



# Cameco Fuel Manufacturing Inc.

Application to Renew Licence for the CFM  
Facility

CNSC Staff Presentation

Commission Hearing  
November 23, 2022  
CMD 22-H12.A



Cameco Fuel Manufacturing Inc. (CFM) Licence Renewal: CMD  
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# Presentation Outline

- Purpose of Hearing
- Facility Overview
- Review of Licence Application
- Regulatory Oversight
- Performance Assessment
- Other Matters of Regulatory Interest
- Indigenous and Public Engagement
- Production Limit and Licence Term
- Conclusions and Recommendations





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# Purpose of Hearing

## **Cameco Fuel Manufacturing Inc. (CFM) has applied to the Commission to:**

- Renew the operating licence for a period of 20 years and increase the facility production limit

## **CNSC staff recommend that the Commission:**

- 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 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
- Renew the operating licence for a period of 20 years, expiry date being February 28, 2043
- Impose a requirement for CFM to provide a mid-term update to the Commission covering all safety and control areas
- Approve CFM's request for an annual production limit increase
- Delegate authority as set out in CMD 22-H12



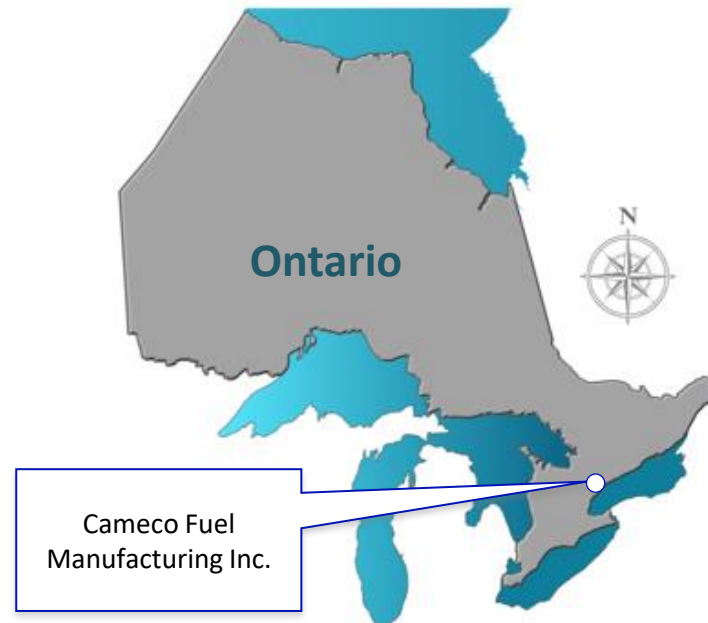
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# FACILITY OVERVIEW



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# Facility Location







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# CFM's Fuel Manufacturing Process

CFM manufactures nuclear fuel pellets from natural and depleted uranium dioxide, and assembles nuclear reactor fuel bundles. CFM is also authorized to process enriched uranium at a small scale.

Uranium dioxide powder



Source: Cameco

Powder  
pressing,  
sintering,  
grinding



Nuclear fuel pellet



Source: Cameco

Pellet loading in  
fuel bundle sub-  
assemblies



CANDU Fuel Bundle



Source: Cameco



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# Current Licence

## The current licence authorizes CFM to:

- Operate its facility for the production of nuclear fuel bundles from depleted natural and enriched uranium compounds
  - Possess, transfer, use, process, import, package, transport, manage store and dispose of the nuclear substances that are required for the production of the nuclear fuel bundles
  - Possess and use prescribed equipment and prescribed information for the purpose of carrying out licensed activities
- Current licence was renewed March 1, 2022, valid until February 28, 2023 (1 year)
  - Previous licence was effective from March 1, 2012 until February 28, 2022 (10 years)



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# Licence Renewal

## CFM's licence application requests the Commission:

- Renew the operating licence for a period of 20 years, effective March 1, 2023 to February 28, 2043
- Approve an annual production limit of 1,650 tonnes of uranium (tU) as uranium dioxide (UO<sub>2</sub>) pellets, for the CFM facility



CFM robot inserting rods into fuel bundle assembly

Source: Cameco





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# REVIEW OF LICENCE APPLICATION



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# CNSC's Review of the Licence Application

## CNSC staff:

- Verified that the information submitted in support of the application is complete in satisfying CNSC regulatory requirements, including the *Nuclear Safety and Control Act* (NSCA) and associated Regulations, for all 14 safety and control areas (SCAs)
- Reviewed CFM's past performance (compliance activities and environmental monitoring)
- Assessed all aspects of CFM's application, including the acceptability of the requested production limit and licence period

CFM's application complies with regulatory requirements



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# Environmental Protection Review Under the NSCA

- CNSC staff conducted an Environmental Protection Review (EPR) under the NSCA to assess the environmental and health effects of the CFM facility
- CNSC staff's assessment was based on information submitted by CFM, as well as technical assessment and independent verification activities conducted by CNSC staff
- The EPR report is available on the [CNSC Website](#) and supports the recommendations in CNSC staff's CMD 22-H12

CFM's measures  
for the protection  
of the  
environment and  
health of persons  
have been  
effective



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# REGULATORY OVERSIGHT



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# Regulatory Oversight Activities

The CNSC has a facility assessment and compliance team that oversees all licensed activities

Activity	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total*
Number of Inspections	0	5	3	3	3	4	2	3	3	2	1	29
Number of Events Reported	2	4	3	4	2	4	1	2	1	1	0	24

\* Values in table are for the previous licence period, from March 1, 2012 to February 28, 2022.

CNSC staff verify completion of corrective actions  
as part of ongoing regulatory oversight



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## Compliance Inspections

- CNSC staff established and carried out a risk-informed inspection compliance plan for CFM
- 29 inspections conducted over 10 years – covered all 14 SCAs
- All inspection findings since 2016 are low safety significance
- Non-compliances tracked by CNSC staff using the CNSC Regulatory Information Bank
- Corrective actions were implemented in a timely manner



*CNSC inspector at CFM  
Source: CNSC*

CFM has implemented corrective actions addressing non-compliances to the satisfaction of CNSC staff





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# Event Reporting

- Licensees must report all events as required by the NSCA, associated Regulations, licence conditions and regulatory documents
- CFM provided 24 reportable event notifications:
  - 10 action level exceedances for Radiation Protection
  - 5 action level exceedances for Environmental Protection
  - 9 other events reported
- All events are of low safety significance
- CFM's event notifications and follow-up reports were acceptable to CNSC staff

CFM met regulatory  
event reporting  
requirements during  
the previous licence  
period



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# PERFORMANCE ASSESSMENT



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# Assessment of Safety and Control Areas (SCA)

- CNSC staff assessed 14 safety and control areas for CFM's licence application
- Information submitted in support of the application satisfies CNSC requirements under the NSCA and its Regulations
- Assessment criteria and results are summarized in CMD 22-H12

CFM's programs meet  
regulatory requirements

## Safety and Control Areas

Management System
Human Performance Management
Operating Performance
<b>Safety Analysis</b>
Physical Design
Fitness for Service
<b>Radiation Protection</b>
<b>Conventional Health and Safety</b>
<b>Environmental Protection</b>
Emergency Management and Fire Protection
<b>Waste Management</b>
Security
Safeguards and Non-Proliferation
Packaging and Transport



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# SCA – Safety Analysis (1/2)

## Program Highlights

### CNSC staff's assessment:

- CFM's Safety Analysis Report identifies facility hazards, analyzes consequences, and identifies mitigation measures
- Safety analysis of hazards demonstrates adequate safety through defence-in-depth
- Increased production limit does not introduce new hazards and therefore does not impact the safety analysis

Safety Analysis Reports are reviewed a minimum of once  
every five years



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## SCA – Safety Analysis (2/2)

### Nuclear Criticality Safety

- CFM is permitted to possess and process enriched uranium in accordance with the licence and has requested continued authorization to carry out small-scale operations involving enriched uranium
- Approval from the Commission is required prior to processing larger quantities of enriched uranium

#### **CNSC staff's assessment:**

- The CFM Nuclear Criticality Safety Program meets the requirements of REGDOC-2.4.3, *Nuclear Criticality Safety*

CNSC staff are satisfied with CFM's performance  
in the Safety Analysis SCA



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# SCA – Radiation Protection (1/2)

## Program Highlights

### CNSC staff's assessment:

- CFM's radiation protection (RP) program meets the *Radiation Protection Regulations*
- CFM's RP program is effective in keeping doses to workers well below CNSC regulatory dose limits
- Action levels are established and exceedances are reported and investigated by Cameco as required

Doses received by CFM workers are monitored, controlled, and maintained ALARA

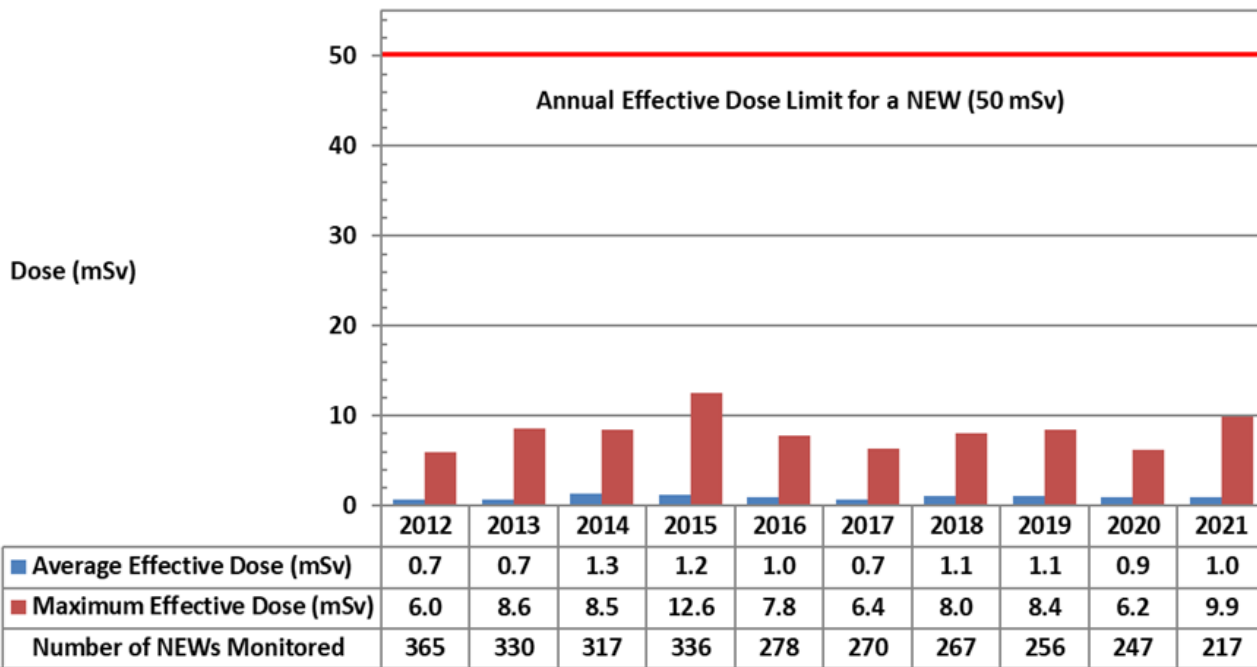




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## SCA – Radiation Protection (2/2)

### Occupational Exposures of CFM Nuclear Energy Workers (NEWs)



Occupational  
exposures to  
NEWs are  
well below  
regulatory limits



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## CMD 22-H12 Erratum

- CMD 22-H12 page 28. Table 3:
  - 2018 maximum internal dose for NEW is documented as 2.7mSv
  - Correct value is 5.6mSv



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# SCA – Conventional Health and Safety

## Program highlights

### CNSC staff's assessment:

- CFM has an effective health and safety program
- CFM has established tools for identifying and controlling hazards
- Employees are trained to identify hazards and the means for minimizing risk
- Safety is maintained through the proper use of personal protective equipment, use of barriers and signage, housekeeping
- One lost time injury in 2015, resulting in one day of lost time during the previous licence period

CNSC staff are satisfied with CFM's performance  
in the Conventional Health and Safety SCA



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# SCA – Environmental Protection (1/5)

## Program Highlights

### CNSC staff's assessment:

- CFM's environmental protection program is implemented effectively and meets regulatory expectations
- The 2016 Environmental Risk Assessment and 2021 update are acceptable and conclude that the human health and ecological risk attributed to CFM operations are low to negligible
- CFM's environmental monitoring program results confirm that the environment and human health are protected

CFM's environmental protection program  
meets regulatory requirements



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# SCA – Environmental Protection (2/5)

## Air Emission Monitoring Results, 2012 - 2021

Total uranium release	Release limit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Process stacks (kg/year)	14*	0.02	0.03	0.01	0.01	0.03	0.01	0.01	0.004	0.01	0.01
Building exhaust ventilation (kg/year)		0.57	0.48	0.40	0.45	0.70	0.57	1.25	1.09	0.92	0.89

\* On March 1, 2022, CFM's licence release limit for atmospheric emissions was reduced to 10.5kg U/yr

Air emissions are well below release limits



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## SCA – Environmental Protection (3/5)

### Liquid Effluent Monitoring Results, 2012 - 2021

	Release limit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<b>Total uranium discharge to sewer (kg/year)</b>	<b>475*</b>	0.95	0.83	1.58	1.24	0.85	0.64	0.84	0.39	0.34	0.29

\*On March 1, 2022, CFM's licence release limit for atmospheric emissions was reduced to 1.7mg/L (equivalent to 62 kg/yr)

Liquid effluent releases are well below release limits





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# SCA – Environmental Protection (4/5)

## Estimated Dose to the Public

### Maximum Annual Effective Dose to a Member of the Public

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dose (mSv)	0.031	0.013	0.018	0.025	0.023	0.022	0.030	0.027	0.020	0.306*

\*2021 change in methodology resulted in increased public dose estimate

Doses for a member of the public are well  
below the regulatory limit of 1 millisievert/year (mSv/yr)



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# SCA – Environmental Protection (5/5)

## Independent Environmental Monitoring Program (IEMP)

- The IEMP complements CNSC's ongoing environmental protection compliance verification activities
- Four IEMP sampling campaigns so far: 2014, 2015, 2017, and 2020
- Samples included soil, air, and water
- All samples analyzed for uranium
- Results are posted on the [IEMP online dashboard](#)

Around CFM, the concentrations of uranium in air, water and soil are all below guideline levels





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# SCA – Waste Management

## Program Highlights

### CNSC staff's assessment:

- CFM has an effective program covering the characterization, segregation, and minimization of radioactive wastes generated on site
- CNSC staff have reviewed the CFM waste management program and determined it meets requirements of CSA Group Standards N292.0-14, and N292.3-14
- During the previous licence period, CFM substantially reduced its on-site inventory of accumulated legacy uranium-contaminated waste and plans are to continue these efforts in the future

CNSC staff are satisfied with CFM's performance in  
the Waste Management SCA



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## OTHER MATTERS OF REGULATORY INTEREST



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# Preliminary Decommissioning Plan

The Preliminary Decommissioning Plan (PDP) captures strategies, activities and cost estimates for decommissioning of the CFM facility.

## CNSC staff's assessment:

CFM's PDP meets the requirements of:

- CSA N294-19, *Decommissioning of facilities containing nuclear substances*
- CNSC Regulatory Guide G-219, *Decommissioning Planning for Licensed Activities*

PDP must be updated and resubmitted every 5 years at a minimum



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## Financial Guarantee

- CFM's financial guarantee was accepted by the Commission earlier in 2022 in association with its decision on the 1-year renewal of the CFM licence
  - The current financial guarantee is in the form of a letter of credit in the amount of \$10.8 million CAD
- The next revision of CFM's financial guarantee is expected in 2026

The financial guarantee is valid, enforceable and sufficient  
to fund CFM's decommissioning strategy





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# INDIGENOUS AND PUBLIC ENGAGEMENT



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# Indigenous Engagement

## CNSC staff engagement activities included:

March/April 2022	Letters of notification with follow-up phone calls and emails. Correspondence providing information about April 13 public webinar and reminder of PFP deadline.
April 28, 2022	Virtual meeting with Curve Lake First Nation
May 19, 2022	Virtual meeting with Mississaugas of Scugog Island First Nation
June 2022	Correspondence providing information about September 14 public webinar
August 10, 2022	Virtual meeting with Métis Nation of Ontario

## Indigenous Nations and Communities:

- 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
- The Métis Nation of Ontario



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# Public Information and Disclosure Program

**CNSC staff have reviewed CFM's Public Information Disclosure Program and determined that it:**

- Identifies clear goals and objectives in terms of dissemination of information
- Identifies target audiences in close proximity to the licensed facility
- Provides contact information for members of the public who want to obtain additional information
- Outlines communication approaches that Cameco will deploy to reach target audiences

Meets regulatory requirements for public information and disclosure



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# Public Engagement

Event	Date
Announcement for Notice of Hearing	March 7, 2022
CNSC Webinar #1	April 13, 2022
Info Mailout	August 15, 2022
CNSC Webinar #2	September 14, 2022
Port Hope Fall Fair	September 16-18, 2022



*CNSC staff at Port Hope fall fair (September, 2022).  
Source: CNSC*



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# Participant Funding Program

Funding was provided to assist Indigenous Nations and communities and members of the public in providing valuable information directly to the Commission.

## **CNSC awarded \$58,352.34 to the following recipients:**

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



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# Interventions

A total of 42 interventions were received in advance of the October 7th deadline.

38 of the interventions support Cameco's licence renewal application.

## Themes from interventions:

- Indigenous engagement and consultation
- Licence period
- Waste management
- Environment and health impacts of a production increase
- Health effects from radiation exposure



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# PRODUCTION LIMIT AND LICENCE PERIOD



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# Production Limit Increase

CFM has requested a production limit of 1,650 tU per year (approximate 24% increase from current limit)

## CNSC staff's assessment

- No equipment or facility modifications required
- No increases to radiological doses to workers are expected
  - Increased production would be achieved by adding personnel to accommodate 7 days/week operations
- No increases to radiological dose to public are expected
  - On-site uranium inventory will continue to be managed to ensure public dose remains well below 1mSv public dose limit
- Conclusions of Environmental Risk Assessment are not impacted

Current safety and control measures are adequate to support the requested production limit





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# Proposed Licence Period (1/3)

## Background and Assessment Criteria

- A 20 year licence period is longer than CNSC licences issued for nuclear fuel cycle facilities.
- Fuel cycle facility licences of 20 years or longer are common internationally
- CMD 02-M12 presents a risk-informed process with criteria for recommending licence periods to the Commission
  - Hazards associated with the licensed activity should be well characterized and appropriately mitigated
  - Consistent and good history of operating experience and compliance should be demonstrated
  - The licence period should align with any significant plans for the future operations of licensed activity



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# Proposed Licence Period (2/3)

## CNSC Staff Regulatory Oversight

- A risk-informed approach to compliance verification that is not dependent on licence duration
- Licence Conditions Handbook clarifies and manages regulatory requirements and is subject to periodic revision by CNSC staff
- Established a comprehensive set of regulatory documents
- Implemented requirements for periodic reviews of key safety documentation
- Introduced periodic Environmental Protection Reviews (EPRs) performed by CNSC staff

CNSC staff regulatory oversight activities are not dependent  
on licence term



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# Proposed Licence Period (3/3)

## Public Engagement

- CNSC employs evolving communication strategies and trust initiatives, including enhanced [CFM facility webpage](#) and [CFM EPR report](#)

## Indigenous Engagement

- CNSC continues to build strong relationships with Indigenous Nations and communities through Terms of Reference, IEMP opportunities, etc.

## Commission Involvement

- Ongoing scheduled and unscheduled reporting during licence period
- Commission review/approval of financial guarantee updates

CNSC staff recommend a performance update from CFM at the mid-term of the licence period



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# CONCLUSIONS AND RECOMMENDATIONS



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# Conclusions

**Based on the technical assessment of CFM's application and supporting information, CNSC staff conclude that:**

- The application complies with the regulatory requirements
- The licensee's performance during the current licence period was satisfactory and met regulatory requirements



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# Recommendations

## CNSC staff recommend that the Commission:

- 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 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
- Renew the operating licence for a period of 20 years, expiry date being February 28, 2043
- Impose a requirement for CFM to provide a mid-term update to the Commission covering all safety and control areas
- Approve CFM's request for an annual production limit increase
- Delegate authority as set out in CMD 22-H12



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