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**ORIGINAL/ORIGINAL**

**CMD: 22-H12**

**Date signed/Signé le : 08 AUGUST 2022**

A Licence Renewal

Un renouvellement de permis

**Cameco Fuel  
Manufacturing Inc.**

**Cameco Fuel  
Manufacturing Inc.**

Application to Renew the Class IB  
Nuclear Fuel Facility Licence for  
Cameco Fuel Manufacturing Inc. in  
Port Hope, Ontario

Demande de renouvellement du permis  
d'exploitation de l'installation de  
combustible nucléaire de catégorie IB  
pour Cameco Fuel Manufacturing Inc.  
à Port Hope (Ontario)

Commission Public Hearing

Audience publique de la Commission

Scheduled for:  
November 23-24, 2022

Prévue pour :  
23-24 Novembre 2022

Submitted by:  
CNSC Staff

Soumise par :  
Le personnel de la CCSN

## Summary

This Commission Member Document (CMD) presents information about the following matters of regulatory interest with respect to the request by Cameco Fuel Manufacturing Inc. (CFM) to:

- Renew the Class IB fuel facility licence FFL-3641.00/2023 to operate the CFM facility for a period of 20 years.
- Increase the authorized CFM facility production capacity to 1,650 tonnes of uranium (tU), as uranium dioxide pellets (UO<sub>2</sub>), per year.

CNSC staff recommend the Commission take the following actions:

- Renew the nuclear fuel facility licence to authorize CFM to operate its facility until February 28, 2043, with a requirement for CFM to provide a comprehensive performance update to the Commission at the mid-point of the licence term.
- Approve the increase of the authorized annual production capacity to 1,650 tU, as UO<sub>2</sub> pellets.
- Authorize the delegation of authority as set out in section 5.9 of this CMD.

The following items are attached:

- Current Licence FFL-3641.00/2023
- Proposed Licence FFL-3641.00/2043
- Draft Licence Conditions Handbook

## Résumé

Le présent CMD présente de l'information sur un ensemble de questions d'ordre réglementaire concernant la demande de Cameco Fuel Manufacturing Inc. (CFM) :

- Renouvellement du permis d'exploitation d'une installation de combustible nucléaire de catégorie IB (FFL-3641.00/2023) afin d'exploiter l'installation de CFM pendant une période de 20 ans.
- Augmentation de la capacité de production annuelle autorisée de l'installation de CFM à 1 650 tonnes d'uranium, sous forme de pastilles de dioxyde d'uranium.

La Commission pourrait considérer prendre les mesures suivantes :


- Renouveler le permis d'installation de combustible nucléaire pour autoriser CFM à exploiter son installation jusqu'au 28 février 2043, avec l'obligation pour CFM de fournir à la Commission une mise à jour exhaustive du rendement à mi-parcours de la période d'autorisation.
- Approuver l'augmentation de la capacité de production annuelle autorisée de l'installation à 1 650 tonnes d'uranium, sous forme de pastilles de dioxyde d'uranium.
- Autoriser la délégation de pouvoirs prévue dans la section 5.9 du présent CMD.

Les pièces suivantes sont jointes :

- Permis actuel FFL-3641.00/2023
- Permis proposé FFL-3641.00/2043
- Ébauche du Manuel des conditions de permis

**Signed/signé le**

08 August 2022

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*On behalf of*

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## EXECUTIVE SUMMARY

Cameco Fuel Manufacturing Inc. (CFM), a wholly owned subsidiary of Cameco Corporation (Cameco), operates a Class IB nuclear fuel manufacturing facility under the [Class I Nuclear Facilities Regulations](#). The CFM facility is located at 200 Dorset Street East in Port Hope, Ontario, which is within the traditional territory of the Wendat, Anishinabek Nation, and the territory covered by the Williams Treaties with the Michi Saagiig and Chippewa Nations.

CFM manufactures nuclear fuel pellets from uranium dioxide powder and assembles nuclear reactor fuel bundles, which are primarily shipped for use in Canadian CANDU reactors.

The purpose of this Commission Member Document (CMD) is to provide the results of CNSC staff's assessment of CFM's application, including conclusions and recommendations, to inform the Commission's decision on CFM's request to renew its operating licence for the CFM facility.

Pursuant to section 24 of the [Nuclear Safety and Control Act](#) (NSCA), the [Commission issued an operating licence](#) to CFM in March 2012 for 10 years, which expired on February 28, 2022. More recently, the [Commission issued a 1-year licence](#), valid from March 1, 2022 until February 28, 2023. During these licence periods, CNSC staff presented the licensee's compliance performance to the Commission in Annual Program Reports (2012 and 2013) and annual [Regulatory Oversight Reports for Uranium and Nuclear Substance Processing Facilities](#) (since 2014).

On October 04, 2021, CFM submitted an application to renew its Class IB Nuclear Fuel Facility Licence FFL-3641.0/2023. In its renewal application, CFM is requesting a licence term of 20 years and an increase of the facility production limit. The requested production limit is approximately 24% higher than the limit currently specified in the CFM Licence Conditions Handbook.

This CMD has 2 parts. Part 1 presents CNSC staff's assessment, conclusions and recommendations in respect of CFM's licence renewal application. CNSC staff have evaluated the licensee's compliance with the requirements of the NSCA and its regulations as well as regulatory requirements imposed through licence conditions. CNSC staff's assessment of the licensee's regulatory performance concludes that the environmental and radiological risks remain low; that effluent quality and radiation doses are effectively controlled and kept well below prescribed regulatory limits; and that CFM's performance in the conventional health and safety SCA demonstrates that hazards and risks are well managed and activities are conducted safely.

Furthermore:

1. CNSC staff conclude that the licensee's performance during the licensing term was satisfactory and met regulatory requirements.
2. CNSC staff's assessment determined that the application complies with regulatory requirements.



CNSC staff recommend that the Commission take the following actions:

1. Conclude, pursuant to paragraph 24(4)(a) and (b) of the NSCA, that CFM:
  - 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. Approve the issuance of the proposed 20-year licence for operation of the CFM facility, effective March 1, 2023 to February 28, 2043 with a requirement for CFM to provide a comprehensive performance update to the Commission at the mid-point of the licence term.
3. Approve CFM's request for an annual production limit of 1,650 tonnes of uranium as uranium dioxide pellets, for the CFM facility.
4. Delegate authority as set out in section 5.9 of this CMD.

Part 2 of this CMD provides licensing-related documentation pertaining to this hearing, including proposed licence changes, the proposed licence and the current licence. A draft licence conditions handbook is also included for information purposes only.

Referenced documents in this CMD are available to the public upon request, subject to confidentiality considerations.

## PART ONE

This Commission Member Document (CMD) is presented in two parts.

Part One includes:

1. An overview of the matter being presented;
2. Overall conclusions and overall recommendations;
3. General discussion pertaining to the safety and control areas (SCAs) that are relevant to this submission;
4. Discussion about other matters of regulatory interest; and
5. Addenda material that complements items 1 through 4.

Part Two provides all available information pertaining directly to the current and proposed licence.

# 1. OVERVIEW

## 1.1 Background

Cameco Fuel Manufacturing Inc. (CFM) operates a nuclear fuel manufacturing facility in Port Hope Ontario under a Class IB nuclear fuel facility licence, FFL-3641.00/2023 [1]. CFM is a wholly owned subsidiary of Cameco Corporation (Cameco).

The CFM facility manufactures nuclear fuel pellets from uranium dioxide powder and assembles nuclear reactor fuel bundles. The finished fuel bundles are primarily shipped for use in Canadian CANDU reactors.

### CFM Location and Layout

The CFM facility is located at 200 Dorset Street East in Port Hope, Ontario. The municipality of Port Hope is situated on the north shore of Lake Ontario, approximately 100 km east of Toronto. The CFM facility is located within the traditional territory of the Wendat, Anishinabek Nation, and the territory covered by the Williams Treaties with the Michi Saagiig and Chippewa Nations.

The CFM licensed area occupies approximately 2.3 hectares of land within a roughly 16 hectare property owned by CFM. The non-licensed area of the property consists of the CFM facility parking lot, a groundwater treatment building, and undeveloped land. Within the licensed area, the main manufacturing building occupies the majority of the site. There are also 3 steel pre-fabricated buildings on site, which are the waste storage building, the maintenance storage building, and the fuel storage building. On the north end of the site, sea containers and transport trailers are used for temporary storage of contaminated waste. There are also several smaller outbuildings used primarily for equipment/materials storage, and a fenced hydrogen compound on the eastern side of the site. An aerial image of the CFM facility and surrounding area is provided in figure 1.

**Figure 1: Aerial image of the CFM facility, located in Port Hope, Ontario.**



### **CFM Licensing History**

The fuel fabrication facility at 200 Dorset Street East was constructed in the 1950's and has been operated by American Machine and Foundry (AMF Atomics Canada Ltd., Westinghouse Canada, Zircatec Precision Industries, and now CFM. Zircatec Precision Industries was the licensed operator of the facility when it was acquired by Cameco on February 01, 2006. [The CNSC licence was amended in November, 2008](#) to change the licensee name from Zircatec Precision Industries to CFM.

In 2012, following a two-part public hearing held November 3, 2011 and January 18-19, 2012, the [Commission issued a 10 year licence to CFM](#), valid from March 1, 2012 to February 28, 2022, [2]. No amendments to the licence were requested by CFM during the 10-year licence period.

In October 2020, CFM submitted an application to the Commission, requesting a 1-year renewal of the CFM operating licence and requesting the Commission's acceptance of a revised financial guarantee. In CFM's application, it explained that the purpose of the requested licence term was to separate CFM licence renewal activities from those of Cameco's Blind River Refinery, which also had its licence expiring on February 28, 2022. Excluding licence duration and the revised financial guarantee, no other changes to any licence terms or conditions were requested by CFM for the 1-year licence renewal. However, CNSC staff recommended that environmental release limits be revised, based on proposed, more conservative exposure-based release limits submitted by CFM subsequent to submission of the application. On February 14, 2022, [the Commission issued](#)

[CFM a 1-year renewal of the CFM facility operating licence](#) which incorporated the new exposure-based release limits, and accepted the revised financial guarantee [3]. CFM's 1-year licence is the current operating licence and will expire on February 28, 2023.

### **CFM Operations**

CFM is authorized to operate its facility for the manufacture of nuclear fuel pellets from natural and depleted uranium dioxide, and the assembly of nuclear reactor fuel bundles. Under the current licence CFM may process up to 125 tonnes of uranium dioxide as pellets during any calendar month. Enriched uranium may also be processed at a small scale.

The manufacturing of finished nuclear fuel bundles at CFM is divided into 2 distinct operations: pellet manufacturing and fuel bundle assembly.

The pellet manufacturing operations at CFM begin with the receipt of uranium dioxide powder from Cameco's Port Hope Conversion Facility. Once drums of uranium dioxide powder are unloaded from transport trailers and emptied, the process involves mixing the uranium dioxide powder with a lubricating agent (zinc stearate), compacting the powder into pellets, sintering the pellets at a high temperature in a hydrogen atmosphere, grinding the pellets to ensure dimensions conform to precise specifications, inspecting the pellets and transferring the finished pellets to the bundle assembly operations.

The fuel bundle assembly operations involve inserting pellets into zircaloy tubes, welding end caps to each tube to form a fuel element, assembling the fuel elements into fuel bundles, welding end plates to each bundle, inspecting the completed bundles for quality characteristics and packaging them for shipment.

The risks associated with the licensed activities at the CFM facility are mainly due to conventional industrial hazards associated with a manufacturing facility, and the chemical and radiological hazards of uranium exposure. CFM currently possesses a small quantity of enriched uranium (i.e., less than 80% of smallest critical mass) and accordingly maintains a reduced scope Nuclear Criticality Safety Program to ensure nuclear criticality risks are minimized.

## **1.2 Highlights**

### **CFM's Licence Renewal Application Requests**

On October 04, 2021, CFM submitted an application for the renewal of its Class IB Nuclear Fuel Facility Licence FFL-3641.0/2023 for the CFM facility [4]. In its application, CFM is requesting a term of 20 years for its future licence and an annual production limit of 1,650 tonnes of uranium (tU) as uranium dioxide (UO<sub>2</sub>) pellets. This production limit represents an approximate 24% increase from the limit currently specified in the CFM Licence Conditions Handbook (LCH) [5].

There are no changes requested to the activities authorized by the CNSC licence. Specifically, CFM has requested authorization for the following activities (provided below as requested in CFM's application [4]):

CFM is requesting:

- i. to operate its nuclear fuel facility for the production of uranium dioxide pellets from depleted, natural, and enriched uranium compounds,
- ii. to possess, transfer, use, process, import, package, transport, manage store and dispose of the nuclear substances that are required for, associated with, or arise from the activities described in (i); and
- iii. to possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i).

CNSC staff note that the wording of item “i” as proposed by CFM (above) contains a minor revision. The current licence authorizes CFM to “operate its nuclear fuel facility for the production of nuclear fuel bundles from depleted, natural, and enriched uranium compounds...”. CFM requested that “nuclear fuel bundles” be replaced with “uranium dioxide pellets” to provide a more accurate statement of current operations and does not represent a request for any new/different authorization. CNSC staff agree that clarity could be added to this statement but are of the opinion that production of nuclear fuel bundles should not be omitted as it is the principal end product of CFM operations. CNSC staff therefore recommend that item “i.” in the proposed licence be written as “operate its nuclear fuel facility for the production of uranium dioxide pellets and assembly of nuclear fuel bundles from depleted, natural, and enriched uranium compounds...”. CNSC staff have discussed this revised wording with CFM, and CFM is in agreement with this change [6]. The proposed licence is included in Part 2 of this CMD and includes this recommended wording.

### **Licence Period**

In the current application CFM is requesting that its Class IB fuel facility licence for the CFM facility (FFL-3641.0/2023) be renewed for a 20-year period. The rationale for CFM’s licence term request is provided in its “*Justification for Licence Term and Production Increase*” document [7] which was submitted to the Commission in support of the application. CFM’s rationale includes an assumption that Canadian CANDU nuclear power plants will continue to operate for an extended period of time (i.e., beyond 20 years), and therefore a 20-year licence term would reduce industry uncertainty regarding the ability of CFM to provide a secure supply of nuclear fuel. Other reasons identified by CFM in support of the licence term request include: CFM’s environmental protection performance (i.e., environmental releases and public doses have remained well below regulatory limits); CFM’s establishment of program documentation for each SCA; the conduct of periodic assessments of key safety documents; and the level of effort required to renew a licence with little to no change in licence conditions and or regulatory requirements. CFM also conveyed its position that CNSC’s strong regulatory framework is capable of supporting longer licence terms, bringing attention to the fact that new regulatory documents and standards can, and have been, integrated into the LCH and implemented during the licence term.

CNSC staff have reviewed CFM's application and rationale for requesting a 20-year licence term. While certain aspects of CFM's rationale, such as the level of effort associated with licence renewals, and reducing industry uncertainty, do not factor heavily into CNSC staff's recommendation, CNSC staff agree with CFM's position that CNSC's current regulatory framework has evolved and is capable of supporting longer licence terms such as that requested by CFM. Further details on CNSC staff's assessment are provided in section 5.7 of this CMD.

### **Production Limit Increase**

In its application, CFM has requested a change to the production limit for the CFM facility. CFM is requesting the facility production limit be changed to “*an annual production limit of 1,650 tonnes of uranium (tU) as uranium dioxide (UO<sub>2</sub>) pellets*”, which represents an increase of approximately 24% relative to the current production limit. The proposed annual-based production limit is also a change from the current limit, which is defined on a monthly basis. In its application CFM stated that there are no immediate plans to increase production. However, a production limit increase is being requested to provide CFM with ability to respond to future business opportunities, should they develop. The change to an annual-based production limit versus the current monthly limit also provides CFM with additional operational flexibility.

In its application and “*Justification for Licence Term and Production Increase*” document [4,7], CFM stated that the requested production increase reflects the production capacity of the facility, as currently configured. Consequently, there is no physical modification of the facility, or new equipment required to operate at the requested level. Instead, increased production would be achieved by increasing the operating hours of the facility. CFM's application provides an assessment of the impact of the production increase on the existing licensing basis and determined only administrative impacts would result. CFM has stated that all current radiation protection and environmental protection action levels would not be impacted, nor would the current Derived Release Limits (DRL) or Exposure Based Release Limits (EBRL) require revision. The overall conclusions from the Environmental Risk Assessment (ERA) would not be impacted by the production increase, and the estimated public dose is also not expected to change.

CNSC staff have reviewed CFM's assessment and agree that the current safety and control measures in place are adequate to ensure that if production is increased, CFM will provide adequate protection to the health and safety of workers, the public, and the environment.

Further details on CNSC staff's assessment are provided in section 5.8 of this CMD.

### **CNSC Staff Assessment of CFM's Licence Application**

CNSC staff have reviewed all aspects of CFM's application for the renewal of FFL-3641.0/2023 and determined that it complies with regulatory requirements for a Class IB licence application as detailed in Addendum C of this CMD.

CNSC staff assessed CFM's licence renewal application and supporting documents and conclude that the information contained therein provides sufficient information to demonstrate that appropriate safety and control measures are in place to meet CNSC's regulatory requirements. CNSC staff's assessment is documented in sections 2 to 4 and Addendum C of this CMD.

On an ongoing basis CNSC staff have reviewed CFM's performance over the previous licence period and reported results to the Commission in public meetings through the annual [\*Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities\*](#). CNSC staff's assessments of performance and compliance are based on desktop reviews of CFM's submissions, including quarterly and annual compliance reports and event reviews, and results of CNSC inspections. CNSC staff have determined that CFM's performance during the licensing term was satisfactory and consistently met regulatory requirements.

Based on CNSC staff's assessments of CFM's past performance and of the licence application, CNSC staff determined that CFM remains qualified and capable of performing the activities authorized by the licence.

### **1.3 Overall Conclusions**

CNSC staff have reviewed CFM's licence renewal application and supporting documents. CNSC staff's assessment determined that the application complies with regulatory requirements and conclude that CFM's performance during the previous licence consistently met regulatory requirements, as reported to the Commission annually through the [\*Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities\*](#).

### **1.4 Overall Recommendations**

CNSC staff recommend that the Commission:

1. Conclude, pursuant to paragraph 24(4)(a) and (b) of the *Nuclear Safety and Control Act* (NSCA), that CFM:
  - 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 20-year nuclear fuel facility licence (FFL-3641.00/2043) for operation of the CFM facility, effective March 1, 2023, to February 28, 2043, with a requirement for CFM to provide a comprehensive performance update to the Commission at the mid-point of the licence term.



3. Approve CFM's request for an annual production limit of 1,650 tonnes of uranium (tU) as uranium dioxide (UO<sub>2</sub>) pellets, for the CFM facility.
4. Delegate authority as set out in section 5.9 of this CMD.

## 2. MATTERS FOR CONSIDERATION

### 2.1 Environmental Review

CNSC staff reviewed the licence renewal application, including the proposed production increase, to identify the type of environmental review required. As part of this process, CNSC staff must assess whether an impact assessment under the [Impact Assessment Act](#) (IAA) is required. For this licence renewal application, an impact assessment is not required because the application does not include activities listed in the IAA [Physical Activities Regulations](#) that require an impact assessment, or that meet the definition of a project on federal lands.

CNSC staff conduct Environmental Protection Reviews (EPRs) for all licence applications with potential environmental interactions, in accordance with CNSC's mandate under the NSCA and associated regulations. The EPRs inform the Commission's conclusion on whether the proposal provides adequate protection of the environment and the health of people.

An EPR was conducted for all activities requested in the licence application, including environmental releases from current operations and a 25% increase in emissions associated with the requested production increase. CNSC staff's assessment included a review of the licence application, past environmental performance and supporting documents, such as the ERA, Annual Compliance and Operational Performance reports, and the Preliminary Decommissioning Plan. The EPR Report, which contains the results of this assessment, including a summary of past environmental reviews for the CFM facility, is available on the CNSC [website](#) [8].

CNSC staff's assessment found that the potential risks from physical stressors, as well as from radiological and hazardous releases to the atmospheric, aquatic, terrestrial and human environments from the CFM facility, are low to negligible. The potential risks to the environment from these releases or stressors are similar to natural background, and the potential risks to human health are indistinguishable to health outcomes in the general public. Therefore, CNSC staff have found that CFM has implemented and maintained effective environmental protection measures to adequately protect the environment and the health of persons, and are confident that CFM will continue to do so in the future.

CNSC staff have found that the information provided by CFM regarding environmental protection is sufficient to meet the applicable regulatory requirements under the NSCA and associated regulations for the licence renewal.

CNSC staff will continue to verify and ensure that, through ongoing licensing and compliance activities and reviews, the environment and the health of persons are protected and will continue to be protected over the proposed licence period.

## 2.2 Relevant Safety and Control Areas (SCAs)

The functional areas of any licensed facility or activity consist of a standard set of safety and control areas (SCAs). Each SCA is comprised of “specific areas” of regulatory interest; however, the specific areas associated with each SCA vary between facility types. See Addendum D, “Safety and Control Framework”, for further information about SCAs.

In the following table:

1. The risk ranking column indicates the overall level of risk associated with each SCA at CFM (refer to Addendum A, “Risk Ranking”).
  - i. The relevance of each SCA to this CMD is indicated.
  - ii. The rating level for each relevant SCA indicates the overall compliance with regulatory requirements for implementation (refer to Addendum B, “Rating Levels”).

| Functional Area               | Safety and Control Area                  | Risk Ranking | Relevant to this CMD? | Rating Level |
|-------------------------------|--|--------------|-----------------------|--------------|
| <b>Management</b>             | Management System                        | M            | Yes                   | SA           |
|                               | Human Performance Management             | M            | Yes                   | SA           |
|                               | Operating Performance                    | M            | Yes                   | SA           |
| <b>Facility and Equipment</b> | Safety Analysis                          | M            | Yes                   | SA           |
|                               | Physical Design                          | M            | Yes                   | SA           |
|                               | Fitness for Service                      | M            | Yes                   | SA           |
| <b>Core Control Processes</b> | Radiation Protection                     | M            | Yes                   | SA           |
|                               | Conventional Health and Safety           | M            | Yes                   | SA           |
|                               | Environmental Protection                 | M            | Yes                   | SA           |
|                               | Emergency Management and Fire Protection | M            | Yes                   | SA           |
|                               | Waste Management                         | M            | Yes                   | SA           |
|                               | Security                                 | M            | Yes                   | SA           |
|                               | Safeguards and Non-Proliferation         | M            | Yes                   | SA           |
|                               | Packaging and Transport                  | L            | Yes                   | SA           |

## 2.3 Other Matters of Regulatory Interest

The following table identifies additional matters that are relevant to this CMD.

| <b>OTHER MATTERS OF REGULATORY INTEREST</b>         |                              |
|---|------------------------------|
| <b>Area</b>   | <b>Relevant to this CMD?</b> |
| Cost Recovery                                       | Yes                          |
| Financial Guarantees                                | Yes                          |
| Improvement Plans and Significant Future Activities | Yes                          |
| Licensee's Public Information Program               | Yes                          |
| Nuclear Liability Insurance                         | Yes                          |
| Proposed Licence Period                             | Yes                          |
| Production Limit Increase                           | Yes                          |

The relevant “other matters” of regulatory interest are discussed in section 5. In addition, a stand-alone section on Indigenous and public consultation and engagement is provided in section 4.

## **2.4 Regulatory and Technical Basis**

The regulatory and technical bases for the matters discussed in this CMD are provided in Addendum C to this document.

For this type of facility, the key requirements come directly from the NSCA and its regulations. The actual citations are placed into Addendum C.

## **3. GENERAL ASSESSMENT OF SCAS**

The specific areas that comprise the SCAs for this facility or activity type are identified in Addendum D, section D.2. If specific areas are not explicitly identified for a given SCA in section 3, then a decision has been made to encompass them in an overall approach to that SCA.

### **3.1 Management System**

The Management System SCA covers the framework that establishes the processes and programs required to ensure an organization achieves its safety objectives, continuously monitors its performance against these objectives, and fosters a healthy safety culture.

This CMD covers the following specific areas of the Management System SCA:

- Management system and organization;
- Performance assessment, improvement and management review;
- Change management and records management; and
- Safety culture.

### 3.1.1 Trends

The following table indicates the overall rating trends for the management system SCA over the previous licensing period:

| TRENDS FOR MANAGEMENT SYSTEM   |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS   |      |      |      |      |      |      |      |      |      |
| 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>  |      |      |      |      |      |      |      |      |      |
| CFM has a management system which meets the requirements of Canadian Standards Association (CSA) standard N286-12, <i>Management System Requirements for Nuclear Facilities</i> [9]. CNSC staff monitor implementation of the management system at CFM through compliance verification activities, which include desktop reviews and inspections. The management system SCA at CFM met applicable CNSC requirements, and received a “satisfactory” (SA) rating during all years of the licence period. |      |      |      |      |      |      |      |      |      |

### 3.1.2 Discussion

CFM is required to implement and maintain a management system in compliance with CSA N286-12 [9]. In 2018, as part of the project to align the management system for the facility with the requirements of CSA N286-12, CFM developed a Management Systems Program Manual (MSPM). The MSPM integrates the management system requirements of the CSA N286-12 standard.

The MSPM applies to the entire life cycle for the CFM facility. The CFM MSPM also applies to supplier(s) contracted to perform the life-cycle activities of design, supply chain, construction, commissioning, operation, and decommissioning, as appropriate, as they relate to CFM. In April of 2018, CNSC staff completed the assessment of the CFM MSPM and identified to CFM that the MSPM meets the requirements of the CSA N286-12 standard. CNSC staff will continue to review the documented and implemented management system during the next compliance cycle.

All enforcement actions associated with inspections pertaining to the management systems SCA are closed to the CNSC’s satisfaction. CNSC staff conclude that CFM’s management system is acceptable and compliant with regulatory requirements.

### 3.1.3 Summary

A summary of the licensee’s past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.1.3.1 Past Performance

##### Management System and Organization

CNSC staff determined that CFM has a management system that meets regulatory requirements. CNSC staff regularly assess the compliance of CFM documents and

programs through desktop reviews and planned compliance verification inspections.

Onsite verification activities conducted in 2012, 2013, 2017 and 2019 included: areas of Organization and Responsibilities, Management Self-Assessment, Annual Management Review, Internal Audits, Nonconformances and Corrective Actions, Change and Design Control, Preventative Maintenance, Calibration, Procurement, Work Planning, Work Control, Work Verification, Document Control, Record Control, Supply Chain (review of Purchase Orders, Acceptable Suppliers, Vendor Audits, Receipt Inspections, Vendor Performance Assessments, and Non-Conforming products segregation). All inspection findings were of low safety significance except for one medium safety significance finding from 2013. This finding was related to the potential for risk of serious injury from lockout / tagout control logbook forms not being fully completed. This was contrary to CFM's control of hazardous energy procedure, and the management systems requirement regarding work processes control processes.

All enforcement actions associated with these inspections were closed to the satisfaction of CNSC staff.

#### **Performance Assessment, Improvements and Management Review**

CFM's management team conducts annual management reviews, to analyze the previous year's performance when compared with its plans, assess compliance with standards, assess the effectiveness of CFM's management system and consider any trends. CNSC staff assessed these management reviews as part of compliance verification activities and found them acceptable.

CFM also conducts internal assessments to confirm conformance and effectiveness of its licensed programs and associated documentation. CFM completes internal assessments on a 3-year frequency and tracks resulting actions in a database that CFM maintains.

Over the previous licence period, CNSC staff performed inspections on CFM's internal assessment program and confirmed that the program met regulatory requirements.

## **Change Management and Records Management**

CFM's design and change control procedures ensure that changes to physical processes as well as changes to documented processes and practices are identified, justified, reviewed, and approved before implementation. CNSC staff verified that these procedures cover any changes to facility layout, equipment, processes including updating of procedures, and provide a documented approach to the assessment of risk and hazards related to any change.

CFM's records management process encompasses the retention of records as either permanent or non-permanent with a specified period of time. Records must be legible and complete; identifiable and traceable to the related items and activities; and retrievable, retained and stored in a manner to preserve the record. Additionally, CFM procedures and records are electronic and can be retrieved on an as needed basis by CFM staff and CFM removes outdated or expired documents in a timely manner.

Over the previous licence period, CFM's design and change control programs and records management program met CNSC's regulatory requirements.

## **Safety Culture**

The management system program at CFM provides the framework that currently guides the processes and programs required to ensure safety objectives are achieved, performance is monitored, and a healthy safety culture is maintained. During the previous licence period, the CNSC published [REGDOC-2.1.2, Safety Culture](#). At the request of CNSC staff, CFM performed a gap analysis and confirmed completed implementation in July, 2022.

CFM indicated that the CFM and Cameco Fuel Services Division (FSD) leadership teams are committed to enhancing a sustainable safety culture and continue to ensure that all workers remain engaged to the extent possible [4]. CFM conducts safety culture assessments approximately every five years at all FSD sites. CFM confirmed that the most recent safety culture self assessment was completed in Q4 2021. The assessments included a written survey and follow-up interviews. CFM stated that they develop action plans in areas where opportunities for improvement are identified from these safety culture assessments. CNSC staff will monitor CFM's performance in this area through the conduct of regular compliance verification activities.

### **3.1.3.2 Regulatory Focus**

CNSC staff will continue to monitor CFM's performance in this SCA through the execution of regulatory oversight activities, focusing on continued compliance with the CSA N286-12 standard.

### **3.1.3.3 Proposed Improvements**

The current programs at CFM for this SCA are considered adequate and no improvements within this SCA are proposed.

### 3.1.4 Conclusion

CNSC staff conclude that CFM continues to maintain and implement a documented management system in accordance with CNSC regulatory requirements.

Based on CNSC staff assessments of CFM's licence renewal application, supporting documents and performance, CNSC staff conclude that CFM has implemented appropriated measures and programs to meet CNSC's regulatory requirements.

CNSC staff will continue to monitor the CFM's performance in this area through the desktop reviews and the conduct of onsite compliance verification activities.

### 3.1.5 Recommendation

One standardized licence condition is included in the proposed licence for this SCA. Licence condition 1.1 requires CFM to implement and maintain a management system. Compliance verification criteria for this licence condition are included in the draft LCH in part 2 of this CMD.

## 3.2 Human Performance Management

The Human Performance Management SCA covers activities that enable effective human performance through the development and implementation of processes that ensure a sufficient number of licensee personnel are in all relevant job areas and these personnel have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.

The specific areas that comprise the Human Performance Management SCA at the CFM facility include:

- Personnel Training
- Human performance program
- Work organization and job design
- Fitness for Duty

### 3.2.1 Trends

The following table indicates the overall rating for the Human Performance Management SCA over the previous licence period:

| TRENDS FOR HUMAN PERFORMANCE MANAGEMENT SCA |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS                  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |

Over the course of the licence period, CFM has implemented and maintained a Systematic Approach to Training (SAT). The satisfactory trend for this SCA has remained stable over the licensing period.

### 3.2.2 Discussion

Paragraphs 12(1)(a) and (b) of the [General Nuclear Safety and Control Regulations](#) (GNSCR) require that a licensee shall ensure the presence of a sufficient number of qualified workers to carry on the licensed activity safely and in accordance with the Act, the regulations made under the Act and the licence; and shall train the workers to carry on the licensed activity in accordance with the Act, the regulations made under the Act and the licence.

Paragraphs 6(m) and 6(n) of the [Class I Nuclear Facilities Regulations](#) require that licence applications include the proposed responsibilities of workers, and qualification requirements and training program for workers, including the procedures for the requalification of workers; and the results that have been achieved in implementing the program for recruiting, training and qualifying workers in respect of the operation and maintenance of the nuclear facility.

Paragraph 14(2)(e) of the [Class I Nuclear Facilities Regulations](#) requires every licensee to keep a record of the status of each worker's qualifications, requalification and training, including the results of all tests and examinations completed in accordance with the licence.

CFM is also required to implement and maintain training programs for workers in accordance with the requirements set out in [REGDOC-2.2.2 Personnel Training](#).

#### Personnel Training

CFM maintains training governance documentation and has implemented training procedures to ensure compliance with the requirements of [REGDOC-2.2.2](#).

CFM has a Training department to ensure timely implementation of training requirements for all groups on site. This department reviews, updates and standardizes site training programs for various operations groups to align with CFM's Systematic Approach to Training (SAT) program.

In addition to operations related training, CFM also has training programs for specific areas such as emergency response, radiation safety, environment and health safety.

#### Human Performance Program

CFM maintains processes to support human performance in its operations. CFM utilizes a variety of Cameco corporate tools to develop and reinforce behaviours that support human performance. Some key tools are the CFM competency model, ladder of self-responsibility and accountability, employee performance program, and employment involvement in safety. In its application, CFM has committed to the continued development and implementation of Human Performance Management tools.

#### Work Organization and Job Design

The Minimum Shift Complement (MSC) is the minimum number of qualified workers who must be present at all times to ensure the safe operation of the



nuclear facility and to ensure adequate emergency response capability. CFM implements an SAT approach to training to ensure all operators are adequately trained and qualified to perform assigned responsibilities. CFM operations require the physical presence of qualified personnel to perform licensed activities, and therefore MSC for operations is maintained. CFM has an emergency response plan which defines the minimum complement requirements for emergency response personnel to respond to emergency situations.

Given the facility configuration, the number of operators required, and the implementation of safety measures documented in its Covid Hazard Prevention Program, CFM has been able to navigate the COVID-19 pandemic safely, while meeting its production commitments.

### **Fitness for Duty**

CNSC staff confirmed that CFM has in place, measures to address fitness for duty requirements. CFM implements Cameco corporate level and CFM site level programs on various fitness for duty aspects, such as Alcohol and Substance Abuse, Attendance Management, and procedures for leave which are fitness for duty impacted (e.g., bereavement, troubled employee, etc.).

## **3.2.3 Summary**

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

### **3.2.3.1 Past Performance**

During the previous licence period CNSC staff conducted 3 inspections (2013, 2017, 2021) and numerous document reviews of the training program at CFM. The training system and program at CFM was revised in 2021 to improve alignment with [REGDOC-2.2.2](#).

Stemming from the 3 aforementioned inspections, non-compliances were identified pertaining to: trainer evaluations, trainee evaluations, training governance misalignments, training records and qualification verifications. In all cases, CFM staff implemented suitable corrective actions and all enforcement actions have been closed in an effective and timely manner.

There are no open enforcement actions associated with this SCA. CNSC staff continues to monitor personnel training at CFM through general and specialist supported inspections as well as annual compliance reports.

### **3.2.3.2 Regulatory Focus**

CNSC staff will continue to monitor and evaluate CFM's compliance with regulatory requirements through regulatory oversight activities including inspections, review of compliance reports, and updates to licensing basis program documentation.

### **3.2.3.3 Proposed Improvements**

The current programs at CFM for this SCA are considered adequate. No improvements for the personnel training specific area are proposed.

### **3.2.4 Conclusion**

Overall CFM has strengthened the training program and provided a robust methodology to assure the competence of its operational staff.

CNSC staff conclude that CFM is performing satisfactorily with respect to this SCA.

### **3.2.5 Recommendation**

One standardized licence condition is included in the proposed licence for this SCA. Licence condition 2.1 requires the licensee to implement and maintain a training program. Compliance verification criteria for this licence condition are included in the draft LCH in Part 2 of this CMD.

## **3.3 Operating Performance**

The operating performance SCA includes an overall review of the conduct of the licensed activities and the activities that enable effective performance.

The specific areas that comprise this SCA at the CFM facility include:

- conduct of licensed activity
- procedures
- reporting and trending

### 3.3.1 Trends

The following table indicates the overall rating trends for the Operating Performance SCA over the previous licence period:

| TRENDS FOR OPERATING PERFORMANCE  |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| Overall Compliance Ratings  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| Comments  |      |      |      |      |      |      |      |      |      |
| The licensee has maintained an operating program in accordance with CNSC requirements over this licence period. CFM continues to be rated SA in this SCA. |      |      |      |      |      |      |      |      |      |

### 3.3.2 Discussion

CFM is required through the NSCA and its regulations to ensure policies, programs, methods and procedures are in place for the safe operation and maintenance of its licensed nuclear facilities. The occupational and industrial safety aspects of CFM's operations are regulated under the [Canada Labour Code](#), and its associated [Canada Occupational Health and Safety Regulations](#). [REGDOC-3.1.2, Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills](#), is also applicable, providing requirements for reporting on Operating Performance.

Verification of the licensee's compliance with the requirements of this SCA are included as part of CNSC's compliance activities ranging from inspections, desktop reviews of annual, quarterly, and event reports, and reviews of corrective actions arising from inspections and event investigations. CNSC staff confirmed through these compliance verification activities that CFM has implemented and maintained an effective operating program in order to ensure licensed activities are conducted safely and in compliance with regulatory requirements.

### 3.3.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.3.3.1 Past Performance

##### Conduct of Licensed Activity

During the previous licence term, CFM has operated its facility in compliance with the licensing basis. CNSC staff conducted a variety of compliance verification activities on CFM's operations, including onsite inspections, reviews of program documents, quarterly and annual compliance reports and event reports.

Throughout the previous licence term, CNSC staff conducted 29 inspections to verify CFM's compliance with the NSCA and its regulations, its operating licence and the programs used to meet regulatory requirements. The inspections were carried out with a focus on specific SCAs in accordance with the baseline compliance plan for CFM, which identifies a risk-informed frequency for inspections of each SCA. A list of inspections conducted during the previous licence period, and the SCAs verified for each inspection, is provided in Addendum E. Recent inspections conducted at CFM (i.e., in 2021 and 2022) have verified elements of various SCAs, including environmental protection, training, packaging and transport, conventional health and safety, waste management, fitness for service and radiation protection.

The majority of findings at CFM were of low safety significance, however several medium safety significance findings were identified during the first half of the previous licence period (i.e., during inspections conducted between 2012 and 2016). As part of its deliberations for the recent 1-year renewal of the CFM licence, the Commission requested CNSC staff to provide details on the medium safety significance findings identified during the previous licence period. CNSC staff submitted a supplemental CMD ([CMD 21-H105.B](#)) in response, and reported that 52 medium safety significance inspection findings were identified during inspections at the CFM facility over the previous licence term. However, a review carried out during the preparation of the supplemental CMD identified that many of these findings may have been incorrectly classified. CNSC staff concluded that inconsistencies between current and past practices, when the database that is used to manage regulatory enforcement actions was new and staff's implementation of it was evolving, likely led to the incorrect classification of some inspection findings. In addition, and as noted in [CMD 21-H105.B](#), criteria have been established for safety significance ranking and 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.

In [CMD 21-H105.B](#), CNSC staff committed to conducting a more in-depth review to establish a proper representation of safety significance for CFM inspection findings. In 2022, CNSC staff performed a thorough review of CFM's inspection findings applying current practices with input from senior inspectors and subject matter experts. It was conservatively determined that 6 inspection findings from the previous licence period were appropriately classified as medium safety significance. All other inspection findings are classified as low safety significance. A brief description of each medium safety significance finding is provided in this CMD under the applicable SCA (i.e., emergency management and fire protection (3 findings), radiation protection (2 findings), and management systems (1 finding)).

Regardless of the safety significance determination, CFM has consistently implemented corrective actions to address regulatory findings in a timely manner. Through desktop review and onsite follow-up activities, CNSC staff have verified that CFM has taken appropriate corrective measures and all enforcement actions

are now closed, apart from those identified in the most recent inspections which CFM is currently addressing.

The annual production limit for the activities carried out at the CFM facility is documented in the LCH associated with the current operating licence. In accordance with [REGDOC-3.1.2](#), CFM submits annual reports summarizing production levels for the previous year. CFM has operated its facility in compliance with CNSC regulatory requirements and remained below its production limit throughout the previous licence period.

In its licence renewal application, CFM has requested an increase to the production limit for the CFM facility. CNSC staff's assessment of the requested production increase is provided in section 5.8 of this CMD.

In accordance with the current LCH, CFM continues to provide information regarding the operating performance of the CFM facility in annual and quarterly compliance reports submitted to CNSC staff. CNSC staff evaluate the information provided in these reports to ensure CFM remains in compliance with regulatory requirements.

### **Procedures**

CFM's management system consists of high-level program documents supported by lower-level procedures and work instructions. CFM maintains a comprehensive suite of procedures across all programs at the CFM facility. Program and procedural documentation is subject to periodic auditing by Cameco corporate and reviews by CFM management to ensure programs are implemented, and remain adequate and effective.

CNSC staff review procedural-level documents as part of ongoing compliance verification activities to ensure proper maintenance of procedures to reflect actual practices as well as procedural adherence by CFM personnel. The current (and proposed) LCH identifies licensing basis program documentation and stipulates requirements for providing change notification, which triggers reviews by CNSC staff to ensure changes continue to align with regulatory requirements and the CFM licensing basis. As per the LCH, CFM is also required to provide notification, and facilitate CNSC staff reviews of lower-tiered documentation for any changes identified as having a potential to negatively impact an element of the licensing basis.

Based on these reviews, CNSC staff conclude that CFM adequately maintains its procedures and there were no changes to operating procedures with the potential to adversely impact the safe operation of the CFM facility.

### **Reporting and Trending**

CFM utilizes Cameco's Incident Reporting System (CIRS) for its internal management of events. Through the use of CIRS, incidents are reported, documented, reviewed, investigated, corrected and tracked. The CIRS system is used at all Canadian Cameco sites and allows CFM to use its own internal operating experience, as well as from its other sites, to perform trending for different types of incidents and to benefit from operational experience.

CNSC staff have inspected CFM's implementation of these processes, focusing on CFM's investigation of root causes and completion of corrective action plans. For example, CNSC staff review CIRS incidents reports during onsite inspections to confirm that CFM has taken appropriate actions to address identified incidents.

In December 2018, following a request from CNSC staff, CFM completed implementation of [REGDOC-3.1.2](#). This regulatory document sets out requirements and guidance for routine compliance reporting, as well as non-routine reporting such as events and action level exceedances. Prior to the implementation of [REGDOC-3.1.2](#), detailed requirements for reporting unplanned situations or events were included in CFM's LCH and were based on section 29 of the GNSCR.

Table 1 lists the events reported to the CNSC over the recent licence period. CFM has complied with the requirements for submission of these reports throughout the licence period. CNSC staff review all reported events to identify if there are any regulatory concerns and report significant events to the Commission at public meetings of the Commission. None of the events reported by CFM were significant enough to warrant reporting to the Commission as an Event Initial Report (EIR) but were reported to the Commission through CNSC staff's annual reports on the performance of uranium processing facilities. Additional discussion of the action level exceedances and reportable events listed in Table 1 are provided under the appropriate SCA sections.

**Table 1: CFM Reportable Events, 2012-2021**

| Year | Action Level Exceedances |                          | Other Reportable Events (applicable SCA)                 |
|------|--------------------------|--------------------------|--|
|      | Radiation Protection     | Environmental Protection |  |
| 2012 | 0                        | 1 <sup>1</sup>           | Radiation Protection <sup>1</sup>                        |
| 2013 | 3                        | 0                        | Packaging and Transport                                  |
| 2014 | 2                        | 1                        | -  |
| 2015 | 2                        | 0                        | Conventional Health and Safety, Environmental Protection |
| 2016 | 0                        | 1                        | Packaging and Transport                                  |
| 2017 | 1                        | 1                        | Fire Protection (2 events)                               |
| 2018 | 0                        | 1                        | -  |
| 2019 | 1                        | 0                        | Environmental Protection                                 |
| 2020 | 0                        | 0                        | Environmental Protection                                 |
| 2021 | 1                        | 0                        | -  |

<sup>1</sup> A single RP event (indoor UO<sub>2</sub> powder spill) resulted in an EP action level exceedance. It was investigated by CFM as a single event.

CNSC staff are satisfied with CFM's reporting and response to events during the previous licence period, and therefore all events are considered closed. CFM continues to provide updates on operating performance via submission of annual

compliance reports in accordance with [REGDOC-3.1.2](#). CFM's most recent annual compliance report is made available for download on its [website](#).

### **3.3.3.2 Regulatory Focus**

CNSC staff continue to monitor CFM's performance in this SCA through regulatory oversight activities including inspections and desktop reviews of relevant program documentation. CNSC staff will focus on procedural adherence and maintenance of the operating limits and safety envelope with compliance verification focusing on the safe conduct of licensed activities.

### **3.3.3.3 Proposed Improvements**

Improvements to operation, equipment and programs are identified on an ongoing basis and implemented as part of continuous improvement. No significant improvement projects have been identified by CFM for the requested licence period.

### **3.3.4 Conclusion**

Based on CNSC staff's assessment of CFM's application, supporting documents and past performance, CNSC staff conclude that CFM continues to implement and maintain an effective operating program for the CFM facility in accordance with regulatory requirements.

### **3.3.5 Recommendation**

Two licence conditions are included in the proposed licence for this SCA. Licence condition 3.1 requires CFM to implement and maintain an operating program, which includes a set of operating limits. Licence condition 3.2 requires CFM to implement and maintain a program for reporting to the Commission or a person authorized by the Commission. Delegation of authority with respect to "a person authorized by the Commission" as included in licence condition 3.2, is described in section 5.9 of this CMD. Compliance verification criteria for both licence conditions are included in the draft LCH.

## **3.4 Safety Analysis**

The Safety Analysis SCA covers the maintenance of the safety analysis that supports the overall safety case for the facility. Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility and considers the effectiveness of preventative measures and strategies in reducing the effects of such hazards.

This CMD covers the following specific areas of Safety Analysis:

- Deterministic safety analysis
- Hazard analysis
- Nuclear Criticality Safety



### 3.4.1 Trends

The following table indicates the overall rating for the Safety Analysis SCA over the previous licence period:

| TRENDS FOR SAFETY ANALYSIS   |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS   |      |      |      |      |      |      |      |      |      |
| 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>  |      |      |      |      |      |      |      |      |      |
| CFM's Safety Analysis Report (SAR) effectively identifies facility hazards and Structures, Systems and Components (SSC) relied upon for safety to control or mitigate these hazards. |      |      |      |      |      |      |      |      |      |

### 3.4.2 Discussion

Paragraph 3(1)(i) of the GNSCR requires a description and the results of any test, analysis or calculation performed to substantiate the information included in the application. Paragraph 6(a) of the [Class I Nuclear Facilities Regulations](#) requires that an application for a licence to operate include a description of the structures at the nuclear facility, including their design and their design operating conditions. Paragraph 6(b) of the [Class I Nuclear Facilities Regulations](#) requires that an application for a licence to operate include a description of the systems and equipment at the nuclear facility, including their design and their design operating conditions. Paragraph 6(c) requires that an application for a licence to operate include a final SAR. A safety analysis must include an analysis of the postulated sequences and consequences of conditions that could arise from initiating events and associated hazards.

CFM has requested continued authorization to carry out small-scale operations involving enriched uranium. Under its current licence, CFM is permitted to possess and process enriched uranium in accordance with its nuclear criticality safety program. CFM may currently process up to 80% of the appropriate smallest critical mass (SCM) of enriched uranium, which permits CFM to carry out small projects, such as manufacturing of test bundles and researching fuel development processes. In order to process larger quantities of enriched uranium, CFM is required to apply for additional, prior approval from the Commission. This regulatory requirement is documented in the draft LCH.

### 3.4.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.4.3.1 Past Performance

##### Deterministic Safety Analysis and Hazard Analysis



During the previous licence period, CNSC staff conducted several desktop reviews of the safety analysis documentation on deterministic safety analysis and hazard analysis. Compliance inspections included verification that the licensee has been adequately maintaining the safety barriers and protective systems as specified in the CFM facility's SAR.

CNSC staff require, in the CFM LCH, that CFM reviews its SAR at a minimum of once every 5 years. The SAR was last updated by CFM and underwent technical assessment by CNSC staff in 2021.

CNSC staff assessed the report against provisions of relevant national standards (CSA N292.0-14, *General principles for the management of radioactive waste and irradiated fuel* [10]) and international guidance ([IAEA SSR-4, Safety of Nuclear Fuel Cycle Facilities, 2017](#)). CNSC staff determined that the CFM SAR is consistent with provisions of these standards. CNSC staff's assessment of the CFM SAR concluded that it meets regulatory requirements. CFM's SAR remains valid in the context of a proposed increase of the production limit because there would be no change in identified facility hazards or to SSC relied upon for safety to control or mitigate these hazards.

### **Nuclear Criticality Safety Program**

CFM has a fully developed nuclear criticality safety program. This controls the handling and processing of fissionable materials. The program has been in place for the entire duration of the previous licence period. During this time, CNSC staff have carried out a compliance inspection of this program. Any findings that were identified have been promptly corrected by the licensee.

Overall, the implementation of this program has been satisfactory.

During the licensing period, the CNSC regulatory document; RD-327 Nuclear Criticality Safety was updated and published as [REGDOC-2.4.3, Nuclear Criticality Safety](#) in September 2020. The licensee has revised the nuclear criticality safety program to ensure that it meets the requirements of [REGDOC-2.4.3](#). The revised program has been submitted, reviewed by CNSC staff and found to be satisfactory.

#### **3.4.3.2 Regulatory Focus**

CNSC staff continue to monitor CFM's performance in this SCA through regulatory oversight activities including onsite inspections and desktop reviews of CFM's compliance reporting and revisions to relevant program documentation pertaining.

#### **3.4.3.3 Proposed Improvements**

No improvements within this SCA are proposed.

### 3.4.4 Conclusion

CNSC staff assessed CFM's documentation and analyses under the safety analysis SCA and found that it meets regulatory requirements. The facility has not been modified to require further analysis during the licensing period.

### 3.4.5 Recommendation

Two standardized licence conditions are included in the proposed licence for this SCA. Standardized licence condition 4.1 requires the licensee to implement and maintain a safety analysis program. Licence condition 15.1 requires the licensee to implement and maintain a nuclear criticality safety program.

Compliance verification criteria for these licence conditions are included in the draft LCH, including a statement indicating that approval from the Commission is required prior to processing enriched uranium in a quantity exceeding 80% of the SCM.

## 3.5 Physical Design

The physical design SCA relates to activities that impact on the ability of systems, components and structures to meet and maintain their design basis given new information arising over time and taking changes in the external environment into account.

The specific areas that comprise this SCA at the CFM facility include:

- design governance
- site characterization
- facility, structure, and system design

### 3.5.1 Trends

The following table indicates the overall rating for the Physical Design SCA over the previous licensing period:

| TRENDS FOR PHYSICAL DESIGN   |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS   |      |      |      |      |      |      |      |      |      |
| 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>  |      |      |      |      |      |      |      |      |      |
| The licensee has maintained a physical design program in accordance with CNSC regulatory requirements over the previous licence period. CFM's performance continues to be rated SA for this SCA. |      |      |      |      |      |      |      |      |      |

### 3.5.2 Discussion

CFM is required to implement and maintain a physical design program such that the design of facilities and any subsequent changes remain within the licensing basis. The requirements under this SCA are provided by national codes and

standards including the National Building Code of Canada (NBCC) and National Fire Code of Canada (NFCC) for structural design and the [Technical Standards and Safety Act, 2000](#) as well as CSA standard B51-19: *Boiler, pressure vessel and pressure piping code* (CSA B51-19) for systems and components including pressure retaining component design [11]. CFM is also required to maintain an authorized inspection agency agreement, which currently is the Technical Standards and Safety Authority (TSSA), for appropriate third-party review and certification of its pressure retaining components.

In addition, CFM is required to notify the CNSC of any proposed changes with potential to impact the fire protection program and submit an accompanying third-party assessment of the potential impact of these changes. Any physical design changes outside of the licensing basis would require Commission approval.

CNSC staff confirmed that CFM has implemented and maintained an adequate physical design program with appropriate change control processes in place to ensure changes are executed safely and within CFM's licensing basis.

In its application [1], CFM has requested an approximate 24% increase to its authorized production limit. CFM has indicated the requested increase in production would be achieved by increasing the operating hours for the facility. Therefore, no facility modifications have been proposed in the licence application associated with this request.

### 3.5.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.5.3.1 Past Performance

##### Design Governance

The CNSC requires CFM to implement and maintain design programs in accordance with applicable codes and standards as set out in the LCH. CFM has an established Change and Design Control procedure (MSP 13-02) which describes the management and documenting of changes to processes, physical plant design, layout and systems design at CFM.

CNSC staff have reviewed various elements and records of CFM's change control process during onsite inspections and have confirmed CFM's compliance with regulatory requirements. All changes are assessed, managed and documented through implementation and adherence to a change control program and related procedures under its management system.

##### Site Characterization

CFM's Safety Analysis Report (SAR) provides information on site characterization, including details on the geology, seismology, meteorology, hydrology, etc. This information is taken into consideration in the safety assessment and design of the facility. The CFM LCH requires that the SAR and underlying risk assessments are reviewed on a minimum 5-year frequency to

ensure any new risks and lessons learned are considered. In accordance with this requirement, the current CFM SAR was most recently updated and reviewed by CNSC staff in May, 2021 and confirmed to meet regulatory expectations.

### **Facility, Structure and System Design**

A description of the CFM facility's various systems and components is documented in the SAR. The SAR also outlines general design aspects such as safety objectives of the facility design, design principles, defence in depth, and measures to ensure conformance with design criteria (e.g., design and change control processes and third-party reviews).

Over the previous licence term, no significant changes to facility design requiring CNSC approval have been proposed. However, CFM implemented several notable modifications which have positively impacted operations and safety. Examples include: re-engineering of the manual bundle manufacturing system to a highly automated process; installation of a new stacking cell and new waste treatment area; and automation of several aspects of the UO<sub>2</sub> powder receipt and powder preparation operations. CFM also documents facility modifications and improvements in its annual compliance report submissions.

CFM conducted a code compliance review and Fire hazard analysis most recently in December 2020, in accordance with CSA N393-13 *Fire Protection for facilities that process, store and handle nuclear substances* [12], as well as the National Building Code of Canada, National Fire Code of Canada, associated NFPA standards, etc. CNSC staff reviewed the reports originating from these activities and concluded that the findings identified are not risk significant and the proposed modifications further increase the safety margin of the facility with respect to fire protection.

CFM submits third party reviews (TPR) of proposed modifications with the potential to impact protection from fire. The submission of the TPRs provides evidence to CNSC staff that the compliance criteria for modifications are being met. CNSC staff have performed desktop reviews of the TPRs and found that they meet the requirements referenced in the CFM LCH.

During the previous licence period, CFM maintained a pressure boundary program and had in place a formal agreement with the TSSA. An updated version of CSA B51 was published in 2019 (CSA B51-19 [11]). In 2020, CFM reviewed CSA B51-19 and revised the pressure boundary program to address the changes from the 2014 version of the standard (CSA B51-14 [13]). The current CFM pressure boundary program is in compliance with the requirements of CSA B51-19. In January 2022, CNSC conducted a general inspection which included verification of specific pressure boundary program requirements and adherence to the TSSA services agreement.

#### **3.5.3.2 Regulatory Focus**

CNSC staff continue to monitor CFM's performance in this SCA through regulatory oversight activities including onsite inspections and desktop reviews of relevant program documentation.

### 3.5.3.3 Proposed Improvements

CFM has not identified any planned facility modifications for the future licence term. Although a production increase has been requested, CFM has indicated that no physical modifications are necessary to operate at the requested capacity.

### 3.5.4 Conclusion

Based on CNSC staff assessments of CFM's application, supporting documents and past performance, CNSC staff conclude that CFM continues to implement and maintain programs for pressure boundary and facility design in accordance with regulatory requirements.

### 3.5.5 Recommendation

CNSC staff are recommending 2 standardized conditions in the proposed licence for this SCA. Licence condition 5.1 requires the licensee to implement and maintain a design program. Licence condition 5.2 requires the licensee to implement and maintain a pressure boundary program, and have in place, a formal agreement with an Authorized Inspection Agency. Compliance verification criteria for both licence conditions are included in the draft LCH.

## 3.6 Fitness for Service

The fitness for service SCA covers activities that impact the physical condition of SSC to ensure that they remain effective over time. This area includes programs that verify all equipment is available to perform its intended design function when called upon to do so.

The specific areas that comprise this SCA at the CFM facility include:

- equipment fitness for service / equipment performance
- maintenance
- aging management
- periodic inspection and testing

### 3.6.1 Trends

The following table indicates the overall rating trends for the Fitness for Service over the previous licence period:

| TRENDS FOR FITNESS FOR SERVICE  |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| Overall Compliance Ratings  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>   |      |      |      |      |      |      |      |      |      |
| The licensee has maintained a fitness for service program in accordance with CNSC regulatory requirements over this licence period. CFM continues to be rated SA in this SCA. |      |      |      |      |      |      |      |      |      |

### 3.6.2 Discussion

CFM is required to implement and maintain a fitness for service program to cover activities that affect the physical condition of SSC to ensure that they remain effective over time.

Paragraph 6(d) of the [\*Class I Nuclear Facilities Regulations\*](#) requires that an application to operate a Class I nuclear facility contain the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility. Further requirements under this SCA are provided under the NBCC and the NFCC. Specific aspects of CSA N286-12 [9] and CSA N393-13 [12] are also applicable for this SCA.

CFM has a well-established maintenance program in place which ensures equipment continues to function as designed, remains available, meets the designed intent in the safety analysis documentation and minimizes equipment failures. Processes, such as periodic asset reviews, are used to detect early warning signs of aging infrastructure by identifying assets requiring maintenance, refurbishment or replacement due to factors such as obsolescence, or excessive deterioration. The preventative maintenance program is documented in CFM's Preventative Maintenance Execution Management procedure and additional requirements related to periodic testing and inspection of CFM SSC are documented in the Management Systems Program Manual.

CNSC staff have reviewed CFM's Preventative Maintenance Execution Management document, as well as underlying related procedures for the conduct of maintenance, and performed onsite verification, and conclude that its fitness for service program meets regulatory requirements.

### 3.6.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.6.3.1 Past Performance

The CNSC requires CFM through its regulations, to have processes in place to maintain equipment as well as SSC. All planned maintenance work at CFM is initiated, managed, and documented using asset management software. To ensure optimum effectiveness of the maintenance program, CFM monitors several Key Performance Indicators (KPIs) focused on maintenance task requirements and task completion. KPI data are monitored and trended against established targets to identify areas requiring improvement. Internal periodic audits of the preventative maintenance process are also performed at least every three years.

CFM has an in-service inspection program which applies to piping and vessels in safety significant systems. Technicians performing the inspections are certified in accordance with the Canadian General Standards Board. Fire protection systems are tested according to an established schedule using the NBCC and NFCC.

Reviews of aspects of the fire protection systems are completed as required by CSA N393-13 [12].

CNSC staff frequently include fitness for service criteria in general inspections which are performed at CFM on a 2–3-year interval. During the previous licence term, a focused Fitness for Service inspection was also conducted in 2020. Records reviewed during these inspections typically include reviews of recent maintenance records, and maintenance related KPI's. During the 2020 inspection, findings were identified related to documentation of maintenance task updates and execution of specific preventative maintenance tasks. All inspection findings identified for this SCA during the previous licence term were considered to be low safety significance. CFM has implemented appropriate corrective actions to the satisfaction of CNSC staff, and therefore all enforcement actions have been closed.

### **3.6.3.2 Regulatory Focus**

CNSC staff continue to monitor CFM's performance in this SCA through regulatory oversight activities including inspections and desktop reviews of relevant program documentation.

### **3.6.3.3 Proposed Improvements**

The current programs at CFM for this SCA are considered acceptable and no specific improvements within this SCA are proposed. CFM continues to track and use fitness for service KPIs to identify opportunities for improvement. CFM has also indicated it will continue to implement its operational reliability improvement plan to further optimize overall equipment effectiveness.

CFM has identified that changes to preventative maintenance may be required as a result of increased equipment operating times if production is increased. Changes will be made in accordance with the preventative maintenance execution management document (AP-018). AP-018 has been reviewed and accepted by CNSC staff and is identified in the LCH as a document requiring notification of any future changes.

## **3.6.4 Conclusion**

Based on CNSC staff assessments of CFM's application, supporting documents and past performance, CNSC staff conclude that CFM continues to implement and maintain effective fitness for service programs in accordance with regulatory requirements and appropriate processes are in place to ensure maintenance programs are updated if/when necessary.

## **3.6.5 Recommendation**

One standardized licence condition is included in the proposed licence for this SCA. Licence condition 6.1 requires the licensee to implement and maintain a fitness for service program. Compliance verification criteria for this licence condition are included in the draft LCH.

### 3.7 Radiation Protection

The Radiation Protection SCA covers the implementation of a radiation protection (RP) program in accordance with the [Radiation Protection Regulations](#). The program must ensure that contamination levels and radiation doses received by individuals are monitored, controlled, and maintained as low as reasonably achievable (ALARA).

The specific areas that comprise this SCA for CFM are as follows:

- application of ALARA
- worker dose control
- radiation protection program performance
- radiological hazard control

#### 3.7.1 Trends

The following table indicates the overall rating trends for the Radiation Protection SCA over the previous licensing period:

| TRENDS FOR RADIATION PROTECTION   |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| Overall Compliance Ratings  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| Comments  |      |      |      |      |      |      |      |      |      |
| CFM implemented and continues to maintain a radiation protection program, as required by the <a href="#">Radiation Protection Regulations</a> . During the licensing period, no worker received a radiation dose in excess of the CNSC's regulatory limits as a result of the licensed activities conducted at CFM. |      |      |      |      |      |      |      |      |      |

#### 3.7.2 Discussion

The [Radiation Protection Regulations](#) require licensees to implement an RP program. As part of that program, licensees must also keep effective and equivalent doses received by and committed to persons ALARA, taking into account social and economic factors, through the implementation of management control over work practices, personnel qualification and training, control of occupational and public exposures to radiation, and planning for unusual situations. The [Radiation Protection Regulations](#) also prescribe dose limits for Nuclear Energy Workers (NEWs) and persons who are not NEWs.

CFM implemented and continues to maintain an RP program that ensures contamination levels and radiation doses received by individuals are monitored, controlled, and maintained ALARA.

Overall, based on the review of CFM's application, supporting documents and compliance verification activities, CNSC staff conclude that CFM is compliant with regulatory requirements.



### 3.7.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.7.3.1 Past Performance

##### Application of ALARA

CFM's commitment to the ALARA principle has been demonstrated through the implementation of their RP program. The application of ALARA is accomplished by various means, including employee training and awareness, the use of specialized handling and personal protective equipment, the development of procedures and monitoring methods, and the monitoring of the effectiveness of these efforts.

Radiation objectives and ALARA targets are established jointly by CFM's management team and site specialists. These objectives and targets address worker dose reduction initiatives and other projects which examine ways to reduce airborne uranium concentrations. The status of these objectives and targets is reviewed by the site management team through key performance indicators.

CFM is also supported in its efforts by a Personal Protection Equipment and Radiation Protection subcommittee under the Joint Health and Safety Committee (JHSC).

CNSC staff are satisfied with CFM's efforts in the application of ALARA during the licensing period.

##### Worker Dose Control

Radiological exposures associated with work activities at CFM are due to alpha, beta and gamma radiation emitted by uranium and its decay products. Exposures to workers can result from beta or gamma radiation sources outside the body, or alpha, beta or gamma radiation taken into the body as a result of inhalation, ingestion or absorption through the skin of uranium product.

CFM's dosimetry programs at CFM include the use of CNSC licensed techniques for both external whole-body and internal dose assignment. The total effective dose assignment for workers is the sum of the external whole-body dose as measured by a dosimeter, plus the internal dose determined from uranium in the lung (lung burden) measurements.

Optically stimulated luminescent dosimeters sensitive to gamma and beta radiation are used to measure external whole-body and skin doses. Monitoring of equivalent dose to the hands is performed using ring-type dosimeters, and CFM is currently re-assessing this methodology to determine if a CNSC licensed technique is required.

Cameco's FSD holds a CNSC dosimetry service licence, which authorizes Cameco to provide in-house internal dosimetry services to CFM. Since 2014, internal dose is assessed and assigned at CFM through the CNSC licensed lung counting program. The general classification system for inhaled compounds by

their solubility or retention in the human body divides compounds as type F (fast), type M (medium), and type S (slow). At CFM, the input to the pellet manufacturing process is ceramic grade Uranium Dioxide ( $\text{UO}_2$ ).  $\text{UO}_2$  has a solubility of type S, which clears slowly from the body, and has a retention time in the body of years. The lung counting program is used for assigning worker doses from routine monitoring assuming a chronic pattern of inhalation intakes. This is a conservative approach for workers exposed to a combination of chronic and acute (short term) inhalation intakes. In cases where a worker exceeds the investigation level for lung counting due to an acute intake, the dose is assigned using a methodology for acute intakes. Prior to 2014, internal doses were estimated through routine urine analysis sampling. However, due to the solubility of  $\text{UO}_2$ , there is very little uranium present in the urine for low-level intakes. Therefore, the implementation of the lung counting program at CFM was a positive enhancement to the RP program.

To complement the lung counting program, routine biweekly urine samples are collected from workers. The urine analysis program at CFM includes graduated responses to varying uranium in urine concentrations. As part of their CNSC licensed dosimetry service, CFM developed tables of urine excretion rates and corresponding concentration levels for uranium compounds which may indicate that the chemical toxicity limit of  $3 \mu\text{g}$  of uranium per gram ( $3 \mu\text{g U/g}$ ) of kidney tissue<sup>1</sup> may have been exceeded. This toxicity limit is based on a vast body of peer reviewed literature and is accepted internationally. It limits potential reversible and irreversible effects to the kidneys due to uranium's chemical toxicity as a heavy metal. Remaining below this limit has been shown to be protective in situations of either acute or chronic exposures to uranium.

Based on the uranium compounds processed at the CFM facility, the uranium in urine concentration that may indicate potential kidney toxicity (i.e., which results from a uranium concentration of  $3 \mu\text{g U/g}$  of kidney tissue due to an inhalation of insoluble uranium 14 days prior to the submission of the sample) is  $70 \mu\text{g}$  of uranium per litre of urine ( $70 \mu\text{g U/L}$ ) for a biweekly sampling schedule. CFM has implemented a conservative action level of  $10 \mu\text{g U/L}$ .

Table 2 provides the urine analysis results for NEWs at CFM during the licensing period. As shown, there have been no exceedances of CFM's action level for urine analysis samples during the licensing period.

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<sup>1</sup> As per the guidance provided in [REGDOC-2.7.2, Volume I, Dosimetry: Ascertaining Occupational Doses](#).

**Table 2: Urine analysis results for Nuclear Energy Workers at CFM, 2012-2021**

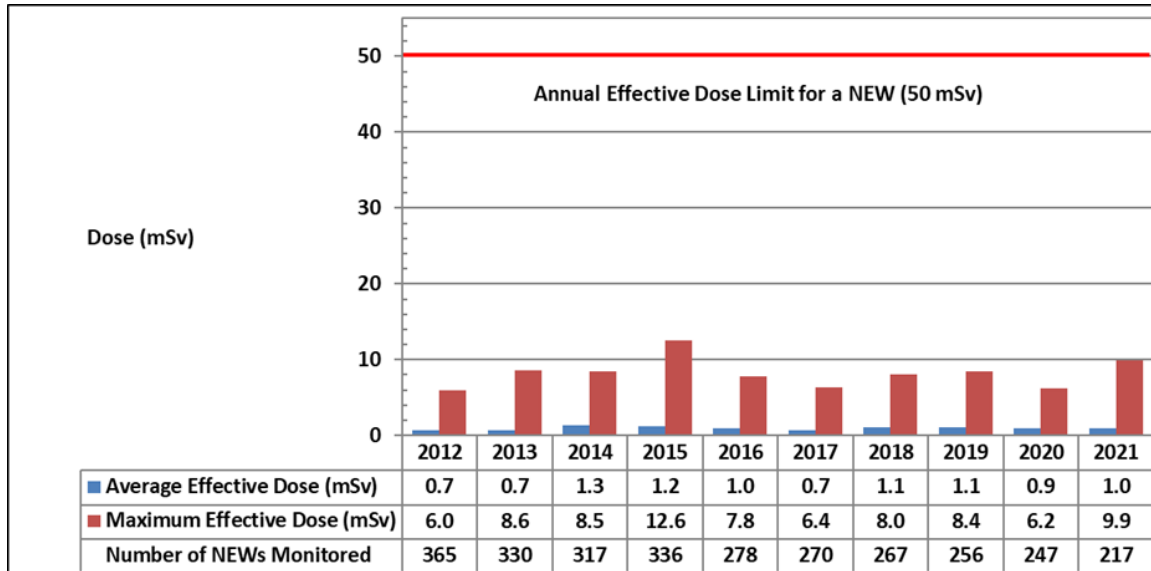
|  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|--|------|------|------|------|------|------|------|------|------|------|
| Total number of samples analyzed   | 2243 | 2153 | 1910 | 1829 | 1866 | 1819 | 1799 | 1689 | 1685 | 1565 |
| Number of samples at or above the action level of 10 µg U/L <sup>1</sup> | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Maximum sample result (µg U/L)   | 2.6  | 5.1  | 6.5  | 6.3  | 6.7  | 2.4  | 4.8  | 3.1  | 2.0  | 1.5  |

<sup>1</sup>CFM's action level is 10 µg U/L

### **Effective and Equivalent Doses for NEWs at CFM**

Workers (including contractors) who have a reasonable probability of receiving an occupational dose greater than 1 mSv in a 1-year dosimetry period are considered NEWs at CFM.

During the licensing period, CFM consistently maintained doses to NEWs below the CNSC's prescribed regulatory dose limits. Figure 2 depicts the total effective dose statistics for NEWs at CFM during the licensing period. The maximum annual effective dose received by a NEW was 12.6 mSv occurring in 2015, which is well below the CNSC's prescribed effective dose limit of 50 mSv per 1-year dosimetry period. The maximum individual effective dose in 2015 is directly related to an incident where a worker received an acute, internal dose of 5.7 mSv; which is discussed in detail under the specific area of Radiation Protection Program Performance. All other years' average and maximum effective doses are relatively stable and reflective of the work activities conducted at CFM.

**Figure 2: Effective doses for Nuclear Energy Workers at CFM, 2012-2021**

During the licensing period, there have been two, 5-year dosimetry periods. For the 5-year dosimetry period from January 1, 2011, to December 31, 2015, the maximum cumulative effective dose received by a NEW at CFM was 36.2 mSv. For the 5-year dosimetry period from January 1, 2016, to December 31, 2020, the maximum cumulative effective dose received by a NEW at CFM was 30.6 mSv. These radiation dose results are well below the CNSC's prescribed effective dose limit of 100 mSv per 5-year dosimetry period.

Table 3 provides the maximum and average doses received by NEWs during the licensing period, for each component contributing to total effective dose (i.e., external dose to the whole body, and internal doses ascertained from urine analysis and/or lung counting). Prior to 2014, internal doses were estimated through routine urine analysis sampling. Since 2014, internal dose is assessed and assigned at CFM through the CNSC licensed lung counting program. The lung counting method results in more conservative dose estimates.

It is important to note that the same NEW at CFM did not necessarily receive each maximum dose component. Therefore, the sum of all maximum dose components in a given year does not yield the same value as the maximum individual effective dose.

**Table 3: Radiation dose statistics for each component of effective dose for Nuclear Energy Workers at CFM, 2012-2021**

| Year | Annual External (Whole Body) Dose (mSv) |         | Annual Internal Dose (mSv) |         | Annual Effective Dose (mSv) |         |
|------|---|---------|----------------------------|---------|-----------------------------|---------|
|      | Average                                 | Maximum | Average                    | Maximum | Average                     | Maximum |
| 2012 | 0.6                                     | 6.0     | 0.3                        | 1.5     | 0.7                         | 6.0     |
| 2013 | 0.7                                     | 8.4     | 0.3                        | 2.0     | 0.7                         | 8.6     |
| 2014 | 0.6                                     | 5.6     | 0.7                        | 3.3     | 1.3                         | 8.5     |
| 2015 | 0.6                                     | 5.6     | 0.7                        | 8.6     | 1.2                         | 12.6    |
| 2016 | 0.5                                     | 6       | 1.2                        | 2.2     | 1.0                         | 7.8     |
| 2017 | 0.5                                     | 5.5     | 0.6                        | 0.9     | 0.7                         | 6.4     |
| 2018 | 0.5                                     | 5.4     | 1.6                        | 2.7     | 1.1                         | 8.0     |
| 2019 | 0.5                                     | 5.5     | 2                          | 3.5     | 1.1                         | 8.4     |
| 2020 | 0.4                                     | 4.5     | 1.3                        | 1.9     | 0.9                         | 6.2     |
| 2021 | 0.5                                     | 5.4     | 1.4                        | 6.5     | 1.0                         | 9.9     |

Table 4 provides the equivalent dose to the skin statistics for NEWs at CFM during the licensing period. The maximum annual equivalent dose to the skin that was received by a NEW at CFM was 108.4 mSv occurring in 2014, which is well below the CNSC's prescribed equivalent dose limit of 500 mSv per 1-year dosimetry period. Since 2014, skin doses have been trending down, mainly due to the automation of the production line.

**Table 4: Equivalent doses to the skin statistics for Nuclear Energy Workers at CFM, 2012-2021**

| Year                         | Average skin dose (mSv) | Maximum individual skin dose (mSv) |
|------------------------------|-------------------------|------------------------------------|
| 2012                         | 6.5                     | 93.2                               |
| 2013                         | 7.3                     | 88.4                               |
| 2014                         | 8.1                     | 108.4                              |
| 2015                         | 6.3                     | 95.6                               |
| 2016                         | 6.6                     | 95.7                               |
| 2017                         | 5.5                     | 88.1                               |
| 2018                         | 3.4                     | 59.0                               |
| 2019                         | 3.1                     | 56.9                               |
| 2020                         | 3.1                     | 55.3                               |
| 2021                         | 3.5                     | 40.9                               |
| <b>Regulatory dose limit</b> | --                      | <b>500 mSv/year</b>                |

Table 5 provides the equivalent dose to the hands statistics for NEWs at CFM during the licensing period. The maximum annual equivalent dose to the hands received by a NEW at CFM was 107.5 mSv occurring in 2012, which is well below the CNSC's prescribed equivalent dose limit of 500 mSv per 1-year dosimetry period. Equivalent doses to the hands are reflective of the work practices conducted at CFM.

**Table 5: Equivalent doses to the hands for Nuclear Energy Workers at CFM, 2012 - 2021**

| Year                         | Average extremity dose (mSv) | Maximum individual extremity dose (mSv) |
|------------------------------|------------------------------|---|
| 2012                         | 16.5                         | 107.5                                   |
| 2013                         | 14.3                         | 87.6                                    |
| 2014                         | 15.5                         | 88.4                                    |
| 2015                         | 15.5                         | 87.0                                    |
| 2016                         | 13.2                         | 98.4                                    |
| 2017                         | 10.6                         | 59.0                                    |
| 2018                         | 15.8                         | 57.1                                    |
| 2019                         | 18.4                         | 90.8                                    |
| 2020                         | 17.9                         | 65.6                                    |
| 2021                         | 8.4                          | 41.9                                    |
| <b>Regulatory dose limit</b> | --                           | <b>500 mSv/year</b>                     |

CNSC staff are satisfied that doses to NEWs at CFM are being controlled below the CNSC's prescribed dose limits.

## Radiation Protection Program Performance

### *CNSC Compliance Activities*

RP program performance at CFM was assessed during the licensing period through various CNSC staff compliance verification activities, including desktop reviews of quarterly and annual compliance reports. CNSC staff's assessment of CFM's RP program performance identified areas of strength and also opportunities for improvement. Aspects of the Radiation Protection SCA have been covered during all CNSC inspection activities. In addition, 3 focused inspections on the Radiation Protection SCA at CFM occurred in the years 2014, 2016 and 2020. The majority of the findings from these inspections were identified as having low safety significance. However, CNSC staff have classified 2 findings as medium safety significance. The medium safety significance findings are described below:

1. During an RP inspection conducted in 2014, CNSC inspectors conducted a walkdown of the CFM facility and identified several conventional health and safety and radiological hazards in the waste treatment area. This finding was assigned a medium safety significance based on the number and significance of hazards identified and the potential consequences on the health and safety of workers. 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, CFM 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. CNSC staff have conducted numerous walkdowns of the facility since this finding was identified and have not observed any recurrence of this issue.
2. During a reactive RP inspection conducted in 2016, in response to an internal dose action level exceedance in 2015 (as described in the *Radiological Action Levels* section), CNSC staff identified a deficiency in CFM's procedure for responding to UO<sub>2</sub> powder spills. The procedure did not explicitly require decontamination and contamination monitoring requirements for workers in the immediate area of a spill and/or workers involved in the subsequent cleanup of a spill. The potential consequences on the radiation safety of workers and worker doses were considered to have medium safety significance. In response to the finding, CFM implemented enhanced protocols for workers involved in a UO<sub>2</sub> powder spill including mandatory requirements for immediate showering and personal contamination monitoring.

All enforcement actions associated with these inspections have been closed to CNSC staff's satisfaction. CFM implemented positive enhancements to the RP program and established appropriate corrective actions to address areas requiring improvement, such as the respiratory protection program, general housekeeping, and posting of radiation warning signs.

## Radiological Action Levels

For various radiological parameters, action levels have been established at CFM that when reached, may be indicative of a potential loss of control for that specific parameter. Action levels have been established for external whole body, skin, extremity, and lung doses, and uranium-in-urine concentrations. Each action level has a defined frequency that corresponds with the associated dosimetry frequency. For example, for NEWs on a monthly dosimetry service for whole body and skin dose, the corresponding action level frequency is monthly. These action levels serve as early warnings of conditions that warrant further investigation and reporting to the CNSC if reached. In addition, CFM has established lower-tier internal administrative levels, which are set well below the action levels to provide very early warnings of potential concerns.

During the licensing period, CFM reviewed the radiological action levels for workers in the years 2015, 2019 and 2020, to ensure that they remain adequately sensitive indicators to detect the emergence of a potential loss of control of CFM's RP program elements. The most recent set of action levels, based on the review that occurred in 2020, continue to be acceptable to CNSC staff and these action levels have been incorporated into the proposed LCH for CFM.

During the licensing period, there were ten action level exceedances reported to the CNSC. All action level exceedances reported to the CNSC have been detailed in CNSC staff's annual regulatory oversight reports for uranium and nuclear substance processing facilities. In all instances, CFM completed investigations and implemented corrective actions to the satisfaction of CNSC staff. It is important to note that all workers' radiological doses were well below the corresponding CNSC regulatory dose limits, and there were no risks to their health and safety because of these action level exceedances. A summary of the action level exceedances are as follows:

- In 2013, there were 3 action level exceedances reported. The first action level exceedance reported to the CNSC related to issues with CFM's internal dose calculations, when errors were discovered in their internal dose spreadsheet calculations. These errors were corrected, and CFM workers' internal dose results were recalculated from 2003 to 2011. Upon reviewing the recalculated results, CFM identified exceedances of their internal dose action level of 0.8 mSv/quarter on ten occasions over these years, which prompted a report to the CNSC. Corrective actions were taken by CFM to ensure that worker doses were accurately calculated in accordance with the technical basis for the internal dosimetry program.

The additional 2 action level exceedances involved two separate occasions where two workers' quarterly internal doses were determined to be 0.82 mSv and 1.02 mSv respectively, which exceeded CFM's internal dose action level of 0.8 mSv/quarter. Corrective actions were taken by CFM including improvements to work instructions and coaching of workers.



- In 2014, there were 2 action level exceedances reported, related to workers' internal doses. On two separate occasions, two workers, in separate work groups with different job functions, were determined to have received quarterly internal doses of 2.94 mSv and 1.74 mSv respectively, which exceeded CFM's internal dose action level of 0.8 mSv/quarter. Corrective actions were taken by CFM including improvements to work instructions and aspects of the urine analysis program.
- In 2015, there were 2 action level exceedances reported. In the first instance, a worker's extremity dosimeter recorded a dose result of 151 mSv, which exceeded CFM's extremity dose action level of 55 mSv/quarter. Further investigation by CFM and the dosimetry service provider determined that the extremity dosimeter worn by the worker was contaminated with uranium product and therefore the dose reported was not fully representative of the dose to the worker's extremity, but rather attributed to the contamination. As such, CFM pursued a change to the worker's dose record with the National Dose Registry, which was approved by the CNSC.

In the second instance, a worker received an acute, internal dose of 5.7 mSv, which exceeded CFM's internal dose action level of 0.8 mSv/quarter. CFM's investigation identified a number of potential causes of the intake; however, it was suspected that a likely cause was related to deficiencies with the respiratory protection program and compliance with the requirement for workers wearing respirators to be clean shaven. Corrective actions implemented by CFM included improvements to CFM's respiratory protection program and the processes for managing suspected and confirmed abnormal intakes of uranium by workers. In January 2016, CNSC staff conducted a reactive onsite inspection focused on this incident and verified CFM's implementation of corrective actions.

- In 2017, there was 1 exceedance of CFM's whole-body dose action level of 1 mSv/quarter reported to the CNSC, when a worker's dosimeter recorded a dose of 1.39 mSv. CFM's investigation revealed that the worker had undergone a therapeutic radiation treatment, which was the primary contributor of the dose recorded on their dosimeter. Corrective actions were implemented at CFM and included updating internal processes to include steps to take when a medical treatment involving a radioisotope is received by a worker in order to prevent exposure of the worker's dosimeter that is used to monitor occupational exposures.
- In 2019, there was 1 action level exceedance of CFM's extremity dose action level of 55 mSv/quarter reported to the CNSC, when a worker's extremity dose for the third quarter was determined to be 73.7 mSv. CFM's investigation into the exceedance did not identify a clear cause, and determined the dose was not possible given the job tasks assigned to the worker, consideration of the worker's past extremity doses, and

comparisons with other workers' extremity doses. As such, CFM pursued a change to the worker's dose record with the National Dose Registry, which was approved by the CNSC.

- In 2021, there was 1 action level exceedance of CFM's annual action level of 5 mSv for lung dose reported to the CNSC, when a worker's lung dose assignment was determined to be 5.9 mSv. CFM's investigation into the exceedance identified that a requirement for the use of respiratory protection during a specific work activity was not included in the work instruction for the activity, nor was it part of workers' training and supervisor oversight activities. Corrective actions were implemented at CFM and included updating the work instructions for this work activity to include the respirator requirement and communicating this requirement to workers and supervisors.

### ***Radiation Protection Program Improvements***

During the previous licence period, CFM revised their RP program documentation as part of their continual improvement activities and as a result of findings arising from CNSC compliance verification activities. Other areas where CFM's RP program was strengthened include the installation of a network of continuous air monitors in processing areas which allow for the timely detection of changing conditions and increases in ambient uranium in air concentrations.

CFM reviewed the potential impacts of a proposed production increase on the RP program and the radiation safety of workers. CFM carried out an analysis of data collected under its internal and external dosimetry programs to determine whether there was a relationship between annual production and worker dose results. This analysis demonstrated that there is no evidence to support an expected change to worker dose because of a production increase. The proposed production increase will not impact the current licensing basis for the Radiation Protection SCA, with the RP measures implemented under the current RP program effectively controlling worker doses arising from the operation of CFM facility.

Overall, CNSC staff are satisfied with RP program performance at CFM during the licensing period.

### **Radiological Hazard Control**

Radiation and contamination control programs have been established at CFM to control and minimize radiological hazards and the spread of radioactive contamination. CFM is also delineated into zones according to the potential for contamination. Appropriate personal protective equipment is provided for each zone and is used to minimize the spread of contamination.

Radiological monitoring programs confirm the effectiveness of contamination control and include a combination of direct and indirect contamination monitoring of areas, work clothing and personal protective equipment. Airborne contamination monitoring provides timely notification of changing conditions related to possible compromises in equipment operation.

CNSC staff are satisfied that radiological hazards have been adequately controlled at CFM during the licensing period.

### **Radiation Protection Reportable Events**

In 2012, CFM reported a uranium powder spill at the facility, due to an equipment failure during the transfer of uranium powder. This incident caused a localized increase of in-plant air uranium concentrations which was extracted through the building ventilation exhaust, resulting in an exceedance of the action level for building ventilation uranium emissions (see section 3.9.3). Through CFM's internal dosimetry program, it was determined that there were minimal to no measurable exposures to workers as a result of this incident. CFM performed a root cause investigation and implemented corrective actions to prevent a recurrence. CNSC staff are satisfied with CFM's corrective actions in response to this event.

#### **3.7.3.2 Regulatory Focus**

CNSC staff will continue to monitor CFM's performance in the Radiation Protection SCA through regulatory oversight activities including inspections and desktop reviews of CFM's compliance reporting and revisions to relevant program documentation, pertaining to this SCA.

In addition, CNSC staff will continue to monitor the effectiveness of CFM's corrective actions as per the causal factors identified from the action level exceedances during the licensing period. CNSC staff will also monitor doses to workers if production levels increase, to verify CFM's position that there will not be a corresponding increase of worker doses.

#### **3.7.3.3 Proposed Improvements**

There are no proposed improvements for the Radiation Protection SCA.

### **3.7.4 Conclusion**

CNSC staff conclude that the overall performance by CFM for the Radiation Protection SCA is satisfactory.

### **3.7.5 Recommendation**

One standardized licence condition is included in the proposed licence for the RP SCA. Licence condition 7.1 requires the licensee to implement and maintain an RP program, which includes a set of action levels. As part of this licence condition, the licensee is required to notify the Commission within 7 days of becoming aware that an action level has been exceeded. Compliance verification criteria for this licence condition are provided in the draft LCH.

## **3.8 Conventional Health and Safety**

The conventional health and safety SCA covers the implementation of a program to manage workplace safety hazards and to protect workers.

The specific areas that comprise this SCA at the CFM facility include:

- performance
- practice
- awareness

### 3.8.1 Trends

The following table indicates the overall rating trends for the Conventional Health and Safety over the previous licence period:

| TRENDS FOR CONVENTIONAL HEALTH AND SAFETY   |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>   |      |      |      |      |      |      |      |      |      |
| CFM has maintained a conventional health and safety program that meets the requirements of the NSCA and in accordance with CNSC requirements over the licence period. |      |      |      |      |      |      |      |      |      |

### 3.8.2 Discussion

CFM is obligated under the NSCA and its associated regulations to have policies, programs, and procedures in place for the safe operation and maintenance of its facilities. In addition to the NSCA and its associated regulations, CFM's activities must comply with the [Canada Labour Code](#), and the associated [Canada Occupational Health and Safety Regulations](#). CFM's occupational health and safety program applies to all work performed by CFM employees and contractors.

As required by paragraph 29(1)(h) of the GNSCR, licensees are to report serious illnesses or injuries incurred or possibly incurred as a result of a licensed activity to the CNSC. In addition to reporting of serious illnesses and injury, CFM also submits annual compliance reporting on conventional health and safety in accordance with [REGDOC-3.1.2, Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills](#), and provides quarterly updates on conventional health and safety metrics to CNSC staff via submission of quarterly compliance monitoring and operational performance reports.

To optimize protection of workers during the pandemic, CFM developed a COVID-19 hazard prevention procedure, which includes various control measures for everyone entering the facility, including mask use, infection prevention, disinfection, and other workplace controls. In November 2020, an outbreak was declared at CFM by the local health unit following 3 COVID-19 cases in workers and likely onsite transmission. Operations were suspended for 1 day as CFM performed testing of close contact employees to confirm the extent of the outbreak (all test results were negative). As of November 2021, all employees and visitors were required to be fully vaccinated to enter the site. CFM also offered voluntary rapid testing twice per week and arranged vaccination clinics for employees on three occasions (twice in 2021, and a booster vaccination clinic in

2022). Throughout the pandemic, CFM has provided ongoing updates to CNSC staff on the status of workers and control measures being put in place to protect workers and visitors entering the facility.

### 3.8.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.8.3.1 Past Performance

##### Performance

CFM uses several leading and lagging KPIs to monitor conventional health and safety performance. Some of the leading indicators include safety meeting attendance, safety inspection completion, and job task observation. Lagging indicators include Lost-Time Injury (LTI) frequency, Days Away, Restricted, Transferred rate (DART) and Total Recordable Injury Rate (TRIR). The TRIR for 2021 was 0.44, as only 1 recordable injury was sustained for the entire year.

The KPIs typically reported to the Commission for conventional health and safety are the number of LTIs that occur per year, LTI severity and LTI frequency. A LTI is defined as an injury that takes place at work, and results in the worker being unable to return to work and carry on their duties for a period of time. The LTI frequency and LTI severity are both based on 100 full time workers (100 FTE = 200,000 hours worked per year). LTI statistics for CFM over the previous licence period are outlined in Table 6.

During the previous licence term, only one lost time injury (LTI) was incurred at CFM and reported to CNSC staff. In January 2015, a CFM contractor sustained injuries to his neck and shoulder when working in a crouched position within a tight space. When the contractor stood up, his neck and shoulder impacted an overhead metal structure. The contractor sought medical attention and missed one day of work as a result of the injury.

**Table 6. Lost-time injury statistics, CFM, 2012 –21**

| Year               | 2012              | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|--------------------|-------------------|------|------|------|------|------|------|------|------|------|
| Lost-time injuries | 0                 | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    |
| Severity rate      | 23.6 <sup>1</sup> | 0    | 0    | 0.6  | 0    | 0    | 0    | 0    | 0    | 0    |
| Frequency rate     | 0                 | 0    | 0    | 0.6  | 0    | 0    | 0    | 0    | 0    | 0    |

<sup>1</sup> Value reflects days lost to injury in 2012 due to medical procedure related to a 2010 injury.

CNSC staff monitor CFM's conventional health and safety performance through reviews of the above-noted compliance reporting and consideration of inspection findings related to this SCA. Over the previous licence period CFM's LTI and

other conventional health and safety statistics support CNSC staff's conclusion of consistent satisfactory performance.

### **Practices**

Licenseses are responsible for developing and implementing conventional health and safety programs for the protection of their workers. These programs must comply with Part II of the [Canada Labour Code](#) (CLC). CFM's Safety and Health program document (CFM-SH) describes the health and safety program for the site and outlines the roles and responsibilities of management and employees towards supporting the program. Senior management has the ultimate responsibility for the safety and health of all persons working for, or on behalf of CFM, while all employees must take responsibility for the aspects of the health and safety program for which they have control. Management is also required to develop health and safety objectives and review the effectiveness of the program annually to identify improvement opportunities related to health and safety performance.

CFM has established a JHSC to provide a forum for workers and management to identify and resolve health and safety issues and improve overall safety in the workplace. The JHSC meets on a monthly basis, exceeding the meeting frequency requirement for workplace health safety committees required by paragraph 135(10) of the CLC<sup>2</sup>.

Conventional health and safety requirements are routinely verified by CNSC inspectors during facility walkdowns which are a standard element of onsite inspections at CFM. During walkdowns, CNSC inspectors observe workers' compliance with requirements related to workplace safety, proper use of PPE, use of signage and barriers along with the general housekeeping of the facility. Additional elements of the conventional health and safety program such as JHSC meeting minutes, health and safety related training are frequently verified during general inspections. During the previous licence term all inspection findings identified under the conventional health and safety SCA were considered low safety significance. CFM has implemented appropriate corrective action to address each enforcement action to the satisfaction of CNSC staff.

CNSC staff are satisfied that CFM's conventional health and safety practices meet CNSC regulatory expectations and requirements as well as requirements of the CLC.

### **Awareness**

The possession and processing of uranium presents a radiological and chemical hazard to workers. Additional chemical hazards exist at the site from bulk hydrogen as well as smaller quantities of laboratory chemicals, water treatment chemicals and other materials used for maintenance work. Physical hazards at the CFM facility may include heat, lighting, noise, vibration, and extreme weather events. Licensees are responsible for ensuring that workers have the knowledge to identify workplace hazards and take the necessary precautions to protect against

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<sup>2</sup> [Canada Labour Code 135\(10\)](#) requires that a work place committee meet at least 9 time per year.

these hazards. This is accomplished through training and ongoing internal communications with workers.

CFM delivers safety-related training courses to all its employees and contractors. All site personnel have general awareness training related to the potential health and safety hazards and exposures that exist at the site and the various means of minimizing risk from the hazards. Employees are required to meet specified qualification requirements prior to performing assigned tasks. Qualification training ensures that employees have the specific knowledge, skills, and attitude to perform the task safely. CNSC staff have reviewed CFM's training programs (see Human Performance SCA) and routinely review health and safety training records during inspections.

CFM identifies workplace hazards through risk assessment and job hazard analyses and implements controls to mitigate those hazards. Hazard control documentation has been developed for many types of hazards present at CFM including electrical, pressure vessels, hazardous materials, tools, machinery and material, and work environment (e.g., heat stress, confined space, noise, working at heights, etc.). During onsite inspections, CNSC staff have observed that CFM implements a hierarchy of controls approach to mitigate exposure to hazards. Preventative measures progress from hazard elimination, to hazard reduction, and lastly the provision of personal protective equipment (PPE).

Apart from formal training, CFM promotes awareness of health and safety during monthly safety meetings covering a range of potential topics including fire safety, ergonomics, radiation protection, mental health, hearing protection, etc. CNSC staff have observed additional communication tools being used to support health and safety awareness at the facility including internal newsletters, bulletin boards, electronic display monitors, and posting of JHSC minutes within the facility.

During the previous licence period, CFM's performance in the conventional health and safety awareness specific area met CNSC expectations. CNSC staff conclude that CFM's overall performance for this SCA is satisfactory, and that CFM is qualified to carry on its activities, as requested in the licence application for this SCA.

### **3.8.3.2 Regulatory Focus**

CNSC staff continue to monitor CFM's performance in this SCA through regulatory oversight activities including inspections and desktop reviews of relevant program documentation.

### **3.8.3.3 Proposed Improvements**

No improvements to this SCA are proposed.

## **3.8.4 Conclusion**

Based on CNSC staff's assessment of CFM's application, supporting documents and past performance, CNSC staff conclude that CFM continues to implement

and maintain an effective conventional health and safety program in accordance with regulatory requirements and CNSC expectations.

### 3.8.5 Recommendation

One standardized licence condition is included in the proposed licence for this SCA. Licence condition 8.1 requires the licensee to implement and maintain a conventional health and safety program. Compliance verification criteria for this licence condition are included in the draft LCH.

## 3.9 Environmental Protection

The environmental protection SCA covers programs that identify, control and monitor all releases of nuclear and hazardous substances and effects on the environment from facilities or as the result of licensed activities.

The specific areas that comprise this SCA at the CFM facility include:

- effluent and emissions control (releases)
- environmental management system (EMS)
- assessment and monitoring
- protection of people
- environmental risk assessment (ERA)

### 3.9.1 Trends

The following table indicates the overall rating for the Environmental Protection SCA over the previous licence period:

| TRENDS FOR ENVIRONMENTAL PROTECTION   |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>   |      |      |      |      |      |      |      |      |      |
| CFM has developed, implemented and maintained an effective environmental protection program that protects the environment and the public in accordance with CNSC regulatory requirements.   |      |      |      |      |      |      |      |      |      |
| During the previous licence period, releases to the environment were well below the release limits specified in the CNSC licence. CNSC staff monitor CFM's implementation of the environmental protection program through compliance verification activities. |      |      |      |      |      |      |      |      |      |
| CFM updated its ERA in 2021. The ERA concluded that human health and ecological risks attributable to the CFM facility's operations are low to negligible.  |      |      |      |      |      |      |      |      |      |

### 3.9.2 Discussion

A summary of the licensee's performance, regulatory focus and proposed improvements are presented in the following subsections.



## Regulatory Requirements

As per the NSCA, licensees are required to make adequate provisions for the protection of the environment. Licensees achieve this by developing and maintaining an environmental protection program to control releases of nuclear and hazardous substances and to assess the effects of these releases on the environment. The design and implementation of the environmental protection program at the CFM facility is in accordance with [REGDOC 2.9.1, \*Environmental Protection: Environmental Principles, Assessments and Protection Measures\*](#).

CFM has implemented the requirements contained in:

- CSA N288.1-14, *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities* [14]
- CSA N288.4-10, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills* [15]
- CSA N288.5-11, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills* [16]
- CSA N288.6-12, *Environmental risk assessments at Class I nuclear facilities, and uranium mines and mills* [17]
- CSA N288.7-15, *Groundwater Protection Programs at Class I Nuclear Facilities and Uranium Mines and Mills* [18]
- CSA N288.8-17, *Establishing and implementing action levels for releases to the environment from nuclear facilities* [19]

CFM is required to abide by all provincial and federal requirements for the handling of nuclear and other hazardous substances. CFM controls releases of nuclear and hazardous substances from the CFM facility to the environment in accordance with CNSC regulatory requirements as well as requirements prescribed in the Environmental Compliance Approvals issued by the Ontario Ministry of the Environment, Conservation and Parks (MECP).

During the previous licence period, CNSC staff verified CFM's performance with respect to environmental protection through inspections and desktop reviews. In total, CNSC staff conducted 3 focused environmental protection inspections in 2013, 2016, and 2021. All findings from these inspections were considered to have low safety significance and all enforcement actions associated with these inspections are closed to CNSC staff's satisfaction.

As a result of these compliance activities, CNSC staff conclude that CFM's implementation of the environmental protection program at the CFM facility meets CNSC's regulatory requirements and expectations.

## Environmental Protection Review (EPR) report

As noted in Section 2.1, the CNSC conducted an EPR to assess CFM's environmental protection and environmental compliance activities conducted under the NSCA. CNSC staff's technical review of CFM's environmental

protection activities has found that human health and the environment around the facility are protected. The EPR report for the CFM facility is available on the CNSC [website](#) [8].

### 3.9.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.9.3.1 Past Performance

The CFM facility monitors and controls its airborne emissions and liquid effluent to the environment, by implementing CFM's Environmental Protection Program. CFM's effluent and emissions monitoring program is based on CSA N288.5-11, *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills* [16] and includes monitoring of radiological and hazardous substances.

##### Atmospheric Emissions

CFM has an Environmental Compliance Approval (ECA) issued by the MECP for air emissions. The ECA requires CFM to maintain an emission summaries and dispersion modelling report to demonstrate compliance against the limits in the ECA.

There are two sources of airborne releases of uranium at CFM: the process stacks and the building exhaust ventilation. CFM uses baghouses, HEPA filtration and scrubbers to control and reduce emissions to air.

At each of the process stacks, air sampling is conducted continuously using an isokinetic sampler. The filter from the stack is collected daily and uranium concentrations analyzed by alpha-counting. A daily emission rate of uranium is calculated using the stack flow rate, operating hours, and the daily filter uranium concentration.

At the building exhaust ventilation, in-plant uranium in air concentrations are measured using continuous and/or fixed air sampling systems at various locations throughout the facility. The filters from the fixed air sampling stations are collected and analyzed by alpha-counting. A daily emission rate of uranium is calculated using the in-plant uranium in air concentration, the exhaust discharge rate, and an efficiency factor to account for the HEPA filtration.

During the licensing term, there were two reportable accidental releases to air. In 2019, CFM staff noticed a nitrogen release from the valve of an exterior storage tank. Upon discovery, the faulty valve was immediately replaced.

In 2020, CFM staff noticed that the liquid hydrogen tank was venting excessively. CFM conducted an investigation into the cause and concluded that all safety systems functioned as intended. CFM implemented corrective actions such as managing the liquid hydrogen tank level more closely in preparation for low usage periods, such as the summer maintenance outage. These two events did not result in impacts on the environment, or on the health and safety of the public.

A summary of the air emissions from all of the stacks at CFM is provided in Table 7. A summary of the air emissions from the building ventilation is provided in Table 8. The total releases of uranium from CFM are provided in Table 9 and compared against the previous licence limit of 14 kg/yr. The licence limit applies to the total uranium discharge from all stacks. In addition to licence limits, CFM has established air emission action levels and internal control levels, which provide additional notification of a condition warranting further investigation. The action levels are based on concentration and are applied individually at each stack. Air emissions of uranium have been consistently several orders of magnitude below licence limits throughout the previous licensing period.

As seen in Tables 7 and 8, there were airborne action level exceedances at CFM in 2012 and in 2016. In 2012, there was a powder spill in the pelleting area which caused an action level exceedance for air emissions from the building ventilation (see section 3.7.3). In 2016, the HEPA filter for the stack servicing the new automated grinder was not clamped down properly during installation. As the filter was loaded, it shifted, and caused an abnormal release of uranium, which exceeded the action level. This was detected during daily stack sampling.

In both these instances, CNSC staff confirmed that CFM provided notification to the CNSC upon discovery, performed an investigation to determine the cause, and implemented appropriate corrective actions to prevent a recurrence.

**Table 7: Total average and maximum uranium discharged to the air from all CFM stacks compared with the action level (2012–2021)**

|   | Action level ( $\mu\text{g}/\text{m}^3$ ) | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|------|------|------|------|------|------|------|------|------|------|
| Overall annual average from all stacks ( $\mu\text{g}/\text{m}^3$ ) | 2.0                                       | 0.1  | 0.1  | 0.0  | 0.1  | 0.1  | 0.03 | 0.02 | 0.02 | 0.04 | 0.04 |
| Overall annual maximum from all stacks ( $\mu\text{g}/\text{m}^3$ ) |   | 1.5  | 1.5  | 0.8  | 1.5  | 9.5  | 1.8  | 0.55 | 1.51 | 1.48 | 1.69 |

**Table 8: Average and maximum building ventilation rates from CFM in g/hr compared with applicable action levels (2012–2021)**

|                                       | Action level (g/hr) |     | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---------------------------------------|---------------------|-----|------|------|------|------|------|------|------|------|------|------|
| Uranium emissions from pelleting area | 1.0                 | Avg | 0.3  | 0.3  | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  | 0.1  | 0.1  |
|                                       |                     | Max | 1.9  | 0.5  | 0.4  | 0.6  | 0.9  | 0.6  | 0.9  | 0.5  | 0.5  | 0.3  |
| Uranium emissions from PP2 area       | 0.5 <sup>1</sup>    | Avg | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
|                                       |                     | Max | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  |

<sup>1</sup> The PP2 action level was reduced to 0.4 g/hr in 2020

**Table 9: Total uranium discharged to the air from CFM in kilograms compared with applicable release limit (2012 – 2021)**

|   | Release limit (kg/yr) <sup>a</sup> | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019  | 2020 | 2021 |
|---|------------------------------------|------|------|------|------|------|------|------|-------|------|------|
| <b>Total uranium discharge through stacks (kg/year)</b>                       | 14                                 | 0.02 | 0.03 | 0.01 | 0.01 | 0.03 | 0.01 | 0.01 | 0.004 | 0.01 | 0.01 |
| <b>Total uranium discharge through building exhaust ventilation (kg/year)</b> |                                    | 0.57 | 0.48 | 0.40 | 0.45 | 0.70 | 0.57 | 1.25 | 1.09  | 0.92 | 0.89 |

<sup>a</sup> The current atmospheric release limit, effective March 01, 2022, is 10.5 kg U/yr, as discussed later in this section.

#### Liquid Effluent Discharges

Liquid effluent from CFM's operations is collected and treated using an evaporator process. The condensed liquid is sampled and analyzed for uranium and pH prior to being released to the municipal sanitary sewer in a controlled batch process. If the uranium concentration in the effluent is below the action level and the pH is within the acceptable range, the effluent is discharged to the municipal sanitary sewer. Otherwise, it is pumped back to the waste treatment tanks for further treatment in the form of re-evaporation. There is no direct discharge of liquid effluent from CFM to the environment. Table 10 shows the annual waterborne releases from CFM compared with the applicable action levels during the 2012 – 2021 period.

**Table 10: Annual waterborne releases from CFM compared with the applicable action levels (2012 – 2021)**

| Parameter           | Uranium (mg/L)                                 |                   | pH      |         |
|---------------------|--|-------------------|---------|---------|
|                     | Minimum  | Maximum           | Minimum | Maximum |
| 2012                | 0.03   | 0.06              | 7.4     | 8.2     |
| 2013                | 0.03   | 0.07              | 7.3     | 8.6     |
| 2014                | 0.05   | 0.54 <sup>a</sup> | 7.3     | 8.3     |
| 2015                | 0.04   | 0.10              | 7.3     | 8.2     |
| 2016                | 0.02   | 0.06              | 6.9     | 8.5     |
| 2017                | 0.02   | 0.10              | 7.3     | 8.1     |
| 2018                | 0.02   | 0.11 <sup>a</sup> | 7.3     | 8.4     |
| 2019                | 0.01   | 0.03              | 7.4     | 8.2     |
| 2020                | 0.01   | 0.05              | 7.3     | 8.9     |
| 2021                | 0.01   | 0.03              | 6.8     | 8.9     |
| <b>Action level</b> | 2012-2017 = 0.20 mg/L<br>2018-2021 = 0.10 mg/L |                   | 6.5     | 9.0     |

<sup>a</sup> Action level exceedances were recorded and reported to CNSC staff in 2014 and 2018.

There were two action level exceedances reported to CNSC related to liquid effluent discharges during the previous licence period.

In 2014, the results of the composite sewer sample for the week of January 13 – 20 indicated that the uranium concentration in the sewer was 0.624 ppm, which exceeded the action level of 0.2 ppm. Upon discovery, CFM notified CNSC staff and conducted an investigation that determined that the probable cause of the incident was maintenance work being performed to clear the furnace sanitary sewer lines. This maintenance work caused a release of historical uranium that had collected in the lines. The results from the investigation were detailed with corrective actions identified and submitted to the CNSC.

In 2018, CFM recorded an action level exceedance when the concentration of uranium in an effluent sample was measured at 0.11 mg U/L. CFM notified CNSC staff of the exceedance and conducted an investigation to identify the cause. Following the investigation, CFM submitted the event report to the CNSC, concluding that the elevated measurement was likely due to recent equipment modifications within the facility. Subsequent liquid effluent monitoring results were all below 0.10 mg U/L for the remainder of 2018.

CNSC staff reviewed the corrective actions implemented by CFM for both these action level exceedances and found them to be adequate.

In 2015, CFM reported a discrepancy in the total volume of liquid effluents discharged to the sanitary sewer from the facility between 2007 and 2014. The provision of an inaccurate record to the CNSC is reportable under section 31 of the GNSCR. CFM determined that the groundwater additions to the sanitary sewer starting in 2007 had not been included in the total volume of liquid effluents used to calculate the total uranium discharged to the sewer. CFM corrected this and provided the updated volumes and total uranium discharged to

the sewer to the CNSC. CNSC staff reviewed the information and confirmed that the total uranium discharged to the sewer from 2007 to 2014 remained a small fraction of the release limit.

Table 11 shows the total uranium discharged to the sanitary sewer from CFM in kilograms compared against the release limits applicable during the 2012 – 2021 period.

**Table 11: Total uranium discharged to the sewer from CFM in kilograms compared against applicable release limits (2012 – 2021)**

|   | Release limit (kg/yr) | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|-----------------------|------|------|------|------|------|------|------|------|------|------|
| <b>Total Uranium discharge to Sewer (kg/yr)</b> | 475 <sup>a</sup>      | 0.95 | 0.83 | 1.58 | 1.24 | 0.85 | 0.64 | 0.84 | 0.39 | 0.34 | 0.29 |

<sup>a</sup> 475 kg U/yr was the release limit from 2012-2021. The current release limit for discharges to sewer, effective March 01, 2022, is equivalent to 62 kg U/yr, as noted in Table 12.

### Release limits

The release limits in place during the previous licence period were based on modelled air and liquid releases from the CFM facility correlating with a 50 µSv dose to a member of the public (i.e., a 20-fold safety factor applied to the regulatory dose limit). At the request of CNSC staff in June 2020, CFM established exposure-based release limits (EBRLs) at its air and liquid release points at the CFM facility. The EBRLs ensure that releases stay below certain levels to meet human health or environmental quality criteria.

For liquid releases to the municipal sanitary sewer, CFM derived EBRLs based on the [Canadian Council of Ministers of the Environment \(CCME\) - Protection of Aquatic Life Guidelines](#) for uranium and a dilution factor determined from modelling releases through the sewage treatment plant and into Lake Ontario.

For releases to air, CFM harmonized its releases with the provincial air quality standards under [Ontario Regulation 419/05 Air Pollution - Local Air Quality](#) and derived an EBRL that applies to all atmospheric release points (i.e., process stacks and building ventilation emission), based on meeting the applicable air quality standards at the maximum Point-of-Impingement. CFM's atmospheric release modelling calculated that a sitewide uranium release rate of 1.2 g/hr correlates with the Ontario uranium air quality standard of 0.03 µg/m<sup>3</sup>. Based on this release rate, an annual release limit of 10.5 kg/yr was derived, assuming continuous operations throughout the year.

CNSC staff assessed and accepted these revised release limits as part of the one-year renewal (Table 12). These EBRLs are the release limits in the current CFM

licence. At the time that CFM proposed the EBRLs, CFM's process stacks were not equipped to monitor operating run times that would enable the calculation of emission rates on an hourly basis. Consequently, the revised atmospheric release limit was expressed as an annual uranium release (10.5 kg/yr), consistent with the release limits in previous CFM licences. As part of CFM's continuous improvements, monitoring equipment and software upgrades are being installed that will permit precise operational run time monitoring. These upgrades are expected to be in place prior to expiry of the current licence. CFM is therefore proposing the atmospheric release limit in the proposed LCH be expressed as the combined average uranium limit of 1.2 g/hr applied to process stack and building ventilation discharge points. The annual averaging period is retained to remain consistent with the Ontario uranium in air standard. CNSC staff support this change as it removes the need for assumptions on operations, therefore allowing for more accurate alignment with the Ontario standard.

**Table 12: Release limits for the CFM facility**

| Source  | Parameter | Release limits               |                  |                       |                                   |
|---|-----------|------------------------------|------------------|-----------------------|-----------------------------------|
|   |           | 2012–2022 limit <sup>2</sup> | Averaging period | Current Limit (EBRL)  | Averaging period                  |
| Water – Releases to sewer                               | Uranium   | 475 kg                       | Annual           | 1.7 mg/L <sup>1</sup> | Twice weekly, composite discharge |
| Air – Process stacks and building ventilation emissions | Uranium   | 14 kg                        | Annual           | 10.5 kg               | Annual                            |

<sup>1</sup> The current release limit of 1.7 mg/L is equivalent to about 62 kg/yr based on CFM's current average release volumes.

<sup>2</sup> These were the operating release limits for CFM during the previous licence period (i.e., until February 28, 2022). They have been replaced by the EBRLs.

CFM has also established action levels that are derived using release monitoring data from the facility and are in alignment with the methodology described in CSA N288.8-17, *Establishing and implementing action levels for releases to the environment from nuclear facilities* [19]. These action levels provide an early indication of a potential loss of control of the environmental protection program. Hence, CFM can take timely corrective actions to ensure that they do not exceed the release limits.



## **Environmental Management System (EMS)**

Cameco has developed and is maintaining an EMS that provides a framework for integrated activities for the protection of the environment at the CFM facility. Cameco describes the EMS for the CFM facility in the FSD EMS. It includes activities such as establishing annual environmental objectives and targets. CNSC staff, through compliance verification activities, review these objectives and targets.

As part of compliance verification activities, CNSC staff review documents relating to environmental protection and follow up with CFM staff on any outstanding issues. The results of these compliance verification activities demonstrate that CFM conducts an annual management review in accordance with CNSC requirements. The results from these management reviews are tracked and corrective actions are implemented to address the findings. CNSC staff are satisfied that CFM is conducting effective reviews and addressing identified issues properly.

## **Assessment and Monitoring**

CFM conducts environmental monitoring under its implementation of the environmental protection program (EPP). The environmental monitoring program is based on CSA N288.4-10, *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills* [15].

### Ambient Air Monitoring

As part of CFM's EPP, an ambient air monitoring program is implemented. The program consists of high-volume air samplers placed at 4 corners within the CFM fence line to measure concentrations of  $UO_2$  in ambient air. Over the 5-year period from 2017 to 2021, the results from these monitoring locations show that uranium concentrations have remained consistently low as summarized in table 13.

**Table 13: Annual concentrations of uranium ( $\mu\text{g}/\text{m}^3$ ) in ambient air as measured at high volume air sampler stations around the CFM facility**

| Hi-Vol station |         | 2017   | 2018   | 2019   | 2020   | 2021   | Ontario Standard [20] |
|----------------|---------|--------|--------|--------|--------|--------|-----------------------|
| East           | Average | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | <b>0.03</b>           |
|                | Maximum | 0.0009 | 0.0005 | 0.0008 | 0.0014 | 0.0039 |                       |
| North          | Average | 0.0003 | 0.0002 | 0.0003 | 0.0004 | 0.0004 |                       |
|                | Maximum | 0.0008 | 0.0005 | 0.0014 | 0.0024 | 0.0050 |                       |
| Northwest      | Average | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 |                       |
|                | Maximum | 0.0006 | 0.0006 | 0.0016 | 0.0012 | 0.0042 |                       |
| Southwest      | Average | 0.0002 | 0.0002 | 0.0003 | 0.0004 | 0.0004 |                       |
|                | Maximum | 0.0010 | 0.0005 | 0.0015 | 0.0014 | 0.0056 |                       |

### Soil Monitoring

CFM collects soil samples at least every 3 years to address soil quality in the vicinity of the CFM facility and to verify that there is no significant build-up of uranium in surface soil due to deposition of airborne uranium released from the facility. Soil samples are taken at 23 locations and sent to an external laboratory to determine concentrations of uranium.

MECP has established the upper limits of typical background concentrations for many substances in soils that are not contaminated by point sources [21]. CNSC staff use this standard to determine if soil concentrations near the nuclear facility are the result of contamination from the facility operations. For uranium, the upper limit of typical background for Ontario is  $2.5 \mu\text{g}/\text{g}$  for residential land use, derived from the 0-5 cm soil horizon.

To enable the comparison with the standard, the soil data for CFM are provided in Table 14. The average soil concentrations of uranium measured near CFM are above the MECP background for Ontario. It is highly unlikely, however, that this can be attributable to CFM operations due to historical contamination of soil in Port Hope which has long been recognized and continues to be the focus of cleanup activities. Between 2009 and 2019, neither average nor maximum soil concentrations of uranium increased in the top soil horizon near the facility. This indicates that there is no accumulation of uranium in surface soil due to current uranium emissions from CFM. The results for all samples were below the most conservative CCME soil quality guideline of  $23 \mu\text{g}/\text{g}$  for residential/parkland land use [22] and, therefore, are not expected to result in any adverse consequences to human and environmental receptors.

**Table 14: Soil monitoring results ( $\mu\text{g/g}$ ) at the CFM facility (0–5 cm depth)**

| Parameter                     | 2009 <sup>a</sup> | 2010 <sup>a</sup> | 2013 | 2016 | 2019 | CCME Guideline [22] |
|-------------------------------|-------------------|-------------------|------|------|------|---------------------|
| Average uranium concentration | 6.8               | 5.6               | 4.7  | 3.0  | 2.9  | 23                  |
| Maximum uranium concentration | 17.0              | 21.1              | 17.4 | 10.2 | 7.6  |                     |

<sup>a</sup> Given the frequency of soil monitoring, soil data beyond the previous licence term (i.e., 2009, 2010) is included.

CFM has provided the rationale on the changes to the soil monitoring program approaches and monitoring frequencies in order to address uncertainties associated with historical contamination of soil in Port Hope. The Port Hope Area Initiative (PHAI) project will provide a unique opportunity to locate soil monitoring stations in clean fill following the clean-up of the low-level radioactive waste throughout the Port Hope community in the coming years. At that time, CFM will review and modify soil monitoring locations within the community as scientifically appropriate. CNSC staff find this proposal acceptable and will further update the Commission on this matter as appropriate.

#### Surface Water Quality Monitoring

Within the site boundary, the surface water environment is limited to that of Gages Creek, located to the east of the CFM facility. Gages Creek receives storm water and ditch discharges. In 2020, CFM collected surface water samples at 9 locations in April, June and October. The uranium concentrations in general met the [interim Provincial Water Quality Objective](#) and the [CCME short-term and long-term uranium guidelines](#) [23] at all surface water sampling locations. The risk to the environment from several observed exceedances is expected to be negligible due to the conservative assumptions and safety factors that were used to derive the guidelines.

#### Groundwater Monitoring

CFM has a groundwater monitoring program in place. Groundwater has been sampled at the site twice a year since 1999, with a network of 70 monitoring wells, including 43 overburden, 23 shallow bedrock and 4 deep bedrock wells. CFM has implemented CSA N288.7-17, *Groundwater protection programs at Class I nuclear facilities and uranium mines and mills* [18] in 2021.

CFM submits annual reports on its monitoring of uranium concentrations in groundwater and surface water [24]. Uranium concentrations have been below the MOE Table 3 Standard (420  $\mu\text{g/L}$ ), except in 3 monitoring wells in the area near the north-east corner of the licensed property. CFM conducted a comprehensive investigation in this area and concluded that the elevated uranium concentrations were caused by historic site soil impacts. The impact is localized and thus has not impacted the surface water in Gages Creek which flows into Lake Ontario. In addition, none of the groundwater monitoring wells are used for consumption.

Therefore, the potential for exposure by humans and ecological receptors is minimal and no adverse impacts are expected.

In response to a request from the MECP, in 2000, CFM's predecessor installed and commissioned a pump-and-treat system that includes 12 pumping wells to remove the historical chlorinated volatile organic compounds (VOCs) in the groundwater. The removal efficiency for the VOC's ranged from 68% to 99% based on the results of the 2019 sampling as reported by CFM in its 2020 Annual Review Report Volatile Organic Compounds in Groundwater and Surface Water [25].

### CNSC Independent Environmental Monitoring Program

The CNSC implemented its Independent Environmental Monitoring Program (IEMP) to build Indigenous and public trust in the CNSC's regulation of the nuclear industry, via an independent, technical and accessible environmental sampling program around nuclear facilities. It is separate from, but complementary to, the CNSC's ongoing compliance verification program. The IEMP helps to confirm the CNSC's regulatory position and supports decision making. The IEMP involves taking samples from public areas around the facility and measuring and analyzing the amount of radiological (nuclear) and hazardous substances in those samples.

CNSC staff conducted the IEMP near the CFM facility in 2014, 2015, 2017 and 2020. The sampling campaigns also included samples collected in the vicinity of the nearby Port Hope Conversion Facility. The results are available on the CNSC's [IEMP Web page](#). The IEMP results support CNSC staff's conclusions that the public and the environment surrounding the CFM facility are protected.

The CNSC is committed to collaborating with Indigenous Nations and communities to ensure that the sampling plan reflects Indigenous traditional land use, values and knowledge. For the 2020 IEMP at CFM, CNSC staff did not receive any specific comments from Indigenous communities. CNSC staff will continue to engage with Indigenous Nations and communities to ensure that IEMP sampling incorporates Indigenous knowledge in future sampling campaigns.

### **Protection of People**

CFM is required to demonstrate that they have made adequate provisions to protect the health and safety of the public from exposures to radiological and non-radiological substances released from the CFM facility. CFM uses the effluent and environmental monitoring programs currently implemented to verify that releases do not result in concentrations that may adversely affect public health.

The CNSC receives reports of spills to the environment through the reporting requirements outlined in the CFM licence and licence conditions handbook. CNSC staff's review and evaluation of spills from the CFM facility to the environment during the previous licensing period indicates that negligible risks to the public occurred during this period.

Based on a review of these programs at the CFM facility, CNSC staff conclude that CFM continues to protect the public and Indigenous Nations and communities from facility emissions.

#### Estimated dose to public

The derived release limit (DRL) for a given radionuclide is defined as the release rate that would cause an individual of the most highly exposed group to receive and be committed to a dose equal to the regulatory annual dose limit due to release of the radionuclide to air or surface water during normal operation of a nuclear facility over the period of a calendar year. The DRL calculation is used to determine dose to the public. The CFM DRL report was most recently revised in February 2021 [26].

CFM calculates the maximum dose to the public from the CFM facility from air emissions, liquid effluent releases and gamma radiation. The CNSC's requirement for following the ALARA principle, taking into account social and economic factors, means that CFM must monitor its facility and keep doses to the public below the annual public dose limit of 1 mSv/year prescribed in the [Radiation Protection Regulations](#).

The CFM facility has twelve environmental dosimeters located around the perimeter fence lines. These dosimeters measure the gamma levels at the fence line to represent a potential exposure to a member of the public. At each monitoring location, there is a specific action level that provides an indication if gamma measurements increase beyond normal levels and triggers investigation by CFM and reporting to CNSC staff.

In the third quarter of 2017, there was one exceedance of the gamma action level at Location #12 (located directly behind the Fuel Storage Building). The quarterly result was 1.11  $\mu\text{Sv/h}$ , which exceeded the action level of 1.0  $\mu\text{Sv/h}$  for this specific monitoring location. CFM investigated the situation and determined that more fuel had been stored in the building starting in the fourth quarter of 2016. To reduce the gamma dose rate at this location, a soil berm was installed to add shielding behind the Fuel Storage Building between the fence line and the building in December 2017. The gamma level measured at Location #12 for the first quarter of 2018 was 0.36  $\mu\text{Sv/h}$ , indicating the soil berm has been effective.

Table 15 shows the estimated doses to the public from the CFM facility over the previous licence period. The public dose estimates reported by CFM from 2012 to 2020 were calculated using the same methodology and remained below 5% of the 1 mSv/year regulatory dose limit during that time period. In 2021, CFM submitted revised DRLs which included an update to the public dose calculation formulas in accordance with CSA N288.1-14 [14]. The revisions include the incorporation of airborne and liquid emissions in the calculation, and a new location for the critical receptor. These changes were made to obtain a more conservative estimate of dose to the public, and accordingly resulted in a substantial increase to the dose reported in 2021 (i.e., 0.306 mSv) relative to previous years. The most significant change to the public dose estimate methodology introduced in the 2021 DRL report [26], is a change to the physical location of the critical receptor upon which

the public dose estimate is based. The new location is a palliative care facility which began operating from a residence located on the west side of the CFM facility in 2014. This location is in closer proximity to the fuel storage building than the location used to support public dose estimates in previous years. At the time the palliative care facility began operating (i.e., 2014), CFM carried out an assessment of dose implications using the previous methodology. No changes to the receptor location for public doses were recommended at that time as CFM concluded that dose rates would remain similar to the current dose estimates.

As a result of the changes to the methodology and the critical receptor location used for the 2021 public dose estimate, a direct comparison of the 2021 value to previous years is not appropriate. However, recognizing that the palliative care facility has been operating at the current location since 2014, CNSC staff have verified that public dose estimates remained below the 1 mSv regulatory public dose limit using the current the methodology from 2014 to 2020. Based on reviews of quarterly and annual compliance reporting during the previous licence period, CNSC staff confirm that there has not been an actual increase in emissions or dose to the public from CFM.

The public dose reported by CFM in 2021 is considered a very conservative estimate and remains well below the 1mSv annual regulatory dose limit applicable to a member of the public. As part of its ALARA initiatives, CFM has indicated it plans to implement additional measures to reduce public dose, such as increased shielding from the fuel storage building, beginning in 2023 [27].

**Table 15: Estimated maximum effective dose to a member of the public, 2012 –2021**

| Public dose limit (mSv) | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  | 2020  | 2021  |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1                       | 0.031 | 0.013 | 0.018 | 0.025 | 0.023 | 0.022 | 0.030 | 0.027 | 0.020 | 0.306 |

### Environmental Risk Assessment

An Environmental Risk Assessment (ERA) of nuclear facilities is a systematic process used by licensees to identify, quantify, and characterize the risk posed by contaminants and physical stressors in the environment on human and other biological receptors, including the magnitude and extent of the potential effects associated with a facility. The ERA serves as the basis for the development of site-specific environmental protection control measures and environmental monitoring programs. The results of these programs, in turn, inform and refine future revisions of the ERA.

In 2016, CFM submitted to the CNSC an ERA for the CFM facility [28]. The ERA included an ecological risk assessment and a human health risk assessment for radiological and hazardous contaminants and physical stressors. CNSC staff reviewed CFM's ERA and found it to be compliant with CSA N288.6-12, *Environmental Risk Assessments at Class I Nuclear Facilities and Uranium Mines and Mills* [17].

In 2021, CFM submitted a review of the ERA for the CFM facility [29] in accordance with the requirements set out in CSA N288.6-12 to review and revise its ERA every 5 years [17]. The 2021 review of the ERA was submitted to support CFM's application for a 1-year renewal of the CFM facility operating licence. CNSC staff found the 2021 review of the ERA to be acceptable and that the update addressed staff's technical comments and recommendations on the 2016 ERA. CNSC staff agreed with the licensee's conclusion that no new risks have emerged since the 2016 ERA and, therefore, that the 2016 ERA conclusions and recommendations are still valid: risks to human health and ecological effects attributable to CFM operations are low to negligible.

CNSC staff reviewed CFM's "*Justification for Licence Term and Production Increase*" document [7], which provides CFM's assessment of the production increase on the environmental protection SCA. CNSC staff's review concluded that the production increase would generate air emissions and effluent that would remain well below the licence limits. Additionally, CNSC staff agree with CFM's conclusion that the proposed production increase will not result in any significant changes in uranium soil concentrations near CFM. More details about CNSC staff's assessment are provided in section 3.3 of the [EPR report](#).

### 3.9.3.2 Regulatory Focus

CNSC staff will continue to monitor performance in this area through regulatory oversight activities, inspections, and desktop reviews of CFM's compliance reporting and revisions to relevant program documentation pertaining to this SCA.

### 3.9.3.3 Proposed Improvements

There are no major changes anticipated in the near future for this SCA. CNSC staff expect that CFM will continually identify and implement improvements to CFM's environmental protection program documents. To that effect, as part of its ongoing ALARA initiatives, CFM has committed to implementing additional measures to reduce public dose beginning in 2023[27].

Additionally, CFM has noted in its application that it anticipates draft REGDOC-2.9.2 *Environmental Protection: Controlling Releases to the Environment* to be published in the future licence period, and CNSC staff will be requesting implementation at CFM. The derivation of EBRLs will be a key component of implementing REGDOC-2.9.2 should it be approved by the Commission. At the request of CNSC staff, CFM has derived EBRLs in advance, which were incorporated into the current licence, effective March 01, 2022.

## 3.9.4 Conclusion

The CFM facility has implemented and maintained an environmental protection program that adequately protects the environment and the public in accordance with regulatory requirements. CNSC staff expect no adverse effects on human health and the environment during the operation of the facility.

### 3.9.5 Recommendation

Standardized licence condition 9.1 has been included in the proposed licence for this SCA. This licence condition requires the licensee to implement and maintain an environmental protection program, which includes a set of action levels with a requirement to notify the CNSC within 7 days of any exceedances. Compliance verification criteria for this licence condition are included in the draft LCH.

CNSC staff are recommending the atmospheric release limit be revised to an annual average uranium release of 1.2 g/hr applied to process stacks and building ventilation discharge points.

CNSC staff are also recommending that a requirement be added to the LCH which requires CFM to review the basis and modelling of public dose estimates, and revise in accordance with CSA N288.1 if necessary. This review will be carried out in association with the periodic review of the ERA, which occurs on a minimum 5-year frequency.

## 3.10 Emergency Management and Fire Protection

The Emergency Management and Fire Protection SCA covers emergency plans and emergency preparedness programs that exist for emergencies and for non-routine conditions. This area also includes any results of participation in exercises.

This CMD covers the following specific areas of:

- Conventional emergency preparedness and response
- Nuclear emergency preparedness and response
- Fire emergency preparedness and response

### 3.10.1 Trends

The following table indicates the overall rating for the Emergency Management and Fire Protection SCA over the previous licence period:

| TRENDS FOR EMERGENCY MANAGEMENT AND FIRE PROTECTION  |      |      |      |      |      |      |      |      |      |
|--|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS   |      |      |      |      |      |      |      |      |      |
| 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>  |      |      |      |      |      |      |      |      |      |
| CFM's emergency preparedness and fire protection measures met applicable CNSC regulatory and performance objectives. CNSC staff monitor CFM's implementation of this program through regular compliance verification activities. |      |      |      |      |      |      |      |      |      |

### 3.10.2 Discussion

The SCA 'Emergency Management and Fire Protection' covers the provisions for a licensee to have in place, an emergency preparedness plan and response capability which can mitigate the effects of accidental releases of radiological and



hazardous substances into the environment during emergency and non-routine conditions. This SCA also includes implementation of a fire protection program to prevent or minimize the risk that fire poses to the environment and the health and safety of persons.

CFM continues to effectively implement an emergency preparedness and fire protection program which adequately protects workers, the public and the environment from emergency or non-routine conditions.

The compliance verification criteria for the proposed licence condition handbook are set out in the following documents:

- [CNSC REGDOC-2.10.1, version 2: Nuclear Emergency Preparedness and Response](#)
- CSA N393-13: *Fire protection for facilities that process, handle, or store nuclear substances* [12].

CNSC staff are satisfied with the emergency preparedness measures taken by CFM during the previous licensing period with respect to this SCA and conclude that they meet CNSC regulatory requirements.

### 3.10.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.10.3.1 Past Performance

##### Emergency Preparedness and Response

CFM continues to improve its emergency preparedness and response program based on changes to regulatory requirements, as well as lessons learned from events, exercises and drills.

During the previous licence period, [REGDOC-2.10.1](#) and CSA N393-13 [12], were published and incorporated as regulatory requirements for CFM.

CFM submitted an updated emergency response plan, dated November 25, 2020 for the CFM facility. The emergency response plan assigns specific accountabilities and sets out processes and procedures to protect the health and safety of employees, contractors, the public and the environment in the case of an emergency. The revised emergency response plan was reviewed and accepted by CNSC staff.

CFM has a memorandum of understanding with the Port Hope Fire and Emergency Services (PHFES) and the Municipality of Port Hope which provides the framework for effective emergency response to the facility. As part of this agreement, CFM provides PHFES with the necessary equipment and training to effectively respond to emergencies at the facility. These arrangements are tested routinely during the conduct of joint training, drills and exercises.

Specific compliance and verification activities performed during this past licensing period include reviews of CFM's emergency response plan and fire

safety plan updates, annual compliance reports, event reviews and onsite inspections of full-scale emergency response exercises which included the local emergency services.

CNSC staff conducted 3 focused inspections during CFM emergency exercises in 2013, 2016 and 2019. Most of the findings from these inspections were of low safety significance. However, 3 findings were identified that CNSC staff have classified as medium safety significance. The medium safety significance findings are provided below:

- 1) During a 2013 inspection, CNSC staff observed that communication between the emergency operation center coordinator and immediate response personnel was not adhering to established communication protocols. During an emergency, inadequate/improper communication could result in misinformation, and potentially serious consequences if personnel were to enter unsafe areas.
- 2) During the inspection in 2016, CNSC staff observed an emergency exercise and identified an absence of adequate arrangements for transportation of a contaminated casualty from the facility during a medical emergency. As a result of this finding, CFM conducted extensive follow-up with the local emergency medical services and provided additional training to ensure that appropriate arrangements are in place.
- 3) During the same inspection in 2016, CNSC staff identified that contamination control procedures were not being strictly adhered to. Emergency response personnel were observed exiting and re-entering the emergency area without contamination monitoring. In an actual emergency, this could result in radiological exposure to emergency personnel and the spread of contamination offsite.

Low safety significance inspection findings from Emergency Preparedness inspection were related to; procedure adequacy, exercise design, command and control of responders during an event, adequacy of contamination control and monitoring during an emergency. CNSC staff are satisfied with the corrective actions taken by CFM and have verified implementation during subsequent inspections involving emergency exercise observation. All action items associated with these inspections have been closed.

Based on the above assessment, CNSC staff have concluded that CFM's implementation of its emergency management program is satisfactory for the type and scope of postulated emergency situations.

### **Fire Protection**

CFM's Fire Protection Program identifies how protection from fire is achieved through planned, coordinated and controlled activities to reduce the risk to the health and safety of persons and to the environment from a fire. CFM continues to maintain its fire protection program in accordance with the current licence and associated LCH, the NBCC, the NFCC, and CSA standard N393-13 [12]. CNSC

staff conclude that the fire protection program at CFM meets regulatory requirements and CFM is performing satisfactorily.

CFM maintains a FHA to ensure that all fire hazards at the facility are identified and evaluated, and appropriate fire protection measures are put in place to minimize and mitigate the potential occurrence and effects of a fire. In accordance with CSA N393-13, CFM is required to update the FHA every 5 years, or sooner to reflect facility modifications or other changes in fire hazards or operational changes. As noted in section 5.3, CFM's most recent review and update of its FHA was conducted in 2020. CNSC staff have reviewed the FHA and concluded that the fire hazards at CFM are appropriately identified and controlled.

There were 2 minor fire events at the CFM facility during the licensing period, both occurring in 2017. On December 1, 2017, a small fire occurred on a weld prep machine extraction hose in the assembly area. As a result, this caused nearby plastic air lines and wiring covers to melt. Appropriate mitigative actions were taken by the operator and the fire was promptly extinguished using a portable fire extinguisher. CFM immediately notified CNSC staff of the event through the CNSC duty officer and provided additional reporting on the event in accordance with [REGDOC-3.1.2](#) requirements. CFM implemented its corrective action process, investigations were completed, and a number of corrective actions were identified and implemented to prevent and/or mitigate a recurrence of these events.

On December 28, 2017 CFM provided notification to CNSC staff that a fire alarm had been activated, which automatically triggers a facility evacuation and dispatch of PHFES. The PHFES determined that a smoke sensor in the maintenance building had been activated due to exhaust fumes from a contractor's diesel vehicle which had been idling near an open door while work was being completed. To mitigate against potential recurrence, CFM modified its non-routine work order form to identify alarms in the work area and consider potential hazards from work being evaluated. CNSC staff are satisfied with CFM's responses to these two events and the corrective actions taken.

CNSC staff conducted focused fire protection inspections at CFM in 2015 and 2018. Inspection findings identified during these inspections included management of transient combustible materials, management of fire impairments, portable fire extinguisher availability, fire protection inspection documentation, third party review corrective action implementation and ignition source control. CNSC staff consider all findings from these inspections to have low safety significance. All enforcement actions issued as a result of findings from these inspections have been addressed through the implementation of corrective actions to the satisfaction of CNSC staff.

### **3.10.3.2 Regulatory Focus**

CNSC staff will continue to monitor CFM's performance in this area through regulatory oversight activities including onsite inspections and desktop reviews of

CFM compliance reporting and revisions to relevant program documentation pertaining to this SCA.

### 3.10.3.3 Proposed Improvements

There are no proposed improvements for this SCA.

### 3.10.4 Conclusion

CNSC staff have assessed CFM's documentation and analyses under the Emergency Management and Fire Protection SCA and concludes that CFM has an acceptable emergency management and fire protection program. CNSC staff therefore conclude that CFM's overall performance for this SCA is satisfactory and that CFM is qualified to carry out the authorized activities in this SCA.

### 3.10.5 Recommendation

Two licence conditions are included in the proposed licence for the SCA Emergency Management and Fire Protection. Licence condition 10.1 requires CFM to implement and maintain an emergency preparedness program. Licence condition 10.2 requires CFM to implement and maintain a fire protection program. Compliance verification criteria for these licence conditions are included in the draft LCH.

## 3.11 Waste Management

The Waste Management SCA covers internal waste-related programs that form part of the facility's operations up to the point where the waste is removed from the facility for storage, treatment, or disposal at another licensed location. This area also covers the planning for decommissioning.

The specific areas that comprise this SCA at CFM include:

- Waste characterization;
- Waste minimization;
- Waste management practices; and
- Decommissioning plans.

### 3.11.1 Trends

The following table indicates the overall rating trends for the Waste Management over the previous licence period:

| TRENDS FOR WASTE MANAGEMENT |      |      |      |      |      |      |      |      |      |
|-----------------------------|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS  |      |      |      |      |      |      |      |      |      |
| 2012                        | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA                          | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |

| Comments  |
|---|
| The CFM waste management program met applicable CNSC regulatory and performance objectives. CNSC staff monitor CFM's implementation of this program through regular compliance verification activities. |

### 3.11.2 Discussion

Cameco FSD maintains a waste management program that is implemented at CFM and meets the requirements of the GNSCR, CSA Standard N292.0-14 *General principles for the management of radioactive waste and irradiated fuel* [10], CSA Standard N292.3-14 *Management of low- and intermediate-level radioactive waste* [30], and for hazardous waste as defined by [Ontario Regulation 347 General – Waste Management](#).

In accordance with paragraph 3(k) of the [Class I Nuclear Facilities Regulations](#), CFM is required to maintain a decommissioning plan throughout the life of the facility. CFM maintains a Preliminary Decommissioning Plan (PDP)[31] for the CFM facility as per CSA standard N294-19 *Decommissioning of Facilities Containing Nuclear Substances* [32] and CNSC Regulatory Guide [G-219, Decommissioning Planning for Licensed Activities](#).

Based on CNSC staff's assessment of the licence renewal application, supporting documents, the PDP and CFM's past performance in this SCA, CNSC staff conclude that CFM continues to maintain and implement a documented waste management program in accordance with CNSC regulatory requirements, and CFM has demonstrated satisfactory performance for this SCA.

### 3.11.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.11.3.1 Past Performance

##### Waste Characterization, Minimization, and Management Practices

CFM's application for a licence renewal included a documented waste management program for the CFM facility. The program involves characterizing waste, minimizing waste, and storing waste.

The program applies to Cameco's FSD operations at CFM, the Port Hope Conversion Facility and the Blind River Refinery. The specific aspects of waste management at the CFM facility are addressed in the CFM Waste Management Plan (WMP). The WMP applies to all aspects of waste management at the site, including all of the waste materials generated, received, handled, stored at the facility, recycled and/or transferred/removed to an appropriate waste management or other facility.

The objectives of CFM WMP are:

- To manage and disposition wastes in accordance with applicable laws and generally accepted industry practices so as to minimize the potential adverse impact to personnel and to the environment;
- To minimize and reduce the quantity of stored onsite waste through recycle, re-use and recovery to the extent possible;
- To segregate radioactively contaminated and non-contaminated waste materials;
- To maintain an inventory of waste materials produced, received, and dispositioned, including quantities and location on site;
- To store waste materials only when re-use, recycle or recovery is not possible and then to do so with proper management systems and controls in place; until an acceptable method has been identified for their eventual disposal; and
- To continually evaluate disposal alternatives and new technologies for waste reductions.

During the previous licence term, CNSC staff conducted focused inspections of the Waste Management SCA at CFM in 2014 and 2018. CNSC staff have also verified elements of CFM's Waste Management programs during general baseline inspections, most recently in January 2021. Inspection findings identified during these inspections included documentation of waste management activities, waste container labelling and signage, and the planning/execution for removal of historic radioactive waste stored on site. CNSC staff consider all findings from these inspections to have low safety significance. All enforcement actions issued as a result of these inspections have been addressed through the implementation of corrective actions to the satisfaction of CNSC staff.

CNSC staff assessed the waste management program and associated supporting documentation submitted by CFM with the licence renewal application for the SCA and found that Cameco FSD's waste management program meet regulatory requirements.

### **Decommissioning plans**

Decommissioning must be conducted in a manner that ensures that the health, safety, and security of workers, the public, and the environment are protected. CFM has selected a prompt decommissioning strategy for CFM where all radioactive materials will be removed from the facility, including product, raw materials, residuals, equipment and process related services. The desired end-state is the unrestricted release of the facility for an industrial use following decommissioning, should CFM achieve its decommissioning targets. CFM's proposed strategy for managing decommissioning waste involves dispositioning the waste to a licensed waste management facility that would be constructed at Cameco's Blind River Refinery site. The construction of a waste management facility for decommissioning wastes is described in Cameco's PDP for the Blind River Refinery. Materials with recoverable levels of uranium (i.e., that can be recovered and processed for fuel manufacturing) and contaminated combustible materials will also be sent to the Blind River Refinery for processing, which is

consistent with CFM's current waste management practice. At this time, CFM does not have a proposed timeframe for permanently shutting down its facility.

The CNSC requires CFM to revise its PDP for CFM at a minimum every five years or when required by the Commission. In May 2021, CFM submitted an updated PDP and cost estimate for decommissioning of the CFM facility [31]. CNSC staff have reviewed the updated PDP and found that it meets the applicable regulatory requirements and provides an acceptable basis for a decommissioning cost estimate.

### 3.11.3.2 Regulatory Focus

CNSC staff will continue to monitor and evaluate CFM's compliance with regulatory requirements through regulatory oversight activities including onsite inspections and reviews of compliance reports and revisions to relevant program documentation.

### 3.11.3.3 Proposed Improvements

Both [REGDOC-2.11.1, \*Waste Management Volume I: Management of Radioactive Waste\*](#) and [REGDOC-2.11.2, \*Decommissioning\*](#), were published in January 2021 and will apply to CFM operations. CNSC staff have requested that CFM conduct a gap analysis and implementation plan to align the waste management and planning for decommissioning programs for CFM with the regulatory requirements set in the newly published regulatory documents.

CSA N292.0-19, *General Principles for the Management of Radioactive Waste and Irradiated Fuel* [33], published in 2019, is the most recent revision of this standard and also applies to CFM's operations. As part of CFM's implementation request for [REGDOC 2.11.1](#) and [REGDOC 2.11.2](#), CNSC staff have requested that the requirements of CSA N292.0-19 also be addressed.

### 3.11.4 Conclusion

Based on the assessment of CFM's WMP, CNSC staff conclude CFM has a waste management program that meets the requirements of CSA Standard N292.3-14, *Management of low- and intermediate-level radioactive waste*, and CSA Standard N292.0-14, *General principles for the management of radioactive waste and irradiated fuel* [10].

Based on the assessment of CFM's revised PDP, CNSC staff conclude that the PDP meets the applicable regulatory requirements of CSA standard N294-19, *Decommissioning of facilities containing nuclear substances*, and CNSC Regulatory Guide [G-219, \*Decommissioning Planning for Licensed Activities\*](#).

### 3.11.5 Recommendation

Two standardized licence conditions are included in the proposed licence for the Waste Management SCA. Standardized licence condition 11.1 requires CFM to implement and maintain a waste management program. Standardized licence

condition 11.2 requires CFM to maintain a decommissioning plan. Compliance verification criteria for these licence conditions are included in the draft LCH.

### 3.12 Security

The Security SCA covers the programs required to implement and support the security requirements stipulated in the regulations, the licence, orders, or expectations for the facility or activity.

The specific areas that comprise this SCA at the CFM facility include:

- facilities and equipment
- response arrangements
- security practices

#### 3.12.1 Trends

The following table indicates the overall rating trends for the security SCA over the previous licensing period:

| TRENDS FOR SECURITY   |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>   |      |      |      |      |      |      |      |      |      |
| CFM has implemented and maintained a security program that meets regulatory requirements under the GNSCR and Part 2 of the <a href="#">Nuclear Security Regulations</a> (NSR) to prevent the loss, unauthorized removal and sabotage of nuclear substances, nuclear materials, prescribed equipment or information. |      |      |      |      |      |      |      |      |      |

#### 3.12.2 Discussion

The GNSCR provides obligations for licensees across all SCAs. Paragraph 12(1) of the GNSCR includes specific obligations that distinctly encompass the security SCA. Under paragraph 12(1)(c), licensees are required to take all reasonable precautions to maintain the security of nuclear facilities and of nuclear substances. Paragraph 12(1)(g) and (h) require licensees to implement measures that will alert them to the illegal use or removal of nuclear substances or prescribed information, and any acts, or attempted act, of sabotage at the licensed site. Paragraph 12(1)(j) requires licensee to instruct workers on the physical security program and their responsibilities under that program

Furthermore, sections 21 to 23 of the GNSCR provide additional obligations for all licensees on the identification, storage, handling, and transfer requirements of information designated as “prescribed information”.

[REGDOC-2.12.3, Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material](#) provides regulatory expectations and guidance for licensees regarding the CNSC’s expectations under the GNSCR for security.



In addition to the regulatory requirements stipulated in the GNSCR, this facility is identified as a named entity within Schedule 2 of the NSR. As such, and as identified by paragraph 40(1)(b) of the NSR, CFM is subject to Part 2 of the NSR, specifically sections 39 to 48. Part 2 of the NSR provides additional requirements, with regard to access control, facilities and equipment, response arrangements, training, staff trustworthiness and reliability programs, practices and procedures, as they relate to security.

During the licence period, CNSC staff performed focused security SCA inspections in 2013, 2017, and 2020 to verify that the CFM's compliance with regulations and to assess the effectiveness of the licensee's security measures. All findings identified during these inspections are determined to have low safety significance. CFM has implemented corrective actions to address all enforcement actions from these inspections with the exception one from the most recent inspection in which CFM is currently implementing corrective actions that have been reviewed and accepted by CNSC staff.

CFM has implemented and maintained a security program that meets regulatory requirements under the GNSCR and Part 2 of the NSR to prevent the loss, unauthorized removal and sabotage of nuclear substances, nuclear materials, prescribed equipment or information. The facility's security program includes administrative and technical measures that meet current CNSC regulatory requirements for nuclear security.

### **3.12.3 Summary**

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### **3.12.3.1 Past Performance**

Specific area performance evaluation for security is identified as sensitive information and has been designated as Prescribed Information. This information is not available for public release.

#### **Facilities and Equipment**

CFM has maintained a security program that provides sufficient security systems and devices for the facility and the areas that involve the processing, use, or storage of nuclear substances. The security program includes a combination of intrusion detection systems, security cameras, physical barriers and the presence of onsite security guards. It also includes measures to prevent the unauthorized removal of nuclear substances from the facility. In addition, CFM has processes for effectively testing and maintaining the security measures and equipment.

#### **Response Arrangements**

Alarm detection and assessment systems are continuously monitored by onsite security staff. CFM has established a response protocol with the local law enforcement agency to ensure timely offsite armed response, should a security-related incident occur.

### Security Practices

CFM maintains effective measures for controlling access to persons and vehicles to prevent unauthorized access to the nuclear facility and nuclear substances. The licensee has implemented a satisfactory Facility Access Security Clearance (FASC) process that includes a criminal record check for individuals with a FASC. In addition, CFM has a security awareness program for all staff and a supervisory awareness program for managers and supervisors to enhance capabilities in identifying and responding to changes in employee behaviour.

#### 3.12.3.2 Regulatory Focus

CNSC staff will continue to monitor CFM performance for the security SCA through regulatory oversight activities, including onsite inspections and technical assessments of relevant program documentation.

#### 3.12.3.3 Proposed Improvements

Specific proposed improvements for the security SCA are evaluated as sensitive information and has been designated as Prescribed Information. This information is not available for public release.

#### 3.12.4 Conclusion

CNSC staff confirm that CFM has met regulatory requirements for the Security SCA throughout the previous licence period, and that the performance rating of “Satisfactory” is supported.

CNSC staff will continue to monitor and provide regulatory oversight of CFM implementation and operation of their security program. CFM compliance with the security SCA include ensuring adequate provisions for the security of nuclear substances, the implementation of measures to alert the licensee to the illegal use or removal of nuclear substances, and sabotage or attempted sabotage, anywhere at the site, and that all workers will be instructed on the facility’s security program and their obligations therein.

#### 3.12.5 Recommendation

One standardized licence condition is included in the proposed licence for this SCA. Licence condition 12.1 requires the licensee to implement and maintain a security program. Compliance verification criteria for this licence condition are included in the draft LCH.

### 3.13 Safeguards and Non-Proliferation

The Safety and Control Area “Safeguards and Non-Proliferation” covers the programs and activities required for the successful implementation of the obligations arising from the Canada/International Atomic Energy Agency (IAEA) safeguards agreements, as well as other measures arising from the [\*Treaty on the Non-Proliferation of Nuclear Weapons\*](#).

This CMD covers the following specific areas of Safeguards and Non-Proliferation:

- Nuclear material accountancy and control
- Access and assistance to the IAEA
- Operational and design information
- Import and export

### 3.13.1 Trends

The following table indicates the overall rating trends for the Safeguards and Non-Proliferation over the previous licence period:

| TRENDS FOR SAFEGUARDS AND NON-PROLIFERATION   |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>   |      |      |      |      |      |      |      |      |      |
| CFM continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude CFM's safeguards and non-proliferation SCA meets regulatory requirements. |      |      |      |      |      |      |      |      |      |

### 3.13.2 Discussion

In February 2018, the CNSC published [REGDOC-2.13.1, Safeguards and Nuclear Material Accountancy](#), which CFM implemented in 2018. This document sets out requirements and guidance for safeguards programs for applicants and licensees who possess nuclear material, operate a uranium and/or thorium mine, carry out specified types of nuclear fuel-cycle related research and development work, and/or carry out specified types of nuclear-related manufacturing activities. The requirements and guidance in this document are essential to Canadian compliance with the safeguards agreements entered into with the IAEA, and are consistent with modern national and international practices.

CNSC staff previously reviewed Cameco's FSD Safeguards Program document, which applies to the CFM facility, against the requirements in [REGDOC 2.13.1](#) and concluded that the safeguards program is satisfactory.

### 3.13.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.13.3.1 Past Performance

Details pertaining to the specific areas within this SCA are presented in the following subsections.

## **Nuclear Material Accountancy and Control**

CNSC staff determined that the facility complied with CNSC's regulatory requirements in accordance with [REGDOC 2.13.1](#).

### **Access and Assistance to the IAEA**

CNSC staff determined that the facility granted adequate access and assistance to the IAEA for safeguards activities.

During 2012-21, the IAEA performed inspections and verifications that included 8 Physical Inventory Verifications (PIVs), 10 Design Information Verifications and 16 short notice random inspections. In addition, the CNSC performed 2 physical inventory-taking evaluations when the PIV was not performed by the IAEA. In all cases, the facility provided the IAEA and CNSC with the necessary access and assistance to perform the activities and complied with all regulatory requirements.

During a Complementary Access activity in February 2021 at Cameco's Port Hope Conversion Facility, the IAEA identified 2 trailers containing nuclear material which were inaccessible due to snow accumulation. The IAEA were informed that the trailers contained contaminated wastes originating from the CFM facility. CFM has repatriated the trailers and committed to sort, segregate, and declare all materials that are found to be of safeguards relevance. The nuclear material in one of the 2 trailers has been processed, and processing of material in the other trailer is planned for late 2023.

### **Operational and Design Information**

The licensee submitted its annual operational programs, annual updates to the additional protocol, and other required information to the IAEA and the CNSC in a timely manner.

### **Import and Export**

The scope of the non-proliferation program under this license is limited to the tracking and reporting of foreign obligations and origins of nuclear material. CNSC staff determined that the licensee complied with the CNSC's regulatory requirements in this respect.

#### **3.13.3.2 Regulatory Focus**

CNSC staff will continue to monitor and evaluate the licensee's performance through participation in IAEA inspections, CNSC evaluations, and ongoing assessments of compliance with regulatory requirements.

#### **3.13.3.3 Proposed Improvements**

No changes are anticipated in the in near future for this SCA.

### 3.13.4 Conclusion

CNSC staff have assessed CFM documentation under the safeguards and non-proliferation SCA and have found the documentation to be acceptable and compliant with regulatory requirements. CNSC staff conclude the overall performance of the SCA is satisfactory and CFM is qualified to carry out the authorized activities in this SCA. It is important to note that the current facility's past performance is presented as an indicative of the performance expected for the future operation of CFM.

### 3.13.5 Recommendation

One standardized licence condition is included in the proposed licence. Licence condition 13.1 requires that the licensee implement and maintain a safeguards program. Compliance verification criteria for this licence condition is included in the draft LCH.

## 3.14 Packaging and Transport

The packaging and transport SCA covers the safe packaging and transport of nuclear substances to and from the CFM facility.

This CMD covers the following specific areas of Packaging and Transport:

- Package design and maintenance
- Packaging and transport

### 3.14.1 Trends

The following table indicates the overall rating trends for the Packaging and Transport SCA over the previous licence period:

| TRENDS FOR PACKAGING AND TRANSPORT  |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|
| OVERALL COMPLIANCE RATINGS  |      |      |      |      |      |      |      |      |      |
| 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| SA  | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   | SA   |
| <b>Comments</b>   |      |      |      |      |      |      |      |      |      |
| CFM continues to perform satisfactorily in this SCA. Overall, CNSC staff conclude that the CFM packaging and transport SCA meets regulatory requirements. |      |      |      |      |      |      |      |      |      |

### 3.14.2 Discussion

The following publications contain regulatory requirements that are applicable over the current licensing period:

- [Transportation of Dangerous Goods Regulations](#)
- [Packaging and Transport of Nuclear Substances Regulations, 2015](#) (PTNSR)

The *Packaging and Transport of Nuclear Substances Regulations, 2015* apply to the packaging and transport of nuclear substances, including the design, production, use, inspection, maintenance and repair of packages, and the preparation, consigning, handling, loading, carriage and unloading of packages.

CFM is required to have appropriate training for personnel involved in the handling, offering for transport and transport of dangerous goods, and is required to issue a training certificate to those workers in accordance with the *Transportation of Dangerous Goods Regulations*.

CNSC staff conclude that CFM has conducted packaging and transportation activities in accordance with regulatory requirements over the previous licence period.

### 3.14.3 Summary

A summary of the licensee's past performance, regulatory focus and proposed improvements are presented in the following subsections.

#### 3.14.3.1 Past Performance

CFM has implemented the Cameco FSD packaging and transport program to ensure all shipments leaving its facility are in compliance with the [\*Packaging and Transport of Nuclear Substances Regulations, 2015\*](#) and the [\*Transportation of Dangerous Goods Regulations\*](#). CFM's packaging and transport program covers elements of packaging and transport and package design and maintenance as required by the regulations. Details of CNSC staff's assessment are presented in the following paragraphs.

There were 2 events reported under the [\*Packaging and Transport of Nuclear Substances Regulations, 2015\*](#) for consignments transported from the CFM facility. Both of the events were of low safety significance. In 2013, production scrap of UO<sub>2</sub> was transported from the CFM facility to the Port Hope Conversion Facility and lids of the 5 packages (drums) were not properly tightened. The other event occurred in 2016, where empty packages transported between facilities in Port Hope had not been properly classified. CNSC staff are satisfied with the corrective actions taken by CFM to ensure these events do not re-occur.

During the previous licence period CNSC staff completed a Packaging and Transport inspection at the CFM facility in 2015. CNSC staff classified all findings from these inspections as low safety significance and CNSC staff are satisfied with all corrective actions taken by CFM. A Packaging and Transport inspection was also conducted at CFM in May 2022. The results of this inspection were being analyzed at the time this CMD was published.

#### 3.14.3.2 Regulatory Focus

CNSC staff will continue to monitor CFM's compliance with regulatory requirements for the packaging and transport SCA through onsite inspections and reviews of annual compliance reporting and packaging and transportation program updates.

Note that package and transport has been removed from Part IV (ii) of the proposed licence, since those activities do not require a licence under the NSCA and associated regulations. Section 26 of the NSCA subjects CFM to the [Packaging and Transport of Nuclear Substances Regulations, 2015](#), where subsection 6 (1) states that a person may transport a nuclear substance without a licence issued under subsection 24 (2) of the Act for that purpose, except for 6 conditions (paragraphs 6 (1) (a) to (f) of the *Packaging and Transport of Nuclear Substances Regulations, 2015*). CNSC staff have determined that the conditions that would require a licence under paragraphs 6 (1) (a) to (f) of the *Packaging and Transport of Nuclear Substances Regulations, 2015* do not apply to the CFM activities.

This change would not have an impact on the licence conditions or the licence conditions handbook as the licensee would still be required to implement and maintain a packaging and transport program as per Licence condition 14.1.

### **3.14.3.3 Proposed Improvements**

Transport Canada have recently published several amendments to the [Transportation of Dangerous Goods Regulations](#). Although regulatory changes are minor, CFM will need to review its packaging and transport program to ensure continued compliance with the revised regulatory requirements.

### **3.14.4 Conclusion**

CNSC staff conclude that CFM meets the requirements covered under the packaging and transport SCA. The licensee's performance remained satisfactory in the area of packaging and transport throughout the previous licence period.

### **3.14.5 Recommendation**

One standardized licence condition is included in the proposed licence. Licence condition 14.1 requires that the licensee implements and maintains a packaging and transport program. Compliance verification criteria for this licence condition is included in the draft LCH.

## **4. INDIGENOUS AND PUBLIC CONSULTATION AND ENGAGEMENT**

### **4.1 Indigenous Consultation and Engagement**

The common-law duty to consult with Indigenous groups applies when the Crown contemplates actions that may adversely affect potential or established Indigenous and/or treaty rights. The CNSC ensures that all of its licence decisions under the NSCA uphold the honour of the Crown and consider Indigenous peoples' potential or established Indigenous and/or treaty rights pursuant to section 35 of the [Constitution Act, 1982](#).

### 4.1.1 Discussion

CNSC staff have identified the Indigenous Nations and communities who may have an interest in the renewal of the CFM licence. These Indigenous Nations and communities include:

- Alderville First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Chippewas of Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation
- Mohawks of the Bay of Quinte
- Métis Nation of Ontario - Region 6

These Indigenous Nations and communities were identified due to the proximity of their communities, treaty areas and/or traditional territories to the CFM facility, or due to previously expressed interest in being kept informed of CNSC licensed activities occurring in or proximal to their territories.

#### **CNSC Staff Engagement Activities**

In March, 2022, CNSC staff sent letters of notification to the list of Indigenous Nations and communities. The letters provided information regarding the proposed licence renewal application, the availability of participant funding to facilitate participation in the licence renewal process, and details on how to participate in the Commission's public hearing process.

CNSC staff conducted follow-up phone calls with the identified Indigenous Nations and communities in late March and early April 2022 to ensure they had received the letters of notification and to answer any questions about the regulatory process, including how to get involved in the Commission proceeding, and the availability of participant funding through the CNSC's Participant Funding Program (PFP). In late March 2022, CNSC staff also provided additional correspondence to Indigenous Nations and communities informing them of the upcoming April 13, 2022 public webinar.

All of the identified Indigenous Nations and communities have been encouraged to participate in the regulatory review process and in the public hearing to advise the Commission directly of any concerns they may have in relation to this licence renewal application. CNSC staff remain open to meeting with Indigenous Nations and communities to discuss this licence renewal application and to encourage and maintain productive and respectful relationships.

CNSC staff are committed to addressing concerns that are raised during engagement activities and providing information pertaining to the CFM licence renewal and ongoing CFM operations. Follow-up activities will be conducted with Indigenous Nations and communities who express any remaining concerns about the facility following the Commission hearing, if interested.



CNSC staff discussed the CFM licence renewal with Curve Lake First Nation and Mississaugas of Scugog Island First Nation during regularly scheduled monthly meetings. A virtual meeting is also scheduled to be held with representatives of the Métis Nation of Ontario - Region 6 Consultation Committee shortly after this CMD is published, in response to an expressed interest in the CFM renewal. During these engagement sessions, CNSC staff have been made aware of specific concerns related to the licence duration, waste management, ensuring opportunities for meaningful engagement during longer licence terms, and the potential for reduced opportunities to voice concerns directly to the Commission over the proposed licensing term. To help address this concern, CNSC staff are recommending that CFM provide a performance update to the Commission at the mid-point of the 20-year licence term. Section 5.7 of this CMD provides additional details relating to this recommendation.

CNSC staff are committed to ongoing engagement and collaboration with interested Indigenous Nations and communities and will continue to provide opportunities for meaningful long-term engagement over the proposed licensing term. CNSC staff remain willing to establish a formalized approach through a Terms of Reference and engagement work plan with any Indigenous Nation and community with interests related to the CFM. CNSC staff have signed Terms of Reference for long-term engagement with Curve Lake First Nation, the Mississaugas of Scugog Island First Nation and the Métis Nation of Ontario. CNSC staff remain open to meeting with all Indigenous Nations and communities interested in CFM on a routine basis to build meaningful long-term working relationships.

### **Licensee Engagement Activities**

CNSC [REGDOC-3.2.2, \*Indigenous Engagement\*](#), sets out requirements and guidance for licensees whose proposed projects may raise the Crown's duty to consult. While the CNSC cannot delegate its obligation, it can delegate procedural aspects of the consultation process to licensees, where appropriate. The information collected and measures proposed by licensees to avoid, mitigate, or offset adverse impacts from the proposed licence renewal, may be used by CNSC staff in helping to meet its consultation obligations.

The CFM renewal application does not raise the formal requirements of [REGDOC-3.2.2](#). However, for the CFM renewal, CFM opted to follow the requirements and guidance of [REGDOC 3.2.2](#) and produced an Indigenous Engagement Report and reported progress on their engagement activities to the CNSC.

CFM's Indigenous engagement activities included letters, facility tours, community meetings/ information sessions, a licence renewal briefing guide and newsletters. The Indigenous Nations and communities are also target audiences in Cameco's FSD Public Information Program, which commits to keeping the Nations and communities informed, offering further engagement, and responding to requests.

Additionally, CNSC staff are aware that Cameco's FSD has regularly scheduled meetings with Curve Lake First Nation and Mississaugas of Scugog Island First Nation. Cameco's FSD has indicated that interest and concerns brought up to date include the proposed licence term, preliminary decommissioning plans, environmental risk assessments, environmental monitoring and long-term waste storage and economic opportunities.

To date, CNSC staff have not been made aware of any concerns regarding potential new impacts on rights specific to the licence renewal expressed by Indigenous Nations and communities through CFM's engagement activities.

CNSC staff acknowledge that Cameco's FSD demonstrates and prioritizes their commitment to maintain their established relationships with Indigenous Nations and communities and continually strives for improvement. CNSC staff encourages CFM to continue engaging with interested Indigenous Nations and communities regarding the CFM facility and activities including the licence renewal application and ongoing operations. CNSC staff are satisfied with the level of engagement and communications that Cameco's FSD has conducted with Indigenous Nations and communities with regards to the CFM licence renewal application.

#### **4.1.2 Conclusion**

Cameco's FSD has informed and engaged with the identified Indigenous Nations and communities of their application to renew the CFM operating licence.

Based on the information received and reviewed, CNSC staff do not expect this licence renewal to cause any new adverse impacts to potential or established Indigenous and/or Treaty rights.

However, the CNSC is committed to meaningful, ongoing engagement with Indigenous Nations and communities that have an interest in CNSC-regulated facilities and activities, including the CFM facility. The identified Indigenous Nations and communities have been notified and encouraged to participate in the process and in the Commission's public hearing, thus providing them the opportunity to advise the Commission directly of any concerns they may have in relation to this request.

## **4.2 Public Engagement**

Part of CNSC's mandate is to provide objective scientific and regulatory information to the public concerning nuclear activities. The availability and clarity of information pertaining to nuclear activities is essential to establishing an atmosphere of openness, transparency and trust between the licensee and the public. Licensees have an important role to inform the public about their nuclear facility and activities. Since 2012, the CNSC requires major licensees to develop and implement a public information and disclosure program (PIDP) supported by a robust disclosure protocol that addresses local communities and stakeholders' needs, discussed fully in section 5.4.

### 4.2.1 Discussion

In accordance with section 17 of the [Canadian Nuclear Safety Commission Rules of Procedure](#), a [Notice of Public hearing](#) was issued and posted on the CNSC website on March 7, 2022, inviting written comments and requests for appearances before the Commission. CNSC staff also informed the public of CFM's application, the public Commission hearing, and participant funding availability, via the CNSC's website, email subscription list, and social media channels.

CNSC staff annually report to the Commission, the public and Indigenous Nations and communities on the regulatory oversight of all the uranium processing facilities, including the CFM facility. The list of regulatory oversight reports is available on the CNSC's [website](#). The public and Indigenous Nations and communities have the opportunity to review, question and comment on the regulatory oversight report. Through CNSC's Participant Funding Program (PFP), financial support was made available for participation in this licence renewal CMD (see section 4.3).

On April 13, 2022 CNSC hosted a webinar on the CFM licence renewal application which provided an overview of the CNSC, our regulatory framework, including the licensing process, key information in CFM's application, guidance on how to participate in a licensing hearing was also provided. A second webinar on the CFM licence renewal application is planned for September 14, 2022, after staff's submission of this CMD to the CNSC registrar. The plan is to provide more focused information on specific SCAs that are of interest to the public and Indigenous Nations and communities, and to be available to answer questions. Awareness for these webinars was ensured by posting notification to the CNSC website, emails to CNSC info list subscribers, direct emails to Indigenous Nations and communities and CNSC social media. In addition, CNSC staff mailed out hardcopy notifications to the public in the immediate vicinity of Port Hope which included information on the public Commission hearings and how to obtain more information/ how to get involved, and to promote the upcoming webinar (on September 14, 2022).

### 4.2.2 Conclusion

The CNSC is committed to keeping interested communities informed of regulatory activities occurring in regard to the CFM facility and will continue to look for ways to enhance the involvement of interested groups.

## 4.3 Participant Funding Program

The CNSC made funding available through its PFP to assist Indigenous Nations and communities, members of the public, and stakeholders in participating in the regulatory process for licence renewal for the CFM facility and to provide value-added information to the Commission through informed and topic-specific interventions. This funding was offered to review CFM's licence application and associated documents and to prepare for, and participate in, the Commission's public hearing.

### 4.3.1 Discussion

The [Notice of Public hearing](#), posted on March 7, 2022, included notification of the PFP opportunity. The participant funding opportunity was also advertised on the CNSC website and was included in notification letters sent to Indigenous Nations and communities. Those interested in obtaining participant funding were able to submit a completed participant funding application from that date until May 6, 2022.

The Funding Review Committee (FRC) reviewed the applications received and made recommendations on the allocation of funding to eligible recipients. Based on the recommendations from the FRC, the CNSC awarded a total of \$58,352.34, in funding to the following recipients:

- Curve Lake First Nation
- Mississaugas of Scugog Island First Nation
- Métis Nation of Ontario
- Port Hope Community Health Concerns Committee
- Northwatch

### 4.3.2 Conclusion

CNSC staff encourage the public and Indigenous Nations and communities to participate in the Commission's public hearing. The PFP was offered to assist interested members of the public, Indigenous Nations and communities, and other stakeholders to prepare for, and participate in, the Commission's public hearing.

## 5. OTHER MATTERS OF REGULATORY INTEREST

### 5.1 Cost Recovery

Paragraph 24(2)(c) of the NSCA requires that a licence application is accompanied by the prescribed fee. The CNSC [Cost Recovery Fees Regulations](#) (CRFR) set out the specific requirements based on the activities to be licensed. An applicant for a Class I facility licence is subject to Part 2 of CRFR, Regulatory Activity Plan fees.

#### 5.1.1 Discussion

CNSC staff confirmed that CFM is in good standing with respect to CRFR requirements and has paid its regulatory fees in full. CNSC staff do not have concerns regarding payment of future regulatory fees for this licensee.

#### 5.1.2 Conclusion

Based on previous performance there is no concern over the payment of future cost recovery fees.

### 5.1.3 Recommendation

There is no requirements for any additional licensing activity or any additional licence conditions.

## 5.2 Financial Guarantees

The NSCA and associated Regulations require the licensees to make adequate provisions for the safe decommissioning of their facilities. Requirements and guidance for establishing a financial guarantee for decommissioning are provided in [REGDOC-3.3.1, \*Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities\*](#), published in January 2021. Prior to that, regulatory guidance and the associated acceptance criteria for establishing a financial guarantee were provided in the CNSC regulatory guide [G-206, \*Financial Guarantees Guide for the Decommissioning of Licensed Activities\*](#).

A financial guarantee for decommissioning is established to fund the activities described in a PDP. The financial guarantee shall be acceptable to the Commission. CFM currently maintains a financial guarantee for decommissioning of the CFM facility as per condition 16.1 of its current licence.

### 5.2.1 Discussion

CFM submitted an update of its PDP for the CFM facility on May 4, 2021, in accordance with condition 12.2 of its current licence, which requires that the PDP be reviewed at a minimum 5 year frequency. The previous PDP for the CFM facility was submitted in 2016. CFM is currently executing a multi-year action plan to minimize the accumulated wastes at the CFM facility. Updates on this activity were provided in the 2019, 2020, and 2021 CFM annual compliance monitoring reports, where CFM reported the removal of accumulated legacy waste from the site each year. As reviewed by CNSC staff in the revised PDP, CFM has reduced the volume of radioactive contaminated waste on site by approximately 70% between 2015 and 2020. This reduces the liability of future decommissioning costs, and therefore reduces the total value required for the financial guarantee. CFM has also identified reductions to other indirect costs associated with decommissioning that are reflected in the revised cost estimate. In the current revision of CFM's PDP, the estimated cost of decommissioning is valued at \$10.8 million CAD (\$10.8M). The cost estimation includes a 40% contingency to all estimated costs, and escalation factors of 0.5-3%. Compared to the previous revision of the PDP, the current cost estimation represents a decrease of \$10.2M CAD.

CNSC staff verified the financial guarantee in accordance with the contents of the revised PDP and assessed the cost estimate against the criteria documented in CNSC regulatory guide [G-206, \*Financial Guarantees Guide for the Decommissioning of Licensed Activities\*](#) and found it acceptable. CFM had begun the process of updating its PDP and cost estimate prior to the publishing of [REGDOC-3.3.1](#) and therefore G-206 was used as guidance. CFM will be required to implement REGDOC-3.3.1 when the financial guarantee is revised.

CNSC staff's assessment of the current PDP and financial guarantee were included in the CMD for the recent 1-year licence renewal (CMD 21-H105). On February 14, 2022 [the Commission accepted CFM's financial guarantee](#) of \$10.8 million in the form of a letter of credit [3].

### 5.2.2 Conclusion

CNSC staff conclude that CFM currently has in place a valid, in effect and acceptable to the Commission, financial guarantee.

### 5.2.3 Recommendation

Standardized licence condition G.3 has been included in the proposed licence for the which requires that the licensee maintain a financial guarantee for decommissioning that is acceptable to the Commission. No amendments to the financial guarantee were proposed by CFM, as the current financial guarantee was updated, and accepted by the Commission in association with the recent CFM 1-year renewal in February 2022 [3].

The proposed LCH includes a requirement for CFM to implement REGDOC-3.3.1 during the next revision of the financial guarantee.

## 5.3 Improvement Plan and Significant Future Activities

CFM has not identified any significant future activities or improvements for the requested licence period. CFM has requested an increase to the production limit, but CFM has indicated that near-term production is expected to be consistent with current production levels. An annualized basis for the production limit is being requested to provide for added operational flexibility, and the increased production is to allow CFM to respond to increased demand, should it develop.

## 5.4 Licensee Public Information Program

As a Class IB licence holder, CFM is required to maintain and implement a Public Information and Disclosure Program (PIDP), in accordance with regulatory document [REGDOC-3.2.1, Public Information and Disclosure](#). Cameco's FSD has developed a FSD PIDP, which is implemented at the CFM facility.

The PIDP is supported by disclosure protocols that outline the type of facility information to be shared with the public as well as details on how that information is to be shared. This ensures that timely information about the health, safety and security of persons and the environment, and other issues associated with the lifecycle of nuclear facilities, is effectively communicated to the public.

### 5.4.1 Discussion

The CNSC published [REGDOC-3.2.1](#) during the previous licence period (i.e., in May 2018), superseding previous CNSC guidance and regulatory requirements for public engagement. At the request of CNSC staff, Cameco's FSD revised its existing PIDP to ensure full alignment with the [REGDOC 3.2.1](#). CNSC staff reviewed the revised PIDP and confirmed that it aligns with the requirements of

[REGDOC-3.2.1](#). The revised program document has been incorporated into the CFM LCH and any changes to this document are reviewed by CNSC staff.

CNSC staff have monitored implementation of the PIDP at CFM to verify that Cameco FSD communicates regularly with its audiences in a way that is meaningful to them. Summaries of public engagement activities are included within CFM's quarterly compliance report, and a more detailed public information program summary is submitted as a standalone report accompanying CFM's annual compliance reports.

All licensees have faced many challenges due to the COVID-19 pandemic and had to adapt their public information programs accordingly. This included moving away from traditional in-person meetings and events, and offering webinars and increased digital communications whenever possible. As described in the Cameco FSD PIDP, communication activities related to CFM included:

- Distributing information to the local community through advertisements, quarterly newsletters, emails to subscribers etc.;
- Updating Cameco FSD's website with the latest information on CFM;
- Engaging on social media extensively with posts and updates throughout the year;
- Participating in dozens of virtual webinars, presentations and events and presentations, as well as numerous in-person events (pre-pandemic);
- Providing site tours for the local community and the media to increase understanding of CFM;
- Meeting with Indigenous Nations and communities, as well as local government councils to strengthen stakeholder relationships;
- Deploying a number of methods to gain feedback from, and create discussion with, interested parties.

CNSC staff are satisfied with CFM's past performance related to public information and disclosure, and its ongoing commitment to effectively implement the PIDP.

#### **5.4.2 Conclusion**

CSNC staff found that, through the implementation of its PIDP, Cameco FSD has demonstrated strong and consistent communications activities, providing appropriate and timely health and safety information related to CFM to the public and Indigenous Nations and communities. This has been done through the use of advertising materials, newsletters, emails, social media and website updates, engagement activities, virtual and in-person events, site tours, media engagement and feedback opportunities.

CNSC staff conclude that regulatory requirements for public information and disclosure associated with CFM are being met through implementation of the Cameco FSD PIDP. The continued efforts of Cameco FSD to enhance the program will ensure it remains effective for the future, regardless of the licensing period.



### 5.4.3 Recommendation

One standardized licence condition is included in the proposed licence. Licence condition G.4 requires that the licensee implement and maintain a public information and disclosure program. Compliance verification criteria for this licence condition is included in the draft LCH

## 5.5 Nuclear Liability Insurance

The [\*Nuclear Liability and Compensation Act\*](#) establishes civil liability and compensation provisions for damages resulting from a nuclear incident. The CFM facility is identified as a nuclear installation in Schedule 2 of the [\*Nuclear Liability Compensation Regulations\*](#) and is therefore required to maintain valid insurance for the liability amount defined in those regulations.

### 5.5.1 Discussion

The Department of Natural Resources oversees the enforcement of the Regulations, and the CNSC, prior to granting a licence to operators, is to ensure that applicants have the required financial security in place to cover their respective liability amount, as established by the Act and the Regulations.

CFM has maintained nuclear liability insurance under the [\*Nuclear Liability and Compensation Act\*](#) and its predecessor the [\*Nuclear Liability Act\*](#) (in force prior to 2017) for the previous licence periods, and has provided CNSC staff a certificate of insurance to demonstrate that its liability insurance remains valid.

### 5.5.2 Conclusion

CNSC staff are satisfied that CFM currently holds valid liability insurance for the required amount, for the CFM facility.

### 5.5.3 Recommendation

A facility specific condition has been included in the proposed licence (LC 15.2) requiring CFM to maintain nuclear installation liability insurance.

## 5.6 Licence Conditions Handbook

The primary purpose of the LCH is to identify and clarify the relevant parts of the licensing basis for each licence condition. This helps ensure that the licensee performs the licensed in accordance with the licensing basis and the intent. The compliance verification criteria provided in the LCH are used by CNSC staff to assess whether the conditions in the licence have been, or are being, met. The LCH provides details associated with each licence condition, such as applicable CSA Group standards and CNSC regulatory documents, regulatory interpretation, compliance verification criteria, version-controlled documents, licensees' written notification requirement and other guidance. This structure allows more freedom for the facility to evolve and update its documentation within the licensing basis. The proposed licence conditions handbook for this proposed licence is provided in part 2 of this CMD.



## 5.7 Proposed Licence Period

In its application CFM has requested that its Class IB fuel facility licence (FFL-3641.00/2023) be renewed for a period of 20 years.

### 5.7.1 Discussion

In the early 2000's the typical licence period for Class I facilities was 2 years. In 2002, following the coming into force of the [Nuclear Safety and Control Act](#), and the evolution of CNSC's licensing process and regulatory framework, CNSC staff reviewed the feasibility of granting longer term licences. As an outcome of this review, CNSC staff developed an approach to recommending appropriate licence periods, which was based on benchmarking with international practices. This approach is outlined in CMD 02-M12 and was presented to the Commission in March, 2002 [34]. CMD 02-M12 provides a risk-informed process that has been used by CNSC staff to support recommendations regarding licence periods to the Commission in the past. Since 2002, CNSC's regulatory framework has continued to evolve and the typical licence period for Class I facilities has gradually lengthened to a 10-year term. For Cameco's FSD facilities, the most recent which received a renewal of its CNSC licence is the Blind River Refinery. Cameco's request for a 10-year renewal of the Blind River Refinery licence was [granted in February 2022](#).

More recently, CNSC has received applications from licensees requesting renewal of licences with terms in excess of 10 years. Following a review of those applications and consideration of the existing CNSC regulatory framework, CNSC staff recommended the Commission grant a 15-year licence to SRBT ([CMD 22-H8](#)) and a 20-year licence be granted for the Point Lepreau Generating Station ([CMD 22-H2.B](#)). In June, the Commission issued its decision on these two licence renewal applications. A [12-year licence was granted for SRBT](#), and a [10-year licence was granted for the Point Lepreau Nuclear Generating Station](#). While these licence terms are shorter than requested by the respective applications, they are longer than the term on the existing licences for both licensees and both decisions identified a midterm update.

CNSC staff reviewed CFM's licence term request against the criteria from CMD 02-M12 [34] and found that a 20-year licence period is reasonable based on those criteria. This review is summarized in Table 16 below. In addition to the criteria listed in Table 16, CNSC staff incorporated other considerations before arriving at a recommendation on the proposed licence period. These include considerations of the international approach to fuel cycle facility licensing, CNSC's regulatory oversight framework, ongoing communication and engagement during the licence term, and ongoing Commission engagement opportunities. These considerations are discussed in the subsections below.

**Table 16: CNSC staff assessment of the proposed 20-year licence term against CMD 02-M12 criteria**

| <b>CMD 02-M12 Licence Period Criteria</b>   | <b>CNSC Staff Position for 20-year Licence</b>   |
|---|--|
| <p><i>The recommended duration of the licence should be commensurate with the licensed activity.</i></p>  | <p>The CFM facility is principally operated for the production of uranium dioxide nuclear fuel pellets and nuclear fuel bundles. In its application, CFM has not requested any changes to the specific activities authorized by its licence (see section IV of the current and proposed licence in Part 2 of this CMD). Although new regulatory requirements have been added, the principle authorized activities have not changed for this facility over several iterations of the licence.</p> <p>There is no specific limitation on the licence term on the basis of the licensed activity or facility lifestage.</p>   |
| <p><i>A longer licence period can be recommended when the hazards associated with the licensed activity are well characterized and their impacts well predicted, and they are within the scope considered in the environmental safety case.</i></p> | <p>CFM has successfully characterized and mitigated hazards associated with facility operations through the implementation of control measures that ensure adequate measures are in place to protect the health and safety of persons and the environment.</p> <p>Key documents describing the CFM safety case include the Safety Analysis Report, Environmental Risk Assessment, Derived Release Limit report, and Fire Hazard Assessment. These documents are part of the licensing basis and CFM is required to review each at a minimum 5-year frequency, or fewer if there are any significant changes to the facility, to ensure safety measures remain current and appropriate.</p> <p>CNSC staff have prepared an <a href="#">Environmental Protection Review Report</a> which provides an assessment of CFM's environmental protection measures for the purpose of confirming whether CFM is providing adequate protection for the environment and health of persons. CNSC staff's assessment concluded that CFM's environmental protection measures have provided adequate protection for the environment and health of persons, and will continue to do so in the future. The assessment of future operations included an increase in emissions based on CFM's requested production limit increase.</p> <p>Regardless of licence term, CNSC staff will continue to verify and ensure that, through ongoing licensing and compliance activities and reviews, CFM provides adequate protection of the environment and the health and safety of persons.</p> |

| CMD 02-M12 Licence Period Criteria  | CNSC Staff Position for 20-year Licence  |
|---|--|
| <p><i>A longer licence period can be recommended when licensees have in place a management system, such as a quality assurance program, to provide assurance that their safety-related activities are effective and maintained.</i></p> | <p>As noted in section 3.1, CFM has a management system that meets the requirements of CSA N286-12. CNSC staff have inspected CFM's management system and found that it meets the requirements of CSA N286-12. The various requirements of N286-12, such as those in the areas of Self Assessments, Independent Assessments, Continual improvement, Problem Identification and Resolution, Design and Change Control, and Maintenance provide a framework to ensure that all work activities are effective and maintained.</p> <p>CFM's safety performance over the previous licence period provides further demonstration that effective programs are maintained to ensure safety while performing licensing activities.</p>  |
| <p><i>A longer licence period can be recommended when effective compliance programs are in place on the part of both the applicant/licensee and the CNSC.</i></p>   | <p>CFM has established programs describing the implementation of control measures to ensure that facility operations remain in compliance within its licensing basis. CNSC staff have reviewed these programs to confirm regulatory expectations are being met. In accordance with the change notification process defined in the LCH, CNSC staff are notified of revisions to licensing basis documents, which triggers CNSC review to ensure compliance with the licensing basis is not adversely impacted. During the previous licence period, CNSC staff formalized expectations and added additional requirements through publication of new/revised regulatory documents and adoption of the new standards. In each case, CFM has reviewed and revised its programs where necessary to implement these requirements.</p> <p>The CNSC has a robust and effective compliance verification program to ensure there is adequate regulatory oversight over the licensed activities at CFM. CNSC staff verify compliance through desktop reviews, inspections and event reviews.</p> <p>CNSC has established, and implemented a compliance strategy for CFM, which identifies a risk-informed frequency for inspections of each SCA. In total, CNSC staff conducted 29 inspections at CFM since the beginning of the previous licence term in March 2012 (see Addendum E).</p> <p>In addition to program documentation reviews, CNSC performs desktop reviews of quarterly and annual compliance reports submitted by CFM in accordance with requirements specified in the LCH. CNSC staff also review event reports, which are submitted by CFM in accordance with requirements specified in <a href="#">REGDOC-3.1.2</a>. CNSC</p> |

| CMD 02-M12 Licence Period Criteria   | CNSC Staff Position for 20-year Licence   |
|--|---|
|  | <p>staff review these reports to verify that CFM implements appropriate corrective actions, where necessary, to prevent recurrence and ensure that adequate provisions ensuring protection of the health and safety of persons and the environment remain in place.</p>   |
| <p><i>A longer licence period can be recommended when the licensee has shown a consistent and good history of operating experience and compliance in carrying out the licensed activity.</i></p> | <p>CNSC staff review and assess licensee performance on an ongoing basis. During the previous licence period CNSC staff rated CFM’s performance as satisfactory across all SCA’s each year. These ratings and other compliance highlights have been published and reported to the Commission in public meetings, through the <a href="#">Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities</a>.</p> <p>As described in this CMD, CFM has demonstrated satisfactory performance over the previous licence period and has conducted operations in accordance with its licensing basis. Worker doses and doses to the public have been kept below regulatory limits at all times (section 3.7), and releases to the environment have been maintained at a small fraction of the licensed release limits (section 3.9). CFM has also demonstrated good performance in the conventional health and safety SCA (section 3.8), having experienced one day of lost time due to injury over the previous licence period.</p> <p>CFM has adhered to events reporting and response requirements detailed in <a href="#">REGDOC-3.1.2</a>. A listing of the events reported to the CNSC during the previous licence period is provided in Table 1. CNSC staff are satisfied with CFM’s reporting and response to events during the previous licence period, and all actions associated with these events are considered closed.</p> |
| <p><i>The licence period must be consistent with the requirements of the <a href="#">CNSC Cost Recovery Fees Regulations</a>.</i></p>  | <p>As per section 5.1, CFM is currently in good standing with the <a href="#">CNSC Cost Recovery Fees Regulations</a>.</p>  |

| CMD 02-M12 Licence Period Criteria   | CNSC Staff Position for 20-year Licence  |
|--|--|
| <p><i>The licence period should take account of the planning cycle of the facility and the licensee's plans for any significant change in licensed activity.</i></p> | <p>CFM has conveyed its intent to continue to operate its facility for the production of the uranium dioxide nuclear fuel pellets and assembly of nuclear fuel bundles.</p> <p>In its application CFM has not identified any specific internal project, contract, or milestone which is currently planned or ongoing that should inform a recommendation for a specific licence term length. However, as part CFM's rationale for requesting a 20-year licence, CFM pointed to life extension projects at Canadian CANDU power plants as an indication of an ongoing need for CFM operations to provide a nuclear fuel supply over the requested licence period, and beyond. CFM expressed that a longer licence term would enable it to provide a secure supply of nuclear fuel and would reduce customer and industry uncertainty associated with licence renewals.</p> <p>The 20-year period does not coincide with any expressed position regarding an end of operations timeline for the CFM facility.</p> <p>A production limit increase has been requested by CFM. The increased production would be achieved by increasing the number of operating hours for the facility and does not require the installation of new equipment or facility modifications. CFM has conveyed that an increased production limit would give CFM flexibility to respond to increased industry demand during the 20-year licence period, should it occur.</p> |

### International Approach to Fuel Cycle Facility Licensing

Internationally, nuclear fuel cycle facilities are issued licences for periods ranging from a few years, to the entire life cycle of the facility, supported by periodic, comprehensive assessments of facility safety.

In addition to the safety assessment undertaken as part of a licence renewal, the CNSC has a number of processes in place to achieve these objectives on a continual basis. The Canadian regulatory framework includes requirements for periodic review and update of essential documentation. Licensees are required to update environmental risk assessments, safety analysis reports, fire hazard analysis, preliminary decommissioning plans and financial guarantees on a minimum 5-year frequency. Additionally, CSA N286 requires that the licensee periodically review and assess all program documentation. When these reviews and updates are carried out, the LCH documents requirements for notification to CNSC staff who then assess the updated version to ensure continued compliance

with the licensing basis. This provides assurance that the licensing basis remains valid and that programs in place are acceptable on a continual basis.

Canadian nuclear fuel cycle licensees are required to establish maintenance programs for their facilities. These programs are in place to support the ongoing safety of operation by identifying maintenance needs, including monitoring, inspection, testing, assessment, calibration, service, overhaul, repairs and replacement of parts. The programs identify the maintenance activities that are needed and CNSC staff verify compliance with the maintenance programs during planned compliance activities. It is significant to note that in cases where replacement of equipment is necessary, nuclear fuel cycle facilities are able to plan and carry out these activities on an ongoing basis, typically without the need for complicated outage scheduling that potentially impacts other operations. Systems important to safety for nuclear fuel cycle facilities are comparatively simple to replace (i.e., relative to nuclear power plants, for example) and this work can be done during normal outages. With the maintenance programs and effective regulatory oversight of maintenance activities in place, CNSC staff remain satisfied that the adequacy of structures, systems and components is appropriately controlled.

The IAEA is currently in the process of developing guidance for Periodic Safety Reviews (PSRs) at nuclear fuel cycle facilities. Once this guidance is published, CNSC staff will perform a review to identify opportunities for enhancing the CNSC's regulatory oversight in this area.

### **CNSC Regulatory Oversight**

The CNSC nuclear fuel cycle regulatory program is effective, independent of the licence period granted by the Commission. CNSC staff have established a 10-year baseline compliance plan for all nuclear fuel cycle facilities. This baseline compliance plan is carried out regardless of licence period and verifies continued safety through planned assessments and reviews. The plan establishes a minimum number of inspections to be carried out at a given facility based on the facility's risk profile and is augmented by the specific features of the facility itself. Each year CNSC staff review the plan as well as the licensee's planned activities for the year to determine if additional verification activities should be added or moved. This approach is flexible and agile to ensure that appropriate, risk-informed regulatory oversight is in place, regardless of the licence period.

CNSC requirements are updated through changes of regulations made under the NSCA and updates to CNSC REGDOCs or CSA standards. CNSC has established a process, through the LCH, to ensure updated requirements can be implemented within the licence term. The process focuses on CNSC staff requesting licensee plans for implementation of the updated document supported by a gap analysis of the updated requirements. Once the licensee responds to the request, the commitment to implement the document is recorded and entered into the LCH at the next update. This ensures that modern codes, standards and practices are implemented continually, rather than using a periodic assessment.

The past decade has been a very active period for the development of regulatory documents and CSA N-series standards (i.e., applicable to the management of nuclear facilities). The process outlined above, has therefore been followed numerous times during the previous licence period. The original LCH issued at the beginning of the licence term contained 8 unique standards, codes, and regulatory documents. At the end of the licence period, the current version of the LCH contained 24 unique standards, codes and regulatory documents. The implementation of these documents represents a substantial effort by the licensee, and CFM has been accepting of implementing the requirements and guidance at all times during the licence period. This example demonstrates the flexibility of the current regulatory framework to continually introduce, update, modernize requirements within the licence term to ensure licensed activities continue to be carried out safely.

### **Ongoing Communication and Engagement**

To deliver on the CNSC mandate to disseminate objective scientific, technical and regulatory information to the public, CNSC remains committed to openness and transparency through effective communication and engagement. Licensing hearings currently represent an opportunity to engage with Indigenous Nations and communities as well as the public. However, this type of engagement has limitations, as it is currently occurring only in association with an upcoming licensing hearing.

To modernize the approach to engagement and ongoing communications, CNSC staff have implemented a number of improvements in recent years, including:

- Signing terms of reference with Indigenous Nations and communities to formalize a forum for collaboration to address areas of interest with ongoing, respectful and open dialogue.
- Reviewing the use of Environmental Protection Review Reports to ensure that information on CNSC's environmental protection reviews is easily accessible.
- Updating nuclear facility web pages on the CNSC public website to provide useful, easily accessible, information for interested parties.
- Initiating a review of the Regulatory Oversight Reports presented to the Commission and associated processes to ensure they provide useful information.

In addition to these improvements, CNSC staff are planning reviews of [REGDOC-3.2.2, \*Indigenous Engagement\*](#) and [REGDOC-3.2.1, \*Public Information and Disclosure\*](#), to ensure requirements related to engagement and communications are modernized and aligned with best practices.

These improvements and planned reviews demonstrate CNSCs commitment to the modernization of information sharing and engagement. As additional improvements are identified, CNSC staff will review them to determine practical steps that can be taken to adopt the improvements. CNSC staff will continue to monitor ongoing communication and engagement efforts, regardless of license

term, to ensure that the approach is modern, agile and focused on the effectiveness of communication with interested parties.

Historically, public and Indigenous Nations and communities have expressed strong interest in CNSC licensing activities in the Port Hope area. In addition, although measures are in place that ensure opportunities for engagement will be ongoing throughout the licence term, concerns were expressed to CNSC staff during engagement activities that opportunities for meaningful engagement may not be adequate within an extended licence term in the absence of a Commission hearing. CNSC staff are therefore recommending that in addition to the opportunities outlined above, if the Commission grants a 20-year licence term to CFM, CFM shall provide a comprehensive performance update to the Commission at the mid-term point of the licence period. The update should include an overview of performance across all 14 SCAs as well as other regulatory matters of interest and a future outlook for the remainder of the licence period. The performance update would be made available for review in advance, and CFM's presentation during a Commission meeting will provide an opportunity for the public and Indigenous nations and communities to provide input in front of the Commission at a frequency in line with previously established licence terms. CNSC staff's recommendation on the mid-term update is in alignment with the recent decisions of the Commission (SRBT, Point Lepreau Nuclear Generating Station) where longer terms were granted than the term on the existing licences.

### **Commission Engagement Opportunities**

CNSC's capability to deliver on its mandate is not impacted by the licence period. Irrespective of the period of a licence granted by the Commission, the powers of the Commission will not be impacted. The Commission has the authority to call public proceedings on any matter of interest to the Commission, and to include intervenor participation and to make participant funding available in such proceedings. The Commission may, at any time, amend, suspend, revoke or replace a licence under the conditions prescribed in the GNSCR. As prescribed in paragraph 25(2) of the GNSCR, conditions under which the Commission may take such action include: if the licensee is not qualified to carry out the licensed activity; the licensee has failed to comply with the Act, the regulations made under the Act, or its licence; or the licensed activity poses an unreasonable risk to the environment.

CNSC staff activities and licensee performance are reported to the Commission through the annual Regulatory Oversight Report, which is presented to the Commission during a meeting with licensee participation. CNSC staff also engage the Commission through Event Initial Reporting, which provides notification of significant events or issues, potentially requiring Commission decision.

Any concerns identified by CNSC staff can be raised to the Commission for consideration and any requested changes from CFM that are deemed to be outside the licensing basis are subject to additional Commission approvals, regardless of the licence period. Additionally, for issues raised by members of the public,



CNSC has an established external complaint process in place [<https://www.cnsccsn.gc.ca/eng/contact-us/external-complaints.cfm>] to ensure the issues raised are reviewed and addressed as appropriate.

### 5.7.2 Conclusion

CNSC staff conclude that the regulatory approach in place is effective, fulfills the intent of international practices and able to provide appropriate regulatory oversight for CFM for any licence period. If the Commission approves CFM's request for a 20-year term, the CNSC regulatory approach is agile and can adapt to address any future changes in the regulatory landscape.

### 5.7.3 Recommendation

CNSC staff recommend the Commission issue the requested licence for a 20-year term. If a 20-year licence term is granted, CNSC staff recommend that CFM provide a comprehensive performance update to the commission at the mid-point of the licence term that would provide an opportunity for public and Indigenous Nations and communities to provide input on the CFM facility directly to the Commission.

## 5.8 Production Limit Increase

In its licence renewal application, CFM has requested an increase to the production limit for the CFM facility. The current production limit, as stated in the CFM LCH is “125 Megagrams (Mg) of  $UO_2$  as pellets during any calendar month”[5]. In its application CFM is requesting the facility production limit be changed to “an annual production limit of 1,650 tonnes of uranium (tU) as uranium dioxide ( $UO_2$ ) pellets”. This equates to an approximate increase of 24% relative to the current production limit (i.e., if the requested limit is expressed as a mass of  $UO_2$  by using a  $UO_2:U$  mass ratio of 1.13, it is equivalent to approximately 1,864.50 t $UO_2$ /yr or 155.38 t $UO_2$ /month).

CFM has indicated its request for a change in units from “Megagrams of  $UO_2$  as pellets” to “tonnes of uranium as uranium dioxide pellets” is to achieve consistency with the units used in the licenses for other Cameco FSD facilities (i.e., Blind River Refinery and Port Hope Conversion Facility). The change to an annual-based production limit (from a monthly limit) also aligns with the other Cameco FSD facilities and provides greater operational flexibility.

In its application, CFM stated that there are no immediate plans to increase production. The production limit increase is being requested to provide CFM with the ability to respond to future business opportunities, should they develop.

### 5.8.1 Discussion

CFM submits annual production summaries to CNSC staff demonstrating compliance with the monthly production limit. Production levels remained in

compliance with the current production limit at all times during the previous licence period.

The annual-based production would provide operational flexibility to account for periods of down-time. For example, CFM typically performs 2 shutdowns each year, spanning 2-3 weeks, to perform maintenance activities and to support employee vacation. These months typically have decreased production output as a result of the shutdown period. When a monthly limit is in place, CFM is limited in its ability to account for that lost production time.

In its application and “*Justification for Licence Term and Production Increase*” document [4,7], CFM has stated that the requested production increase reflects the production capacity of the facility, as currently configured. Consequently, there is no physical modification of the facility, or new equipment required to operate at the requested level. Instead, increased production would be achieved by increasing the operating hours of the facility. The CFM facility currently operates 3 shifts, 5 days a week, with some weekend shifts (when necessary to meet customer needs). To achieve a 25% increase, operations would be increased to a 7 days/week schedule, allowing for up to 168 production hours each week. Additional operators and supervisory staff would be required to operate CFM on this schedule.

In CFM’s “*Justification for Licence Term and Production Increase*” document [7], an assessment is provided of the potential impacts of the production increase on programs and safety and control measures currently in place for each SCA. CFM’s conclusion is that a production limit increase would only require administrative changes to certain licensing basis documents, which can be implemented under the current change management framework, ensuring that licensed activities continue to be carried out in a manner that ensures safety of workers, the public, and the environment.

Key considerations made by CFM in its assessment of impacts of a production increase on specific SCA’s include:

- **Human Performance Management:** CFM has identified that additional operational employees and supervisory staff would be required to achieve increased production. CFM maintains a Systematic Approach to Training (SAT) program which meets requirements [REGDOC-2.2.2](#). This training will ensure that new staff are adequately trained and qualified to fulfill their assigned roles and responsibilities.
- **Safety Analysis:** Administrative changes to the SAR would be required to reflect the change to operating days and the production limit. Given that no changes to activities, equipment, or facility design are planned, further revision of the SAR is not anticipated.
- **Physical Design:** No changes are anticipated.
- **Fitness for Service:** CFM has identified that the increased equipment operating times necessary to achieve increased production may require changes to the frequency of preventative maintenance tasks. CFM’s

*Preventative Maintenance Execution Management* procedure (AP-018) contains adequate processes to ensure maintenance needs are assessed and preventative maintenance schedules are adjusted where necessary.

- **Radiation Protection:** CFM has indicated that the production increase would be achieved by the addition of personnel to support the increase in facility operating hours. The hours worked for each employee is not expected to increase. CFM indicated that no changes to its radiation protection program would be required as there will be no changes to work groups identified in the program and no changes to the action levels defined therein. Doses to workers are not expected to change as a result of a production increase, and will therefore continue to be a small fraction of applicable radiation dose limits. Additional information regarding impacts of a production increase on radiation protection is provided in section 3.7 of this CMD.
- **Environmental Protection:** CFM has indicated that the requested production increase would not necessitate changes to the environmental monitoring program, the Derived Release Limits (DRL), environmental action levels, or the release limits specified in the current CFM licence. CFM applied a 25% extrapolation of uranium emission to air and sanitary sewer and determined that the increased releases would not impact the overall risk conclusion of the 2016 ERA or 2021 ERA review. The extrapolated annual uranium loadings to sewer ranges from 1.06 kg U/yr to 1.975 kg U/yr and remains well below the current DRL of 331 kg U/L and the current EBRL of 62 kg U/L. Similarly, the extrapolated annual uranium loadings to air from emission sources ranges from 0.94 kg U/yr to 1.61 kg U/yr, which is well below the current EBRL of 10.7 kg U/yr. Additional information regarding impacts of a production increase on environmental protection, and CNSC staff's assessment of the production increase is provided in section 3.3 of the EPR report [8].

CFM has stated that the estimated dose to the public is not expected to be impacted by a production increase. At CFM, the gamma dose contribution accounts for nearly all of the estimated dose to the public. The estimated public dose is therefore highly dependent on the quantity and location of uranium stored on site, relative to the critical receptor location. CFM does not store large quantities of UO<sub>2</sub> powder on site, but receives deliveries on a just-in-time basis. This practice would remain in place if production is increased. Similarly, CFM does not expect storage of finished product to increase as the current storage quantity is based on customer agreements and the maintenance of a specified fuel bundle reserve.

- **Preliminary Decommissioning Program and Financial Guarantee:** The production increase would not impact the content of the PDP or the value of the financial guarantee.

Based on its assessment of potential impacts of the production increase under its licensing basis for the 14 SCAs, and other regulatory areas, CFM concluded that

only minor administrative changes are required and therefore increasing production up to the requested limit is within its current licensing basis.

CNSC staff have reviewed CFM's assessment and agree with its conclusions regarding potential impacts on the various SCAs. However, increasing production above the current production limit would not have been permitted under the current licence. Although it may not significantly impact other SCAs, the current production limit is part of the licensing basis as it is a bounding operational condition, or control measure, that was proposed in the previous application and approved by the Commission. Consequently, CFM would have been required to apply for Commission approval of a licence amendment if it sought to increase production during the previous licence period.

CNSC staff have reviewed CFM's assessment and agree that the current safety and control measures as documented in CFM's current licensing basis documents, which also support the current application, are adequate to ensure that if production is increased, CFM will provide adequate protection to the health and safety of workers, the public, and the environment.

### **5.8.2 Conclusion**

If approved by the Commission, CNSC staff will verify CFM's compliance with the new production limit. CNSC staff are confident that CFM has appropriate programs in place to manage and support the implementation of changes outlined in its assessment if the production is realized. As part of compliance oversight, CNSC staff will monitor worker dose and environmental releases to verify the accuracy of CFM's conclusions regarding the absence of impacts from increased operations.

### **5.8.3 Recommendation**

CNSC staff recommend the Commission approve the production increase requested by CFM. The production limit: "1,650 tonnes of uranium (tU) as uranium dioxide pellets per year", is included in the draft LCH provided in Part 2 of this CMD.

## **5.9 Delegation of Authority**

The Commission may include in a licence, any condition it considers necessary for the purposes of the NSCA. The Commission may delegate authority to CNSC staff with respect to the administration of licence conditions, or portions thereof.

There is one proposed licence condition in the proposed CFM licence, FFL-3641.00/2043 that contains the phrase "the Commission or a person authorized by the Commission":

- LC 3.2 Reporting Requirements

CNSC staff recommend that the Commission delegate its authority for the purposes described in the above licence condition to the following staff:

- Director, Nuclear Processing Facilities Division
- Director General, Directorate of Nuclear Cycle and Facilities Regulation
- Executive Vice-President and Chief Regulatory Operations Officer, Regulatory Operations Branch

## 6. OVERALL CONCLUSIONS AND RECOMMENDATIONS

CNSC staff's conclusions and recommendations consider an overall assessment of CFM's compliance with the NSCA and its regulations during the previous licence period (2012-2022). CNSC staff's assessment determined that the application complies with regulatory requirements. As reported to the Commission each year in [\*Regulatory Oversight Reports for Uranium and Nuclear Substance Processing Facilities\*](#), CFM's performance during the current licensing term was satisfactory and met regulatory requirements.

CNSC staff conclude that CFM has programs, resources, and measures in place at the CFM to ensure the health and safety of persons and the environment and to ensure appropriate measures related to security and Canada's international obligations during the proposed licence period.

Based on above conclusions, CNSC staff recommend that the Commission take the following actions:

1. Conclude, pursuant to paragraphs 24(4)(a) and (b) of the NSCA, that CFM:
  - 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. Approve the issuance of the proposed 20-year licence (FFL-3641.00/2043) for operation of the CFM facility, effective March 1, 2023 to February 28, 2043, with a requirement for CFM to provide a comprehensive performance update to the Commission at the mid-point of the licence term.
3. Approve CFM's request for an annual production limit of 1,650 tonnes of uranium (tU) as uranium dioxide (UO<sub>2</sub>) pellets, for the CFM facility.
4. Delegate authority as set out in section 5.9 of this CMD.

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## GLOSSARY

For definitions of terms used in this document, see [REGDOC-3.6, Glossary of CNSC Terminology](#), which includes terms and definitions used in the Nuclear Safety and Control Act and the Regulations made under it, and in CNSC regulatory documents and other publications.

Additional terms and acronyms used in this CMD are listed below.

|        |   |
|--------|---|
| ALARA  | As low as reasonably achievable                       |
| Cameco | Cameco Corporation                                    |
| CCME   | Canadian Council of Ministers of the Environment      |
| CCR    | Code Compliance Reviews                               |
| CFM    | Cameco Fuel Manufacturing Inc.                        |
| CIRS   | Cameco's Incident Reporting System                    |
| CMD    | Commission Member Document                            |
| CNSC   | Canadian Nuclear Safety Commission                    |
| CRFR   | <i>Cost Recovery Fees Regulations</i>                 |
| CSA    | Canadian Standards Association                        |
| DRL    | Derived Release Limit                                 |
| EBRLs  | Exposure Based Release Limits                         |
| ECA    | Environmental Compliance Approval                     |
| EIR    | Event initial report                                  |
| EMS    | Environmental management system                       |
| EPR    | Environmental Protection Reviews                      |
| ERA    | Environmental Risk Assessment                         |
| ERT    | Emergency response team                               |
| FASC   | Facility Access Security Clearance                    |
| FFL    | Fuel Facility Licence                                 |
| FHA    | Fire Hazard Analysis                                  |
| FPP    | Fire Protection Program                               |
| FRC    | Funding Review Committee                              |
| FSD    | Fuel Services Division                                |
| GNSCR  | <i>General Nuclear Safety and Control Regulations</i> |
| HEPA   | high efficiency particulate air (filtration)          |

|        |  |
|--------|--|
| IAA    | <i>Impact Assessment Act</i>                                     |
| IAEA   | International Atomic Energy Agency                               |
| IEMP   | Independent Environmental Monitoring Program                     |
| JHA    | Job hazard analysis  |
| JHSC   | Joint Health and Safety Committee                                |
| LCH    | Licence conditions handbook                                      |
| LOC    | Letters of Credit  |
| KPI    | Key Performance Indicator  |
| LTI    | Lost-time injuries   |
| MECP   | Ontario Ministry of the Environment, Conservation and Parks      |
| mSv    | Millisievert   |
| MSC    | Minimum Shift Complement   |
| MSPM   | Management Systems Program Manual                                |
| NBCC   | National Building Code of Canada                                 |
| NEW    | Nuclear Energy Workers   |
| NLCA   | Nuclear Liability and Compensation Act                           |
| NFCC   | National Fire Code of Canada                                     |
| NSR    | <i>Nuclear Security Regulations</i>                              |
| NSCA   | Nuclear Safety and Control Act                                   |
| PDP    | Preliminary Decommissioning Plan                                 |
| PFM    | Participant Funding Program                                      |
| PHAI   | Port Hope Area Initiative  |
| PHFES  | Port Hope Fire and Emergency Services                            |
| PIDP   | Public Information and Disclosure Program                        |
| PIV    | Physical Inventory Verification                                  |
| PPE    | Personal protective equipment                                    |
| PTNSR  | <i>Packaging and Transport of Nuclear Substances Regulations</i> |
| REGDOC | Regulatory Document  |
| RP     | Radiation protection   |
| SA     | Satisfactory   |
| SAR    | Safety Analysis Report   |
| SAT    | Systematic approach to training                                  |
| SCA    | Safety and Control Areas   |

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|                 |  |
|-----------------|--|
| SSC             | Structures, Systems and Components       |
| TSSA            | Technical Standards and Safety Authority |
| UO <sub>2</sub> | Uranium Dioxide                          |
| WMP             | Waste management plan                    |

## A. RISK RANKING

The CNSC uses a risk-informed regulatory approach in the management and control of regulated facilities and activities. CNSC staff have therefore established an approach to identifying appropriate levels of regulatory monitoring and control for specific classes of licensed facilities and types of licensed activities based on risk ranking.

Risk ranking is applied to each SCA, and is determined by considering the probability and consequence of adverse incidents associated with each SCA as it relates to the given facility and activity types.

The methodology used to determine risk ranking is based on Canadian Standards Association guideline CAN/CSA-Q850, Risk Management: Guideline for Decision Makers. This guideline provides a description of the major components of the risk management decision process and their relationship to each other, and describes a process for acquiring, analyzing, evaluating, and communicating information that is necessary for making decisions.

In section 2.2 of the CMD, in the Relevant Safety Control Areas table, the “Risk Ranking” column shows a high (H), moderate (M) or low (L) indicator for each SCA that is relevant to the current facility and activities being addressed in this CMD. The risk rankings are not static and will change over time for a given facility and activities (e.g., facilities age, facilities and equipment are upgraded, activities cease or begin, licensees change, technology and programs mature, knowledge and understanding of impacts and probabilities increase, etc.).

The following matrix provides a high-level overview of risk ranking, and the management and monitoring approach associated with the various degrees of risk.

| <b>APPROACH TO ASSESSING AND MANAGING POTENTIAL RISK</b> |   |  |  |
|--|---|--|--|
| <b>CONSEQUENCE</b>                                       | <b>MANAGEMENT/MONITORING APPROACH</b>       |  |  |
| <b>Significant Impact</b>                                | Considerable management of risk is required | Must manage and monitor risk with occasional control | Extensive management is essential. Constant monitoring and control |
| <b>Moderate Impact</b>                                   | Occasional monitoring                       | Management effort is recommended                     | Management effort and control is required                          |
| <b>Low Impact</b>  | Random monitoring                           | Regular monitoring                                   | Manage and monitor   |
| <b>Probability of Occurrence</b>                         | Unlikely to Occur                           | Might Occur  | Expected to Occur  |

| <b>RISK RANKING SCALE</b> |               |                    |
|---------------------------|---------------|--------------------|
| <b>L</b>                  | Low Risk      | <b>H</b> High Risk |
| <b>M</b>                  | Moderate Risk |                    |

On this basis, a high-risk SCA would be subject to increased regulatory scrutiny and control while a low-risk SCA would generally require minor verification and control.

## **B. SAFETY PERFORMANCE RATING LEVELS**

### **Satisfactory (SA)**

#### **Licensee meets all of the following criteria:**

- Performance meets CNSC staff expectations
- Licensee non-compliances or performance issues, if any, are not risk-significant
- Any non-compliances or performance issues have been, or are being, adequately corrected

### **Below Expectations (BE)**

#### **One or more of the following criteria apply:**

- Performance does not meet CNSC staff expectations
- Licensee has risk-significant non-compliance(s) or performance issue(s)
- Non-compliances or performance issues are not being adequately corrected

### **Unacceptable (UA)**

#### **One or both of the following criteria apply:**

- Risk associated with a non-compliance or performance issue is unreasonable
- At least one significant non-compliance or performance issue exists with no associated corrective action

## C. BASIS FOR THE RECOMMENDATION(S)

### C.1 Regulatory Basis

The recommendations presented in this CMD are based on compliance objectives and expectations associated with the relevant SCAs and other matters. The regulatory basis for the matters that are relevant to this CMD are as follows.

#### Management System

The regulatory foundation for the recommendation(s) associated with Management System includes the following:

- The [\*Class I Nuclear Facilities Regulations\*](#) require that an application for a licence shall contain, under paragraph:
  - 3(d), the proposed management system for the activity to be licensed, including measures to promote and support safety culture.
- The [\*General Nuclear Safety and Control Regulations\*](#) require that an application for a licence shall contain, under paragraphs:
  - 3(1)(k), the applicant's organizational management structure insofar as it may bear on the applicant's compliance with the NSCA and the regulations made under the NSCA, including the internal allocation of functions, responsibilities and authority.
  - 15(a), the persons who have the authority to act for them (the applicant/licensee) in their dealings with the Commission.
  - 15(b), the names and position titles of the persons who are responsible for the management and control of the licensed activity and the nuclear substance, nuclear facility, prescribed equipment or prescribed information encompassed by the licence.

#### Human Performance Management

The regulatory foundation for the recommendation(s) associated with Human Performance Management includes the following:

- The [\*Class I Nuclear Facilities Regulations\*](#) require that an application for a licence shall contain, under paragraphs:
  - 3(d.1), the proposed human performance program for the activity to be licensed, including measures to ensure workers' fitness for duty.
  - 6(m), the proposed responsibilities of and the qualification requirements and training program for workers, including the procedures for the requalification of workers
  - 6(n), the results that have been achieved in implementing the program for recruiting, training and qualifying workers in respect of the operation and maintenance of the nuclear facility.

- The [\*General Nuclear Safety and Control Regulations\*](#) require that licensees, under paragraphs:
  - 12(1)(a), ensure the presence of a sufficient number of qualified workers to carry on the licensed activity safely and in accordance with the Act, the regulations made under the Act and the licence.
  - 12(1)(b), train the workers to carry on the licensed activity in accordance with the Act, the regulations made under the Act and the licence.
  - 12(1)(e), require that every person at the site of the licensed activity to use equipment, devices, clothing and procedures in accordance with the Act, the regulations made under the Act and the licence.

### **Operating Performance**

The regulatory foundation for the recommendation(s) associated with operating performance includes the following:

- The [\*Class I Nuclear Facilities Regulations\*](#) require that an application for a licence to operate a Class I nuclear facility shall contain, under paragraph:
  - 6(d), the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility.

### **Safety Analysis**

The regulatory foundation for the recommendation(s) associated with safety analysis includes the following:

- The [\*General Nuclear Safety and Control Regulations\*](#) require that an application for a licence shall contain, under paragraph:
  - 3(1)(i), a description and the results of any test, analysis or calculation performed to substantiate the information included in the application.
- The [\*Class I Nuclear Facilities Regulations\*](#) require that an application for a licence shall contain, under paragraphs:
  - 6(c), a final safety analysis report demonstrating the adequacy of the design of the nuclear facility.
  - 6(h), the effects on the environment and the health and safety of persons that may result from the operation and decommissioning of the nuclear facility, and the measures that will be taken to prevent or mitigate those effects.



## Physical Design

The regulatory foundation for the recommendation(s) associated with physical design includes the following:

- Paragraph 3(1)(d) of the [General Nuclear Safety and Control Regulations](#) requires that an application for a licence shall contain a description of any nuclear facility, prescribed equipment or prescribed information to be encompassed by the licence.
- The [Class I Nuclear Facilities Regulations](#) require that an application for a licence shall contain, under paragraphs:
  - 3(a), a description of the site of the activity to be licensed, including the location of any exclusion zone and any structures within that zone;
  - 3(b), plans showing the location, perimeter, areas, structures and systems of the nuclear facility;
  - 6(a), a description of the structures at the nuclear facility, including their design and their design operating conditions;
  - 6(b), a description of the systems and equipment at the nuclear facility, including their design and their design operating conditions;
  - 6(c), a final safety analysis report demonstrating the adequacy of the design of the facility; and
  - 6(d), proposed measures, policies, methods and procedures for operating and maintaining the facility.

## Fitness for Service

The regulatory foundation for the recommendation(s) associated with fitness for service includes the following:

- The [Class I Nuclear Facilities Regulations](#) require that an application for a licence shall contain, under paragraph:
  - 6(d), the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility.

## Radiation Protection

The regulatory foundation for the recommendation(s) associated with radiation protection includes the following:

- The [General Nuclear Safety and Control Regulations](#) require, under subsection 3(1), that a licence application contain the following information under paragraphs:
  - 3(1)(e), the proposed measures to ensure compliance with the [Radiation Protection Regulations](#).
  - 3(1)(f), any proposed action level for the purpose of section 6 of the [Radiation Protection Regulations](#).
- The [Radiation Protection Regulations](#)

- The [\*Class I Nuclear Facilities Regulations\*](#) require that an application for a licence to operate a Class I nuclear facility shall contain, under paragraphs:
  - 6(e), the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances.
  - 6(h), the effects on the environment and the health and safety of persons that may result from the operation and decommissioning of the nuclear facility, and the measure that will be taken to prevent or mitigate those effects.

### **Conventional Health and Safety**

The regulatory foundation for the recommendation(s) associated with Conventional Health and Safety includes the following:

- The [\*Class I Nuclear Facilities Regulations\*](#) require that an application for a licence shall contain, under paragraph:
  - 3(f), the proposed worker health and safety policies and procedures.
- CFM's activities and operations must comply with the [\*Canada Labour Code, Part II: Occupational Health and Safety\*](#).

### **Environmental Protection**

The regulatory foundation for the recommendation(s) associated with Environmental Protection includes the following:

- The [\*General Nuclear Safety and Control Regulations\*](#), under paragraphs 12(1)(c) and (f), require that each licensee take all reasonable precautions to protect the environment and the health and safety of persons, and to control the release of radioactive nuclear substances and hazardous substances within the site of the licensed activity and into the environment.
- The [\*Radiation Protection Regulations\*](#) prescribe dose limits for the general public, which under Subsection 1(3) is 1 mSv per calendar year.
- The [\*Class I Nuclear Facilities Regulations\*](#) require that an application for a licence shall contain, under paragraphs:
  - 3(e), the name, form, characteristics and quantity of any hazardous substances that may be on the site while the activity to be licensed is carried on.
  - 3(g), the proposed environmental protection policies and procedures.
  - 3(h), the proposed effluent and environmental monitoring programs.
  - 6(e), the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances.
  - 6(h), the effects on the environment and the health and safety of persons that may result from the operation and decommissioning of the nuclear facility, and the measures that will be taken to prevent or mitigate those effects.

- 6(i), the proposed location of points of release, the proposed maximum quantities and concentrations, and the anticipated volume and flow rate of releases of nuclear substances and hazardous substances into the environment, including their physical, chemical and radiological characteristics.
- 6(j), the proposed measures to control releases of nuclear substances and hazardous substances into the environment.

### **Emergency Management and Fire Protection**

The regulatory foundation for the recommendation(s) associated with Emergency Management and Response includes the following:

- 12(1)(c) of the [\*General Nuclear Safety and Control Regulations\*](#) states that every licensee shall “take all reasonable precautions to protect the environment and the health and safety of persons and to maintain security”.
- 12(1)(f) of the [\*General Nuclear Safety and Control Regulations\*](#) states that every licensee shall “take all reasonable precautions to control the release of radioactive nuclear substances or hazardous substances within the site of the licensed activity and into the environment of the licensed activity”.
- The [\*Class I Nuclear Facilities Regulations\*](#) require that an application for a licence shall contain, under paragraph:
  - 6(k) information on the licensee’s proposed measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment, the health and safety of persons and the maintenance of national security, including measures to:
    - Assist offsite authorities in planning and preparing to limit the effects of an accidental release;
    - Notify offsite authorities of an accidental release or the imminence of an accidental release;
    - Report information to offsite authorities during and after an accidental release;
    - Assist offsite authorities in dealing with the effects of an accidental release; and
    - Test the implementation of the measures to prevent or mitigate the effects of an accidental release.

## Waste Management

The regulatory foundation for the recommendation(s) associated with Waste Management includes the following:

- The [General Nuclear Safety and Control Regulations](#) require that an application for a licence include, under paragraph:
  - 3(1)(j), the name, quantity, form and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed, or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste.

## Security

The regulatory foundation for the recommendation(s) associated with Security includes the following:

- The [Nuclear Security Regulations](#) (NSR). It is a requirement of all Class I licensees to comply with the NSR.
- Specific obligations of the GNSCR that distinctly encompass the security SCA include:
  - Paragraph 12(1)(c), *Every licensee shall take all reasonable precautions to protect the environment and the health and safety of persons and to maintain the security of nuclear facilities and of nuclear substances;*
  - Paragraph 12(1)(g), *Every licensee shall implement measures for alerting the licensee to the illegal use or removal of a nuclear substance, prescribed equipment or prescribed information, or the illegal use of a nuclear facility;*
  - Paragraph 12(1)(h), *Every licensee shall implement measures for alerting the licensee to acts of sabotage or attempted sabotage anywhere at the site of the licensed activity;* and
  - Paragraph 12(1)(j), *Every licensee shall instruct the workers on the physical security program at the site of the licensed activity and on their obligations under that program.*

## Safeguards and Non-Proliferation

The regulatory foundation for the recommendation(s) associated with Safeguards and Non-Proliferation includes the following:

- It is a requirement of the [General Nuclear Safety and Control Regulations](#) under paragraph 12(1)(i) that each licensee take all necessary measures to facilitate Canada's compliance with any applicable safeguards agreement, where the applicable agreements are:
  - The [Agreement between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons](#).

- The [Protocol Additional to the Agreement between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons](#).

### **Packaging and Transport**

The regulatory foundation for the recommendation(s) associated with Packaging and Transport includes the following:

- The [Packaging and Transport of Nuclear Substances Regulations, 2015](#); and
- Transport Canada's [Transportation of Dangerous Goods Regulations](#).

### **Decommissioning Strategy and Financial Guarantees**

The regulatory foundation for the recommendation(s) associated with CFM's Decommissioning Strategy and Financial Guarantees includes:

- The [General Nuclear Safety and Control Regulations](#) require that an application for a licence shall contain, under paragraph:
  - 3(1)(l), a description of any proposed financial guarantee relating to the activity to be licensed.
- The [Class I Nuclear Facilities Regulations](#) require that an application for a licence shall contain, under paragraph:
  - 3(k), the proposed plan for the decommissioning of the nuclear facility or of the site.

### **Licensee's Public Information Program**

- The [Class I Nuclear Facilities Regulations](#) require that an application for a licence shall contain, under paragraph:
  - 3(j), information on the licensee's public information program.

## **C.2 Detailed Summary of CNSC Assessment of Application**

CNSC staff's assessment of CFM's licence application included a completeness check, a sufficiency check, and a technical assessment against regulatory requirements. The completeness check verified whether the application included the prescribed information in accordance with the [Nuclear Safety and Control Act](#) and its regulations. The sufficiency check verified whether the application included sufficient and quality information in order for CNSC staff to conduct the technical assessment. The technical assessment verified whether the application included adequate safety and control measures to address CNSC requirements. Documents originally submitted as part of the application may have been revised, updated or replaced over the course of the assessment in order to address CNSC requirements. Additional information and clarifications on the application and supporting documents provided by CFM are considered part of the application.

| Pursuant to Section 3 of the <a href="#">General Nuclear Safety and Control Regulations</a> Licences – General Application Requirements   | Location in Application or Supporting Document(s) as Noted by CFM  | Complete? | Sufficient? | Adequate? |
|---|--|-----------|-------------|-----------|
| (1) An application for a licence shall contain the following information:   |  |           |             |           |
| (a) the applicant's name and business address;  | Application sections 1.1, 1.2 and 1.3  | Y         | Y           | Y         |
| (b) the activity to be licensed and its purpose;  | Application sections 1.3 and 2.3<br>Facility Licensing Manual  | Y         | Y           | Y         |
| (c) the name, maximum quantity and form of any nuclear substance to be encompassed by the licence;  | Application sections 1.3, and 2.3  | Y         | Y           | Y         |
| (d) a description of any nuclear facility, prescribed equipment or prescribed information to be encompassed by the licence;   | Application sections 1.3, 2.2 and 2.3  | Y         | Y           | Y         |
| (e) the proposed measures to ensure compliance with the <a href="#">Radiation Protection Regulations</a> , the <a href="#">Nuclear Security Regulations</a> and the <a href="#">Packaging and Transport of Nuclear Substances Regulations, 2015</a> ; | Documents referenced in application appendix B<br>Facility Licensing Manual, CFM Radiation Protection Program, CFM Security Plan, FSD Packaging and Transportation Program | Y         | Y           | Y         |
| (f) any proposed action level for the purpose of section 6 of the <a href="#">Radiation Protection Regulations</a> ;  | Sections 4.7.6, 4.7.8, 4.7.9   | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><i>General Nuclear Safety and Control Regulations</i></u><br>Licences – General Application Requirements  | Location in Application or Supporting Document(s) as Noted by CFM   | Complete? | Sufficient? | Adequate? |
|---|---|-----------|-------------|-----------|
| (g) the proposed measures to control access to the site of the activity to be licensed and the nuclear substance, prescribed equipment or prescribed information;   | Application sections 4.7 and 4.12<br>Facility Licensing Manual, CFM Radiation Protection Program, CFM Security Plan   | Y         | Y           | Y         |
| (h) the proposed measures to prevent loss or illegal use, possession or removal of the nuclear substance, prescribed equipment or prescribed information;   | Application section 4.12,<br>CFM Security Plan  | Y         | Y           | Y         |
| (i) a description and the results of any test, analysis or calculation performed to substantiate the information included in the application;   | Application sections 4.4, 4.7, 4.9 and 4.11<br>Facility Licensing Manual, Derived Release Limits, Environmental Risk Assessment (2016, 2021, Safety Analysis Report | Y         | Y           | Y         |
| (j) the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste; | Application sections 4.4 and 4.11<br>Facility Licensing Manual, Safety Analysis Report, FSD Waste Management Program, CFM-Waste Management Plan                     | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><a href="#">General Nuclear Safety and Control Regulations</a></u><br>Licences – General Application Requirements  | Location in Application or Supporting Document(s) as Noted by CFM  | Complete? | Sufficient? | Adequate? |
|--|--|-----------|-------------|-----------|
| (k) the applicant's organizational management structure insofar as it may bear on the applicant's compliance with the <u><a href="#">Act</a></u> and the regulations made under the <u><a href="#">Act</a></u> , including the internal allocation of functions, responsibilities and authority; | Application sections 2.1 and 4.1.1<br>Supporting Documents – Facility Licensing Manual,<br>CFM letter: Persons Having Authority to Act for CFM in Dealings with the CNSC. April 17, 2020 | Y         | Y           | Y         |
| (l) a description of any proposed financial guarantee relating to the activity to be licensed; and   | Application sections 2.5 and 4.11.3,<br>Preliminary Decommissioning Plan   | Y         | Y           | Y         |
| (m) any other information required by the <u><a href="#">Act</a></u> or the regulations made under the <u><a href="#">Act</a></u> for the activity to be licensed and the nuclear substance, nuclear facility, prescribed equipment or prescribed information to be encompassed by the licence.  | All relevant information is contained within the application, the Facility Licensing Manual and supporting documents referenced in Appendix B of the application.                        | Y         | Y           | Y         |

| Pursuant to Subsection 3(1.1) of the <u><a href="#">General Nuclear Safety and Control Regulations</a></u><br>Other Information Requested by CNSC Staff | Location in Application or Supporting Document(s) as Noted by CFM | Complete? | Sufficient? | Adequate? |
|---|---|-----------|-------------|-----------|
| (1.1) The Commission or a designated officer authorized under paragraph 37(2)(c) of the <u><a href="#">Act</a></u> may require any other information    | As required   | Y         | Y           | Y         |



| Pursuant to Subsection 3(1.1) of the <u><i>General Nuclear Safety and Control Regulations</i></u><br>Other Information Requested by CNSC Staff   | Location in Application or Supporting Document(s) as Noted by CFM | Complete? | Sufficient? | Adequate? |
|--|---|-----------|-------------|-----------|
| <p>that is necessary to enable the Commission or the designated officer to determine whether the applicant:</p> <p>(a) is qualified to carry on the activity to be licensed; or</p> <p>(b) will, in carrying on that activity, make adequate provision 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.</p> |   |           |             |           |

| Pursuant to Section 5 of the <u><i>General Nuclear Safety and Control Regulations</i></u><br>Obligations – Representatives of Applicants and Licensees | Location in Application or Supporting Document(s) as Noted by CFM | Complete? | Sufficient? | Adequate? |
|--|---|-----------|-------------|-----------|
| 5 An application for the renewal of a licence shall contain:   |   |           |             |           |
| (a) the information required to be contained in an application for that licence by the applicable regulations made under the Act; and                  | Application and identified supporting documentation               | Y         | Y           | Y         |

| Pursuant to Section 5 of the <u><i>General Nuclear Safety and Control Regulations</i></u><br>Obligations –<br>Representatives of<br>Applicants and Licensees | Location in<br>Application or<br>Supporting<br>Document(s) as Noted<br>by CFM | Complete? | Sufficient? | Adequate? |
|--|---|-----------|-------------|-----------|
| (b) A statement identifying the changes in the information that was previously submitted.  | Not applicable  | -         | -           | -         |

| Pursuant to Section 15 of the <u><i>General Nuclear Safety and Control Regulations</i></u><br>Obligations –<br>Representatives of<br>Applicants and Licensees  | Location in<br>Application or<br>Supporting<br>Document(s) as Noted<br>by CFM   | Complete? | Sufficient? | Adequate? |
|--|---|-----------|-------------|-----------|
| 15 Every applicant for a licence and every licensee shall notify the Commission of:  |   |           |             |           |
| (a) the persons who have authority to act for them in their dealings with the Commission;  | Application sections 2.1 and 4.1.1<br>Supporting Documents – Facility Licensing Manual, CFM letter. Persons Having Authority to Act for CFM in Dealings with the CNSC. April 17, 2020 | Y         | Y           | Y         |
| (b) the names and position titles of the persons who are responsible for the management and control of the licensed activity and the nuclear substance, nuclear facility, prescribed equipment or prescribed information encompassed by the licence; and | Application sections 2.1 and 4.1.1<br>Supporting Documents – Facility Licensing Manual, CFM letter. Persons Having Authority to Act for CFM in Dealings with the CNSC. April 17, 2020 | Y         | Y           | Y         |

| Pursuant to Section 15 of the <u><a href="#">General Nuclear Safety and Control Regulations</a></u><br>Obligations –<br>Representatives of<br>Applicants and Licensees | Location in<br>Application or<br>Supporting<br>Document(s) as Noted<br>by CFM   | Complete? | Sufficient? | Adequate? |
|--|---|-----------|-------------|-----------|
| (c) any change in the information referred to in paragraphs (a) and (b), within 15 days after the change occurs.   | Facility Licensing Manual,<br>CFM letter. Persons Having Authority to Act for CFM in Dealings with the CNSC. April 17, 2020 | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><a href="#">Class I Nuclear Facilities Regulations</a></u><br>Licence Applications –<br>General Requirements  | Location in<br>Application or<br>Supporting<br>Document(s) as Noted<br>by CFM   | Complete? | Sufficient? | Adequate? |
|---|---|-----------|-------------|-----------|
| 3 An application for a licence in respect of a Class I nuclear facility, other than a licence to abandon, shall contain the following information in addition to the information required by Section 3 of the <u><a href="#">General Nuclear Safety and Control Regulations</a></u> : |   |           |             |           |
| (a) a description of the site of the activity to be licensed, including the location of any exclusion zone and any structures within that zone;   | Application Section 2.2,<br>CFM Facility Licenced Area Drawing 05C144 Site Map Property Layout Drawing 00A084,<br>CFM Letter Submission of Updated Site Layout Drawings for CFM Fuel Manufacturing. July 13, 2020 | Y         | Y           | Y         |
| (b) plans showing the location, perimeter, areas, structures and systems of the nuclear   | CFM Facility Licenced Area Drawing 05C144 Site Map Property Layout Drawing 00A084,  | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><i>Class I Nuclear Facilities Regulations</i></u> Licence Applications – General Requirements                         | Location in Application or Supporting Document(s) as Noted by CFM   | Complete? | Sufficient? | Adequate? |
|---|---|-----------|-------------|-----------|
| facility;   | CFM Letter Submission of Updated Site Layout Drawings for CFM Fuel Manufacturing. July 13, 2020   |           |             |           |
| (c) evidence that the applicant is the owner of the site or has authority from the owner of the site to carry on the activity to be licensed;         | CFM Letter. Deeds for CFM Fuel Manufacturing Inc. March 8, 2021   | Y         | Y           | Y         |
| (d) the proposed management system for the activity to be licensed, including measures to promote and support safety culture;                         | Application Section 4.1, Facility Licensing Manual, CFM-Management Systems Program Manual   | Y         | Y           | Y         |
| (d.1) the proposed human performance program for the activity to be licensed, including measures to ensure workers' fitness for duty;                 | Application Section 4.2 Facility Licensing Manual, CFM-Training Program   | Y         | Y           | Y         |
| (e) the name, form, characteristics and quantity of any hazardous substances that may be on the site while the activity to be licensed is carried on; | Application Section 4.4, Facility Licensing Manual, Safety Analysis Report, Environmental Risk Assessment (2016, 2021), Derived Release Limits document | Y         | Y           | Y         |
| (f) the proposed worker health and safety policies and procedures;  | Application Section 4.8 CFM-Safety and Health Program   | Y         | Y           | Y         |
| (g) the proposed environmental protection policies and procedures;  | Application Section 4.9, Environmental Protection Program   | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><a href="#">Class I Nuclear Facilities Regulations</a></u> Licence Applications – General Requirements   | Location in Application or Supporting Document(s) as Noted by CFM                                  | Complete? | Sufficient? | Adequate? |
|--|--|-----------|-------------|-----------|
| (h) the proposed effluent and environmental monitoring programs;   | Application Section 4.9, Environmental Protection Program  | Y         | Y           | Y         |
| (i) if the application is in respect of a nuclear facility referred to in paragraph 2(b) of the <u><a href="#">Nuclear Security Regulations</a></u> , the information required by section 3 of those Regulations;  | Not applicable to CFM  | -         | -           | -         |
| (j) the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed; and | Application Section 2.4, FSD-Public Information Program  | Y         | Y           | Y         |
| (k) the proposed plan for the decommissioning of the nuclear facility or of the site.  | Application Sections 2.5 and 4.11.3 Facility Licensing Manual, Preliminary Decommissioning Program | Y         | Y           | Y         |

| Pursuant to Section 6 of the <u><a href="#">Class I Nuclear Facilities Regulations</a></u> Licence Applications – Licence to Operate | Location in Application or Supporting Document(s) as Noted by CFM | Complete? | Sufficient? | Adequate? |
|--|---|-----------|-------------|-----------|
|--|---|-----------|-------------|-----------|

| Pursuant to Section 6 of the <u><i>Class I Nuclear Facilities Regulations</i></u> Licence Applications – Licence to Operate  | Location in Application or Supporting Document(s) as Noted by CFM  | Complete?  | Sufficient? | Adequate? |
|--|--|--|-------------|-----------|
| 6 An application for a licence to operate a Class I nuclear facility shall contain the following information in addition to the information required by section 3: |  |  |             |           |
| (a) a description of the structures at the nuclear facility, including their design and their design operating conditions;   | Application Sections 2.2, 2.3, 4.4, 4.5 and 4.6<br>Facility Licensing Manual, Safety Analysis Report<br>Detailed information on specific structures and their design and operation was previously submitted to the CNSC (AECB) at the time the structures were commissioned. | Y<br>CFM provided updated information in response to CNSC staff request. | Y           | Y         |
| (b) a description of the systems and equipment at the nuclear facility, including their design and their design operating conditions;                              | Application Sections 2.2, 2.3, 4.4, 4.5 and 4.6<br>Facility Licensing Manual, Safety Analysis Report<br>Detailed information on specific structures and their design and operation was previously submitted to the CNSC (AECB) at the time the structures were commissioned. | Y<br>CFM provided updated information in response to CNSC staff request  | Y           | Y         |
| (c) a final safety analysis report demonstrating the adequacy of the design of the nuclear facility;   | Application Section 4.4,<br>Safety Analysis Report   | Y  | Y           | Y         |

| Pursuant to Section 6 of the <u><i>Class I Nuclear Facilities Regulations</i></u> Licence Applications – Licence to Operate   | Location in Application or Supporting Document(s) as Noted by CFM  | Complete? | Sufficient? | Adequate? |
|---|--|-----------|-------------|-----------|
| (d) the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility;   | Application Sections 4.1, 4.2, 4.3, 4.5, and 4.6, Facility Licensing Manual, Management Systems Program Manual and referenced documents                              | Y         | Y           | Y         |
| (e) the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances;  | Application Sections 4.2, 4.3, 4.7, and 4.14, Facility Licensing Manual, Radiation Protection Program, FSD-Packaging and Transportation Program                      | Y         | Y           | Y         |
| (f) the proposed measures to facilitate Canada's compliance with any applicable safeguards agreement;   | Application Section 4.13, Facility Licensing Manual, FSD-Safeguards Program  | Y         | Y           | Y         |
| (g) the proposed commissioning program for the systems and equipment that will be used at the nuclear facility;   | Application Sections 4.1 and 4.5, Facility Licensing Manual, Management Systems Program Manual, Change Control (MSP 13-02)   | Y         | Y           | Y         |
| (h) the effects on the environment and the health and safety of persons that may result from the operation and decommissioning of the nuclear facility, and the measures that will be taken to prevent or mitigate those effects; | Application Sections 4.4, 4.7 and 4.9 Facility Licensing Manual, Environmental Risk Assessment (2016, 2021), Safety Analysis Report, Derived Release Limits document | Y         | Y           | Y         |

| Pursuant to Section 6 of the <u><i>Class I Nuclear Facilities Regulations</i></u> Licence Applications – Licence to Operate  | Location in Application or Supporting Document(s) as Noted by CFM  | Complete? | Sufficient? | Adequate? |
|--|--|-----------|-------------|-----------|
| (i) the proposed location of points of release, the proposed maximum quantities and concentrations, and the anticipated volume and flow rate of releases of nuclear substances and hazardous substances into the environment, including their physical, chemical and radiological characteristics; | Application Sections 4.4 and 4.9<br>Facility Licensing Manual,<br>Environmental Risk Assessment (2016, 2021), Safety Analysis Report, Derived Release Limits document,<br>Environmental Protection Program | Y         | Y           | Y         |
| (j) the proposed measures to control releases of nuclear substances and hazardous substances into the environment;   | Application Sections 4.4 and 4.9<br>Facility Licensing Manual,<br>Environmental Risk Assessment (2016, 2021), Safety Analysis Report, Derived Release Limits document,<br>Environmental Protection Program | Y         | Y           | Y         |



| Pursuant to Section 6 of the <u><i>Class I Nuclear Facilities Regulations</i></u> Licence Applications – Licence to Operate   | Location in Application or Supporting Document(s) as Noted by CFM  | Complete? | Sufficient? | Adequate? |
|---|--|-----------|-------------|-----------|
| <p>(k) the proposed measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment, the health and safety of persons and the maintenance of national security, including measures to:</p> <p>(i) assist . offsite authorities in planning and preparing to limit the effects of an accidental release;</p> <p>(ii) notify . offsite authorities of an accidental release or the imminence of an accidental release;</p> <p>(iii) report information to . offsite authorities during and after an accidental release;</p> <p>(iv) assist . offsite authorities in dealing with the effects of an accidental release; and</p> <p>(v) test the implementation of the measures to prevent or mitigate the effects of an accidental release.</p> | <p>Application Sections 4.4, 4.9 and 4.10 Facility Licensing Manual, Environmental Risk Assessment (2016, 2021), Safety Analysis Report, Derived Release Limits document Emergency Preparedness Plan and Response Procedure, Fire Safety Plan, Fire Protection Program</p> | Y         | Y           | Y         |

| Pursuant to Section 6 of the <u><i>Class I Nuclear Facilities Regulations</i></u><br>Licence Applications –<br>Licence to Operate  | Location in Application or Supporting Document(s) as Noted by CFM | Complete? | Sufficient? | Adequate? |
|--|---|-----------|-------------|-----------|
| (l) the proposed measures to prevent acts of sabotage or attempted sabotage at the nuclear facility, including measures to alert the licensee to such acts;                              | Application Section 4.12<br>CFM Security Plan                     | Y         | Y           | Y         |
| (m) the proposed responsibilities of and qualification requirements and training program for workers, including the procedures for the requalification of workers; and                   | Application Section 4.2,<br>Training Program                      | Y         | Y           | Y         |
| (n) the results that have been achieved in implementing the program for recruiting, training and qualifying workers in respect of the operation and maintenance of the nuclear facility. | Application Section 4.2,<br>Training Program                      | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><a href="#">Nuclear Substances and Radiation Devices Regulations</a></u> : Licence Applications – General Requirements   | Location in Application or Supporting Document(s) as Noted by CFM   | Complete? | Sufficient? | Adequate? |
|--|---|-----------|-------------|-----------|
| 3(1) An application for a licence in respect of a nuclear substance or a radiation device, other than a licence to service a radiation device, shall contain the following information in addition to the information required by section 3 of the <u><a href="#">General Nuclear Safety and Control Regulations</a></u> : |   |           |             |           |
| (a) the methods, procedures and equipment that will be used to carry on the activity to be licensed;   | Application Sections 2.3, 4.4, 4.7, 4.9 and 4.10;<br>Facility Licensing Manual, Radiation Protection Program, Environmental Protection Program Emergency Preparedness Plan and Response Procedure | Y         | Y           | Y         |
| (b) the methods, procedures and equipment that will be used while carrying on the activity to be licensed, or during and following an accident, to:  |   |           |             |           |
| (i) monitor the release of any radioactive nuclear substance from the site of the activity to be licensed;   | Application Sections 2.3.5, 4.7 and 4.9<br>Facility Licensing Manual, CFM-RP, CFM-EP, Emergency Preparedness Plan and Response Procedure  | Y         | Y           | Y         |

| Pursuant to Section 3 of the <i><u>Nuclear Substances and Radiation Devices Regulations</u></i> : Licence Applications – General Requirements                           | Location in Application or Supporting Document(s) as Noted by CFM   | Complete? | Sufficient? | Adequate? |
|---|---|-----------|-------------|-----------|
| (ii) detect the presence of and record the radiation dose rate and quantity in becquerels of radioactive nuclear substances at the site of the activity to be licensed; | Application Sections 2.3.5, 4.7 and 4.9; Facility Licensing Manual, Radiation Protection Program, Environmental Protection Program Emergency Preparedness Plan and Response Procedure   | Y         | Y           | Y         |
| (iii) limit the spread of radioactive contamination within and from the site of the activity to be licensed; and  | Application Sections 2.3.5, 4.7 and 4.9; Facility Licensing Manual, Radiation Protection Program, Environmental Protection Program Emergency Preparedness Plan and Response Procedure   | Y         | Y           | Y         |
| (iv) decontaminate any person, site or equipment contaminated as a result of the activity to be licensed.   | Application Sections 2.3.5, 4.7 and 4.9; Facility Licensing Manual, Radiation Protection Program, Environmental Protection Program Emergency Preparedness Plan and Response Procedure   | Y         | Y           | Y         |
| (c) a description of the circumstances in which the decontamination referred to in subparagraph (b)(iv) will be carried out;  | Application Sections 4.4, 4.7, 4.9, 4.10, 4.11; Facility Licensing Manual, Radiation Protection Program, Environmental Protection Program Emergency Preparedness Plan and Response Procedure, Fire Safety Plan, Fire Protection Program | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><i>Nuclear Substances and Radiation Devices Regulations</i></u> : Licence Applications – General Requirements | Location in Application or Supporting Document(s) as Noted by CFM  | Complete? | Sufficient? | Adequate? |
|---|--|-----------|-------------|-----------|
| (d) the proposed location of the activity to be licensed, including a description of the site;  | Application Section 2.2<br>CFM Facility Licenced Area Drawing 05C144<br>Site Map Property Layout Drawing 00A084,<br>CFM Letter Submission of Updated Site Layout Drawings for CFM Fuel Manufacturing. July 13, 2020                          | Y         | Y           | Y         |
| (e) the roles, responsibilities, duties, qualifications and experience of workers;  | Application Section 4.2;<br>CFM-Training Program   | Y         | Y           | Y         |
| (f) the proposed training program for workers;  | Application Section 4.2;<br>CFM-Training Program   | Y         | Y           | Y         |
| (g) the proposed instructions for dealing with accidents, including fires and spills, in which the nuclear substance may be involved;         | Application Sections 4.4, 4.7, 4.9, 4.10;<br>Radiation Protection Program,<br>Environmental Protection Program<br>Emergency Preparedness Plan and Response Procedure,<br>Fire Safety Plan, Fire Protection Program,<br>Waste Management Plan | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><i>Nuclear Substances and Radiation Devices Regulations</i></u> : Licence Applications – General Requirements                 | Location in Application or Supporting Document(s) as Noted by CFM  | Complete? | Sufficient? | Adequate? |
|---|--|-----------|-------------|-----------|
| (h) the proposed inspection program for the equipment and systems that will be used to carry on the activity to be licensed;                                  | Application Sections 4.4, 4.5, 4.6, 4.7, 4.9, 4.10, Facility Licensing Manual, CFM Radiation Protection Program, CFM-Environmental Protection Program, Pressure Retaining Components (MSP 27-16), Preventative Maintenance Execution Management (AP 018) | Y         | Y           | Y         |
| (i) the methods, procedures and equipment that will be used to calibrate radiation survey meters in accordance with these Regulations;                        | Application Sections 2.3.5 and 4.7; CFM-Radiation Protection Program, Sealed Sources (HSI-048)   | Y         | Y           | Y         |
| (j) the methods, procedures and equipment that will be used to calibrate and verify the calibration of dosimeters referred to in paragraphs 30(3)(d) and (e); | Application Sections 2.3.5 and 4.7; CFM-Radiation Protection Program, Sealed Sources (HSI-048)   | Y         | Y           | Y         |
| (k) the methods, procedures and equipment that will be used to conduct the leak tests and surveys required by these Regulations;                              | Application Sections 2.3.5 and 4.7; CFM-Radiation Protection Program, Sealed Sources (HSI-048)   | Y         | Y           | Y         |
| (l) where the application is in respect of a nuclear substance that is an unsealed source and that is to be used in a room, the proposed design of the room;  | Application Sections 2.3.5 and 4.7; CFM-Radiation Protection Program, Sealed Sources (HSI-048)   | Y         | Y           | Y         |

| Pursuant to Section 3 of the <u><a href="#">Nuclear Substances and Radiation Devices Regulations</a></u> : Licence Applications – General Requirements  | Location in Application or Supporting Document(s) as Noted by CFM                              | Complete? | Sufficient? | Adequate? |
|---|--|-----------|-------------|-----------|
| (m) if the application is in respect of a nuclear substance that is contained in a radiation device, the brand name and model number of the radiation device, and the quantity of the devices;  | Application Sections 2.3.5 and 4.7; CFM-Radiation Protection Program, Sealed Sources (HSI-048) | Y         | Y           | Y         |
| (n) where the application is in respect of Category I, II or III nuclear material, as defined in section 1 of the <u><a href="#">Nuclear Security Regulations</a></u> ;   | Not applicable   | -         | -           | -         |
| (i) the measures that will be taken to prevent nuclear criticality; and   | Not applicable <sup>3</sup>  | -         | -           | -         |
| (ii) the information required by section 3 or 4 of the <u><a href="#">Nuclear Security Regulations</a></u> , as applicable.   | Not applicable   | -         | -           | -         |
| (o) if the applicant will be manufacturing or distributing radiation devices referred to in paragraph 5(1)(c) or section 6 or 7, or check sources mentioned in section 8.1, the proposed procedure for the disposal of each radiation device or check source or for its return to the manufacturer. | Not applicable   | -         | -           | -         |

<sup>3</sup> CFM does not possess Cat I, II, or III material, therefore this GNSCR clause is not applicable. CFM documented its nuclear criticality safety control measures in section 4.7.13 of its application.

| Pursuant to Part 2 of the <a href="#">Nuclear Security Regulations</a> : PART 2 SECURITY OF NUCLEAR FACILITIES LISTED IN SCHEDULE 2 – LICENCE APPLICATIONS  | Location in Application or Supporting Document(s) as Noted by CFM | Complete? | Sufficient? | Adequate? |
|---|---|-----------|-------------|-----------|
| 41 An application for a licence in respect of a nuclear facility shall contain, in addition to the information required by sections 3 to 8 of the <a href="#">Class I Nuclear Facilities Regulations</a> , a description of the physical protection measures to be taken to ensure compliance with sections 42 to 48. | Application Section 4.12;<br>CFM Security Plan                    | Y         | Y           | Y         |

### C.3 Technical Basis

The technical basis for the recommendations presented in this CMD are listed in the table below.

#### CFM - Applicable Standards and Codes per Safety and Control Area

| SCA                          | Document Title   | Sufficient? | Adequate? |
|------------------------------|--|-------------|-----------|
| Management System            | CSA N286-12 (reaffirmed 2017): <i>Management System Requirements for Nuclear Facilities</i>  | Y           | Y         |
|                              | <a href="#">CNSC REGDOC-2.1.2 (2018): Safety Culture</a>   | Y           | Y         |
| Human Performance Management | <a href="#">CNSC REGDOC-2.2.2 (2016): Personnel Training, Version 2</a>  | Y           | Y         |
| Operating Performance        | <a href="#">CNSC REGDOC-3.1.2 (2018): Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills</a> | Y           | Y         |
| Physical Design              | CSA B51 (2019): <i>Boiler Pressure Vessel and Pressure Piping Code</i>   | Y           | Y         |
|                              | CSA N393-13 (R2018): <i>Fire Protection for facilities that process, store and handle nuclear substances</i>                                 | Y           | Y         |
|                              | NRCC 56190 (2015): <i>National Building Code of Canada</i>   | Y           | Y         |



| SCA                                      | Document Title  | Sufficient? | Adequate? |
|--|---|-------------|-----------|
|  | NRCC 56192 (2015): <i>National Fire Code of Canada</i>  | Y           | Y         |
| Fitness for Service                      | CSA N393-13 (R2018): <i>Fire Protection for facilities that process, handle or store nuclear substances</i>   | Y           | Y         |
|  | NRCC 56192 (2015): <i>National Fire Code of Canada</i>  | Y           | Y         |
| Radiation Protection                     | <a href="#">CNSC REGDOC-3.1.2 (2018): Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills</a>                                      | Y           | Y         |
| Conventional Health and Safety           | CSA Z94.4 (2018), <i>Selection, Use and Care of Respirators</i>   | Y           | Y         |
| Environmental Protection                 | CSA N288.1 (R2019): <i>Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents for Normal Operation of Nuclear Facilities</i> | Y           | Y         |
|  | CSA N288.4 (R2015): <i>Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills</i>  | Y           | Y         |
|  | CSA N288.5 (R2016): <i>Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills</i>   | Y           | Y         |
|  | CSA N288.6 (R2017): <i>Environmental Risk Assessments at Class I Nuclear Facilities and Uranium Mines and Mills</i>   | Y           | Y         |
|  | CSA N288.8 (2017): <i>Establishing and implementing action levels for releases to the environment from nuclear facilities</i>   | Y           | Y         |
|  | <a href="#">CNSC REGDOC-3.1.2 (2018): Reporting Requirements, Volume I: Non-Power Reactor Class I Facilities and Uranium Mines and Mills</a>                                      | Y           | Y         |
|  | <a href="#">CNSC REGDOC-2.9.1 (2020): Environmental Protection: Policies, Programs and Procedures</a>   | Y           | Y         |
| Emergency Management and Fire Protection | <a href="#">CNSC REGDOC-2.10.1 (2016): Nuclear Emergency Preparedness and Response</a>  | Y           | Y         |
|  | CSA N393-13 (R2018): <i>Fire Protection for facilities that process, handle or store nuclear substances</i>   | Y           | Y         |
|  | NRCC 56190 (2015): <i>National Building Code of Canada</i>  | Y           | Y         |

| SCA                        | Document Title   | Sufficient? | Adequate? |
|----------------------------|--|-------------|-----------|
|                            | NRCC 56192 (2015): <i>National Fire Code of Canada</i>   | Y           | Y         |
| Waste Management           | CSA N292.0-14 (2014): <i>General Principles for the Management of Radioactive Waste and Irradiated Fuel</i>  | Y           | Y         |
|                            | CSA N292.3-14 (2014): <i>Management of Low- and Intermediate –level Radioactive Waste</i>  | Y           | Y         |
|                            | CSA N294-19 (2019): <i>Decommissioning of Facilities Containing Nuclear Substances</i>   | Y           | Y         |
|                            | <a href="#">CNSC G-219, Decommissioning Planning for Licensed Activities</a>   | Y           | Y         |
| Security                   | <a href="#">CNSC REGDOC-2.12.3 (2020): Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1</a> | Y           | Y         |
| Safeguards                 | <a href="#">CNSC REGDOC-2.13.1 (2018): Safeguards and Nuclear Material Accountancy</a>   | Y           | Y         |
| Public Information Program | <a href="#">CNSC REGDOC-3.2.1 (2018): Public Information and Disclosure</a>  | Y           | Y         |
| Financial Guarantee        | <a href="#">CNSC G-206 (2000): Financial Guarantees Guide for the Decommissioning of Licensed Activities</a>                                       | Y           | Y         |

## D. SAFETY AND CONTROL AREA FRAMEWORK

### D.1 Safety and Control Areas Defined

The safety and control areas identified in section 2.2, and discussed in summary in sections 3.1 through 3.14, are comprised of specific areas of regulatory interest which vary between facility types.

The following table provides a high-level definition of each SCA. The specific areas within each SCA are to be identified by the CMD preparation team in the respective areas within section 3 of this CMD

| <b>SAFETY AND CONTROL AREA FRAMEWORK</b> |                                |   |
|--|--------------------------------|---|
| <b>Functional Area</b>                   | <b>Safety and Control Area</b> | <b>Definition</b>   |
| <b>Management</b>                        | Management System              | Covers the framework which establishes the processes and programs required to ensure an organization achieves its safety objectives and continuously monitors its performance against these objectives and fostering a healthy safety culture.  |
|  | Human Performance Management   | Covers activities that enable effective human performance through the development and implementation of processes that ensure a sufficient number of licensee personnel are in relevant job areas and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.                                     |
|  | Operating Performance          | This includes an overall review of the conduct of the licensed activities and the activities that enable effective performance.   |
| <b>Facility and Equipment</b>            | Safety Analysis                | Maintenance of the safety analysis that supports that overall safety case for the facility. Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility and considers the effectiveness of preventative measures and strategies in reducing the effects of such hazards. |
|  | Physical Design                | Relates to activities that impact on the ability of systems, components and structures to meet and maintain their design basis given new information arising over time and taking changes in the external environment into account.   |

| <b>SAFETY AND CONTROL AREA FRAMEWORK</b> |  |  |
|--|--|--|
| <b>Functional Area</b>                   | <b>Safety and Control Area</b>           | <b>Definition</b>  |
|  | Fitness for Service                      | Covers activities that impact on the physical condition of systems, components and structures to ensure that they remain effective over time. This includes programs that ensure all equipment is available to perform its intended design function when called upon to do so. |
| <b>Core Control Processes</b>            | Radiation Protection                     | Covers the implementation of a radiation protection program in accordance with the Radiation Protection Regulations. This program must ensure that contamination and radiation doses received are monitored and controlled and maintained ALARA.                               |
|  | Conventional Health and Safety           | Covers the implementation of a program to manage workplace safety hazards and to protect workers.  |
|  | Environmental Protection                 | Covers programs that identify, control and monitor all releases of radioactive and hazardous substances and effects on the environment from facilities or as the result of licensed activities.  |
|  | Emergency Management and Fire Protection | Covers emergency plans and emergency preparedness programs which exist for emergencies and for non-routine conditions. This also includes any results of exercise participation.   |
|  | Waste Management                         | Covers internal waste-related programs which form part of the facility's operations up to the point where the waste is removed from the facility to a separate waste management facility. Also covers the planning for decommissioning.  |
|  | Security                                 | Covers the programs required to implement and support the security requirements stipulated in the regulations, in their licence, in orders, or in expectations for their facility or activity.   |

| SAFETY AND CONTROL AREA FRAMEWORK |                                  |  |
|-----------------------------------|----------------------------------|--|
| Functional Area                   | Safety and Control Area          | Definition   |
|                                   | Safeguards and Non-Proliferation | Covers the programs and activities required for the successful implementation of the obligations arising from the Canada/IAEA safeguards agreements as well as all other measures arising from the <i>Treaty on the Non-Proliferation of Nuclear Weapons</i> . |
|                                   | Packaging and Transport          | Programs that cover the safe packaging and transport of nuclear substances and radiation devices to and from the licensed facility.  |

## D.2 Specific Areas for this Facility Type

The following table identifies the specific areas that comprise each SCA for a uranium processing facility, as applicable for this licence application:

| <b>SPECIFIC AREAS FOR THIS FACILITY TYPE</b> |                                |   |
|--|--------------------------------|---|
| <b>Functional Area</b>                       | <b>Safety and Control Area</b> | <b>Specific Areas</b>   |
| Management                                   | Management System              | <ul style="list-style-type: none"> <li>▪ Management System</li> <li>▪ Organization</li> <li>▪ Performance Assessment, Improvement and Management Review</li> <li>▪ Change Management</li> <li>▪ Safety Culture</li> <li>▪ Records Management</li> </ul> |
|  | Human Performance Management   | <ul style="list-style-type: none"> <li>▪ Human Performance Programs</li> <li>▪ Personnel Training</li> <li>▪ Work Organization and Job Design</li> <li>▪ Fitness for Duty</li> </ul>  |
|  | Operating Performance          | <ul style="list-style-type: none"> <li>▪ Conduct of Licensed Activity</li> <li>▪ Procedures</li> <li>▪ Reporting and Trending</li> </ul>  |
| Facility and Equipment                       | Safety Analysis                | <ul style="list-style-type: none"> <li>▪ Deterministic Safety Analysis</li> <li>▪ Hazard Analysis</li> <li>▪ Nuclear Criticality Safety</li> </ul>  |
|  | Physical Design                | <ul style="list-style-type: none"> <li>▪ Design Governance</li> <li>▪ Site Characterization</li> <li>▪ Facility Design</li> <li>▪ Structure Design</li> <li>▪ System Design</li> </ul>  |
|  | Fitness for Service            | <ul style="list-style-type: none"> <li>▪ Equipment Fitness for Service/Equipment Performance</li> <li>▪ Maintenance</li> <li>▪ Aging Management</li> <li>▪ Periodic Inspection and Testing</li> </ul>   |
| Core Control Processes                       | Radiation Protection           | <ul style="list-style-type: none"> <li>▪ Application of ALARA</li> </ul>  |

| <b>SPECIFIC AREAS FOR THIS FACILITY TYPE</b> |  |  |
|--|--|--|
| <b>Functional Area</b>                       | <b>Safety and Control Area</b>           | <b>Specific Areas</b>  |
|  |  | <ul style="list-style-type: none"> <li>▪ Worker Dose Control</li> <li>▪ Radiation Protection Program Performance</li> <li>▪ Radiological Hazard Control</li> </ul>   |
|  | Conventional Health and Safety           | <ul style="list-style-type: none"> <li>▪ Performance</li> <li>▪ Practices</li> <li>▪ Awareness</li> </ul>  |
|  | Environmental Protection                 | <ul style="list-style-type: none"> <li>▪ Effluent and Emissions Control (releases)</li> <li>▪ Protection of People</li> <li>▪ Environmental Management System</li> <li>▪ Assessment and Monitoring</li> <li>▪ Environmental Risk Assessment</li> </ul>                             |
|  | Emergency Management and Fire Protection | <ul style="list-style-type: none"> <li>▪ Conventional Emergency Preparedness and Response</li> <li>▪ Nuclear Emergency Preparedness and Response</li> <li>▪ Fire Emergency Preparedness and Response</li> </ul>  |
|  | Waste Management                         | <ul style="list-style-type: none"> <li>▪ Waste Characterization</li> <li>▪ Waste Minimization</li> <li>▪ Waste Management Practices</li> <li>▪ Decommissioning Plans</li> </ul>  |
|  | Security                                 | <ul style="list-style-type: none"> <li>▪ Facilities and Equipment</li> <li>▪ Response Arrangements</li> <li>▪ Security Practices</li> </ul>  |
|  | Safeguards and Non-Proliferation         | <ul style="list-style-type: none"> <li>▪ Nuclear Material Accountancy and Control</li> <li>▪ Access and Assistance to the IAEA</li> <li>▪ Operational and Design Information</li> <li>▪ Safeguards Equipment, Containment and Surveillance</li> <li>▪ Import and Export</li> </ul> |

| <b>SPECIFIC AREAS FOR THIS FACILITY TYPE</b> |                                |  |
|--|--------------------------------|--|
| <b>Functional Area</b>                       | <b>Safety and Control Area</b> | <b>Specific Areas</b>  |
|  | Packaging and Transport        | <ul style="list-style-type: none"><li>▪ Package Design and Maintenance</li><li>▪ Packaging and Transport</li></ul> |



## E. INSPECTIONS

The following table includes inspections conducted at CFM during the previous licence period.

| Inspection title             | SCA(s) covered  |
|------------------------------|---|
| NPFD-CAMECO-CFM-2013-01-21   | Human Performance Management, Radiation Protection, Environmental Protection, Conventional Health and Safety  |
| NPFD- CAMECO -CFM-2013-03-25 | Environmental Protection, Conventional Health and Safety, Radiation Protection  |
| NPFD- CAMECO -CFM-2013-10-07 | Management System   |
| NPFD- CAMECO -CFM-2013-10-21 | Emergency Management and Fire Protection  |
| NPFD- CAMECO -CFM-2013-11-21 | Security  |
| NPFD- CAMECO -CFM-2014-03-05 | Waste Management  |
| NPFD-CFM-2014-05-30          | Safety Analysis   |
| NPFD-CFM-2014-07-14          | Radiation Protection  |
| NPFD-CFM-2015-06-03          | Emergency Management and Fire Protection  |
| NPFD-CFM-2015-10-15          | Packaging and Transport   |
| NPFD-CFM-2015-11-10          | Security  |
| NPFD-CFM-2016-01-18          | Radiation Protection  |
| NPFD-CFM-2016-06-14          | Environmental Protection  |
| CAMECO -CFM-2016-03          | Emergency Management and Fire Protection  |
| CAMECO -CFM-2017-01          | Management System   |
| CAMECO -CFM-2017-02          | Human Performance Management  |
| CAMECO -CFM-2017-03          | Security  |
| CAMECO -CFM-2017-04          | Management System, Fitness for Service, Operating Performance, Radiation Protection, Environmental Protection, Conventional Health and Safety, Emergency Management and Fire Protection |

| <b>Inspection title</b> | <b>SCA(s) covered</b>  |
|-------------------------|--|
| CAMECO -CFM-2018-01     | Emergency Management and Fire Protection   |
| CAMECO -CFM-2018-02     | Waste Management, Conventional Health and Safety   |
| CAMECO -CFM-2019-01     | Management System  |
| CAMECO -CFM-2019-02     | Operating Performance, Fitness for Service, Conventional Health and Safety, Radiation Protection   |
| CAMECO -CFM-2019-03     | Emergency Management and Fire Protection   |
| CAMECO -CFM-2020-01     | Radiation Protection   |
| CAMECO -CFM-2020-02     | Security   |
| CAMECO -CFM-2020-03     | Fitness for Service  |
| CAMECO -CFM-2021-01     | Environmental Protection   |
| CAMECO -CFM-2021-02     | Human Performance Management   |
| CAMECO -CFM-2022-01     | Fitness for Service, Operating Performance, Radiation Protection, Conventional Health and Safety, Human Performance Management, Waste Management |

## PART TWO

**Part Two** provides all relevant information pertaining directly to the licence, including:

1. The current licence;
2. Any proposed changes to the conditions, licensing period, or formatting of an existing licence;
3. The proposed licence; and
4. The draft licence conditions handbook.

## **CURRENT LICENCE**

The current licence is provided on the following pages of this document.



## NUCLEAR FUEL FACILITY LICENCE

### CAMECO CORPORATION FUEL MANUFACTURING FACILITY

---

- I) **LICENCE NUMBER:** FFL-3641.00/2023
- II) **LICENSEE:** Pursuant to section 24 of the *Nuclear Safety and Control Act* this licence is issued to:
- Cameco Fuel Manufacturing Inc.**  
**200 Dorset Street East**  
**Port Hope, Ontario**  
**L1A 3V4**
- III) **LICENCE PERIOD:** This licence is valid from **01 March 2022** to **28 February 2023**, unless suspended, amended, revoked or replaced.

IV) **LICENSED ACTIVITIES:**

This licence authorizes the licensee to:

- (i) operate its nuclear fuel facility for the production of nuclear fuel bundles from depleted, natural, and enriched uranium compounds, (hereinafter “the facility”) at 200 Dorset Street East, Port Hope, in the province of Ontario, as more particularly described in the Cameco Fuel Manufacturing Facility Licensed Area drawing 05C144 Rev 4 dated April 16, 2009;
- (ii) possess, transfer, use, process, import, package, transport, manage store and dispose of the nuclear substances that are required for, associated with, or arise from the activities described in (i); and
- (iii) possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i).

V) **EXPLANATORY NOTES:**

- (i) Unless otherwise provided for in this licence, words and expressions used in this licence have the same meaning as in the *Nuclear Safety and Control Act* and associated Regulations.
- (ii) The content of any appendix attached to this licence forms part of the licence.

- (iii) The Licence Condition Handbook (LCH) for CAMECO FUEL MANUFACTURING INC. provides compliance verification criteria in order to meet the conditions listed in the licence. The LCH also provides information regarding delegation of authority and applicable version control of documents.

## **VI) CONDITIONS:**

### **1. General**

- 1.1 The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis described in the LCH, unless otherwise permitted in this licence.
- 1.2 Changes to the safety and control measures described in the application and the documents needed to support that application are permitted provided that the objective of the licensing basis is met.
- 1.3 Changes that are outside of the licence conditions are not permitted without the prior written approval of the Canadian Nuclear Safety Commission (hereinafter “the Commission”).
- 1.4 The licensee shall, in the event of any conflict or inconsistency between licence conditions, codes or standards or regulatory documents referenced in this licence, direct the conflict or inconsistency to the Commission, or a person authorized by the Commission.

### **2. Management System**

- 2.1 The licensee shall implement and maintain a management system for the facility.
- 2.2 The licensee shall prepare an annual compliance and performance report.
- 2.3 The licensee shall prepare a quarterly compliance report for each calendar quarter.
- 2.4 The licensee shall implement and maintain a process for reporting to the Commission or a person authorized by the Commission that includes reporting of all events required by the *Nuclear Safety and Control Act* and its Regulations, and routine reports on the results of monitoring programs. The process shall define the frequency of the routine reports.
- 2.5 Where any release limit stipulated in Appendix A to this licence is exceeded, the licensee shall:
- (a) notify the Commission, Environment Canada, the Ontario Ministry of the Environment and the Municipality of Port Hope within 24 hours of detecting the event;
  - (b) investigate the cause and the circumstances; and
  - (c) within a time approved by the Commission take corrective action to comply with the release limit stipulated in Appendix A to this licence.
- 2.6 The licensee shall implement and maintain a public information program for the facility, including a public disclosure protocol.
- 2.7 The licensee shall give written notification of any changes to the management system program document prepared to meet condition 2.1.

### **3. Human Performance Management**

3.1 The licensee shall implement and maintain a program for training staff for the facility.

### **4. Operating Performance**

4.1 The licensee shall implement and maintain a program for the safe operation of the facility.

4.2 The operating program shall provide direction for safely operating the facilities and shall reflect the safety analysis referred to in condition 5.1.

4.3 The licensee shall establish and maintain, in addition to any record required to be maintained pursuant to the *Nuclear Safety and Control Act* and its Regulations, full and accurate records to show:

- a) the acquisition of nuclear substances including the quantity received, the form of the substance, and the name of the vendor;
- b) the inventory of all nuclear substances at the facility; and
- c) the disposition of all nuclear substances acquired for use or processed by the facility, including the name and address of the recipient, a copy of the recipient's licence (if applicable), the quantity of nuclear substance, and the date of shipment.

4.4 The licensee shall implement and maintain a pressure boundary program for the facility.

4.5 The licensee shall have a formal agreement with an Authorized Inspection Agency, designated by the Commission as authorized to register, pressure boundary designs and procedures, perform inspections, and perform other applicable functions at the licensed facility.

### **5. Safety Analysis**

5.1 The licensee shall implement and maintain a safety analysis for the facility.

5.2 The licensee shall ensure that all operations with fissionable materials will be carried out in accordance with the requirements set out in the CNSC document RD 327 Nuclear Criticality Safety.

### **6. Physical Design**

6.1 The licensee shall implement and maintain a program for physical design for the facility.

6.2 The licensee shall not make any change to the design of, or equipment at the facility, that would introduce hazards different in nature or greater in probability than those considered by the safety analysis, without the prior written approval of the Commission or a person authorized by the Commission.

### **7. Fitness for Service**

7.1 The licensee shall implement and maintain a program for maintenance for the facility.

7.2 The licensee shall implement and maintain a program for periodic inspection and testing for the facility.

**8. Radiation Protection**

- 8.1 The licensee shall implement and maintain a radiation protection program.
- 8.2 The licensee shall notify the Commission or a person authorized by the Commission within 24 hours of becoming aware that an action level has been exceeded and shall file a written report within 45 working days of becoming aware of the matter.

**9. Conventional Health and Safety**

- 9.1 The licensee shall implement and maintain an occupational health and safety program for the facility.

**10. Environmental Protection**

- 10.1 The licensee shall implement and maintain an environmental protection program for the facility.
- 10.2 The licensee shall control, monitor and record releases of nuclear substances to the environment from the facility such that the releases do not exceed the release limits specified in Appendix A.
- 10.3 The licensee shall control and monitor and record the releases of hazardous substances.
- 10.4 The licensee shall notify the Commission within 24 hours of becoming aware that an action level has been reached (or exceeded) and shall file a written report within 45 working days of becoming aware of the matter.

**11. Emergency Management and Fire Protection**

- 11.1 The licensee shall implement and maintain a program for emergency preparedness to address on-site and off-site events which can affect the facility.
- 11.2 The licensee shall implement and maintain a program for fire protection for the facility.

**12. Waste Management**

- 12.1 The licensee shall implement and maintain a program for waste management for the facility.
- 12.2 The licensee shall maintain a preliminary decommissioning plan (PDP) for decommissioning the facility. This PDP shall be reviewed every five years or when requested by the Commission, or a person authorized by the Commission.

**13. Security**

- 13.1 The licensee shall implement and maintain a program for nuclear security at the facility.

**14. Safeguards and Non-Proliferation**

- 14.1 The licensee shall implement and maintain a safeguards program and undertake all measures required to ensure safeguards implementation at the facility.



14.2 The licensee shall not make changes to operations, equipment or procedures that would affect the implementation of safeguards measures, except with the prior written approval of the Commission, or a person authorized by the Commission.

**15. Packaging and Transport**

15.1 The licensee shall implement and maintain a program for the facility for the receipt, packaging and transport of nuclear and hazardous substances.

**16. Facility-Specific**

**16.1 Financial Guarantee**

The licensee shall maintain in effect a financial guarantee for decommissioning that is acceptable to the Commission.

**16.2 Nuclear Liability Insurance**

The licensee shall maintain nuclear installation liability insurance.

SIGNED at OTTAWA, this 16<sup>th</sup> day of February, 2022.

**Velshi, Rumina**

Digitally signed by Velshi, Rumina  
DN: C=CA, O=GC, OU=CN=CCSN, CN="Velshi, Rumina"  
Reason: I am the author of this document  
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**Rumina Velshi, President**  
**on behalf of the Canadian Nuclear Safety Commission**

**APPENDIX A**  
**RELEASE LIMITS**

**Liquid Releases:**

| <b>Release Source</b> | <b>Substance</b> | <b>Licence Limit</b> | <b>Frequency and Averaging Period</b> |
|-----------------------|------------------|----------------------|---------------------------------------|
| Releases to sewer     | Uranium          | 1.7 mg/L             | Twice Weekly, Composite Discharge     |

**Air Releases:**

| <b>Release Source</b>                             | <b>Substance</b> | <b>Licence Limit</b> | <b>Averaging Period</b> |
|---|------------------|----------------------|-------------------------|
| Process stacks and building ventilation emissions | Uranium          | 10.5 kg              | Annual                  |

## PROPOSED LICENCE CHANGES

### Overview

CFM currently operates the CFM facility under a Nuclear Fuel Facility Licence, FFL-3641.00/2023. The proposed licence incorporates standardized licence conditions in a standard format.

### Licence Format

The current licence is based on the previous licence that was drafted in 2012 and reflects the format and conditions that were used in CNSC licences at that time. During the previous licence period, CNSC has modified the licence format and have introduced a set of standardized conditions for each SCA. Although the CFM licence was renewed in 2022 no changes were made to the licence format or conditions. The proposed CFM fuel facility licence for this renewal has been prepared using the current standardized licence condition format.

### Licence Conditions

The proposed licence incorporates the standardized licence conditions applicable to CFM as a uranium processing facility as developed by CNSC staff. As described in section 1.2 of this CMD, a change to the wording of authorized activity “i” is included in the proposed licence. This change improves alignment with CFM’s operations and does not represent any new/different authorization for CFM.

One other notable change to the proposed Nuclear Fuel Facility Licence for CFM is described below:

- Packaging and transport have been removed as licensing activities from Part IV of the proposed licence. For CFM, these activities are not licenced activities as per the [\*Nuclear Safety and Control Act\*](#) and [\*Packaging and Transport of Nuclear Substances Regulations, 2015 \(PTNSR 2015\)\*](#). Section 26 of the NSCA subjects CFM to the PTNSR, where subsection 6 (1) states that a person may transport a nuclear substance without a licence issued under subsection 24 (2) of the Act for that purpose, except for six conditions (paragraphs 6 (1) (a) to (f) of the PTNSR 2015). CNSC staff have determined that the conditions that would require a licence under paragraphs 6 (1) (a) to (f) of the PTNSR 2015 do not apply to CFM activities.

### Licence Period

CFM has requested a renewal of its licence for a period of 20 years. As discussed in section 5.7 of this CMD, CNSC staff are recommending that the Commission approve the renewal of the CFM licence for the requested period. CNSC staff have concluded that a 20-year licence term is acceptable following an assessment of CFM’s application and supporting documents, and considering CFM’s satisfactory performance history across all SCAs during the previous licence period. Additionally CNSC staff have also given consideration to the risk profile of the CFM facility, the ability of CNSC’s regulatory framework to support a fuel facility licence for a 20-year period, including the continued

ability to provide appropriate public and Indigenous engagement. Based on these considerations, CNSC staff are recommending the Commission approve CFM's request for a renewal of its licence for a 20-year period.

## **PROPOSED LICENCE**

The proposed licence is provided on the following pages of this document.



**DRAFT**

PDF Ref.: e-DOC 6828613

Word Ref.: e-DOC 6726891

File / Dossier: 2.02

## NUCLEAR FUEL FACILITY LICENCE

### CAMECO FUEL MANUFACTURING INC

---

**I) LICENCE NUMBER: FFL-3641.00/2043**

**II) LICENSEE:** Pursuant to section 24 of the *Nuclear Safety and Control Act* this licence is issued to:

**Cameco Fuel Manufacturing Inc  
200 Dorset Street East  
Port Hope, Ontario  
L1A 3V4**

**III) LICENCE PERIOD:** This licence is valid from **01 March 2023** to **28 February 2043**, unless suspended, amended, revoked or replaced.

**IV) LICENSED ACTIVITIES:**

This licence authorizes the licensee to:

- (i) operate its nuclear fuel facility (hereinafter “the facility”), located at 200 Dorset Street East, Port Hope, Ontario, for the production of uranium dioxide pellets and assembly of nuclear fuel bundles, from depleted, natural, and enriched uranium compounds.
- (ii) possess, transfer, use, process, import, manage, store and dispose of the nuclear substances that are required for, associated with, or arise from the activities described in (i) and;
- (iii) possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i).

**V) EXPLANATORY NOTES:**

- (i) Nothing in this licence shall be construed to authorize non-compliance with any other applicable legal obligation or restriction.
- (ii) Unless otherwise provided for in this licence, words and expressions used in this licence have the same meaning as in the *Nuclear Safety and Control Act* and associated Regulations.
- (iii) The Licence Condition Handbook (LCH) for the facility provides compliance verification

criteria used to verify compliance with the conditions set out in this licence. The LCH also provides information regarding applicable versions of documents and a process for version control of codes, standards or other documents that are used as compliance verification criteria.

## **VI) CONDITIONS:**

The licensee shall comply with the following conditions, established pursuant to subsection 24(5) of the *Nuclear Safety and Control Act*.

### **G. General**

#### **G.1 Licensing Basis for Licensed Activities**

The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:

- (i) the regulatory requirements set out in the applicable laws and regulations;
- (ii) the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence; and
- (iii) the safety and control measures described in the licence application and the documents needed to support that licence application;

unless otherwise approved in writing by the Canadian Nuclear Safety Commission (hereinafter "the Commission").

#### **G.2 Notification of Changes**

The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis.

#### **G.3 Financial Guarantee**

The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission.

#### **G.4 Public Information and Disclosure**

The licensee shall implement and maintain a public information and disclosure program.

##### **1. Management System**

1.1 The licensee shall implement and maintain a management system.

##### **2. Human Performance Management**

2.1 The licensee shall implement and maintain a training program.

##### **3. Operating Performance**

3.1 The licensee shall implement and maintain an operating program, which includes a set of operating limits.

3.2 The licensee shall implement and maintain a program for reporting to the Commission or a person authorized by the Commission.

**4. Safety Analysis**

4.1 The licensee shall implement and maintain a safety analysis program.

**5. Physical Design**

5.1 The licensee shall implement and maintain a design program.

5.2 The licensee shall implement and maintain a pressure boundary program and have in place a formal agreement with an Authorized Inspection Agency.

**6. Fitness for Service**

6.1 The licensee shall implement and maintain a fitness for service program.

**7. Radiation Protection**

7.1 The licensee shall implement and maintain a radiation protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

**8. Conventional Health and Safety**

8.1 The licensee shall implement and maintain a conventional health and safety program.

**9. Environmental Protection**

9.1 The licensee shall implement and maintain an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.

**10. Emergency Management and Fire Protection**

10.1 The licensee shall implement and maintain an emergency preparedness program.

10.2 The licensee shall implement and maintain a fire protection program.

**11. Waste Management**

11.1 The licensee shall implement and maintain a waste management program.

11.2 The licensee shall maintain a decommissioning plan.

**12. Security**

12.1 The licensee shall implement and maintain a security program.

**13. Safeguards and Non-Proliferation**

13.1 The licensee shall implement and maintain a safeguards program.

**14. Packaging and Transport**

14.1 The licensee shall implement and maintain a packaging and transport program.



**15. Facility Specific**

**15.1** The licensee shall implement and maintain a nuclear criticality safety program.

**15.2** The licensee shall maintain nuclear installation liability insurance.

SIGNED at OTTAWA, this x day of February, 2023.

---

**Rumina Velshi, President**  
**on behalf of the Canadian Nuclear Safety Commission**

## **DRAFT LICENCE CONDITIONS HANDBOOK**

The draft Licence Conditions Handbook is provided on the following pages of this document.



**DRAFT**

e-Doc 6726887 (Word)  
e-Doc 6829813 (PDF)

# **LICENCE CONDITIONS HANDBOOK**

## **CAMECO FUEL MANUFACTURING INC**

### **Nuclear Fuel Facility Licence**

**FFL-3641.00/2043**

**Revision 0**



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**Licence Conditions Handbook**

**Effective: March 01, 2023**

**LCH-FFL-3641.00/2043**  
**Cameco Fuel Manufacturing Inc**  
**Licence Type**  
**FFL-3641.00/2043**

SIGNED at OTTAWA this X<sup>th</sup> day of February 2023

---

Andrew McAllister  
Director  
Nuclear Processing Facilities Division  
Directorate of Nuclear Cycle and Facilities Regulation  
CANADIAN NUCLEAR SAFETY COMMISSION

**REVISION HISTORY:**

| <b>Effective Date</b> | <b>Rev. #</b> | <b>LCH e-Doc #</b> | <b>Section(s) changed</b> | <b>Description of Changes</b> |
|-----------------------|---------------|--------------------|---------------------------|-------------------------------|
| March 01, 2023        | 0             | 6726887            | N/A                       | Original Document             |

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## INTRODUCTION

The general purpose of the Licence Conditions Handbook (LCH) is to identify and clarify the relevant parts of the licensing basis for each licence condition (LC). This will help ensure that Cameco Fuel Manufacturing Inc (CFM) performs the licensed activities at the CFM facility in accordance with the licensing basis and the intent of the licence. The LCH should be read in conjunction with the licence.

The LCH typically has three parts under each LC: the Preamble, Compliance Verification Criteria (CVC) and Guidance. The Preamble explains, as needed, the regulatory context, background, and/or history related to the LC. CVC are criteria used by Canadian Nuclear Safety Commission (CNSC) staff to verify and oversee compliance with the LC. Guidance is non-mandatory information on how to comply with the LC.

Current versions of the licensing basis publications, licensee documents that require notification of change and guidance documents referenced in the LCH are tracked in the document *CFM-Written Notification Table (for licence FFL-3641.00/2043)* (e-Doc 6748707). This document is controlled by the Nuclear Processing Facilities Division (NPF) and is available to the licensee upon request.

Most CNSC documents referenced in the LCH are available through the [CNSC website](#). The e-access links provided in the LCH (eg., “e-doc xxxxxx”) are references to the internal CNSC electronic filing system, and these links cannot be accessed from outside of the CNSC network. Most licensee documents referenced in the LCH are not publicly available as they contain proprietary information or prescribed information as defined by the [General Nuclear Safety and Control Regulations](#) (GNSCR).

Domestic and international standards (in particular consensus standards produced by the CSA Group) are an important component of the CNSC's regulatory framework. Standards support the regulatory requirements established through the [Nuclear Safety and Control Act](#) (NSCA), its regulations and licences by setting out the necessary elements for acceptable design and performance at a regulated facility or a regulated activity. Standards are one of the tools used by the CNSC to evaluate whether licensees are qualified to carry out licensed activities.

The CNSC offers complimentary access to the [CSA Group suite of nuclear standards](#) through the CNSC website. This access platform allows interested stakeholders to view these standards online through any device that can access the Internet. Standards applicable to the licensees are documented in the CVC or guidance as appropriate.

This LCH has 2 appendices:

- Appendix A: which provides definitions of terms and a list of acronyms used throughout the LCH.
- Appendix B: which provides a list of version controlled documents referenced in the LCH.

Part IV “Licensed Activities” of Nuclear Fuel Facility Licence FFL-3641.00/2043 authorizes the licensee to:

- (i) operate its nuclear fuel facility (hereinafter “the facility”), located at 200 Dorset Street East, Port Hope, Ontario, for the production of uranium dioxide pellets and assembly of nuclear fuel bundles, from depleted, natural, and enriched uranium compounds;
- (ii) possess, transfer, use, process, import, manage, store and dispose of the nuclear substances that are required for, associated with, or arise from the activities described in (i) and;
- (iii) possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i).

CFM is authorized to operate the facility. The facility is located in the Municipality of the Town of Port Hope, Ontario. The plant layout drawings that describe the facility are written notification documents found under LC 5.1.

## GENERAL

### Licence Condition G.1: Licensing Basis for Licensed Activities

**The licensee shall conduct the activities described in Part IV of this licence in accordance with the licensing basis, defined as:**

- (i) the regulatory requirements set out in the applicable laws and regulations;**
- (ii) the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence; and**
- (iii) the safety and control measures described in the licence application and the documents needed to support that licence application**

**unless otherwise approved in writing by the Canadian Nuclear Safety Commission (hereinafter "the Commission").**

#### Preamble

The licensing basis sets the boundary conditions for acceptable performance at a regulated facility or activity, and thus establishes the basis for the CNSC's compliance program with respect of that regulated facility or activity. The degree to which the regulatory requirements are applied should reflect their importance to the health and safety of persons, environment, national security, international obligations to which Canada has agreed, licensee's quality and economic expectations, the complexity of facility or activity, and the possible consequences if accidents occur or the activity is carried out incorrectly.

Where the LC requires the licensee to implement and maintain a particular program, the licensee documents that describe how these safety and control area requirements are implemented at the facility are part of the licensing basis.

#### Compliance Verification Criteria

##### Regulatory Role of the Licensing Basis

The licensing basis is established when the Commission renders its decision regarding the licence application. LC G.1 requires the licensee to conduct the licensed activities in accordance with the licensing basis. For activities that are not in accordance with the licensing basis, the licensee shall take action as soon as practicable to return to a state consistent with the licensing basis, taking into account the risk significance of the situation.

The licensing basis is not intended to unduly inhibit the ongoing management and operation of the facility or the licensee's ability to adapt to changing circumstances and continuously improve, in accordance with its management system.

### **Part (i) of the Licensing Basis**

Part (i) of the licensing basis refers to applicable laws and regulations. There are many federal and provincial acts and regulations, and international laws, agreements, guidelines, etc., applicable to activities performed at CFM.

The laws, regulations and international agreements for which CNSC has a regulatory role include:

- [Nuclear Safety and Control Act](#) (NSCA) and its Regulations;
- [Impact Assessment Act](#) and its Regulations;
- [Canadian Environment Protection Act](#);
- [Nuclear Liability and Compensation Act](#);
- [Transportation of Dangerous Goods Act](#) and its Regulations;
- [Radiation Emitting Devices Act](#);
- [Access to Information Act](#);
- [Canada/IAEA Safeguards Agreements](#);
- *Canada Labour Code, Part II*;
- *Ontario Ministry of the Environment, Conservation and Parks Acts and Regulations*; and
- *Environment and Climate Change Canada Acts and Regulations*.

### **Part (ii) of the Licensing Basis**

Part (ii) of the licensing basis refers to the conditions and the safety and control measures included in the licence and in the documents directly referenced in the licence.

Under the standardized format and content, the licence requires the licensee to implement and maintain certain programs. There are no documents directly referenced in the CFM licence. For the purpose of licence requirement, a program may be a series of documented, coordinated activities, not necessarily a single document.

### **Part (iii) of the Licensing Basis**

Part (iii) of the licensing basis consists of the safety and control measures described in the licence application and in the documents in support of that licence application. The safety and control measures include important aspects of that documentation, as well as important aspects of analysis, design, operation, etc. They may be found in high-level, programmatic licensee documents but might also be found in lower-level, supporting licensee documentation. LC G.1 requires the licensee to conform to, and/or implement, all these safety and control measures.

Part (iii) of the licensing basis also includes the safety and control measures in the standards, codes and CNSC regulatory documents referenced in the application or in the licensee's supporting documentation. Note, however, this does not mean that all details in these referenced

documents are part of the licensing basis; some of these documents may contain administrative, informative or guidance sections that are not considered to be part of the licensing basis.

Applicable licensee documents are listed in the LCH under the heading “Licensee Documents that Require Notification of Change”. Applicable CNSC regulatory documents, CSA standards and other documents are listed in the LCH under the heading “Licensing Basis Publications”. The documents listed in the LCH could cite other documents that also contain safety and control measures. Applicable licensing basis publications are listed in tables in this LCH under the most relevant LC. All “shall” or normative statements in licensing basis publications are considered CVC unless stated otherwise. If any “should” or informative statements in licensing basis publications are also considered CVC, this is also explained under the most relevant LC.

Details that are not directly relevant to safety and control measures for facilities or activities authorized by the licence are excluded from the licensing basis. Details that are relevant to a different safety and control area (i.e., not the one associated with the main document), are only part of the licensing basis to the extent they are consistent with the main requirements for both safety and control areas.

In the event of any perceived or real conflict or inconsistency between two elements of the licensing basis, the licensee shall consult CNSC staff to determine the approach to resolve the issue.

### **CNSC Staff’s Approach to Assessing the Licensing Basis for CFM**

In accordance with LC G.2, CFM will submit relevant documentation for CNSC staff review regarding proposed changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis. This includes, but is not limited to changes to equipment, processes, supporting activities, specific licensee documentation or any other item considered a safety or control measure under the licensing basis. There are specific licensee documents listed in the LCH, which require written notification every time a new version of the document is approved by CFM. CNSC staff will review the information submitted by CFM to confirm Cameco’s assessment that the proposed change remains within the licensing basis. CNSC staff assess a proposed change as being within the licensing basis based on changes or impact on the overall safety at the facility. CFM may proceed with the proposed initiatives if they are found to be within the licensing basis.

Any proposed activity, facility or other change, which CNSC staff consider to be outside the licensing basis, will be discussed with CFM and should Cameco choose to proceed with the change, CNSC staff will submit the matter to the Commission for consideration. If the Commission grants approval to the change, it will become part of the licensing basis for the facility and reflected in updates to the LCH as appropriate.

## Licence Application Documents and Supporting Documents

| Submission Date   | Document Title  | e-Doc   |
|---|---|---------|
| October 4, 2021<br>(revision 1 dated<br>December 23,2021) | Cameco Fuel Manufacturing Renewal of Licence<br>FFOL-3641.0/2023 for a 20-year term, Revision 1 | 6719414 |
| December 14, 2021   | Justification for Licence Term and Production<br>Increase for Cameco Fuel Manufacturing         | 6703852 |

## Guidance

### Guidance Documents

| Document Number | Document Title          | Version |
|-----------------|-------------------------|---------|
| REGDOC-3.5.3    | Regulatory Fundamentals | 2018    |

When the licensee becomes aware that a proposed change or activity might not be in accordance with the licensing basis, it should first seek direction from CNSC staff regarding the potential acceptability of this change or activity. The licensee should take into account that certain types of proposed changes might require significant lead times before CNSC staff can make recommendations and/or the Commission can properly consider them. Guidance for notifications to CNSC related to licensee changes are discussed under LC G.2.

## Licence Conditions G.2: Notification of Changes

**The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis.**

### Preamble

CNSC staff tracks the version history of licensee documents that require written notification of change in: *Cameco Fuel Manufacturing Written Notification Documents Tracking Sheet (Licence FFOL-3641.00/2022)* (e-Doc 4685980) (with the exception of security-related documents).

The objective of the licensing basis, as defined in the LCH under LC G.1, is to set the boundary conditions for acceptable performance at the facility. The licensee is encouraged to make continuous improvements to their programs and documents throughout the licensing period as long as they remain within the licensing basis authorized by the Commission.

### Compliance Verification Criteria

Written notification is a physical or electronic communication from a person authorized to act on behalf of the licensee to the CNSC.

Under the licensee’s management system, a change control process requires justifying changes and the review of changes by relevant stakeholders. Proposed changes with the potential to negatively impact designs, operating conditions, policies, programs, methods, or other elements that are integral to the licensing basis, are documented and written notification of the change shall be provided to the CNSC. Written notifications shall include a summary description of the change, the rationale for the change, expected duration (if not a permanent change), and a summary explanation of how the licensee has concluded that the change remains in accordance with the licensing basis (e.g., an evaluation of the impact on health, safety, security, the environment and Canada’s international obligations). A copy of the revised document shall accompany the notification. All written notifications shall be transmitted to CNSC per established communications protocols.

Many changes for which the licensee shall notify the CNSC are captured as changes to licensee documents under part (iii) of the licensing basis. The LCH identifies specific documents that require written notification under the most relevant LC. However, other documents identified in the application or in the licensee’s supporting documentation may require notification of change if they describe safety and control measures applicable to the licensing basis. For example, if a licensee document in the CVC refers to another document, including a third-party document, without citing the revision # of that document, if that document changes and the licensee uses the revised version, the licensee shall determine if it is necessary to notify the CNSC of the change.

The documents needed to support the licence application may include documents produced by third parties (e.g., reports prepared by third party contractors). Changes to these documents require written notification to the CNSC only if the new version continues to form part of the licensing basis. That is, if the licensee implements a new version of a document prepared by a third party, it shall inform the CNSC of the change(s), per LC G.2. On the other hand, if a third party has updated a certain document, but the licensee has not adopted the new version as part of its safety and control measures, the licensee is not required to inform the CNSC that the third party has changed the document.

Licensee documents listed in the CVC of the LCH are subdivided into categories having different requirements for notification of change:

**Notification Category for Licensee Documents Listed in the LCH**

| Category | Definition  |
|----------|---|
| PN       | Prior Notification - The licensee shall submit the notice to the CNSC prior to implementing the change; typically, the requirement is to submit the proposed changes 30 days prior to planned implementation; however the licensee shall allow sufficient time for the CNSC to review the change proportionate to its complexity and the importance of the safety and control measures being affected |
| NT       | Notification – The licensee shall submit the notice at the time of making the change  |

Notification of some proposed changes (i.e., engineered physical changes, new processes/activities for the facility) may not be best captured through an update to a licensee



document. In these cases, a standalone submission may be made that includes the summary description of the change, the rationale for the change, expected duration (if not a permanent change), and a summary explanation of how the licensee has concluded that the change remains in accordance with the licensing basis.

Changes that are not clearly in the safe direction require further assessment of impact to determine if Commission approval is required in accordance with LC G.1.

## Guidance

For proposed changes that would not be in accordance with the licensing basis, the guidance for LC G.1 applies.

## Licence Condition G.3: Financial Guarantee

**The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission.**

## Preamble

The [General Nuclear Safety and Control Regulations](#) require that a licence application contain a description of any proposed financial guarantee relating to the activity to be licensed.

The licensee’s cost estimate for decommissioning should include all decommissioning activities as per the facility’s most up-to-date preliminary decommissioning plan and reflect the assumed decommissioning strategy and end state of the facility.

The facility’s current financial guarantee is covered by an irrevocable letter of credit for the full value of the estimated decommissioning cost.

## Compliance Verification Criteria

### Licensing Basis Publication

| Document Number | Document Title  | Version | Implementation Date                                       |
|-----------------|---|---------|---|
| G-206           | Financial Guarantees for the Decommissioning of Licensed Activities                                   | 2000    | Implemented   |
| REGDOC-3.3.1    | Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities | 2021    | To be implemented by next revision of financial guarantee |



## Licence Documents that Require Notification of Change

| Document Number | Document Title                   | Notification |
|-----------------|----------------------------------|--------------|
| N/A             | Preliminary Decommissioning Plan | PN           |

The licensee shall report annually to confirm that their financial guarantee for decommissioning remains, valid, in effect and sufficient to meet the decommissioning needs according to the current PDP. The licensee shall submit this report as part of the Annual Compliance Report, or at any time as the Commission may request.

### Guidance

None provided.

## Licence Condition G.4: Public Information and Disclosure

**The licensee shall implement and maintain a public information and disclosure program.**

### Preamble

The [Class I Nuclear Facilities Regulations](#) requires that an application for a licence contain the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed.

The primary goal of a public information and disclosure program is to ensure that information related to the health, safety and security of persons and the environment, and other issues associated with the lifecycle of the nuclear facilities are effectively communicated to the public and Indigenous Peoples. In addition, the program shall include a commitment to a disclosure protocol for ongoing, timely communication of information related to the licensed facility during the course of the licence period.

This LC requires the licensee to implement and maintain a public information and disclosure program to improve the public's level of understanding about CFM's activities.

### Compliance Verification Criteria

#### Licensing Basis Publication

| Document Number | Document Title                    | Version | Implementation Date |
|-----------------|-----------------------------------|---------|---------------------|
| REGDOC-3.2.1    | Public Information and Disclosure | 2018    | Implemented         |

### **Licensee Documents that Require Notification of Change**

| <b>Document Number</b> | <b>Document Title</b>          | <b>Notification</b> |
|------------------------|--------------------------------|---------------------|
| FSD-PGR-PIP-001        | FSD Public Information Program | NT                  |

### **Guidance**

None provided.

## SCA – MANAGEMENT SYSTEM

### Licence Condition 1.1: Management System

**The licensee shall implement and maintain a management system.**

#### Preamble

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain information on the proposed quality assurance program for the activity to be licensed, including the measures to promote and support safety culture.

The [General Nuclear Safety and Control Regulations](#) require that a licence application contain the applicant’s organizational management structure, including the internal allocation of functions, responsibilities and authority.

CSA N286, *Management System Requirements for Nuclear Facilities*, contains the requirements for a management system throughout the life cycle of a nuclear facility and extends to all safety and control areas.

CSA N286.0.1, *Commentary on N286-12, Management System Requirements for Nuclear Facilities*, provides background information concerning certain clauses and requirements in CSA N286. This background information can help the user clarify the context of the CSA N286 requirements.

#### Compliance Verification Criteria

##### Licensing Basis Publications

| Document Number | Document Title   | Version      | Implementation Date |
|-----------------|--|--------------|---------------------|
| CSA N286        | Management System Requirements for Nuclear Facilities* | 2012 (R2017) | Implemented         |
| REGDOC- 2.1.2   | Safety Culture   | 2018         | Implemented         |

\*This document is applicable to all LCs.

### Licensee Documents that Require Notification of Change

| Document Number | Document Title                    | Notification |
|-----------------|-----------------------------------|--------------|
| CFM-MS          | Management System Program Manual* | PN           |
| CFM-FLM         | Facility Licensing Manual*        | PN           |
| MSP 13-02       | Change and Design Control         | NT           |

\*This document is applicable to all LCs.

### Guidance

#### Guidance Documents

| Document Number | Document Title   | Version |
|-----------------|--|---------|
| CSA N286.01     | Commentary on N286-12, Management System Requirements for Nuclear Facilities | 2021    |
| REGDOC-2.1.1    | Management System  | 2019    |

## SCA – HUMAN PERFORMANCE MANAGEMENT

### Licence Condition 2.1: Training Program

**The licensee shall implement and maintain a training program.**

#### Preamble

This LC requires the licensee to develop and implement training programs for workers. It also provides the requirements regarding the program and processes necessary to support responsibilities, qualifications and requalification training of persons at the nuclear facility.

As defined by the [General Nuclear Safety and Control Regulations](#), a worker is a person who performs work that is referred to in a licence. This includes contractors and temporary employees. Training requirements apply equally to these types of workers as to the licensee’s own employees. The GNSCR require that licensees ensure that there are a sufficient number of properly trained and qualified workers to safely conduct the licensed activities.

The [Class I Nuclear Facilities Regulations](#) require that licence applications include the proposed responsibilities of and qualification requirements and training program for workers, including the procedures for the requalification of workers; and the results that have been achieved in implementing the program for recruiting, training and qualifying workers in respect of the operation and maintenance of the nuclear facility.

The [Class I Nuclear Facilities Regulations](#) require every licensee to keep a record of the status of each worker’s qualifications, requalification and training, including the results of all tests and examinations completed in accordance with the licence.

#### Compliance Verification Criteria

##### Licensing Basis Publications

| Document Number | Document Title                | Version | Implementation Date |
|-----------------|-------------------------------|---------|---------------------|
| REGDOC-2.2.2    | Personnel Training, Version 2 | 2016    | Implemented         |

##### Licensee Documents that Require Notification of Change

| Document Number | Document Title                          | Notification |
|-----------------|---|--------------|
| CFM-HR-01       | Systematic Approach to Training Program | PN           |

## Guidance

### Guidance Documents

| Document Number | Document Title           | Version |
|-----------------|--------------------------|---------|
| REGDOC-2.2.5    | Minimum Staff Complement | 2019    |

## SCA – OPERATING PERFORMANCE

### Licence Condition 3.1: Operating Program

**The licensee shall implement and maintain an operating program, which includes a set of operating limits.**

#### Preamble

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain the following information: the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility. The [Nuclear Substances and Radiation Devices Regulations](#) have requirements for records to be kept and retained for nuclear substances.

An operating program includes an up-to-date set of operating limits for the facility and activities authorized under the licence, including: production limits and limits for the possession, use, management, transfer, storage of nuclear substances, and an inventory of nuclear substances possessed under the licensees' operating licence.

#### Compliance Verification Criteria

##### Licence Documents that Require Notification of Change

| Document Number | Document Title                   | Notification |
|-----------------|----------------------------------|--------------|
| CFM-EP          | Environmental Protection Program | PN           |
| CFM-RP          | Radiation Protection Program     | PN           |
| HSI-048         | Sealed Source                    | PN           |

#### Nuclear Substances and Radiation Device

The licensee shall ensure the sealed sources are controlled (by maintaining an inventory of sealed sources and tracking and reporting their transfer) in order to achieve the objectives of REGDOC-2.12.3 *Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material*, Version 2.

The licensee shall notify CNSC staff prior to possessing sources with aggregate activity levels which meet or exceed Category 3 sources as defined in REGDOC-2.12.3.

## Annual Production Limits

The annual production for the facility shall not exceed the following limits:

- 1,650 tonnes of uranium (tU) as uranium dioxide pellets per year.
- The facility may possess natural, depleted and enriched uranium compounds for the purposes and under the conditions, stipulated in the licence.

## Guidance

None provided.

## Licence Condition 3.2: Reporting Requirements

**The licensee shall implement and maintain a program for reporting to the Commission or a person authorized by the Commission.**

## Preamble

This LC requires the licensee to implement and maintain a program for reporting information to the Commission. This includes compliance monitoring, operational performance, responses to unusual events, and notifications of various types.

The [Nuclear Safety and Control Act](#) and its applicable regulations describe reporting to the Commission or a person authorized by the Commission. Reporting requirements are found in sections 29-32 of the [General Nuclear Safety and Control Regulations](#) and section 27 of the NSCA.

The statement “a person authorized by the Commission” in the LCs or the LCH indicates that the Commission may delegate certain authority to CNSC staff. Unless otherwise specified, the delegation of authority by the Commission to act as a person authorized by the Commission (Delegated Officer) is only applied to the incumbents in the following positions:

- Director, Nuclear Processing Facilities Division
- Director General, Directorate of Nuclear Cycle and Facilities Regulation
- Executive Vice-President and Chief Regulatory Officer, Regulatory Operations Branch

## Compliance Verification Criteria

### Licensing Basis Publication

| Document Number | Document Title   | Version | Implementation Date |
|-----------------|--|---------|---------------------|
| REGDOC-3.1.2    | Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills | 2018    | Implemented         |

The annual compliance and performance report covering the period January 1 to December 31 shall be submitted to CNSC staff by March 31 each year.

The licensee shall submit a quarterly compliance report within eight weeks of the end of each quarter, covering the following areas:

- Facility operations;
- Conventional health and safety;
- Radiation protection monitoring data;
- Environmental monitoring data; and
- Public information program summary.

## **Guidance**

None provided.



## SCA – SAFETY ANALYSIS

### Licence Condition 4.1: Safety Analysis Program

**The licensee shall implement and maintain a safety analysis program.**

#### Preamble

The [General Nuclear Safety and Control Regulations](#) require that a licence application contains information that includes a description and the results of any test, analysis or calculation performed to substantiate the information included in the application.

The [Class I Nuclear Facilities Regulations](#) require that a licence application contains information that includes a final safety analysis report demonstrating the adequacy of the design of the nuclear facility, and the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility.

The implementation and maintenance of a safety analysis program includes a process to identify and assess hazards and risks on an ongoing basis. This includes identifying and evaluating new or unforeseen risks that were not considered at the planning and design stages and updating previous risk assessments by replacing important assumptions with performance data. The results of this process will be used to set objectives and targets and to develop preventative and protective measures.

#### Compliance Verification Criteria

##### Licence Documents that Require Notification of Change

| Document Number | Document Title                                       | Notification |
|-----------------|--|--------------|
| N/A             | Safety Analysis Report for Cameco Fuel Manufacturing | PN           |

The licensee shall maintain the safety analysis report to ensure it adequately considers the hazards associated with the facility. The safety analysis shall be a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility and consider the effectiveness of preventative measures and strategies in reducing the effects of such hazards.

The licensee shall establish and maintain a process to periodically review and revise existing risk assessments to ensure, at a minimum of every five years, new risks and lessons learned are incorporated into an updated safety analysis report. This report shall be provided to CNSC staff for review.

#### Guidance

The licensee should establish and maintain one or more safety committees at the facility to periodically assess safety issues related to the operation and modification of the facility. These committees should have among their membership the necessary breadth of knowledge and experience to conduct these assessments. The results of these assessments should feed into the safety analysis report.

## Guidance Documents

| Document Number | Document Title                          | Version |
|-----------------|---|---------|
| IAEA SSR-4      | Safety of Nuclear Fuel Cycle Facilities | 2017    |

## SCA – PHYSICAL DESIGN

### Licence Condition 5.1: Design Program

**The licensee shall implement and maintain a design program.**

#### Preamble

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain the proposed measures, policies, methods and procedures to maintain the nuclear facility. The [Class I Nuclear Facilities Regulations](#) require that a licence application contain a description of the structures, systems and equipment, including the relevant design information for the facility.

A design program ensures that the design of the facility is managed using a well-defined systematic approach. This LC requires that the licensee implement and maintain a design program to confirm that safety-related systems, structures and components (SSCs) and any modifications to them continue to meet their design basis given new information arising over time and taking changes in the external environment into account. It also confirms that SSCs continue to be able to perform their safety functions.

This LC requires that the licensee implement and maintain a design control process to ensure that design outputs (both interim and final) are reviewed, verified and validated against the design inputs and performance requirements, and to ensure that the design inputs are selected such that safety, performance and dependability of the design item are achieved.

CSA N393, *Fire protection for facilities that process, handle, or store nuclear substances*, provides the minimum fire protection requirements for the design, construction, commissioning, operation, and decommissioning of facilities which process, handle, or store nuclear substances, and other hazardous substances that directly relate to the nuclear substances being regulated.

The *National Fire Code of Canada 2015* sets out technical provisions regulating:

- (a) activities related to the construction, use or demolition of buildings and facilities;
- (b) the condition of specific elements of buildings and facilities;
- (c) the design or construction of specific elements of facilities related to certain hazards; and
- (d) protection measures for the current or intended use of buildings.

The *National Building Code of Canada 2015*, sets out technical provisions for the design and construction of new buildings. It also applies to the alteration, change of use and demolition of existing buildings.

## Compliance Verification Criteria

### Licensing Basis Publications

| Document Number | Document Title   | Version      | Implementation Date |
|-----------------|--|--------------|---------------------|
| NRCC 56190      | National Building Code of Canada 2015  | 2015         | Implemented         |
| NRCC 56192      | National Fire Code of Canada 2015  | 2015         | Implemented         |
| CSA N393        | Fire protection for facilities that process, handle, or store nuclear substances | 2013 (R2018) | Implemented         |

### Licensee Documents that Require Notification of Change

| Document Number | Document Title                 | Notification |
|-----------------|--------------------------------|--------------|
| MSP 13-02       | Change and Design Control      | NT           |
| 05C144          | Facility Licenced Area Drawing | PN           |
| 00A084          | Site Map Property Layout       | PN           |

## Guidance

### Guidance Documents

| Document Number | Document Title                               | Version |
|-----------------|--|---------|
| REGDOC-2.5.1    | General Design Considerations: Human Factors | 2019    |

## Licence Conditions 5.2: Pressure Boundary Program and Authorized Inspection Agency

**The licensee shall implement and maintain a pressure boundary program and have in place a formal agreement with an Authorized Inspection Agency.**

### Preamble

A pressure boundary is a boundary of any pressure retaining vessel, system or component of a nuclear or non-nuclear system, where the vessel, system or component is registered or eligible for registration. This LC provides regulatory oversight with regards to the licensee's implementation of a pressure boundary program and holds the licensee responsible for all aspects of pressure boundary registration and inspections. A pressure boundary program is comprised of processes and procedures and associated controls that are required to ensure compliance with the requirements set out in CSA B51, *Boiler, Pressure Vessel, and Pressure Piping Code*.

This LC also ensures that an Authorized Inspection Agency (AIA) will be subcontracted directly by the licensee. An AIA is an organization recognized by the CNSC as authorized to register designs and procedures, perform inspections, and other functions and activities as defined by CSA B51 and its applicable referenced publications.

## Compliance Verification Criteria

### Licensing Basis Publications

| Document Number | Document Title                                    | Version | Implementation Date |
|-----------------|---|---------|---------------------|
| CSA B51         | Boiler, Pressure Vessel, and Pressure Piping Code | 2019    | Implemented         |

### Licensee Documents that Require Notification of Change

| Document Number | Document Title                                  | Notification |
|-----------------|---|--------------|
| N/A             | Authorized Inspection Agency Services Agreement | NT*          |
| MSP 27-16       | Pressure Retaining Components                   | NT           |

\* Termination of the agreement is considered a change that requires prior notification to CNSC.

### Formal Agreement with an Authorized Inspection Agency

The licensee shall always have a valid AIA agreement, and shall adhere to the following:

- (a) the licensee shall arrange for the AIA inspectors to have access to all areas of Cameco's facilities and records, and to the facilities and records of Cameco's pressure boundary contractors and material organizations, as necessary for the purposes of performing inspections and other activities required by the standards;
- (b) the licensee shall provide the inspectors of the AIA with: information, reasonable advance notice and time necessary to plan and perform inspections and other activities required by the standards;
- (c) where a variance or deviation from the standard exists, the licensee shall submit the proposed resolution to the AIA for evaluation; and
- (d) design registration services shall be provided by an AIA legally entitled under the applicable provincial boilers and pressure vessels acts and regulations to register designs in the province of installation.

The licensee shall obtain AIA acceptance for implementation of the licensee's programs and procedures for:

- (a) calibration, repair and maintenance of overpressure protection devices;
- (b) repair and maintenance of mechanical joints; and

- (c) periodic inspection of boilers and pressure vessels designed according to CSA standard B51.

The licensee shall provide a copy of the signed AIA agreement to the CNSC. The licensee shall notify the CNSC in writing of any change to the terms and conditions of the agreement, including termination of the Agreement.

For safety significant systems or components, the licensee shall submit a preliminary report immediately and submit a full report within 21 days on the following:

- a pressure boundary failure, deformation, degradation or leak; and
- the degradation of an over-pressure protection device for the pressure boundary that prevented, or could have prevented, the proper functioning of that device.

**Guidance:**

None provided.

## SCA – FITNESS FOR SERVICE

### Licence Conditions 6.1: Fitness for Service Program

**The licensee shall implement and maintain a fitness for service program.**

#### Preamble

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain information including the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility. It is expected that the licensee will conduct routine maintenance, inspection and testing to ensure that the availability, reliability and effectiveness of facilities and equipment that may impact the health, safety and protection of the environment.

#### Compliance Verification Criteria

##### Licensing Basis Publications

| Document Number | Document Title  | Version         | Implementation Date |
|-----------------|---|-----------------|---------------------|
| CSA N393        | Fire Protection for Facilities that Process, Handle or Store Nuclear Substances | 2013<br>(R2018) | Implemented         |
| NRCC 56192      | National Fire Code of Canada  | 2015            | Implemented         |

##### Licensee Documents that Require Notification of Change

| Document Number | Document Title                                | Notification |
|-----------------|---|--------------|
| AP 018          | Preventative Maintenance Execution Management | NT           |

The maintenance program shall include testing and inspection and shall be performed in such a manner that the availability, reliability, and effectiveness of the facility remain consistent with the design and safety analysis documents submitted in support of the licence application.

The program shall document the frequency that the various maintenance, inspection, and testing are performed.

#### Guidance

None provided.

## SCA – RADIATION PROTECTION

### Licence Condition 7.1: Radiation Protection Program

**The licensee shall implement and maintain a radiation protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.**

#### Preamble

The [Radiation Protection Regulations](#) require that the licensee implement a radiation protection program and also ascertain and record doses for each person who performs any 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. This program shall ensure that doses to workers do not exceed prescribed dose limits and are kept As Low As Reasonably Achievable (ALARA), social and economic factors being taken into account.

The regulatory dose limits are explicitly provided in the [Radiation Protection Regulations](#).

Action levels (ALs) are designed to alert licensees before regulatory dose limits are reached. By definition, if an AL is reached, a loss of control of some part of the associated radiation protection program may have occurred, and specific action is required, as defined in the [Radiation Protection Regulations](#). ALs are not intended to be static and are to reflect operating conditions in the facility.

#### Compliance Verification Criteria

##### Licensing Basis Publications

| Document Number | Document Title   | Version | Implementation Date |
|-----------------|--|---------|---------------------|
| REGDOC-3.1.2    | Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills | 2018    | Implemented         |

##### Licence Documents that Require Notification of Change

| Document Number | Document Title               | Notification |
|-----------------|------------------------------|--------------|
| CFM-RP          | Radiation Protection Program | PN           |

ALs for radiation protection are shown in the table below. In the event of a discrepancy between the table and the licensee documentation upon which they are based, the licensee documentation shall be considered the authoritative source considering that the licensee has followed its own change control process, including providing written notification to CNSC staff.



### Radiation Protection Action Levels

| Parameter       | Period  | Action Level |
|-----------------|---|--------------|
| Whole body dose | Monthly<br>Nuclear Energy Worker                | 1.6 mSv      |
|                 | Quarterly<br>Nuclear Energy Worker              | 1.0 mSv      |
|                 | Quarterly<br>Non-Nuclear Energy Worker          | 0.2 mSv      |
| Skin dose       | Monthly<br>Nuclear Energy Worker                | 20.0 mSv     |
|                 | Quarterly<br>Nuclear Energy Worker              | 5.0 mSv      |
|                 | Quarterly<br>Non-Nuclear Energy Worker          | 2.0 mSv      |
| Extremity Dose  | Quarterly<br>Nuclear Energy Worker              | 55.0 mSv     |
| Urine Analysis  | Bi-Weekly Urine Sample<br>Nuclear Energy Worker | 10 µg U/L    |
| Lung Counting   | Annually<br>Nuclear Energy Worker               | 5 mSv        |

The licensee shall review and, if necessary, revise the ALs specified above at least once every five years in order to validate their effectiveness. The results of such reviews shall be provided to CNSC staff.

### Guidance

#### Guidance Documents

| Document Number | Document Title                                      | Version |
|-----------------|---|---------|
| REGDOC-2.7.1    | Radiation Protection                                | 2021    |
| REGDOC-2.7.2    | Dosimetry, Volume I: Ascertaining Occupational Dose | 2021    |

## CONVENTIONAL HEALTH AND SAFETY

### Licence Condition 8.1: Conventional Health and Safety Program

The licensee shall implement and maintain a conventional health and safety program.

#### Preamble

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain information including the proposed worker health and safety policies and procedures. As a federal regulated site, CFM is also subject to the requirements of Part II of the [Canada Labour Code](#) and [Canada Occupational Health and Safety Regulations](#).

CSA Z94.4, *Selection, Use, and Care of Respirators*, sets out requirements for the selection, use, and care of respirators and for the administration of an effective respiratory protection program in the workplace

#### Compliance Verification Criteria

##### Licensing Basis Publications

| Document Number | Document Title                         | Version | Implementation Date |
|-----------------|--|---------|---------------------|
| CSA Z94.4       | Selection, Use and Care of Respirators | 2018    | Implemented         |

##### Licencee Documents that Require Notification of Change

| Document Number | Document Title            | Notification |
|-----------------|---------------------------|--------------|
| CFM-SH          | Safety and Health Program | PN           |

Employment and Social Development Canada is mandated with overseeing and enforcing compliance with the [Canada Labour Code](#), and its underlying regulations. CNSC staff monitor licensee compliance with its conventional health and safety program, and will take regulatory actions for any potential unsafe work practice situations.

#### Guidance

##### Guidance Documents

| Document Number | Document Title                 | Version |
|-----------------|--------------------------------|---------|
| REGDOC-2.8.1    | Conventional Health and Safety | 2019    |

## SCA – ENVIRONMENTAL PROTECTION

### Licence Condition 9.1: Environmental Protection Program

**The licensee shall implement and maintain an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within seven days.**

#### Preamble

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain the proposed environmental protection policies, procedures, effluent and environmental monitoring programs. The [General Nuclear Safety and Control Regulations](#) require that every licensee take all reasonable precautions to protect the environment and the health and safety of persons and to maintain the security of nuclear facilities and of nuclear substances. The [Radiation Protection Regulations](#) prescribe the radiation dose limits for the general public of 1 mSv per calendar year.

The release of hazardous substances is regulated by the CNSC as well as both the Ontario Ministry of the Environment, Conservation and Parks and Environment and Climate Change Canada through various acts and regulations.

CSA N288.1 *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*, provides guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities.

CSA N288.4 *Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills*, provides requirements for the design and implementation of an environmental monitoring program at nuclear facilities.

CSA N288.5 *Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills*, provides requirements for the design and implementation of an effluent monitoring program at nuclear facilities.

CSA N288.6 *Environmental risk assessments at Class I nuclear facilities and uranium mines and mills*, provides requirements for the performance and maintenance of an environmental risk assessment at nuclear facilities.

CSA N288.7 *Groundwater protection programs at Class I nuclear facilities and uranium mines and mills* provides requirements and guidance, which facilitate groundwater protection at nuclear facilities.

CSA N288.8 *Establishing and implementing action levels for releases to the environment from nuclear facilities*, provides requirements for establishing and implementing action levels at nuclear facilities.

## Compliance Verification Criteria

### Licensing Basis Publications

| Document Number | Document Title   | Version         | Implementation Date |
|-----------------|--|-----------------|---------------------|
| REGDOC-2.9.1    | Environmental Protection: Environmental Principles, Assessments and Protection Measures, Version 1.2   | 2020            | Implemented         |
| REGDOC-3.1.2    | Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills   | 2018            | Implemented         |
| CSA N288.1      | Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities | 2014<br>(R2019) | Implemented         |
| CSA N288.4      | Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills  | 2010<br>(R2015) | Implemented         |
| CSA N288.5      | Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills   | 2011<br>(R2016) | Implemented         |
| CSA N288.6      | Environmental risk assessments at Class I nuclear facilities and uranium mines and mills   | 2012<br>(R2017) | Implemented         |
| CSA N288.7      | Groundwater protection programs at Class I nuclear facilities and uranium mines and mills  | 2015            | Implemented         |
| CSA N288.8      | Establishing and implementing action levels for releases to the environment from nuclear facilities  | 2017            | Implemented         |

### Licensee Documents that Require Notification of Change

| Document Number | Document Title  | Notification |
|-----------------|---|--------------|
| FSD-PGR-EMS-001 | FSD Environmental Management System   | PN           |
| CFM-EP          | Environmental Protection Program  | PN           |
| N/A             | Environmental Risk Assessment for the Cameco Fuel Manufacturing Facility              | PN           |
| N/A             | Derived Release Limits for the Cameco Fuel Manufacturing Facility                     | PN           |
| N/A             | Review of Environmental Action Levels to Support the Environmental Protection Program | PN           |

The licensee shall review and revise the ERA in accordance with CSA N288.6. As part of the ERA review, the licensee shall also review the basis and modelling of public dose estimation, and revise in accordance with CSA N288.1 if necessary. The results of such reviews shall be provided to CNSC staff.

The licensee’s environmental protection program shall ensure the control, monitoring and recording of environmental emissions from the facility such that the releases to the environment do not exceed licence limits as defined below.

#### Release Limits – Liquid

| Release Source    | Substance | Licence Limit | Frequency and Averaging Period    |
|-------------------|-----------|---------------|-----------------------------------|
| Releases to sewer | Uranium   | 1.7 mg/L      | Twice Weekly, Composite Discharge |

#### Release Limits – Air

| Release Source                                    | Substance | Licence Limit | Averaging Period |
|---|-----------|---------------|------------------|
| Process stacks and building ventilation emissions | Uranium   | 1.2 g/hr      | Annual           |

The licensee’s environmental protection program shall have action levels for environmental emissions as shown below. In the event of a discrepancy between the tables and the licensee documentation upon which they are based, the licensee documentation shall be considered the authoritative source considering that the licensee has followed its own change control process, including providing written notification to CNSC staff.

**Action Levels – Gamma, Liquid, and Air Emissions**

| Source                                 | Parameter                         | Action Level        | Averaging Period       |
|--|-----------------------------------|---------------------|------------------------|
| Stack emissions for each process stack | Uranium                           | 2 µg/m <sup>3</sup> | Daily                  |
| Building Ventilation                   | Uranium - PP2                     | 0.4 g/hr            | Daily                  |
|  | Uranium – All other process areas | 1.0 g/hr            | Daily                  |
| Liquid Effluent                        | Uranium                           | 0.1 mg/L            | Twice Weekly Composite |
|  | pH                                | 6.5 ≤ pH ≤ 9.0      | Twice weekly composite |
| Fenceline Gamma: Location #1 and #2    | Gamma                             | 0.2 µSv/hr          | Quarterly              |
| Fenceline Gamma: All other locations   | Gamma                             | 1.0 µSv/hr          | Quarterly              |

The licensee shall review and, if necessary, revise ALs specified above at least once every five years in order to validate their effectiveness. The results of such reviews shall be provided to CNSC staff.

**Guidance**

None provided.

# SCA – EMERGENCY MANAGEMENT AND FIRE PROTECTION

## Licence Condition 10.1: Emergency Preparedness Program

**The licensee shall implement and maintain an emergency preparedness program.**

### Preamble

The [Class I Nuclear Facilities Regulations](#) require measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment, the health and safety of persons and the maintenance of national security, including measures to assist, notify, report to off-site authorities including the testing of the implementation of these measures.

This LC requires the licensee to establish an emergency preparedness program to prepare for, to respond to, and to recover from the effects of accidental radiological/nuclear and/or hazardous substance release. As part of the emergency preparedness program, the licensee shall prepare an onsite emergency plan and establish the necessary organizational structure for clear allocation of responsibilities, authorities, and arrangements for coordinating onsite activities and cooperating with external response organizations throughout all phases of an emergency.

### Compliance Verification Criteria

#### Licensing Basis Publications

| Document Number | Document Title                              | Version | Implementation Date |
|-----------------|---|---------|---------------------|
| REGDOC-2.10.1   | Nuclear Emergency Preparedness and Response | 2016    | Implemented         |

#### Licensee Documents that Require Notification of Change

| Document Number | Document Title                                     | Notification |
|-----------------|--|--------------|
| MSP 30-02       | Emergency Preparedness Plan and Response Procedure | PN           |

### Guidance

None provided.

## Licence Condition 10.2: Fire Protection Program

**The licensee shall implement and maintain a fire protection program.**

### Preamble

Licensees require a comprehensive fire protection program (the set of planned, coordinated, controlled and documented activities) to ensure the licensed activities do not result in an unreasonable risk to the health and safety of persons and to the environment due to fire and to ensure that the licensee is able to efficiently and effectively respond to emergency fire situations.

### Compliance Verification Criteria

#### Licensing Basis Publications

| Document Number | Document Title  | Version      | Implementation Date |
|-----------------|---|--------------|---------------------|
| NRCC 56192      | National Fire Code of Canada  | 2015         | Implemented         |
| NRCC 56190      | National Building Code of Canada  | 2015         | Implemented         |
| CSA N393        | Fire Protection for Facilities that Process, Handle or Store Nuclear Substances | 2013 (R2018) | Implemented         |

#### Licensee Documents that Require Notification of Change

| Document Number | Document Title          | Notification |
|-----------------|-------------------------|--------------|
| MSP 30-07       | Fire Protection Program | PN           |
| MSP 30-03       | Fire Safety Plan        | PN           |

### Guidance

None provided.



## SCA – WASTE MANAGEMENT

### Licence Condition 11.1: Waste Management Program

**The licensee shall implement and maintain a waste management program.**

#### Preamble

The GNSCR require that a licence application contain information related to the in-plant management of radioactive waste or hazardous waste resulting from the licensed activities.

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain the proposed procedures for handling, storing, loading and transporting nuclear substances and hazardous substances.

CSA N292.0 *General Principles for the Management of Radioactive Waste and Irradiated Fuel* specifies common requirements for the management of radioactive waste and irradiated fuel from generation to storage or disposal.

CSA N292.3 *Management of Low- and Intermediate-Level Radioactive Waste* provides requirements specific to the management of low- and intermediate-level radioactive waste in solid, liquid, or gaseous states.

#### Compliance Verification Criteria

##### Licensing Basis Publications

| Document Number | Document Title   | Version | Implementation Date |
|-----------------|--|---------|---------------------|
| CSA N292.0      | General Principles for the Management of Radioactive Waste and Irradiated Fuel | 2014    | Implemented         |
| CSA N292.3      | Management of Low- and Intermediate-Level Radioactive Waste                    | 2014    | Implemented         |

##### Licence Documents that Require Notification of Change

| Document Number | Document Title               | Notification |
|-----------------|------------------------------|--------------|
| FSD-PGR-WM-001  | FSD Waste Management Program | PN           |
| CFM-EP-02       | CFM Waste Management Plan    | PN           |

#### Guidance

##### Guidance Documents

| Document Number | Document Title  | Version |
|-----------------|---|---------|
| REGDOC-2.11     | Framework for Radioactive Waste Management and Decommissioning in Canada, version 2 | 2021    |

#### WASTE MANAGEMENT

## Licence Condition 11.2: Decommissioning Plan

**The licensee shall maintain a decommissioning plan.**

### Preamble

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain information including the proposed plan for the decommissioning of the nuclear facility or of the site. This LC requires that the licensee maintain a decommissioning plan.

A decommissioning plan specifies the strategy for decommissioning and provides an overview of the proposed decommissioning approach. It should be sufficiently detailed to assure that the proposed approach is, in the light of existing knowledge, technically and financially feasible and appropriate in the interests of health, safety, security and the protection of the environment. The decommissioning plan defines areas to be decommissioned and the general structure and sequence of the principle work packages. The decommissioning plan forms the basis for establishing a financial guarantee for decommissioning to ensure that adequate funding will be available.

CSA N294 *Decommissioning of facilities containing nuclear substances* specifies requirements for the decommissioning of licensed facilities and other locations where nuclear substances are managed, possessed, or stored.

### Compliance Verification Criteria

#### Licensing Basis Publications

| Document Number | Document Title  | Version | Implementation Date |
|-----------------|---|---------|---------------------|
| CSA N294        | Decommissioning of Facilities Containing Nuclear Substances | 2019    | Implemented         |

#### Licensee Documents that Require Notification of Change

| Document Number | Document Title                   | Notification |
|-----------------|----------------------------------|--------------|
| N/A             | Preliminary Decommissioning Plan | PN           |

The licensee shall revise the PDP at a minimum every 5 years, or if there are any changes to the facility operations or design that affect the estimated cost of decommissioning. When the PDP is revised, the cost of decommissioning shall be reviewed.

### Guidance

#### Guidance Documents

| Document Number | Document Title                                   | Version |
|-----------------|--|---------|
| G-219           | Decommissioning Planning for Licensed Activities | 2000    |

#### WASTE MANAGEMENT

## SCA – SECURITY

### Licence Condition 12.1: Security Program

The licensee shall implement and maintain a security program.

#### Preamble

The [General Nuclear Safety and Control Regulations](#) require that a licence application contain information including the proposed measures to control access to the site of the activity to be licensed and the nuclear substance, prescribed equipment or prescribed information.

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain information including the proposed measures to prevent acts of sabotage or attempted sabotage at the nuclear facility, including measures to alert the licensee to such acts.

The [Nuclear Security Regulations](#) describe the application of Part 2 of these regulations which is relevant to this licensee.

#### Compliance Verification Criteria

##### Licensing Basis Publications

| Document Number | Document Title  | Version | Implementation Date |
|-----------------|---|---------|---------------------|
| REGDOC-2.12.3   | Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1 | 2020    | Implemented         |

##### Licence Documents that Require Notification of Change

| Document Number | Document Title | Notification |
|-----------------|----------------|--------------|
| MSP 30-01       | Security Plan  | PN           |

#### Guidance

None provided.

## SCA – SAFEGUARDS AND NON-PROLIFERATION

### Licence Condition 13.1: Safeguards Program

**The licensee shall implement and maintain a safeguards program.**

#### Preamble

The [General Nuclear Safety and Control Regulations](#) require the licensee to take all necessary measures to facilitate Canada’s compliance with any applicable safeguards agreement, and defines reporting requirements for safeguards events.

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain information on the licensee’s proposed measures to facilitate Canada’s compliance with any applicable safeguards agreement.

Safeguards is a system of inspection and other verification activities undertaken by the IAEA in order to evaluate a Member State’s compliance with its obligations pursuant to its safeguards agreements with the IAEA.

Canada has entered into a Safeguards Agreement and an Additional Protocol (hereinafter referred to as “safeguards agreements”) with the IAEA pursuant to its obligations under the [Treaty on the Non-Proliferation of Nuclear Weapons](#) (INFCIRC/140). The objective of the Canada-IAEA safeguards agreements is for the IAEA to provide assurance on an annual basis to Canada and to the international community that all declared nuclear materials are in peaceful, non-explosive uses and that there is no indication of undeclared nuclear materials or activities. This conclusion confirms that Canada is in compliance with its obligations under the following Canada-IAEA safeguards agreements:

- (i) *Agreement between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*; and
- (ii) *Protocol Additional to the Agreement between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*.

These are reproduced in information circulars [INFCIRC/164](#) and [INFCIRC/164/Add.1](#).

The scope of the non-proliferation program carried out under this licence is limited to tracking and reporting of foreign obligations and origins of nuclear material. Additionally, the import and export of controlled nuclear substances, equipment and information identified in the [Nuclear Non-proliferation Import and Export Control Regulations](#) require separate authorization from the CNSC, consistent with subsection 3(2) of the *General Nuclear Safety and Control Regulations*. The guidance to seek such an authorization is provided in REGDOC-2.13.2 – *Import and Export*.

## Compliance Verification Criteria

### Licensing Basis Publications

| Document Number | Document Title                              | Version | Implementation Date |
|-----------------|---|---------|---------------------|
| REGDOC-2.13.1   | Safeguards and Nuclear Material Accountancy | 2018    | Implemented         |

### Licensee Documents that Require Notification of Change

| Document Number | Document Title         | Notification |
|-----------------|------------------------|--------------|
| FSD-PGR-SG-01   | FSD Safeguards Program | PN           |

### Guidance

None provided.

## SCA – PACKAGING AND TRANSPORT

### Licence Condition 14.1: Packaging and Transport Program

The licensee shall implement and maintain a packaging and transport program.

#### Preamble

The [Class I Nuclear Facilities Regulations](#) require that a licence application contain information on the proposed procedures for handling, storing, loading and transporting nuclear substances.

The transport of nuclear substances or hazardous substances shall be done in accordance with the requirements of the [Packaging and Transport of Nuclear Substances Regulations, 2015](#), (PTNSR) and [Transportation of Dangerous Goods Regulations](#) (TDGR) set out by Transport Canada.

#### Compliance Verification Criteria

##### Licence Documents that Require Notification of Change

| Document Number | Document Title                   | Notification |
|-----------------|----------------------------------|--------------|
| FSD-PGR-TRN-001 | FSD Packaging and Transportation | PN           |

The licensee shall implement and maintain a packaging and transport program that will be in compliance with all the regulatory requirements set out in the PTNSR and in the TDGR.

Every person who transports or causes to be transported nuclear substances (included in Class 7 of the Schedule to the [Transportation of Dangerous Goods Act](#)) shall act in accordance with the requirements of the TDGR set out by Transport Canada.

The PTNSR provide specific requirements for the design of transport packages, the packaging, marking and labeling of packages and the handling and transport of nuclear substances.

#### Guidance

##### Guidance Documents

| Document Number | Document Title  | Version |
|-----------------|---|---------|
| REGDOC-2.14.1   | Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015 | 2016    |

## FACILITY SPECIFIC

This section contains the specific requirements for licence conditions that are not associated with the Safety and Control Areas.

### Licence Condition 15.1: Nuclear Criticality Program

The licensee shall implement and maintain a nuclear criticality safety program.

#### Preamble

The licence authorizes the licensee to carry out certain activities with respect to enriched uranium.

#### Compliance Verification Criteria

##### Licensing Basis Publications

| Document Number | Document Title             | Version | Implementation Date |
|-----------------|----------------------------|---------|---------------------|
| REGDOC-2.4.3    | Nuclear Criticality Safety | 2019    | Implemented         |

##### Licence Documents that Require Notification of Change

| Document Number | Document Title                            | Notification |
|-----------------|---|--------------|
| CFM-NC          | Nuclear Criticality Safety Program Manual | PN           |

CFM may possess enriched uranium in accordance with the Nuclear Criticality Safety Program Manual. CFM must receive Commission approval prior to processing enriched uranium in a quantity above 0.8 smallest critical mass.

#### Guidance

None provided.

## **Licence Condition 15.2: Nuclear Liability Insurance**

**The licensee shall maintain nuclear installation liability insurance.**

### **Preamble**

None provided.

### **Compliance Verification Criteria**

CFM is required to maintain nuclear installation liability insurance as required under the Nuclear Liability and Compensation Act and to ensure it remains valid and in effect for as long as the facility is designated as a nuclear installation.

### **Guidance**

None provided.



## APPENDIX A - DEFINITIONS AND ACRONYMS

### A.1 Definitions

The following is a list of definitions of words or expressions used in the LCH that may need clarification; they are defined for the purpose of the LCH only. All other terms and expressions used in the LCH are consistent with the definitions provided in the NSCA, the regulations made pursuant to the NSCA, or in the CNSC regulatory document [REGDOC-3.6, \*Glossary of CNSC Terminology\*](#).

**Accept/ed/able/ance** – meets regulatory requirements, which mean it is in compliance with the documents referenced in the LCH.

**Approval** – Commission’s permission to proceed, for situations or changes where the licensee would be:

- not compliant with a regulatory requirements set out in applicable laws and regulations;
- not compliant with a licence condition; and
- not in the safe direction but the objective of the licensing basis is met.

**Boundary Conditions** – procedural, administrative rules and operating limits for ensuring safe operation of the facility based on safety analyses and any applicable regulatory requirements.

**Compliance Verification Criteria** – regulatory criteria used by CNSC staff to verify compliance with the licence conditions.

**Design Basis** – the entire range of conditions for which the nuclear facility is designed, in accordance with established design criteria, and for which damage to the fuel and/or the release of radioactive material is kept within authorized limits.

**Guidance** – guidance in the LCH is non-mandatory information, including direction, on how to comply with the licence condition.

**Implementation Date** – the date that a given document is implemented by the licensee. If the licensee implemented the document at the time of the LCH revision, then “implemented” will be stated.

**Notification Document** – a document which is submitted to the CNSC at the time of implementing the change.

**Prior Notification Document** – a document which is submitted to the CNSC prior to implementing the change.

**Program(s)** – a documented group of planned activities, procedures, processes, standards and instructions coordinated to meet a specific purpose.

**Qualified Staff** – trained licensee staff, deemed competent and qualified to carry out tasks associated with their respective positions.

**Safe Direction** – changes in facility safety levels that would not result in:

- (a) a reduction in safety margins;
- (b) a breakdown of barrier;
- (c) an increase (in certain parameters) above accepted limits;
- (d) an increase in risk;
- (e) impairment(s) of safety systems;
- (f) an increase in the risk of radioactive releases or spills of hazardous substances;
- (g) injuries to workers or members of the public;
- (h) introduction of a new hazard;
- (i) reduction of the defence-in-depth provisions;
- (j) causing hazards or risks different in nature or greater in probability or magnitude than those stated in the safety analysis of the nuclear facility.

**Safety and Control Measures** – measures or provisions which demonstrate that the applicant:

- (i) is qualified to carry on the licensed activities; and
- (ii) has made adequate provision for the protection of the environment, the health and safety of persons, the maintenance of national security and any measures required to implement international obligations to which Canada has agreed.

**Written Notification** – a physical or electronic communication between CNSC staff and a person authorized to act on behalf of the licensee.

## A.2. Acronyms List

| Acronym | Definition   |
|---------|--|
| AIA     | Authorized Inspection Agency                                     |
| ALARA   | As Low As Reasonably Achievable                                  |
| AL      | Action Level   |
| CLC     | Canada Labour Code   |
| CFM     | Cameco Fuel Manufacturing  |
| CNSC    | Canadian Nuclear Safety Commission                               |
| CSA     | Canadian Standards Association                                   |
| CVC     | Compliance Verification Criteria                                 |
| EMS     | Environmental Management System                                  |
| FFL     | Nuclear Fuel Facility Licence                                    |
| FSD     | Fuel Services Division   |
| GNSCR   | <i>General Nuclear Safety and Control Regulations</i>            |
| IAEA    | International Atomic Energy Agency                               |
| LC      | Licence Condition  |
| LCH     | Licence Conditions Handbook                                      |
| mSv     | Millisievert   |
| N/A     | Not Applicable   |
| NEW     | Nuclear Energy Worker  |
| NLCA    | Nuclear Liability and Compensation Act                           |
| NPFD    | Nuclear Processing Facilities Division                           |
| NSCA    | <i>Nuclear Safety and Control Act</i>                            |
| NT      | Notification   |
| PDP     | Preliminary Decommissioning Plan                                 |
| PN      | Prior Notification   |
| PTNSR   | <i>Packaging and Transport of Nuclear Substances Regulations</i> |
| SCA     | Safety and Control Area  |
| SSCs    | Systems, Structures and Components                               |
| TDGR    | <i>Transportation of Dangerous Goods Regulations</i>             |
| µg      | Microgram  |
| µSv     | Microsievert   |

|                 |                 |
|-----------------|-----------------|
| U               | Uranium         |
| UO <sub>2</sub> | Uranium dioxide |

## APPENDIX B – LIST OF VERSION CONTROLLED DOCUMENTS

### B.1 Codes, Standards and Regulatory Documents

| Document     | Document Title   | Revision        |
|--------------|--|-----------------|
| CSA B51      | Boiler, pressure vessel, and pressure piping code  | 2019            |
| CSA N286     | Management systems requirements for nuclear facilities   | 2012<br>(R2017) |
| CSA N286.0.1 | Commentary on N286-12, Management systems requirements for nuclear facilities  | 2021            |
| CSA N288.1   | Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities | 2014<br>(R2019) |
| CSA N288.4   | Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills  | 2010<br>(R2015) |
| CSA N288.5   | Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills   | 2011<br>(R2016) |
| CSA N288.6   | Environmental risk assessments at Class I nuclear facilities and uranium mines and mills   | 2012<br>(R2017) |
| CSA N288.7   | Groundwater protection programs at Class I nuclear facilities and uranium mines and mills  | 2015            |
| CSA N288.8   | Establishing and implementing action levels for releases to the environment from nuclear facilities  | 2017            |
| CSA N292.0   | General principles for the management of radioactive waste and irradiated fuel   | 2014            |
| CSA N292.3   | Management of low- and intermediate-level radioactive waste  | 2014            |
| CSA N294     | Decommissioning of facilities containing nuclear substances  | 2019            |
| CSA N393     | Fire protection for facilities that process, handle, or store nuclear substances   | 2013<br>(R2018) |
| CSA Z94.4    | Selection, use and care of respirators   | 2018            |
| G-206        | Financial Guarantee for the Decommissioning of Licensed Activities   | 2000            |
| G-219        | Decommissioning Planning for Licensed Activities   | 2000            |
| IAEA SSR-4   | Safety of Nuclear Fuel Cycle Facilities  | 2017            |
| NRCC 56190   | National Building Code of Canada 2015  | 2015            |
| NRCC 56192   | National Fire Code of Canada 2015  | 2015            |
| REGDOC-2.1.1 | Management System  | 2019            |
| REGDOC-2.1.2 | Safety Culture   | 2018            |

## APPENDIX B – LIST OF VERSION CONTROLLED DOCUMENTS

| Document      | Document Title  | Revision |
|---------------|---|----------|
| REGDOC-2.2.2  | Personnel Training, Version 2   | 2016     |
| REGDOC-2.2.5  | Minimum Staff Complement  | 2019     |
| REGDOC-2.4.3  | Nuclear Criticality Safety  | 2019     |
| REGDOC-2.5.1  | General Design Considerations: Human Factors  | 2019     |
| REGDOC-2.7.1  | Radiation Protection  | 2021     |
| REGDOC-2.7.2  | Dosimetry, Volume I: Ascertaining Occupational Dose   | 2021     |
| REGDOC-2.8.1  | Conventional Health and Safety  | 2019     |
| REGDOC-2.9.1  | Environmental Protection: Environmental Principles, Assessments and Protection Measures, Version 1.2              | 2020     |
| REGDOC-2.10.1 | Nuclear Emergency Preparedness and Response   | 2016     |
| REGDOC-2.11   | Framework for Radioactive Waste Management and Decommissioning in Canada, Version 2                               | 2021     |
| REGDOC-2.12.3 | Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1           | 2020     |
| REGDOC-2.13.1 | Safeguards and Nuclear Material Accountancy   | 2018     |
| REGDOC-2.14.1 | Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015 | 2016     |
| REGDOC-3.1.2  | Reporting Requirements, Volume I: Non-Power Reactor Class I Nuclear Facilities and Uranium Mines and Mills        | 2018     |
| REGDOC-3.2.1  | Public Information and Disclosure   | 2018     |
| REGDOC-3.3.1  | Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities             | 2021     |
| REGDOC-3.5.3  | Regulatory Fundamentals   | 2018     |
| REGDOC-3.6    | Glossary of CNSC Terminology  | 2016     |

## B.2 Licensee Documents

| Document # | Document Title                                | Notification |
|------------|---|--------------|
| AP 018     | Preventative Maintenance Execution Management | NT           |
| CFM-EP     | Environmental Protection Program              | PN           |
| CFM-EP-02  | CFM Waste Management Plan                     | PN           |
| CFM-HR-01  | Systematic Approach to Training Program       | PN           |

### APPENDIX B – LIST OF VERSION CONTROLLED DOCUMENTS

| <b>Document #</b> | <b>Document Title</b>   | <b>Notification</b> |
|-------------------|---|---------------------|
| CFM-MS            | Management System Program Manual  | PN                  |
| CFM-RP            | Radiation Protection Program  | PN                  |
| CFM-SH            | Safety and Health Program   | PN                  |
| CFM-FLM           | Facility Licensing Manual   | PN                  |
| FSD-PGR-EMS-001   | FSD Environmental Management System   | PN                  |
| FSD-PGR-SG-01     | FSD Safeguards Program  | PN                  |
| FSD-PGR-TRN-001   | FSD Packaging and Transportation  | PN                  |
| FSD-PGR-WM-001    | FSD Waste Management Program  | PN                  |
| HSI-048           | Sealed Source   | PN                  |
| MSP 13-02         | Change and Design Control   | NT                  |
| MSP 27-16         | Pressure Retaining Components   | NT                  |
| MSP 30-01         | Security Plan   | PN                  |
| MSP 30-02         | Emergency Preparedness Plan and Response Procedure                                    | PN                  |
| MSP 30-03         | Fire Safety Plan  | PN                  |
| MSP 30-07         | Fire Protection Program   | PN                  |
| CFM-NC            | Nuclear Criticality Safety Program Manual   | PN                  |
| FSD-PGR-PIP-001   | Public Information Program  | NT                  |
| 05C144            | Facility Licenced Area Drawing  | PN                  |
| 00A084            | Site Map Property Layout  | PN                  |
| N/A               | Authorized Inspection Agency Services Agreement                                       | NT                  |
| N/A               | Safety Analysis Report for Cameco Fuel Manufacturing                                  | PN                  |
| N/A               | Environmental Risk Assessment for the Cameco Fuel Manufacturing Facility              | PN                  |
| N/A               | Derived Release Limits for the Cameco Fuel Manufacturing Facility                     | PN                  |
| N/A               | Review of Environmental Action Levels to Support the Environmental Protection Program | PN                  |
| N/A               | Preliminary Decommissioning Plan  | PN                  |

## APPENDIX B – LIST OF VERSION CONTROLLED DOCUMENTS