipitation/dissolution of minerals (e.g., pyrite/metal oxyhydroxides) and the corresponding influence on contaminant transport from both a modelling and monitoring perspective, these should be further characterized. It should also be noted that the measurement of Oxidative-Reductive Potential (ORP) in natural waters can be complex and difficult due to the variability and disequilibrium of natural systems and issues inherent to electrode calibration (e.g., Schuring et al., 2000). Measurements of redox couples (e.g., As(III)/As(V); Fe(II)/Fe(III); S(-II)/S(VI)) are typically recommended to accurately characterize redox conditions in natural waters (Schuring et al., 2000). B. The assumptions regarding redox conditions for the 3D solute transport model should be clarified. C. The amount of pyrite (e.g., % by weight) assumed for the purposes of modelling should be clarified, given the potential role of pyrite as a reducing agent in limiting the transport of COPCs. **Reference**: [1] Schuring J.; Schulz, H. D.; Fischer, W.R.; Bottcher, J.; and Duijnisveld, M.H.W. 2000. Redox: Fundamentals, Processes and Applications. Springer: Berlin.	**Reference**: [2] Jurgens, B.C., McMahon, P.B., Chapelle, F.H., and Eberts, S.M., 2009, An Excel workbook for identifying redox processes in ground water: U.S. Geological Survey Open-File Report 2009–1004 8 p.	
IR-83	CNSC	Geology and Groundwater	Appendix 7-A, Section 7.4.2.2 and Appendix K	**Context:** Leaching of uranium from the ore zone will generate voids within the ore zone, which could fail and collapse. Failure of the voids would cause displacement in overlying rocks, which will lead to the eventual ground subsidence. Based on the developed geological model, a geomechanical study was conducted to assess potential maximum vertical displacement in the overlying rock formations and predict the ground subsidence. While a layer of altered sandstone is modeled above the ore zone, the desilicified zone, a zone that is comprised of completely to partially unconsolidated sands and has very low rock quality, high fracture intensity, and high friability, and low strength in the area overlying and east of the Phoenix deposit, appears not to have been included in the model for geomechanical modeling. The evaluated displacement/deformation in the overlying rock formation and the resulted ground subsidence would not be conservative without including the desilicified zone. **Rationale:** Stability of the ore zone rock matrix and the potential	Please provide details whether and how the desilicified zone is considered in the geomechanical modeling of the detailed strip model. Such details should include figures and the linkage between the geomechanical model including the determination of strength parameters of the desilicified zone and the geological model including information on the core delineation of the desilicified zone.	

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				displacement/deformation in the overlying rock formations when voids in the extracted ore zone collapse are critical for protecting the overlying aquifers, preventing substantial ground subsidence, safeguarding casing integrity, and mitigating plug-off of the remaining ore as well as efficiently mining extraction. The deformed zone in the overlying rock formations will change in hydraulic conductivity that will impact on the assessment of potential effects on groundwater flow and contaminant transport in the zone. Therefore, the rock mass behavior including and above the ore zone should be adequately understood and the potential displacement/deformation should be assessed and quantified with adequately defined geological model.		
IR-84	CNSC	Geology and Groundwater	Appendix 7-C	**Context:** It is stated in Section 2.5.2.4 (p. 2.35, Appendix 7-C) that "In addition to calibrating to water level elevations targets, the model was calibrated to estimates of groundwater discharge to Whitefish Lake. A match between simulated and observed flows helps to support that groundwater recharge rates are reasonable, and to provide validation for water budget assessments. Baseflow calibration targets were developed using point streamflow measurements collected upstream and downstream of Whitefish Lake. Figure 2-10 (p. 2.26, Appendix 7-C) shows the locations of the baseflow calibration targets, and Table 2-7 (p. 2.35, Appendix 7-C) illustrates the model-simulated groundwater discharge rates in relation to the estimated range of baseflow from stream measurements. The simulated baseflow to Whitefish Lake is in good agreement with the estimated representative baseflow". **Rationale:** It is not clear in Figure 2-10 (p. 2.26, Appendix 7-C) where the point streamflow measurements were conducted upstream and downstream of Whitefish Lake. Additionally, it is not clear how the groundwater discharge to Whitefish Lake is simulated, since the model domain does not cover the whole Whitefish Lake.	1) Please clarify in Figure 2-10 where the point streamflow measurements were conducted upstream and downstream of Whitefish Lake. 2) Please clarify how the groundwater discharge to Whitefish Lake is simulated considering that the model domain does not cover the whole Whitefish Lake.	
IR-85	CNSC	Geology and Groundwater	Appendix 7-C	**Context:** Section 2.7.3 (Appendix 7-C) mentions Wells A, B and C, and Figure 2-17 (p. 2.43, Appendix 7-C) illustrates the predicted drawdown ranges at Well B and Well C. **Rationale:** It is not clear where Well A, Well B and Well C are located.	Please provide the locations of Well A, Well B and Well C illustrated in a Figure.	
IR-86	CNSC	Geology and Groundwater	Appendix 7-C	**Context:** It is stated in Section 2.7.3 (p. 2.41, Appendix 7-C) that "Both the pumping demand and the recharge changes were incorporated into a transient simulation performed using the calibrated groundwater flow model. The model simulation was started at the beginning of mine construction, with initial conditions taken from the calibrated model. The simulation period was extended for 40 years to include the entire period of construction, operation, and decommissioning, and extending through 17 years post decommissioning".	Please clarify the parameters, boundary conditions and any other aspects as used in the transient model that are different from the calibrated model.	

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				Rationale: It is not clear what is the difference between the calibrated model and transient model in terms of parameters (such as the K values for the mining zone), boundary conditions, etc.		
IR-87	CNSC	Geology and Groundwater	Appendix 7-C	**Context:** In Section 2.8 (p. 2.45, Appendix 7-C) Parameter uncertainty assessment, only parameters for certain zones (part of each specific hydro-stratigraphic unit as shown in Figure 2-19, p. 2.46, Appendix 7-C) related to the pathway from the ore zone toward Whitefish Lake were allowed to vary in order to find combinations of parameter values that met statistical calibration criteria. If each hydro-stratigraphic units within the whole model domain were treated as parameter zones that can have varied hydraulic conductivity values, a different combination of parameter values could be obtained that meet statistical calibration criteria too. **Rationale:** The parameter values for parameter zones between the mining area and Whitefish Lake is important in determining the hydraulic connection between the mining area and Whitefish Lake. Parameter values in other parameter zones could also be important. For example, if the K values for the intermediate sandstone aquitard are significantly larger than in the current calibration results, the interaction between the upper sandstone aquifer and the lower sandstone aquifer could be more active, and the mined-out zone could be more active hydraulically and groundwater in the minded-out zone could have a shorter residence time than in the current calibrated model. Additionally, it is noted that Figure 2.19 (p. 2.46, Appendix 7-C) illustrates the parameter zone for the intermediate sandstone aquitard. However, Figure 2.20 (p. 2.49, Appendix 7-C) did not include the intermediate sandstone aquitard in the results.	It is recommended that the parameter zones in the Parameter uncertainty assessment include hydro-stratigraphic units in the whole model domain to investigate the possible combination of parameter values that could make the groundwater in the mined-out zone more active hydraulically.	
IR-88	CNSC	Geology and Groundwater	Appendix 7-C	**Context:** The conceptual hydrogeological model includes upper sandstone aquifer, intermediate sandstone aquitard, and lower sandstone aquifer. The desilicified zone above the ore zone have enhanced hydraulic conductivity. The boundary condition for the lower sandstone aquifer on the west (upstream) side was assigned to have specified head, which provide source of water for the lower sandstone aquifer. As a result of the conceptual model setup, the upper sandstone aquifer is hydraulically active and the groundwater residence time within the upper sandstone aquifer is relative short. In contrast, the lower sandstone aquifer (and the ore zone) is hydraulically inactive, and the groundwater residence time in the lower sandstone aquifer is relatively long (as shown in the particle tracking results in Figure 7.6-2	It is recommended to conduct the following work to demonstrate if the mined-out zone is hydraulically active: 1. Determine the groundwater residence time in the lower sandstone aquifer and compare it with the simulated residence time in the numerical model. 2. Conduct additional particle tracking to demonstrate where groundwater originating from the mined-out zone flow towards (forward tracking) and where groundwater flowing towards the mined-out zone originates from. This would help determine why groundwater in the mined-out zone is not hydraulically active.	

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				(p. 7-71, main EIS report), and the simulated plume for chloride in Figure 7.6-7(p. 7-86, main EIS report)). It is stated in Section 2.6.4 (Appendix 7-C) that "As noted above in section 2.6.3, it is estimated that 99% of the groundwater discharge to Whitefish Lake is derived from groundwater that has only flowed through shallow deposits (i.e., Overburden and Upper Sandstone Aquifers). Contribution of deep groundwater flow through the Desilicified Zone within the Intermediate Sandstone Aquitard is estimated to be < 1% of the groundwater discharging to Whitefish Lake". This simulation result is reflective of the conceptual model. Section 7.3.3.3 (p. 7-42) states that "The Lower Sandstone Aquifer is characterized spatially by two types of groundwater. The first groundwater type is most like that observed in the Local Flow System. This reflects hydraulically active fractures and fault systems that allow fresh recharge water to penetrate and mix with deeper waters in the aquifer. The second type of groundwater is within the zone of thermal alteration around the ore zone ……". The hydraulic connectivity of the ore zone with the upper sandstone aquifer has important implication on the groundwater restoration. The ore zone is not hydraulically active locally because it is enclosed by a clay zone before the mining operation. But if it is located within a hydraulically active area, or on a groundwater flow pathway that is hydraulically active, the mined-out zone (with much larger porosity and hydraulic conductivity) could become active hydraulically after mining operation is finished. Figure 7.6-7 (p. 7-86, main EIS report) shows that the chloride plume is most persistent within the mined-out mining area. This seems to indicate the mined-out zone is hydraulically inactive after the mining operation is finished. It is stated in Section 7.3.3.2 (p. 7-37, main EIS report) that "Exploration boreholes drilled in the Phoenix area, where left unplugged, have the potential to provide preferential flow paths between the Overburden and Upper and Lower Sandstone Aquifers. Exploration holes were reportedly grouted approximately 10 to 20 m above and below the ore zone, resulting in open holes remaining throughout the overlying materials. These portions of the open holes may act as open conduits for groundwater flow through the 400 m of Athabasca Group Sandstone." So, there is possibility that the unplugged borehole could increase the hydraulic connection between the upper and lower sandstone aquifer. **Rationale:** It is important to understand if the larger area containing	3. Conduct sensitivity analysis to investigate the effect of higher K values for the intermediate sandstone aquitard and the K and porosity values of the mined-out zone on the plume migration.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				ore zone is hydraulically active. Additional confidence would be gained if there is any other evidence that support that the area containing the ore zone is not hydraulically active, and groundwater residence time in the lower sandstone aquifer surrounding the ore zone is comparable with the simulated results. Table 2-4 (p. 2.16, Appendix 7-C) shows the effective porosity (0.01-0.05) of the ore body. Figure B7 (p. B.8, Appendix 7-C) shows that the calibrated K values for the mined-out zone is 1x10-6 m/s. Section 3.5.2 (p. 3.24, Appendix 7-C) states that "The same average linear velocity was assumed for the mining area (source zone), following from the discussion in Section 4.4.2, where the hydraulic conductivity value in this zone following mining was set to 5x10-6 m/s, and a porosity of 0.2 is assumed for the ore zone (Table 4-2)". It is not clear what the justification is for the selection of the porosity and K values for the mined-out area, and whether they are conservative. It is also not clear, what the potential impact on the groundwater flow and COPCs transport would be If the mined-out zones collapse.		
IR-89	ECCC	Fish and fish habitat	Appendix 7-C, Numerical Modelling: Post-Decommissioning Evaluation, Section 2.3.1.4, Desilicified Zone	**Context:** The Proponent states that a hydraulic conductivity value of 5x10-6 m/s was uniformly assigned to the model layers representing the Desilicified Zone. They additionally state that this value is consistent with packer and pumping tests screened in this unit that have interpreted hydraulic conductivity values ranging from 1x10-6 to 3x10-5 m/s (Appendix C), with a geomean of 6.0x10-6 m/s. Considering that the Desilicified Zone is of particular interest because it is the main pathway for the COPC to reach Whitefish lake, and that hydraulic conductivities are not entirely understood, ECCC recommends that a larger range of hydraulic conductivities be simulated to understand potential effects on fish and fish habitat. **Rationale:** The Desilicified Zone is a critical layer in the hydrogeological model as it represents a key potential pathway of contaminants to Whitefish Lake. The base case hydraulic conductivity value (5x10-6 m/s) is even lower than the geometric mean, not to mention the highest value found. When simulating geochemical processes and contaminant transport within this important pathway a more conservative approach should be employed. Modifying this parameter will affect travel times and distribution of COPC in the subsurface.	1. Provide an in-depth rationale for choosing a value of 5x10-6 m/s as the base case for the hydraulic conductivity, in both the PH REdox EQuilibrium (PHREEQC) and Finite-Element Ground Water Flow (FEFLOW) models. 2. Provide a rationale for keeping the sensitivity analysis within one order of magnitude considering the lack of physical data on the Desilicified Zone. Alternatively, provide contaminant transport simulation results with more conservative hydraulic conductivity (e.g., more than 3x10-5 m/s) values in the Desilicified Zone. See also related: IR-96.	
IR-90	ECCC	Fish and fish habitat	Appendix 7-C, Section 2.4 and 2.6	**Context:** Hydraulic conductivities and hydraulic gradients play an important role in groundwater flow, geochemical modeling, and contaminant transport for the PHREEQC and FEFLOW models. Although there is an important vertical component to the	1. Explain if the vertical and lateral hydraulic gradients and hydraulic conductivities are assumed to be equivalent. 2. Provide a rationale for not distinguishing between vertical and lateral hydraulic gradients.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				contaminant transport, there is no distinction made between lateral and vertical hydraulic conductivities of hydraulic gradients. **Rationale:** According to the conceptual model, there is an important vertical aspect to the groundwater flow thus incorporating any vertical hydraulic gradient or hydraulic conductivity information into the calibration would increase confidence in the results. Providing a distinct value for vertical hydraulic conductivity will improve the accuracy of the model in regards to the transport of contaminants to Whitefish Lake through the Desilicified zone, which is important to understand potential impacts to aquatic life.	3. Alternatively, provide both lateral and vertical hydraulic gradient estimates and the implications on contaminant transport.	
IR-91	NRCan	Fish and fish habitat	Appendix 7-C, section 2.5.2	**Context**: The numerical model calibration quality plot (Appendix 7-C, sec. 2.5.2.1, Figure 2-13) contains a small error. The vertical (simulated heads) and horizontal (observed heads) axes do not have the same scales (499 to 521 masl versus 499 to 522 masl). Therefore, the line of ideal fit is offset. **Rationale**: As a result, NRCan notes that observed heads in the 510-512 masl range are underpredicted by the model. NRCan also notes that the calibration statistics (Appendix 7-C, sec.2.5.2.3) are highly leveraged by two data points from open boreholes south of Kratchkowsky Lake where simulated values are largely controlled by the nearby constant-head boundary in the Lower Sandstone aquifer (520 masl).	The proponent should correct the scales on the axes of Figure 2-13 in Appendix 7-C. The proponent should also comment on the effect on calibration of the clustering of most observation wells in the ore zone.	
IR-92	CNSC	Geology and groundwater	Appendix 7-C, Section 3.2.1, Mineralogical Composition	**Context:** Table 3-2 summarizes the clay content of the Athabasca Group sandstones and the Paleoweathered Zone. Although minimum, maximum and median values are provided, the number of samples and variability of the dataset are not. Rationale for incorporating illite into reactive transport modelling and excluding kaolinite/dichlorite is provided in the text. From p. 3.29 in Appendix 7-C: "The illite content was based on the normative clay composition determined from site-specific corehole elemental analysis (median illite by mass is 7.68%; Table 3-2) and using portable infra-red mineral analysis indicating median illite content by mass is 13.1% (data not shown)" From p. 3.30 in Appendix 7-C: "Using the minor amount of illite compared to the more dominant chlorite is conservative in that not all sorptive capacity of the clays is accounted for in the simulated paleoweathered zone". This conservative assumption appears contrary to assumptions for the desilicified zone (DSZ) and Athabasca Group sandstones "Illite was used to represent the total clay content,	1. Please provide in Table 3- the number of samples and variability of the datasets used to estimate the clay content of hydrostratigraphic units for the model. Include results from infrared mineral analysis in the text if the information is used to support assumptions for modelling. 2. Please provide further information/discussion within the EIS relating to the assumptions of clay content in hydrostratigraphic units for modelling. Provide further justification and rationale as to why total clay content in the Athabasca Group sandstones and Desilicified Zone is assumed to be illite, and how this assumption is conservative. This discussion could include a comparison of the properties (cation exchange capacity, surface area) of illite vs. kaolinite vs. dichlorite for the anticipated range of subsurface conditions (pH, redox, U concentrations, etc.).	

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				which varies from 1.74% to 5.85% by mass in the hydrostratigraphic units within the Athabasca Group sandstones and Desilicified Zone". **Rationale:** Information is missing in the EIS regarding the clay composition of hydrostratigraphic units. Results from infrared mineral analysis are not reported. The assumption for the solute transport model is that all clays in the downgradient DSZ are illite. However, clay content in the Read Formation (Lower Sandstone Aquifer) downgradient of the ore zone is low in illite (0.42%) compared to kaolinite (0.52%) and dichlorite (1.18%). A value of 3.9% illite clay by weight is used for the DSZ, but Table 3-2 indicates median content is 2.42% illite. It is not clear why illite was used to represent total clay content for the DSZ, as opposed to the conservative assumptions used for the Paleoweathered Zone, nor has any basis or justification been given.		
IR-93	CNSC	Geology and Groundwater	Appendix 7-C, Table 3-10: Properties of Adsorbing Mineral Phases	**Context:** In Appendix 7-C, section 3.5.6.2.2 Ion Exchange and Surface Complexation, the consideration of ion exchange and surface complexation and the corresponding parameters and chemical reaction are discussed. **Rationale:** The site density of sorbent Geothite was reported in Table 3-10 to be 1.6E3 mol/kg. Taking into account the specific surface area of 60 m2/g, this equals to 1600/6E4 mol/m2, or 0.0266 mol/m2, 1.6e4 sites/nm2. This value largely overestimates the site density of goethite, which is reported to be in the range of 2~6 sites/nm2. The reference used in the EIS report indicates the similar range of variation for this specific parameter. There are plenty of similar studies on SCM of iron oxides in literature. It is suggested to consult with more than one single study to enhance the reliability of model parameters. The overestimation of sorption site density will directly result in underestimation of the affected COPCs' concentrations in pore fluid. This will result in underestimation of COPC transport plume in the affected underground space, and potentially the dissolved concentrations in the hydrogeological sink.	Please provide additional evidence to justify the model parameter of site density for goethite, applied to the numerical model. If necessary, the reactive transport modelling should be re-run to update the contents presented in the EIS report.	
IR-94	CNSC	Geology and Groundwater	Appendix 7-C, Numerical modelling: post-decommissioning evaluation, Section	**Context:** It is reported in this section the assumed subsurface conditions that were applied in the geochemical site conceptual models. Critical phenomenon of pH tail was mentioned. Inclusion and exclusion of corresponding geochemical reactions were discussed briefly.	Please provide additional evidence to justify the approach for excluding uraninite and pyrite from the analysis of remediated mining area. This may require the results from additional modelling.	

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			3.5.5, Subsurface Conditions Incorporated	**Rationale:** It was reported that the residual reduced minerals of uraninite and pyrite were not included in the modelling of the remediated mining area. The argument was based on consideration of the upstream groundwater, passing through the mined zone, will not be oxidizing and groundwater conditions are expected to be similar to pre-mine conditions. However, this ignores the pH tail effect that releases proton H+ sorbed to solid surface during ISR flooding. By ignoring this process, there is a potential risk of underestimating the source terms for some key COPCs. Exclusion of uraninite and pyrite in remediated mining area modelling is contradictory to pH-tail effect. The justification is not sufficient in the current form.		
IR-95	CNSC	Geology and Groundwater	Appendix 7-C, Table 3-11	**Context:** The Table 3-11 reported the Solid-Phase Concentrations and Partitioning Constants for COPCs. Data were both measured and simulated. **Rationale:** It is unclear how the partition coefficients of various COPCs upon desilicified and paleoweathered rocks were obtained. It was not reported at what pH were these Kd analyzed. Sorption of chemicals on solid phase is known to be pH dependent. It is unclear whether pH influence was considered in the measurement and analysis of apparent partition coefficients. In addition, uptake of metals on clay is highly nonlinear, and always has a maximum capacity. Even with a very strong affinity towards specific metal ions, the sorption will be saturated at elevated concentrations. Therefore, assuming a linear correlation needs to be cautious of the concentration range of target COPC species, and the applicable sorption capacity of the clay mineral. In the current model, only the linear form of sorption is considered, although with discussion of Kd value selection. Additional rationale is needed to justify if the applied methodology is sufficient for assessment.	Please justify the choice of applying a linear form partition coefficient for the modelling and assessment, and whether it provides a conservative approach to the assessment results. Clarity around the experimental conditions during the measurement of partitioning coefficient of various COPCs on the target rocks may help support this assumption.	
IR-96	CNSC	Geology and groundwater	Appendix 7-C, Section 4.4.4, Sub-Domain Model Transport Boundary Conditions	**Context:** From the text, "Transport parameters were specified for diffusion (1x10-9 m2/s), longitudinal dispersivity (10 m along the plume trajectory), and transverse dispersivity (5 m)". The source of this information is not provided in Appendix 7-C. It is unclear if the values used are defaults in the modelling software, from literature, from small-scale laboratory tests, or are site-specific values determined through tracer tests. **Rationale:** The use of a calibrated flow model does not imply that the solute transport model is calibrated. The transport parameters (such as effective porosity, dispersivity and reactive transport parameters)	1. Please provide the source of the numerical value used for diffusion and longitudinal and transverse dispersivity, and provide justification if default values by the model code were used. 2. Please provide a discussion on the influence of large-scale heterogeneity on dispersion and solute transport predictions in the modelling report. See also related: IR-89.	

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				can only be calibrated by matching simulated and observed spatial and/or temporal distributions of a solute. Sensitivity analysis indicates that decreasing longitudinal and transverse dispersivities by a factor of two resulted in exceedances of groundwater criteria for both selenium (Se) and cobalt (Co). Given the clear influence of these values on contaminant transport, it is important that transfer parameter values are justified in the solute transport model. In addition, the influence of large-scale heterogeneity on dispersion and solute transport predictions should be discussed, to identify any uncertainty in the model predictions, and provide confidence that the applied model is adequately representing groundwater flow and solute transport. Further guidance on solute transport modelling can be found in BC MOE (2012) [1]. **Reference**: [1] British Columbia Ministry of the Environment (BC MOE). 2012. Guidelines for Groundwater Modelling to Assess Impacts of Proposed Natural Resource Development Activities. Report no. 194001, 385 p.		
IR-97	ECCC	Fish and fish habitat	Appendix 7-C, Figures 4-6, 4-7a, 4-7b, 4-8a, 4- 8b, 4-9a, 4-9b	**Context:** Appendix 7, Figures 4-6, 4-7a, 4-7b, 4-8a, 4-8b, 4-9a, 4-9b present contaminant transport simulations of chloride, selenium, cadmium, and uranium. All simulations use initial condition concentrations at t=0 (or end of mining operations. In the 3D FEFLOW contaminant transport model it is not clear why initial condition concentrations were chosen rather than a constant concentration boundary. It is also unclear if mining activities will cause mobilization of the contaminants beyond the end of operations. **Rationale:** The choice of boundary conditions may impact the predicted transport of contaminants that reach Whitefish Lake through groundwater, which may have impacts to aquatic life.	1. Explain and clarify if mining operations will mobilize contaminants beyond operations? 2. Clarify if the source of contamination, (e.g., uranium, selenium) will cease after operations? 3. For the 3D model please provide the rationale for using initial concentrations rather than constant concentration boundary conditions for contaminant concentrations.	
IR-98	CNSC	Change to an environmental component due to hazardous contaminants	Section 8, Aquatic Environment	**Context:** It states in EIS in Section 8.3.7.1 (p. 8-151) that "Cameco's Key Lake Operation will overlap spatially and temporally with the Project". **Rationale:** It is not clear whether there is the possibility that planned Denison discharges would eventually flow into and influence a background reference lake used by Key Lake operation.	Please provide supporting information to demonstrate whether discharges from the proposed operation will not eventually flow into a reference lake used by another existing operation.	
IR-99	CNSC	Aquatic environment	Section 8, Water Quality, Table 8.2-13	**Context:** Table 8.2-13 shows the maximum concentration of hazardous and radiological COPC's in surface water throughout the local study area. However, the concentration for all constituents is stated as mg/L.	Please use Bq/L when displaying concentration of radiological COPC's. If this was a typographical error in the table, please indicate as such and revise the table to indicate values are indeed in Bq/L. Please also review other	

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				Rationale: It is unusual for radiological COPC's to be displayed in mg/L, radiological constituents are typically displayed in Bq/L	tables displaying concentrations of radiological constituents to ensure this error is not repeated in other tables.	
IR-100	HC	Indigenous Peoples' health / Socio- economic conditions	Section 8, (p. 8-195) Section 8.5.3, Table 8.5-2, (p. 8-226)	Mercury is excluded as a COPC in the assessment. Inadequate consideration of mercury and methylmercury in fish and other country foods, and use of incorrect Hg-related health guideline values can underestimate the risks to human health among country food consumers. **Context:** Section 8 states "Mercury has not been identified as a COPC for the Project as it is currently not present in the receiving environment (i.e., background condition) at detectable concentrations and will not be produced as part of the mine process; therefore, it will not be discharged to the aquatic environment. However, it is understood that potential nutrient enrichment-related effects are possible and can be linked to increases in mercury in the environment" (p. 8-195). Table 8.5-2 shows that there is mercury present in the tissues of Northern Pike and White Sucker sampled in the waterbodies within the local study area and in Russell Lake. These fish are regularly consumed by nearby communities according to the ERFN 2017 dietary survey. In Section 8.5.3, fish tissue concentrations are compared to Health Canada's human health risk- based maximum permissible mercury concentration (0.5 µg/g wet weight), which is applicable to most species of commercially sold fish rather than country foods. **Rationale:** It is recommended that mercury be listed as a COPC considering it is in fact present in fish tissue under existing conditions, the significant consumption of fish by the local Indigenous communities, and its toxicological significance to human health. Further, the Health Canada provisional tolerable daily intake (pTDI) value of 0.2 µg/kg/bw/day (Health Canada, 2007) is a more appropriate reference level when evaluating consumption of mercury in fish by Indigenous people, as it allows for the consideration of food consumption patterns in the risk assessment that differ from the general population and is protective of the most sensitive sub-group (i.e., developing foetus). It is important to note that methylmercury, rather than inorganic mercury, is generally the predominant mercury species present in fish	1. Include mercury (including methylmercury) as a COPC in the assessment given the baseline presence of mercury in sampled fish, the potential increase of methylmercury in receiving waters due to nutrient enrichment resulting from the project, the significant fish consumption by the local population and that country foods, particularly fish, are an important source of dietary exposure to mercury. 2. Assess health risks from fish consumption by calculating hazard quotients for baseline and predicted methylmercury levels in country foods using Health Canada's pTDI for methylmercury (Health Canada, 2007). 3. Clarify whether mercury data represented throughout the EIS represents total mercury, inorganic mercury or methylmercury. **Suggestions for mitigation and follow-up measures:** Health Canada recommends including methylmercury in the list of COPCs to be monitored in fish throughout all project phases. See also related Advice to the Proponent: AD-31.	

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				and is also the most toxicologically significant form. The assumption of 100% of mercury in fish and other country food items being present as methylmercury ensures that the potential health risks are not underestimated. It is unclear, however, if the mercury data presented throughout the EIS represent total mercury, inorganic mercury or methylmercury.		
IR-101	ECCC	Fish and fish habitat	Section 8.1.1.3, Section 8.2.1.3 Aquatic Environment	**Context:** In Section 8.1.1.3 Spatial and Temporal Boundaries the Project Area, Local Study Area (LSA) and Regional Study Area (RSA) are established as they pertain to surface water quantity. The same is done in Section 8.2.1.3 for surface water quality. In Section 8.1.1.3 Figure 8.1-4, the locations of the Project Area, LSA, RSA and surface water features and monitoring stations are provided. However, the locations of wetlands located near the Project area and within the LSA and RSA have not been provided. The location of wetlands within or near the Project footprint, as well as the other wetlands existing within the LSA can be confirmed from Part II_S9 Terrestrial Environment, Section 9.2.3.3 Figure 9.2.-8, including the wetland classifications. There appears to be at least one shallow open water wetland and several bogs located within the Project Area. There is no consideration of wetlands or potential effects to wetland hydrology, surface water or sediment quality throughout the aquatic environment assessments. There is no baseline information regarding wetlands and their status as fish habitat and ecological function, or assessment of potential effects to flow rates, water levels, water quality, sediment quality, or biota. **Rationale:** There is currently not enough information provided for ECCC to provide advice on the potential risks of the proposed Project to wetland hydrology, surface water and sediment quality within the LSA. This pathway of effects is important to assess in terms of potential effects to wetland habitat availability and quality due to changes in flow rates, water levels, water quality, sediment transport, sediment quality and potential effects to terrestrial and aquatic receptors. It is necessary to evaluate if changes in groundwater and surface water runoff flows and routing will affect water levels and habitat availability within wetlands. Potential effects from COPCs and radionuclides to surface water and sediment, or potential effects to ecological receptors within wetlands have not been evaluated.	1. Provide baseline information regarding wetland characterization within the Project Area and LSA, including: locations, wetland type, size, water surface elevation, depth, water flow pathways, and the presence of wildlife receptors including presence of fish/fish habitat within the Aquatic Environment section of the draft EIS. If this information is available in annexes or baseline studies, summarize it within the main body of the Aquatic Environment section of the draft EIS with references to respective documents for review. 2. Provide baseline information on wetland surface water and sediment quality characterization for wetlands within the Project footprint. 3. Provide an assessment of potential effects to wetlands within the LSA and potential effects to ecological receptors during all phases of the proposed Project. 4. Provide further information on mitigation measures and monitoring that would be applied for the protection of wetlands.	
IR-102	ECCC	Fish and fish habitat	Section 8.1.3.1 Appendix 8-C, including Appendix II, Table 1 (p. 2)	**Context:** Only one measured-results dataset for baseline stream flow exists that is relevant to the Project data from the Water Survey of Canada (WSC) station for Wheeler River (06DA005), and the Proponent used constructed records. The Proponent states that data from 06DA005 was used to extend local hydrometric station records and calculate baseline water quantity metrics. However, this was done	1. Provide more information on the extension of Project hydrometric station data using WSC station 06DA005. 2. Discuss the accuracy of any correlations/relationships and justify any deviations from simple unit area runoff relationships in the estimation of baseline water quantity	

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				through a complex combination of daily data correlation or monthly unit area runoff relationship, with or without offset, where some stations were based off constructed records instead of the real long-term dataset at 06DA005 (see Section 8.1.3.1 and Appendix II of Appendix 8-C, Table 1, p.2 (PDF p. 569)). Appendix 8-C references previous reports in its own appendices, but no equations are shown and there is no description of the accuracy of the fit, or explanation for not referring back to the one dataset (WSC station). Subsequent statistics calculated from these constructed records (e.g., 7Q10 needed for SK water licenses) would be affected by this uncertainty. **Rationale:** Fish habitat can be altered by changes to depositional and erosional patterns in streams. Confidence in the Proponent's estimate of baseline water quantity, and by extension Project effects to fish habitat, cannot be established without a complete description of the method applied, as well as a discussion of its accuracy.	values for the Project hydrometric stations. Constructing records from records that are themselves constructed is not recommended. 3. If baseline water quantity metrics need to be revised, discuss (if any) resulting changes to the effects assessment.	
IR-103	ECCC	Fish and fish habitat	Section 8.1.3.4 Climate Change Influenced Extreme Events	**Context:** The Proponent notes that Intensity duration frequency (IDF) curves are used to estimate the size of water management structures around a site and that the IDF curves are often specific to climate monitoring stations. The Proponent used the IDF_CC Tool 5.0 developed by the Institute for Catastrophic Loss Reduction (2021) which generates Intensity Duration Frequency (IDF) curves at ungauged locations in order to estimate future IDF curve values under influences of climate change. This tool generates sub-daily values at ungauged locations by interpolation and distance weighing from gauged locations. **Rationale:** IDF trends exhibit random behavior at some locations and correlated behavior at other locations. The choice of gauged locations will infer the statistics for the ungauged locations, including the IDF trends. Without identification of the gauged locations, it is not possible to assess if the modelled data is realistic or not. If the modelled data is not accurate the design of water management structures on the site may not be sufficient resulting in the potential for impacts to the Project from flooding or extreme weather events.	Provide the gauged stations used to generate the sub daily duration values found in Table 8.1-6: Baseline of Intensity Duration Frequency data. **Technical Discussion Required**: Yes	
IR-104	ECCC	Fish and fish habitat	Section 8.1.3.4.2 Probable Maximum Precipitation (PMP) Events Appendix 8C	**Context and Rationale:** The Proponent notes: "The probable maximum precipitation (PMP) event is a design standard value for an extreme rainfall event. The PMP event does not have an estimated return period but is instead based on the theoretical maximum amount of water that a storm could produce based on the maximum persisting dew point." The Proponent provides a PMP value of 489.3 mm, which is based on data and methodologies available in 1999, taken from the	1. Provide a revised PMP value (using up to date data) or justify the use of a PMP that is based on data and methodologies from 1999 as opposed to a more recent time series analysis. 2. Describe the alternative methods for determining PMP values that were considered. Include descriptions of both "statistical" outcomes and "rational" outcomes as applicable.	

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				Atmospheric Environment Branch Report (1999), Report Number AHSD-R99-01. The Proponent references Appendix 8C for details. Appendix 8C contains no supplementary information other than what is already provided in Section 8.1.3.4.2. The assumptions and methodologies presented in the report are the results of time series analyses available in 1999. As time series evolve so do the derived statistics. In order to assess potential flood risks and impacts to the Project from flooding, data that is current and representative of the changing climate is needed. The Proponent should explain why they've used data from 1999 rather than using up to date data, describe what alternative methods for determining PMP they have considered, and describe how they will support their use of 489.3 mm as a PMP, or describe how they will generate a refreshed PMP. The main factor that influences the statistical data output is the length of the time series hence the reason to keep the statistical data. The PMP values can be substantially (>10%) different if two decades of data is used in the statistical analysis.	**Technical Discussion Required**: Yes	
IR-105	Directorate of Fisheries and Oceans (DFO)	Fish and fish habitat	Section 8.1.4.1, Potential interactions between project and valued component/key indicators Surface Water Quantity Section 8.1.4.2.2, Surface Water Taking 8.3.4.1, Potential interactions between project and valued component/key indicators	**Context:** Table 8.1-8 and Table 8.3-6 in the EIS indicates a potential for freeze wall operation to influence groundwater interactions and surface water quantity and as a result, impact fish and fish habitat. Section 8.1.4.2.2 references Section 7 Geology and Groundwater for details on potential impacts. In addition, IR-63 notes the groundwater model does not describe the pathway in which groundwater would pass around the freeze wall during operation and any resulting potential effects on groundwater discharge to Whitefish Lake. **Rationale:** As per IR-63, the groundwater model analysis is insufficient to make conclusions on the potential effects of the freeze wall on groundwater discharge into Whitefish Lake. DFO requires this information to fully understand if altered groundwater regimes will result in changes to Whitefish Lake water levels and any potential impacts to fish and fish habitat as a result of changing water levels.	1. Provide a more fulsome analysis of the potential impact of freeze wall operations on local and semi-regional groundwater regimes, and subsequently to fish and fish habitat within Whitefish Lake. The analysis should provide a rationale of how the scope of the groundwater model is relevant to and able to detect changes at the scale of fish and fish habitat. 2. If impacts to fish and fish habitat in Whitefish Lake are predicted to occur due to changes in the groundwater regime, describe any mitigation measures that could be used to avoid these impacts. 3. If impacts are predicted that cannot be avoided, characterize residual effects on fish and fish habitat.	
IR-106	CNSC	Change to an environmental component due to hazardous contaminants	Section 8.1.4.2.3, Surface Water Discharge	**Context:** It is stated in this section under construction that all site contact water will be held in the Clean Waste Rock Pond. **Rationale:** It is unclear from this section what will happen to the contact water held in the Clean Waste Rock Pond, and whether it will be removed from site or released at a later time. What is the contingency plan if more contact water is produced during construction than the Clean Waste Rock Pond has capacity for.	Please indicate what will happen to the contact water stored in the Clean Waste Rock Pond during construction activities, will it be released after the wastewater treatment plant is installed? Further, please describe the contingency plan if contact water produced exceeds estimates and will exceed the volume of the clean waste rock pond?	
IR-107	CNSC ECCC	Aquatic environment	Section 8.2.3.3, Existing Surface Water Quality	**Context:** Under the methodology and metrics section (8.2.3.1) it is stated baseline water quality was sampled in 2016, 2018, and 2019. Looking at the data in Appendix A of Appendix 8D it seems that some	Please clarify what data quality objectives were used for the baseline characterization data. Please provide justification whether the number of datapoints collected	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				waterbodies have little data available for baseline characterization. For example, Whitefish Lake only has 3 and 5 samples taken between its two sample stations, with sampling frequency seeming intermittent. **Rationale:** The amount of data available for baseline water quality characterization does not seem sufficient to adequately characterize the baseline and the variation it would experience. An effective baseline characterization is vital to ensure water quality is indeed not being affected by the project. In addition, it is not clear if data quality objectives were applied to determine baseline information was adequate. To meet CEAA 2012 requirements, and CNSC expectations outlined in REGDOC 2.9.1, Environmental Principles Assessments and Protection Measures, the applicant is required to complete a characterization of the baseline environment. As described in REGDOC 2.9.1 Appendix B.2, Characterization of the Baseline Environment for Environmental Assessment Under CEAA 2012, the "baseline information should be sufficient to support the use of an aquatic dispersion model to conduct the site-specific ERA and to support an assessment of the effects of the environment on the facility or activity" In addition, the "applicant or licensee should include an assessment of any limitations or gaps in the quality and extent of baseline data and methods, as well as the method(s) by which they have been addressed."	with inconsistent frequency in baseline surface water characterization is sufficient to meet data quality objectives and to adequately characterize the baseline, and whether Denison is confident that the data collected is enough for a robust water quality baseline characterization. **Suggestions for mitigation and follow-up measures:** CNSC recommends that additional water samples are collected and analyzed at a consistent frequency to ensure a robust baseline	
IR-108	ECCC	Change to an environmental component due to hazardous contaminants	Section 8.2.3.3 Aquatic Environment	**Context:** Tables 8.2-2 and 8.2-3 provide summaries of the baseline surface water quality in the LSA. No justifications for the selection of water quality guidelines have been provided. COPCs that require calculations based on other parameters such as hardness, pH, or temperature to derive guidelines (i.e., ammonia, cobalt, zinc, etc.) should be indicated within the table, with a note specifying the parameter values used in the calculations, so that thresholds may be confirmed. No baseline data for un-ionized ammonia has been provided, which is a Schedule 4 substance requiring monitoring under the MDMER. For cobalt, manganese, and vanadium, Federal Environmental Quality Guidelines (FEQGs) and/or CCME Canadian Water Quality Guidelines (CWQGs) for the Protection of Aquatic Life have not been included. A guideline of 26 mg/L has been provided for molybdenum as a Saskatchewan Environmental Quality Guidelines (SEQG), however the actual SEQG is 31 mg/L and the CCME CWQG is 0.073 mg/L.	1. Update Tables 8.2-2 and 8.2-3 to include all COPCs that require effluent characterization and receiving environment monitoring under the MDMER. 2. Update Tables 8.2-2 and 8.2-3 to include missing or corrected water quality guidance thresholds, and information on values used to derive thresholds for COPCs that are dependent on general parameters.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				Rationale: In order to assess potential changes to surface water quality from Project related activities, ECCC requires that data on all parameters that require MDMER effluent and receiving environment monitoring be provided for assessment, including accurate water quality guidelines where available.		
IR-109	ECCC	Change to an environmental component due to hazardous contaminants	Section 8.2.4.1.1 Aquatic Environment	**Context:** In this section it is stated "Treated water from the IWWTP will be pumped to the three Effluent Monitoring and Release Ponds (each 3,300 m3). These ponds will be designed to hold effluent for 72 hours for testing before discharge to the environment" (p. 8-75). It is unclear what procedure will be followed if effluent in monitoring ponds does not meet discharge requirements following testing. Additionally, it is also stated that "Treated water in the Effluent Monitoring and Release Ponds will be monitored prior to release to a surface waterbody or injected into groundwater via deep well injection." However, the MDMER pursuant to the Fisheries Act requires all mine effluent and seep. from the mine site that contain deleterious substances be discharged through a final discharge point. **Rationale:** In order to fully understand effluent management, more information is required regarding the procedure for managing effluent in monitoring ponds that does not meet discharge requirements. It is unclear how effluent that does not meet discharge requirements will be managed if it needs re-treatment and re-testing prior to discharge. ECCC reminds the Proponent that Project effluent from all final discharge points must meet federal legislation requirements.	Provide further information regarding management of effluent in monitoring ponds that does not meet the requirements for discharge under the MDMER.	
IR-110	ECCC	Change to an environmental component due to hazardous contaminants	Section 8.2.4.1.1 Aquatic Environment Appendix 8-E, Section 2.1	**Context:** It is stated that the diffuser at the final effluent discharge point will be located in approximately 3m of water. However, in Figure 8.2-5 displaying the location of the proposed diffuser and lake bathymetry, the diffuser location seems to be located in 2-2.5m of water. A similar image in Figure 1 Section 2.0 of Appendix 8-E also indicates that the diffuser seems to be located in 2-2.5m of water. Additionally, while thermal effects are unlikely, this cannot be confirmed until a more detailed diffuser design is provided for review. **Rationale:** The Proponent should confirm the location and depth of the proposed diffuser in order to confirm that modelling predictions for effluent discharged into the receiving environment are accurate.	Provide confirmation of the diffuser depth and location. ECCC requests the opportunity to review the finalized diffuser design once it is available.	
IR-111	CNSC	Fish and fish habitat	Section 8.2.4.2.2, Controlled Discharge	**Context:** This section of the EIS indicated that the scenario was assessed using a conservative assumption of a continuous freshwater withdrawal rate of 40.5 m3/hr, and a continuous effluent discharge rate of 81.0 m3/hr.	Please clarify where the other half of the total volume of effluent discharged is from in the water balance between water intake and effluent.	

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				Rationale: The withdrawal rate assessed is half of the effluent rate, it is unclear from the text where the other half of the volume of effluent is coming from, if not drawn from the lake.		
IR-112	ECCC	Change to an environmental component due to hazardous contaminants	Section 8.2.4.2.2, Aquatic Environment Appendix 8-E, Section 1.2.1 Appendix 10-A (ERA), Section 3.1	**Context:** This section of the EIS states that, "for the purpose of assessing the scenario of greatest potential effects, the Project was assessed as having a continuous freshwater withdrawal rate of 40.5 m^3/hr and a continuous effluent discharge rate of 81.0 m^3/hr." (p. 8-21) However, several sentences later it is stated that, "The approach to assessing Project-related effects on the Surface Water Quality VC was conservative for the following reasons: The assessment was based on a continuous (year-round) discharge rate at an expected average effluent discharge of 0.0101 m3/s (or 36.5 m3/hr) throughout Construction, Operation, and Decommissioning…" This is a continuous theme throughout Section 8, Aquatic Environment, where the discharge rate for the surface water quality assessment changes between 36.5 m3/hr and 81.0 m3/hr. However, in Appendix 10-A (ERA) the 36.5 m3/hr discharge rate is the only value used for the near and far-field modelling. It should be made clear in the main body of the draft EIS that the average effluent discharge rate of 36.5 m3/hr has been used as the input for the near- and far-field modelling for effluent, surface water and sediment quality predictions. The maximum upper bound discharge rate is 81 m3/hr; however, modelling for effluent, surface water and sediment quality was not completed for this discharge rate. **Rationale:** It remains unclear throughout the draft EIS that all predictions of COPC concentrations in effluent, and receiving environment surface water and sediment are based upon the effluent discharge rate of 36.5 m3/hr, and not the maximum upper bound discharge rate of 81 m3/hr. All conclusions about risk to the environment and aquatic and terrestrial biota must make this clear. If the Proponent wishes to make conclusions based on the maximum upper bound discharge rate of 81 m3/hr, modelling needs to be conducted using this rate of discharge.	1. Confirm that the surface water quantity, quality, and aquatic biota risk assessments and modelling, were conducted using the discharge rate for 36.5 m3/hr within the draft EIS. 2. Revise any statements or conclusions in the draft EIS to improve clarity about the usage of the maximum upper bound discharge rate of 81 m3/hr. Remove statements regarding use of the discharge rate of 81 m3/hr during modelling and risk assessments to the receiving environment as needed.	
IR-113	ECCC	Change to an environmental component due to hazardous contaminants	Section 8.2.4.2.3 and Section 8.4.7.6, Aquatic Environment	**Context:** No quantitative assessment of climate change has been conducted. Representative concentration pathways (RPC) projections for climate change have not been integrated with near-and far-field modelling to assess impacts to surface water quality or sediment quality in the future. **Rationale:** Changes in air and water temperatures, precipitation, snow	Provide a quantitative analysis of the potential impacts of predicted COPCs from mine effluent to surface water and sediment quality with climate change scenarios for the Project lifespan incorporated into modelling. Include modelling predictions regarding the influence of changes to air and water temperatures, precipitation, snow melt,	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				melt, ice formation, etc., due to climate change can all influence COPC concentrations in surface water and sediment. It is not possible to assess the potential impacts from climate change on predicted surface water and sediment COPC concentrations with the current information.	ice formation, etc., on COPC concentrations in surface water and sediment.	
IR-114	ECCC CNSC	Change to an environmental component due to hazardous contaminants	Section 8.2.4.2.3 and Section 8.2.4.2.4	**Context:** Tables 8.2-9, 8.2-10 and 8.2-13 demonstrate predicted maximum effluent concentrations of COPCs and maximum predicted receiving environment concentrations in the near- and far-field. General parameters such as temperature, pH, conductivity, etc. that would require Project thresholds and monitoring under the MDMER have not been provided in this table. Lead, nickel, TSS and un-ionized ammonia were not provided, despite all being Schedule 4 substances with maximum monthly concentrations under the MDMER. Aluminum, iron, nitrate, thallium, and manganese have not been provided despite being required parameters under Schedule 5 Section 4 of the MDMER for effluent characterization. For zinc, it is unclear how guidelines have been calculated when CCME thresholds can only be derived with hardness values <250 mg/L. Additionally, water quality thresholds appear to have been calculated using estimated effluent concentrations rather than receiving environment baseline concentrations. Mercury has been identified as a COPC of interest to Indigenous groups for the proposed Project. Table 8.2-8 indicates that background concentrations of mercury in LA-5 are low, and predicted effluent concentrations are also low. However, no information has been provided on background methylmercury concentrations or expected atmospheric deposition of mercury from Project related emissions. Predicted effluent concentrations of 3915 mg/L of sulphate are quite high, and sulphate is known to increase mercury methylation rates in aquatic environments. **Rationale:** A review of all modelling results for all COPCs under the MDMER will assist ECCC in understanding the potential risks to the receiving environment. ECCC recommends the use of the most stringent guidelines for the protection of aquatic biota. All water quality thresholds should be derived from receiving environment parameters to determine any baseline receiving environment and effluent COPC exceedances of water quality thresholds. Increased sulphate availability can lead to increased methylation rates of mercury and methylmercury in sediment and surface water. Methylmercury is a toxin that can bioaccumulate within the food chain and present risks to aquatic biota and wildlife consuming aquatic biota. Potential changes to methylmercury concentrations in	1. Update all tables to include all COPCs with required monitoring under the MDMER including acute and chronic thresholds. 2. Ensure all selected water quality thresholds are derived using baseline receiving environment concentrations and use water quality guidelines that are protective of aquatic biota. 3. Provide baseline data on the concentrations of methylmercury in surface water, sediment and fish tissues (i.e., large- bodied sports fish and small-bodied forage fish) in the LSA and RSA receiving environment to establish a baseline prior to potential Project impacts. 4. Provide an assessment of risk from methylmercury to ecological receptors due to changes in sulphate concentrations in effluent, and potential deposition of mercury from Project related atmospheric emissions in the receiving environment.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				water quality, sediment and fish tissues should be assessed due to the proposed sulphate loadings in effluent. Additionally, in accordance with the MDMERs, Denison will be required to demonstrate that their effluent quality meets the limits in the MDMER. Denison is expected to provide the predicted effluent quality for lead, nickel, and un-ionized ammonia to demonstrate compliance with the MDMERs.		
IR-115	ECCC	Fish and fish habitat	Section 8.2.4.2.3 Aquatic Environment Appendix 10-A (ERA), Section 3.1.1.1	**Context:** Table 8.2-8 demonstrates baseline concentrations of COPCs in LA-5 South Whitefish Lake, their respective water quality guidelines from applicable sources, and proposed Project thresholds. General parameters such as temperature, pH, conductivity, etc. that would require Project thresholds and monitoring under the MDMER have not been provided in this table. Lead, nickel, Total Suspended Solids (TSS) and un-ionized ammonia were not provided, despite all being Schedule 4 substances with maximum monthly concentrations under the MDMER. Aluminum, iron, nitrate, thallium, and manganese have not been provided despite being required parameters under Schedule 5 Section 4 of the MDMER for effluent characterization. Water quality thresholds appear to have been calculated using estimated effluent concentrations rather than receiving environment baseline concentrations. The water quality objective selected for molybdenum is the 31 mg/L SEQG rather than the CCME guideline of 0.073 mg/L. **Rationale:** ECCC recommends the use of guidelines that will ensure the protection of aquatic biota. All water quality thresholds should be derived from receiving environment parameters to determine any baseline receiving environment and effluent COPC exceedances of water quality thresholds.	1. Update Table 8.2-8 to include all COPCs with required monitoring under the MDMER. 2. Ensure all selected water quality thresholds are derived using baseline receiving environment concentrations and are at levels protective of aquatic life. 3. Provide additional information to justify the use of the selected water quality guideline for molybdenum.	
IR-116	ECCC	Change to an environmental component due to hazardous contaminants	Section 8.2.4.2.5, Section 8.4.4.2.5 and Section 8.5.4.2.3	**Context:** Tables 8.2-14, 8.4-9 and 8.5-5 demonstrate predicted mass flux (in mg/s) of COPCs in groundwater during the future centuries scenario. The table does not provide any information on actual surface water concentrations of COPCs or accumulation in concentrations over time. It is not possible to determine what the COPC concentrations in surface water and sediment will be during the future centuries scenario with the current information. Additionally, only a subset of parameters have been provided in this table based on parameters that were elevated in effluent after treatment. Groundwater may have a variety of different COPCs with elevated concentrations as it will migrate directly from the ore body area and not receive treatment. **Rationale:** It is not possible for ECCC to assess the predicted concentrations of COPCs in surface water and sediment, and therefore	1. Provide the predicted water and sediment quality concentrations of COPCs in the receiving environment for the future centuries scenario. 2. Include data for a greater suite of COPCs that were assessed as having potential to be at elevated concentrations in groundwater.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				risk to aquatic biota during the future centuries scenario with the provided information.		
IR-117	CNSC	Human health with respect to hazardous contaminants	Section 8.2.4, Table 8.2-9	**Context:** CNSC staff note that some of the effluent quality predictions in the EIS are quite high for a uranium mine and mill facility compared to the existing facilities. For example, the upper bound effluent quality of molybdenum is 2.5 mg/L. In 2021, the highest monthly mean concentration at the existing uranium mine and mill facilities is 0.213 mg/L. Also, the upper bound effluent quality of copper is 0.022 mg/L. In 2021, the highest monthly mean concentration at the existing uranium mine and mill facilities is 0.002 mg/L. **Rationale:** Surface water quality models should be based on the anticipated effluent quality. From discussions with Denison, it appears that the effluent quality predictions may change based on the results of more bench scale tests that are still being conducted and continued optimization of the design of the water treatment plant.	Please provide the anticipated effluent quality of the constituents of potential concern during normal operations. Once Denison has refined the effluent quality predictions, Denison is expected to update the inputs into the surface water quality model.	
IR-118	ECCC	Change to an environmental component due to hazardous contaminants	Section 8.2.6.1, Section 8.4.6.1 and Section 8.5.6.1, Aquatic Environment	**Context:** It is unclear if Tables 8.2-16, 8.4-12, 8.5-7 and 8.5-8 take into consideration potential effects from groundwater seepages of COPCS to surface water and sediment quality in the future centuries scenario. No information regarding the future centuries scenario has been provided in the rationale summary for ratings. **Rationale:** Groundwater seepage of COPCs may have future impacts to surface water quality, sediment quality and aquatic receptors; however, the extent of residual effects is unclear without further information.	Provide further information regarding how groundwater seep. of COPCs may have future impacts to surface water quality, sediment quality, and aquatic receptors, and any residual effects that may persist.	
IR-119	CNSC	Fish and fish habitat	Section 8.3.1.2, Table 8.3-1, Sediment quality	**Context:** Sediment quality isn't considered a key indicator for fish and fish habitat, but the accumulation of contaminants in sediment porewater without habitat alteration is similar to the key indicator 'change in surface water quality from baseline conditions' that is considered. **Rationale:** It is not clear whether sediment was just considered for physical disturbance, and why chemical changes are missing from key indicator list for fish and fish habitat.	Please provide the rationale for exclusion of sediment quality from the key indicator list for fish and fish habitat.	
IR-120	CNSC	Aquatic species	Section 8.3.3 and 8.5, Aquatic Environment	**Context:** Although downstream impacts are not predicted by Denison it is important from an ecosystem perspective to establish baseline locations to monitor for potential cumulative effects to the aquatic environment due to the Key Lake and Wheeler River Operations to ensure the aquatic environment is being protected from cumulative impacts.	If Denison has not collected baseline aquatic studies in the far-field downstream receiving environment of Russell Lake, please provide a rationale for why. If a far-field Russell Lake location was sampled as part of baseline data collection, more information about the	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				Denison should consider adding a far-field exposure location and collecting baseline aquatic ecosystem baseline data in Russell Lake including: • Water quality/chemistry • Sediment chemistry/quality • Benthic invertebrate chemistry /community • Large-bodied fish tissue/chemistry **Rationale:** Russell Lake is identified as part of the RSA for the aquatic environment, but it appears that no detailed aquatic baseline data was completed in far-field location in Russell Lake. In addition, several Indigenous Nations and communities and local resource users have indicated that Russell Lake is an important body of water both culturally for traditional use and was once used as commercial fishery.	process and results with regards to sampling at Russell Lake should be included in the EIS. This information would be valuable to help determine potential cumulative effects downstream in the Russell Lake drainage system (due to the Key Lake Operation) which has been identified as a key concern and area of interest by several Indigenous Nations and communities.	
IR-121	CNSC	Fish and fish habitat	Section 8.3.3.1, Methodology and Metrics	**Context:** In the description of methodology for fish communities and spawning surveys, there's no mention that could be found for an any evaluation of fish condition, other than sexual condition. **Rationale:** Exposure to other pre-existing stressors could result in abnormal conditions or deformation(s) in existing population, but the extent of existing conditions should be evaluated to ascertain whether the rate is increasing as a result of proposed activities once in operation.	Please provide reference to where fish condition is considered or provide a justification for its exclusion.	
IR-122	CNSC	Fish and fish habitat	Section 8.3.8, Monitoring and Follow-up	**Context:** Section 8.3.8 of the EIS states: "Changes in fish communities/populations will be assessed through comparison of Construction, Operation, and Decommissioning results to pre-development." **Rationale:** Tracking changes in fish communities / populations in reference lakes over time should be conducted, as reference lakes can be used to differentiate natural temporal variation with potential project impacts.	Please include reference lakes, and if it is provided, please reference where in the EIS these are discussed. If there are no reference lakes, these should be included in the monitoring program.	
IR-123	ECCC	Change to an environmental component due to radiological contaminants	Section 8.4.3.2.3, Aquatic Environment Appendix 8-D, Table 3-5	**Context:** Table 8.4-3 provides a summary of the baseline concentrations of COPCs in sediments in the LSA. Sediment quality thresholds and justification for the selection of those thresholds have not been provided. Table 3-5 in Appendix 8-D does provide benchmarks but the selection of benchmarks is not discussed, and the most stringent guidelines are not used for some COPCs. Additionally, there is no data provided for sediment concentrations of mercury, which is a COPC that requires surface water quality monitoring and effluent characterization under the MDMER. **Rationale:** Further information should be provided regarding any	1. Provide sediment quality thresholds and justification for the selection of those thresholds for comparison against measured baseline COPC concentrations in the LSA. 2. Provide data on baseline concentrations of mercury in sediment. 3. Identify any COPCs with baseline concentrations that exceed sediment quality thresholds in the LSA.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				exceedances of sediment quality thresholds in baseline concentrations of COPCs, which should be recommended for further assessment of risk due to effluent discharges.		
IR-124	ECCC	Change to an environmental component due to hazardous contaminants	Section 8.4.4.2.3, Aquatic Environment	**Context:** Table 8.4-7 provides maximum concentrations of surface water COPCs in sediment. The following COPCs, which are required to evaluate the risk from effluent to sediment quality, were not evaluated: 1. COPCs that have monitoring requirements in receiving environment surface water and effluent under the MDMER, 2. COPCs that exceed water quality guidelines in effluent, and, 3. COPCs that have baseline concentrations that exceed sediment quality thresholds in the receiving environment. **Rationale:** Due to the lack of information on COPCs with baseline concentrations that exceed sediment quality guidelines, and COPCs that require monitoring under the MDMER, a determination on risk to sediment quality and aquatic biota cannot be made.	1. Provide the information on baseline exceedances of COPCs in sediment. 2. Provide an assessment of risk for any COPCs that have baseline exceedances of sediment quality thresholds in the receiving environment. 3. Provide an assessment of risk from any COPCs that require monitoring in the receiving environment and effluent under the MDMER. Please include any COPCs in effluent that will exceed water quality guidelines.	
IR-125	CNSC	Fish and fish habitat	Section 8.5, Aquatic Environment and Fish health	**Context:** Indigenous Knowledge studies and information collected in relation to the Project clearly identified the importance of water quality and fish health to local Indigenous peoples and is discussed throughout the Draft EIS. For example: • "Russell is one lake where I commercially fish. How will this effluent impact the water quality, fish health? Will I be able to sell fish from here? If there is going to water" pollution, I just want to know" (19-LK-ERFNTrap-134.255) " • "How are you going to protect the water quality? We are concerned about mercury in fish, other animals, etc. Is there mercury or arsenic in the uranium solution?" (p. 8-53) **Rationale:** Several Indigenous Nations and communities and local resources users have indicated Russell Lake is an important body of water both culturally for traditional use and was used as commercial fishery in the past and from an aquatic ecosystem perspective.	One of the many mitigation measures mentioned throughout the aquatic environment section states: "Denison will work with the associated communities to develop and implement the Project-specific monitoring programs and a framework to share the results for the purpose of assessing the performance of the water management system." (p.10-32) Has Denison considered the collection of additional baseline fish tissue species that are of importance to Indigenous Nations and communities and local cabin owners from Russell Lake? Assuming the species would be walleye (commercially and recreationally) and lake white whitefish that is traditionally an important species consumed. Please provide more information on the engagement to date on the development of the Surface Water Management Program and Monitoring program that Denison is developing and engagement to date with interested Indigenous Nations and communities in the region on fish and fish health.	
IR-126	ECCC	Aquatic species	Section 8.5.3 Appendix 10-A (ERA), Section 5.3.1.1.8	**Context:** The Proponent has used the US Environmental Protection Agency (US EPA) guidelines for the assessment of selenium fish tissue concentrations in Section 8.5.3 of the draft EIS and in the	Update the selenium fish tissue assessment in the draft EIS and the Wheeler River ERA (Appendix 10-A (ERA) in Section 10) as needed using ECCC's FEQG.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				Environmental Risk Assessment (ERA) in Appendix 10-A (ERA) of Section 10. **Rationale:** ECCC's Federal Environmental Quality Guidelines of 6.7 ug/g dry weight fish whole body tissue for selenium should be used, as it is more protective than the US EPA guidelines.		
IR-127	CNSC	Aquatic environment	Appendix 8-E, Section 1.2.1, Hydrological Inputs	**Context:** Within this section it states that the 7Q10 low flow rate used in the mixing assessment "was provided verbally to Ecometrix by NewFields Canada during a project meeting on 26 April 2022" **Rationale:** The statement that this value was provided verbally is not an infallible method of communicating data, as the value could have been misheard, misremembered, or recorded improperly.	Please verify that the 7Q10 value used in the assessment is the correct value determined by NewFields.	
IR-128	CNSC	Current use of lands and resources for traditional purposes	Section 9 Various pages in section 11.1, Land and Indigenous Resource Use Section 12 Section 14	**Context:** The increased road traffic (14-18 trucks per day during construction/operations) may have indirect impact on ungulates, furbearers and wood land caribou presence/absence for traditional and subsistence hunting have been raised to CNSC staff when meeting with Indigenous Nations and communities and are presented in the EIS. **Rationale:** The increased traffic and therefore dispersal of game (moose, woodland caribou) due to increased traffic has been raised as a concern with respect to increased mortality on wildlife and decreased ability to practice traditional rights.	How have the potential residual impacts with respect to increased traffic and noise (due to current and future operations) been communicated to Indigenous Nations and communities who use the road #914 for cultural and traditional activities (such as moose harvesting, berry picking and small game and birds)? Please provide any additional information on the engagement that has taken place to date with Indigenous Nations and communities with respect to concerns and potential impacts on current use of lands and resources due to increased road traffic, and any mitigation measures proposed by Indigenous Nations and communities to minimize the potential impacts.	
IR-129	CNSC	Current use of lands and resources for traditional purposes	Section 9 Section 10 Section 11, including Section 11.1.4.3.1 (p. 11-46) Section 12 Section 16	**Context:** ERFN indicated they are concerned about declining moose populations from an influx of hunters; more people may be accessing the area year after year, and worried populations may be affected by the Project (21-EN-ERFN-473.13). Further, the EIS highlights that: "Vehicle collisions are the most likely source of direct mortality for moose. Effective mitigation measures (e.g., breaks in snowbanks; speed limits; and exclusion fencing around contaminated waste pads and ponds) will be implemented to reduce moose mortality." (p. 11-46) **Rationale:** The Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA 2012 notes: "The views of affected Aboriginal groups on mitigation be considered and included in the EIS. This could assist in ensuring that the environmental effects on the current use of land and resources for traditional purposes are at an acceptable level for the community."	Please provide additional information on the discussions Denison has had with Indigenous Nations and communities on how to mitigate any residual project impacts on their traditional harvesting activities of large game such as moose. More information is required to determine if Denison has engaged directly with ERFN/KML and other Indigenous Nations who utilize the area to harvest moose to determine current baseline harvest numbers that provide subsistence, continued cultural identity and community well-being, as well as discussions on how the project could potentially impact moose populations and the harvesting of moose for traditional practices.	

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				Sources for indirect moose mortality (e.g., increased hunter access, changes to health due to sensory disturbances, changes to predator-prey dynamics) may result in mortality outside the Wildlife LSA. The residual effect of change in moose mortality is likely to occur. Although mitigation measures are expected to reduce, but not fully eliminate, the residual effect on moose. The potential residual impact on the moose and other large game populations in the broader regional study area may potentially impact Indigenous treaty rights, culture, and community well-being if the harvesting of moose and large game declines due to increased traffic, noise, and vehicle mortality or increased outside hunting pressure.		
IR-130	CNSC	Physical stressors (noise and vibration) on wildlife	Section 9, Terrestrial Environment	**Context:** Sensory disturbances such as noise have been identified as stressors for selected wildlife (Ungulates, Furbearers, and Woodland Caribou), birds and amphibians in the project area. However, there is no consideration of impacts from vibrations on these species. Also, impacts of noise and vibration on reptiles have not been assessed in the project area. **Rationale:** While noise has been qualitatively assessed for selected wildlife, birds, and amphibians, there is no consideration of project-related vibrations as a sensory disturbance/physical stressor. Sensitive terrestrial species (specifically, herpetofauna, amphibians, invertebrates, and caribou) can be impacted by vibrations emanating from the operation of heavy machinery, blasting activities, and other anthropogenic activities at the project site. Also, impacts of physical stressors (noise and vibration) on reptiles were not assessed. These species should be included in this assessment due to their sensitivity to noise and vibrations.	Please provide a discussion of impacts of physical stressors (specifically vibrations) on wildlife, birds, and amphibians in the project area. Specific mitigation measures and/or monitoring for impacts from project-related vibrations should be considered, as appropriate. Also, include reptiles in the assessment of project-related noise and vibrations as sensory disturbance/physical stressor, or a justification for their exclusion.	
IR-131	CNSC	Migratory birds, Wildlife and Wildlife Habitat	Section 9, Terrestrial Environment	**Context and Rationale:** As per the requirement outlined in Section 79 of the Species at Risk Act (SARA): *The person must identify the adverse effects of the project on the listed wildlife species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and to monitor them. The measures must be taken in a way that is consistent with any applicable recovery strategy and action plans. This is accomplished by ensuring that the Proponent has identified, avoided, lessened and will monitor effects to species at risk.* As per the CNSC's Generic Guidelines for the Preparation of an EIS pursuant to the Canadian Environmental Assessment Act, 2012: "*The EIS will then describe mitigation measures that are specific to each environmental effect identified. Measures will be written as specific commitments that clearly describe how the proponent intends to*	Identify all species at risk listed on Schedule 1 of the Species at Risk Act and their critical habitat that are likely to be affected by the Project and describe how they may be adversely affected by the Project. Describe what measures will be taken to avoid or lessen the effects of each Project activity and stage, and how these effects will be monitored to ensure they are avoided or minimized.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				implement them and the environmental outcome the mitigation is designed to address. The EIS will describe mitigation measures in relation to species and/or critical habitat listed under the Species at Risk Act (SARA). These mitigation measures will be consistent with any SARA permit, applicable recovery strategy and/or action plan". The draft EIS neither lists the adverse effects to all listed schedule 1 SARA species, nor outlines the measures that will be taken to avoid or lessen these effects. The Proponent references that additional species-specific mitigations will be detailed in environmental management plans but has not provided those plans for review.		
IR-132	ECCC	Wildlife and Wildlife habitat	Section 9, Terrestrial Environment	**Context and Rationale:** ECCC has identified that three species at risk arthropods (yellow banded bumble bee, transverse lady beetle, and nine-spotted lady beetle) have ranges overlapping the Project area and these were not mentioned in the draft EIS.	1. Conduct an effects assessment for arthropod species at risk. 2. Explain what mitigation measures will be used to minimize potential effects.	
IR-133	ECCC		Section 9, Terrestrial Environment	**Context and Rationale:** There is potential for some species at risk (e.g., myotis species, barn or bank swallows, common nighthawk) to be attracted to and use mine infrastructure (buildings, roads etc.) once constructed for nesting, roosting, or foraging. Details on mitigation measures and adaptive management with respect to attraction to Project components should be identified to assess residual and cumulative impacts to species at risk.	For all Project phases, describe the mitigation measures and adaptive management to prevent and minimize effects on species at risk that may utilize mine infrastructure.	
IR-134	ECCC	Wildlife and Wildlife habitat	Section 9, Terrestrial Environment	**Context and Rationale**: The draft EIS states in multiple places that vegetation clearing may occur year-round. In order to correspond with the timing of emergence from hibernation, tree clearing should not be conducted during the bat roosting period. If maternity roost trees are removed after pregnant females have established a roost area, there is a higher likelihood of abortion than there would be otherwise. Species-specific mitigations are required to protect bat SAR.	Provide important roosting dates for bat species at risk in the Project area.	
IR-135	ECCC	Migratory birds, Wildlife and Wildlife Habitat	Section 9, Terrestrial Environment	**Context and Rationale:** The mitigation measures for birds and wildlife presented in the draft EIS are very general. Additional detail is required for a complete assessment of residual and cumulative Project effects to birds and wildlife. The Proponent has committed to providing a number of plans including, a Decommissioning Plan, a Spill Response Plan, a Waste Management Plan, a Surface Water Monitoring Plan, a Remediation and Closure Plan, a Radiation Protection Plan, a Soil and Vegetation Monitoring Plan, a Wildlife Monitoring Plan, and a Woodland Caribou	The following information should be included in the various plans and should be provided for review during the environmental assessment: 1. For all Project phases, describe the species-specific mitigation measures and responses to prevent and minimize effects on migratory birds or species at risk (SAR) birds and mammals that may utilize mine infrastructure.	

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				Management Plan. In order to assess potential affects to migratory birds and wildlife from Project related activities, ECCC requires details on species-specific mitigation measures, and monitoring plans.	2. Explain how light pollution will be managed and what specific mitigation measures will be used to minimize effects to migratory birds and SAR birds and mammals. 3. Provide details on what methods will be used for erosion control and how they will prevent sediment from entering waters frequented by migratory birds or SAR. Explain what actions will be taken if the erosion control measures are not successful. 4. Provide details on noise and other sensory disturbance monitoring and mitigations if noise levels surpass thresholds. 5. Describe time windows and species- specific mitigations related to maintenance activities such as vegetation management, road or building repair and stream crossing replacements.	
IR-136	CNSC	Soil Salvage Monitoring	Section 9.1.8.2	**Context:** The proponent plans to salvage and stockpile soil and organic matter/peat in order to use it in reclamation activities during decommissioning. Periodic monitoring of the stockpiles is proposed to be conducted to verify that soil and organic matter/peat are delineated, stripped, handled, and stockpiled as recommended, and to evaluate the stability of salvaged soil, e.g., in relation to potential erosion and/or degradation. It is unclear whether monitoring includes soil quality in terms of concentrations of COPCs. **Rationale:** It is expected that project-related activities (road and airport traffic, drilling) can result in open-source (i.e., fugitive) dust and process-source dust (incl. radionuclides), which can accumulate and result in changes in soil quality of the stockpiled soil and organic matter/peat as described in Sections 9.1.4.2.2 and 9.1.4.2.3).	Please clarify if COPC concentrations monitoring is planned to be performed for stockpiled soil and organic matter/peat.	
IR-137	ECCC	Migratory birds, Wildlife and Wildlife Habitat, Vegetation and Wetlands	Section 9.2.1.3, Spatial and Temporal Boundaries for Vegetation and Ecosystems, Listed Plant Species and Wetlands Section 9.3.1.3.1, Spatial Boundaries for Ungulates, Furbearers and Woodland Caribou	**Context and Rationale:** The CNSC's Generic Guidelines for the Preparation of an EIS Pursuant to the Canadian Environmental Assessment Act, 2012 states that: "The EIS will describe the spatial boundaries, including local and regional study areas, for each VC to be used to assess the potential adverse environmental effects of the Project and provide a rationale for each boundary. Spatial boundaries will be defined taking into account the appropriate scale and spatial extent of potential environmental effects, community knowledge and Indigenous knowledge, current or traditional land and resource use by Indigenous groups, ecological, technical, social and cultural considerations."	Provide a biologically relevant rationale for the delineated study boundaries (LSA and RSA) for all different valued components. Include the following information: • Descriptions of how the RSA and LSA boundaries were derived for all VCs. Specific to boreal caribou: Project Footprint: • Include a 500-m buffer of area of maximum physical disturbance to represent functional habitat loss for boreal caribou LSA:	

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			9.4.1.3.1, Spatial Boundaries for Raptors, Migratory Breeding Birds, and Bird Species at Risk	The information provided in the EIS does not enable a biologically relevant assessment of the Project's effects. The Proponent did not provide rationale for the selection of study areas for individual vegetation, wildlife or migratory bird valued components (VC). Different VCs may have different spatial boundaries for the LSA and/or RSA. For wildlife and bird VCs, the LSA is defined as a 1.7-km buffer from the Project area, and the RSA is defined as a 6.6-km buffer around the LSA. There is no information on how the spatial boundaries were derived. Specific to Woodland Caribou, boreal population (hereafter referred to as boreal caribou): <u>Project Footprint</u>: In a scientific assessment of critical habitat (Environment Canada, 2011) [1] ECCC demonstrated that the application of a 500-m buffer to mapped anthropogenic features best represents the combined effects of increased predation and avoidance on caribou population trends at the national scale. Adding a 500-m buffer to the Project footprint is required to represent functional habitat loss. The draft EIS does not appear to use a buffer for their Project area. The draft EIS (Section 9.3.1.3.1) states: "Project Area: the area within which the Project and all components/activities are located (i.e., the area of maximum physical disturbance). The Project Area covers 169.6 ha and is not VC-specific, but consistent throughout the EA." (p. 9-168) <u>LSA</u>: The defined LSA for boreal caribou has to consider avoidance of disturbed areas, predator access to undisturbed areas, reduction in connectivity and sensory disturbance. This required information is not detailed in the draft EIS. Adverse effects of Projects including predator and prey access to undisturbed areas, reduction in connectivity, and sensory disturbance to individual boreal caribou can vary and extend several kilometers depending on Project activities and ecological context. At minimum, the LSA should capture the above- mentioned effects. For boreal caribou, the Project footprint should be defined as the immediate area to be cleared, plus a 500-m buffer to represent functional habitat loss. Following this guidance, the LSA should be defined as a buffer of the Project footprint with the 500-m buffer. <u>RSA</u>: The Amended Recovery Strategy for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada states: *Mitigation of adverse effects from individual projects/activities will*	• Include a description of how the LSA takes into account boreal caribou avoidance of disturbed areas, predator access to undisturbed areas, reduction in connectivity and sensory disturbance to individuals. <u>RSA</u>: • Include a description of how the RSA used in the draft EIS is an accurate representation of the SK1 boreal caribou range; **or** • Re-do the assessment with the RSA at the scale of the range See also related IRs: IR-154 and IR-156.	

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				require a coordinated approach and management of cumulative effects within and among ranges. A cumulative effects assessment is essential to position the proposed project/activity in the context of all current and future development activities. The cumulative effects assessment will: • *Assess the impact of all disturbances (anthropogenic and natural) at the range-scale;* • *Monitor habitat conditions, including the amount of current disturbed and undisturbed habitat, and amount of habitat being restored;* • *Account for planned disturbances; and* • *Assess the distribution of disturbance in large ranges for risk of range retraction in parts of the range.* The proposed Project's cumulative effects for boreal caribou are possible at the scale of the SK1 boreal caribou range. The RSA used for boreal caribou for this Project is only 40,173.6 ha, compared to the SK1 range, which is 18,034,870 ha. As such, it is too small to capture cumulative effects to this species and does not follow the Scientific Assessment to Support the Identification of Critical Habitat for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada (Environment Canada, 2011) or the Amended Recovery Strategy for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada. **Reference**: [1] Scientific Assessment to Support the Identification of Critical Habitat for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada (Environment Canada, 2011).		
IR-138	CNSC	COPC in Lichen	Section 9.2.4.2.2 Appendix 10-A (ERA)	**Context:** A quantitative assessment using modelling dispersion and uptake of COPCs in the environment was completed for the Project as part of the ERA, to support conclusions drawn in the EIS. In Appendix 10-A (ERA), COPCs in plant tissue was estimated for lichen. Table 5-5 of the ERA (p. 5.24) named "Complete Exposure Pathways for All Selected Ecological Receptors to be Assessed using the IMPACT Model" lists the exposure pathway for lichen as direct contact on soil. **Rationale:** Airborne COPC can deposition on lichen and subsequently enter the food chain; therefore, the "contact with air" pathway should be considered. In fact, lichen species are frequently used to monitor the deposition and accumulation of airborne contaminants (e.g., dust, metals). It is also noted that based on sampling results of the 2017 baseline studies, lichen frequently contain higher concentrations of COPC than blueberry (compare Table 9.2-6 and Table 9.2-7 in the EIS), especially at sampling sites with elevated concentrations (e.g., RSV9 and RSV10).	Please include the exposure pathway of direct deposition (dry and wet) of airborne contaminants on lichen in the quantitative ERA, or justify why this exposure pathway was not considered. See also related: IR-189.	

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IR-139	ECCC	Change to an environmental component due to hazardous contaminants	Section 9.2.5.2.7, Waste and Hazardous Materials Management	**Context:** In this section, the Proponent outlines various measures to mitigate air emissions, including implementation of the air quality programs within the Environmental Management System, regular maintenance and inspection of equipment, and elimination of unnecessary idling of equipment. However, the intention to use industry-standard emission control systems has not been substantiated. **Rationale:** For the protection of air quality, it is important to specify the emission standards that equipment will have (e.g., Tier 3 or Tier 4 engines). Vehicles and equipment with Tier 4 engines have much lower emissions of contaminants than those with Tier 3 engines. If non-Tier 4 engines are used, ECCC recommends that best management practices are followed, including proper maintenance of the engine and anti-idling measures.	Confirm if vehicles and equipment will be equipped with Tier 4 engines where feasible.	
IR-140	CNSC	Change in the Areal Extent of Wetlands	Section 9.2.6.4	**Context:** Predicted residual effects on the areal extent of wetlands include the direct effect of loss of wetlands and several indirect effects of alteration of wetlands. As stated in the EIS, wetlands can exhibit low resilience and high susceptibility to disturbance. At the same time, wetlands tend to support a high species diversity, and are considered to have a moderate to high potential to support listed plant species. Lastly, wetlands are rare on the landscape compared to terrestrial ecosites (see Table 9.2-5). **Rationale:** Several wetland ecosites (BS19/24, BS25, BS27) occur only in small areas (< 30 ha) in the RSA but are predicted to experience disturbance of 6-64%, most notably the ecosite BS19/24 where 0.8 of 1.2 ha are predicted to be disturbed. It is noted that wetlands are scattered throughout the landscape as shown in Figure 9.2-8. More information is requested regarding the ecological impact of this disturbance.	1. Please provide a discussion on the ecological impact of disturbance to rare wetland ecosites. 2. Please provide information on whether adequate other habitat is available for species impacted in these disturbed sites in close proximity, taking into account the home ranges of susceptible species. 3. Please provide additional information on whether wetland connectivity is maintained through the landscape within the LSA/RSA. See also related: IR-141. **Suggestions for mitigation and follow-up measures:** CNSC recommends that Denison conduct monitoring of species present in wetlands before and after disturbance, with a focus on listed plant species.	Verify text changes
IR-141	ECCC	Wetlands	Section 9.2.6.4.1	**Context and Rationale:** The Proponent states that: "Direct loss of wetlands has been mitigated by reducing the size of the Project Area to the extent practicable during Project design. However, up to 0.5 ha (less than 0.1%) of all wetlands within the Terrestrial RSA are anticipated to be removed from the Project Area during Construction (Table 9.2-16)." Information is not provided on whether wetlands in the terrestrial RSA are considered ecologically, economically or socially important to the region. Information on the regional importance of the wetlands that will be lost is needed in order to assess effects, including a wetland	1. Provide information that accounts for whether wetlands are considered ecologically, economically and socially important to the region. 2. If the above is affirmative provide a wetland compensation plan to offset the loss. Consistent with the Operational Framework For Use of Conservation Allowance [1] a minimum ratio of 2:1 should be the starting point when determining the amount to be offset. [1] Available at : https://publications.gc.ca/site/eng/9.696852/publication.html	

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				compensation plan if the wetlands are considered regionally important.	See also related: IR-138.	
IR-142	ECCC CNSC	Wildlife and Wildlife habitat	Section 9.3.3.2.1 Scientific Literature Review – Wolverine Section 9.3.5 Mitigation Measures Section 9.3.6 Residual Effects Evaluation	**Context:** The Proponent did not conduct any field work to identify potential wolverine dens in the Project area and therefore did not present any mitigations for the potential impacts to wolverine dens. In Section 9.3.3.2.1, the Proponent states: "Denning females are sensitive to disturbance during denning season in February to April and may abandon their dens and, in some cases, their litter, which may decrease their reproductive success. " In Section 9.3.6, the Proponent states: "In the Project Area, 145.0 ha or 100% of available wolverine habitat is assumed to be removed and will not be available to wolverine for the duration of the Project (Table 9.3-13). Similarly, 145.0 ha (3.4%) of available wolverine habitat within the Wildlife LSA is anticipated to be removed, all from the Project Area, during site clearing in Construction. In the Terrestrial RSA, up to 0.5% (145.0 ha; from the Project Area) of available wolverine habitat is anticipated to be removed during site clearing in Construction." The residual effect assessment estimates that 8.2% of available wolverine habitat within the Terrestrial RSA may be altered or lost (Table 9.3-20). **Rationale**: As Wolverine is a Species at Risk Act Schedule 1 listed species, effects need to be identified, avoided, lessened and monitored. Mitigations, such as setback distances, should be used to protect important habitat features, such as dens. Wolverine occupy large home ranges and, therefore, need vast tracts of undisturbed land to maintain viable populations. The species avoids most human footprint types and linear features.	1. Please provide additional information on whether the lost and/or altered wolverine habitat overlaps with wolverine home ranges. 2. Describe any important wolverine habitat feature (i.e., dens) that may be lost as a result of the Project. 3. Assess the need for pre- construction/pre-clearing surveys to identify any wolverine denning sites. 4. Please provide additional information on whether the remaining, available, undisturbed wolverine habitat size is suitable to maintain populations.	
IR-143	ECCC	Wildlife and Wildlife habitat	Section 9.3.3.3, Baseline Studies	**Context and Rationale:** The baseline caribou data is insufficient to understand potential Project impacts to this species. Presence/absence detection was provided by camera traps, incidental observations, winter track and pellet survey. Additional information and analyses on caribou use of the landscape during all life stages of the Project area is required to assess impacts and to determine significance of impact from the Project to caribou.	Provide details on the baseline caribou data including: • Revision of map 9.3-8 to include all observations, categorized by type, season and year (see also IR-145); and • Description of seasonal use of the LSA, RSA and caribou range. • Description of Project areas used by caribou. • Description of future studies planned to assess habitat use by caribou. Include specific details on how many additional years of aerial surveys will be completed to assess the caribou baseline conditions. Utilizing additional data noted above and specified in IR-	

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					145, explain how caribou use of the area could be affected by the Project throughout all seasons and life stages (e.g., calving, post-calving, rutting, wintering). See also related: IR-152.	
IR-144	ECCC	Wildlife and Wildlife habitat	Section 9.3.3.3, Baseline Studies – map 9.3-8	**Context and Rationale:** The mapping of caribou observations during baseline studies provided in Figure 9.3-8, "Caribou Sign Observations in the Wildlife Study Areas," is insufficient to enable conclusions to be drawn. ECCC is not able to review the spatial aspect of caribou observations without a map of all available observations. Additional information is available, as stated in Section 9.3.3.3.3: *"A total of 200 observations were made between 2017 and 2019 and recorded as either caribou sign (i.e., tracks, pellets, and evidence of feeding activity based on ground feeding craters and arboreal feeding evidence) or photographs (collected through the wildlife camera study) to document caribou presence in the LSA and RSA. Most observations occurred in the Terrestrial RSA, with observations concentrated in the north and southeast portions.* *Three observations occurred in the southeast portion of the Wildlife LSA, and no caribou sign was observed in the Project Area. Figure 9.3-8 provides an overview of some caribou sign observed during the baseline studies."*	Update map 9.3-8 to show all caribou observations during baseline studies, broken down by type of observation (camera, incidental, pellet, track) and season/year when the observation was made. Include additional data from the Province of Saskatchewan (see also IR-145) to help characterize caribou use on a spatial map.	
IR-145	ECCC	Wildlife and Wildlife habitat	Section 9.3.3.3, Woodland Caribou	**Context and Rationale:** The Proponent has not provided sufficient information on how caribou use the landscape, including identification of areas for different life stages of caribou (calving, post-calving, rutting and wintering). The University of Saskatchewan published a report entitled Population and habitat ecology of boreal caribou and their predators in the Saskatchewan Boreal Shield. This report contains information on habitat types that are used during different life stages. Additionally, Appendix H of the Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada 20202 [1] details habitat characteristics required by boreal caribou to carry out life processes necessary for survival and recovery. The scientific literature review (Section 9.3.3.3.1) on Woodland Caribou states: "While calving areas have not been documented within the SK1 range, it is recognized that caribou may use open fen and treed bog habitat types for calving during the spring/summer period. In Saskatchewan, caribou habitat used during the calving season in the SK2 range demonstrated a strong selection for treed	1. Provide, based off existing literature or available data and the Amended Recovery Strategy for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada: • information on known important habitat features or biophysical attributes in Project areas for different caribou life stages (calving, post-calving, rutting, wintering), • a map(s) of the type and spatial extent of important caribou habitat features or biophysical attributes of the study areas as defined in Appendix H of the Recovery Strategy, ○ mapping should be at the RSA/LSA level as well as larger-scale mapping at the scale of the Project footprint. 2. Assess the potential direct and indirect effects based on additional information on caribou from bullet A above. See also related IRs: IR-143 and IR-152.	

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				muskegs, but avoidance of jack pine, mixed hardwood stands, and roads (Dyke 2008)." ECCC is not able to verify the Proponent's effects assessment without sufficient information on important habitat or biophysical attributes for caribou within the study areas. [1] https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/woodland-caribou-boreal-2020.html#toc0	**Suggestions for mitigation and follow-up measures:** ECCC recommends that the Proponent contact the Province of Saskatchewan to enquire about obtaining caribou telemetry data in the Project area. The data can be analyzed to determine important habitat features in the Project area.	
IR-146	ECCC	Wildlife and Wildlife habitat	Section 9.3.3.3.1, Woodland Caribou, Scientific Literature Review - Predation	**Context and Rationale:** The information on impacts of predation and apparent competition for caribou in relation to the proposed Project are insufficient. In the section on caribou predators (9.3.3.3.1), the Proponent provided details on densities of wolves and their overlap with caribou and speaks of apparent competition. The Proponent did not examine other predators, such as black bear. The analysis on impacts of predation and apparent competition is insufficient since known predators have been omitted without explanation from the assessment of effects. ECCC is not able to verify the Proponent's effects assessment since important species have not been considered in the assessment.	Provide further information and analyses on all potential predators of caribou, including impacts from apparent competition.	
IR-147	ECCC	SAR - Boreal Caribou	Section 9.3.4.2.1, Alteration and/or Loss of Habitat	**Context and Rationale:** The process of in-situ recovery mining will likely create changes to the surface topography and potential ground subsidence as well as changes to groundwater elevations. These changes can affect the plant communities and ecosite types. In Section 9.3.4.2.1 the Proponent states that: "Following decommissioning and reclamation, wildlife habitat is expected to recover to baseline conditions." A more thorough explanation regarding post-decommissioning landscape is required to assess Project impacts.	1. Provide further rationale and/or analysis regarding the return of wildlife habitat to baseline conditions post-decommissioning. Incorporate other environmental impacts including: • Ground subsidence and impacts on wildlife habitat • Changes to aquifers and impacts on wildlife habitat 2. Describe reclamation activities/measures, including temporal information that will be implemented to help in the recovery to baseline conditions.	
IR-148	ECCC	Wildlife and Wildlife habitat	Section 9.3.4.2.1, Alteration and/or Loss of Habitat	**Context and Rationale:** ECCC analyzes disturbance for caribou at the range level, in this case within the SK1 range. However, the Proponent did not provide an adequate assessment of total disturbance at the range level. The draft EIS (Section 9.3.4.2.1 p. 9-211) reads: "The SK1 Boreal Shield Woodland Caribou Management Unit has relatively low levels of anthropogenic disturbance and was exposed to large fire disturbances in the past 40 years (ECCC 2019). Environment and Climate Change Canada (2019) identified this caribou population as	Provide the following in order to support analysis of habitat disturbance: 1. Calculation of total disturbance including natural and anthropogenic disturbance at the range level. 2. Description of effects on existing habitat at the scale of the range (for < 40% undisturbed habitat in the SK1). Include:	

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				being self-sustaining at a threshold of 40% undisturbed habitat with the total anthropogenic disturbance not exceeding 5% of their habitat. The current anthropogenic disturbance levels (without areas burnt by past forest fires) for the study areas are below this threshold (with the exception of the already disturbed Project Area) and are estimated as: 24.8 ha (14.6%) for the Project Area, 168 ha (3.5%) for the Wildlife LSA, and 599 ha (1.5%) for the Terrestrial RSA." Analysis of habitat disturbance should be calculated at the range level in order to assess impacts and determine significance. Analysis should be consistent with the methodology described in the document Scientific Assessment to Support the Identification of Critical Habitat for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada (Environment Canada, 2011) [1]. [1]https://publications.gc.ca/site/eng/401605/publication.html, p. 28/41	• an account (and GIS file if available) of existing habitat affected, using the following formula: (Project footprint + 500m buffer) - overlapping (permanent alteration(s) + 500m buffer) 3. A map of the SK1 range showing all disturbed and undisturbed habitat, including predicted disturbance (direct and indirect) resulting from the Project. 4. Description of whether the Project is expected to compromise the ability of the range to be restored to the undisturbed habitat threshold, and provide a rationale for the conclusion. See also related: IR-154.	
IR-149	ECCC CNSC	Wildlife and Wildlife habitat	Section 9.3.5.2, Additional Wildlife-specific Mitigation Measures	**Context:** The EIS describes that ongoing research is performed to inform the development of a Woodland Caribou Management Plan. This includes studies on the effectiveness of linear disruption features on predator/prey movements, and a field program for long-term reclamation planning. Moreover, it is stated that the Plan will include a detailed assessment of the need for habitat offsets. The draft EIS Section 9.3.5.2 states: "A wildlife monitoring plan and a Woodland Caribou Management Plan will be developed to address wildlife-specific mitigation measures based on proven and accepted mitigation following standard industry guidelines and BMPs. The plans will provide guidance to avoid or minimize potential adverse effects of the Project on wildlife and wildlife habitat, including monitoring and follow-up programs, as appropriate. It will be in place during all phases of the Project and will be subject to ongoing review and revision as required. If monitoring identifies a need for additional or revised mitigation measures, a process of adaptive management (as described in the plan) will be triggered." **Rationale**: The draft EIS does not present sufficient species-specific mitigation measures for boreal caribou. ECCC is not able to assess potential residual impacts to caribou without specific mitigations. Since the Woodland Caribou Management Plan is still under development, it is difficult to judge whether the measures will be adequate to mitigate and/or offset potential project effects on Woodland caribou and its critical habitat.	Provide the Woodland Caribou Management Plan, to demonstrate effective mitigation of potential project effects, along with wildlife-specific mitigation measures for review. The Plan should be informed by and consistent with the Boreal Caribou Recovery Strategy and demonstrate that avoidance and minimization measures will be applied to mitigate for predicted Project effects to boreal caribou and its critical habitat prior to considering offsetting measures. That is, the Plan should follow the mitigation hierarchy and information should be provided as outlined below: 1. AVOID: Describe all measures that will be taken to avoid effects to boreal caribou and avoid the destruction or alteration boreal caribou critical habitat. 2. MINIMIZE: Describe all measures that will be taken to minimize the effects to boreal caribou and minimize the destruction of boreal caribou critical habitat. 3. RESTORE ON-SITE: describe the measures that will be taken to restore disturbed areas of the project, related to construction, operation and maintenance, on boreal caribou critical habitat, remaining after considering the avoidance and minimization measures. 4. Characterize the risk of the adverse effects that are likely to result from the project on boreal	

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					caribou and its critical habitat after avoidance minimization, and onsite restoration measures have been considered. 5. OFFSET: Describe the measures that will be implemented outside the Designated Project area to mitigate adverse effects, destruction or alteration of boreal caribou critical habitat by the Designated Project during construction and operation. 6. Characterize the risk of the adverse effects that are likely to result from the project on boreal caribou and its critical habitat after avoidance, minimization, onsite restoration, and offset measures have been considered. Describe all relevant uncertainties on the effectiveness of the measures to address adverse effects on boreal caribou and the rationale for the selected measure, in light of the mitigation hierarchy. See also related IRs: IR-149 and IR-157.	
IR-150	ECCC	Wildlife and Wildlife habitat	Section 9.3.5.2.1, Best Management Practices for working in Boreal Woodland Caribou Range in Saskatchewan	**Context and Rationale:** In the draft EIS Section 9.3.5.2.1, the Proponent states: "Denison proactively initiated research to provide field-based findings on the effectiveness of linear disruption features on predator/prey movements." "Results will help the development of proactive and meaningful restoration strategies as an ongoing part of the overall Project (Omnia 2022). Additionally, the 2023 field program will support a program that uses the results from the 2021/2022 Caribou Trail Study in long-term reclamation planning. The program will be led by the University of Saskatchewan and is funded by Denison, an Indigenous-owned environmental company, the Northwest Communities Environmental Services (Métis owned), Mitacs, and the Natural Science and Engineering Research Council of Canada through an alliance grant. The Caribou Trail Study and the reclamation plan will culminate with the development of a Woodland Caribou Management Plan." ECCC is available to support the Proponent through review of study programs should those programs be made available during the review process. ECCC requests to see the 2021/2022 study to further our review of caribou use in the Project area.	Provide the report for 2021/2022 Caribou Trail study for long-term reclamation planning for ECCC review.	

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IR-151	ECCC	Wildlife and Wildlife habitat	Section 9.3.6.4	**Context and Rationale:** In the analysis of residual and cumulative effects for woodland caribou, information and analyses on impacts to connectivity and movement across the landscape is lacking.	1. Using available reports and data, provide an analysis of impacts to landscape connectivity for woodland caribou at the LSA and Range scales. 2. Determine whether the Project is expected to result in a reduction of connectivity within or between the ranges and provide a rationale for the conclusion. Describe how movement corridor(s) may be affected by Project activities and infrastructure.	
IR-152	CNSC	Woodland Caribou Residual Effects Evaluation	Section 9.3.6.4, Appendix 9-B	**Context:** Baseline studies for Woodland caribou include: • Winter Track Count Survey to assess presence, abundance, feeding activity, and ecosite affiliation; • Pellet Group/Browse Availability Survey to detect presence and abundance of caribou, and frequency of occurrence and abundance of lichen; • Covert Camera Survey to determine presence and use of linear features (roads, trails, and hand-cut lines). The Saskatchewan Conservation Strategy for Boreal Woodland caribou [1] states that caribou are very susceptible to predation during the calf-rearing period, and populations are extremely sensitive to even minor changes in mortality rates. **Rationale:** It is unclear if, or how, any data on seasonal and spatial use of habitat was considered in the residual effect analysis, for example summer/winter home ranges, sensitive life stages including calving (e.g., location of calving sites). It should be noted that the English River First Nation have identified caribou calving areas in the vicinity of the project footprint. **Reference**: [1] Saskatchewan Ministry of Environment. 2013. Conservation Strategy For Boreal Woodland Caribou (Rangifer tarandus caribou) in Saskatchewan. Saskatchewan Ministry of Environment. Fish and Wildlife Technical Report 2014.	Please provide a summary of available baseline data on habitat use during all seasons and life stages, in particular sensitive stages such as calving, and how habitat use during all seasons and life stages was considered in the residual effect analysis. See also IR-145 and IR-143.	
IR-153	CNSC	Woodland Caribou Residual Effects Evaluation	Section 9.3.6.4.1	**Context:** According to ECCC (2020), forest fires can directly alter habitat, making it unsuitable for boreal caribou (e.g., through loss of mature conifer stands, loss of lichens and other forage plants, barriers to movement). Boreal caribou generally do not return to burned areas for several decades until the forest is old enough to support lichens and other food sources, although they may make limited use of burned areas to feed on new growth. The residual effects evaluation of alteration and/or habitat loss lists ecosites BS3 and BS7 (regenerating forest types) as available habitat in	1. Please provide further information on the suitability of ecosites BS3 and BS7 for Woodland caribou in different life stages. 2. Please provide the results of a residual effect analysis not including ecosites BS3 and BS7 for conservatism. 3. If 2 leads to habitat fragmentation, consider connectivity of habitat patches in the residual effect analysis.	

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				Table 9.3-22, which represent 43.5% of the Regional Study Area. **Rationale:** It is unclear whether the ecosites BS3 and BS7 (regenerating forest types) represent suitable habitat for Woodland caribou year-round. More information is required on the habitat quality (e.g., time since last forest fire) and suitability for different life stages of caribou. For conservatism, it is recommended to perform a second residual effect analysis not including regenerating forest ecosites.		
IR-154	CNSC	Woodland Caribou Alteration and/or Loss of Habitat	Section 9.3.6.4.1	**Context:** Lichen, the primary food source for Woodland caribou (up to 70% of the year-round diet), can be exposed to airborne contaminants and dust deposition at distances of 1–40 km (e.g., increased metal concentrations or dust were detected in lichen at distances of 1–40 km from a mine site [1, 2]). **Rationale:** Further information is requested on how the potential for contamination of the food source "lichen" is reflected in the applied buffers of direct and indirect disturbance for woodland caribou. **References**: [1] Watkinson et al. (2021). Effects of dust deposition from diamond mining on subarctic plant communities and barren-ground caribou forage. Journal of Environmental Quality 50(4): 990-1003. doi: 10.1002/jeq2.20251. [2] Chen et al. (2017). Does dust from arctic mines affect caribou forage? Journal of Environmental Protection 8(3): 258-276. doi: 10.4236/jep.2017.83020.	1. Please provide additional justification for how the potential for contamination of the food source "lichen" is reflected in the applied buffers for sensory disturbance. See also related IRs: IR-137, IR-148 and IR-156. **Suggestions for mitigation and follow-up measures:** CNSC recommends the following: • COPC in Lichen monitoring is recommended in transects from the Project site to assess COPC concentrations and confirm whether the chosen buffer is conservative.	
IR-155	ECCC	Wildlife and Wildlife habitat	Section 9.3.6.4.1, Alteration and/or Loss of Habitat	**Context and Rationale:** In Section 9.3.6.4.1 of the draft EIS, the Proponent presents figure 9.3-14 and table 9.3-22, which "depicts available woodland caribou habitat in the Project study areas" and provide a summary of available Woodland Caribou Habitat in the Project Area, Wildlife Local Study Area, and the Terrestrial Regional Study Area. The Proponent does not provide a biologically relevant explanation on the ecosites that are considered available woodland caribou habitat. According to the amended recovery strategy for Caribou, all habitat within SK1 range has been designated as critical habitat. To align with best current knowledge and the amended recovery strategy, the map and table should show the biophysical attributes, as outlined in Appendix H of the recovery strategy.	1. Provide a biologically relevant explanation about how available caribou habitat was determined or determine available habitat based on new data from the province of Saskatchewan (See IR-145). 2. Consider referencing Appendix H of the Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada 2020 to define important biophysical features.	

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IR-156	ECCC	Wildlife and Wildlife habitat	Section 9.3.6.4.1 Section 9.3.7.3.1	**Context and Rationale:** In Section 9.3.6.4.1 of the draft EIS, the Proponent identified that 142 ha of available caribou habitat within the Project footprint will be directly impacted or lost, while an additional 1,165 ha will be indirectly impacted by Project activities such as sensory disturbance. They assessed the residual and cumulative effect of alteration to habitat for woodland caribou as not significant: "The residual effect of alteration and/or loss of available woodland caribou habitat is not expected to result in a change that will alter caribou habitat integrity to the point where it would not be able to sustain the regional woodland caribou population. Therefore, the effect is assessed as not significant." Section 9.3.7.3.1 of the draft EIS states: "It is not expected that the cumulative effects of alteration and/or loss of habitat will alter the integrity of woodland caribou habitat within the Terrestrial RSA to the point where it is not sustainable or available to contribute to ecological functions. Therefore, the cumulative effects resulting from the Project's residual effect interacting with residual effects from other projects and activities is predicted to be not significant." For the residual effect of alteration and/or loss of available caribou habitat (Section 9.3.6.4.1, Table 9.3-24), the proponent assessed the magnitude as low, the geographic extent as local, the duration as long-term, the frequency as frequent, the reversibility as fully reversible, the context as high and the likelihood as likely. The rationale provided by the proponent is insufficient to determine the accuracy of these assessments, given the lack of data and the small size of the assessment area. ECCC does not support the residual effects assessment of low magnitude, given the uncertainties related to seasonal use by caribou in the project area and the current level of disturbance in the SK1 range. For the cumulative effect of alteration and/or loss of available caribou habitat (Section 9.3.7.3.3 , Table 9.3-30), the proponent assessed the magnitude as moderate, the geographic extent as beyond the RSA, the duration as long-term, the frequency as frequent, the reversibility as fully reversible, the context as high, the likelihood as likely, the significance as not significant and the level of confidence as moderate. The rationale provided by the proponent is insufficient to determine the accuracy of these assessments, given the lack to data presented for caribou and the small size of the RSA, compared to the SK1 region. ECCC does not support the conclusion of the cumulative effects assessments or for the level of confidence. The Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada 2020 states that the range is currently at the 60% disturbance management threshold.	Provide a revised assessment of residual and cumulative effects, taking into consideration that the disturbance within the SK1 range is above the disturbance management threshold required for survival and recovery of the species. See also related IRs: IR-137 and IR-154.	

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				Therefore, any activity likely to result in the alteration or destruction of critical habitat may impact on the species survival and recovery. In addition, the Proponent's assessment was based on information that was lacking data on calving, wintering and rutting areas, and connectivity and caribou movements. The absence of considerations of the regional context of disturbance does not provide a conclusion based on best available information.		
IR-157	ECCC	Wildlife and Wildlife habitat	Section 9.3.9 Ungulates, Furbearer and Woodland Caribou Summary	**Context and Rationale:** The Proponent has committed to developing a Woodland Caribou Management Plan, which will include a "detailed assessment for the need for habitat offsets." The Woodland Caribou Management Plan will support ECCC's review of the Proponent's assessment of residual effects following mitigation and offsetting. This plan should consider ECCC's Operational Framework for Use of Conservation Allowances (ECCC, 2012). ECCC is available to assist the Proponent in the determination of appropriate offsets that would balance against Project adverse effects after the application of measures to avoid, minimize and restore on-site are adopted. Based on the Amended Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada 2020, anthropogenic impacts to local caribou populations experience a lag effect, which occurs over extended periods. This lag effect needs to be adequately considered when proposing offsets. ECCC is available to assist the Proponent in understanding how critical habitat is described in the Recovery Strategy and the determination of appropriate offsets that would balance against Project effects based on the predicted impacts to caribou habitat.	Provide the Woodland Caribou Management Plan for review. The plan should clearly demonstrate efforts to avoid and minimize any Project effects and restore on-site any disturbed areas prior to the consideration of offsetting. Details on how severity of disturbance and vulnerability of the species were considered should be explained. See also related: IR-149. **Suggestions for mitigation and follow-up measures:** ECCC notes that the Woodland Caribou Management Plan should clearly explain efforts to address Project effects, including any contribution to cumulative adverse effects, after it has been determined that all options in the previous steps of the mitigation hierarchy (i.e., avoidance, and minimization,) have been fully considered and applied. In the Woodland Caribou Management Plan, provide details on how the factors outlined in the Operational Framework for Use of Conservation Allowances (ECCC, 2012) were considered in determining the offsetting amounts, including the severity of disturbance and vulnerability of the caribou population. Important factors including time lag (the amount of time from restoration work to when the habitat would be considered caribou habitat) would also need to be considered. ECCC typically recommends a minimum offset multiplier of 4:1 (offset outcome: area disturbed). This is a benchmark ratio applied to a project that is in the lower end of the risk spectrum, such as one with a low severity impact adversely affecting a low vulnerability ecological component. In general, the minimum 4:1 multiplier accounts for time-lags to restoration, uncertainty in outcomes, a precautionary approach, and the adverse impact itself in its specific context. Offset multipliers are variable and determined by project-specific circumstances and associated risks and uncertainties.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-158	ECCC	Migratory birds	Section 9.4.1.2, Key Indicators and Measurable Parameters	**Context and Rationale:** In Section 9.4.1.2 the Proponent outlined key indicators for "Migratory Breeding Birds" which includes Waterbirds and Waterfowl, Upland Game Birds and Migratory Songbirds. These are broad categories, which do not allow for assessment of the variation in habitat requirements or ecology of individual species or guilds. ECCC advises the Proponent to identify additional focal species that have the ability to represent anticipated impacts to a broader guild of species. Indicator species should be demonstrably sensitive to the potential effect of interest, and suitable for inferring effects on other species. Species may be grouped into guilds for assessment based on similarities in ecology or vulnerability to Project effects (e.g., species at elevated risk of collision with vehicle traffic).	Identify focal species/guilds for each key indicator species within the Migratory Breeding Birds valued components. Provide an updated analysis of Project effects on migratory birds.	
IR-159	ECCC	Migratory birds	9.4.3.2.3 Baseline Studies – Migratory Songbirds Appendix 9-B, Section 2.10.2, Results	**Context and Rationale:** Information presented in the draft EIS is insufficient to accurately predict Project impacts to breeding birds. The Proponent collected a single year of breeding songbird point counts and aerial waterfowl surveys (including avian species at risk). A single year of surveys in which birds may be unusually scarce or abundant could severely compromise interpretation of post-construction monitoring data. Additionally, data presented in the draft EIS is from 2017 and ECCC advises that more recent data is needed for a comprehensive baseline to verify Project impacts. Data from the Saskatchewan Conservation Data Centre (HABISask), the Saskatchewan Breeding Bird Atlas and the Boreal Avian Modelling project contain information on avian densities and avian species at risk that could supplement field data. The national standard for major projects recommends a minimum of two years of field surveys to be provided, so that temporal variability can be considered when comparing post-construction against baseline records and other available data.	Supplement breeding bird point count data and aerial waterfowl data collected during 2017 with additional pre-construction field data or existing post-2017 data/modelling to provide a comprehensive baseline that can be used to verify Project impacts during construction and operational phases.	
IR-160	ECCC	Migratory birds	Section 9.4.3.2.3 Baseline Studies – Migratory Songbirds	**Context and Rationale:** ECCC advises that the results of the field studies need to be interpreted/analyzed in the context of the study area. The Proponent presents results on areas with highest richness and diversity but does not make a link to habitat that will be lost or experience indirect effects. Results from baseline studies as well as other supplemental information as per IR-159 should be used in effects assessment.	Provide results interpreted in the context of Project direct and indirect effects. Include discussion on the habitat types that will be lost or indirectly impacted during the Project and the overall impact on the avian community, using results from the analysis of baseline studies and other supplemental data (as per IR-159).	

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					Discussion should support the conclusions of the effects assessment. See also related IRs: IR-161 and IR-162.	
IR-161	CNSC	Bird Species at Risk	Section 9.4.3.3 Appendix 10-A (ERA)	**Context:** For the assessment of effects on Bird Species at Risk (SAR), in the EIS it was decided to use representative species for certain SAR birds: • Olive-sided Flycatcher and Common Nighthawk were selected to represent Barn Swallow. • Yellow Rail and Rusty Blackbird were selected as substitutes for Horned Grebe. No further rationale is provided to demonstrate that the identified surrogate species are representative of the Barn Swallow and Horned Grebe in the EIS. For example, do they share a common diet? Moreover, in the residual effects assessment, limited discussion is provided on the conservatism of chosen suitable habitat types for both surrogate and represented species, in the calculation of habitat loss and alteration, as well as change in mortality. For example, how does habitat for Common Nighthawk and Barn Swallow overlap (do they use identical habitat types?) and how does this affect the calculation of habitat loss and alteration used to evaluate the magnitude of residual effect? Finally, in the ERA, Lesser Scaup is the surrogate for Horned Grebe. Yellow Rail is also represented by Lesser Scaup but Rusty Blackbird is represented by Olive-sided Flycatcher. **Rationale:** It is unclear what criteria were applied to select surrogate species for Barn Swallow and Horned Grebe, and how the chosen surrogates relate to Barn Swallow and Horned Grebe in terms of habitat type and range, nesting, and feeding requirements etc. There is also inconsistency with respect to the use of surrogate species for the Horned Grebe between the EIS and ERA supporting document.	1. Please provide additional information to justify the selection of surrogate species for Barn Swallow and Horned Grebe in the EIS. This should include a description of the similarity of SAR and associated surrogate species and any relevant uncertainties. 2. Please provide conservative estimates of habitat loss and alteration for the represented and not directly assessed species (Barn Swallow, Horned Grebe). 3. Please provide clarity as to why different surrogate species are used for Horned Grebe between the EIS and ERA. See also related IRs: IR-160 and IR-162.	
IR-162	ECCC	Migratory birds	Section 9.4.3.3, Bird Species at Risk	**Context and Rationale:** Not all avian species at risk present in the study area were included as Key Indicators in the avian species at risk (SAR) valued component (VC). Barn swallow and horned grebe were recorded in the study area, but not included as VCs. Additionally, bank swallow may inhabit the Project area. Impacts to Species at Risk Act Schedule 1 listed species need to be identified, avoided, lessened and monitored.	1. Explain how nesting habitat requirements of barn swallow is represented by common nighthawk and olive-sided flycatcher as a VC or assess individually each SAR that overlaps with the Project and is likely to be affected. 2. Explain how nesting habitat requirements of horned grebe are represented by yellow rail and rusty blackbird as	

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				In Section 9.4.3.3. the Proponent states: "It is acknowledged that the listed Barn Swallow (Hirundo rustica) and Horned Grebe (Podiceps auratus) could potentially occur in the Terrestrial RSA. Incidental observations occurred during the baseline studies (Appendix 9-B). To focus the effects assessment on a few key species (described in the following) it was decided to use Olive-sided Flycatcher and Common Nighthawk to represent Barn Swallow as well, and to use Yellow Rail and Rusty Blackbird as a substitute for Horned Grebe. Unlike Horned Grebe, Yellow Rail and Rusty Blackbird are also listed provincially." Barn swallow, bank swallow and horned grebe may have different nesting habitat requirements than the representative species discussed in the draft EIS. An explanation of how differing species are representative of one another is required, or if an explanation cannot be provided, the species should be assessed individually.	a VC, or assess individually each SAR that overlaps with the Project and is likely to be affected. 3. Assess individually each SAR that overlaps with the Project and is likely to be affected. See also related IRs: IR-160 and IR-161.	
IR-163	ECCC	Migratory birds	Section 9.4.3.3.3, Baseline Studies – Avian species at risk VCs	**Context and Rationale:** The baseline studies and data analysis for species at risk (SAR) birds is insufficient to accurately predict Project effects. ECCC recommends the use of predictive modeling in relation to survey data and habitat attributes to produce distribution and density maps. Sites within the study area that support particularly high densities or diversity of an individual species, based on direct observation and, where appropriate, distribution or occupancy models, would greatly improve confidence in Project impact predictions. Additional information on specific habitat use or models of habitat used by SAR would facilitate a more complete analysis of Project effects.	Provide additional information, including mapping/modelling of specific habitat requirements for each avian species at risk or provide a justification of models used in the draft EIS.	
IR-164	ECCC	Migratory birds	Section 9.4.4.2.1, Alteration and/or Loss of Habitat – Migratory Breeding Birds	**Context and Rationale:** The discussion on impacts to migratory songbirds presented by the Proponent is not sufficient to understand the impacts on various guilds of birds (e.g., aerial insectivores, forest birds, wetland birds, habitat specialists). As per IR-158, focal representative species/guilds should be used as key indicators (KI) in the Migratory Breeding Birds Valued Component. A greater level of detail on Project impacts to migratory songbirds with differing habitat requirements is needed for a fulsome assessment of effects.	1. Provide further discussion on impacts to different focal species/guilds within the Migratory Breeding Birds Valued Component. 2. Provide mapping of important features or habitat types that will be lost due to the Project for different guilds of migratory birds.	
IR-165	CNSC ECCC	Birds (all species)	Section 9.4.4.2.2 Section 9.4.5.2.4, Avian Deterrence and	**Context:** On p. 9-364 of the EIS, it is stated that exposure to hazardous materials through contact with contaminated waste ponds could affect avian health and contribute to mortality. However, the ERA places the avian receptors only in waterbodies and	Please perform an ecological risk assessment with avian receptors located at the contaminated waste ponds, including:	

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			Prevention of Entrapment Appendix 10-A (ERA)	locations outside of the Project area (see Figure 5-2 in the ERA), i.e., Whitefish Lake, McGowan Lake, the inlet to Russell Lake, and Kratchkowsky Lake. Further, there are insufficient details on the potential effects of the water quality in the water management and treatment facilities on birds, species at risk, and other wildlife, including the risk of bioaccumulation of contaminants. The Proponent should assess potential effects of water quality from these areas using applicable CCME guidelines. **Rationale:** It is unclear whether the ecological risk assessment based on the chosen exposure locations is protective and conservative for avian species potentially exposed to contaminated waste ponds on the Project site. While mitigation measures such as physical, visual, and/or auditory deterrents are proposed in Section 9.4.5.2.4, the possibility of avian species coming into contact with waste ponds cannot be excluded based on the available information in the EIS. The possibility of birds, species at risk, and other wildlife accessing the water management and treatment facilities for drinking water or other purposes is not discussed in the draft EIS.	1. Describe and analyze the possibility of birds, species at risk and other wildlife using the water or waste management facilities and provide an analysis to determine if there is a risk to wildlife that may access these areas. 2. Identify the potential toxicity of water management ponds to aquatic migratory birds and species at risk (SAR). 3. Describe what measures will be taken if the waters are found to be toxic to migratory birds and SAR. **Suggestions for mitigation and follow-up measures:** CNSC recommends that Denison ensure adequate mitigation measures are implemented to minimize the potential for avian exposure to pond waters.	
IR-166	ECCC	Migratory birds	Section 9.4.5.2 Additional Avian Species-specific Mitigation Measures	**Context and Rationale:** Avian species-specific mitigation measures are not presented in the draft EIS. The Proponent has committed to providing a variety of environmental management plans. Section 9.4.5.2 reads: “Additional mitigation measures specific to the Raptors, Migratory Breeding Birds, and Bird Species at Risk VCs, in accordance with the Migratory Birds Convention Act, and tailored to Project features will be incorporated into various Project management and monitoring plans such as the, erosion and sediment controls, soil and vegetation monitoring, wildlife monitoring, the Decommissioning Plan, air quality monitoring, Spill Response Plan, Radiation Protection Plan, surface water and effluent monitoring, and Waste Management Plan.” Migratory birds, the nests of migratory birds and/or their eggs can be inadvertently harmed or disturbed as a result of many activities, including but not limited to clearing trees and other vegetation, draining or flooding land, or using fishing gear; this is known as incidental take. This inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs is prohibited under the MBCA. Incidental take, in addition to harming individual birds, nests or eggs, can have long-term consequences for migratory bird populations in Canada, especially through the cumulative effects of many different	Provide details on species-specific mitigations for species at risk (SAR) and other avian species that will include: • details on what activity restrictions will be implemented for migratory birds and SAR and when they will be applied; • details on mitigations used during regular maintenance activities such as vegetation management (e.g., mowing), access road repair (e.g., aggregate stockpiles), and infrastructure repair; • details on methods used to detect species listed on Schedule 1 of the *Migratory Birds Convention Act* (e.g., Pileated Woodpecker) and mitigations/setback distances and timing to reduce risk to these species.	

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				incidents. For further details, please refer to the Avoiding Harm to Migratory Birds website at: https://www.canada.ca/en/environment-climate- change/services/avoiding-harm-migratory-birds.html In order to assess the effectiveness of species-specific mitigations and need for additional mitigations ECCC requires details on the species-specific mitigation measures proposed, and the monitoring plans.		
IR-167	ECCC	Migratory birds	Section 9.4.5.2.1 Work Timing Windows and Habitat Disturbance	**Context and Rationale:** The Proponent has stated that when it is not practicable to clear outside of the breeding bird window, they will conduct pre-clearing surveys. Section 9.4.5.2.1 states: "Prior to commencing any site clearing (i.e., vegetation clearing and/or soil disturbance) during the nesting season, pre-clearing nest surveys will be conducted at that location within the Project Area." ECCC does not recommend the use of nest searches or pre-clearing surveys for active bird nests during the breeding season as a mitigation, given the difficulty associated with finding nests reliably and the high likelihood of disturbing nesting birds when searching. Instead, ECCC recommends that clearing and grubbing activities not be conducted during the breeding bird season. The Migratory Birds Regulations 2022 (MBR 2022) brings new scenarios that need to be considered: 1. Most migratory birds: - Nests are protected only when they are in use or when live eggs or chicks are present. 2. Migratory birds listed in MBR 2022 Schedule 1: - For the 18 species of migratory birds identified on Schedule 1, the MBR 2022 provide year-round nest protection until they can be deemed abandoned. 3. Migratory birds listed under SARA: - For some SARA listed migratory birds, the residence prohibition (s.33) will protect nests that are not active, but are re-used in subsequent years, and the critical habitat prohibition (s.58) will protect nests that are part of the critical habitat identification. Those prohibitions apply everywhere in Canada and at all times of the year. In these cases, a SARA permit will be required.	Provide the following information: • details on how vegetation clearing related to site development will be conducted to minimize risk to migratory birds and species at risk (SAR). • the timing window that will be used for vegetation removal to reduce risk to migratory birds and SAR	
IR-168	ECCC	Migratory birds	Section 9.4.5.2.4, Avian Deterrence and Prevention of Entrapment	**Context and Rationale:** The Proponent mentions that avian deterrents will be used on power transmission lines, buildings and other Project infrastructure. However, the Proponent does not mention any deterrents that will be used for deterring birds from the water or waste management facilities.	1. Provide information on avian deterrents to be used to prevent birds or other wildlife entering water or waste management ponds. 2. Explain how proposed timing of use of deterrents will reduce risk of migratory birds making contact with	

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				Details on deterrents for all Project components should be identified to assess residual and cumulative impacts to migratory birds.	treatment waters outside of the nesting season (i.e., during migration and stop overuse). 3. Explain which deterrents will be used, which deterrents were considered, and what alternative, adaptive measures will be considered if deterrents are unsuccessful for any Project components.	
IR-169	ECCC	Migratory birds	Section 9.4.6.3, Residual Effects Evaluation for Migratory Birds, Table 9.4-15 and Map 9.4-11	**Context and Rationale:** The analysis of available habitat types for migratory songbirds appears incorrect. In their interpreted ecosite mapping, the Proponent identified 25 different ecosite types. In their table 9.4-15 and map 9.4-11, the Proponent only lists 8 ecosite types that are available migratory songbird habitat. Section 9.4.6 Residual Effects Evaluation for Migratory Songbirds reads: "Considering the baseline data (Appendix 9-B), migratory songbird habitat is described in the following text without species-specific differentiation and referred to as available habitat for migratory songbirds. Based on the baseline study results, 66.8%, 52.2%, and 50.7% of the Project Area, Wildlife LSA, and Terrestrial RSA, respectively, are assumed to provide available habitat for migratory songbirds (Table 9.4-15)." All Project areas, except some anthropogenic features and open water, would be considered available habitat for migratory songbirds. Although some ecosite types may have lower density and diversity, it is expected that all ecosites provide migratory songbird habitat.	1. Explain how information in Table 9.4-15 and map 9.4-11 were derived. 2. Explain why other habitat types were not considered as available habitat for migratory songbirds.	
IR-170	ECCC	Migratory birds	Section 9.4.6.4, Residual Effects Evaluation for Bird SAR, Table 9.4-19	**Context and Rationale:** The table and map presented by the Proponent do not appear representative of all available habitat for common nighthawk (CONI). Although CONI do preferentially use open areas such as gravel (often an anthropogenic disturbance) and regenerating forest, as identified in the draft EIS, they also use rock outcrops that can be within forested areas. As this area lies within the pre- Cambrian shield, there are likely rock outcrops that are also available habitat. As aerial insectivores, CONI select nesting areas in close proximity to wetlands or lakes where there is abundant forage. Habitat requirements and preferences for all species at risk is required for developing effective mitigations and adaptive management.	1. Provide an updated table and map that considers all available habitat for common nighthawk. 2. Additionally, as part of environmental management plans the Proponent should include species-specific mitigations that are biologically relevant to all the species at risk for all Project phases and components.	
IR-171	ECCC	Migratory birds	Section 9.4.6.4, Residual Effects Evaluation	**Context and Rationale:** Section 9.4.6.4 Residual Effects Evaluation for Bird SAR – Common Nighthawk reads: "Progressive reclamation is anticipated to begin during Construction. However, a conservative approach is used, with Common Nighthawk (CONI) habitat in the	Develop mitigation plans appropriate for avoiding collisions of common nighthawks with vehicles, when and where nighthawks are observed foraging near or roosting on gravel roads. Demonstrate how the planned mitigation	

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				Project Area considered to be unavailable for the duration of the Project, only becoming available as habitat following Post-Decommissioning (i.e., during the regeneration of vegetation following Decommissioning)." CONI may nest on the roadsides of access roads within the Project area. As such, the Project area should still be considered available habitat for the duration of the Project and appropriate mitigations and adaptive management should be discussed for this species.	activities will result in reduced residual effects from this pathway.	
IR-172	CNSC	Birds (all species)	Section 9.4.6.4.2	**Context:** Populations of listed species may be less resilient to changes in mortality. CSA N288.6:22 Clause 7.2.4.3 states that effects on a few individuals of endangered, threatened, or vulnerable species would not be acceptable. The residual effects assessment for "Change in Mortality" for bird species at risk states that Project mitigation measures identified in Section 9.4.5 are expected to limit interactions between bird species at risk and potential sources of direct and indirect mortality. However, the mitigation measures are not discussed with respect to their effectiveness to limit interactions, specifically for bird species at risk. **Rationale:** It is unclear if the proposed mitigation measures are effective in preventing mortality in bird species at risk for which even only a few deaths could negatively impact the population.	Please provide a discussion on mitigation measures with respect to their effectiveness in minimizing mortality for bird species at risk, for which effects on a few individuals would not be acceptable.	
IR-173	ECCC	Migratory birds	Section 9.4.8 Monitoring and Follow-up	**Context and Rationale:** Monitoring and follow up programs are part of adaptive management and implementation of additional mitigations. In Section 9.4.8 the Proponent states: "Considering the Project planning, baseline survey results, and proposed mitigation measures, no follow-up programs are considered to be warranted at this time." Project impacts related to mortality of birds, such as collisions with the transmission line, mortality along roads and use of waste and water management facilities should be monitored during all phases of the Project and adaptively managed.	Provide details on the follow-up program to monitor impacts to avian mortality. The follow-up plan should include: • Monitoring of avian use of waste and water facilities • Monitoring of mortality along access roads • Monitoring of mortality related to transmission lines • Monitoring of effectiveness of avian deterrents.	
IR-174	ECCC	SAR - Bats	Appendix 9-B, Denison Mines Corporation Wheeler River Project, Terrestrial Environment, Wildlife and Vegetation	**Context and Rationale:** The Proponent conducted acoustic surveys for bats and confirmed presence of two Species at Risk Act (SARA) schedule 1 listed bat species in the Project area, little brown myotis (Myotis lucifugus) and northern myotis (Myotis septentrionalis). However, the Proponent did not do an effects assessment of either of these bat species.	1. Conduct an effects assessment for little brown myotis and northern myotis, including the likelihood that tree clearing during the bat roosting period, is likely to 'kill', 'harm', or 'harass' Little Brown Myotis and Northern Myotis and its ability to carry out its life processes.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
			Baseline Inventory, Section 2.1.4 Acoustic Bat Surveys	Although bats are present in the study area, no work was done to identify hibernaculum or maternal roosting sites. All species at risk that are expected to be present in the Project area should be assessed and species-specific mitigations detailed.	2. Describe and map locations of suitable myotis hibernacula and/or maternal roost habitat within the Local Study Area and Regional Study Area and explain how these habitats may be affected by Project activities. 3. Describe what mitigation measures will be taken to avoid the breeding period for bats. 4. Describe any pre-construction/pre- clearing surveys will be conducted to identify any hibernaculum and maternal roosting sites. Describe how monitoring will support adaptive management.	
IR-175	CNSC	Provincially Listed Species	Appendix 9-B; section 2.2.2	**Context:** Vegetation and wildlife habitat characterization field surveys were completed in 2017, based on which ecosite factsheets were prepared. The factsheets list observations of two provincially listed plant species with a rank of S3 (vulnerable/rare to uncommon; Table 2.4-2) according to the Saskatchewan Conservation Data Centre, which are not discussed in the main EIS document: • Angle-leaved sundew (Drosera anglica) observed in ecosites BS19, BS20, BS22, BS25 • Neat Spike-rush (Eleocharis nitida) observed in ecosite BS25 Table 9.2-12 in section 9.2.6.2.1 of the EIS indicates that there may be indirect disturbance to some of these ecosites (BS19, BS20, BS25). In section 9.2.6.3.1 it is discussed that listed plant species are not likely to return once lost from a specific location. **Rationale:** Given that not all areas in the revised Project footprint were surveyed for listed plant species in baseline studies, there is uncertainty as to whether any species were missed, in particular those that have been observed in ecosites present in the LSA/RSA (e.g., Drosera anglica and Eleocharis nitida, see also Appendix 2 Table of Appendix 9-B). It should also be noted that rare plant surveys were completed in summer 2017 only (section 2.4.2 of Appendix 9-B), which may underestimate annual rare species that may be dormant in the seed bank in some years due to specific seed emergence requirements. It is acknowledged that the proponent committed to pre-construction listed plant surveys targeted on ecosites encountered in the Project Area but not previously surveyed, as well as ecosites within the Project Area with high potential to support listed plants. More information is requested on the potential indirect effects on rare plant species as well as the planned pre-construction surveys.	1. Please provide a discussion on the potential risks from indirect effects on ecosites with observed rare plant species 2. Please provide additional information on the ecosites included in the planned pre-construction listed plant surveys **Suggestions for mitigation and follow-up measures:** CNSC recommends focusing monitoring on ecosites that have known observations of listed plant species outside of the Project Area (e.g., BS19, BS20, BS22, BS25).	

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IR-176	CNSC	Human Health with respect to radiation exposure	Section 10.1.4.2.1 Section 10.1.6.1.4 Appendix 10-A (ERA)	**Context:** In section 10.1.4.2.1, the proponent provides an evaluation of air quality constituents of potential concern to human health. It states: "A screening value for radon gas of 200 becquerels per cubic metre (Bq/m3) was available from Health Canada, which applies to total radon including background sources (Health Canada 2009). The radon concentrations which were predicted are incremental concentrations (i.e., above background) and were therefore compared to the applicable incremental screening value of 60 Bq/m3 for indoor air established by the Canadian Nuclear Safety Commission (CNSC) (Health Canada 2010a; Radiation Protection Regulations. SOR/2000-203)." The 60 Bq/m3 radon concentration value also appears in section 7.1.2 of Appendix 10-A (ERA). Further in section 10.1.6.1.4, it is stated: "Radon dose was calculated separately from the dose due to other radionuclides; however, the predicted radon concentration was compared against the CNSC incremental concentration limit of 60 Bq/m3." The Radiation Protection Regulations do not stipulate a limit for radon above background for sites licensed by the CNSC. The effective dose limits for Nuclear Energy Workers (NEWs) and persons that are not NEWs are listed in section 13 of these regulations, and in subsection 1(3) of these regulations for the general public. The annual effective dose from all sources associated with the licensed activities and within the scope of the Nuclear Safety Control Act and Regulations must be compared to the applicable effective dose limit. For members of the public this limit is 1 mSv per calendar year. In Section 4.2.5.3 of Appendix 10-A (ERA), there appears to be no reference mentioned for the radon equilibrium factors. These factors are a significant input into the dose calculations for radon. **Rationale:** The reason for the requested change is to ensure consistency with the Radiation Protection Regulations.	The EIS and appendices should be aligned with the Radiation Protection Regulations by: 1. Removing the reference to a 60 Bq/m3 limit. 2. Reporting the assessment results as the total dose, from all radionuclides combined including radon progeny, and by comparing this annual effective dose to the effective dose limit. Provide a summary of the conservative assumptions that have been included in the dose calculations. Provide a reference that shows how the radon equilibrium factors were determined.	
IR-177	HC	Change to an environmental component due to radiological contaminants	Section 10.1.4.2.1 (p. 10-22) Appendix 10-A (ERA): Appendix B Table B.9, Ref. 19-2638	**Context:** Section 10.1.4.2.1 states that, "Screening values for radionuclide concentrations in ambient air were not available. All relevant radionuclides were assessed in the HHRA in terms of their contribution to the total radiological dose to human and ecological receptors" (p. 10-22). Section 10 Appendix 10-A (ERA) states that, "No formal screening was conducted for radionuclides. However, since radiation dose to human	1. Assess predicted radionuclides in Section 10 Appendix 10-A (ERA) using appropriate available screening values. Alternatively, provide a justification for why a screening wasn't conducted for radionuclides despite the availability of screening values (e.g., ICRP 96 and NORM Guidelines, 2011). 2. Clarify if uranium progenies in air are considered in the	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
			Section 6, Table 6.1-1 (p. 6-7)	receptors is of public and regulatory interest, the radionuclides in the uranium-238 decay series are carried forward as COPCs for further assessment" (Appendix 10-A (ERA): Appendix B Ref. 19-2638). Table 6.1-1 lists radionuclides as a key indicator for air quality, but only uranium and radon are considered in Section 6, and Section 10 Table B.9 does not include doses from uranium progeny in air. **Rationale:** Health Canada recommends using screening values that are available for radionuclides if they are appropriate for the dose and if the screening values have listed assumptions (such as particulate size and worker exposure time that can be adapted to in Denison's models). Two examples are ICRP 96, which CNSC uses in their regulatory reports to derive reference air quality values for Pb-210, Ra-226, and Th-230 (CNSC: Regulatory Oversight Report for Uranium Mines and Mills in Canada 2019); and Health Canada's Guidelines for Management of NORM (Health Canada: Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials, 2011).	atmospheric transport and air quality modelling and are simply not reported, or if they are not included in the models because no screening criteria are available.	
IR-178	HC	Change to an environmental component due to hazardous contaminants	Section 10.1.4.2.1 (p. 10-22) Section 6.1.4.2, Potential Project Related Effects (p. 6-31)	The Baseline + Project scenario was not provided for radon levels. **Context:** Section 6.1.4.2 states that the predicted levels for radon were not added to the respective baseline air quality levels (p. 6-31), and further explains that "In all modelled phases of the Project, annual average radon concentrations at receptors beyond the Property Boundary are expected to be indiscernible from background levels." In Section 10.1.6.1.4, a different approach to evaluating predicted radon levels is mentioned: "the predicted radon concentration was compared against the CNSC incremental concentration limit of 60 BQ/m3"(p. 10-44). **Rationale:** Without a rationale as to why baseline levels of radon were not included in the assessment, HC cannot fully evaluate the appropriateness of the air quality assessment. While Health Canada is of the opinion that using background radon levels as a screening value is appropriate in this case from a health perspective, different approaches to screening predicted radon levels in different sections appear to be used (i.e., background radon levels vs. CNSC incremental concentration).	1. Provide further information on whether and how baseline radon concentrations in air were determined. 2. Include baseline radon concentrations in the predicted total concentrations when comparing to existing guidelines; alternatively, provide a rationale for why baseline concentrations of radon were not included. 3. Discuss the potential health implications of the project-only increment-over-baseline radon levels	
IR-179	CNSC	Groundwater quality decommissioning objectives.	Section 10.1.4.2.2, Release of Treated Effluent to Whitefish Lake During Decommissioning	**Context:** It is stated that "This process would continue until the recovered water meets acceptable groundwater quality decommissioning objectives". **Rationale:** The information provided does not include groundwater	Please provide groundwater quality decommissioning objectives or a reference to the information.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				quality decommissioning objectives nor a reference to these objectives.		
IR-180	CNSC	Human health with respect to hazardous contaminants	Section 10.1.6.1.1, Human Receptors Selection and Characterization	**Context:** Within the Human Health assessment, offsite receptors during the operation period are only considered downstream of Whitefish Lake. The only identified concern was for Se to the Fisher/Trapper located at Russel Lake. This section cites Indigenous Knowledge as informing the receptor selection and location. **Rationale:** While the assessment is fairly conservative in the assumptions made on intake and receptor habits, it stands to reason that if the trapper receptor was located closer to the operation, such as at McGowan or Whitefish Lakes, this exceedance of Se could be more pronounced. In terms of maintaining a conservative assessment, if the most vulnerable receptor can be shown to be protected at the point of highest expected COPC concentration, it can be concluded that this receptor would be protected further away from the project. Considering this, why was the hunter/trapper receptor not also assessed at Whitefish or McGowan Lake? Was Indigenous Knowledge specific in mentioning Whitefish or McGowan Lakes were not used for the activities carried out by identified receptors?	Please provide justification for excluding a receptor from occupancy at lakes closer to the project during operation (McGowan, Whitefish). Alternatively, conduct a risk assessment to a receptor at these lakes during operation to determine if there is a predicted risk that may require monitoring or mitigation. **Suggestions for mitigation and follow-up measures:** CNSC recommends the following: • Assessment of a receptor located closer to the point of effluent release may need to be considered to ensure there are negligible risks • If Se is expected to exceed hazard quotients further upstream, selenium removal technology may be required as part of the effluent treatment process as a mitigation measure. Other COPC's exceeding an HQ of 1 may also be identified under this process that could require specific monitoring or mitigation measures.	
IR-181	CNSC	Human Health with respect to radiation exposure	Section 10.1.6.1.4	**Context:** In section 10.1.6.1.4, it is stated: "The maximum incremental radon concentration at the camp worker site during Operation was predicted to be 12.4 Bq/m3, which is below the CNSC limit of 60 Bq/m3 for incremental radon." As per IR-176, there is no such CNSC limit for incremental radon. The camp worker would be considered a person who is not a nuclear energy worker (NEW) and subject to the dose limits of section 13 and 14 of the Radiation Protection Regulations, not the dose limit for the general public as per subsection 1(3) of the Radiation Protection Regulations. The CNSC has regulatory requirements for the ascertainment and recording of doses of radiation as per section 5 of the Radiation Protection Regulations. Every licensee must ascertain and record the magnitude of exposure to radon progeny, the effective dose and equivalent dose received by and committed to a person who performs duties in connection with any activity that is authorized by the Nuclear Safety and Control Act or is present at a place where that activity is carried on. The camp worker performs duties in connection with the licensed activity and is present at the location where the activity is carried out. Hence, they are not considered to be a member of the general public	The EIS and appendices should be aligned with the Radiation Protection Regulations by: 1. Removing the reference to a 60 Bq/m3 limit for incremental radon. 2. Revising all references to the 'public dose limit' applied to camp workers (non-NEWs) to align with section 13 and 14 of the Radiation Protection Regulations. The proponent should explain why the radon dose for the camp worker appears as 0.13 mSv/year in one instance and 0.02 mSv/year in another. The proponent is also asked to provide the rationale as to why a non-NEW has a higher radon dose than a NEW.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				(who has no connection with the activity) Further, the proponent indicates that the maximum incremental radon dose to the camp worker was estimated to be 0.13 mSv/year during Operation. The assessment assumes that the camp worker spends 100% of the time indoors. Table 10.1-11 shows the maximum total incremental dose for the camp worker to be 0.02 mSv/year. This appears to be a discrepancy. Table 5.2 in Appendix 10-C provides internal annual dose from radon inhalation. The radon doses to some NEW workers (9.44E-02 mSv/a Driller 1 and 1.03E-01 mSv/a Wellfield Operator 1, 2) here appear less than the radon dose (0.13 mSv/year from section 10.1.6.1.4) to the camp worker, who is a non-nuclear energy worker. **Rationale:** The reason for the requested change is to ensure consistency with the Radiation Protection Regulations and the environmental impact statement.		
IR-182	HC	Change to an environmental component due to radiological contaminants	Section 10.1.6.1.4, (p. 10-44)	**Context:** Section 10.1.6.1.4 states, "The limit is incremental and is exclusive of natural background, such as natural levels of radon and medical exposures. A dose constraint of 0.3mSv/yr was established for the public from all radionuclides and all pathways for the Project, as recommended by Health Canada (2010a). The dose constraint represents a dose lower than the public dose limit that ensures the combined dose from multiple sources does not result in exceedance of the public dose limit. Radon dose was calculated separately from the dose due to other radionuclides; however, the predicted radon concentration was compared against the CNSC incremental concentration limit of 60 BQ/m3" (p. 10-44). **Rationale:** Calculating radon separately from all radionuclides may underestimate the health risks by not considering combined doses from multiple sources when comparing to the public dose limit constraint of 0.3 mSv/yr recommended by Health Canada (2010a).	1. Provide clarification on how combined doses from all sources would be accounted for in respecting the public dose limit of 0.3 mSV/yr if radon concentrations are being calculated separately.	
IR-183	CNSC	Human Health with respect to radiation exposure	Section 10.2 Appendix 10-C	**Context:** Exposure scenarios for workers have been identified and high-level summaries of the assumptions and resultant dose estimates have been provided. However, the detailed dose calculations have not been provided. **Rationale:** The method used to estimate effective, equivalent and committed dose is required to be verified. Sample dose calculations should be included, to confirm use of acceptable input data, for at least the most dose significant scenarios.	Provide the dose calculations for deriving the dose estimates for workers in all exposure scenarios, for at least the most dose significant scenarios.	

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IR-184	CNSC	Human Health with respect to radiation exposure	Section 10.2 Appendix 10-C, 2.0	**Context:** It is stated in Appendix 10-C, section 2.0 that: "In addition, the CNSC has proposed a 100 mSv 5-year equivalent dose to lens of eye, in accordance with recent recommendations of the International Commission for Radiological Protection (ICRP, 2012a). This implies an average annual equivalent dose to lens of 20 mSv/a and will be considered as an applicable dose limit for workers." As per section 14 of the Radiation Protection Regulations, the equivalent dose limit for the lens of an eye for nuclear energy workers (NEWs), effective January 1, 2021, is 50 mSv in a one-year dosimetry period. **Rationale:** The reason of the requested change is to ensure consistency with the Radiation Protection Regulations.	The EIS and Appendix 10-C should be aligned with the Radiation Protection Regulations regarding the equivalent dose limit for the lens of an eye for NEWs.	
IR-185	CNSC	Human Health with respect to radiation exposure	Section 10.2.3.2 Appendix 10-C Table 3.10-3.12	**Context:** The Geometries for External Exposure Scenarios Modelled in MicroShield for Sources in various locations were provided in tables 3.10-3.12 in appendix 10-C. The doses from those scenarios were omitted. **Rationale:** The method used to estimate effective, equivalent, and committed dose is required to be verified. Sample dose calculations should be included, to confirm use of acceptable input data.	The proponent is asked to provide all the necessary information and assumptions required to perform the MicroShield calculations independently and to list the resulting calculated values from the listed scenarios.	
IR-186	CNSC	Human Health with respect to radiation exposure	Section 10.2.3.2.4 Section 10.2.3.2.6 Section 10.2.4 Appendix 10-C, Section 3.2	**Context:** In sections 10.2.3.2.4 and 10.2.3.2.6, as well as section 3.2 of Appendix 10-C, the proponent has stated that workers in the drying and packaging areas of the processing plant will be required to wear powered air purifying respirators (PAPR) to reduce/eliminate inhalation exposure. Further in section 10.2.4, which elaborates mitigation measures, it is stated: "For the drying and packaging/loading areas of the ISR plant, use of PAPR has been assumed. It will be needed in these areas, and it has been planned in these areas to substantially reduce doses from inhalation of uranium dust. Dust levels in these areas will be monitored and kept ALARA." The use of respirators appears to be in contradiction of the requirements of section 13 of the Uranium Mines and Mills Regulations, which states: *No licensee shall rely on the use of a respirator to comply with the Radiation Protection Regulations unless the use of the respirator (a) is for a temporary or unforeseen situation; and (b) is permitted by the code of practice referred to in the licence.* The proponent is also reminded that respirators should not be the first choice for dose reduction in workplaces. They should only be used when the hierarchy of control (elimination, substitution, engineering,	Provide the rationale for mandating the use of respirators by workers in the drying and packaging areas of the processing plant. Include the demonstration of the application of the hierarchy of control for radiological protection within the design of these areas of the processing plant. Justify that this approach complies with section 13 of the Uranium Mines and Mills Regulations.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				or administrative controls) is not possible. **Rationale:** At this stage of the project, the proponent is expected to identify design improvements to these areas of the ISR plant/processing plant following the hierarchy of control for the radiological protection of workers, as per regulatory requirements and as described in REGDOC-2.7.1, *Radiation Protection.*		
IR-187	CNSC	Human Health with respect to radiation exposure	Section 10.2.3.2.4 Section 10.2.3.2.6 Appendix 10-C, Section 3.3, 6.0	**Context:** The exposure scenarios and assumptions for the workers in the drying area and the packaging/loading area of the processing plant include the wearing of PAPRs, which is assumed to provide a 1000-fold reduction in dust exposure. Further to reference IR-186, the use of a respirator as well as in worker dose predictions for the project, appears to contravene section 13 of the Uranium Mines and Mills Regulations, and does not follow the hierarchy of controls for radiological protection of workers as described in REGDOC-2.7.1, Radiation Protection. **Rationale:** At this stage of the project, the proponent is expected to identify design improvements to these areas of the ISR plant/processing plant following the hierarchy of control for the radiological protection of workers, as per regulatory requirements and as described in REGDOC-2.7.1, *Radiation Protection.*	Modify the exposure scenarios and assumptions (i.e., remove the use of a respirator) for the workers in the drying area and the packaging/loading area of the processing facility. Assess the resultant exposures against CNSC regulatory dose limits and the ALARA principle. Identify mitigation measures as per the hierarchy of control for radiological protection.	
IR-188	CNSC	Human Health with respect to radiation exposure	Section 10.2.4	**Context:** The following is stated in section 10.2.4: "Dust inhalation is also a potentially substantial component of worker dose at the core shack. At this location, PAPR will not be required; however, N95 masks will be used, and dust levels will be monitored here…It may be possible to increase air exchange in the core shack, above the planned six exchanges per hour, should this be necessary. This would also reduce radon exposure in the core shack." If it is possible to increase air exchanges in the core shack, it is not clear why this was not assessed and incorporated in the design of the core shack. **Rationale:** It appears that a control measure (e.g., air exchange protocols in the core shack) to reduce the exposure to workers has been identified. However, it is not certain if it has been formally documented to ensure that it is incorporated in the engineered design of the core shack.	Provide details on how the control measures to reduce the exposure to both workers through the air exchange protocols in the core shack have been formally documented to ensure that it is incorporated in the engineered design of the core shack.	
IR-189	CNSC	Woodland Caribou Ecological Model	Appendix 10-A (ERA)	**Context:** In the ERA (p. C.12, section 2.3.6 Woodland Caribou) it is stated: "For the ecological model a diet comprised of 50% browse, 20% lichen and 30% macrophytes is assumed for the woodland caribou."	Please provide additional evidence to support that those Woodland Caribou who may have higher consumption rates of lichen as part of their diet, will remain protected. This can be provided through including a second model	

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				In the EIS, section 9.3.3.3.1, it is stated: "Research has shown that up to 70% of the year-round diet of caribou may consist of ground and arboreal lichens." **Rationale:** It is unclear whether the assumptions in the ecological model in the ERA regarding Woodland caribou diet are conservative, given only 20% lichen intake in the model. Lichen is known to accumulate COPC such as metals and dust from the atmosphere.	that assumes 70% lichen in the diet. See also related: IR-138.	
IR-190	HC	Change to an environmental component due to hazardous contaminants	Appendix 10-A (ERA), Table 3-8 (p. 3.31) and Table 3-9 (p. 3.36) Appendix 6, Table 5 (p. 16)	NO2 criteria is not being consistently compared. **Context**: Provincial and federal air quality criteria/screening values for NO2 have been used inconsistently. Table 3-9 in Appendix 10-A (ERA) uses the 2015 Saskatchewan Ambient Air Quality Standards (SAAQS) value of 300 µg/m3 to compare the maximum concentrations of NO2 at receptor locations for the 1-hour average period, while Table 5 of Appendix 6 uses the 2025 Canadian Ambient Air Quality Standards (CAAQS) of 79µg/m3 for the same average period time. **Rationale**: By utilizing the SAAQS screening value for NO2, the maximum concentrations at receptor locations exceed the 1-hour threshold solely during the decommissioning stage (Table 3-9). However, if the 2025 CAAQS are applied, the screening values would be exceeded at receptor locations for all project phases. It is best practice to use the more protective air quality standards to evaluate potential human health risks associated with project activities.	1. Compare the predicted maximum concentrations to the most protective applicable air quality standards available. Alternatively, provide a rationale as to why the SAAQS for NO2 were used rather than the more protective 2025 CAAQS to determine potential exceedances and screen for the need for additional mitigation measures. **Suggestions for mitigation and follow-up measures:** Health Canada recommends use of the standards from the 2025 CAAQS for NO2 in future mitigation and follow-up plans.	Validate revisions to comment
IR-191	HC	Change to an environmental component due to hazardous contaminants	Appendix 10-A (ERA), Table 3-9 (p. 3.36) and Table 3-10 (p. 3.46) Section 6.1.8 (p. 6-44)	Non-threshold substances are not included in screening and monitoring plans. **Context:** Fine particulate matter (PM2.5) is not being considered further in secondary air quality screening for short and long-term exposure at human and ecological receptors because it is not predicted to exceed the screening values of the Ontario Ambient Air Quality Criteria (OAAQC) or the Canadian Ambient Air Quality Standards (CAAQS) for both annual and 24-hour average periods (Tables 3-9 and 3-10). Furthermore, it is not compared against the baseline for analysis. Table 3-9 indicates that coarse PM (PM10) is predicted to exceed the 24-hour CAAQS during all phases of the project. However, Appendix 10-A p. 3.46 states that, "There were no exceedances of PM2.5 which is generally considered to be a more reliable indicator of potential health effects. However, health effects would be infrequent and	1. Include PM2.5 and PM10 in the secondary air quality screening for short and long- term exposure at human receptors. 2. Include PM10 and PM2.5 in the air quality monitoring plan as they are non- threshold substances. 3. Provide a discussion of the significance of predicted exceedances of health- based standards. 4. Identify additional mitigation measures to reduce concentrations of non- threshold air contaminants associated with the project. **Suggestions for mitigation and follow-up measures:** Health Canada recommends use of the 2025 CAAQS Management Levels to develop mitigation measures that	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				reversible, subsiding after exposure; therefore, PM10 was not considered for further quantitative assessment in the ERA." PM10 and PM2.5 were not included in the air quality monitoring plan (Section 6.1.8). **Rationale:** Particulate matter and NO2 are considered non- threshold pollutants, meaning that health effects can occur at any level of exposure, The CAAQS for PM2.5 PM.10, and NO2 recognize that there is no population health threshold for human health effects; therefore, any increase in exposure will result in an incremental population risk (Environment Canada and Health Canada, 2012; CCME, 2000). The CAAQS values should not be construed as limits to which polluting up to is allowed. In addition, based on the principles of keeping clean areas clean and continuous improvement, proposed mitigation measures should not be confined to meeting the standards but should also be targeted towards reducing population exposure to CACs associated with the proposed project. Furthermore, although health risks associated with PM2.5 are higher than those associated with PM10, both fractions are considered non-threshold pollutants and identified by IARC (2013) as causes of cancer. **Reference**: [1] International Agency for Research on Cancer (IARC). 2013. IARC monographs on the evaluation of carcinogenic risks to humans. Volume 109. Outdoor air pollution. Lyon: International Agency for Research on Cancer.	reduce project contributions of non-threshold pollutants (e.g., PM2.5, NO2).	
IR-192	CNSC	Human Health with respect to radiation exposure	Appendix 10-A (ERA), Section 3.1.1.2, including Tables 3-1 and 3-2	**Context:** Section 3.1.1.2 in Appendix 10-A (ERA) provides the method of how select constituents including cadmium, chromium, selenium and lead-210 were determined. This section does not mention how the other constituents as listed in Tables 3-1 and 3-2 are determined. The values for Th-230 and U-238 in Table 3-1 are unexpected. Typically, these values should be at equilibrium. **Rationale:** The technical basis for the selection of constituents of concern is required as part of the environmental and human health risk assessments.	1. Provide the methodology of how all listed constituents are determined. 2. Provide the rationale as to why Th-230 and U-238 are not in equilibrium.	
IR-193	ECCC	Change to an environmental component due to hazardous contaminants	Appendix 10-A (ERA), Section 3.1.1.2 Section 8.2.4.2.3	**Context:** Appendix 10-A (ERA) Table 3-1 'Screening of Effluent Quality against Surface Water Quality Guidelines for the Wheeler River ERA' does not include acute water quality thresholds for all COPCs compared against predicted effluent quality. For example, it is stated that the final effluent quality discharge target for uranium is 0.057 mg/L. However, the CCME water short term (acute) water quality	1. Provide acute and chronic water quality thresholds for all required COPCs with monitoring required under the MDMER. 2. Ensure all water quality thresholds are derived from receiving environment baseline parameters and that these	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				guidelines for the protection of aquatic life is 0.033 mg/L. The proposed effluent discharge target for uranium exceeds the acute water quality guidelines, indicating effluent may pose the risk of being acutely lethal to aquatic biota at end-of-pipe. All water quality thresholds should be derived from receiving environment parameters, and there are discrepancies between the values used in Appendix 10-A (ERA) Table 3-1 and the values presented in Tables 8.2-8 and 8.2-10 in Section 8.2.4.2.3 of the draft EIS. No selected screening value for TSS has been calculated from baseline conditions. Un-ionized ammonia, which is a regulated Schedule 4 substance under the MDMER, has not been included. **Rationale:** A review of all modelling results for all COPCs under the MDMER will assist ECCC in understanding the potential risks to the receiving environment.	thresholds are consistently applied throughout the draft EIS.	
IR-194	ECCC	Aquatic species	Appendix 10-A (ERA), Section 3.1.1.2 and Section 3.1.2.3	**Context:** In the ERA, COPCs should be selected for further assessment based upon the following factors: 1. COPC concentrations in effluent that exceed selected water quality guidelines for the protection of aquatic biota, and 2. Baseline COPC concentrations in the LSA that exceed selected surface water and sediment quality guidelines for the protection of aquatic biota. However, only COPCs that had concentrations in effluent that exceeded guidelines were assessed further. Baseline concentrations of COPCs in sediment were not considered. In addition to this, not all COPCs that require monitoring under the MDMER had predicted effluent concentrations. From Section 8.2.3.3 Table 8.2-2 of the Aquatic Environment Report, it appears Aluminum in McGowan Lake and Whitefish Lake South and North, and pH in Whitefish Lake North exceed water quality guidelines. Predicted effluent concentrations or near-field surface water concentrations for Aluminum and pH are not provided. **Rationale:** It is not possible to determine if there is risk from effluent to the receiving environment and aquatic receptors based on the current information provided.	1. As noted in IR-114, provide the information on predicted effluent quality for COPCs with required monitoring under the MDMER. 2. Provide the information on predicted maximum receiving environment surface water concentrations for COPCs with required monitoring under the MDMER in IR-114. 3. Update the ERA to assess the risk of any additional MDMER COPC concentrations in effluent that exceed water quality guidelines. 4. Update the ERA to assess the risk of COPCs that had elevated baseline water and sediment quality concentrations in the receiving environment.	Validate this correction with Samantha (previously referred to ECCC-SW-16)
IR-195	ECCC	Change to an environmental component due to hazardous contaminants	Appendix 10-A (ERA), Section 3.1.2.1	**Context:** Figure 3-2 depicts modelled concentrations of COPCs in the receiving environment surface water during all Project phases. Effluent discharge rates during Operations and Decommissioning are not anticipated to differ significantly. However, COPC concentrations seem to decrease rapidly after the end of the operations period despite effluent releases continuing into the decommissioning phase.	1. Provide further information on modelled maximum COPC concentrations for each individual Project phase with estimated timing for peak concentrations to appear in the receiving environment. 2. Provide further information on predicted effluent quality during the Project decommissioning phase.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				Rationale: There has been no information provided on predicted changes in effluent COPC concentrations and discharge rates during the decommissioning phase. It remains unclear how COPC concentrations would decrease so quickly following the end of operations.	3. Update ERA figures and conclusions as needed.	
IR-196	ECCC	Change to an environmental component due to hazardous contaminants	Appendix 10-A (ERA), Section 3.1.2.3	**Context:** Table 3-6 provides predicted maximum sediment concentrations of COPCs compared to sediment quality guidelines. Several selected sediment screening values are not the most stringent sediment quality guidelines, with no justification provided. Additionally, copper and lead appear to be missing guidelines that are available from the Burnett-Seidel and Liber (2013) study. **Rationale:** The most stringent guidelines should be used for the sediment quality risk assessment in the ERA. Use of the most stringent guidelines will allow the most protective assessment to analyze risks to the receiving environment, aquatic and terrestrial biota.	1. Provide further information and justification for the selection of less stringent thresholds. 2. Update the ERA as needed.	
IR-197	ECCC	Aquatic species	Appendix 10-A (ERA), Section 3.2	**Context:** It remains unclear if atmospheric deposition from Project related emissions has been incorporated into modelling for the ERA and surface water and sediment quality assessments. **Rationale:** While expected Project air emissions are unlikely to have direct impacts on the aquatic receiving environment and aquatic biota, this Project effect pathway may have indirect effects through accumulation of COPCs over time or deposition of contaminants that are not expected in effluent, which should be evaluated with predicted emissions data incorporated into water quality modelling predictions.	Incorporate atmospheric deposition from Project-related emissions into water quality modelling and assess any Project related effects to aquatic receptors from this pathway.	
IR-198	HC	Change to an environmental component due to radiological contaminants	Appendix 10-A (ERA) Appendix B, Tables B.7 and B.8 Ref. 19-2638 Appendix 10-A (ERA), Table 4-3 Ref. 19-2638 (p. 4.17)	**Context:** Section 10 Appendix 10-A (ERA) contains Table 4-3 (p. 4.17), which lists ingestion rates for traditional foods and includes the category “organs” for Mammals. Tables B.7 and Table B.8 in Section 10 Appendix 10-A (ERA) Ref. 19-2638 provide the predicted concentrations of radionuclides for ecological receptors during the project phases and during future centuries, respectively. They list the concentrations of radionuclides in moose and in moose organs, which is presented as a single cumulative organ value. Other terrestrial and aquatic animals (such as the black bear and woodland caribou) that are a part of the traditional diet of nearby Indigenous communities have higher concentrations of radionuclides than moose, yet concentrations are not provided for organs of these species. **Rationale:** While Health Canada is not aware of transfer factors to	1. Provide more clarification on how the mammalian organ ingestion rates are calculated (which animals and relative contribution percentages). 2. Provide a rationale for why concentrations of radionuclides were not assessed in organs of animals (other than moose) that are consumed as country foods by Indigenous people harvesting in the area.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				individual organs, or to organs in animals that are not ruminants, it would be beneficial to have a better understanding of radionuclide concentrations in the organs of other animals that may be consumed by local Indigenous communities.		
IR-199	ECCC	Change to an environmental component due to hazardous contaminants	Appendix 10-A (ERA), Sections 3.2.1 and 3.3.1, Wheeler River Project IMPACT Model	**Context:** Model calibrated concentrations of selenium, uranium, and lead- 210 are under-predicted compared to measured baseline concentrations for water quality in the IMPACT modelling based on Figure 3-2. Calibrated concentrations of cobalt are under-predicted and there is poor agreement between model calibrated and measured concentrations of arsenic, lead-210, polonium-210, and radium-226 for sediment quality in Figure 3-3. **Rationale:** It is unclear how poor agreement between model calibrated and measured baseline concentrations of COPCs impacts the near-field and far-field modelling predictions of COPCs during all Project phases. It is also unclear why measured concentrations of COPCS could not be used directly as model inputs when there was poor agreement.	1. Provide justification as to why model calibrated concentration inputs of COPCs were preferable for use in predictive modelling of water and sediment quality over measured baseline concentrations. 2. Provide a rationale detailing how under- or over-predicted model calibrated COPC concentration inputs influence IMPACT model predictions and uncertainty for water and sediment quality. Provide specific details on how this may impact the risk analysis for parameters that have been highlighted as having poor agreement between calibrated and measured concentrations (i.e., arsenic, selenium, uranium, lead-210, polonium-210, and radium-226).	
IR-200	HC	Indigenous Peoples' health / Socio- economic conditions	Section 10 (p. 4.10) Appendix 10-A (ERA), Table 4-4 (p. 4.19)	Indigenous consultation should be included in the Country Foods analysis. **Context**: The Proponent obtained country food consumption data through engagement with a single local fisher/trapper and from a dietary survey administered by CanNorth to the English River First Nations (ERFN) in 2017. However, the potential health risks to consumers of traditional food were only assessed using the data obtained from the CanNorth dietary survey. Section 10 of the EIS *states the following: "*The diet assumptions for the fisher/trapper are conservative and are based on engagement with a local fisher/trapper. The diet of the fisher/trapper is representative of one person, who consumes a unique composition and quantity of traditional foods (e.g., ingestion rate of 175 kg/yr of caribou, equivalent to approximately 2 to 3 servings per day). Most people fishing, hunting, and trapping in the Local Study Area and Regional Study Area would consume traditional foods more consistent with the average traditional foods consumer diet which was developed from the ERFN country foods study. In comparison, the ERFN country foods study in Section 10 Appendix 10-A (ERA) Table 4- 4 indicates a caribou ingestion rate of 2.6 kg/yr (1 to 2 servings per month) and a total game ingestion rate of 21.3 kg/yr*" (p. 4.10).* **Rationale:** Health Canada is in general agreement that the dietary habits of the local fisher/trapper may be an outlier and not necessarily representative of most of the local population. However, a rationale has not been provided to demonstrate whether and how the 2017	1. Evaluate the suitability of using the 2017 EFRN survey results and consider surveying additional community members (such as local hunters/trappers) to obtain more representative country food consumption rates for use in the traditional foods risk assessment, and for communicating the results to the communities. 2. Additionally, consider evaluating consumption patterns (and applicable TRVs) of sensitive or vulnerable populations (e.g., elders, toddlers, women of childbearing age) in the traditional food risk assessment and provide risk levels for these sub-groups separately. **Suggestions for mitigation and follow-up measures:** Health Canada recommends providing the community with the opportunity to validate the ERFN 2017 survey results.	Validate revisions to comment

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				ERFN dietary survey results are representative of consumption patterns of local Indigenous communities. Also, it is unclear whether or how the ERFN dietary survey results account for the consumption patterns of vulnerable or more sensitive subgroups (e.g., heavy consumers, children and women of child-bearing age)		
IR-201	ECCC	Aquatic species	Appendix 10-A (ERA), Section 5.0	**Context:** For the ERA methodology the Proponent followed CSA N288.6-12 for the assessment of risk to aquatic biota from radionuclide and non-radionuclide COPCs. This is the 2012 version, and a more recent 2022 version was publicly released. **Rationale:** The Proponent should review the most up-to-date version of the standard to ensure no changes to the methodology of the COPC exposure assessment are required for the ERA.	Update the COPC exposure assessment methodology in the ERA using the most recent CSA N288.6-22 standard, as needed.	
IR-202	CNSC	QA/QC	Appendix 10-A (ERA), Section 6.0-Quality Assurance	**Context:** This section provides only Quality Assurance (QA) of the ERA, including planning and preparation of the ERA. **Rational:** The Quality Control (QC) aspects are not included. Both QA and QC aspects provide confidence that ERA results are defensible and fit for use in decision-making. The N288.6 (Clause 10.2) requires that "Appropriate QA/QC requirements shall exist for all aspects of the ERA and should be specified prior to conducting the ERA".	Please include appropriate QC aspects, as per a Clause 10.2 of the N288.6.	
IR-203	CNSC	Sediment Quality and Benthic Invertebrates	Appendix 10-A (ERA), Section 6.2 Future Centuries Sensitivity Analysis	**Context:** This section of the ERA states "If treated effluent was released at the maximum upper bound discharge rate, the modelled concentrations of all COPCs are expected to be below their corresponding sediment quality guidelines." It appears from Figure 6-2: "Comparison of maximum concentrations of COPCs in sediment at expected and upper bound discharge rate" that cadmium and vanadium would be over their sediment quality guidelines indicated if maximum upper bound discharge rates are used. **Rationale:** It is not clear which is correct; the statement that no exceedances of sediment quality guidelines when considering the maximum upper limit effluent release, or the figures indicating there could be exceedances for cadmium and vanadium. This discrepancy in the ERA should be explained and corrected.	Please provide clarity on if cadmium and vanadium are expected to be over the sediment quality guidelines for the maximum upper bound discharge rate scenario.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-204	CNSC	Human health with respect to hazardous contaminants	Appendix 10-A (ERA), 7.1.1, Non-radiological Human Health Risk Assessment	**Context:** In the human health risk assessment of the non-radiological COPCs, it was determined that the project incremental HQ was predicted to remain below 0.2 for all non-carcinogens and all pathways during all phases of the project, except for selenium for the fisher/trapper at Russell Lake from the fish ingestion pathway. **Rationale:** Given that the fisher/trapper receptor will likely be exposed to higher concentrations of selenium from the consumption of fish at Russell Lake, there is an elevated risk of selenosis in exposed individuals. This potential for selenosis would be further exacerbated in individuals who consume fish taken from other lakes closer to the mining operation. There is, however, no discussion of mitigation of these risks to exposed individuals.	Please provide a discussion of measures that could be applied to mitigate the risk of selenosis in exposed individuals who consume fish from Russell Lake and other waterbodies closer to the mining operation. **Suggestions for mitigation and follow-up measures:** CNSC recommends the following: • Selenium abatement technologies may be considered to eliminate or reduce selenium in effluent entering the lake system. • If HQs continue to exceed 0.2, then it may be necessary to post fish consumption advisories, in consultation with the Medical Officer of Health for the jurisdiction where the project is located.	
IR-205	CNSC	Geology and Groundwater	Section 7, appendix H	**Context:** In this appendix the analytical concentration of various groundwater samples taken from monitoring wells is reported. **Rationale:** There is one sample labeled as “Tracer Tank” with no definition available in the current report. It is difficult to judge whether the results presented are relevant to the EIS and how it may impact the findings therein.	Please clarify the definition of “tracer tank”.	
IR-206	ISRD	Current use of lands and resources for traditional purposes	Section 11 Section 12 Section 15 Section 16	**Context:** Impacts to Lands and Resources Use have been identified by Indigenous Nations and communities. **Rationale:** Additional information is required to demonstrate whether Indigenous Nations and communities were engaged directly by Denison regarding the cumulative effects assessment, significance determination and residual effects, and thus the overall conclusions on potential adverse impacts of the project on the potential or established Indigenous and/or treaty rights and effects of changes to the environment on Indigenous peoples, pursuant to paragraph 5(1)(c) of the CEAA 2012.	Please describe any outstanding or residual issues or concerns raised by Indigenous Nations and communities that Denison was unable to address. In addition, outline any plans to find solutions or continue discussions with the potentially impacted Indigenous Nations and communities.	
IR-207	CNSC	Current use of lands and resources for traditional purposes	Section 11, Perceived Risks to Lands and Resources	**Context:** The EIS states: “Resource users may also experience changes in their perception of the quality of resources for consumption such as the palatability of fish or wildlife or have apprehensions about the safety of resources for consumption. These changes may affect the patterns of ILRU during all Project phases including Post Decommissioning. The ERFN refer to this indicator as a “psycho-social’ effect, meaning that even if people know their fears are “*perceived fears, the fear … is real and has real impacts on ERFN members’ perception of their overall health and well-being*” (ERFN and SVS 2022a).” (p. 11-11)	How does Denison plan to work directly with Indigenous Nations and communities who currently use the potentially impacted areas, including the RSA, to mitigate and monitor the perceived risks and/changes to the RSA? Has Denison had discussions with the potential impacted Indigenous Nations and communities on how fear and avoidance behaviors and related impacts on traditional land use will be mitigated, especially within the RSA? Additional information is needed to determine if Denison has engaged directly with the Indigenous Nations and	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				Resource harvesters may experience Project-related disturbances and, depending on how these changes are perceived, it may cause some resource harvesters to avoid the Project Area. Reductions in harvests may occur based on fear or uncertainty about the ongoing quality of country foods. For example, "*People stopped picking berries in this area when Key Lake mine was established because of concerns about health impacts*" (ERFN and SVS 2022b). **Rationale:** CNSC's Generic Guidelines for the Preparation of an EIS state: "The EIS will document specific suggestions raised by Indigenous groups for mitigating the effects of changes to the environment on Indigenous peoples (section 5(1)(c) of CEAA 2012). For the mitigation measures intended to address the effects of changes to the environment for Indigenous peoples, the proponent must discuss the residual effects with the Indigenous groups prior to submitting the EIS." These changes may affect the patterns of ILRU during all Project phases including Post Decommissioning.	communities to develop potential mitigation measures to address fear and avoidance impacts, such as a community monitoring program, which could help to reduce the perceived risk to lands and resource use through education, collaboration, and long-term monitoring with Indigenous Nations, in order to build trust. **Suggestions for mitigation and follow-up measures:** It is recommended that Denison consider engaging with potentially impacted Indigenous Nations and communities on the collaborative development and implementation of a monitoring program to help address concerns about potential impacts on lands and resources as a result of the project. The program(s) could help to monitor changes over time related the potential perceived risk of contamination of the land from Project activities and subsequent effects on the quality of fish, vegetation, and wildlife resources, which in turn could affect the safety of traditional foods and human health, and impacts on culture practices, and overall community well-being that travel to region yearly.	
IR-208	CNSC	Indigenous physical and cultural heritage	Tables 11.1-3, 11.1-4 and 11.1-5 Section 11.1.3.2.6	**Context:** Black bear is listed as a species hunted by several Indigenous nations, including Pinehouse residents. CNSC participated in an in-person engagement with Pinehouse residents in October 2022 and bears eating waste was identified as a concern for hunting and consumption. **Rationale:** Perceived risk of eating animals that are contaminated by hazardous or radiological wastes could deter community members from harvesting animals that are normally part of their traditional diet. Fencing for waste was specified as a deterrent for human trespassers, not animals.	Please specify measures that Denison will take to ensure bears and other animals do not scavenge from waste facilities.	
IR-209	CNSC	Indigenous Peoples' health / Socio-economic conditions	Section 12.1.4.2.1 (p. 12-22) Section 12.1.5 Section 12.1.6.2	**Context:** KML indicates that working at a mine camp could inhibit community members from participating in cultural activities and sharing them with family and community members, resulting in a loss of cultural knowledge and language, thus impact knowledge transmission (p. 12-22). **Rationale:** Denison addresses this by briefly identifying culturally sensitive policies which would eliminate residual effects (p. 12-30)	Please provide detailed proposed mitigation measure for KML's concerns related to loss of cultural knowledge and language should they work for Denison.	
IR-210	CNSC	Current use of lands and resources for	Section 12.1.4.2.2, Potential Effect 2: Change in Traditional Diet, Perceived	**Context:** The EIS states: "Project activities could change the perceived suitability of country foods. An ecological risk assessment (ERA) was conducted to consider both radiological and toxicological risks to ecological receptors such as terrestrial and aquatic invertebrates,	Given concerns with psycho-social impacts and the influence of perception discussed by ERFN earlier on in the EIS, does Denison have information on the perspectives	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
		traditional purposes	Suitability of Country Foods (p. 12-26)	terrestrial and aquatic vegetation, fish, and terrestrial and aquatic mammals and birds. Results for the radiological assessment predicted no exceedances of the radiation dose benchmark for the ecological receptors. For non-radiological COPCs, no exceedances were predicted except for selenium in fish from Russell Lake, based on a conversative dietary assumption for one resource user. The traditional foods diet for the fisher/trapper is conservative as it assumes that their annual fish consumption (183 kg of fish per year) would be obtained from Russell Lake, meaning the exceedance of the benchmark for selenium from fish would only occur if fish were only sourced from this one lake. This one exceedance could potentially change the perceived safety of country foods for community members and make country foods a less desirable part of a traditional diet. Experience from other uranium operations in northern Saskatchewan suggests that resource use will continue despite the potential selenium exceedance. An examination of members of the Hatchet Lake Denesųłiné First Nation who live in Wollaston Lake near the Rabbit Lake operation found that over years of being active on the landscape both with and without the presence of the uranium industry, members had developed their own culturally appropriate practice of risk assessment and management based on their relationship with the land. Hatchet Lake Denesųłiné First Nation members appear to be more concerned with the direct effects of uranium mining on the local environment and less concerned about uranium mining's effects on their health through consumption of plants and animals. This is likely due to their high level of confidence in recognizing affected plants and wildlife and avoiding them (Elias et al. 1997). The usage patterns of the ERFN Trapper have similarly allowed for continued use and access to areas proximal to other uranium operations. The ERFN Trapper had a positive relationship with other uranium operations in the ILRU LSA. He also continued to trap (i.e., used his trapline in Fur Block N-18), fish, and opportunistically pick berries, and consumed those resources during operations (KPI Program 2021). Good relationships between Denison and a new trapper who eventually takes over the trapline from the ERFN Trapper would promote continued use." (p. 12-26) **Rationale**: The underlined reference suggests that negative perceptions may not prevent traditional resource users from continuing to consume, due to adaptation to potential risks in the environment.	from Indigenous Nations and communities to validate this conclusion is applicable?	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-211	CNSC	Accidents and Malfunctions	Section 14.6.1, Bounding Scenario 1, Vehicle Accident and Aquatic Release of Radioactivity	**Context:** Scenario 1 describes a spill of uranium concentrate into the lake. It's not clear how the ecological risk assessment was performed. It is stated that sediment concentrations in post-remediation conditions are expected to exceed the benthic invertebrate benchmark and that these results indicate that a spill of uranium concentrate could potentially affect benthic invertebrate populations following a spill, but the spatial extent would be limited. For water, it is stated that when evaluating the potential effect, a comparison was made between the results of the estimated short-term water quality 1,892 µg/L (1.892 mg/kg) and the guideline (33 µg/L). This indicates that there may be some aquatic species that could be affected, but the effects are expected to be transient as the water concertation quickly drops to a long-term level of 0.19 µg/L. However, when looking at dose to other receptors, the results of the ecological risk assessment indicated short-term ingestion of contaminated water resulting from an accident would not result in potential risks to grouse, vole, or deer, however rationale for how these receptors were chosen is not provided. **Rationale:** It's not clear from the EIS, why the receptors grouse, vole, and deer were chosen to evaluate ecological effects from a potential spill, and why they differ from receptors in the ERA. It is also not clear if the pathway from sediment ingestion/contact was considered for semi-aquatic receptors as they could be exposed to the increased concentrations post-spill. It is also not clear if SARA species exposure to sediment and water post-spill was considered.	Please clarify why grouse, vole, and deer were chosen as receptors for the ecological risk assessment performed for accidents and malfunctions scenario 1 and clarify if the sediment pathway to receptors post-spill was considered, as well as if SARA species were considered.	
IR-212	HC	Human health with respect to hazardous contaminants	Section 14 (p. 14-3) Appendix 16-C (p. 14 & 15)	The follow-up plan does not sufficiently describe how various parties will be engaged in the design, implementation, and review of monitoring programs. **Context:** Section 14 of the EIS states that "The overarching fear of contamination from the mine is woven in to almost every other concern noted by participants in the TK study. It is worth acknowledging this concern separately given the potential for mental health impacts related to people's experiences of fear and anxiety" (p. 14- 3). The commitment regarding monitoring and follow-up activities appears limited to *"shar[ing] information in a transparent manner with the General Public, and specifically those Communities of Interest and Nearby Land Users with whom Denison is regularly engaging about the Project. Such an information-sharing program would consider the involvement of the Regulators to make sure the information available addresses the issues identified as concerns"* (p. 14).	1. Provide details of how local, provincial and federal authorities, and Indigenous Nations and communities will be engaged in developing the follow-up and monitoring program, including the information-sharing program. 2. Describe the steps that will be taken if there are any exceedances of established benchmarks or deviation from predictions. **Suggestions for mitigation and follow-up measures**: Health Canada recommends that the proponent's plan for communicating follow-up results (environmental and country foods) aims at, among other things, responding to community concerns regarding country foods to minimize avoidance of this resource. This goes beyond a passive dissemination of information and developing a strategy based on dialogue and the direct involvement of communities in monitoring, surveillance, and risk communication activities.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				Rationale: Country food safety is not regulated federally unless foods are sold commercially. Certain aspects of country food safety and availability may be covered by provincial regulators. It is unclear whether and how various levels of government and potentially affected communities would be involved in the development of the follow-up and monitoring program. It is also unclear what the information sharing program entails and how it would inform any adaptive management if monitoring results deviated from the predictions.		
IR-213	CNSC	Accidents and Malfunctions	Section 14.5.3 Appendix 14-A	**Context:** The proponent states that the assessment of accidents and malfunctions began with the initial identification of hazard scenarios. Hazard scenarios were identified using a systematic approach that considered the existence of sources of hazards and initiating events for the Project in consideration of Project activities and components. The hazard identification was conducted to identify a comprehensive list of potential project-related accident and malfunction scenarios associated with the key project components and activities with further details provided in Appendix 14-A. The initial hazards were then screened qualitatively based on likelihood and consequence to determine overall risk level using a risk matrix approach. Bounding scenarios were then selected from this initial list of hazard scenarios. The results of numerical analyses (RESPEC, 2021) of detailed strip model suggest that the deformation imposed on the cemented steel casing from downward movement of the rock mass may exceed the assumed casing-strain yield limits and the failure limit locally after extracting the uranium ore. However, this potential hazard is not identified in the hazard identification. **Rationale:** Exceedance of steel casing yield limits and failure limit would either compromise the steel casing integrity or damage the steel casing and result in the leakage of injected solution, which could impact on mine operation and contaminate the surrounding groundwater.	Please include the hazard of steel casing yield or damage in the table of hazard identification evaluation and conduct an initial risk screening and further detailed assessment as required.	
IR-214	CNSC	Accidents and Malfunctions	Section 14.5.3 Appendix 14-A, section 3.2.3	**Context:** Hazard scenarios were identified using a systematic approach that considered the existence of sources of hazards and initiating events for the Project in consideration of Project activities and components. Details for how each of these project components and activities are considered in the initial hazard scenario identification process are provided in the accidents and malfunctions TSD (see Appendix 14-A; Ecometrix 2022). However, in Table 3-1 to Table 3-14 in Appendix A of Appendix 14-A, the following inconsistencies were identified:	Please clarify or correct all inconsistent and/or inaccurate information in Tables 3-1 to 3-14 in Appendix A of Appendix 14-A.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				i. consequences for the hazards ID# 1.1, 1.5, 1.7, 14.2 include occupational major injuries; however, the severity (S) is denoted as number 2 that appears to be inconsistent with consequence rating number in Figure 14.5-2 ii. Hazard ID# 1.5 has a L=2, but it is described as a highly unlikely event, which is inconsistent with the term in Figure 14.5-2 iii. Hazards ID# 3.6 and 3.7 have a L=1, but they are described as low probability event that is inconsistent with the term in Figure 14.5-2 iv. Hazards ID# 8.2, 8.3, 9.1, 10.1 to 10.5, 11.1, 11.5 have a L=1, but they are described as unlikely events, which are inconsistent with the term in Figure 14.5-2. Rationale needs to be provided how stockpile erosion is considered to have a L=1 v. Hazard ID# 12.1 has a L=2 and S=3, but it's risk ranking is moderate, which is inconsistent with the term in Figure 14.5-2 vi. Hazard ID# 13.3 has a L=2. Based on the operation experience in the similar projects in the northern Saskatchewan, ponds lining failure and leakage is a very likely event. Rationale needs to be provided to support L=2 or change the number for L. **Rationale:** Inconsistent or inaccurate/incorrect information was included in Accidents and Malfunctions assessment.		
IR-215	CNSC	Human health with respect to hazardous contaminants	Section 14.6	**Context:** One of the potential risks of a uranium mine and mill is a spill of untreated effluent. **Rationale:** In the EIS, it doesn't appear that the scenario of a spill of untreated effluent to the environment has been considered. A failure of the piping containing the untreated effluent could result in an uncontrolled release to the environment and could affect the groundwater, soil quality, and terrestrial biota.	Please evaluate and provide the results for a bounding scenario of a spill of untreated effluent or provide justification for its exclusion.	
IR-216	CNSC	Human Health with respect to radiation exposure	Section 14.6.1 Section 14.6.7 Appendix 14-A	**Context:** Radiological doses to human receptors, including workers (i.e., driver(s) of the vehicles), from the Bounding Scenarios 1 (Vehicle Accident Including Rollover, Collision, Run Off Road) and 7 (Vehicle Accident Including Rollover, Collision, Run Off Road) have not been assessed. **Rationale:** An estimate of the effective doses to human receptors, including workers, are required to determine whether the expected doses meet the dose limits set out in the Radiation Protection Regulations.	Provide estimates (including calculations) of the potential radiological doses to human receptors, including workers, resulting from Bounding Scenarios 1 and 7.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-217	CNSC	Accidents and Malfunctions	Sections 14.6.1 and 14.6.2	**Context:** Highway 914 crosses the Wheeler River 10 km southwest of the access road junction. A vehicle accident, including a rollover, collision, or run off road, at or near the bridge could potentially result in a release of uranium concentrate and release of fuels and chemicals into the surface water at this location. Denison believes that a release of uranium concentrate and a release of fuels and chemicals at this location would bound the releases at any other water crossing along the transportation corridor. However, no information on what other water crossings along the transportation corridor exist and how bounding scenarios 1 and 2 would bound the risk of releasing uranium concentrate and fuels and chemicals at other crossings. **Rationale:** The release of uranium concentrate and fuels and chemicals at water crossings would contaminate the water body at the crossings and pose a risk to the environment and public health.	Please provide information on all water crossings along the transportation corridor and justification why bounding scenarios 1 and 2 would bound the effects of the accidental releases of uranium concentrate and fuels and chemicals at these crossings.	
IR-218	CNSC	Accidents and Malfunctions	Sections 14.6.1.1 and 14.6.1.4	**Context:** Table 14.6-1 indicates that the average flow of Wheeler River south of Russel Lake is 17,340 L/s or 17.34 m3/s. This rate is used for uranium dissolution rate calculation. However, in section 14.6.1.4, it states that the average annual flow is 24.3 m3/s. In Table 14.6-3, the last two rows appear to be added wrongly. It also states that sediment quality results are shown in Table 14.6-5 for post-remediation conditions. During minimum flow conditions, the affected volume is expected to be smaller, resulting in a higher sediment concentration. In comparison, higher flow conditions are expected to result in a greater footprint and lower concentrations. However, in Table 14.6-5, the average sediments concentration and porewater concentration appear to be incorrect and switched between average flow and maximum flow. **Rationale:** Inconsistent/inaccurate information provided in the EIS.	Please clarify and correct the inconsistent information on average flow rate of Wheeler River at the crossing and incorrect information in Table 14.6-3, and average sediment concentration and porewater concentration under average and maximum flow conditions in Table 14.6-5.	
IR-219	CNSC	Accidents and Malfunctions	Sections 14.6.1.1.1 and 14.6.1.4.1; Sections 5.1.1 and 8.1 of Appendix 14-A	**Context:** When assessing the release characterization of Bounding Scenario 1, the proponent assumed that 95% of the released uranium concentrate can be recovered from the release location without sufficient justification, and that different water column depths, i.e., 10 cm and 5 cm, and average water depth of 1.2 m at the release location were used without explanation. **Rationale:** As the recovery rate of the uranium concentrate would have an impact on the assessment of its potential effects, it is necessary to understand how the recovery rate and water level were selected for assessing this bounding scenario.	Provide further rationale for assuming 95% recovery rate and for using different water column depths for uranium concentrate release characterization.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-220	CNSC	Accidents and Malfunctions	Section 14.6.1.1.1 Appendix 14-A, Section 5.1.1	**Context:** The proponent states that based on drum deformations performed in a previous analysis (McSweeney et al. 2004), if a drum experienced a crush force of 100,000 lbs., then the deformation of the drum would cause the lid to detach from the drum. Using this drum failure mechanism, and assuming the drums weigh 450 kg and are arranged four across in the truck, at a speed of 48 km/h, the front 25% of the drums would fail, at 60 km/h to 97 km/h 55% would fail, at 145 km/h 75% would fail, and at ≥193 km/h all would fail. Given that the speed of the truck is likely between 60 km/h to 97 km/h, it was concluded that less than 55% of the drums would fail upon a traffic accident scenario. It is assumed to be 40 drums per shipment, so some stacking or rows of drums should be expected in this scenario. The drums stacked above could be at greater risk of deformation in a traffic accident. It is not clear whether drums stacking was considered in the previous study cited by the proponent and whether less than 55% fail is still an adequate percentage of drum failures in such traffic accident scenarios if drums stacking is needed. **Rationale:** Drum failure percentage will impact the release quantity of uranium in such an accident scenario and then impact the consequence assessment. Therefore, the drum failure should be adequately assessed and supported with sufficient information and justification.	Please provide information and/or rationale as to whether drum stacking would impact drum failure at different speeds and confirm whether 55% drum fail for such an accident is still valid.	
IR-221	CNSC	Accidents and Malfunctions	Section 14.6.1.3, Appendix 14-A, Section 7.1	**Context:** It is projected that there would be about 100 drums packaged per mill operating day. One trip per day for 330 days per year is assumed for the probability evaluation. This means 100 drums per trip, which is inconsistent with description in section 14.6.1.1.1 where assuming 40 drums in one shipment per day. **Rationale:** Shipments per day will impact the probability evaluation, and number of drums per trip will impact the release of uranium during an accident.	Please clarify the number of shipments per day and number of drums per shipment that are expected and re-calculate the probability as necessary.	
IR-222	CNSC	Accidents and Malfunctions	Section 14.6.2.4	**Context:** Bounding Scenario 2 consists of the aquatic release of fuel and hazardous chemicals due to traffic accidents. The EIS states that amongst the fuels considered for this scenario, the consequences of the release of gasoline and solvents are bounded by the consequences associated with the release of diesel. Both gasoline and solvents are lighter with higher vapour pressure; therefore, they have a shorter half-life in the aquatic environment and a lesser tendency for adsorption to sediments and suspended solids in the water column. There is no other justification provided to show that the release of diesel can bound other chemicals such as sulfuric acid and sodium hydroxide that are heavier than diesel.	Please provide further justification that the consequences of the release of sulfuric acid and sodium hydroxide can be bounded by the consequences associated with the release of diesel.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				Rationale: The release of either sulfuric acid or sodium hydroxide during accident could change the water PH significantly at the releasing location, which would post a negative impact on the local environment.		
IR-223	CNSC	Accidents and Malfunctions	Section 14.6.4.1 Appendix 7-A, Appendix K	**Context:** The EIS states that the 3D strip numerical model predicted that stresses and displacements did not show instability in the altered sandstone or basement rock at the location where a freeze wall would be placed around the Phoenix Deposit boundary (RESPEC 2021). The potential damage to the freeze wall due to mine-induced stresses and displacements under this scenario is excluded. **Rationale:** One outer section of the freeze wall (i.e., north-east freeze wall of the phase 4 mining area) and some internal cross walls are located in the desilicified zone. The RESPEC 2021 report (i.e., Appendix K of Appendix 7-A) appears not to have included the desilicified zone in the geomechnical modeling, nor is provided the stresses and the displacements/deformation of the area northeast of the phase 4 ore body where a significant extent of the desilicified zone exists.	Please provide information on the stresses and displacements/deformation of the area northeast of the phase 4 ore body from the geomechanical studies to demonstrate the resulted stresses and displacements will not impact on the freeze wall integrity after IRs for geomechanical studies for ore extraction are addressed. **Technical Discussion Required**: Yes	
IR-224	CNSC	Human Health with respect to radiation exposure	Section 14.6.5.4 Appendix 14-A	**Context:** For the Bounding Scenario 5 (Process System and Piping Failure), doses to receptors at distances of 100 and 500 metres (0.25 and 0.01 mSv respectively) are predicted. The assessment also indicated that the dose to the unprotected worker staying inside the processing plant during the spill could exceed the 50 mSv dose limit specified by CNSC if workers did not leave the area quickly after the spill. The proponent did not provide the dose calculations for deriving the dose estimates. **Rationale:** The method used to estimate effective, equivalent, and committed dose is required to be verified. Sample dose calculations should be included, to confirm use of acceptable input data.	Provide the dose calculations for deriving the dose estimates for workers and members of the public for Bounding Scenario 5 (Process System and Piping Failure).	
IR-225	CNSC	Human Health with respect to radiation exposure	Section 14.6.5.4 Appendix 14-A	**Context:** With the Bounding Scenario 5 (Process System and Piping Failure), the proponent states that Denison ensures that the process is designed to include control measures to reduce the exposure to both workers and members of the public as low as achievable. The measures would ensure that the processing plant is adequately ventilated, and that spills or leaks are detected by loss of system pressure, observation, or flow imbalance. It is not indicated where these additional measures have been detailed/elaborated within the EIS.	Provide details on how the control measures to reduce the exposure to both workers and members of the public, identified in the assessment of Bounding Scenario 5, have been formally documented and incorporated in the engineered design of the processing facility.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				Rationale: Control measures to reduce the exposure to both workers and members of the public as low as achievable, that are identified in the assessment of Bounding Scenario 5, must be formally documented to ensure that they are carried over into the engineered design of the processing plant.		
IR-226	CNSC	Accidents and Malfunctions	Sections 14.6.6.1 and 14.6.6.4	**Context:** It is stated that in the case of the accident and for a release amount of 1 kg inside the processing plant, the dose to offsite receptors at 200 m from the project site was calculated to be less than the CNSC public dose limit of 1 mSv. The analysis also indicated that the dose to a worker in a full-face-piece powered air-purifying respirator who stays in the area would be 88 mSv, which exceeds the annual worker dose limit of 50 mSv. **Rationale:** Section 14.6.6.1 indicates that 2 kg of uranium concentrate could be released in case of the accident. No rationale is provided why 1 kg rather than 2 kg uranium concentrate is used for dose calculation. If 2 kg is used as the source term, the dose to offsite receptors at 200m and workers in the area would be higher.	Please provide the rationale for using a source term of 1 kg rather than 2 kg of uranium concentrate for the dose calculation to offsite receptors and workers. If sufficient rationale cannot be provided, the doses to offsite receptors and workers should be recalculated using 2 kg uranium concentrate, and the results provide.	
IR-227	CNSC	Accidents and Malfunctions	Section 14.6.6.1.1	**Context:** Bounding Scenario 6 involves a fire and/or explosion within the processing plant, resulting in the release of a large amount uranium to the atmosphere. The airborne source term for this scenario is estimated with equation developed by the United States Department of Energy (USDOE), where the respirable faction is assumed to only include particles of 10 mm and smaller. **Rationale:** No rationale was provided to support the consideration of only 10 mm and smaller particles. As provided in Table 14.6-3, the particle size of uranium <15 mm is less than 20%. Majority of the uranium particle size is larger than 10 mm. The airborne source term is an important factor for the effects assessment and should be calculated with transparent and justified information/data.	Provide rationale for only considering 10 mm and smaller particles for the respirable fraction.	
IR-228	CNSC	Human Health with respect to radiation exposure	Section 14.6.6.4 Appendix 14-A	**Context:** For the Bounding Scenario 6 (Facility Fire and/or Explosion), the predicted dose is less than 1 mSv to a member of the public 200 metres away from the project site. The analysis also indicated that the dose to a worker in a full-face powered air-purifying respirator who stays in the area would be 88 mSv, which exceeds the annual worker dose limit of 50 mSv. The proponent did not provide the dose calculations for deriving the dose estimates. **Rationale:** The method used to estimate effective, equivalent, and committed dose is required to be verified. Sample dose calculations should be included, to confirm use of acceptable input data.	Provide the dose calculations for deriving the dose estimates for workers and members of the public for Bounding Scenario 6 (Facility Fire and/or Explosion).	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-229	CNSC	Human Health with respect to radiation exposure	Section 14.6.6.4 Appendix 14-A	**Context:** With the Bounding Scenario 6 (Facility Fire and/or Explosion), the proponent states that Denison would ensure that the design of the plant includes control measures to reduce the exposure to both workers and members of the public to levels that are as low as achievable. The measures would ensure that the processing plant is adequately ventilated. It is not indicated where these additional measures have been detailed/elaborated within the EIS. **Rationale:** Control measures to reduce the exposure to both workers and members of the public as low as achievable, that are identified in the assessment of Bounding Scenario 6, must be formally documented to ensure that they are carried over into the engineered design of the processing plant.	Provide details on how the control measures to reduce the exposure to both workers and members of the public, identified in the assessment of Bounding Scenario 6, have been formally documented and incorporated in the engineered design of the processing facility.	
IR-230	CNSC	Accidents and Malfunctions	Section 14.6.7.4	**Context:** It is stated that a conservative penetration time of 15 min was applied in the assessment. Based on this assumption, the maximum depth of contamination could be 90 cm (for penetration rate of 0.1 cm/s). It is not clear why the penetration time of 15 minutes is considered conservative as the penetration time would depend on the time needed for the emergency response team to respond. It is also stated that the wide range of the calculated velocities is a result of variation of soil conditions and the slope of the surface. The distance that the groundwater can travel under these extreme (i.e., conservative) conditions ranges from 0.15 m to 100 m. It is not clear how the groundwater travel distance of 0.15m and 100m is calculated. **Rationale:** The penetration time will influence the penetration depth of the released materials, which in turn, considering the groundwater travel distance, will impact the potential areas and volumes of contaminated soils and shallow groundwater.	Please provide justification for applying 15 minutes of penetration time, and why it is considered conservative. In addition, please provide information on how the groundwater travel distance of 0.15 m and 100 m was obtained.	
IR-231	CNSC	Accidents and Malfunctions	Sections 14.6.6.4 and 14.6.6.5	**Context:** The EIS states that in the unlikely event of an unmitigated accidental release of uranium due to a dryer explosion, doses to the workers are expected to have a moderate effect, while doses to members of the public are expected to have a minor effect. Based on this evaluation, the severity of the consequences of this accident and malfunction scenario is predicted to be moderate. In consideration of both probability and consequences, the overall risk related to Bounding Scenario 6 is predicted to be low. **Rationale:** When there is an explosion within the process plant, it is likely there will have worker fatality. The severity of the consequences	Please re-evaluate the consequence and the risk of Bounding Scenario 6 by considering the potential worker fatality resulted from an explosion.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				of an explosion would be catastrophic and the risk of Bounding Scenario 6 would be higher.		
IR-232	ECCC	Change to an environmental component due to hazardous contaminants	Appendix 14-A, Table 3-7, ID# 7.1 Appendix 14-A, Table 5-5	**Context:** The Proponent indicates in Appendix 14-A, Table 3-7 that a release of sulfuric acid is a low consequence event therefore would not require further assessment. However, according to a Safety Datasheet on high concentrated sulfuric acid (ICSC 0362 - SULFURIC ACID, concentrated (> 51% and < 100%) (ilo.org)), the substance is incompatible with certain materials and can give off toxic fumes. Furthermore, it reacts with various metals to produce hydrogen gas, which is explosive. The Proponent provides estimates of chemicals, including sulfuric acid, to be transported to site in Appendix 14-A, Table 5-5. The annual consumption of sulfuric acid is estimated at 15,417 m3, in 617 trucks per year, but the concentration is not stated. **Rationale**: Given the high reactivity and inherent corrosive nature of sulfuric acid combined with the volume and concentration that may be stored on site, ECCC requests that the Proponent provide a detailed risk assessment related to a terrestrial spill of sulfuric acid, specifically at the processing plant.	1. Provide the volume and the concentration of sulfuric acid that will be stored on site. 2. Provide a detailed risk assessment of the fate and behavior of sulfuric acid during a release into the environment.	
IR-233	HC	Human health with respect to hazardous contaminants	Appendix 14-A, Section 8.7 (p. 8.10)	An effects assessment for a transportation accident scenario involving radioactive materials was not included. **Context:** The proponent provided an effects assessment relating to a diesel spill on the ground (Section 14 Appendix 14-A, Section 8.7). However, no information was provided regarding the potential human health effects of a uranium concentrate release at the two locations considered (Section 14 Appendix 14-A p. 8.10). **Rationale:** An accident involving radioactive material may have an impact on human receptors, based on the proximity of receptors and the proposed response protocols.	1. Assess and describe the potential health effects (chemical and radiological) of a transportation accident involving a uranium concentrate spill at the following locations: a) km 160 of Hwy 914, which is the location of a cultural camp that has been established by the ERFN. b) km 67 of Hwy 914, which is a gathering location for the Kineepik Métis Local associated with the Northern Village of Pinehouse. c) All other potential sites of importance for the public and Indigenous peoples.	
IR-234	CNSC	Effect of Environment	Section 15.2.2	**Context:** Effects of seismic events on the uranium extraction and post decommissioning are not assessed. **Rationale:** Seismic events could further exacerbate the stability of the voids induced by the uranium extraction, which will result in extra stresses and displacements/deformation in the overlying rock formations. These extra stresses and displacements/deformation could impact on the mine operation and post decommissioning groundwater flow and contaminant transport.	Please provide an assessment of seismic events on the mine-induced voids stability and the resulted effects on the mine operation and post decommissioning. **Technical Discussion Required**: Yes	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
IR-235	ECCC	Fish and fish habitat	Section 15.5.2, Expected Environmental Conditions	**Context:** In this section it is stated that: "Table 15.5-1 and Table 15.5-2 summarize the predicted mean values of the climate variables for the Tomblin Lake regional grid unit, following the RPC4.5 and RCP8.5 scenarios, respectively, as indicated by the Climate Atlas (PCC 2019)." RCP4.5 represents predicted climate conditions of a moderate carbon future. RCP8.5 represents predicted climate conditions under a high carbon future. The values shown in Tables 15.5-1 and 15.5-2 show averages of 25.9 and 26.7 mm for RCP4.5 and 25.9/27.5 mm for RCP8.5. These values do not correspond to the source indicated by the Proponent. **Rationale:** Based on the Proponent's description we would expect to find the same values for "Max 1-Day Precipitation (mm)"in the Climate Atlas for RCP4.5 and RCP8.5 scenarios. ECCC was unable to duplicate the results. ECCC queried the Climate Atlas for Tomblin Lake and returned a result of "Region Geikie River." https://climateatlas.ca/find-local-data ECCC then queried the Climate Atlas for Max 1 Day Precipitation (mm). https://climateatlas.ca/data/grid/782/maxdaypr_2030_85/line https://climateatlas.ca/data/grid/782/maxdaypr_2030_45/line The results displayed an array of values ranging from 83.6 mm (2050) to 87.3mm (2092) for a Regional Concentration Pathway RCP8.5 scenario and values ranging from 48.9mm (2050) to 89.5 mm (2083) for an RCP4.5 scenario. These values do not match the averages shown in Tables 15.5-1 and 15.5-2.	1. Provide the source of the data displayed in Max 1-Day Precipitation (mm) category in Tables 15.5.1 and 15.5-2. 2. Provide detailed calculations for the following average values: • 25.9 mm 26.7 mm in Table 15.5-1: Predicted Climate Conditions of a RCP4.5 Moderate Carbon Future • 25.9 mm 27.5 mm in Table 15.5-2: Predicted Climate Conditions of a RCP8.5 High Carbon Future 3. Explain how the data shown in Tables 15.5.1 and 15.5.2 were used in the precipitation risk assessment. 4. Denote the differences between "mean", "value/max value", and "fluctuation", in the calculation of extreme event risk. 5. Compare model derived data against: 1. Natural variability of the observed data. 2. Variability in the statistics generated via observation based time series. **Technical Discussion Required**: Yes	
IR-236	ECCC	Fish and fish habitat	Section 15.5.2, Expected Environmental Conditions	**Context:** It is stated that, "Table 15.5-1 and Table 15.5-2 summarize the predicted mean values of the climate variables for the Tomblin Lake regional grid unit…" As per the Proponent's description, Tomblin Lake was chosen as representative location for Wheeler when Climate Atlas was used as data source. **Rationale:** In those two tables, for the "Max 1-Day Precipitation (mm)" the historical average is given as 24.1mm. Local time series analysis for the climatic region in which Wheeler Project is located provide	1. Provide a clear explanation on how the historical mean for 1-Day Max Precipitation was calculated. 2. Compare the values obtained via various means (ex: copied from the internet, modeled via some online algorithm, derived from specialty literature), against time series analysis based on observations. **Technical Discussion Required**: Yes	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				averages (for 1-day max precipitation) of approximately 30+ mm. It is the Proponent's responsibility to keep the required database current and up to date, because the length of the time series influences all derived statistics. Statistical analysis of extreme events is highly dependent of the mean with extreme values reaching values 3 to 4 times higher than the mean.		

IR-237	CNSC	EA follow-up and monitoring program	Appendix 16-C throughout, including Table 1.5-1: Wheeler River Monitoring and Follow-up Program Summary (p. 8-15)	**Context:** CNSC's Generic Guidelines for the Preparation of an EIS state: "The EIS should provide discussion on the follow-up program's requirements, and include:
				• objectives and structure of the follow-up program and the VCs targeted by the program
				• tabular summary and explanatory text of the main components of the program including:
				  ○ a description of each monitoring activity under that component
				  ○ which of the two generic program objectives the activity is relevant to (e.g., verify EA predictions, determine effectiveness of mitigation measures)
				  ○ the specific statement from the EA that goes along with that generic objective and will be the focus for that activity (e.g., program objective: verify predicted effects; environmental assessment effect: no potential adverse effects)
				  ○ the specific monitoring objective for that activity
				  ○ planned schedule
				• roles and responsibilities to be played by the proponent, regulatory agencies, Indigenous people, local and regional organizations and others in the design, implementation and evaluation of the program results
				• possible involvement of independent researchers
				• program funding sources
				• information management and reporting (reporting frequency, methods and format)
				• possible opportunities for the proponent to include the participation of the public and Indigenous groups, during the development and implementation of the program
				
				The follow-up program plan should be sufficiently described in the EIS to allow independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them) and confirm the effectiveness of mitigation measures." (Section 11)
				
				Rationale: The Summary of Monitoring and Follow-up Programs provided in Appendix 16-C contains very high-level information, and
					It is recognized that this document will evolve over the planning process and be finalized prior to the EA Decision; however, as plans are developed and revised, CNSC staff expect that updates will be made to this document and provided with any future versions of the EIS.
					
					Appendix 16-C Summary of Monitoring and Follow-up Programs must include sufficient details to allow CNSC staff to determine the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them) and confirm the effectiveness of mitigation measures. This includes concrete monitoring plans (sampling locations, frequency, etc.).
					
					Additionally, please incorporate any relevant information included in the EIS into this Summary.	

Ref. #	Department	Project Effects Link	Reference to EIS, appendices, or supporting documentation[1]	Context and Rationale	Information Requirement (IR)[2]	Denison Response
				while some of the aspects detailed in the Generic EIS Guidelines are included, the aspects underlined are missing or appear incomplete. Further, all information from throughout the EIS should be incorporated into this Summary. For example, the EIS notes that: "Groundwater samples will be collected at least monthly and semi-annually in the wells within the freeze wall and on the freeze wall perimeter, respectively" (p. 7-109) and that "At least five to seven multi-well clusters are proposed across the mined area (Figure 7.8-2). Sampling will include KI parameters or the full suite of COPC at different times in the remediation process" (p. 7-111). These details (only examples) are not included in Appendix 16-C.		
IR-238	CNSC	Current use of lands and resources for traditional purposes	Various sections of the EIS, including: Section 8 Section 9 Section 10 Section 11 Section 12 Section 15 Section 16 Appendix 16-C (p. 3)	**Context:** The EIS indicates that "further detailed [follow-up and monitoring programs] will be developed as Project designs are finalized that may influence the nature, frequency, and locations of monitoring. In addition, input from regulatory agencies, the public and Indigenous Peoples will be considered." (Appendix 16-C, p.3) It is not clear in several section(s) of the EIS and the Indigenous Engagement Report, whether Denison has provided the interested Indigenous Nations and communities with the opportunity to participate in the development, implementation, and review of monitoring and mitigation measures, as per the guidance of REGDOC-3.2.2 and CNSC's Generic EIS Guidelines. **Rational:** As outlined in Section 11 of CNSC's Generic Guidelines for the Preparation of an EIS, please include roles and responsibilities to be played by the proponent, regulatory agencies, Indigenous people, local and regional organizations and others in the design, implementation and evaluation of the monitoring program results as well as possible opportunities for the proponent to include the participation of the public and Indigenous Nations and communities, during the development and implementation of the program.	Please provide additional information to demonstrate whether Indigenous Nations and communities were engaged directly on the potential mitigation and monitoring measures to address the concerns raised regarding potential impacts of the project on the potential or established Indigenous and/or treaty rights. Provide a rationale if this engagement has not been completed. As the Project develops, please provide concrete actions Denison will take in the follow-up and monitoring programs to engage Indigenous Peoples to alleviate concerns and incorporate their interests, and when this engagement is planned to take place.	

[i] **Additional Lung Cancer Mortality from PM2.5: Recommended Approach and Sample Calculation**
Health Canada, Water and Air Quality Bureau, October 2022

Health Canada (2022) provides a quantitative estimate of the risk of lung cancer associated with exposure to PM2.5 in Canada. The pooled hazard ratio (HR) for lung cancer mortality in the Canadian population is 1.127 (95% CI: 1.085, 1.170)

per 10 µg/m3 increase in long-term exposure to ambient PM2.5. The slope coefficient (β) for this relationship is 0.01196, as derived below:

$$e^{(\beta \times 10\ \mu g/m^3)} = pooled\ hazard\ ratio\ per\ 10\ \mu g/m^3$$

$$e^{(\beta \times 10\ \mu g/m^3)} = 1.127$$

$$\beta \times 10\ \mu g/m^3 = \ln 1.127$$

$$\beta = (\ln 1.127)/(10\ \mu g/m^3)\ `$$

$$\beta = 0.01196$$

The additional lung cancer mortality (over the baseline rate) from PM2.5 derived from a given source can be determined using the equation below, based on the attributable fraction or (HR-1)/HR (Greco et al. 2020):

$$ALCM = \left[\left(e^{\beta \cdot Exposure} - 1 \right) \Big/ e^{\beta \cdot Exposure} \right] \cdot Baseline\ rate \cdot Years$$

ALCM = additional lung cancer mortality cases per 100,000 population

β = 0.01196 (slope coefficient from meta-analysis in Health Canada (2022))

Exposure = estimated PM2.5 exposure concentration from the relevant source(s) (µg/m3) (does not include baseline PM2.5 exposure)
Baseline rate = 45.5 per 100,000 (current Canadian Age Standardized Mortality Rate (ASMR) for lung cancer from Canadian Cancer Statistics Advisory Committee 2021); the Canadian baseline rate is appropriate as the slope coefficient was derived from Canada-wide studies and an updated ASMR of Canada (if available) would be appropriate for use in the calculation

Years = years of project or project phase

<u>Sample calculation:</u>
Project estimates an exposure from relevant source(s) of 0.067 µg/m3 over 50 years of operation

$$ALCM = \left[\left(e^{\beta \cdot Exposure} - 1 \right) \Big/ e^{\beta \cdot Exposure} \right] \cdot Baseline\ rate \cdot Years$$

$$ALCM = \left[\left(e^{0.01196 \cdot 0.067} - 1 \right) \Big/ e^{0.01196 \cdot 0.067} \right] \cdot 45.5 \cdot 50$$

ALCM = 1.8 additional lung cancer mortality cases per 100,000

References:
[1] Canadian Cancer Statistics Advisory Committee in collaboration with the Canadian Cancer Society, Statistics Canada and the Public Health Agency of Canada. Canadian Cancer Statistics 2021. Toronto, ON: Canadian Cancer Society; 2021. Available at: cancer.ca/Canadian-Cancer-Statistics-2021-EN
[2] Greco, S.L., MacIntyre, E., Young, S. et al. An approach to estimating the environmental burden of cancer from known and probable carcinogens: application to Ontario, Canada. BMC Public Health 20, 1017 (2020). https://doi.org/10.1186/s12889-020-08771-w
[3] Health Canada. Lung cancer and ambient PM2.5 in Canada: a systematic review and meta-analysis.
[4] Health Canada, 2022. Available online at: https://publications.gc.ca/site/eng/9.907038/publication.html