



Regulatory Oversight Report for Uranium Mines, Mills, Historic and Decommissioned Sites in Canada: 2017

Commission Meeting
December 12, 2018
CMD 18-M48.A



CNSC Staff Presentation



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CMD 18-M48.A – 2017 ROR for Uranium Mines, Mills, Historic and Decommissioned Sites

CNSC Regulatory Oversight Reports Presented in 2018

- Research Reactors and Class 1B Accelerators – August 23, 2018
- Use of Nuclear Substances in Canada – October 3, 2018
- Canadian Nuclear Power Generating Sites – November 8, 2018
- **Uranium Mines, Mills, Historic and Decommissioned Sites in Canada – December 12, 2018**
- Uranium and Nuclear Substance Processing Facilities in Canada – December 13, 2018

Reporting on licensee performance resulting from CNSC oversight



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Errata – Page 41, CMD 18-M48

- Figure 3.3, bar chart for collective dose totals in 2013 and 2014 do not correctly display data



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Regulatory Oversight Report for Uranium Mines, Mills, Historic and Decommissioned Sites in Canada: 2017

Highlights:

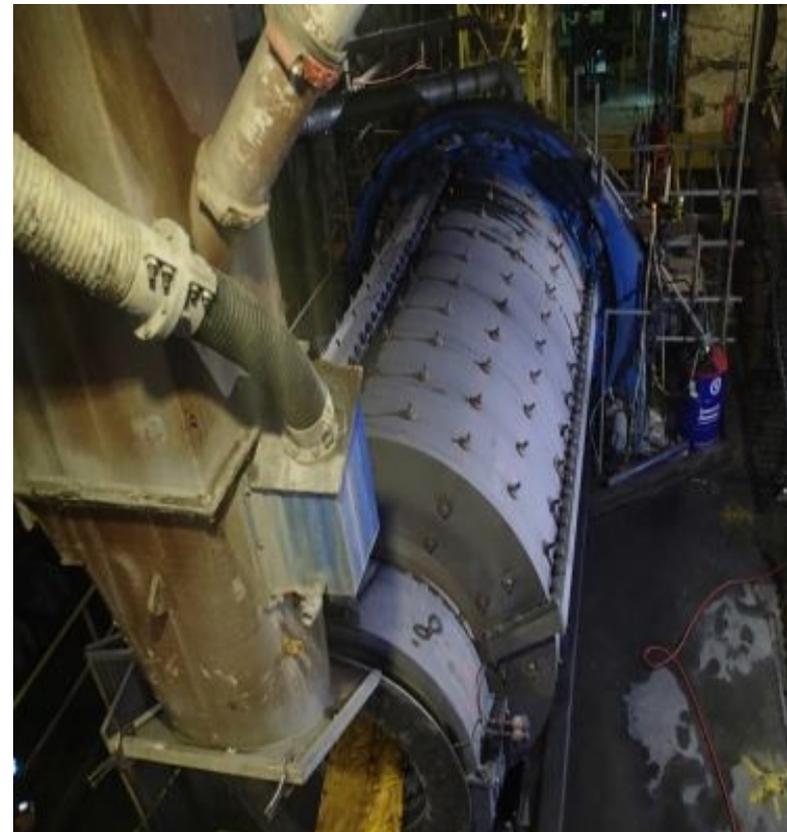
- CNSC's regulatory efforts
- Licensees rated for 14 safety and control areas (SCAs) with a focus on:
 - radiation protection
 - environmental protection
 - conventional health and safety
- Licensing activities, significant events and changes in performance ratings at historic and decommissioned sites



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Presentation Outline

- Production suspension at Key Lake and McArthur River
- Introduction
- Operating mine and mill facilities
- Historic and decommissioned sites
- Interventions
- Conclusions



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



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Production Suspension at Key Lake and McArthur River (1/2)

- November 2017, Cameco notified CNSC staff that:
 - activities directly related to mining and processing of uranium ore would be temporarily suspended
 - associated equipment and facilities would be placed into care and maintenance
 - compliance to applicable regulations would be maintained
 - collection and treatment of contaminated water would continue
 - facilities and equipment would be preserved



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Production Suspension at Key Lake and McArthur River (2/2)

- July 2018, Cameco notified CNSC staff of indefinite suspension of production
- CNSC staff:
 - requested and received information on activities during suspended operations
 - requested updated documents for programs impacted by the suspension of production
 - compliance to be conducted on revised activities

CNSC staff continue to use a risk-informed approach on oversight



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CNSC REGULATORY OVERSIGHT

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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
- Oversight is commensurate with risk



Risk-informed and performance-based approach



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CNSC Regulatory Oversight Safety and Control Area Performance Ratings



- CNSC staff assess and evaluate licensee performance on applicable SCAs
- Performance is rated as:
 - fully satisfactory
 - satisfactory
 - below expectations
 - unacceptable
- Ratings derived from results of regulatory oversight activities

Safety and Control Areas (SCAs)
Management system
Human performance management
Operating performance
Safety analysis
Physical design
Fitness for service
Radiation protection
Conventional health and safety
Environmental protection
Emergency management and fire protection
Waste management
Security
Safeguards and non-proliferation
Packaging and transport



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CNSC Regulatory Oversight

Safety and Control Area Performance Rating Methodology

- 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

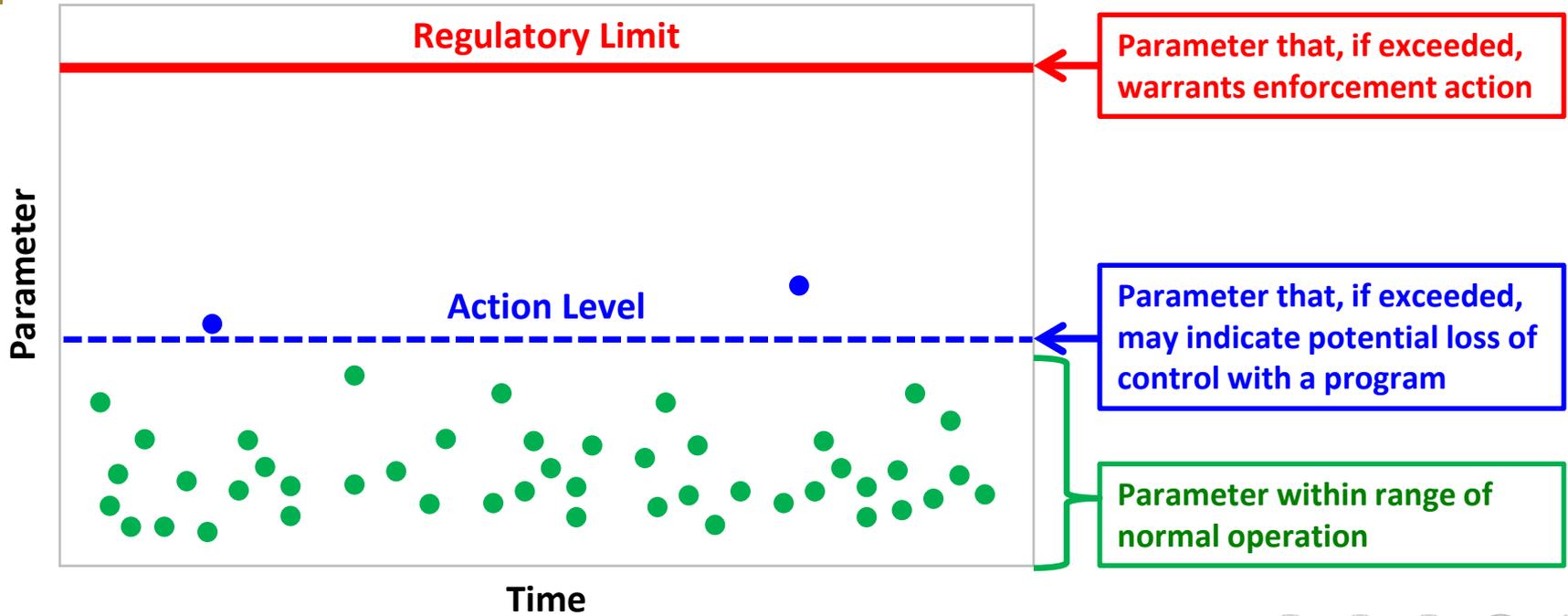
Examples of rating methodology in annex 1



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CNSC Regulatory Oversight

Regulatory Limits and Action Levels





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Public Information and Community Engagement

In 2017, CNSC activities included:

- Northern Mines Monitoring Secretariat – update on the Environmental Quality Committee
- Mining for Society – two-day event for Saskatoon area students
- Information sessions:
 - La Loche community members
 - Fedoruk Center “Coffee Break”
 - Ya’thi Néné Land and Resource Office
 - Pinehouse, Kineepik Metis Local Inc.

Information shared through the CNSC website, social media and CNSC online

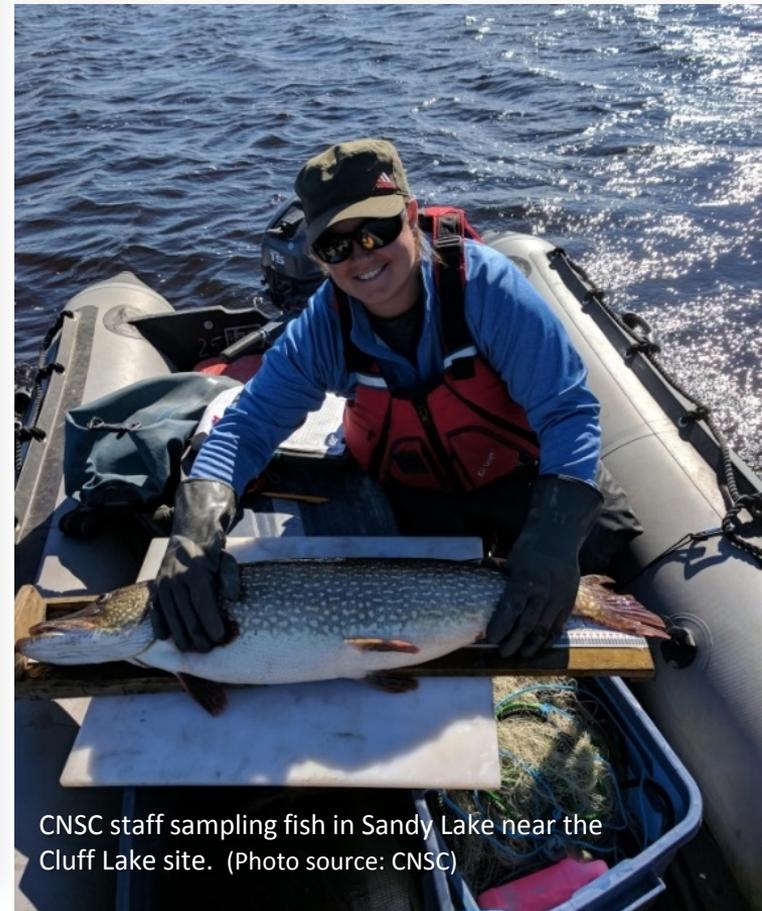


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Independent Environmental Monitoring Program (IEMP)

- Supports ongoing compliance verification activities
- Samples collected in publicly accessible areas under CNSC direction
- Results posted on CNSC's IEMP Web page
- Complemented by the Eastern Athabasca Regional Monitoring Program

IEMP results indicate that people and the environment are protected



CNSC staff sampling fish in Sandy Lake near the Cluff Lake site. (Photo source: CNSC)

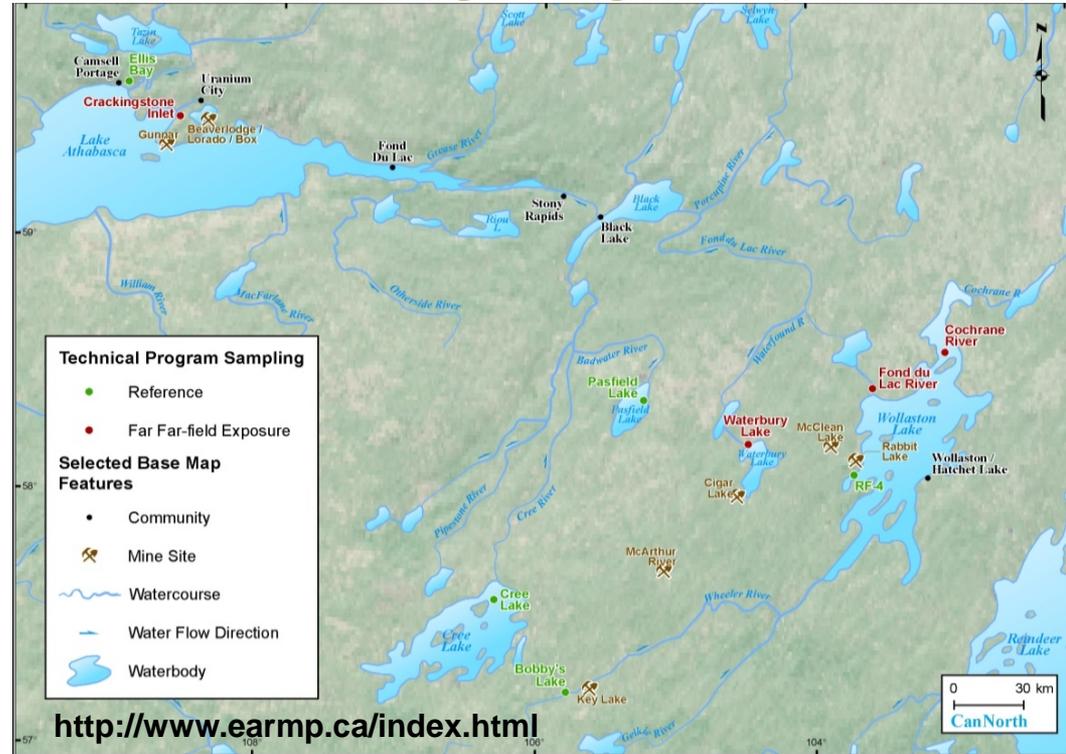


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Eastern Athabasca Regional Monitoring Program (EARMP)

- EARMP monitors the safety of traditionally harvested country foods annually
- Traditional local foods are safe to eat, water quality is safe to drink, and the environment is protected
- CNSC is a funding partner
 - funding partnership secured through 2018/19 to 2022/23





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Eastern Athabasca Regional Monitoring Program

- Designed to gather data on environment and potential cumulative impacts
- Supported by Indigenous communities, licensees, the Province of Saskatchewan and the CNSC
- Chemicals of interest within regional reference range

EARMP concluded there are no cumulative effects from operating uranium mines and mills in Saskatchewan



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Decision on Radionuclide Reporting in the National Pollutant Release Inventory (NPRI) (1/2)

- Environment and Climate Change Canada (ECCC) concluded radionuclides did not meet the criteria for an NPRI reportable substance
 - releases monitored and reported to the CNSC
 - decision is conditional on improving public access to CNSC environmental information and data



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Decision on Radionuclide Reporting in the National Pollutant Release Inventory (NPRI) (2/2)

- CNSC/ECCC joint task team formed
 - Phase I: Appendices of RORs and CNSC-NPRI Web linkages include total annual releases (complete)
 - Phase II: Develop a single publicly accessible source for digitally downloadable data (in progress)
 - committed to continued updates to NPRI Advisory Working group

Fulfilling the CNSC mandate



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OPERATING MINE AND MILL FACILITIES



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Operating Mine and Mill Facilities

Cameco Corporation

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

AREVA Resources Canada Inc.

- McClean Lake Operation (mill)





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Operating Facilities

2017 Operating Mine and Mill Regulatory Efforts

	Cigar Lake		McArthur River		Rabbit Lake		Key Lake		McClean Lake		Total	
Person days for compliance	218	↑	186	↓	137	↑	184	↓	238	↓	963	↓
Person days for licensing	15	↑	40	↓	26	↓	5	↑	365	↑	451	↑
Number of inspections	6	→	6	→	6	→	6	→	6	→	30	→
Inspection action items	1	↓	6	↑	4	↓	9	↓	3	↓	23	↓
Enforcement actions	0	↓	0	↓	0	↓	0	↓	0	↓	0	↓

No 12(2)s, orders, or AMPs issued; all non-compliances closed



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Operating Facilities

2017 Operating Mine and Mill Performance Ratings

FS = Fully satisfactory
SA = Satisfactory
BE = Below expectations
UA = Unsatisfactory

- CNSC staff’s review of key performance indicators resulted in a rating of “satisfactory” for all operating mines and mills
- McClean Lake radiation protection program rated “fully satisfactory”

Safety and control area	Cigar Lake	McArthur River	Rabbit Lake	Key Lake	McClean 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	FS
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	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA



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Operating Facilities 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)

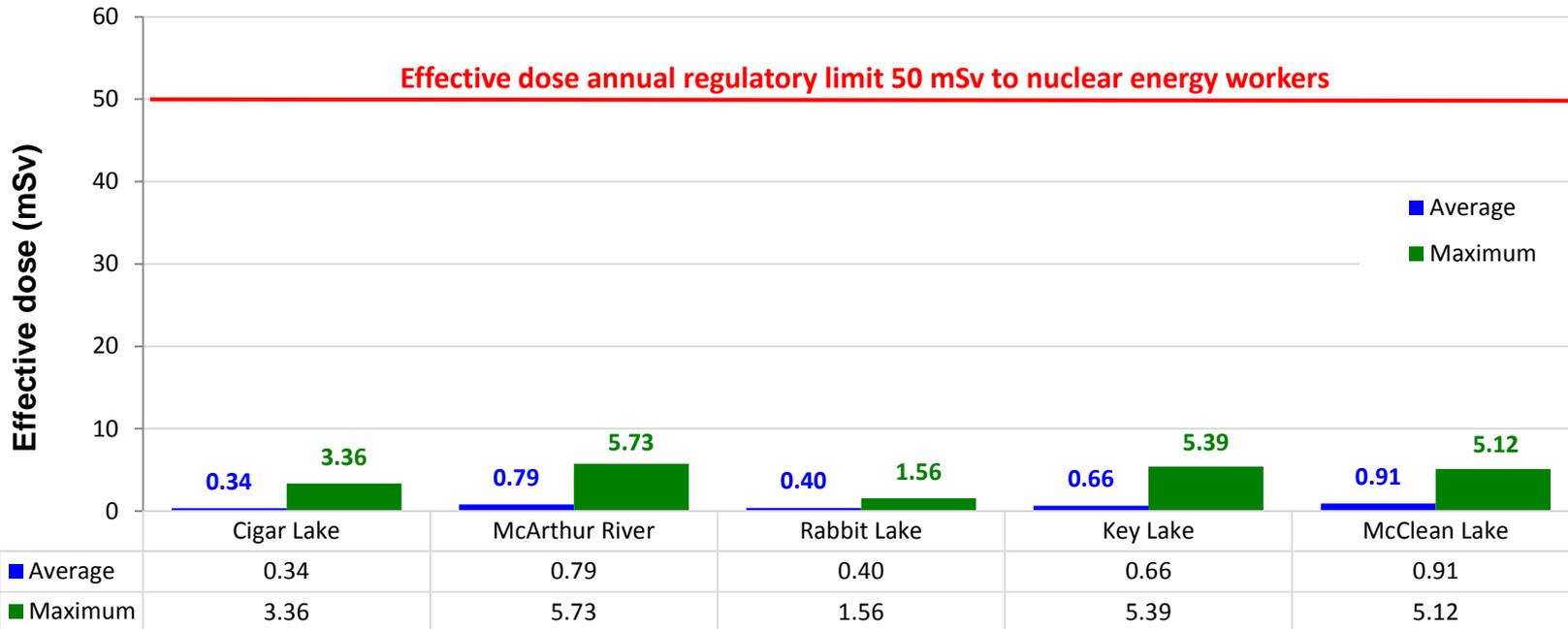


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Operating Facilities – Radiation Protection Performance

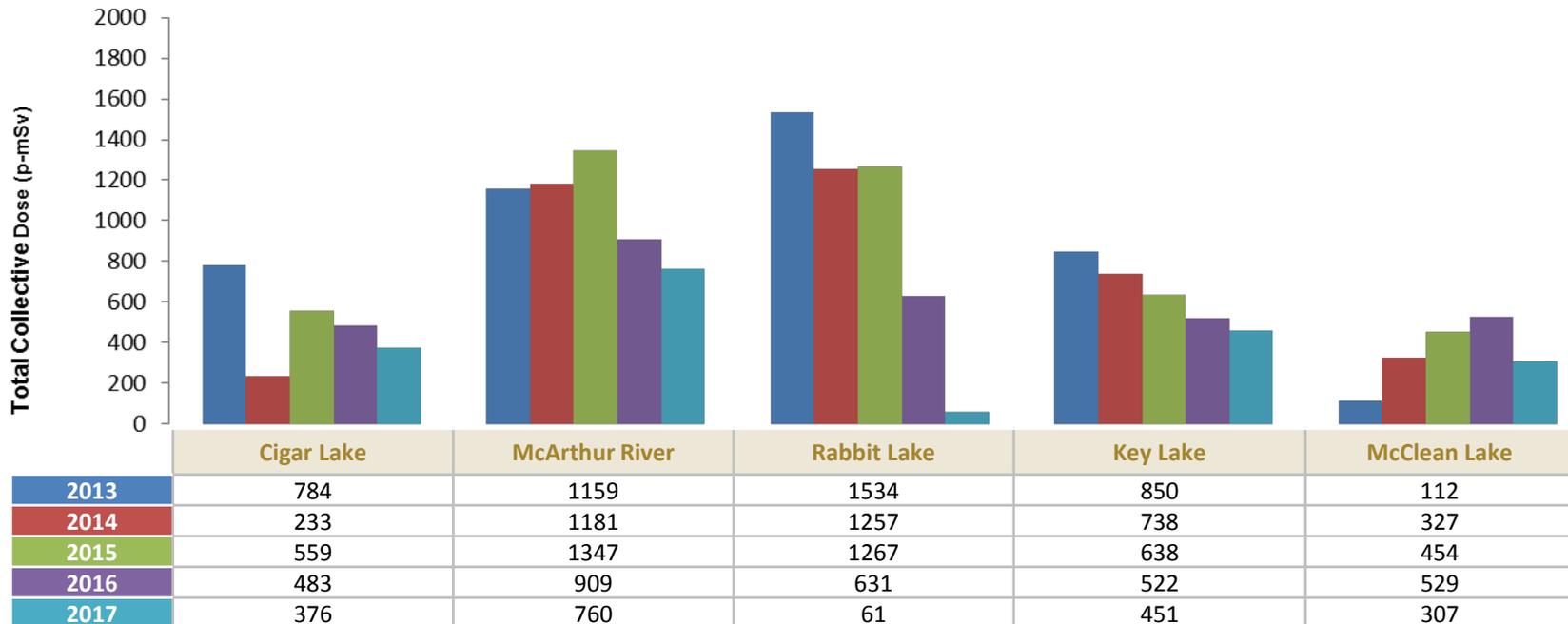
2017 Effective Dose (mSv)





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Operating Facilities – Radiation Protection Performance Total Collective Dose (p-mSv) – 5-Year Trend





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Operating Facilities Environmental Protection Performance

- Licensees required to implement environmental protection programs
- Action levels ensured 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)



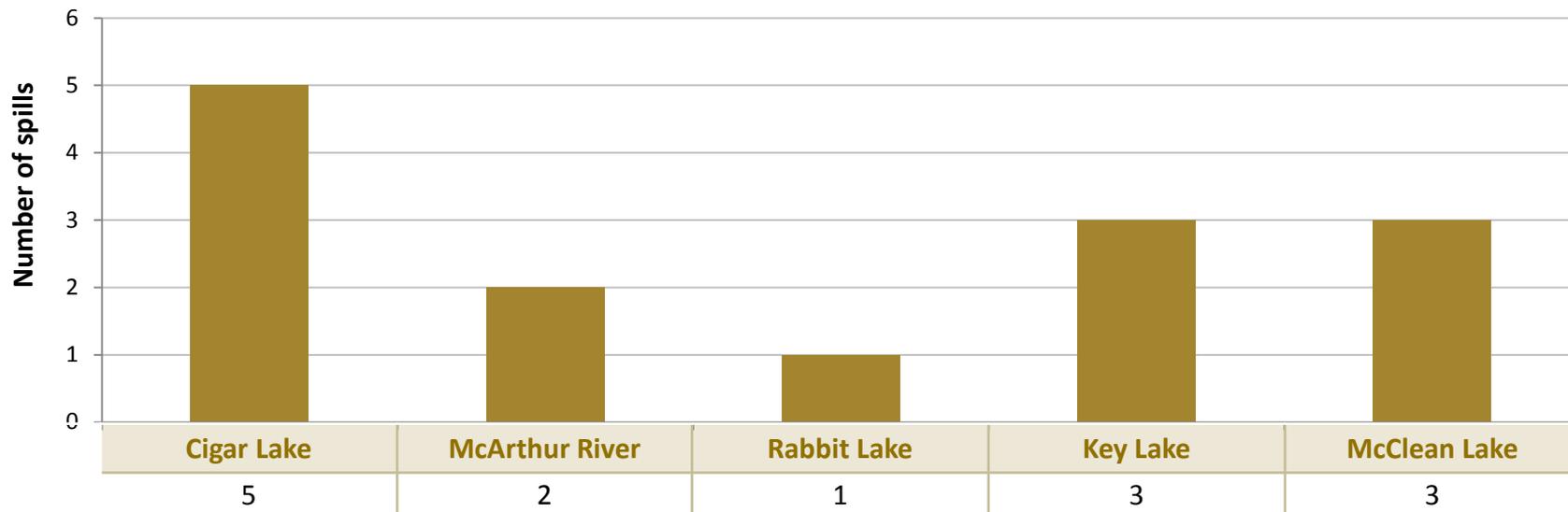
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Operating Facilities – Environmental Protection Performance

2017 Reportable Spills



No residual impacts to the environment



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Operating Facilities – Environmental Protection Performance

2017 Treated Effluent Annual Average Concentrations

- All effluent discharge concentrations were below:
 - *Metal Mining Effluent Regulations*
 - licence discharge limits
 - site specific action levels

Treated effluent concentrations met regulatory requirements

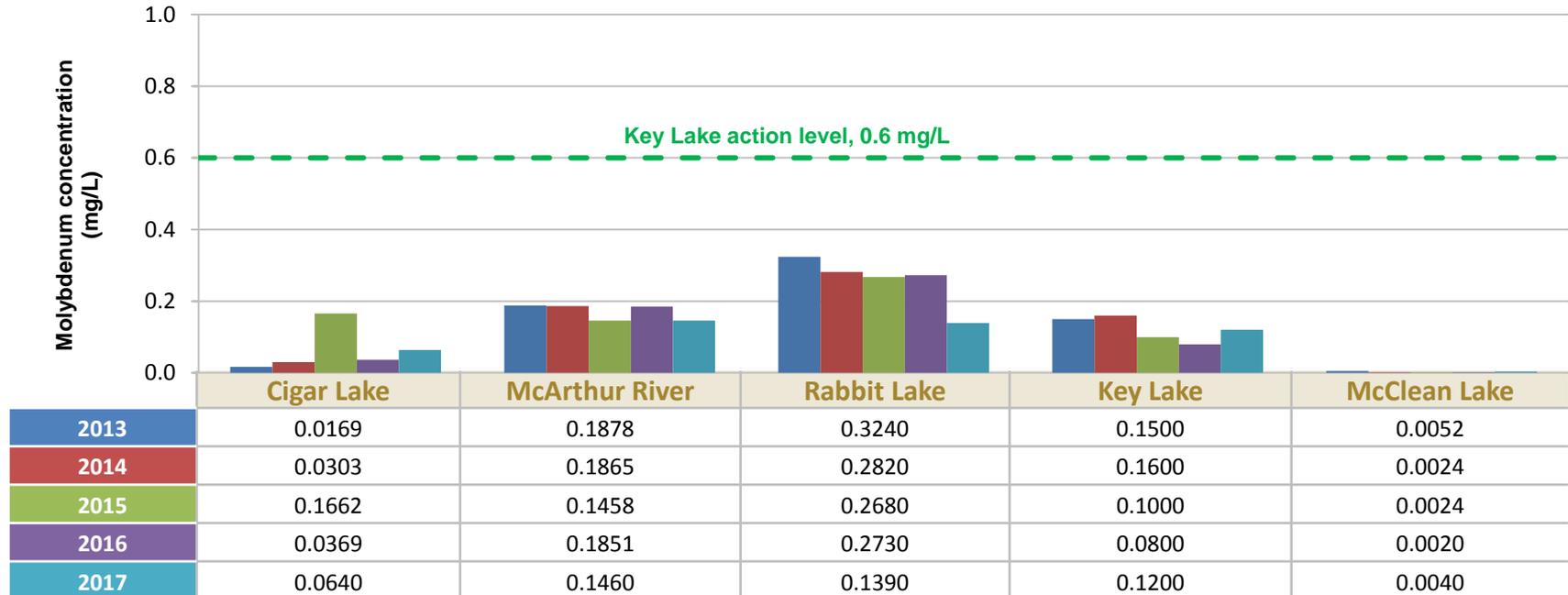


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Operating Facilities – Environmental Protection Performance

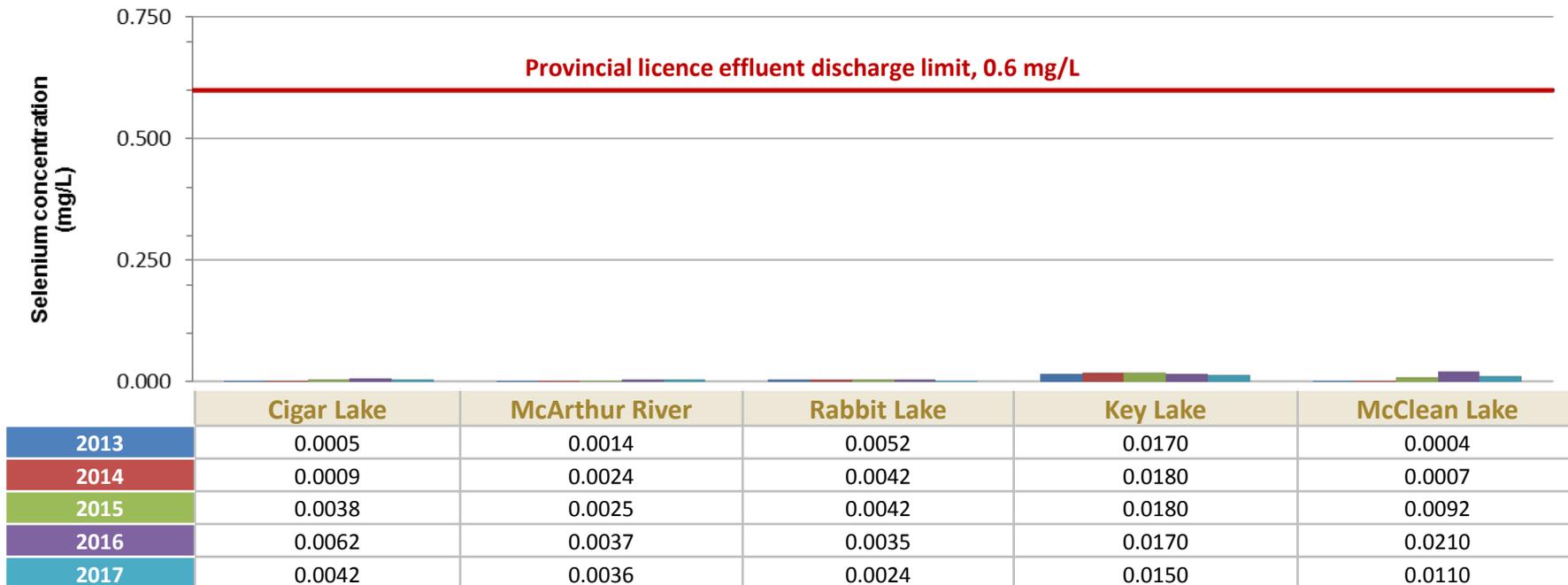
Molybdenum – 5-Year Trend





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Operating Facilities – Environmental Protection Performance Selenium – 5-Year Trend



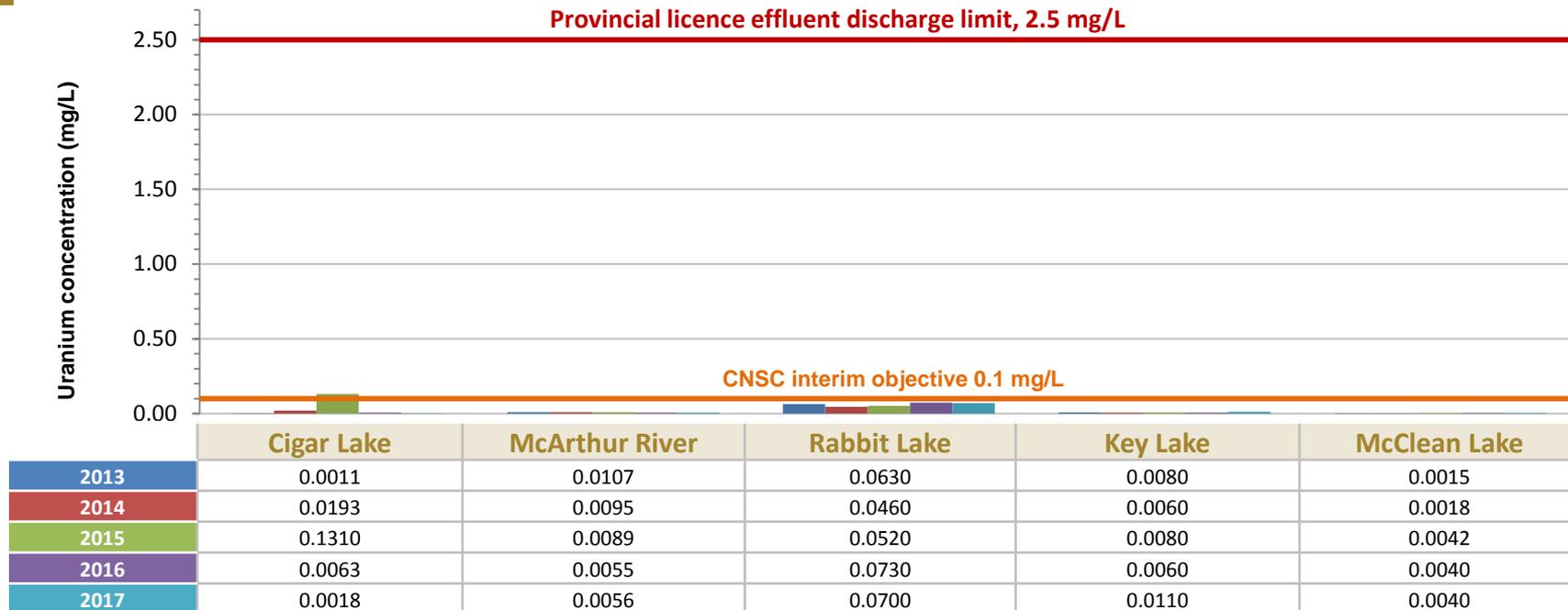


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Operating Facilities – Environmental Protection Performance Uranium – 5-Year Trend

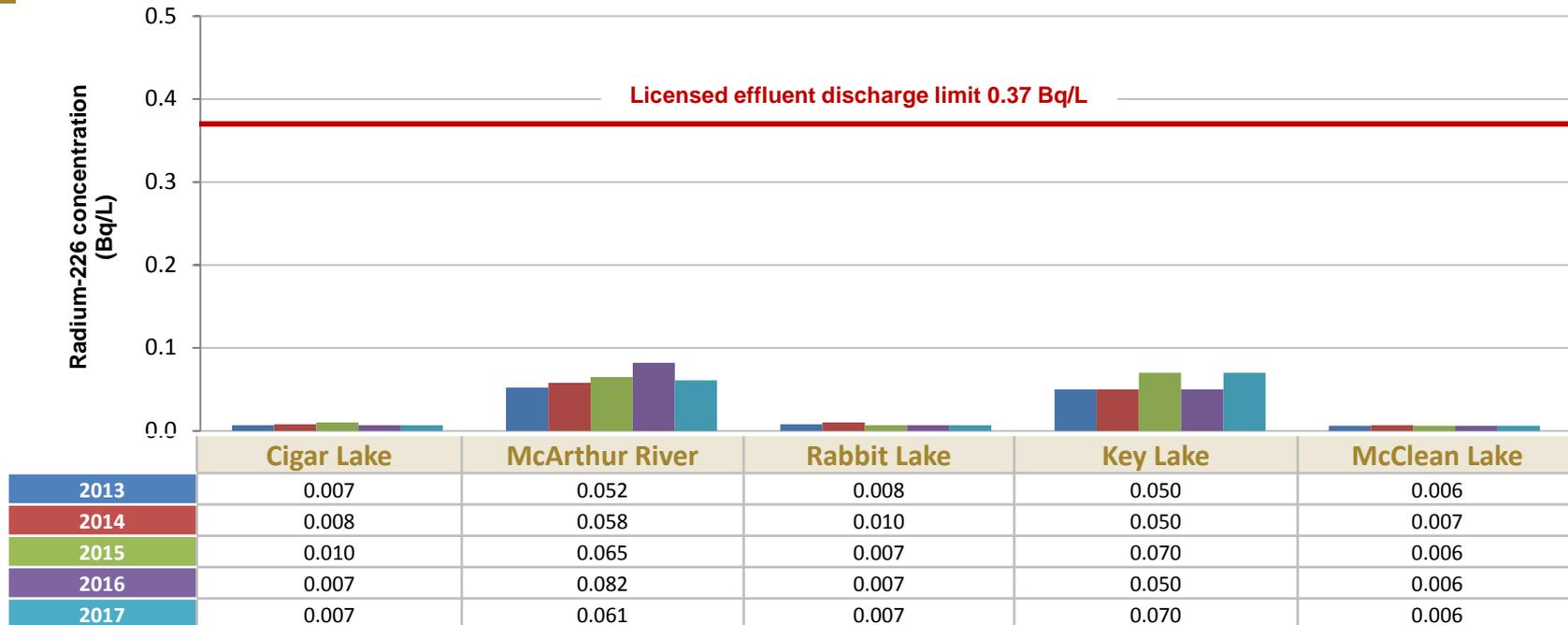




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Operating Facilities – Environmental Protection Performance

Radium-226 – 5-Year Trend





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Operating Facilities – Environmental Protection Performance 2016* Treated Effluent Comparison to Metal Mining Sectors in Canada

Mining sector	Number of mines	Number of mines out of compliance with at least one parameter	Number of mines out of compliance by parameter							
			Total Suspended Solids	Arsenic	Copper	Lead	Nickel	Zinc	Radium-226	pH range
Uranium	5	0	0	0	0	0	0	0	0	0
Base metal	47	10	6	0	0	0	1	0	0	3
Precious metal	54	6	4	0	0	0	0	0	2	1
Iron	8	5	2	0	0	0	0	1	0	3

* Environment and Climate Change Canada, 2016 is the most current data available.

Uranium mines and mills compared favorably to other mining sectors



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Operating Facilities – Environmental Protection Performance 2017 Radionuclides in Ambient Air (High-Volume Air Samples)

Radionuclides in ambient air at uranium mines and mills in 2017

Parameter	Reference annual air quality levels	Cigar Lake	McArthur River	Rabbit Lake	Key Lake	McClellan Lake
Pb ²¹⁰ (Bq/m ³)	0.021 ¹	0.00036	0.0004	0.000013	0.0004	0.000309
Ra ²²⁶ (Bq/m ³)	0.013 ¹	0.00003	0.00001	0.000004	0.0003	0.000014
Th ²³⁰ (Bq/m ³)	0.0085 ¹	0.00002	0.0001	0.000004	0.0002	0.000006
U (µg/m ³)	0.06 ²	0.00151	0.0003	0.000190	0.0091	0.002029

¹ Reference dose levels were derived using an annual dose to a member of the public of 1 mSv per year.

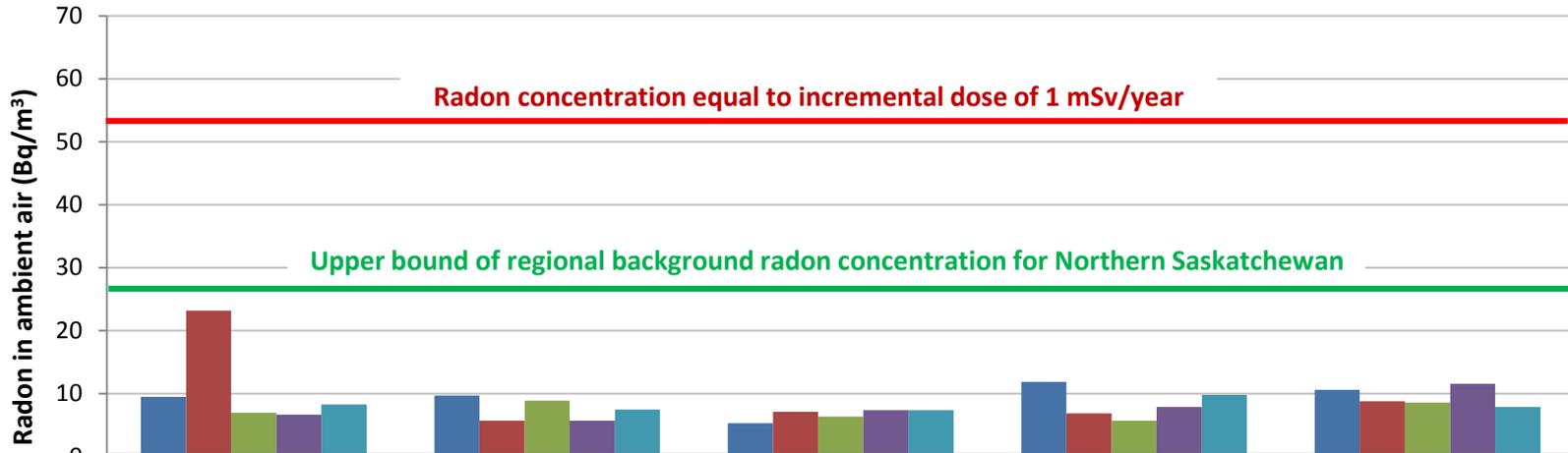
² Reference annual air quality levels derived from Ontario 24-hour *Ambient Air Quality Criteria* (OMOE 2012).

Concentrations of radionuclides in particulates were well below reference levels



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Operating Facilities – Environmental Protection Performance Radon in Ambient Air - 5-Year Trend



	Cigar Lake	McArthur River	Rabbit Lake	Key Lake	McClean Lake
2013	9.5	9.7	5.3	11.9	10.6
2014	23.2	5.7	7.16	6.9	8.8
2015	7.0	8.9	6.39	5.7	8.6
2016	6.7	5.7	7.37	7.9	11.6
2017	8.3	7.5	7.40	9.8	7.9



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Operating Facilities – Conventional Health and Safety Performance 2017 Lost-Time Injuries (LTIs)

Total number of LTI statistics	Cigar Lake	McArthur River	Rabbit Lake	Key Lake	McClellan Lake
Number of LTIs	0	1	0	0	0
Severity rate	0	12.1	0	0	67.8*
Frequency rate	0	0.15	0	0	0

Severity rate - the accident severity rate measures the total number of days lost to injury for every 200,000 person-hours worked at the site.

Severity = [(# of days lost in last 12 months)/# of hours worked in last 12 months] x 200,000.

Frequency rate - the accident frequency rate measuring the number of LTIs for every 200,000 person-hours worked at the site.

Frequency = [(# of injuries in last 12 months)/# of hours worked in last 12 months] x 200,000.

*Severity impacted from LTIs in previous years

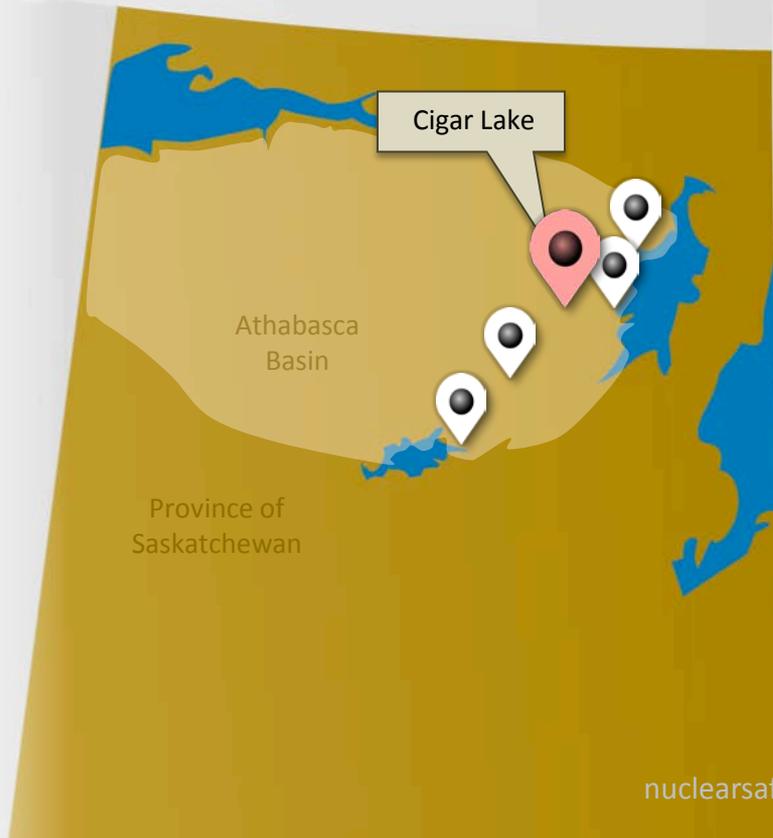
CNSC staff confirmed licensees provided effective oversight of health and safety



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Cigar Lake Mine



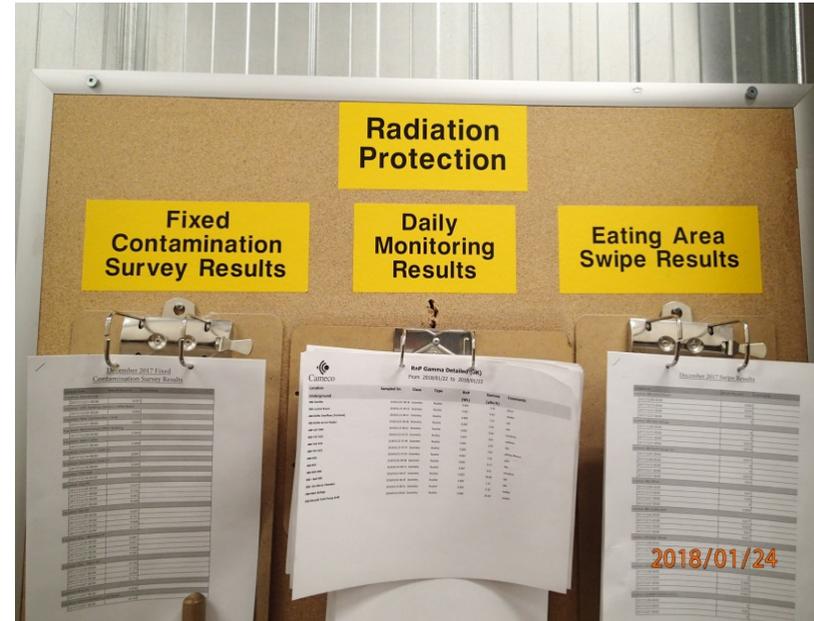
Cigar Lake Operation uranium mine, operated by Cameco Corporation, is located approximately 660 kilometres north of Saskatoon, Saskatchewan. (Photo source: Shaw Global)



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Operating Facilities Cigar Lake Operation Highlights

- Ongoing high-grade ore production and shipment of slurry to McClean Lake
- Infrastructure construction to support sustained production plan
- Development of underground workings continued
- Improvements to water treatment to minimize arsenic concentrations in effluent



Employee information posting at Cigar Lake mining facility.
(Photo source: CNSC)

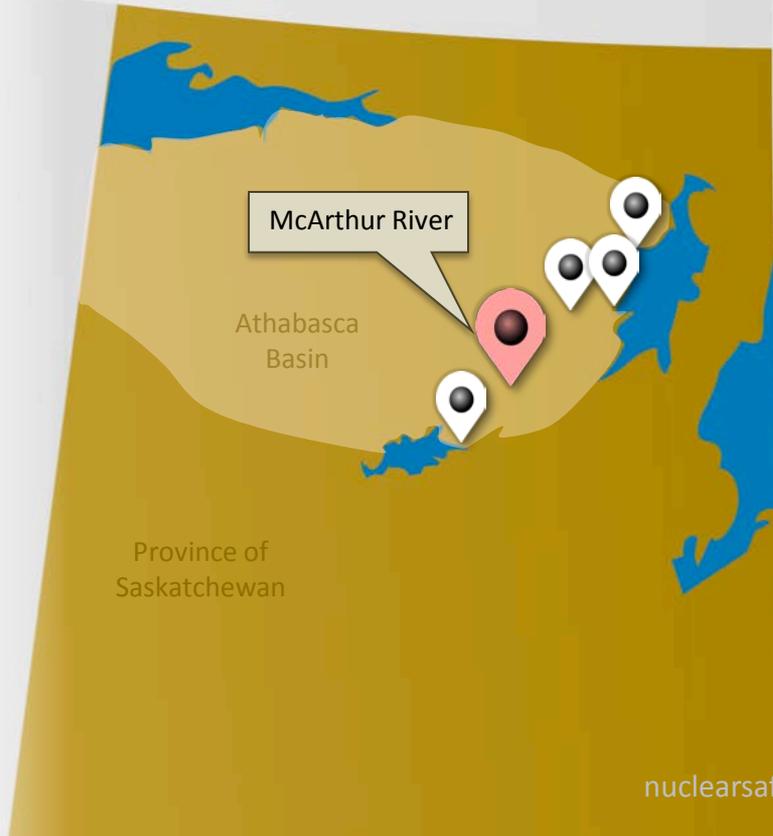


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McArthur River Mine



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



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Operating Facilities

McArthur River Operation Highlights

- High-grade ore production and shipment of slurry to Key Lake
- Ongoing development of ore production zones
- November 2017, CNSC staff notified of plan to temporarily suspend operations in 2018



Waste rock pile at the McArthur River Operation.
(Photo source: CNSC)

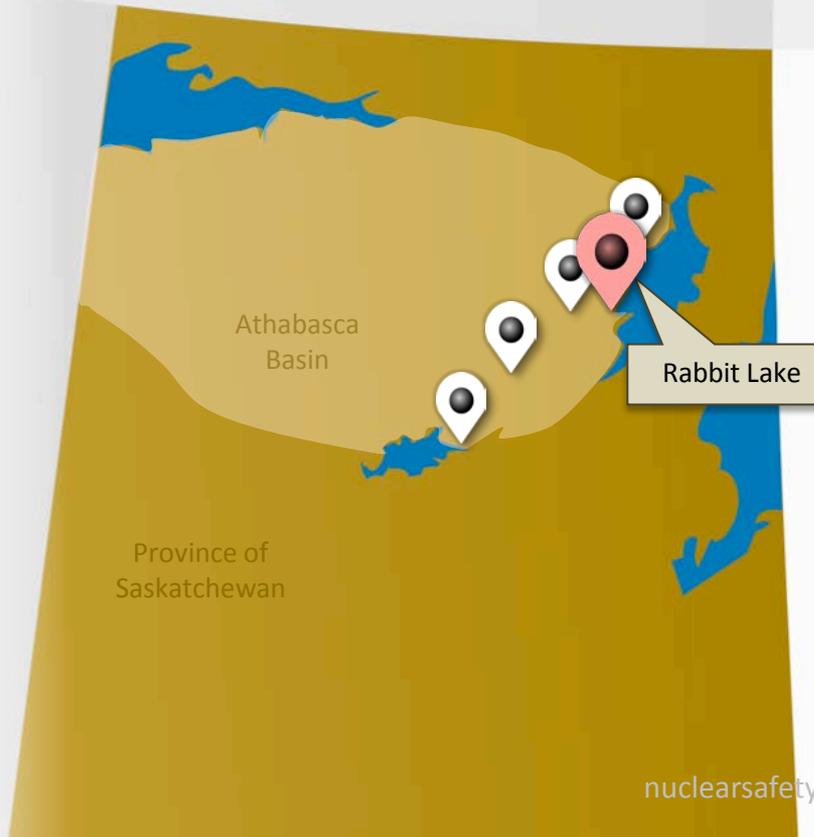


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Rabbit Lake Mine and Mill



Cameco Corporation operates the Rabbit Lake mine and mill site located 750 kilometres north of Saskatoon, Saskatchewan.

(Photo source: CNSC)



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Operating Facilities

Rabbit Lake Operation Highlights

- Spring 2016, mining and milling suspended
- Care and maintenance activities in place to ensure safety and protection of the environment
- Reclamation activities continue



Polishing ponds at the Rabbit Lake Operation as seen from the above ground tailings facility berm.

(Photo source: CNSC)

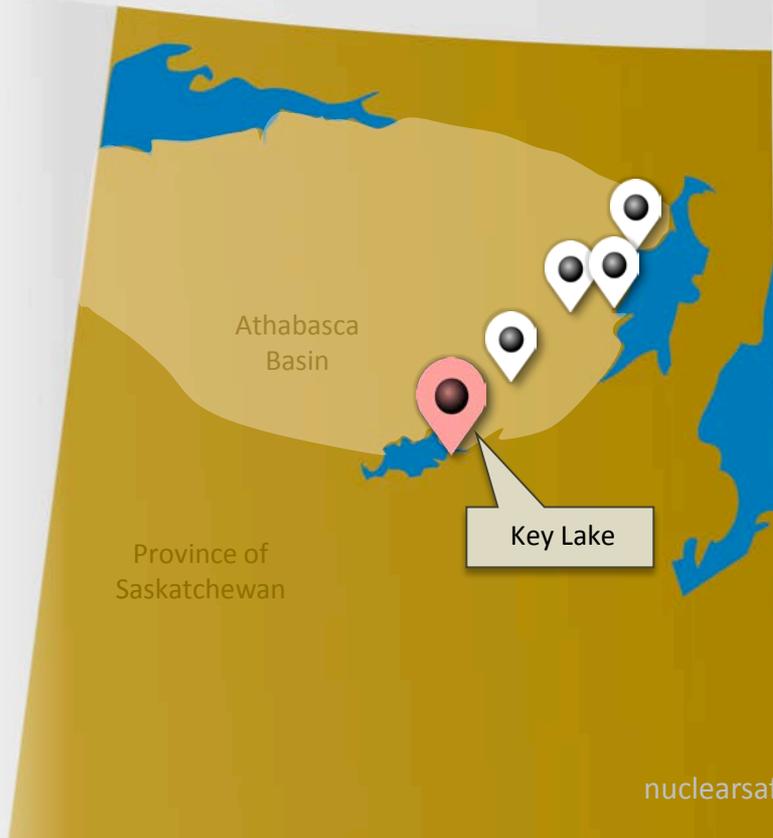


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Key Lake Mill



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



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Operating Facilities

Key Lake Operation Highlights

- Processes McArthur River ore and residual special waste from past Key Lake mining
- Calciner shaft and brickwork replaced during July 2017 maintenance work
- Ammonia storage tank and infrastructure refurbishment as follow-up to 2017 leaks
- November 2017, CNSC staff notified of plan to temporarily suspend operations in 2018



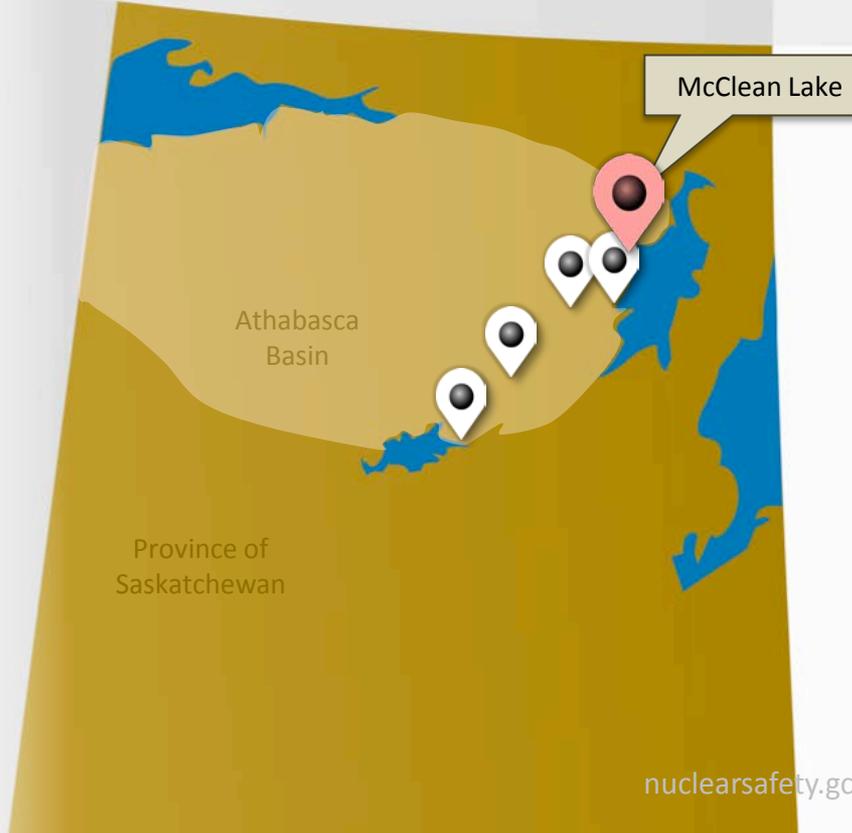
Deilmann Tailings Management Facility at the Key Lake Operation.

(Photo source: CNSC)



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McClellan Lake Mill



McClellan Lake Operation, located about 750 kilometres north of Saskatoon, Saskatchewan, is operated by AREVA Resources Canada Inc.
(Photo source: AREVA)



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Operating Facilities

McClellan Lake Operation Highlights

- Operating licence renewed by the Commission on July 1, 2017 for 10 years
- Continued processing uranium ore slurry received from Cameco's Cigar Lake mine
- Removal of infrastructure impacting JEB Tailings Management Facility (TMF) optimization stage 2 was completed



JEB water treatment plant at the McClellan Lake Operation.
(Photo source: AREVA)



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Operating Facilities

McClellan Lake - Selenium Adaptive Management Plan Update

- AREVA submitted an adaptive selenium management plan outlining:
 - changes to leaching and tailings preparation circuits
 - changes to the hydrogen peroxide concentration and delivery system
 - physical changes to improve hydrogen peroxide mixing
 - active commissioning plan
- August 2017, CNSC staff reviewed and accepted the adaptive selenium management plan

This completes the Commission request of CNSC staff



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HISTORIC AND DECOMMISSIONED SITES



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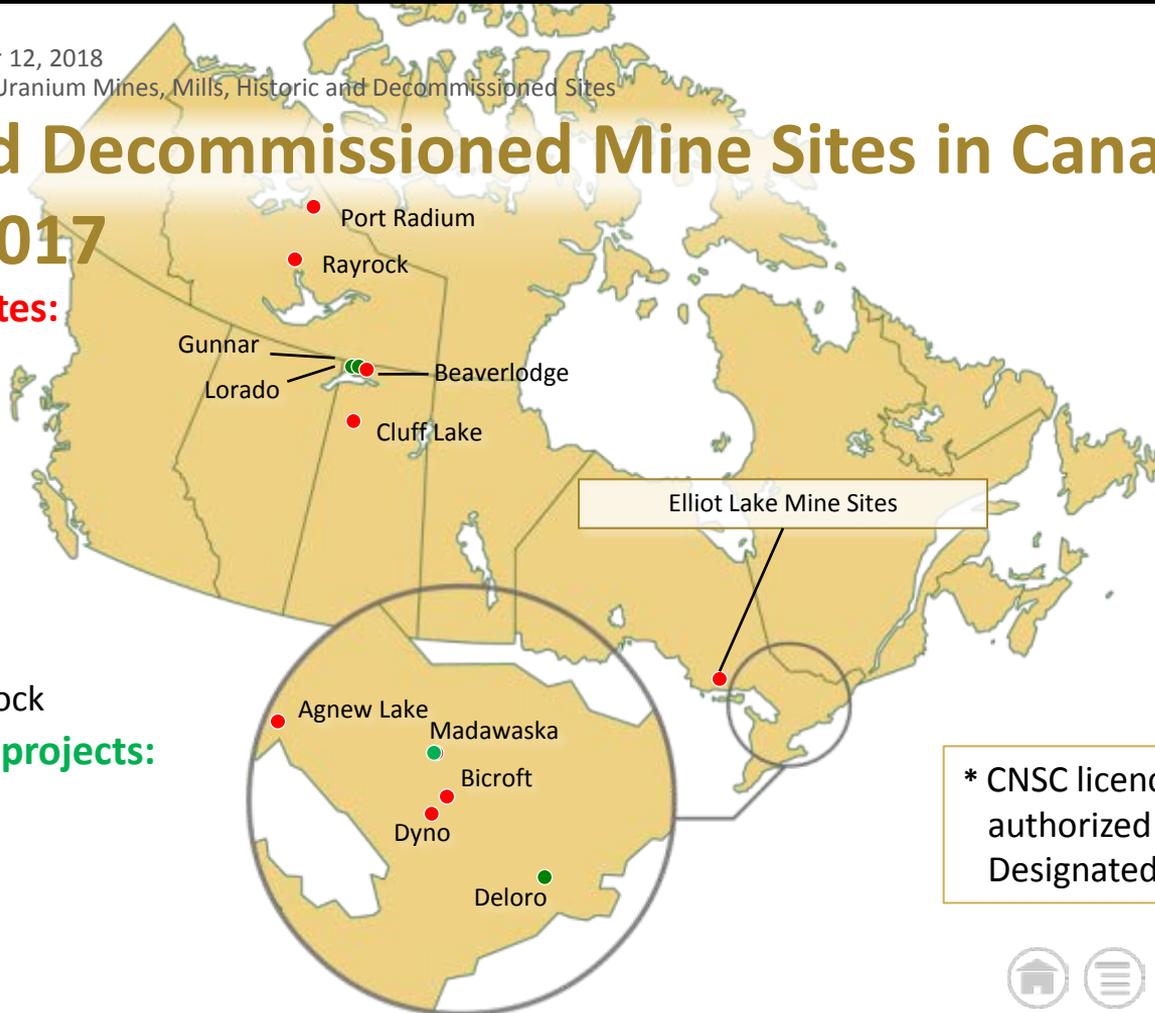
Historic and Decommissioned Mine Sites in Canada 2016 and 2017

Decommissioned sites:

- Beaverlodge
- Cluff Lake
- Rayrock*
- Port Radium*
- Agnew Lake*
- Bicroft*
- Dyno mine*
- Elliot Lake
- Denison and Stanrock

Active remediation projects:

- Gunnar
- Lorado*
- Deloro *
- Madawaska*



* CNSC licences
authorized by a
Designated Officer



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ACTIVE REMEDIATION PROJECTS

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Active Remediation Projects

- Clean-up of legacy uranium mine and mill sites and historic sites
- Goal is to restore sites to a safe and stable condition
- Operations consist of:
 - ongoing clean-up activities using full-time staff and contractors
 - frequent monitoring and reporting on licence requirements



Engineered cover on mine waste at Deloro site.
(Photo source: CNSC)



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Active Remediation Projects

2016 and 2017 Regulatory Efforts

Site	2016			2017		
	Person-days for licensing	Person-days for compliance	Number of inspections	Person-days for licensing	Person-days for compliance	Number of Inspections
Gunnar	71	59	1	17	53	1
Lorado	8	18	1	0	24	1
Deloro	31	85	2	80	41	2
Madawaska	0	20	1	1	2	0*

* Inspection deferred to 2018/2019



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Active Remediation Projects 2016 and 2017 Performance Ratings

FS = Fully satisfactory
SA = Satisfactory
BE = Below expectations
U/A = Unacceptable

Safety and control area	Gunnar	Lorado	Deloro	Madawaska
Management system	SA	SA	SA	SA
Physical design	SA	SA	SA	SA
Radiation protection	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA
Security	SA	SA	SA	SA



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Active Remediation Projects Environmental Protection Performance

- Environmental protection practices are followed to ensure protection of public and environment
- Licensee monitored environment for air quality, surface water and groundwater
 - establish baseline conditions
 - ensure environment is protected during remediation activities

CNSC staff expect environmental conditions will improve following remediation



Signage to restrict fishing and swimming at Langley Bay at the Gunnar Site.

(Photo source: CNSC)

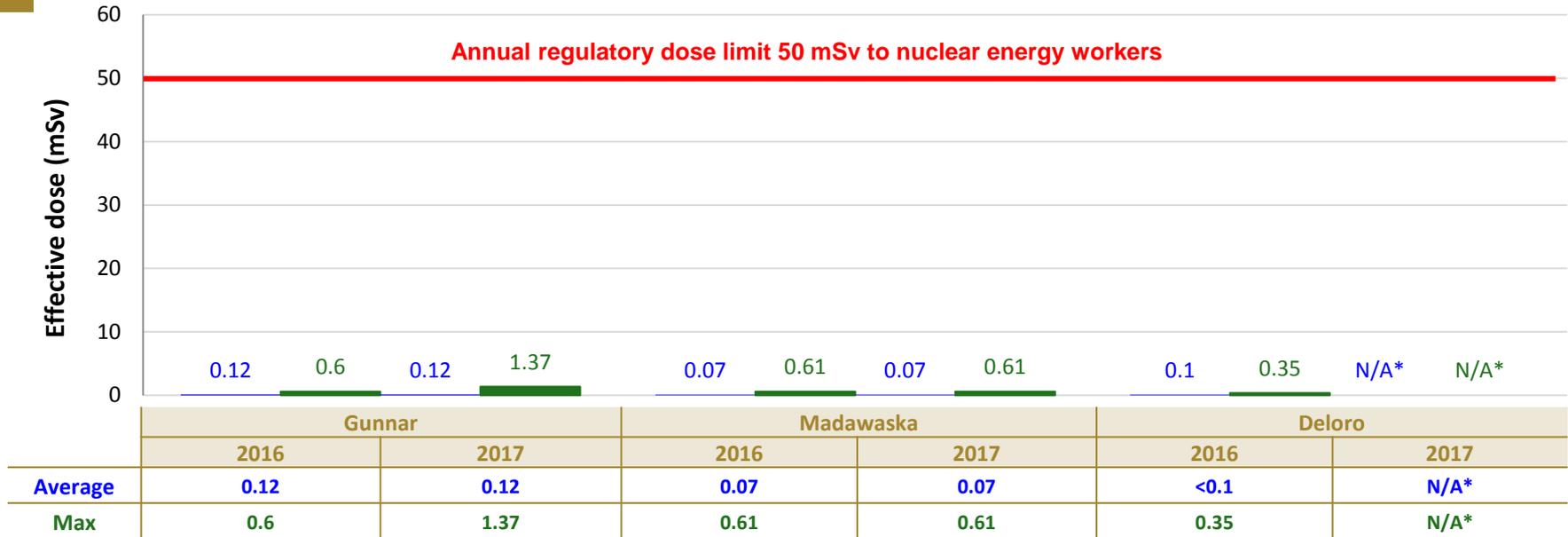


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Active Remediation Projects – Radiation Protection Performance 2016 and 2017 Effective Dose (mSv)



* In 2017, as work on the cover was completed, the previously existing dosimetry program that was in place during the remediation was discontinued due to low dose rates.



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Active Remediation Projects – Conventional Health and Safety Performance 2016 and 2017 Lost-Time Injuries (LTIs)

Total number of FTE workers and LTI statistics	Gunnar	Lorado	Deloro	Madawaska
Total number of FTE workers	115 contractors and part-time SRC staff	2016 only: 25 contractors 7 part-time SRC staff	2016: 28 full-time staff 2017: 17 full-time staff	40 contractors
Number of LTIs	0	0	0	0

CNSC staff confirm the licensees provide effective oversight of health and safety



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Active Remediation Projects

Gunnar Mine Site Highlights

- Saskatchewan Research Council (SRC) carrying out remediation
- In 2017, SRC began constructing the Gunnar Main Tailings cover
- Request to transfer to institutional control program expected by 2035, will require Commission approval

Remediation work underway



Aerial view of Gunnar mine site, 2018.
(Photo source: CNSC)

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Active Remediation Projects

Lorado Site Highlights

- SRC responsible for the clean-up on behalf of Province of Saskatchewan
- CNSC staff verified remediation of mine tailings and adjacent Nero Lake were completed in 2015
- Request to transfer to institutional control program expected by 2030, will require Commission approval

Environmental conditions improved following remediation



View of mine tailings at the Lorado site, 2017.
(Photo source: CNSC)



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Active Remediation Projects

Deloro Mine Site Highlights

- Ontario Ministry of Environment, Conservation and Parks (MECP) is the licensee
- In 2017, MECP demonstrated two areas are below conditional clearance levels; now removed from licensing
- Site footprint includes Young's Creek Area (YCA); remediation work continues at YCA

MECP expects entire site to qualify for release from licensing within next 5 years



Aerial view of Young's Creek Area (cell and sediment removal area), 2017.

(Photo source: MOECC)



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Active Remediation Projects

Madawaska Mine Site Highlights

- EWL Management Limited is the licensee
- Site consists of sealed mine openings, vegetated tailings areas
- Ongoing rehabilitation work to reduce radon exhalation and increase physical stability of the tailings management areas



Radon sampling on the new cover of Madawaska TMA 2.
(Photo source: CNSC)



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DECOMMISSIONED URANIUM MINE AND MILL SITES



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Decommissioned Sites

- Remediated as part of decommissioning
- Uranium mine and mill sites that have been decommissioned, and are in the long-term maintenance and monitoring phase
- All sites, with the exception of Cluff Lake and Beaverlodge, expected to remain under a CNSC licence for foreseeable future



Dam at Madawaska mine site.
(Photo source: CNSC)



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Decommissioned Sites

2016 and 2017 Regulatory Effort

Facility	2016			2017		
	Person-days for licensing	Person-days for compliance	Number of inspections	Person-days for licensing	Person-days for compliance	Number of inspections
Beaverlodge	18	39	1	7	59	1
Cluff Lake	25	70	1	71	69	1
Rayrock	1	8	1	42	5	0*
Port Radium	10	31	1	1	8	0*
Agnew Lake	1	6	1	2	12	1
Bicroft	0	6	1	0	19	1
Dyno	0	9	1	0	7	1
Elliot Lake	1	60	2	4	22	1
Denison	2	25	2	0	7	1
Stanrock	1	28	2	0	7	1

* Baseline for inspections is every three years; last inspections completed in 2016. Next scheduled inspection is planned for 2019.



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Decommissioned Sites 2016 and 2017 Performance Ratings

FS = Fully satisfactory
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U/A = Unacceptable

Safety and control area	Beaverlodge		Cluff Lake		Rayrock		Port Radium		Agnew Lake		Bicroft		Dyno		Elliot Lake		Denison/Stanrock		
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	
Radiation protection	SA	SA	SA	SA	BE	SA	BE	SA	BE	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA



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Decommissioned Sites

Environmental Protection Performance

- All decommissioned sites have adequate measures in place to protect the public and environment
- All licensees carried out environmental sampling and reporting consistent with environmental monitoring program requirements
- All measurements are within environmental risk assessment predictions which have demonstrated there is negligible risk to human health, and where the environment was impacted from historical releases, the environment is recovering as predicted



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Decommissioned Sites

Radiation Protection Performance

- Sites in long-term maintenance and monitoring phase; radiation protection program requirements need to be put in place and implemented
- Potential for radiation exposure to workers and the public is very low given:
 - the limited nature of onsite work
 - outdoor setting
 - low radiation levels following remediation activities
- Doses for all NEWs performing monitoring, maintenance or site visits were 2% of CNSC regulatory dose limits or less

CNSC staff confirmed levels of exposure are below regulatory dose limits



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Decommissioned Sites

Conventional Health and Safety Performance

- Licensed activities involve routine monitoring and maintenance work
- No permanent staff on site
- All sites maintain an effective occupational health and safety program that protects workers, contractors and visitors

**CNSC staff rated conventional health and safety at all sites
as “satisfactory” in 2016 and 2017**



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Decommissioned Sites

Saskatchewan's Institutional Control Program (ICP)

- Outlines formal regulatory process for long-term site management by the Province of Saskatchewan
- CMD 18-M38 – *Overview of the Institutional Control Program for Decommissioned Mine and/or Mill Sites in Saskatchewan* presented to the Commission on October 3, 2018
- Anticipate request for exemption/transition of 20 Beaverlodge properties to the ICP in 2019

Transition to ICP is a Commission decision



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Decommissioned Sites Beaverlodge Mine and Mill Highlights

- Cameco is the licensee
- Five Beaverlodge properties exempted from CNSC licensing in 2009 and entered into provincial ICP
- CNSC staff reviewing Cameco's request for the exemption of 20 more properties
- Cameco's goal is to transfer all remaining properties to ICP by 2023



Stainless steel raise cap installed in 2017 at Beaverlodge Project; located north of Lake Athabasca in Saskatchewan. (Photo source: CNSC)



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Decommissioned Sites

Cluff Lake Mine and Mill Highlights

- In 2016, AREVA carried out monitoring and small maintenance activities to conform to its Detailed Decommissioning Plan
- Requested a 5-year licence with a reduced licensed area
- Will request the Province of Saskatchewan to accept remaining properties into its ICP before the end of the 5-year licence



Tailings management area with cover.

(Photo source: CNSC)



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Decommissioned Sites

Rayrock Mine Site Highlights

- Indigenous and Northern Affairs Canada (INAC) is the licensee
- In 2016, Rayrock received a “below expectations” rating for radiation protection
- In 2017, INAC demonstrated improvements to program documentation and radiation protection procedures
- Undertook field program to support updated risk assessments and focus on future remediation

Radiation protection rating returned to “satisfactory” in 2017



Aerial photo of Rayrock mine site, 2016.
(Photo source: CNSC staff)



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Decommissioned Sites

Port Radium Mine Site Highlights

- INAC is the licensee
- June 2016, CNSC inspection found the site to be well-maintained and stable
- In 2016, Port Radium received a “below expectations” rating
- In 2017, INAC demonstrated improvements to program documentation and radiation protection procedures

Radiation protection rating returned to “satisfactory” in 2017



CNSC staff inspection of Port Radium site, 2016.
(Photo source: CNSC)



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Decommissioned Sites Agnew Lake Mine Site Highlights

- Ontario Ministry of Energy, Northern Development and Mines (ENDM) is the licensee
- In 2016, CNSC staff rated radiation protection SCA as “below expectations”
- In 2017, radiation signage upgraded and hunting blinds on the tailings management area removed
- ENDM plans to request a licence amendment to support upgrade to the tailings cover in 2018; work proposed to begin in 2019



CNSC inspection of Agnew Lake, sign at main entrance to site. (Photo source: CNSC)

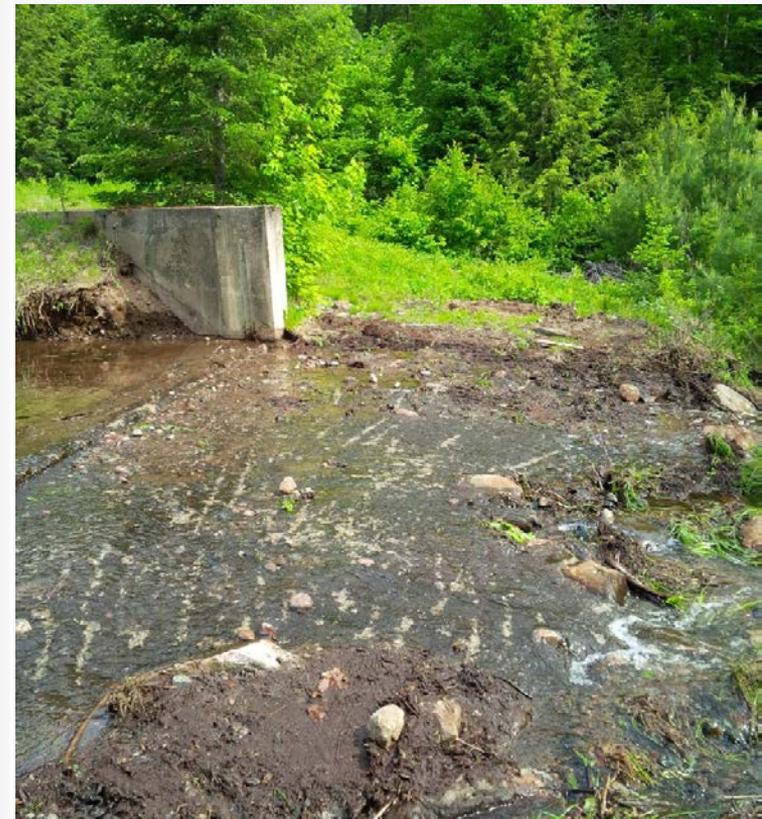


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Decommissioned Sites **Bicroft Site Highlights**

- Barrick Gold is the licensee
- Site consists of mine tailings and containment dams
- For the foreseeable future, site will remain in long-term monitoring and maintenance under a CNSC licence

**No changes in activities on site from
previous report**



Spillway of Pond A at the Bicroft site.
(Photo source: CNSC)



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Decommissioned Sites

Dyno Mine Site Highlights

- EWL Management Limited is the licensee
- Site consists of capped mine openings, mine tailings and a containment dam
- For the foreseeable future, site will remain in long-term monitoring and maintenance under a CNSC licence

**No changes in activities on site
from previous report**



Base of mine tailings dam at Dyno mine site.
(Photo source: CNSC)

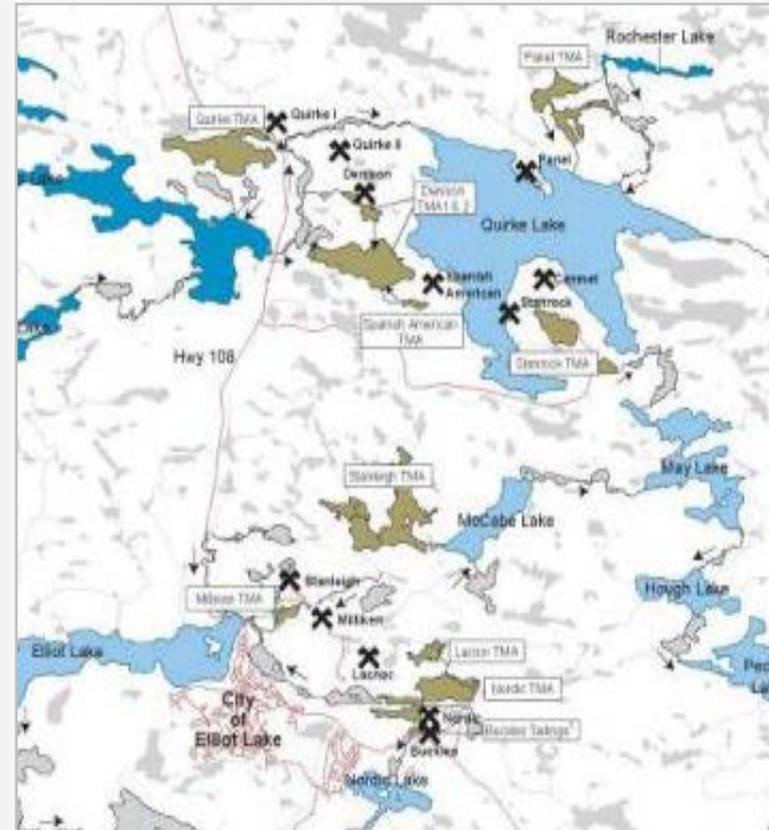


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Decommissioned Sites

Elliot Lake Mine Sites Highlights

- Two licensees manage the Elliot Lake sites (Rio Algom Ltd. and Denison Mines)
- Consists of 12 mines and 10 TMAs
- Three CNSC licences (1 for Rio Algom, 2 for Denison) for long-term monitoring and maintenance
- Decommissioning occurred from 1992 to 2002



Map of Elliot Lake mine sites.
(Photo source: Rio Algom)



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Decommissioned Sites Elliot Lake Licence Limit Exceedance for Radium

- Rio Algom Ltd. (RAL) reported a licence limit exceedance for Ra-226 at Stanleigh TMA
- Ra-226 concentrations in undiluted effluent remain below Health Canada's Canadian Drinking Water Guidelines (0.5 Bq/L)
- CNSC staff requested further information pursuant to GNSCR 12(2)
- September 2018, CNSC staff confirmed the request was closed

No impact to the public or the environment

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CNSC staff collecting an effluent sample during a reactive inspection, 2018.

(Photo source: CNSC)



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INTERVENTIONS



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Interventions

Participant Funding Program (PFP) and Interventions

- Total of 12 interventions received

PFP recipients	Other intervenors
Saskatchewan Environmental Society	Athabasca Joint Engagement and Environmental Subcommittee
Ya'thi Néné Land and Resource Office	Metis Community of Pinehouse
Algonquins of Ontario	Canadian Nuclear Workers Council
Sagamok Anishnawbek Nation	Canadian Environmental Law Association
Northwatch	
Prince Albert Grand Council	
English River First Nation	
Athabasca Chipewyan First Nation	



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Key Themes in Interventions

- Indigenous Community Engagement
- Financial Guarantees
- Inspection reports, activities and non-compliance reporting



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Indigenous Engagement

- CNSC staff will continue to report annually on operating uranium mines and mills
- CNSC staff are committed to and will continue to work with Indigenous communities to establish a regular and ongoing engagement program for all sites
- Indigenous communities have access to participant funding to assist in ROR review

Commitment to long-term Indigenous engagement activities



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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
- For sites where the licensee is a government entity, the ultimate financial liability rests with the provincial or federal government
- CNSC verifies that financial guarantees are sufficient, valid and in effect

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



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Inspection Reports, Activities and Non-compliance Reporting

- CNSC inspection reports available upon request, pending review of protected information
- CNSC inspections are not open to members of the public
- Non-compliance are included in inspections reports
- Various mechanisms are in place to report events and non-compliances to the Commission
- Unplanned environmental releases or spills are regularly posted on CNSC's and licensees' websites, where available



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Conclusions

CNSC staff confirmed that in 2016 and 2017, 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



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2018 and 2019 Regulatory Focus

- Will include continued:
 - effective regulatory oversight using risk-informed approach
 - cooperation with Saskatchewan on transfer of projects to institutional control following decision by the Commission
 - outreach and engagement with Indigenous groups and the public
 - monitoring and oversight of active remediation projects

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



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ANNEX 1

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RATING METHODOLOGY USED IN NUCLEAR CYCLE AND FACILITIES REGULATORY OVERSIGHT REPORTS



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Outline

- Background
- Regulatory oversight
- Rating objectives
- Rating methodology for Nuclear Cycle Facilities performance reports
- Conclusion



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Background (1/2)

- Regulatory oversight reports include performance ratings
- CNSC staff rate licensee performance within each safety and control area
- Internationally Canada is unique in:
 - rating performance for fuel cycle program licensees
 - presenting these reports in a public meeting
 - offering public interventions and participant funding on the reports



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Background (2/2)

- Detailed reporting on areas of interest to the public and Commission:
 - Radiation Protection
 - Environmental Protection
 - Conventional Health and Safety

Key performance indicators directly linked to the CNSC mandate to protect health, safety and the environment

 - Other Areas of Concern or Major Improvements
- Performance ratings reflect our understanding and history with the licensed facility



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Regulatory Oversight (1/2)

Licensee performance is continually assessed by CNSC staff

- performance ratings do not replace day to day compliance and enforcement
- non-compliances are addressed with enforcement actions at the time they are discovered

Compliance planning

- takes into account the risk associated with the type/complexity of the facilities or activities
- is flexible to allow for the broad range of licensee operations

Compliance results come from various inputs such as inspections, technical assessments of licensee scheduled and unscheduled reporting and enforcement actions



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Regulatory Oversight (2/2)

Subject Matter Experts are organized into Facility Assessment and Compliance (FAC) Teams

- licensing, inspection and specialist groups collaborate using a multi-key approach in regulatory oversight in teams organized by licensed facility
- these teams participate in compliance planning and oversight activities throughout the licence period and reflect a collective knowledge of each facility

Compliance activities include:

- inspections at the licensed locations
- technical assessments of licensee submissions such as:
 - scheduled annual compliance reports
 - unscheduled event or occurrence reports



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Rating Objectives

- Provides overall picture to the Commission, public and Indigenous Groups on performance in a transparent manner
- Trending of ratings over time can inform regulatory program
- Indicate to licensees where they need to focus effort and where they need to maintain current performance
- Highlight good performance



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Rating Methodology Overview (1/2)

- Expert judgement/qualitative approach in evaluating and rating licensees' performance using performance indicators
- Based on evaluation of licensee's performance:
 - since the last rating was assigned
 - over the current licensing period including the significance of any enforcement actions issued and the licensee's response to those actions
- Ratings draw upon the FAC Teams' exposure to rating similar facilities within that safety and control area and ensure knowledge is shared

Rigorous methodology and reproducible ratings



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Rating Methodology Overview (2/2)

Each safety and control area is evaluated individually and every facility has different inputs to the technical topic areas

For example:

- a rating may not have an input from onsite inspections in an SCA if none were conducted in that year
- in these cases the rating input is based on the FAC Team's assessment of scheduled and unscheduled reports since the last rating was assigned

Each safety and control area is evaluated individually



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Three Step Process Approach

1

Identify
Compliance Results

- Inspections
- Technical assessments
 - scheduled reports
 - unscheduled reports
- Enforcement actions
- Trends
- Performance indicators

2

Assess Compliance
Results

- Regulatory requirements

3

Rate Performance

- Performance by SCA
for each licensee



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Identify Compliance Results



- Compliance results compiled by FAC Team
- The number and types of compliance results is facility specific and based on our risk-informed compliance plans
- Non-compliances are addressed as they are found and the Commission is updated on any significant findings at the time they occur



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Assess Compliance Results



- Use a qualitative, expert based approach to assess compliance results against regulatory requirements using documented technical assessments
- Safety significance is assigned to non-compliances and enforcement actions
- CNSC Regulatory Information Bank database used to rank, monitor and report on non-compliances and enforcement actions and licensee commitments



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Rate Performance (1/2)

1

- Scheduled and unscheduled reporting
- Inspection results
- Non-compliances and enforcement actions
 - low, medium and high safety significance

2

3

Rate Performance

- Performance indicators and trends
 - lost-time injuries
 - reportable events
 - licensee response to events
 - worker radiation doses
 - environmental releases
 - major improvements

FAC Team Considerations in Rating Performance



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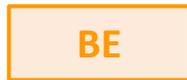
Rate Performance (2/2)



- Qualitative approach taken due to the number of compliance results considered for these licensees
- Consistency in rating between facilities and activities through FAC Teams' shared knowledge, lessons learned and mentoring
- Single reportable event or deficiency in a program area does not result in a licensee getting a BE or prevent a licensee from getting a FS
- Compliance results drive the rating in an SCA



Unacceptable



Below expectations



Satisfactory



Fully Satisfactory



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Example 1: Agnew Lake 2016 Radiation Protection SCA Rating



Inspections

- Type II Baseline Inspection

Technical assessments

- Annual compliance report review

Inconsistent implementation of radiation protection program across site

- Lack of formally documented radiation protection program
- Inconsistent application of radiation protection on site

Enforcement Actions

- 3 Action Notices

Low safety significance

- static state of the site and infrequent access

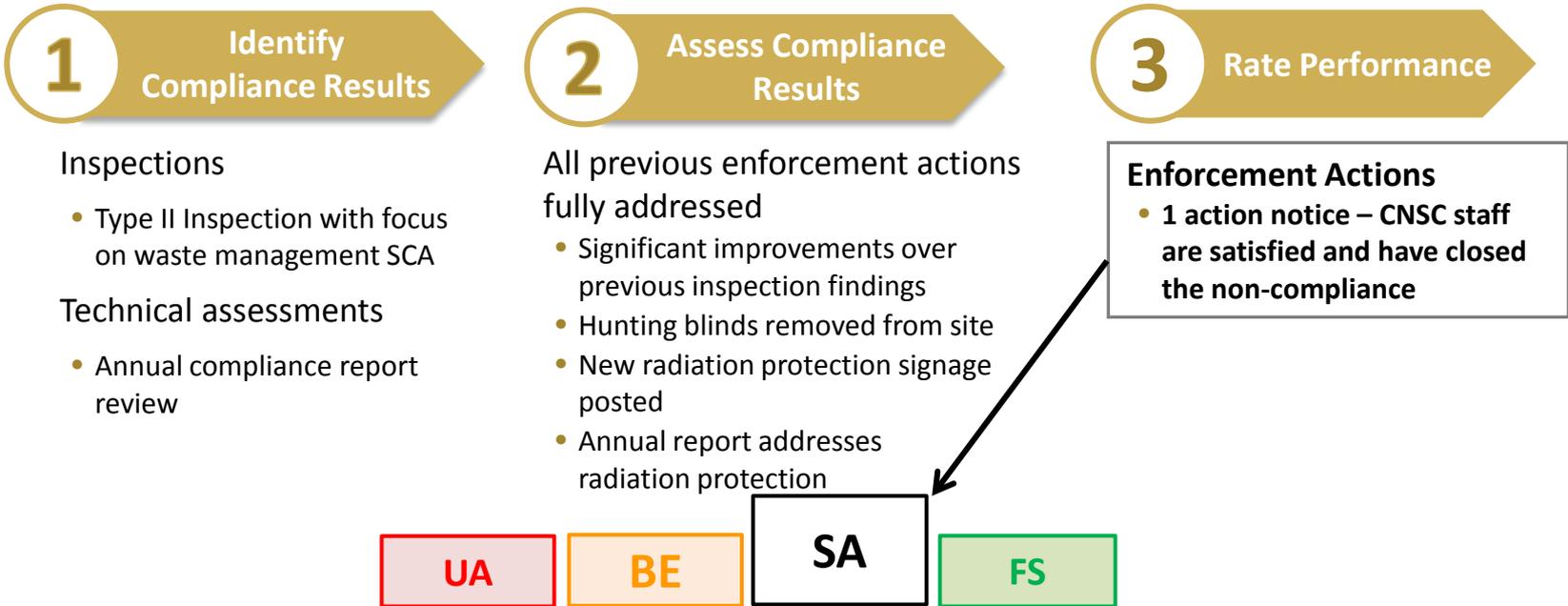
- Site had specific elements of a radiation protection program such as dosimetry, signage and limited access to site although no formal documentation



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Example 2: Agnew Lake 2017 Radiation Protection SCA Rating

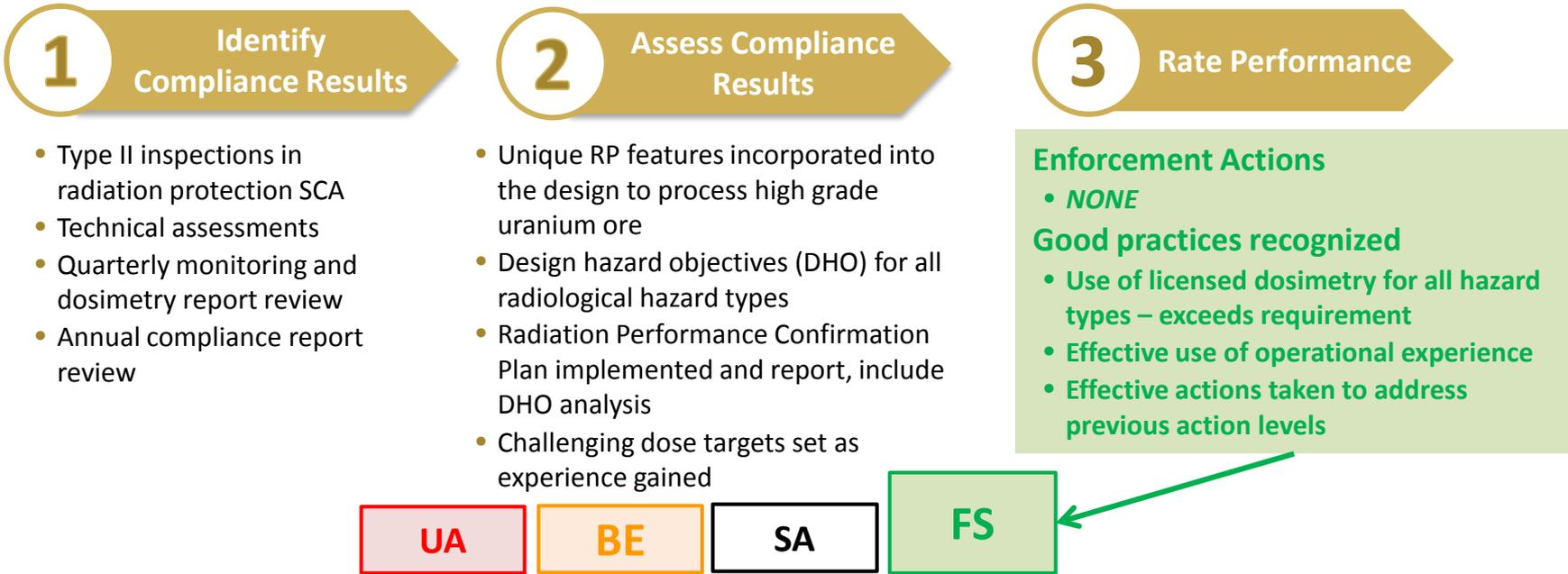




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Example 3: McClean Lake – Radiation Protection SCA Rating





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Conclusions

- Performance ratings utilize a qualitative, expert based approach that takes into consideration the wide variety of licences and relative risk-ranking associated with the type of activity and associated hazards
- While the approach is qualitative, it is comprehensive, based on expert opinion and includes operational staff, subject matter experts and management to arrive at performance ratings



ANNEX 2

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INTERVENTION COMMENTS



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Interventions

The following interventions are addressed:

- CMD 18-M48.1 - Athabasca Joint Engagement and Environmental Subcommittee
- CMD 18-M48.2 - Métis Community of Pinehouse
- CMD 18-M48.3 - Canadian Nuclear Workers Council
- CMD 18-M48.4 - English River First Nation
- CMD 18-M48.5 - Ya'thi Néné Land and Resource Office
- CMD 18-M48.6 - Saskatchewan Environmental Society



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Interventions

- CMD 18-M48.7 - Prince Albert Grand Council
- CMD 18-M48.8 - Canadian Environmental Law Association
- CMD 18-M48.9 - Northwatch
- CMD 18-M48.10 - Sagamok Anishnawbek
- CMD 18-M48.11 - Athabasca Chipewyan First Nation
- CMD 18-M48.12 - Algonquins of Ontario



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Interventions – CMD 18-M48.1 Athabasca Joint Engagement and Environmental Subcommittee

Comment	CNSC Disposition
Athabasca Joint Engagement and Environmental Subcommittee (AJES) has been well informed about the operations included in this 2017 ROR.	No comment.



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Interventions – CMD 18-M48.2 Métis Community of Pinehouse

Comment	CNSC Disposition
Pinehouse is satisfied with the information provided in this Regulatory Oversight Report and is supportive of the information received from Cameco with respect to its operations.	No comment.



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Interventions – CMD 18-M48.3

Canadian Nuclear Workers Council

Comment	CNSC Disposition
<p>The Canadian Nuclear Workers Council (CNWC) concurs with the CNSC staff’s conclusions that:</p> <ul style="list-style-type: none"> - McArthur River uranium mine, Key Lake mill, and McClean Lake mill were operated safely during 2017 - each of the above sites covered by this report made adequate provision for the health and safety of the workers, the protection of the public and the environment, and Canada’s international obligations. 	<p>No comment.</p>
<p>We look forward to these facilities being rated as “fully satisfactory” in this area in the future.</p>	<p>CNSC continue to rate facility SCAs using the holistic approach described in the addendum. The “conventional health and safety” SCA at Cigar Lake was rated “FS” in a previous ROR.</p>



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Interventions – CMD 18-M48.4 English River First Nation

Comment	CNSC Disposition
Recommendations for readability.	These recommendations will be added to the lessons learned and considered for inclusion in future oversight reports.
Request to include Public Information and Community Engagement as a key performance indicator.	The key licensee performance indicators, based on risk, are radiation protection, conventional health and safety and environmental protection. Public information and community engagement will continue to be reported on in the annual regulatory oversight report.
Request for formal framework for engagement.	In addition to the ongoing engagement work conducted by CNSC staff in northern Saskatchewan, CNSC staff are working with interested Indigenous communities and organizations to establish a mutually agreeable formalized structure for ongoing and regular engagement and communication that meets their information needs and expectations.



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Interventions – CMD 18-M48.4 English River First Nation

Comment	CNSC Disposition
Provide explanation of what the purpose of administrative levels and action levels are for all sites.	Action levels are an indication of whether there is a loss of control of an aspect of the operation and are used as an early warning sign to ensure licence limits are not exceeded. Administrative levels are internal targets that licensees use to represent the high end of normal operations.
What are the non-compliances at these sites?	All non-compliances identified at operating, historic and decommissioned sites were of low safety significance. CNSC staff assessed and verified that licensee’s corrective actions taken in response to identified non-compliances were appropriate and acceptable. All enforcement actions were addressed appropriately by licensees and have been closed by CNSC staff. Non-compliances are identified in inspection reports, are available upon request pending review of protected information.
Does financial guarantee’s established for the sites encompass monies required to undertake engagement and consultation?	Engagement may be included in the financial assurance/guarantee. Engagement activities would be conducted to ensure communities, Indigenous groups and other interested groups are aware of what is proposed to provide an opportunity for input.



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Interventions – CMD 18-M48.5 Ya'thi Néné Land and Resource Office

Comment	CNSC Disposition
Requested that CNSC staff work collaboratively with the Ya'thi Néné to continue to refine and focus information sharing efforts.	In addition to the ongoing engagement work conducted by CNSC staff in northern Saskatchewan, CNSC staff are working with interested Indigenous communities and organizations to establish a mutually agreeable formalized structure for ongoing and regular engagement and communication that meets their information needs and expectations.
Engagement with Ya'thi Néné on IEMP planning.	The CNSC is committed to regular, structured and formalized engagement with Indigenous groups to discuss activities and issues related to the uranium mines and mills. CNSC staff are planning to send notification letters well in advance and will ask for feedback. CNSC staff will consider feedback from Indigenous groups in the sampling plan.
Process to share spill notification.	Uncontrolled releases to the environment are posted on the licensee website, and the CNSC website as required.
Addition of a plain language summary to assist in translation to Indigenous languages.	This recommendation will be captured under the lessons learned process for consideration in future RORs.



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Interventions – CMD 18-M48.6 Saskatchewan Environmental Society

Comment	CNSC Disposition
3.1 ALARA.	CNSC Regulatory Guide Document G-129 is available to assist in clarifying ALARA.
3.2 Long term planning and climate change.	<p>Long term predictions is the scope of the ROR which is a report on activities that took place in 2016 and/or 2017.</p> <p>3.2.1: Onsite compliance inspections include assessment of erosion and geotechnical stability of containment structures.</p> <p>3.2.2 and 3.2.3 are outside the scope of the ROR.</p>
3.3 Access to inspection reports and participation in inspections.	<p>CNSC regulatory oversight activities such as inspections are conducted by highly qualified and certified inspectors. CNSC staff are required to maintain occupational health and safety training as well as other training in order to participate in inspections. There are no plans to allow the public or other groups to accompany inspectors on inspections.</p> <p>The frequency and scope of inspections are based on risk. Inspections are only one component of compliance activities. A list of inspections is provided in the ROR and inspection reports are available upon request, pending review of protected information.</p>



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Saskatchewan Environmental Society

Comment	CNSC Disposition
<p>3.4 Radon Gas Consider different standard background for the region.</p>	<p>Monitoring demonstrates that atmospheric radon levels rapidly decrease with distance such that members of the public beyond the property boundaries are exposed to natural background radon levels. Thus, there is no need to complete detailed calculations of incremental dose.</p> <p>The background range (<7.4 – 25 Bq/m³) used for the ROR is from the Cumulative Effects Monitoring Program completed between 1994 and 2000 established after the regional FEARO panel reviews on uranium mining in Saskatchewan. This range fits well with the data provided by other radon studies.</p> <p>McClellan Lake pre-operational baseline:</p> <ul style="list-style-type: none"> • average 24 Bq/m³ • upper 95th percentile: 58 Bq/m³ <p>Saskatchewan (Grasty 1994)</p> <ul style="list-style-type: none"> • 1990 average: 16 Bq/m³ • 1991 average: 61 Bq/m³ (very dry year) <p>Canadian national (Grasty and Lamarre 2004)</p> <ul style="list-style-type: none"> • outdoor average for 17 cities: 13.5 Bq/m³



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Comment	CNSC Disposition
<p>3.4 Radon Gas The 1 mSv/yr above background does not include all other radiation sources.</p>	<p>Radionuclides associated with uranium mining and milling are found naturally in the environment. The radiation protection regulations require that the dose over and above background be < 1 mSv/year (i.e., incremental dose). With the exception of radon, the combined dose from background and incremental dose is so low (μSv/year range) that it is not necessary to separate background from incremental. However, this is not the case for radon.</p> <p>As it is not possible to discern background radon from incremental radon resulting from mining and milling activities, it is simpler to assess radon activity levels against background conditions. If radon levels are within regional background, then there is no need to complete complex radon transport and exposure modelling.</p>



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Comment	CNSC Disposition
3.5 Ammonia releases.	<p>As with any environmental incident/spill which is reported to the CNSC, CNSC staff review any proposed corrective and preventative actions to prevent a re-occurrence. A review of maintenance procedures and practices is often included in the investigation. All ammonia released in 2017 were classed as low risk both to the environment and to the workers.</p> <p>Key Lake has initiated a 3-year refurbishment plan to address ammonia leaks.</p>
3.6 Impact of ventilation on the outside environment.	<p>Radon, and particulate monitoring are conducted as part of the licensee environment monitoring program. CNSC staff review the monitoring data and verify that it is within the predicted performance.</p>



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Comment	CNSC Disposition
3.7 Effluent toxicity testing.	<p>Effluent toxicity testing involves two types of testing: acute toxicity assays, and chronic or sublethal assays based on ECCC certified test methods.</p> <p>Passing the acute toxicity assays is required for compliance. Testing is completed on 100% undiluted effluent using the rainbow trout 96 hour standard. With the coming into force of the new <i>Metal and Diamond Mining Effluent Regulations</i> an additional zooplankton (D. magna) acute toxicity test will also be required.</p> <p>Sublethal or chronic toxicity testing is also required. These are completed less frequently and involve a battery of assays for fish, invertebrates, aquatic plants, and algae.</p> <p>Routine monitoring activities are also required in the receiving environment including water, sediment and fish tissue chemistry, as well as biological monitoring in the form of benthic invertebrate community, studies and fish health and populations studies. Special studies are required if necessary.</p>



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Comment	CNSC Disposition
3.8 Participation in the EQC.	The Environmental Quality Committee (EQC) is a provincial committee and outside the CNSC mandate.
3.9 Financial guarantees under federal or provincial governments.	Sites where the licensee is a government entity, the ultimate liability rests with the provincial or federal government. Guidance on decommissioning is discussed in CNSC’s Regulatory Guide Document G-219 and CSA Standard N294.0.
3.10 Future liability for transferred sites.	Once a property enters into the Institutional Control Program (ICP), regulatory oversight managed entirely by Province of Saskatchewan.



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Comment	CNSC Disposition
<p>4.1 Cigar Lake (pages 8 & 9): Cigar Lake is carrying forward a shortfall of 12.7 million kilograms of uranium which can be recouped in future years. What is the purpose of defining authorized annual production? What would be the impact of significantly exceeding the limit some years if the company chooses to recoup the shortfall?</p>	<p>The authorized annual production is the production rate requested by Cameco for which the safety case for the Cigar Lake Operation has been accepted by CNSC.</p> <p>The provision for applying for production flexibility during the current licence period allows for Cameco to recoup production shortfalls.</p> <p>CNSC accepted the flexible production rate for Cigar Lake Operation based on conclusions of the environmental assessments.</p> <p>An increase above the authorized annual production rate of 7.0 million kilograms of uranium per year, or above the production flexibility of 9.25 million kilograms of uranium per year, would need to be reviewed by CNSC staff. The recoup of the ‘shortfall’ in any one year remains constrained by the authorized maximum flex production of 9.25 million kilograms of uranium.</p>
<p>Radon worker exposure.</p>	<p>Dose from radon gas is calculated and assigned when workers are in RnG levels above 3,000 Bq/m³ (equivalent to a 0.5 µSv/h dose rate).</p> <p>In 2017 there were no instances where workers were exposed to radon gas levels greater than 3,000 Bq/m³.</p>



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Comment	CNSC Disposition
<p>4.1 Cigar Lake (pages 8 & 9)</p> <p>Arsenic chemical species.</p>	<p>Arsenic (V) is the valence state typically encountered in surface water of neutral pH and well oxygenated (McIntyre & Lipton 2011).</p>
<p>It appears the background level of radon in ambient air at Cigar Lake is quite low. Should the 1 mSv reference line in table 3.4 be lowered accordingly?</p>	<p>Radionuclides associated with uranium mining and milling are found naturally in the environment. The radiation protection regulations require that the dose over and above background be < 1 mSv/yr (i.e., incremental dose). With the exception of radon, the combined dose from background and incremental dose is so low ($\mu\text{Sv}/\text{yr}$ range) that it is not necessary to separate background from incremental. However, this is not the case for radon.</p> <p>As it is not possible to discern background radon from incremental radon resulting from mining and milling activities, it is simpler to assess radon activity levels against background conditions. If radon levels are within regional background then there is no need to complete complex radon transport and exposure modelling.</p>



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Comment	CNSC Disposition
<p>Cigar Lake received a “fully satisfactory” rating for conventional health and safety in 2013, but not for subsequent years. What changed?</p>	<p>In 2012, Cameco received a “fully satisfactory” rating for the safety control area of conventional health and safety in holistic consideration of the achievements for the year.</p> <p>That year, Cameco continued to carry out rehabilitation of the underground workings and mine development at Cigar Lake without any safety incidents. Both the employee and contractor camps were at capacity due to construction and mine development activities. CNSC staff observed that Cameco strove for improvements in its overall safety program and to build upon its safety culture. Therefore, considering the increase in activities and the required personnel to complete those activities during which there were zero LTIs, Cameco’s performance for Cigar Lake in the conventional health and safety SCA was rated as “fully satisfactory”.</p> <p>In 2013, although Cigar Lake Operation continued to strive for improvement in the overall program, the SCA rating was changed to “satisfactory” following a review of key performance indicators, including four lost-time incidents that year.</p>



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Comment	CNSC Disposition
<p>4.2 McArthur River (page 9): Figure 4.2 - Radon and radon progeny.</p>	<p>Higher RnG in 2016:</p> <p>The higher collective dose values for radon gas (RnG) in 2016 were due to acute exposure events and not chronic exposures.</p> <p>Reduction in RnP Collective Dose:</p> <p>In 2016, acute exposure events for RnG also resulted in some increases in radon progeny (RnP) for certain individuals involved (as RnG is the origin of RnP). In two instances, this resulted in exceedance of the weekly action level of 1 mSv. These were reported in the 2016 ROR (CMD 17-M47). Ventilation upgrades and improvements to control RnG/RnP in higher risk work areas that began in 2016 resulted in reductions in worker collective dose in 2017.</p>
<p>Changes to the Read Creek conveyance channel.</p>	<p>To accommodate an inflow event, a contingency effluent flow rate of 1,500 m³/hr was approved in 2009. As a result of this change, the original effluent flow path through a muskeg area had the potential to effect the environment due to sediment transport downstream. Figure 4.4 shows the modified effluent path. DFO, Province of Saskatchewan and CNSC reviewed and approved the flow path change.</p>



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Comment	CNSC Disposition
Ammonia leaks.	CNSC staff followed up on the ammonia spills during a January 23, 2018 inspection. Cameco’s predictive and preventative maintenance program was evaluated and “actions” for improvement issued. All “actions” have been closed.
Value of triennial monitoring and lichen species selection.	More frequent sampling is not required as atmospheric deposition rates are low. In addition, more frequent lichen sampling would be irresponsible as coverage is limited and growth rates are extremely slow (i.e., mm per year). Lichen of the genus Cladina also known as reindeer lichen are collected. (C. mitis, C. rangiferina, C. stellaris). Used to monitor deposition of metals and radionuclides.



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Comment	CNSC Disposition
4.3 Rabbit Lake (Pages 9 and 10): RnP contribution to dose 73% at Rabbit Lake and 33% at McClean Lake. Why?	The difference between the sites is attributed to the fact that they are different operational facilities with different source terms. Most sources of gamma radiation have been reduced at Rabbit Lake as a result of placing the facility in care and maintenance. The maximum individual dose due to radon progeny (RnP) at Rabbit Lake was 1.29 mSv.
RnP:RnG ratio.	<p>The RnG:RnP ratios at a mine site will vary based on a number of factors such as mining activities, time periods after radon gas (RnG) has entered an area, and ventilation rates.</p> <p>It is important to know the equilibrium factor when estimating the concentrations of RnP from a radon gas sample.</p> <p>However at the Uranium Mines and Mills, the radon gas and the radon progeny are measured separately. Therefore the equilibrium factor is not required to calculate RnP as it is directly measured.</p>



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Comment	CNSC Disposition
4.3 Rabbit Lake (Pages 9 and 10 cont'd): RnG increase from 2015 to 2016.	There can be year to year fluctuations in RnG doses. The 2016 collective dose value was consistent with historical values. When radon gas levels are $\geq 3,000$ Bq/m ³ , work permits are issued and worker exposures are calculated based on the measured hazard levels and time spent in the area. There can be year to year variations in RnG dose values due to changes in hazard levels, exposure times and the number of persons involved.



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Comment	CNSC Disposition
<p>4.3 Rabbit Lake (Pages 9 and 10 cont'd): Uranium in effluent and impact on fingernail clams.</p>	<p>The Rabbit Lake site has been in operation for over 30 years commencing operations in 1975. The effluent in the early years (e.g., late 1970s) prior to modern regulations was actually acutely toxic due to high ammonia levels (EC 1980). During this period, the upper reaches of Horseshoe Creek were severely impacted with no zooplankton, or benthic invertebrates in the upper ponds (thus no fingernail clams) (EC 1980). The current benthic invertebrate and fish community actually represents a substantially recovered biological system as a result of improved effluent quality and recolonization. Unlike insect benthic invertebrates, fingernail clams do not have an aerial life-stage thus recolonization to these headstream waters would be limited.</p> <p>This has been confirmed and documented in a recent scientific paper published by CNSC staff. Reference of the paper: Kilgour BW, Dowsley B, McKee M, Mihok S, 2018. Effects of uranium mining and milling on benthic invertebrate communities in the Athabasca Basin of Northern Saskatchewan. Can Water Res J.</p>



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Comment	CNSC Disposition
<p>4.4 Key Lake (Page 10) To what extent are trends in RnP exposure and radon in ambient air connected?</p>	<p>There is no clear connection between these two values. The decreasing trend in RnP collective dose is due to decreases in the number of workers, not due to changing hazard levels.</p> <p>The number of person that have received RnP exposures has decreased from 1,148 persons in 2015, to 804 persons in 2016 and 670 persons in 2017.</p>
<p>Is the decline in SO₂ in 2016 and 2017 expected to continue, or will it increase when production levels increase?</p>	<p>As noted in the ROR, a new acid plant was installed at the site in 2012, which included a new air pollution scrubber. There was a decline in the actual stack emissions since the new plant became operational.</p> <p>CNSC staff will continue to review SO₂ emissions when the facility returns to operation.</p>
<p>What species of lichen is collected for triennial sampling?</p>	<p>Lichen of the genus Cladina are collected, also known as reindeer lichen (C. mitis, C. rangiferina, C. stellaris). Used to monitor deposition of metals and radionuclides.</p>



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Comment	CNSC Disposition
<p>Concerns related to allowing the tailings level in the Deilmann Pit have not been addressed.</p>	<p>The Key Lake Extension Project included both a production increase for the mill and increased capacity or expansion of the existing Deilmann Tailings Management Facility. The Province conducted an Environmental Assessment for the Project which also included public and Indigenous community consultation, and CNSC consultation activities were harmonized with the Province’s consultation activities.</p> <p>An Environmental Assessment (EA) under the <i>Nuclear Safety and Control Act</i> (NSCA) was also completed for the Key Lake Extension Project. The consultation for the provincial EA in which CNSC staff participated was used to inform the public and Indigenous community consultation for the EA under the NSCA.</p> <p>The Commission accepted the Environmental Assessment for the Key Lake Extension Project in an Abridged Hearing in June 2014.</p>



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Comment	CNSC Disposition
<p>4.6 Beaverlodge What are the merits of a stainless steel vs. concrete mine cover?</p>	<p>For Beaverlodge the quality of existing caps installed in the 1980s could not be assured and therefore a decision was made, in accordance with the regulatory acceptance criteria, to replace or cover the existing caps.</p> <p>The use of steel caps provides an option that has a much longer life than a concrete and also enables the licence to cover existing concrete caps. Placement of the steel caps over the existing concrete reduces safety risks by avoid working around an open hole.</p> <p>Stainless steel has a much longer life compared to concrete (1,000s of years versus approximately 100). One of the primary negatives of using steel is the potential for theft from readily accessible sites. This is considered a lower risk at Beaverlodge due to remoteness.</p> <p>Both caps are durable and can last for a long time for closure of the opening. It is the choice of the licensee to decide which cap they want to use.</p>



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Comment	CNSC Disposition
<p>4.6 Beaverlodge The financial guarantee for Beaverlodge is described as the responsibility of the Canadian government, with no figure provided. Does this apply to sites that have not been transferred to the provincial ICP? Saskatchewan has a total of only \$177,200 assigned, is this sufficient?</p>	<p>For all of the sites where the financial assurance/guarantees are backed by the federal and provincial governments, the CNSC has reviewed the proposed arrangements and are satisfied there will be sufficient funds to complete the work. This information has been presented to and proposed mechanisms have been accepted by the Commission.</p> <p>For the five properties at Beaverlodge already in the ICP, these are all very low risk sites. As described in the publically available monitoring report from the Province in 2014, only two water quality samples were collected and there is only one shaft cap requiring replacement in the future.</p> <p>CNSC staff reviewed the proposed monitoring and maintenance plans and fund allocation and determined it to be adequate.</p>



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Comment	CNSC Disposition
<p>4.7.1 Completeness of decommissioning: Is the core storage area at Cluff Lake in a satisfactory condition to permanently leave the site?</p>	<p>The maintenance of the core storage area is a requirement of the Province of Saskatchewan. The core library is part of exploration activities which are permitted by the Province and are considered NONS (NORM) by the CNSC. The Cluff Lake Project core library and the assessment of risk associated with it are outside of the mandate of the CNSC.</p>
<p>4.7.2 Coverage of Tailings: Is the cover sufficient? Is there a need for independent review?</p>	<p>Environmental Risk Assessments are updated every five years and reviews since decommissioning provide evidence that Snake Lake remains protected. An independent assessment may be recommended when Orano submits a request to the CNSC to transfer the TMA into institutional control of Saskatchewan.</p>
<p>4.7.3 Cover material for mine openings: What are the merits of stainless steel and concrete covers?</p>	<p>Mine openings shall be closed off with an engineered cap. Design specifications for each cap are provided by the proponent and are considered as best engineering practice in Canada. Both caps are durable and can last for a long time for closure of the opening. It is the choice of the licensee to decide which cap they want to use.</p>



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Comment	CNSC Disposition
<p>4.7.4 Cluff Lake: IEMP monitoring: Why are CNSC staff concluding that the environment is protected without including radon results?</p>	<p>Radon in ambient air rapidly disperses to background levels once outside the perimeter of the uranium mine or mill, which is where all the Cluff Lake IEMP samples were taken. Hence, CNSC staff conclude that the environment is protected.</p>
<p>Why isn't Island Lake included in IEMP monitoring?</p>	<p>The IEMP did not sample at Island Lake because the IEMP samples at publicly accessible locations that are frequently used by members of the public. The exposure locations were selected because they are downstream of where the effluent was discharged and because they are in close proximity to where a member of the public is reasonably expected to fish, eat berries, and drink water.</p>



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Comment	CNSC Disposition
<p>4.8 Gunnar Mine Site Concerns with funding of project.</p>	<p>Not within the CNSC mandate. The licensee can speak to the funding of the project.</p>
<p>4.9 Rayrock Site Radon and gamma monitoring is carried out every five years, and surface water quality monitoring every three years. This seems inadequate given that remediation is still far from completion.</p>	<p>Rayrock was initially remediated in the 1990s and included the removal of buildings, closure of the mine adit(s), tailings containment areas and a waste disposal area. Since then it has been in monitoring and maintenance; there is substantial data to support this sampling frequency.</p> <p>In addition to the formal monitoring program, the licensee has undertaken extensive site characterization activities which included collection of soil, sediment, surface water, and fish. Those results have fed into an updated risk assessment for the site and development of remedial options. Once the remediation is complete, a revised monitoring program will be reviewed by CNSC staff. The monitoring program including the frequency of the sampling must be adequate to demonstrate the effectiveness of the remediation in the long-term.</p>



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Comment	CNSC Disposition
<p>4.10 Port Radium</p> <p>Remediation of the site was completed in 2007 (p.139) and it is now apparently at the stage of post-remediation monitoring and maintenance. However, elevated concentrations of several contaminants are still found in onsite waterbodies (p.141). Does this mean that such concentrations are acceptable and that further remediation is not required?</p>	<p>No further remediation work is required. However, CNSC staffs' expectation is that should the results of on-going monitoring or inspections demonstrate that maintenance activities are required, then the licensee would be required to undertake those activities. For example, during the 2016 inspection, there was evidence of some shoreline erosion. The licensee has addressed the erosion with the installation of additional rip-rap along the shoreline. CNSC staff are satisfied with the measures taken by the licensee.</p>
<p>Do we know how much the Canadian government has designated for future costs of monitoring, maintenance and any future remediation at Port Radium?</p>	<p>The Government of Canada has committed to the effective monitoring of Port Radium which includes ensuring that resources are available for the continued long term monitoring of the site.</p>



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Comment	CNSC Disposition
4.11 Elliot Lake Indefinite term licence for Elliot Lake sites.	The indefinite licence term for the Elliot Lake sites was a decision taken by the Commission in 2001 due to the fact that sites were decommissioned and sites were under long term care and maintenance.



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Comment	CNSC Disposition
<p>4.12 Agnew Lake Ontario's monitoring and maintenance at Agnew Lake and hazard signage on site.</p>	<p>Agnew Lake is an orphan site and now is the responsibility of the Province of Ontario. The site was decommissioned in the 1980s according to industry practice at the time. The site was not licensed by the CNSC until 2001. As part of CNSC's requirements for ongoing care and maintenance, the licensee will be performing upgrades to the cover.</p> <p>As per most decommissioned mine sites, public access is not restricted by physical means such as fencing. The Agnew site is isolated and any use of the site by the public is infrequent and limited (mostly hunting).</p>



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Interventions – CMD 18-M48.7 Prince Albert Grand Council

Comment	CNSC Disposition
<p>Proposal for research project on the impact of northern mines on Indigenous communities.</p>	<p>The CNSC encourages the Prince Albert Grand Council (PAGC), and interested groups, to work with the licensees, or the Province of Saskatchewan, to discuss their interest in undertaking this type of research and receiving funds for such research and collaboration projects.</p> <p>The CNSC also encourages the PAGC to consider such initiatives as Community Vitality Monitoring Partnership who has a mandate to assess the social well-being and quality of life of residents of Northern Saskatchewan impacted by uranium mining; for further information on any social implications of uranium mining on northern Saskatchewan.</p>



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Interventions – CMD 18-M48.7 Prince Albert Grand Council

Comment	CNSC Disposition
Funding to train Indigenous youth.	<p>The CNSC encourages PAGC, and interested groups, to work with the licensees, or the Province of Saskatchewan, to discuss their interest in receiving funds to train Aboriginal youth; particularly if the training relates to youth taking part in decommissioning and/or reclamation activities.</p> <p>The CNSC is willing to explore with PAGC to determine how the CNSC could contribute through an appropriate funding mechanism to provide community members a chance to learn about nuclear industry practices and regulatory work to verify safety and compliance. Depending on the desired scope of the program, this type of initiative would be consistent with the CNSC’s mandate to disseminate scientific and regulatory information to the public.</p>
Can the CNSC support Indigenous controlled reclamation activities, such as Species at Risk?	<p>The CNSC encourages PAGC, and interested groups, to work with the licensees to discuss their interest in involvement in licensees’ reclamation activities if these activities are on the licensees sites. If PAGC has interest in reclamation activities outside of licensed facilities, then CNSC encourages PAGC to work with the province of Saskatchewan, Environment Canada or other relevant organizations (where appropriate) to propose such projects.</p>



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Interventions – CMD 18-M48.7 Prince Albert Grand Council

Comment	CNSC Disposition
Does CNSC have any information on safety issues related to human and ecosystem about the mines in the CLEANs project?	Project CLEANs is a program managed by the Government of Saskatchewan. Only 2 of the 37 sites are licensed by the CNSC (Gunnar and Lorado). All 37 mines were assessed and only the Gunnar and Lorado sites require licensing and oversight by the CNSC.
Question regarding flooding issues at Gunnar and 37 abandoned mines.	<p>CNSC staff reviewed the effect of a severe rain event occurring every 1,000 years and concluded that the covers at the site would remain intact. The CNSC review risk assessment every five years and flood assessment will be updated with new climate change science.</p> <p>Additional work on covers could be requested if climate data suggest floods would be more intense than anticipated.</p>



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Interventions – CMD 18-M48.7

Prince Albert Grand Council

Comment	CNSC Disposition
<p>Lorado 1a) Mine revegetation.</p>	<p>Local Indigenous communities were involved in developing the revegetation plans. Licensee can provide more information.</p>
<p>Lorado 1b) Fish Advisory and compensation for loss of work.</p>	<p>Fish advisories are administered by the Province of Saskatchewan.</p>
<p>Lorado 2) Fire Protection.</p>	<p>Mine rescue plans and testing , including underground fires, are assessed by the Province of Saskatchewan, and are included in the Emergency Response Programs reviewed by CNSC staff.</p> <p>Forest fires are considered as part of the licensee emergency programs evaluated by the CNSC. Facilities at risk of forest fire coordinate with the appropriate provincial agencies to ensure the safety of persons and protection of facilities as required.</p> <p>A small fire at Gunnar in 2017 was reported in CMD 17-M47.</p>



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Interventions – CMD 18-M48.7 Prince Albert Grand Council

Comment	CNSC Disposition
Does the CNSC or licensee test the sample in several labs to verify the accuracy of results.	Licensee samples are analyzed at accredited laboratories. The CNSC also conducts sampling through the IEMP where environmental samples are analyzed at the CNSC lab or a third-party accredited lab.
Caribou migration and species at risk.	This is under the mandate of Environment and Climate Change Canada.
Opportunities for improvement.	These will be captured under the lessons learned and considered for improvement to future reports.



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Interventions – CMD 18-M48.8

Canadian Environmental Law Association

Comment	CNSC Disposition
<p>Releasing radionuclide data in an ROR is not equivalent to reporting under the NPRI.</p>	<p>The ROR text states “ making this data accessible as part of their commitment to open government and ...” (bold added).</p> <p>The ROR appendices are only Phase I of a multiphase public reporting plan:</p> <ul style="list-style-type: none"> - Phase I: Appendices and CNSC-NPRI Web linkages - Phase II: Digitally downloadable databases <p>The CNSC will be providing digitally downloadable databases on radionuclide releases, transfers and disposals with direct linkages established between the CNSC and NPRI sites.</p> <p>In the interim, data tables are being provided in the RORs and CNSC-NPRI links are being established to existing CNSC environmental information and data products.</p> <p>Canadian Environmental Law Association has been informed of the multi-phase plan via CNSC progress updates provided to the NPRI Multi-Stakeholder Work Group. This is now a regular agenda item.</p>



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Interventions – CMD 18-M48.8

Canadian Environmental Law Association

Comment	CNSC Disposition
Reporting radionuclide data to the NPRI would support Goal 7 of the CNSC's Strategic Planning Framework.	<p>This is identified as a core initiative of the CNSC Strategic Planning Framework, item 7.1.1.</p> <p>There is an OMC approved internal work plan with formal Terms of Reference (ToR) and an external ToR and work plan with the NPRI.</p> <p>7.1.1 Make licensee data, such as environmental releases etc., available through open source:</p> <ul style="list-style-type: none"> a) Include licensee release data as an appendix to applicable 2017 Regulatory Oversight Reports (2018-2019) b) Publish licensee release data on the CNSC website (2018-2019).
Reporting radionuclide data to the NPRI would further the public's right to know.	<p>The establishment of links between the NPRI and the CNSC furthers the public's right to know providing increased public access to the greater range of data available on the CNSC website.</p> <p>NPRI noted that CNSC environmental reporting requirements and information exceeded those of the NPRI with a wealth of additional information on releases, environmental data and radiological and environmental sciences.</p>



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Interventions – CMD 18-M48.9

Northwatch

Comment	CNSC Disposition
Agnew Lake cover.	Through inspections of the TMA at Agnew Lake site, CNSC staff identified areas of higher radiation and requested the licensee take corrective actions to eliminate the risks of a member of the public receiving a dose above the annual dose limit. The licensee proposed to add soil contaminated with naturally occurring radioactive material (NORM) from the former Beaucage Niobium mine as additional cover material. In 2016, the licensee conducted a public dose assessment to consider the addition of the Beaucage material and concluded that the resulting dose would be below public dose limit. CNSC staff are awaiting an amendment application from the ministry.



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Interventions – CMD 18-M48.9

Northwatch

Comment	CNSC Disposition
Denison TMA - 1 site uranium in effluent.	The effluent coming from TMA-1 is above provincial water quality guidelines but is treated prior to release from the site. This is the reason why water treatment will be necessary for the foreseeable future.
Stanleigh TMA – radium.	Since the last exceedance in January, there have been no other exceedances at the Stanleigh effluent treatment plant. In addition, CNSC staff requested additional monitoring by the licensee downstream from the site and the results demonstrated there has been no effect on aquatic biota.
Beaucage mine to Pronto TMA.	CNSC staff confirmed with the licensee and through extensive review of the 2016 and 2017 annual reports that no plans were made to emplace any material from the former Beaucage niobium mine at the Pronto site.



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Interventions – CMD 18-M48.9 Northwatch

Comment	CNSC Disposition
ROR - reporting Historic and Decommissioned Sites every two years.	CNSC reports on the performance of the historic and decommissioned sites every two years. No reporting is conducted on the remaining sites annually because a number of these sites do not have annual monitoring programs, and some sites are not inspected annually (i.e., Port Radium and Rayrock). CNSC staff continue to ensure compliance through desktop reviews of the documentation provided by the licensees, inspections and meetings/teleconferences with the licensees.
LCHs for historic and decommissioned sites.	CNSC staff will develop licence conditions handbooks for the following licenses upon renewal or when an amendment request is submitted by the licensee: <ul style="list-style-type: none"> - Agnew Lake Tailings Management Area (2019 due to amendment request) - Denison and Stanrock Mines (2019, CNSC staff expect an amendment request in 2019) - Rio Algom Limited Elliot Lake Historic Sites Facility (2019-2020 CNSC staff await an amendment request from the licensee) - Bicroft Tailings Storage Facility and Madawaska Decommissioned Mines and Tailings Management Site (both in 2021 when these licences need to be renewed).



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Interventions – CMD 18-M48.9 Northwatch

Comment	CNSC Disposition
Agnew Site - mineral exploration.	Mineral exploration is not authorized at the Agnew Site. CNSC’s risk informed regulatory oversight considers activities at the site as well as the licensee’s compliance history and includes several activities such as inspections and reviews of various reports.
Agnew Lake – site access.	As per most decommissioned mine sites, public access is not restricted by physical means such as fencing. The Agnew Site is isolated and any use of the site by the public is infrequent and limited (mostly hunting).
Exempted sites not included in the report.	The sites in question were exempted by the Commission in 2001 and therefore are not subject to CNSC oversight. The two unlisted sites were former niobium mines which is considered NORM and therefore not regulated by the CNSC.



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Interventions – CMD 18-M48.9 Northwatch

Comment	CNSC Disposition																					
<p>Appendix K</p> <p>What is the annual loading from Stanleigh to the surface water receiving its effluent?</p>	<p>The following table shows the final discharge of Radium-226 and uranium from the Stanleigh effluent treatment plant. This information was missed in the drafting of the ROR and will be added to Appendix K when the Regulatory Oversight Report is published.</p> <table border="1" data-bbox="1110 565 1522 918"> <thead> <tr> <th colspan="3">Stanleigh Final Discharge</th> </tr> <tr> <th>Year</th> <th>226 (MBq)</th> <th>Uranium (kg)</th> </tr> </thead> <tbody> <tr> <td>2013</td> <td>2403.5</td> <td>23.8</td> </tr> <tr> <td>2014</td> <td>2087.2</td> <td>19.1</td> </tr> <tr> <td>2015</td> <td>976.7</td> <td>13.8</td> </tr> <tr> <td>2016</td> <td>2143.1</td> <td>15.7</td> </tr> <tr> <td>2017</td> <td>2375.1</td> <td>14.8</td> </tr> </tbody> </table>	Stanleigh Final Discharge			Year	226 (MBq)	Uranium (kg)	2013	2403.5	23.8	2014	2087.2	19.1	2015	976.7	13.8	2016	2143.1	15.7	2017	2375.1	14.8
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Interventions – CMD 18-M48.10 Sagamok Anishnawbek

Comment	CNSC Disposition
<p>Present CNSC report to Chief and Council and G'Daa Kiim-Non Committee and relevant follow-up information provided or requested.</p>	<p>CNSC staff are committed to strengthening relationships with each Indigenous community/group with interest in CNSC regulated facilities. As part of CNSC's long term Indigenous engagement strategy, CNSC staff are actively working with interested Indigenous communities/organizations to develop a mutually agreed upon formalized structure (e.g. terms of reference or protocol agreement) for ongoing and regular engagement and communication particular to the community/organization. Should an Indigenous community/organization wish to request a presentation updating the community's leadership on CNSC's Regulatory Oversight Report, this request can be accommodated in the formal agreement.</p> <p>In October 2018, CNSC staff met with representatives from Sagamok First Nation. In that meeting, preliminary discussions were held regarding developing a formalized structure for ongoing engagement and communication. The next meeting is scheduled for December 12, 2018.</p>



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Interventions – CMD 18-M48.10 Sagamok Anishnawbek

Comment	CNSC Disposition
Improve the Indigenous Community engagement and relationship building via formation of Indigenous Citizens Committee (ICC).	CNSC staff are actively working with interested Indigenous communities/ organizations to develop a mutually agreed upon formalized structure (e.g. terms of reference or protocol agreement) for ongoing and regular engagement and communication particular to the community/organization. The CNSC engages with Indigenous organizations in the format requested or suggested by the Indigenous community/organization. Should an Indigenous community/organization suggest CNSC engage with them through the ICC, the CNSC will accept this recommendation. However, the CNSC does not participate in the formation of an ICC.



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Interventions – CMD 18-M48.10

Sagamok Anishnawbek

Comment	CNSC Disposition
Provide community with updated environmental monitoring data (i.e. IEMP) of the Cameco Fuel Processing Facility, Agnew Lake and Elliot Lake Decommissioned mine sites.	CNSC staff provide their results from the IEMP campaigns on the CNSC website. CNSC staff look forward to working with the Sagamok Chief and Council to provide regular information to the community on the CNSC's oversight of licensees' annual environmental monitoring reporting data, as well as IEMP sampling and results.



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Interventions – CMD 18-M48.10 Sagamok Anishnawbek

Comment	CNSC Disposition
<p>Include Indigenous representative(s) the opportunity to be directly involved in CNSC inspection visits and participate in compliance verification activities at locations of interest to Indigenous communities.</p>	<p>A list of inspections is provided in the ROR and inspection reports are available upon request, pending review of protected information.</p>
<p>Create annual funding programs and scholarships to provide training opportunities for youth of Indigenous communities and programs that provide community members a chance to learn about nuclear industry practices.</p>	<p>The CNSC is willing to explore this request with Sagamok to determine how the CNSC could contribute through an appropriate funding mechanism to provide community members a chance to learn about nuclear industry practices. Depending on the desired scope of the program, this type of initiative would be consistent with the CNSC’s mandate to disseminate scientific and regulatory information to the public.</p>



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Interventions – CMD 18-M48.10 Sagamok Anishnawbek

Comment	CNSC Disposition
<p>Invite CNSC staff into community to enhance knowledge, promote transparency and discuss items of importance to Indigenous peoples.</p>	<p>CNSC is committed to building long-term relationships with Indigenous groups who have interest in the facilities it regulates and proactively engages with groups on a regular basis both prior to and post licensing decisions to discuss topics of interest and address their concerns.</p> <p>The CNSC will continue to consult and engage with Indigenous groups and during 2018, the CNSC has begun to implement Indigenous Engagement Forums, an important new initiative to facilitate on-going relationship-building and dialogue between CNSC staff and Indigenous groups with interest in CNSC regulated facilities and activities, throughout the licensing term of a particular facility or activity.</p> <p>The sharing of opportunities such as to intervene at Commission meetings on future RORs is one ongoing agenda item to be considered for Indigenous Engagement Forums. CNSC staff re-affirm a commitment to inform each group directly of the opportunity to intervene in future RORs, and the associated participant funding, regardless of whether an interest was expressed in intervening in previous RORs.</p>



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Interventions – CMD 18-M48.10 Sagamok Anishnawbek

Comment	CNSC Disposition
<p>Provide for annual site visits/inspections at the Cameco refinery, Elliot Lake and Agnew Lake decommissioned sites.</p>	<p>As an independent regulator, the CNSC does not conduct inspections with members of the public or Indigenous groups. Inspectors follow a systematic qualification process and receive training such as radiation protection, occupational health and safety and conducting onsite inspections. In addition, inspectors must have the necessary security clearances to receive access to nuclear facilities and review prescribed information as part of the inspections. However, CNSC staff encourage licensees to offer facility tours to Indigenous groups and interested members of the public.</p>



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Interventions – CMD 18-M48.10 Sagamok Anishnawbek

Comment	CNSC Disposition
<p>Incorporate TEK sustainability insights, implementing their customs, traditions and beliefs into environmental assessment and performance evaluations of nuclear licensee holders.</p>	<p>The CNSC as an Agent of the Crown respects and values Indigenous Knowledge (IK). When Indigenous groups are willing to share their IK with the CNSC, CNSC staff feel it is important to learn about the knowledge shared and integrate it into the work that they do in an appropriate and respectful manner, while ensuring its protection.</p> <p>Currently the CNSC works with IK in a number of different areas including its IEMP, in environmental assessments, Commission Member Documents, licensing and licensee program reviews, Environmental Risk Assessments and other regulatory activities and studies as appropriate.</p> <p>Upon consent of the Indigenous community, IK is also shared directly with the Commission in order to help inform Commission member’s understanding of the Indigenous groups interests, rights and practices and how it may relate to the matter before them.</p> <p>In addition, through its Participant Funding Program (PFP) CNSC staff are able to offer, upon request, funding support for IK studies related to CNSC regulated facilities and activities.</p> <p>CNSC is currently funding a number of IK studies for Indigenous groups with direct interest in CNSC regulated facilities and would be open to discussing this type of initiative with Sagamok as part of the development of a work plan in relation to our long term engagement relationship.</p>



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Intervenors – CMD 18-M48.11 Athabasca Chipewyan First Nation

Comment	CNSC Disposition
<p>Page 1: Concerns with extreme rain runoffs and soil erosion at Gunnar Mine.</p>	<p>CNSC staff reviewed the effect of a severe rain event happening every 1,000 years and concluded that the covers at the site would remain intact. The CNSC review risk assessment every five years and flood assessment will be updated with new climate change science. Additional work on covers could be requested if climate data suggest floods would be more intense than anticipated.</p>
<p>Page 1: Concerns regarding Cluff Lake tailings pond embankment and cover permeability.</p>	<p>CNSC staff review risk assessment of the TMA every five years to ensure that recent groundwater quality data migrating from the TMA to Snake Lake are as predicted. TMA embankment stability is also verified during yearly inspections.</p>
<p>Page 2: Inclusion in consultation going forward, including access to inspection reports.</p>	<p>A list of inspections is provided in the ROR and inspection reports are available upon request, pending review of protected information.</p>



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Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
<p>1, 5 and 9 – Masawaska, Dyno and Bicroft</p> <p>Provide radiation dose exposure estimates for representative small mammals and ungulates (such as moose and deer), with comparisons to exposure limits.</p>	<p>CNSC staff reviewed the ERA for the Madawaska site in 2012 and agree with the conclusions that there may be limited effects to small mammals and ungulates if these animals permanently inhabit the contaminated area. Improvement to the cover is expected to reduce those localized risks to wildlife.</p> <p>For the Bicroft and Dyno site, annual reports indicate that concentration of uranium and radium in surface water is lower than Madawaska. Given this information, it is possible some individual effects may be observed at Bicroft at a lower magnitude and smaller spatial extent than Madawaska with population level effects unlikely.</p>



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Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
<p>2a – Madawaska</p> <p>Information on the human health risk to consuming fish and other aquatic species caught in the water bodies with the uranium concentration exceedance found. If a human health risk assessment has not been completed the AOO requests such a study be undertaken with the involvement of the AOO.</p>	<p>2a - CNSC staff reviewed the 2012 human health risk assessment and concluded that infant, toddler, child, adolescent and adults can safely consume 30 to 60 g/day every day each year. This is an unlikely scenario that adds to CNSC confidence that fish are safe to eat.</p>
<p>2b - Provide list including the names and locations of the water bodies where uranium concentration exceedances were found.</p>	<p>2b - At the tailings management spillway, Bentley Lake, Bentley Creek and Bow Lake. Improvement in the engineering material covering the tailings is expected to reduce uranium concentrations in these lakes.</p>



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Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
<p>3 - Madawaska</p> <p>CNSC and EWL Management provide site specific health and safety training for AOO land users who may be accessing land around the Madawaska site for traditional harvesting purposes.</p>	<p>The health and safety training is provided to all visitors who are accessing the Madawaska site itself due to the fact that there is large equipment and on-going construction activities. This training is not required for any activities off-site.</p>
<p>4 - Madawaska</p> <p>EWL Management and the CNSC work with the AOO to engage Algonquin people in the environmental protection monitoring and reclamation activities on the site in a way that is respectful of and works to integrate Algonquin traditional knowledge into the reclamation and monitoring of the Madawaska site.</p>	<p>The current rehabilitation work is being performed to ensure reduction in the effects to the environment as well as radon levels for those residing in very close proximity to the site. Once work is completed, CNSC staff can provide an update to the community.</p>



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Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
<p>6 - Bicroft Request to provide the 2016 Dam Safety Review for the Bicroft site.</p>	<p>The dam safety review is still undergoing review. CNSC staff can provide an update once this assessment has been completed.</p>
<p>7 - Bicroft Requests that full details of the monitoring program at the Bicroft Site be provided. In addition, members of the AOO should be provided with the opportunity to be involved in on-going environmental monitoring activities on the site.</p>	<p>Following remediation work at the site, water quality was monitored on a yearly basis from 2002 to 2004. After these three years, uranium and radium concentrations were decreasing in Deer Creek to 0.6 µg U/L and 0.02 Bq Ra/L below water quality criteria for the protection of aquatic life and below drinking water quality guidelines. As a result, CNSC staff authorized sampling every five years. Since then, uranium could not be detected in 2010 and 2015 at Deer Creek and radium was measured at 0.02 and 0.048 Bq/L in 2010 and 2015. Hence, sampling every five years is the result of stable and low concentrations of metal and radionuclides in surface water at this particular site.</p> <p>The Community may participate in the upcoming IEMP program scheduled for this area in 2019.</p>



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Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
<p>8 – Dyno</p> <p>Requests to be informed of the criteria, timelines, and conditions for review, and be involved in the license renewal application review process.</p>	<p>This is a designated officer licence due to the low risk of the site and there is no system in place to accommodate interventions. There are no changes to the Dyno site since the last renewal as it is a decommissioned site. CNSC staff are currently revising the licensee's submission in order to ensure that the licence is renewed prior to the due date of January 31, 2019.</p>
<p>10 – Dyno</p> <p>AOO requests that the CNSC provide quantitative data for the gamma dose rates in and around the site, with appropriate comparison data for public and wildlife exposure limits.</p>	<p>The dose rates near the sites are below the annual public dose. CNSC inspectors took a number of gamma dose readings throughout the site during inspections in 2016 and 2017 and, with the exception for dose readings taken near the TMA which were slightly above 1 mSv/h, all other dose readings were at or below background levels.</p>



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Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
<p>11 – Dyno</p> <p>Request that full details of the monitoring program and appropriate inspections be provided.</p>	<p>The Dyno site is a decommissioned site. The CNSC accepted water monitoring program reflects the fact that the site has remained in a stable state for a number of years. Water quality (uranium and radionuclides) is collected every two years directly from Farrell Lake and at one location downstream, near a provincial road.</p> <p>The Community may participate in the upcoming IEMP program scheduled this area in 2019.</p>
<p>12, 13 a) - Establish a communications protocol for informing the AOO of any regulatory oversight programs happening within unceded AOO Settlement Area.</p>	<p>CNSC staff will involve AOO in the development of sampling plans for IEMP, as appropriate. CNSC regulatory oversight activities such as inspections are conducted by highly qualified and certified inspectors.</p>
<p>12, 13 b) - Provide adequate capacity support to the AOO to meaningfully participate in regulatory oversight programs.</p>	<p>CNSC staff will involve AOO in the development of sampling plans for IEMP, as appropriate. Other CNSC compliance monitoring activities are conducted by highly qualified and certified inspectors. The ROR provides a summary of compliance performance.</p>



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Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
<p>12, 13 c) - Develop policy guidance collaboratively with the AOO and other interested Indigenous Peoples around the integration of Indigenous knowledge, land, and resource use into CNSC's regulatory oversight program including licensing requirements.</p>	<p>The CNSC as an Agent of the Crown respects and values Indigenous Knowledge (IK). When Indigenous groups are willing to share their IK with the CNSC, CNSC staff feel it is important to learn about the knowledge shared and integrate it into the work that they do in an appropriate and respectful manner, while ensuring its protection.</p> <p>Currently the CNSC works with IK in a number of different areas including its IEMP, in environmental assessments, Commission Member Documents, licensing and licensee program reviews, Environmental Risk Assessments and other regulatory activities and studies as appropriate. Upon consent of the Indigenous community, IK is also shared directly with the Commission in order to help inform Commission member's understanding of the Indigenous groups interests, rights and practices and how it may relate to the matter before them.</p> <p>The CNSC is committed to strengthening relationships with each Indigenous community/group with interest in CNSC regulated facilities and would be willing to collaborate with the AOO to explore ways in which CNSC staff can continue to integrate Indigenous Knowledge into environmental monitoring, environmental assessments, licensing activities and other CNSC activities.</p>



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Interventions – CMD 18-M48.12

Algonquins of Ontario

Comment	CNSC Disposition
<p>12 d), 13 d) e) - Provide the AOO with the opportunity to be involved in all aspects of safety and control framework activities, compliance monitoring programs and set out requirements for licensees to involve AOO in aspects of management systems.</p>	<p>The CNSC is committed to regular, structured and formalized engagement with Indigenous groups to discuss activities and issues related to the CNSC regulated facilities, including the SCA framework and associated oversight activities.</p>
<p>14 a) b) c) – Set out dose limits to be applied to individuals (including harvesters, land users and workers) who may be exposed to radiation due to accidents or malfunctions, allow AOO to review and comment on dose limits and provide funding to participate.</p>	<p>This request is outside the scope of the ROR.</p> <p>The CNSC’s process of regulatory amendment provides all persons ample opportunities to participate fully in establishing appropriate limits. Communications strategies around setting these limits include comprehensive consultations and outreach to all communities.</p>



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Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
<p>15 - Mandatory notification and transmittal of non-compliances to Indigenous communities in a user friendly manner.</p>	<p>Licensees are required to have a public information program in place that includes reporting events and unusual occurrences at the facility to the public. Information regarding events are posted on both the CNSC website and the licensees' websites where available.</p> <p>The CNSC is committed to regular, structured and formalized engagement with Indigenous groups to discuss activities and issues related to the CNSC regulated facilities. The CNSC strives for continuous improvements to provide data and information of interest to the public and Indigenous groups in a manner that can easily be understood.</p> <p>Matters related to routine compliance activities are contained in CNSC's inspection reports, which can be provided upon request pending review of protected information.</p>



Commission Meeting, December 12, 2018
CMD 18-M48.A – 2017 ROR for Uranium Mines, Mills, Historic and Decommissioned Sites

Interventions – CMD 18-M48.12 Algonquins of Ontario

Comment	CNSC Disposition
16 - Ensure all data obtained through the CNSC's compliance verification and enforcement program be transmitted to impacted Indigenous communities in a user-friendly manner.	This will be taken under advisement. However, CNSC inspection reports can be provided upon request, pending review of protected information. This will be captured until the lessons learned and considered in future reports.
17 - CNSC lengthen review timelines to accommodate AOO's internal review process.	Review periods are established in the <i>Commission Rules of Procedure</i> and are the purview of the Commission Secretariat.