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Response to Commission Request for Information

Réponse à la Demande d'information de la Commission

Cameco Corporation

Application to Renew Licence for Cameco Fuel Manufacturing Inc.

Cameco Corporation

Demande de renouvellement de permis pour Cameco Fuel Manufacturing Inc.

Public Hearing in Writing

Réunion publique

Submitted by:

CNSC Staff

Soumise par :

Le personnel de la CCSN

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Canada

Summary

This supplemental Commission Member Document (CMD) provides CNSC staff's response to questions raised by the Commission panel members in CMD 21-H105Q.

Résumé

Ce document à l'intention des commissaires (CMD) supplémentaire apporte les réponses du personnel de la CCSN aux questions posées par les membres de la formation de la Commission dans le CMD 21-H105Q.

Signed/signé le

23 December 2021

Murthy, Kavita

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1 BACKGROUND

The Panel of the Commission, in conducting a hearing in writing (2021-H-105) to consider the request from Cameco Corporation to renew the Class IB nuclear fuel facility operating licence for Cameco Fuel Manufacturing Inc. for a period 1 year, has directed a request for additional information to CNSC staff (CMD 21-H105Q). Questions from the panel directed at CNSC staff, and staff's responses, are provided in this supplemental CMD.

2 STAFF RESPONSE

The Commission's questions have been reproduced below in the shaded boxes to provide suitable context for CNSC staff's responses.

2.1 CNSC Staff's Response to Question #1

#1	Staff indicated that there were no incidents of significance but, in fact, there were 5 medium risk findings during the licence term. Curve Lake First Nation (CMD 21-H105.5) raised the question as to whether these findings created concerns. Could staff please comment on these 5 risk findings, what they were, what risk was created, how was the risk resolved, and are there any remaining long-term issues of concern.

On page 16 of CMD 21-H105, CNSC staff discussed Cameco's overall safety performance, and stated that "the majority of findings at CFM were of low safety significance, however several medium safety significance findings were identified by CNSC inspectors during the first half of the current licence period." CNSC staff also conveyed that for each of these findings, Cameco has taken appropriate corrective measures and the enforcement actions are considered closed.

As part of the CNSC inspection process, inspectors make a determination on the safety significance of each non-compliance finding issued in the final inspection report. In general, a situation, event, or issue is deemed to have safety significance if it denotes a deviation from the safety case accepted in the licence in a direction detrimental to safety [1]. The ranking of safety significance into low, medium, or high, refers to the degree to which performance deviated from meeting regulatory requirements, and the magnitude of potential impacts to the health, safety and security of persons and the environment if not addressed by the licensee. A finding with medium safety significance is one where a significant deviation from compliance expectations is identified, and there is a medium risk that if not addressed, the finding could lead to significant impact to the health, safety and security of persons, or the environment.

As noted by CNSC staff in CMD 21-H105, there were no findings of medium or higher safety significance identified at CFM in the second half of the current 10-year licence term. A review of historical data of all enforcement actions issued to CFM identified that 52 enforcement actions were issued for medium safety significance inspection findings over the current licence term (i.e., March 01, 2012 to present day). Thirty-nine of these arose from inspections conducted during the first 3 years of the current licence (i.e., 2012-2014).

CNSC staff performed a preliminary review of CFM inspection findings and concluded that the majority do not meet the threshold for medium safety significance discussed above, and therefore should not have been classified as such.

Below are 2 examples of inspection findings classified as medium that do not meet medium safety significance criteria:

Low Safety Significance Finding Classified as Medium. Example #1.

Inspection Date: July 14 to 16, 2014

Safety and Control Area: Radiation Protection

Finding: CNSC staff conducted an inspection at CFM on July 14 to 16, 2014 focusing on radiation protection. CFM has hand-and-foot monitors and handheld contamination meters to verify that contamination levels on personnel and materials are below the free release criterion of 0.4 Bq/cm^2 before leaving the production area. During the inspection CNSC staff identified that the trigger levels for identifying a positive result were set exactly at the criterion, and therefore do not account for measurement uncertainty.

Safety Significance: This finding was assigned a medium safety significance in CNSC's RIB database. The consequence of this finding is that personnel or materials could be cleared to exit the production area with surface contamination above the free release criterion by a margin equivalent to the measurement uncertainty. If for example, the measurement uncertainty is 10%, contamination levels up to 0.44 Bq/cm^2 may have been cleared to exit the production area. Given the conservatism in the free release criterion relative to levels associated with health impacts, the potential for significant impacts as a result of this finding is low. The potential for this finding to result in an exceedance to a regulatory dose limit or action level is also considered low. Consequently, the appropriate safety significance classification for this finding is "low".

Licensee Corrective Actions: In response to this finding, Cameco updated internal documentation to ensure that measurement uncertainties are determined and trigger levels on the hand-and-foot monitors and handheld contamination meters are updated on a semi-annual basis to incorporate uncertainty.

Remaining Concerns: There are no remaining concerns. The corrective actions implemented by Cameco adequately addressed the finding.

Low Safety Significance Finding Classified as Medium. Example #2.

Inspection Date: October 7-11, 2013

Safety and Control Area: Management System

Finding: CNSC staff conducted an inspection on October 7-11, 2013 focusing on the CFM management system. A review of CFM's integrated management system manual and documented organizational roles and responsibilities identified an inconsistency when compared to actual practice, determined from interviews with CFM staff. The observed inconsistency was in relation to whether the Fuel Service Division (FSD) divisional controller reports to the CFM general manager or FSD vice president.

Safety Significance: This finding was assigned a medium safety significance. However, this finding represents a minor deviation from compliance expectations and the potential for it to result in significant impacts to the health, safety and security of persons, or the environment is low. Consequently, the appropriate safety significance classification for this finding is "low".

Licensee Corrective Actions: This finding was discussed by Cameco during its annual management review and the documented organizational roles and responsibilities were updated to reflect the appropriate reporting structure.

Remaining Concerns: There is no remaining concern in relation to this finding. The corrective actions implemented by Cameco adequately addressed this finding.

Although a preliminary review by CNSC staff identified many findings which should not be classified as medium safety significance, there are also several which do meet the criteria and are correctly classified as such. Examples of medium safety significance findings identified by CNSC inspectors at CFM during the current licence term are provided below.

Medium Safety Significance Finding Example #1.

Inspection Date: October 18, 2016

Safety and Control Area: Emergency Management and Fire Protection

Finding: CNSC staff conducted an inspection at CFM on October 18 to 19, 2016, which included the observation of a simulated emergency where support from Cameco's response team and local Emergency Medical Services (EMS) were required. During the de-brief held after the exercise was complete, members of the local EMS expressed doubts about whether they would transport a contaminated person.

Safety Significance: This finding was assigned a medium safety significance based on the potential consequence that an injured person at CFM may not get appropriate medical treatment in an emergency situation if not addressed.

Licensee Corrective Actions: Cameco held a meeting with the local EMS to discuss the finding and identify a resolution that would alleviate the expressed concerns. As an outcome of the meeting, Cameco implemented changes to its Emergency Response Team responsibilities to increase support for EMS personnel and minimize potential patient contamination prior to receiving EMS attention and/or prior to transport.

Remaining Concerns: There is no remaining concern in relation to this finding. CNSC staff have observed subsequent emergency exercises during recent inspections at CFM and the transport of injured persons by local EMS was not an issue.

Medium Safety Significance Finding Example #2.

Inspection Date: July 14, 2014

Safety and Control Area: Conventional Health and Safety/Radiation Protection

Finding: CNSC staff conducted a walkdown of the CFM facility during an inspection conducted on July 14, 2014, focusing on radiation protection. During the walkdown, several conventional health and safety and radiation protection hazards were observed in the waste treatment area.

Safety Significance: This finding was assigned a medium safety significance based on the number, and significance of hazards identified and the potential consequences on health and safety of workers.

Licensee Corrective Actions: The condition of the waste treatment area was attributed, in part, to renovations being completed elsewhere in the facility that resulted in additional equipment being brought into the area temporarily. In response to the finding, Cameco removed unnecessary equipment from the area and implemented enhanced internal housekeeping and contamination surveys. Indoor air monitoring identified an improvement in airborne uranium levels as a result of the corrective actions.

Remaining Concerns: There are no remaining concerns regarding this finding. CNSC inspections routinely include complete facility walkdowns as part of each onsite inspection. Cameco has continued to implement measures to minimize conventional health and safety and radiation protection hazards in the waste treatment area.

Medium Safety Significance Finding Example #3.

Inspection Date: October 7 to 11, 2013

Safety and Control Area: Management Systems, Conventional Health and Safety

Finding: CNSC staff performed an inspection at CFM from October 7 to 11, 2013, focusing on the management system safety and control area. Management system requirements regarding work verification were verified for various procedures, including Control of Hazardous Energy (COHE). CNSC staff identified that a form used to ensure proper transfer of Lock-Out-Tag-Out (LOTO) devices for shift or personnel changes was not being completed consistently.

Safety Significance: This finding was assigned a medium safety significance based on the risk, and potential consequence to worker health and safety if accidental exposure to active energy sources were to occur.

Licensee Corrective Actions: Following the issuance of this finding, CFM introduced a new Cameco Corporate COHE standard at CFM and provided training to employees. A requirement was also introduced for supervisors to perform audits of the associated forms.

Remaining Concerns: There are no remaining concerns regarding this finding. The corrective actions implemented by Cameco were reviewed by CNSC staff and determined to adequately address the finding. Given the importance of the COHE procedure to the safety of workers, CNSC staff have conducted verification on various aspects of this process during the current licence period and this finding has not been repeated.

This question has highlighted an inconsistency in past practices dating back to a period when the database used to manage regulatory enforcement actions was new and staff's implementation of it was evolving. The current practice of assigning safety significance to findings aligns more consistently with the basis described above which considers the potential consequence of each finding on the health and safety of persons and the environment if not addressed by the licensee. Criteria have been established for safety significance ranking of events at nuclear fuel cycle facilities, such as those presented in Appendix L of the *Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2018*. In recent years, internal forums have also been introduced which provide opportunities for CNSC inspectors to share lessons learned from recent inspections with the goal of improving the consistency and knowledge of all aspects of the CNSC inspection process.

Moving forward, CNSC staff will be carrying out a review of the CFM inspection findings from the first half of the current licence term to establish a proper representation of the safety significance of CFM inspection findings.

Regardless of the safety significance determination, CNSC staff expectation remains that licensees address and correct all non-compliances to CNSC's staff satisfaction. As discussed earlier, CNSC staff are satisfied that Cameco has implemented appropriate corrective measures for all inspection findings during the current licence term.

2.2 CNSC Staff's Response to Question #2

Question #2 from the Commission has been separated into two parts to facilitate CNSC Staff's response.

#2 (part a)	Could staff comment on the concern raised by the Port Hope Community Health Concerns Committee (PHCHCC) in CMD 21-H105.7 regarding neutron emission from UF6 cylinders? Staff can also comment on how this concern relates specifically to this facility, recognizing it was also addressed in the context of the 2011 renewal hearing for this facility.

In their submission (CMD21-H105.7), the Port Hope Community Health Concerns Committee (PHCHCC) described their concerns regarding the CFM licence renewal, which include neutron emissions from uranium hexafluoride (UF6) cylinders. The PHCHCC has raised these concerns to the Commission previously, including in their intervention to the Commission as part of the previous licence renewal for CFM in 2012. PHCHCC included the 2012 intervention in CMD 21-H105.7, claiming that the issues raised are still relevant today. In that submission, PHCHCC stated that "Trucks travel regularly through the streets of Port Hope on their way to the highways with cylinders of Cameco's UO2 and UF6 product that emit gamma and neutron radiation".

UF6 is not received, processed, or produced at CFM and is therefore not relevant to the renewal of the CFM licence. The CFM facility receives UO2 powder as source material, and produces nuclear fuel bundles for use in Canada. Transportation of these materials is conducted safely and is protective of the environment and health and safety of persons. Transport packages used to transport UO2 powder and nuclear fuel bundles comply with the *Packaging and Transport of Nuclear Substances Regulations, 2015*, and the dose rates on the outside of the packages meet regulatory requirements.

As part of the ongoing CNSC Compliance Program and initiated by requests from members of the public, in 2005 neutron dose rate measurements were taken from full UF6 packages at Cameco's conversion facility in Port Hope, Ontario. CNSC staff's measurements of the surfaces of UF6 cylinders were < 0.03 mSv/h for gamma radiation and < 0.003 mSv/h for neutron radiation which is well below the prescribed dose rate limits in the PTNSR 2015. The observed dose rates were as expected and reasonable values for these packages.

Although not relevant to CFM, this item was addressed by the CNSC staff during the previous licence renewal hearings. The discussion on this topic during those hearings remains valid and is captured in the *Record of Proceedings, Including Reasons for Decision for Cameco Corporation's Application for the Renewal of the Operating Licence for Cameco Fuel Manufacturing Inc. in Port Hope, Ontario. [item 137]:*

#2 (part b)	Could staff also comment on the PHCHCC's note in CMD 21-H105.7 that, in Europe, transportation of UF6 containers requires additional shielding through blanketing but that, in Canada, this does not appear to be required.

There are 2 types of cylinders used to transport UF6:

1. 30 inch cylinders that are specifically used for enriched UF6, which is a fissile material and requires a protective cylinder for the purposes of thermal resistance and mechanical impact protection. Both Europe and Canada implement this requirement for additional protection.
2. 48 inch cylinders that are specifically used for non-fissile material only.

There are no differences in European or Canadian requirements for transport of UF6. Both follow the IAEA Regulations for the Safe Transport of Radioactive Materials, SSR-6. All the certificates issued by the CNSC for 30 inch and 48 inch cylinders meet the requirements of the IAEA regulations.

Thermal blanketing is required in some countries for 48 inch UF6 cylinders for additional thermal protection and not to reduce the dose rate from the packages. Some European countries require thermal blanketing because of their different interpretation of the fire test results. The testing and the modeling has demonstrated that 48 inch cylinders will withstand 800^{o}C temperature for 30 minutes without failure. Therefore, in Canada and USA both bare cylinders and thermal blanketed cylinders are accepted.

These 48 inch cylinders have an excellent safety record. Millions of tonnes of UF6 have been transported throughout the world for decades using these cylinders, with no significant transport incidents resulting in serious consequences from either the radiological or the chemical nature of UF6.

Although not relevant to CFM, the discussion on this topic during the previous hearing also remains valid and is captured in the *Record of Proceedings, Including Reasons for Decision for Cameco Corporation's Application for the Renewal of the Operating Licence for Cameco Fuel Manufacturing Inc. in Port Hope, Ontario [item 136].*

3 CONCLUSION

In this CMD, CNSC staff provided responses to questions from a panel of the Commission (CMD 21-H105Q) in respect of the hearing in writing (CMD 21-H105), concerning the request from Cameco Corporation to renew its Class IB nuclear fuel facility operating licence for Cameco Fuel Manufacturing Inc. for a period 1 year.

CNSC staff's conclusions and recommendations remain unchanged and therefore recommend that the Commission (as documented in CMD 21-H105):

1. Conclude, pursuant to paragraph 24(4)(a) and (b) of the NSCA, that Cameco:
    i. is qualified to carry on the activities authorized by the licence
    ii. will make adequate provisions for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.
2. Issue the proposed 1-year licence for operation of the CFM facility FFL-3641.00/2023.
3. Accept the revised financial guarantee for the future decommissioning of the CFM facility as recommended in subsection 4.4 of CMD 21-H105.
4. Authorize the delegation of authority as set out in subsection 4.8 of CMD 21-H105.

REFERENCES

1. Canadian Nuclear Safety Commission, REGDOC-3.6 *Glossary of CNSC Terminology*, Ottawa, Canada, 2019.