



# Regulatory Oversight Report for Uranium Mines and Mills in Canada: 2019

Commission Meeting  
December 10, 2020  
CMD 20-M25.A



CNSC Staff Presentation

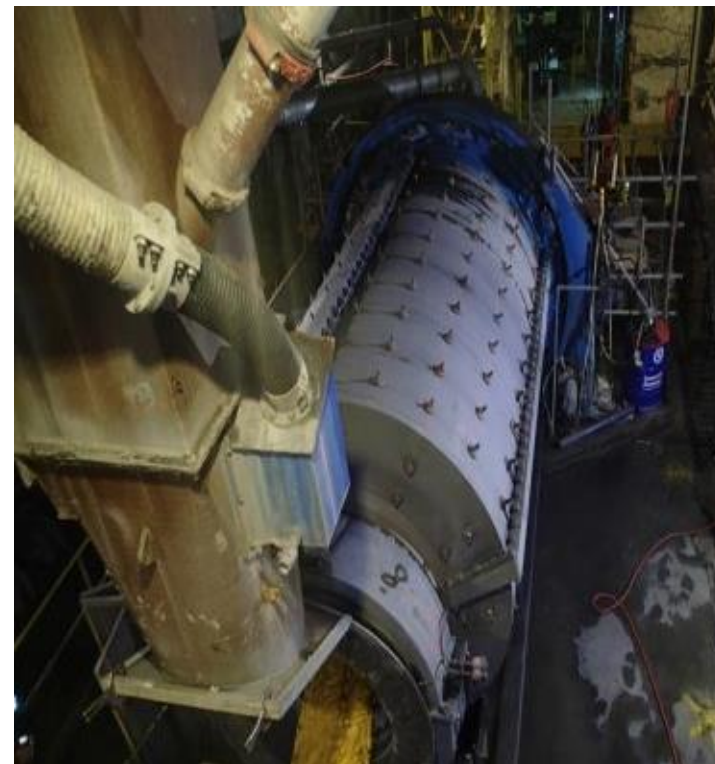




Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Presentation Outline

- Overview
- Uranium mine and mill facilities
- CNSC regulatory efforts
- CNSC staff assessments
- Other matters of regulatory interest
- Conclusions



SAG mill used to grind ore at the McArthur River Operation. (Photo source: CNSC)



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## CNSC Regulatory Oversight Reports - 2019

- November 4, 2020: Use of Nuclear Substances in Canada
- December 8 to 10, 2020:
  - Canadian Nuclear Laboratories Sites
  - Uranium Processing and Nuclear Substance Processing Facilities
  - Uranium Mines and Mills
  - Canadian Nuclear Power Generating Sites



Commission Meeting, December 10, 2020

CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

# OVERVIEW



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Improvements and Status of Previous Actions (1/3)

- **2017 ROR:**

- Plain language summary

- **2018 ROR:**

- Orano's engagement strategy
- CNSC working agreements with Saskatchewan





Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Improvements and Status of Previous Actions (2/3)

- 2017 ROR:
  - Plain language summary
- **2018 ROR:**
  - Orano's engagement strategy
  - CNSC working agreements with Saskatchewan







Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Improvements and Status of Previous Actions (3/3)

- 2017 ROR: Plain language summary
- 2018 ROR: Orano's engagement strategy
- **2018 ROR: CNSC working agreements with Saskatchewan**
  - *Working agreements between the:*
    - ❖ *AECB and the Saskatchewan Environment and Resource Management (1993)*
    - ❖ *AECB and Saskatchewan Environment and Resource Management (1996)*
    - ❖ *Government of Saskatchewan and the CNSC Respecting the Regulation of Uranium Mining and Milling Facilities in Saskatchewan (2000)*
    - ❖ *CNSC-Saskatchewan Administrative Agreement for the Regulation of Health, Safety and the Environment at Saskatchewan Uranium Mines and Mills (2003)*



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## CNSC Regulatory Oversight

- Includes licensing, compliance and reporting to the Commission
- Compliance is completed through:
  - Inspection/verification activities
  - Review of operational activities and documentation
  - Review of licensee reports and events
- Effort is commensurate with risk



**Risk-informed and performance-based approach**





Commission Meeting, December 10, 2020

CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

# URANIUM MINE AND MILL FACILITIES



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Operating Mine and Mill Facilities



Sites in **RED** are operating facilities; sites in **BLACK** are in care and maintenance

### Orano Canada Inc.

- McClean Lake Operation (mine/mill)

### Cameco Corporation

- Cigar Lake Operation (mine)
- McArthur River Operation (mine)
- Rabbit Lake Operation (mine/mill)
- Key Lake Operation (mill)



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Uranium Mines and Mills Licences

Licensee/site/licence #	Licence effective	Last licence amendment	Licence expiration
Cameco Corporation, <b>Cigar Lake Operation</b> UML-MINE-CIGAR.00/2021	2013.07.01	---	2021.06.30
Cameco Corporation, <b>McArthur River Operation</b> UML-MINE-McARTHUR.01/2023	2013.11.01	2019.06.26	2023.10.31
Cameco Corporation, <b>Rabbit Lake Operation</b> UMOL-MINEMILL-RABBIT.00/2023	2013.11.01	---	2023.10.31
Cameco Corporation, <b>Key Lake Operation</b> UML-MILL-KEY.01/2023	2013.11.01	2020.07.29	2023.10.31
Orano Canada Inc., <b>McClellan Lake Operation</b> UMOL-MINEMILL-McCLEAN.01/2027	2017.07.01	2018.07.17	2027.06.30



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Cigar Lake Mine

- No licensing or LCH changes
- Ongoing high-grade ore production and shipment of ore to McClean Lake mill
- **No** action level exceedances
- **Three** reportable events



Cigar Lake Operation uranium mine, operated by Cameco Corporation, is located approximately 660 kilometres north of Saskatoon, Saskatchewan. (Photo source: Shaw Global)



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## McArthur River Mine

- Updated financial guarantee (approved June 2019)
- Indefinitely suspended operations in 2018
- Care and maintenance activities in place to ensure safety of workers, the public and protection of the environment
- **No** action level exceedances
- **One** reportable event



Cameco Corporation operates the McArthur River mine located approximately 620 kilometres north of Saskatoon, Saskatchewan. (Photo source: Cameco)

Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills



## Rabbit Lake Mine and Mill

- No licensing or LCH changes
- Indefinitely suspended operations in 2016
- Reclamation activities continue
- Care and maintenance activities in place to ensure safety of workers, the public and protection of the environment
- **No** action level exceedances
- **No** reportable events



Cameco Corporation operates the Rabbit Lake mine and mill facility located 750 kilometres north of Saskatoon, Saskatchewan. (Photo source: CNSC)



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills



## Key Lake Mill

- No licensing or LCH changes
- Indefinitely suspended operations in 2018
- Care and maintenance activities in place to ensure the safety of workers, the public and protection of the environment
- **No** action level exceedances
- **Four** reportable events



Owned and operated by Cameco Corporation, Key Lake is located approximately 570 kilometres north of Saskatoon, Saskatchewan. (Photo source: Cameco)





Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## McClean Lake Mine and Mill

- No licensing or LCH changes
- Continued processing of uranium ore slurry received from Cameco's Cigar Lake mine
- November 2019, Orano requested to expand the JEB TMF
  - CNSC staff will make a recommendation on this matter at a future Commission hearing
- **Two** action level exceedances
- **Three** reportable events



McClean Lake Operation, located approximately 750 kilometres north of Saskatoon, Saskatchewan, is operated by Orano Canada Inc. (Photo source: Orano)



Commission Meeting, December 10, 2020

CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

# CNSC REGULATORY EFFORTS



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills



## CNSC Regulatory Efforts: Uranium Mine and Mill Facilities

	Cigar Lake	McArthur River	Rabbit Lake	Key Lake	McClean Lake	Total
Person days for compliance	280.6	107.5	109.3	110.0	251.4	858.8
Person days for licensing	3.2	48.5	29.4	19.6	68.2	168.9
Number of inspections	6	4	3	3	4	20
Inspection non-compliances	9	7	0	4	3	23

**All non-compliances have been closed**



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## CNSC Regulatory Efforts: **CNSC Staff Site Licensing Efforts**

- CMD 19-H105 recommended an amendment to the McArthur River licence, UML-MINE-MCARTHUR.01/2023, to update the financial guarantee
- CNSC staff also worked on amendments to:
  - **Key Lake: UML-MILL-KEY.01/2023**
  - **Rabbit Lake: UMOL-MINEMILL-RABBIT.00/2023**
- CNSC staff also ensured that Licence Condition Handbooks remained up to date as REGDOCs were introduced or revised



Commission Meeting, December 10, 2020

CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

# CNSC STAFF ASSESSMENTS



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills



## Safety and Control Area Performance

- CNSC staff use expert judgement and rate performance based on multiple inputs, including:
  - Key performance indicators
  - Results of compliance activities
  - Repeat of non-compliance and effectiveness of licensee actions
- Ratings represent a holistic summary of each SCA



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills



# 2019 Uranium Mines and Mills Performance Ratings

CNSC staff’s review of key performance indicators resulted in a rating of **“satisfactory”** for all operating mines and mills

Safety and control area	Cigar Lake	McArthur River	Rabbit Lake	Key Lake	McClellan Lake
Management system	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA
Safety analysis	SA	SA	SA	SA	SA
Physical design	SA	SA	SA	SA	SA
Fitness for service	SA	SA	SA	SA	SA
Radiation protection	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA
Security	SA	SA	SA	SA	SA
Safeguards and non-proliferation	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA





Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Radiation Protection Performance

- Licensees' radiation programs and practices were effective in controlling radiological hazards
- As low as reasonably achievable (ALARA) initiatives provided enhanced radiation protection
- Action levels ensured detection of potential problems
- Radiation doses received by workers and the public were well below regulatory limits

**CNSC staff's compliance activities verified radiation doses were kept ALARA**



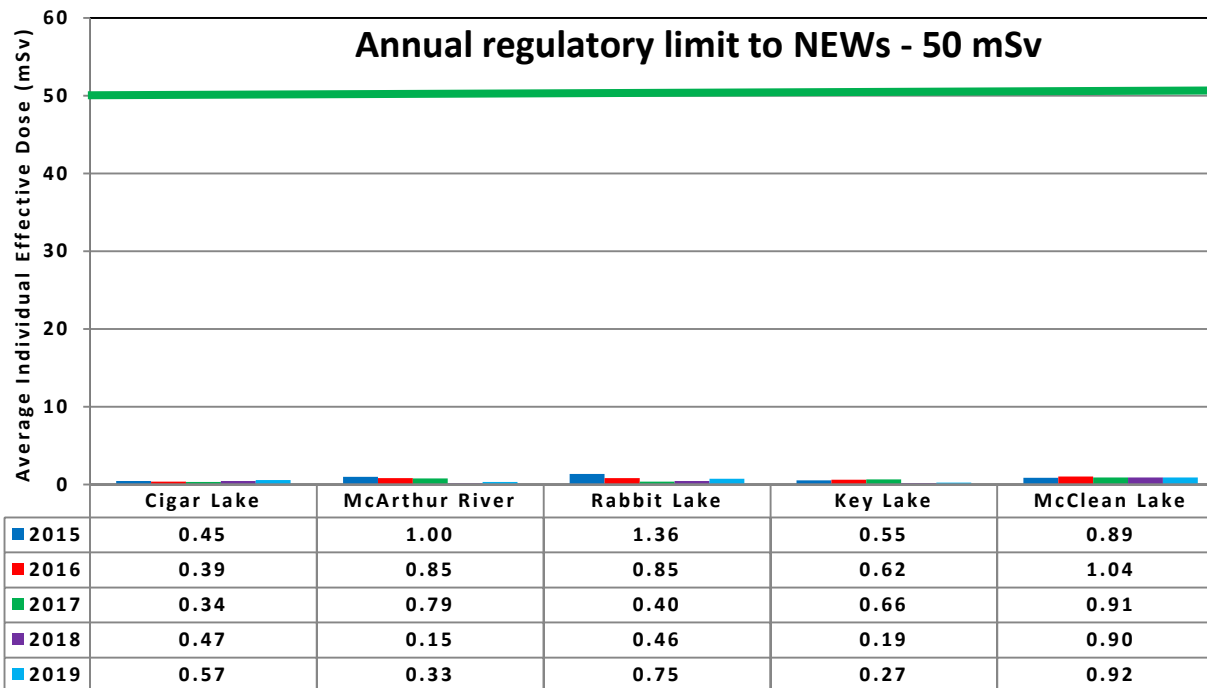
CNSC staff taking dose rate measurements at the McArthur River Operation. (Photo source: CNSC)



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

# Radiation Protection Performance

## Average Individual Effective Dose (mSv)





Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Environmental Protection Performance

- Licensees are required to implement environmental protection programs
- Action levels ensure early detection of potential problems
- No exceedances of regulatory release limits

**CNSC staff's compliance activities verified the environment continues to remain protected**



McArthur River – Treated water flow path.  
(Photo source: CNSC)



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Environmental Protection Performance **Exceedances (1/2)**

### **Two action level exceedances at McClean Lake:**

**1**

#### Action level exceedance – TSS in treated effluent

- Treated effluent from Pond C discharged to Sink Reservoir with TSS exceeding action level
- Discharge was rerouted to TMF
- Work instructions were updated to eliminate future occurrences
- No measurable impact on the environment



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Environmental Protection Performance **Exceedances (1/2)**

### **Two action level exceedances at McClean Lake (cont'd):**

2

Authorized level exceedance – SO<sub>2</sub> in ambient air

- During start up of sulphuric acid plant, elevated SO<sub>2</sub> emissions led to temporary elevated ambient SO<sub>2</sub> concentrations in air
- Work instructions were updated to eliminate future occurrences
- No measurable impact on workers or the environment



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

Environmental Protection Performance

## 2019 Treated Effluent Annual Average Concentrations

**All effluent discharge concentrations were below:**

- *Metal and Diamond Mining Effluent Regulations*
- Licence discharge limits
- Site specific action levels

**Treated effluent concentrations met regulatory requirements**



Commission Meeting, December 10, 2020

CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## OTHER MATTERS OF REGULATORY INTEREST





Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Financial Guarantees

- Established to ensure sufficient funds are available to decommission a facility in the event that a licensee is unable to carry out the decommissioning themselves
- CNSC verifies that financial guarantees are sufficient, valid and in effect

**Financial guarantees are a licence requirement and must be accepted by the Commission**



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

# Indigenous and Community Engagement

## What we heard in previous years:

- Include a plain language summary
- Provide more time for review
- Hold dedicated information session on technical aspects of the ROR data

**CNSC staff remain committed to building long-term positive relationships with Indigenous communities**



CNSC staff presenting information to the EQC members on September 4, 2019 in Prince Albert, SK. (Photo source: CNSC)



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

## Public Information

### **REGDOC-3.2.1, *Public Information and Disclosure* sets out guidance and requirements for licensees**

- CNSC staff confirm licensees have:
  - Continued communication with interested communities
  - Updated websites for events at their facility
  - Held workshops with Athabasca collaboration agreement communities





Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2018 ROR for Uranium Mines and Mills

## Eastern Athabasca Regional Monitoring Program (EARMP) (2/2)

- As part of the community program, samples were collected from September to December 2018
- All samples were collected independently by, or with, the aid of community members

**2018/2019 EARMP concluded that consumption of local water and traditional country foods is safe**



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills

# CONCLUSIONS



Commission Meeting, December 10, 2020  
CMD 20-M25.A – 2019 ROR for Uranium Mines and Mills



## Conclusions

### **CNSC staff confirmed that in 2019 all facilities had:**

- Satisfactory performance
- Comprehensive radiation protection programs that adequately control radiation exposures, keeping doses ALARA
- Environmental protection programs to protect the environment
- Comprehensive health and safety programs to protect workers





Commission Meeting, December 10, 2020  
CMD 20-M25 – 2019 ROR for Uranium Mines and Mills



## 2020 Regulatory Focus

### **CNSC staff will continue to:**

- Implement regulatory oversight using a risk-informed approach
- Contribute to outreach and engagement with Indigenous groups and the public
- Work constructively with Provincial and local governments

**CNSC mandate to protect the environment, the health and safety of workers, and the public**



Commission Meeting, December 10, 2020  
CMD 20-M25 – 2019 ROR for Uranium Mines and Mills

## 2020 Regulating Under COVID-19 Restrictions

- Refer to CMD 20-M36 for more information on CNSC response to COVID-19 and modified oversight approach for the nuclear fuel cycle program
- Licensees implemented business continuity plans, moved operating facilities to safe shutdown state and reduced onsite workforce to essential workers only
- Licensees implemented protective barriers around workspaces, enhanced hygiene practices, screening protocols and physical distancing requirements
- CNSC staff continued:
  - Inspections using a combination of remote and onsite methods
  - Conduct of desktop reviews of licensee reports and submissions
  - Remote engagement with applicants and licensees
  - Remote engagement with Indigenous groups

**Safety and security maintained at all times**



Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire

Canada

## Connect With Us

Join the conversation



[nuclearsafety.gc.ca](http://nuclearsafety.gc.ca)

