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VIA EMAIL

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Dear Mr. Torrie:

Cameco Corporation's Comments on Discussion Paper DIS-16-05, *Human Performance*

Cameco Corporation (Cameco) has prepared the following comments on the Canadian Nuclear Safety Commission's (CNSC's) Discussion Paper DIS-16-05, *Human Performance* (the Discussion Paper).

Background

Cameco is the licensee for a number of nuclear facilities in Canada, including uranium mines in Saskatchewan and uranium processing facilities in Ontario. We are committed to ensuring the safety of our employees at our operations and place the highest priority on minimizing the health and safety risks associated with our business. As outlined in our Safety, Health, Environment and Quality Policy, Cameco strives to be a leading performer in all aspects of our business through a strong safety culture, environmental leadership, and operational excellence.

Human performance management is one of the CNSC's fourteen safety and control areas and the requirements in this regard for Cameco's operations are currently outlined in each site's licence and associated Licence Conditions Handbook (LCH). Currently, the focus of human performance as required by our sites' LCHs is focussed on training, which is appropriate for the risk profile of Cameco's operations.

Need for a REGDOC on Human Performance

Although we recognize the importance of human performance at our facilities, we do not see the need for the CNSC to develop specific guidance or a REGDOC on human performance.

Human performance is captured in our management system and various aspects of human performance are incorporated into Cameco's existing programs. As CSA N286-12, *Management System Requirements for Nuclear Facilities* states: "[t]he management system brings together in a planned and integrated manner the processes necessary to satisfy the requirements that must be met to achieve business success and sustainability." In accordance with this, we believe that a management system should be the overarching document guiding activities at our facilities, not a Human Performance Program (HPP). Cameco's management system programs are effective and well established; we do not see a gap to nuclear safety that a REGDOC on human performance would fill.

Further, the analogy provided under the section *10 A Note on Human Performance Tools* notes that human performance tools are only part of the solution to ensuring good "human performance" and that the entire management system is critical. Since Cameco already has a management system and the CNSC provides guidance on this (e.g., through licences, LCHs, CSA N286-12, etc.), the very broad view of human performance as articulated in the Discussion Paper makes it redundant. Industry would be better served with a more focussed and practical view of human performance.

Should the CNSC require licensees to have either a formal or roadma-style HPP, this would add a significant administrative burden and increase complexity without a corresponding improvement in safety. Our view is that the LCH identifies the risks and level of risk of each facility as well as the human performance activities that are appropriate to that facility. An exercise in road mapping or duplicating content into a separate program will only add complexity and will not result in any substantive reduction in risk.

Although we do not see the need for HPPs, either formal or roadmap type, nor the development of a REGDOC or regulation on HPPs, we have nonetheless provided the following comments should the CNSC chose to advance regulation of human performance beyond the level of the Discussion Paper.

Requirement for Human Performance Programs at all Nuclear Facilities

Currently, all licensees for nuclear facilities have human performance management requirements that are commensurate with the risk of the licensed activity.

Unfortunately, we found the Discussion Paper did not adequately rationalize why all nuclear facilities would benefit from implementation of a HPP beyond what is currently in place. The development of HPPs should be tailored and specific to each type of facility licensed by the CNSC. What is a required or good practice at a nuclear power plant may not be necessary or practical at a uranium mine or mill, or a fuel processing facility.

Although the Discussion Paper notes that the CNSC will accept a graded approach to application commensurate with risk, the overall purpose and objectives of HPPs at all nuclear facilities, specifically non-power plants, has not been adequately outlined. As noted in Cameco's comments on the CNSC's Discussion Paper DIS-13-02, *Proposed Amendments to Regulations Made under the Nuclear Safety and Control Act* (Mooney to Torrie, March 21, 2014), the need for, and requirements of, HPPs (in this case) in nuclear power plant industry versus mining, milling, and fuel processing industries should be more clearly communicated by the CNSC.

Implementation of Human Performance Programs

The CNSC has not clearly outlined their expectations for implementation of HPPs at facilities that do not currently require formal HPPs (e.g., uranium mines, uranium mills, and fuel services facilities). Cameco believes the concept of a graded approach outlined in the Discussion Paper should be applied to both the type of HPP and the implementation of a HPP based on number of factors that make up risk. Some facilities may justify having HPP as a licence condition, while other sites will not require this level of human performance oversight.

At the Discussion Paper level, we have further questions about what will be required to document and demonstrate that the objectives, practices, and elements of a HPP are in place. Similarly, how the CNSC will review and monitor effectiveness and adequacy of the less formal roadmap-type HPPs remains unclear based on information provided in the Discussion Paper.

CNSC Policy on Human Factors versus the Discussion Paper

The CNSC's existing regulatory policy on human factors, P-119 (the Policy), was published in 2000 and describes how the CNSC will take human factors into account during licensing, compliance, and standards-development activities.

The purpose and scope of the Policy is quite different from the Discussion Paper. For instance, the Policy is focused on the activities and actions of the Commission (regulatory oversight), while the Discussion Paper is focused on licensee activities and processes. If the intent of the Discussion Paper and potential future REGDOC on the topic is to replace or supersede the policy, the evolution in objectives and purpose is important to highlight.

In addition, we note that the policy is not currently referenced in any of Cameco's licences or LCHs; this raises additional uncertainty on the applicability of the human factors to uranium mining, uranium milling, and fuel services activities.

Response to the Discussion Paper Questions

Q 1. Do you agree with the definition of human performance as stated above [Human performance is the behaviours and the results of human activities when carrying out work tasks]? Are there changes or alternative definitions you would propose?

Cameco's response: We do not agree with the definition in the Discussion Paper, which includes the phrase "results of human activities". It is important to recognize the distinction between behaviours and their results (accomplishing a specific objective or task), which is not necessarily part of the human performance. Cameco suggests the CNSC host a workshop with all interested parties to reach consensus on a clearly-written definition based upon a common understanding and actual work in the field.

Q 2. Do you propose any changes or alternatives to the CNSC's existing definition of human factors [Human factors are those factors that influence human performance]? Please provide rationale for any proposed changes or alternatives.

Cameco's response: We disagree with this definition and believe defining human factors as "those factors that influence human performance" is overly broad and vague. The definition does not provide guidance to licensees as it can be interpreted to refer to all

aspects of the facility, the worker, and the environment around them. As currently written, the definition could be interpreted to include a wide range of aspects such as the management system and physical design, as well as non-work related experiences, situations, social and economic conditions as factors that influence human performance.

From this broad starting point, the Discussion Paper then lists specific examples of human factors that are already included in other programs, management systems, and as conditions in LCHs. It is thus unclear what value is added by replicating these items under a separate program.

We note there were instances where the concept of human factors varied within the Discussion Paper. In section 5 *Elements of a Human Performance Program*, human factors are explicitly linked to design. Although this is helpful and we agree with this connection, the concept contradicts the broader definition used elsewhere in the Discussion Paper.

We propose that human factors be explicitly linked with design and the interaction of workers with the facility. This will provide a more focussed, meaningful, and applicable definition that does not attempt to replace other guidance, such as CSA N286, which already includes a number of the human factor aspects that are now described in the Discussion Paper.

We also note that the following human factors definition is provided in the CNSC's REGDOC 3-6, *Glossary of CNSC Terminology*: "*Factors that influence human performance as it relates to the safety of a nuclear facility or activities over all phases, including design, construction, commissioning, operation, maintenance and decommissioning. Some examples are organizational and management structures; policies and programs; allocation of functions to humans and machines; the design of user interfaces; staffing provisions; job-design features; work schedules; design of procedures; training; and the physical work environment.*" While this definition is quite broad, it outlines boundaries to human factors thereby providing some clarity relative to the definition in the Discussion Paper. Further, the inconsistency in the definition of human factors between the recently published REGDOC 3-6 and the Discussion Paper suggests there is misalignment within CNSC on this concept.

Q 3. Do you agree with the objectives and practices of a human performance program listed above? Are there items that you would add to or remove from the lists? Please explain.

Cameco's response: As a general point, an implicit assumption of this question is that there is agreement that there should be a HPP. As noted previously, not all licensees are currently required to have a formal HPP and the Discussion Paper references components that are already part of management systems as set out in the applicable CSA standard (CSA N286-12). Outside of the discussion on the appropriateness of the listed objectives, an HPP is not necessarily required to achieve these outcomes, particularly if the components mentioned are part of a management system.

Cameco does not agree with the objectives and practices of human performance as listed because the definitions of human factors and HPP are not correct. The human performance objectives were not written to be specific, measurable, achievable, or

reasonable. At the core of the problem with the objectives and practices is the overly broad definitions of human performance and human factors, which seem to replicate significant aspects of the management system.

We suggest the CNSC host a workshop with all interested parties to agree upon human performance objectives and practices that are risk-based and applicable with this approach to all nuclear facilities in Canada.

Q 4. Do you agree with the elements of a human performance program listed above? Are there items that you would add to or remove from the list above? Please explain.

Cameco's response: The HPP elements listed in the Discussion Paper are already covered by our facilities' management system. Based on the information in the Discussion Paper, it is difficult to understand how a separate HPP within the management system will function in practice. As written, the elements could inadvertently mandate organizational design and create a stand-alone program that would not benefit from an integrated approach within the management system. As noted previously, it is unclear why elements of our current management system, which describes our integrated programs and meets LCH requirements as prescribed by the CNSC, are being repeated as elements of a separate program.

Cameco encourages the CNSC to conduct a workshop with all interested parties to discuss the elements of a HPP. The elements of a HPP can be best identified following development of commonly understood and accepted definitions for human factors and human performance.

If the CNSC does move forward with a REGDOC on human performance prior to a workshop, the CNSC should consider cross-referencing to specific REGDOCs, regulatory policies and regulatory guides that contain elements of HPPs.

Q 5. Do you agree with the concept of a human performance program described above? If you would propose other ways of viewing a human performance program and its elements, please describe them.

Cameco's response: Cameco does not agree with this concept as described. Programs require distinct processes that can be easily described and performed with clear, measurable goals and outcomes. The HPP concept in the Discussion Paper describes an integrated management system rather than a program. This management system, which describes how our programs are integrated, is already in place as required by our LCHs.

The International Atomic Energy Agency (IAEA) Nuclear Energy Series Technical Report NG-T-2.7, *Managing human performance to improve nuclear facility operation* states as follows:

The idea of creating a programme just for HPI [human performance improvement model] is not a recommended strategy. Rather, all the basic principles and tools for excellence in human performance should be effectively integrated into all ongoing processes and programmes at a facility to ensure the desired results. The overall strategy and structure of the nuclear facility should be designed with the alignment of

its processes and values for achieving the identified and communicated operational and safety goals.

The CNSC cites this IAEA report in section 6 *CNSC Considerations for Regulating Human Performance* of the Discussion Paper, yet the CNSC proposes a solution for human performance (i.e., a standalone program) that is not aligned with the IAEA's recommendations in the report.

As stated previously, the relationship between and integration of our programs and elements is described within our management system. This management system is a requirement of our licences and already describes the integration of the components listed in section 5 *Elements of a Human Performance Program* as it pertains to each facility. We view the requirement for a separate HPP as a redundant exercise that would add administrative burden with no corresponding benefit to safety. Human performance should not be a program, rather those elements applicable to the individual facility should be integrated within the appropriate parts of a facility's existing management system.

Q 6. Do you think that the requirement to have a human performance program should be applied using a graded approach to all CNSC-licensed facilities and activities? If so, what might this graded approach look like?

Cameco's response: We do not see the need for the CNSC to develop specific guidance or a REGDOC on human performance. However, we provide the following notes should the CNSC advance this concept to the REGDOC level.

In theory, a graded approach to HPPs works well if it is based on the scope of activities and risk associated with a particular nuclear facility. However, we believe the Discussion Paper did not consistently enable the application of a graded approach. For instance, fairly prescriptive lists of human performance objectives, elements, and practices were provided. In addition, the text in section 9 *CNSC Expectations of a Human Performance Program* is quite directive and not aligned with earlier sections where the roadmap option was discussed as part of a graded approach.

We were concerned that the differences between the roadmap-type HPP and a more formal HPP have been poorly described in the Discussion Paper. For instance, section 7 *Human Performance and Management Systems* provide two very similar descriptions for a formal program ("...an umbrella-type overview...") and a less formal "roadmap". The Discussion Paper was also lacking information on how the licensee would implement and how the CNSC would enforce the less formal roadmap-style HPP. This made it difficult to provide informed feedback on potential impacts of the proposed HPPs.

We suggest the CNSC expand the graded approach to include the option of "no HPP" if warranted based on the characteristics of and risk associated with the facility. A facility with no HPP would still meet requirements of CSA N286-12 and address aspects of human performance within the site's management system.

It will be advantageous for the CNSC to provide clarity to licensees and CNSC staff on what type of HPP is needed for what type of nuclear facility, and differentiate between requirements and guidance.

Q 7. Which type of human performance program (a formal program or otherwise) is most appropriate for the types of nuclear facilities most relevant to your comments, and why?

Cameco's response: We do not see the need for the CNSC to develop specific guidance or a REGDOC on human performance. However, we provide the following notes should the CNSC advance this concept to the REGDOC level.

Cameco supports the application of a graded approach to HPPs and believe that our operations would be best suited to a roadmap-style HPP. Our existing management system covers many, if not all, of the HPP elements described in the Discussion Paper. A roadmap could be used to describe the elements of the management system of relevance to human performance.

How a licensee supports workers to perform their tasks safely and effectively will vary with the activities and work being undertaken at the operation. At Cameco's operations, the scope of work and nature of activities supports a graded approach based on risk. We believe a HPP at uranium mines and mills and uranium fuel processing operations would be best developed as a roadmap rather than a formal program.

Q 8. Do you propose any additional or alternative expectations of a human performance program?

Cameco's response: This question is included in section 9 *CNSC Expectations of a Human Performance Program* and yet the expectations for what the CNSC will require in an HPP have not been clearly stated and seem to contradict earlier sections of the Discussion Paper.

Specifically, this section of the Discussion Paper appears to undermine the ability of a licensee to adopt a roadmap approach to HPP and to some extent a graded approach, as described in sections 7 *Human Performance and Management Systems* and 8 *Graded Approach*. If the Discussion Paper evolves into a REGDOC, then the CNSC should consider revising this section to incorporate these concepts. As currently written, the CNSC's expectations of a HPP would require a significant investment for licensees and all aspects of their business, regardless of the benefit.

The Discussion Paper notes that nuclear power plant licensees and other specified nuclear facilities are currently required to implement and maintain HPPs. It was not explicitly stated that facilities with current HPPs would be expected to have formal HPPs as described in the Discussion Paper. It was also unclear what type of HPP the CNSC proposes to implement at "other" nuclear facilities, such as Cameco's operations.

Cameco encourages the CNSC to host a workshop with all interested parties to discuss this and all other questions posed in this Discussion Paper.

Summary

Effective human performance is enabled through the development and implementation of processes that ensure staff are sufficient in numbers in all relevant job areas and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties. While

Cameco recognizes that safe and reliable human performance is essential in order to assure the overall safety of nuclear facilities, we do not see the need for the CNSC to develop a REGDOC on human performance. The topics discussed in the Discussion Paper already exist within management systems and the various programs used to satisfy the standard articulated by CSA N286-12. These programs are mature, effective and well understood by licensees, who do not see a gap to nuclear safety that requires a REGDOC to help close. The Discussion Paper speaks to a HPP being an overarching management document; however, most licensees are required to follow management standards and there appears to be significant and unnecessary duplication between HPPs as described in the Discussion Paper and existing integrated management systems.

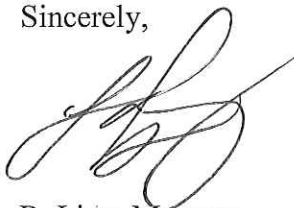
As stated at numerous points above, we encourage the CNSC to host a workshop with all interested parties before any decisions are made regarding the need for any requirements or REGDOCs on human performance. The workshop should include discussion of human performance objectives and practices that are risk-based and relevant to all nuclear facilities in Canada.

The safety and control area of human performance management in our licences currently focus on training because this is the key human performance element at Cameco's operations. Although we do not believe a REGDOC is required, should the Discussion Paper evolve into more formal guidance, Cameco encourages the application of a graded approach to HPPs based on the nature of activities and risk at the facility. An informal roadmap outlining elements of a HPP would be more appropriate than a formal HPP at Cameco's fuel services facilities and uranium mines and mills.

Thank you for the opportunity to provide feedback on this Discussion Paper. Cameco looks forward to the opportunity to participate in a CNSC-led workshop on this topic prior to the release of any further specific human performance proposals.

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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