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VIA EMAIL

Mr. Brian Torrie
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Regulatory Policy Directorate
Canadian Nuclear Safety Commission
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Dear Mr. Torrie:

Cameco Corporation's Comments on Discussion Paper DIS-16-03, Radioactive Waste Management and Decommissioning

Cameco Corporation (Cameco) has prepared the following comments on Discussion Paper DIS-16-03, *Radioactive Waste Management and Decommissioning* (the Discussion Paper).

Cameco is the licensee for a number of licensed nuclear facilities in Canada. More specifically:

- Operating uranium mines (e.g. Cigar Lake and McArthur River operations).
- An operating uranium mill (Key Lake Operation).
- A decommissioned uranium mine and mill site (Beaverlodge).
- Uranium processing facilities, including a refinery (Blind River Refinery), a conversion facility (Port Hope Conversion Facility) and a fuel manufacturing facility (Cameco Fuel Manufacturing).

The breadth of our experience and extent of our expertise in radioactive waste management and decommissioning shape our opinion and perspective on this Discussion Paper.

To begin with, we would like some clarification on how the Canadian Nuclear Safety Commission (CNSC) plans to include waste management and decommissioning information in their regulatory framework. Cameco may view the proposals in the Discussion Paper in a

different light if the CNSC is including this information in regulatory documents (REGDOCs) (i.e. guidance) versus regulations (i.e. requirements).

Cameco supports a consistent approach in managing radioactive wastes based on risk through the use of standards and REGDOCs. Cameco is of the view, however, that the current legislation adequately provides a clear process for licensing uranium mines and mills and our processing facilities and no regulatory change is necessary. The current licensing process proceeds progressively through site preparation and construction, operating, decommissioning, and abandonment (or release from licensing) phases and incorporates regulation of radioactive waste management and decommissioning herein. The Discussion Paper lacks rationale for what gaps the CNSC aims to fill with a new regulatory framework for radioactive waste management and decommissioning compared to the current process.

Further, as a general comment, we recognize that with the Discussion Paper, the CNSC is seeking to validate the need for improvements in the regulatory framework for radioactive waste management and decommissioning and to understand stakeholder views on the topic. Many of the questions for stakeholders in the Discussion Paper asked for feedback on potential impacts of proposed changes. However, because the Discussion Paper is a high-level document, there was not enough information for Cameco to comment on potential compliance or administrative impacts. Consequently, we have responded to the questions posed on potential impacts of proposed changes where possible while recognizing that the CNSC will provide additional opportunities for consultation on specific proposals in due course.

We have reviewed the seven (7) opportunities for improvement and the related stakeholder questions from the Discussion Paper. Our detailed comments on each section, along with our responses to stakeholder questions, are provided below.

1. Defining Waste Types (Waste Categories)

Radioactive waste

The Discussion Paper does not clearly identify the purpose for creating a classification system for radioactive wastes. If the purpose is to better align the CNSC's guidance documents for radioactive waste management, then a classification system may be beneficial. If, however, the classification system is intended to form the foundation for new regulations or amendments to existing regulations, then the proposed system is not adequately described for Cameco to provide detailed comments. Recognizing our concern and the limitation of our review, we provide the following feedback on the proposed radioactive waste categories.

Cameco supports the definition for a radioactive waste classification system from CSA 292.0-14, *General principles for the management of radioactive waste and irradiated fuel*: "the grouping of radioactive waste into categories in order to specify the needs for its safe management." Cameco further supports a risk-based classification system based on waste characteristics using low, intermediate, and high-level radioactive waste categories as outlined in CSA 292.0-14. The Discussion Paper notes that low, intermediate and high-level radioactive waste categories are classified from a risk perspective based on a number of limits. We note, however that the "mine and mill tailings" category was specifically excluded from the scope of CSA 292.0-14 and the

Discussion Paper maintains this source-based category in the proposed classification system without consideration of the range of waste characteristics within this broad category.

The CNSC's regulatory policy P-290, *Managing Radioactive Waste (P-290)* is intended to promote consistent national and international standards and practices for the management and control of radioactive waste. The International Atomic Energy Agency (IAEA) *General Safety Guide GSG-1, Classification of Radioactive Waste* includes uranium mine and mill waste in the naturally occurring radioactive material (NORM) category and further characterizes these wastes in very low, low, or intermediate-level waste subcategories. The approach in Canada could include recognition that uranium mine waste rock and uranium mill tailings are NORM that are part of the fuel cycle; however, there are other types of NORM that are not part of the fuel cycle and, therefore, not regulated by the CNSC. In addition, Natural Resources Canada and the Canadian Nuclear Laboratories through the Low-Level Radioactive Waste Management Office classifies uranium mine waste rock and tailings in the 'low-level radioactive waste' category. If "mine and mill tailings" are to be included, Cameco recommends redefining "mines and mill tailings" in a risk-based hazard spectrum to better align with international and national standards. This could include designating clean waste rock as non-radioactive waste, and mine special waste rock as very low-level NORM waste and mill tailings as low-level NORM waste.

Further, using the term "uranium mine and mill tailings" itself introduces some confusion. The introductory part of Section 2.1.1. *Proposed categories of radioactive waste management* refers to tailings only. Waste rock is first mentioned further down in Section 2.1.1 under heading 4) Uranium mine and mill tailings. As currently written, it is unclear if the CNSC is proposing to include both mill tailings and mine waste rock or just mill tailings under the category of "uranium mine and mill tailings." As mines generate waste rock and mills generate tailings, Cameco suggests using the term "mine waste rock and mill tailings" to recognize the distinction between these waste streams and their characteristics and to be consistent with RD/GD-370, *Management of Uranium Mine Waste Rock and Mill Tailings (RD/GD 370)*.

There are also discrepancies within the Discussion Paper on how the radioactive waste categories were developed. The Executive Summary notes that "[t]he proposed categories are low-level, intermediate-level and high-level radioactive waste, and uranium mine and mill tailings. These categories are based on the radioactive characteristics of the waste, as opposed to the source." However, Section 2.1.1 *Proposed categories of radioactive waste* provides a different explanation for the development of the four proposed categories of radioactive waste: '[l]ow-level, intermediate-level, and high-level waste categories are defined by specific constraints based on their overall characterization. The category of "uranium mine and mill tailings" is the only proposed waste classification defined by its source.' This inconsistency should be reviewed and corrected as not all of the proposed radioactive waste categories were developed based on waste characteristics. Our earlier comment requesting a risk-based spectrum be applied to the categorization of mine waste rock and mill tailings would resolve this inconsistency. If these proposed revisions are included, then all four proposed categories of radioactive waste would then be 'based on radioactive characteristics of the waste' (i.e., hazard or risk).

The topic of surface contamination needs to be addressed in the context of the proposed radioactive waste categories. As outlined in CSA N292.5-11, *Guideline for the exemption or*

clearance from regulatory control of materials that contain, or potentially contain, nuclear substances: “[t]he generic criteria provided in the NSRDR only apply to materials where the radioactive nuclear substance(s) are uniformly distributed within the material. The clearance criteria for surface contaminated materials are addressed in individual licences issued by the CNSC.” It would be useful for the CNSC to clarify if the proposed categories of radioactive waste are based on radioactive nuclear substances uniformly distributed within the material versus surface contamination. Similarly, because clearance criteria is expressed as surface activity concentrations (i.e., Bq/cm²), it is unclear how surface contaminated waste would fit within the proposed waste categories, which consider Bq/g limits when defining low, intermediate, and high-level radioactive waste.

We note that some of Cameco’s fuel services facilities have received letters from the CNSC requesting when the facility will be in full compliance with both CSA N292.0-14 and N292.3-14, *Management of low- and intermediate-level radioactive waste*. There seems to be a disconnect as the Discussion Paper implies that full compliance with these standards will not be a requirement, yet some of Cameco’s operations are being asked to do so. We request clarification from the CNSC on this topic.

Questions for stakeholders on proposed categories for radioactive waste:

- Do the definitions provided above align well with current usage within the Canadian nuclear sector?
 - Overall yes, but Cameco would like to see more information on uranium mine waste rock and mill tailings. ‘Uranium mine and mill tailings’ were not included in the scope of the CSA 292.0-14. We believe the CNSC needs to expand on the characteristics of this type of radioactive waste and what risk-based considerations went into the development of the category, as was shown for low, intermediate, and high-level radioactive waste.
- Should any waste categories be re-examined?
 - ‘Uranium mine and mill tailings’ should be 1) clarified (i.e. mill tailings and/or mine waste rock), and 2) linked to risk or hazard characteristics similar to the IAEA General Safety Guide GSG-1, *Classification of Radioactive Waste* which categorized NORM as very low, low, or intermediate-level NORM waste.
- If these categories were adopted within the CNSC regulatory framework, how would licensees operationalize the proposed definitions? That is, how would they demonstrate/ensure that their waste management programs comply with the proposed definitions?
 - Overall, we expect very little change would be required for Cameco’s mining and milling operations as management of mine waste rock and mill tailings is covered under each site’s current licence.
 - We request more guidance from the CNSC on management of mixtures, for example low-level radioactive waste that is also hazardous (and see our comments on the next section of the Discussion Paper).
 - We request that the CNSC provide guidance on how surface contamination clearance levels (removable and total) relate to the proposed radioactive waste categories.

- What would be the impact on licensees or other stakeholders if the CNSC adopted these definitions for use within its regulatory framework; e.g. by referencing or including them in regulations or regulatory documents?
 - We encourage the CNSC to take any opportunities to help educate and inform the public on risk associated with uranium mine waste rock and mill tailings. The current category does not speak to hazard or risk for this type of radioactive waste.

Other types of waste

As outlined in P-290, it is the policy of the CNSC to consult and cooperate with provincial, national and international agencies to promote harmonized regulation and consistent standards. The conventional waste category is effectively regulated by provincial authorities and any regulation by the CNSC for these wastes does not contribute any safety benefit. Further, we acknowledge the federal government's efforts in recent years to reduce regulatory red tape as summarized in the *Cabinet Directive on Regulatory Management*. Considering this information, we believe conventional wastes can be removed from further consideration by the CNSC.

From our experience, more guidance is required from the CNSC on how to handle and dispose of mixed waste. This could include recommendations on what information is required to present to CNSC staff for mixed waste proposals and what can be done to navigate the challenge of having few or no outlets for disposal or recycling.

Questions for stakeholders on other types of waste (hazardous, conventional, mixed):

- Should the CNSC revise or clarify the types of waste described above?
 - Conventional waste management is not within the CNSC's regulatory mandate. Please revise the discussion under other types of waste to remove reference to conventional waste.
 - Mixed waste should be clearly described to align with the definitions used in the CSA 292.0-14, i.e. mixed waste is 'radioactive waste that also contains hazardous substances.' The terminology used in the Discussion Paper leave the 'mixture' aspect open for interpretation and it should be narrowed to acknowledge the radioactive waste component of the mix.
 - Provide guidance and clarity on the CNSC's expectation for handling and disposing of mixed wastes.
- Are there other types of waste that the CNSC should describe or define?
 - No.

2. Making "Reduce, Reuse, Recycle" a Requirement

Cameco acknowledges that "reduce, recycle, reuse" (the 3Rs) are valuable waste minimization strategies and Cameco incorporates these strategies into its waste management programs, where it is possible, practical and economic. There is, however, no legal foundation for elevating these three strategies to a collective principle and we strongly oppose any reference to the 3Rs as a principle. Any steps to make the use of these strategies a requirement is contrary to a risk-based

and performance-based regulatory approach and may be impossible or impractical to implement for all wastes.

The *Nuclear Safety and Control Act* requires licensees to demonstrate how health, safety, security and environmental objectives are met in an application for a CNSC decision. There may be situations where using one of the 3Rs to minimize waste will further one of the legislative objectives, but it is unclear how CNSC would propose to regulate these targets considering the site-specific nature of wastes and the subjectivity involved in evaluating any qualitative benefit.

Questions for stakeholders on making “reduce, reuse, recycle” a requirement:

- Should the CNSC reinforce the importance of “reduce, reuse, recycle” in regulations?
 - We recognize the importance of the 3Rs in waste reduction; however, we do not think the 3Rs should be 1) referred to as a principle and 2) included in regulations. The current practice of including the 3Rs in waste management programs is the appropriate level of oversight for this type of site-specific and subjective target.
- The CNSC is of the view that licensees are already applying “reduce, reuse, recycle” in their waste management programs. If there are significant compliance or administrative costs associated with this proposed new regulatory requirement, please describe the nature of these costs.
 - Should a new regulatory requirement be developed and the 3Rs included in regulations, we expect compliance and administrative costs to increase in order to meet expectations for a site-specific and somewhat subjective target. Licensees may incur significant compliance costs if the CNSC mandates impractical or costly waste reduction plans specifically focused on meeting the 3Rs.. This is particularly relevant if the implementation of the 3Rs has no corresponding improvement to the health, safety, security or environmental performance of the site.

3. Establishing Record-Keeping Requirements for Waste Operations

We support the CNSC’s proposal that all facilities retain records for a period of ten years after licence expiration, consistent with the record retention timeline in the *Class I Nuclear Facilities Regulations*. Any opportunities to align the CNSC’s requirements with provincial waste record retention requirements should be explored.

For other facilities, Cameco suggests that the minimum record retention periods should be based on the type of facility. Permanent disposal facilities should have records stored in perpetuity as part of an Institutional Control Program (ICP) or, in jurisdictions without an ICP, records should be transferred to the regulator for maintenance beyond the existence of a private company. Records for non-permanent facilities (e.g. storage facilities that hold radioactive waste for a period of time prior to permanent disposal) should have a shorter record retention period, i.e. ten years past a licence’s expiry.

Questions for stakeholders on establishing record-keeping requirements for waste operations:

- Should the CNSC standardize the minimum record retention period for all waste management and storage facilities? What should be the minimum retention period after a licence expires?
 - Minimum record retention periods should be dependent on the type of facility. Permanent disposal facilities should have records stored in perpetuity by the federal and/or provincial governments as part of an ICP. Records for non-permanent facilities (e.g. a facility that stores radioactive waste for a period of time and then disposes of it) should have a shorter record retention period. At a conceptual level, we support the idea that all facilities retain records for a period of ten years post licence expiration, consistent with the timeline in the *Class I Nuclear Facilities Regulations*. However, we would need more information about what records, format, and frequency of data would be included within record keeping requirements to provide a fulsome response to this question.
- Are there other considerations (e.g. administrative costs) that the CNSC should take into account when setting record-keeping requirements for disposal facilities?
 - Administrative costs may include a funding mechanism for the government to hold records in perpetuity through an ICP. The costs would vary depending on factors such as the type (e.g. characterization, annual inventory, annual report, database files), frequency (e.g. weekly accounting or an annual summary report), and format (e.g. hard copy, electronic copy) of the records.
 - The CNSC should consult and cooperate with provincial agencies on matters concerning radioactive waste management records in Canada.

4. Licensing of Waste Management and Decommissioning Operations

Cameco is encouraged to see that the CNSC "...does not intend to create new classes of licences, nor create new requirements for existing licences" for licensing of waste management and decommissioning operations. However, to better understand the CNSC's commitment, we request more information on how the licence application requirements for repositories will be developed. Specifically, how would the licensing of a tailings management facility (TMF) as described within Section 2.4.1 *Licensing requirements for waste disposal facilities (repositories)* be aligned with or different from the current licensing process of uranium mines and mills which follow the stages laid out in the *Uranium Mines and Mills Regulations*, proceeding progressively through site preparation and construction, operating, decommissioning, and abandonment (or release from licensing) phases.

The interplay of this section with the other sections, particularly Section 2.1 *Defining waste types (waste categories)* is not clearly described. It is unclear if the CNSC is proposing a requirement for licensing that is based on radioactive waste categories, total activity or where the waste was generated.

Questions for stakeholders on licensing of waste management and decommissioning operations:

- Should the CNSC clarify its licence application requirements for different types of waste operations? What are your comments on the proposals above?
 - Cameco would like to see clarification on how radioactive waste categories and total activity in the waste or where the waste was generated will be reconciled. Clarification is also required on how the licence application requirements proposed for the three types of waste operations and activities will align with or deviate from the current licensing processes. It is unclear what regulatory gaps the CNSC is proposing to fill or what changes would result for licensees based on the information provided in the Discussion Paper.
- Waste management and storage facilities are currently subject to the *Class I Nuclear Facilities Regulations* when they have an inventory greater than 1×10^{15} Bq. Does this continue to provide an effective, safe and practical point to distinguish between a Class I facility and other waste operations?
 - No, this threshold seems arbitrary. Cameco believes the difference between a Class I facility and other waste operations can be based on the waste being stored or generated at the facility.
- The CNSC is of the view that classifying facilities as described above would improve clarity by codifying the application requirements now addressed by using the “any other information” clause. If there are any new compliance or administrative costs associated with the proposals above, please describe the nature of these costs.
 - We are not able to comment on this question at this conceptual stage based on the information available in the Discussion Paper.

5. Waste Management Program Requirements

We recognize the benefit to continual improvement and streamlining information in the CNSC’s regulatory framework. Pulling information from P-290, RD/GD-370, and Regulatory Guide G-320, *Assessing the Long Term Safety of Radioactive Waste Management* together into a new REGDOC is a welcome improvement as long as the information is summarized appropriately to retain relevant context. We support the combining of the CNSC’s existing documents without creating any new requirements. Further, we support the merging of CNSC documents into a new REGDOC rather than having this information written into regulations.

Questions for stakeholders on waste management program requirements:

- In what areas does the CNSC need to clarify its requirements for waste management programs?
 - The existing waste management program requirements are clear. We would like the opportunity to provide input into the language of the draft REGDOC on this topic when available.
- Are there any specific comments on the proposed activities above?
 - No.

- The CNSC is of the view that licensees are already implementing these requirements, although they have not yet been codified in the regulatory framework. If there are significant compliance or administrative costs associated with the requirements described, please describe the nature of these costs.
 - There is not enough detailed information in the Discussion Paper for Cameco to comment on potential compliance or administrative impacts. We look forward to the opportunity to provide further comment on a specific draft REGDOC related to waste management program requirements once developed.

6. Regulating Remediation Activities

Cameco believes that the CNSC should broaden the description of where remediation activities occur. For example, the Beaverlodge site that Cameco is now the license for was not orphaned, abandoned or the result of an offsite accident. The site also followed a process for developing an acceptable decommissioning plan that received regulatory approval.

Cameco was encouraged to see that the CNSC does not appear to be proposing additional regulation of ongoing reclamation activities at operating sites. We want to emphasize in saying this that ongoing site reclamation activities are appropriately addressed through an operating facility's licence.

Questions for stakeholders on regulating remediation activities:

- Is there a need for the CNSC to define the concepts of remediation, legacy site, existing situation, and reference levels?
 - Providing clarity on the expectations for remediation in Canada by discussing terms relevant to radioactive waste management and decommissioning could benefit current and potential licensees. It would be beneficial for the CNSC to provide an interpretation of the International Commission on Radiological Protection concepts of "existing situation" and "reference levels" as applied to radioactive waste and decommissioning in Canada. "Remediation" and "legacy site" should be defined if they are relevant to regulations or associated guidance. Are there other definitions that may be useful to the consideration of the requirements for long-term management of remediated sites?
 - There should be some discussion about what is meant by 'institutional control' and how it can (or should) be applied to the long term management of a remediated site. It would also be valuable for the CNSC to provide a discussion on the various types of institutional control and how they fit into the CNSC's licensing process.
 - Consider adding definitions for site-specific remediation objectives and site-specific risk assessments.
- Is there a need for an alternative process to the issuance of a licence to perform remediation for existing situations?
 - As the remediation process is seen as improving an existing situation, the regulatory process for implementing remediation should be streamlined. For instance, extensive environmental assessment may not be required for

remediation projects. Similarly, if the remediation activity fits within the licensing basis, then there should be no need for an additional licence to perform remediation activities as long as site-specific programs and other documents are maintained.

- Are there any additional comments on the proposals above?
 - No.

7. Release from Licensing After Decommissioning or Remediation

Cameco agrees that the issuance of a licence to abandon may be counter-intuitive and perhaps misleading. The term 'abandon' may be misleading because it suggests that licensees are deserting or walking away from a site, or abdicating without fulfilling duties or obligations. Alternatives to the licence to abandon include:

- Release from licensing
- Application to have licence revoked/an exemption from licence approach

The existing exemption from the licensing approach could be reworked to incorporate any existing ICP framework. For any sites where ongoing monitoring requirements may exist, the CNSC would need to define and reach consensus for any ongoing monitoring with the central government authority responsible for institutional control.

Questions for stakeholders on release from licensing after decommissioning or remediation:

- Is there a need for the CNSC to clarify the role of a licence to abandon in a nuclear facility's lifecycle?
 - Yes. The suggested terminology in the Discussion Paper provides options for this clarification.
- Is "abandon" the appropriate term to use for a nuclear facility that has successfully completed a decommissioning or remediation process and no longer requires CNSC oversight?
 - No, 'abandon' is not the best term to describe completion of a project with regulatory oversight in accordance with the decommissioning plan.
- Is there a need for an alternative process to the issuance of a licence to abandon for nuclear facilities when they reach the end of their lifecycle, but still require long-term care and maintenance?
 - It will be important for the CNSC and the appropriate government agency responsible for assuming long-term institutional control to define the transfer requirements associated with long-term care and maintenance.
- Are there any additional comments on the proposals above?
 - No.

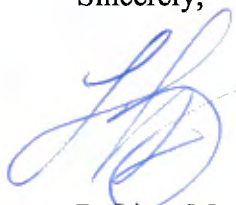
Summary

Cameco recognizes and supports the CNSC's commitment to continuous improvement of its regulatory framework. We believe there are areas of the radioactive waste management and decommissioning topic that need to be further considered and clarified. This includes the proposed radioactive waste categories (the categories themselves and the regulatory purpose of these categories), handling of mixed waste, terminology and requirements associated with the 3Rs, and clarifications on licensing approach. One of Cameco's main requests for clarification is how radioactive waste management and decommissioning will be incorporated into the CSNC's regulatory framework, through either REGDOC(s) or regulation. In addition, because the Discussion Paper is a high-level document, we found it challenging to comment in a meaningful way on potential compliance or administrative impacts.

Thank you for the opportunity to provide feedback on this Discussion Paper. Cameco looks forward to the opportunity to provide additional feedback on specific radioactive waste management and decommissioning proposals when available.

If you have any questions with respect to the above, then please contact the undersigned at (306) 956-6685 or liam_mooney@cameco.com.

Sincerely,



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