



Regulatory Oversight Report for Uranium and Nuclear Substance Processing Facilities in Canada: 2018

Commission Meeting
December 11, 2019
CMD 19-M35.A



CNSC Staff Presentation





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Corrections to CMD 19-M35

Two Radiation Protection action levels exceeded for Best Theratronics Ltd. in 2018, not zero.

- CNSC staff reviewed and are satisfied with the corrective actions
- No changes to the safety conclusions for the facility



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Presentation Outline

- **Overview of CNSC Regulatory Oversight**
 - Safety and control area performance ratings
 - Independent Environmental Monitoring Program
 - Public and Indigenous engagement
- **Safety Performance of Uranium Processing Facilities**
- **Safety Performance of Nuclear Substance Processing Facilities**
- **Participant Funding and Interventions**

Uranium Processing Facilities

Cameco Blind River Refinery

Cameco Port Hope Conversion Facility

Cameco Fuel Manufacturing Inc.

BWXT Nuclear Energy Canada Inc.

Nuclear Substance Processing Facilities

SRB Technologies (Canada) Inc.

Nordion (Canada) Inc.

Best Theratronics Ltd.



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CNSC Regulatory Oversight Reports - 2018

- **November 6, 2019:** Canadian Nuclear Power Generating Sites
- **November 7, 2019:** Use of Nuclear Substances in Canada
- **November 7, 2019:** Canadian Nuclear Laboratories Sites
- **December 11, 2019:** Uranium Processing and Nuclear Substance Processing Facilities
- **December 12, 2019:** Uranium Mines and Mills

**Summary and highlights of CNSC staff oversight activities
across nuclear industry for 2018**



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ROR for Uranium and Nuclear Substance Processing Facilities in Canada: 2018

Key Topics:

- CNSC's regulatory efforts
- Ratings of licensee performance for the 14 safety and control areas (SCAs) with a focus on:
 - Radiation protection
 - Environmental protection
 - Conventional health and safety
- Licensing and compliance verification activities, significant events and changes in performance ratings at uranium and nuclear substance processing facilities



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CNSC REGULATORY OVERSIGHT



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CNSC Regulatory Oversight

Regulatory oversight includes licensing, compliance verification and reporting activities.

Compliance is verified through:

- Inspection/verification activities
- Reviews of operational activities and documentation
- Licensee reporting of performance data, including annual reports and unusual occurrences

Regulatory oversight activities are commensurate with risk associated with each facility.

Risk-informed and performance-based approach



CNSC inspector inspecting a Type B Package at Nordion (Canada) Inc. *Source: CNSC*



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CNSC Regulatory Oversight Ratings and Performance

Safety and control areas (SCAs) are used to assess and evaluate licensee performance.

CNSC staff rate performance as:

- Fully satisfactory (FS)
- Satisfactory (SA)
- Below expectations (BE)
- Unacceptable (UA)

Ratings are derived from results of regulatory oversight activities.



Safety and Control Areas

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 Ratings and Performance

CNSC staff use expert professional judgement to rate performance based on multiple inputs, including:

- Key performance indicators
- Results of compliance verification activities
- Repeat of non-compliance and effectiveness of licensee actions

Ratings represent a holistic summary of each SCA



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Independent Environmental Monitoring Program (IEMP)

CNSC staff sample air, water, soil, vegetation, and various foods to independently verify that the public and the environment are protected.

In 2018, CNSC staff conducted IEMP sampling at:

- Cameco Blind River Refinery
- BWXT Toronto and Peterborough
- SRB Technologies
- Nordion

All IEMP results are posted on the CNSC's website



CNSC staff taking water samples near the SRB Technologies facility in Pembroke, Ontario in 2018.

Source: CNSC





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Public and Indigenous Engagement

CNSC staff routinely engage with the public and Indigenous Groups.

Examples include:

- Participation in relevant community events as a means to inform the public of the CNSC's role
- Engagement and consultation with Indigenous Groups to discuss issues of concern to them related to the CNSC's mandate



CNSC staff available to answer questions at a community event in Peterborough, 2018.

Source: CNSC



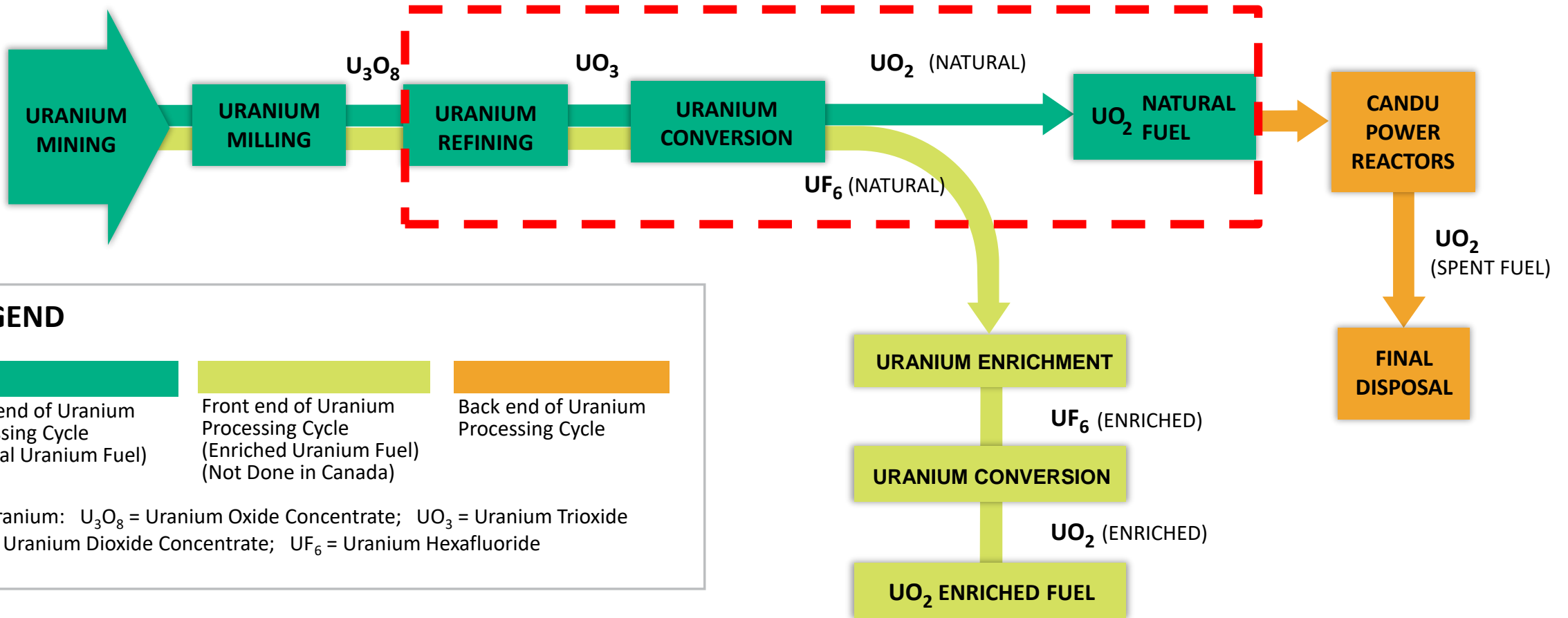
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URANIUM PROCESSING FACILITIES



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Nuclear Fuel Cycle



LEGEND

- Front end of Uranium Processing Cycle (Natural Uranium Fuel)
- Front end of Uranium Processing Cycle (Enriched Uranium Fuel) (Not Done in Canada)
- Back end of Uranium Processing Cycle

U = Uranium: U_3O_8 = Uranium Oxide Concentrate; UO_3 = Uranium Trioxide
 UO_2 = Uranium Dioxide Concentrate; UF_6 = Uranium Hexafluoride

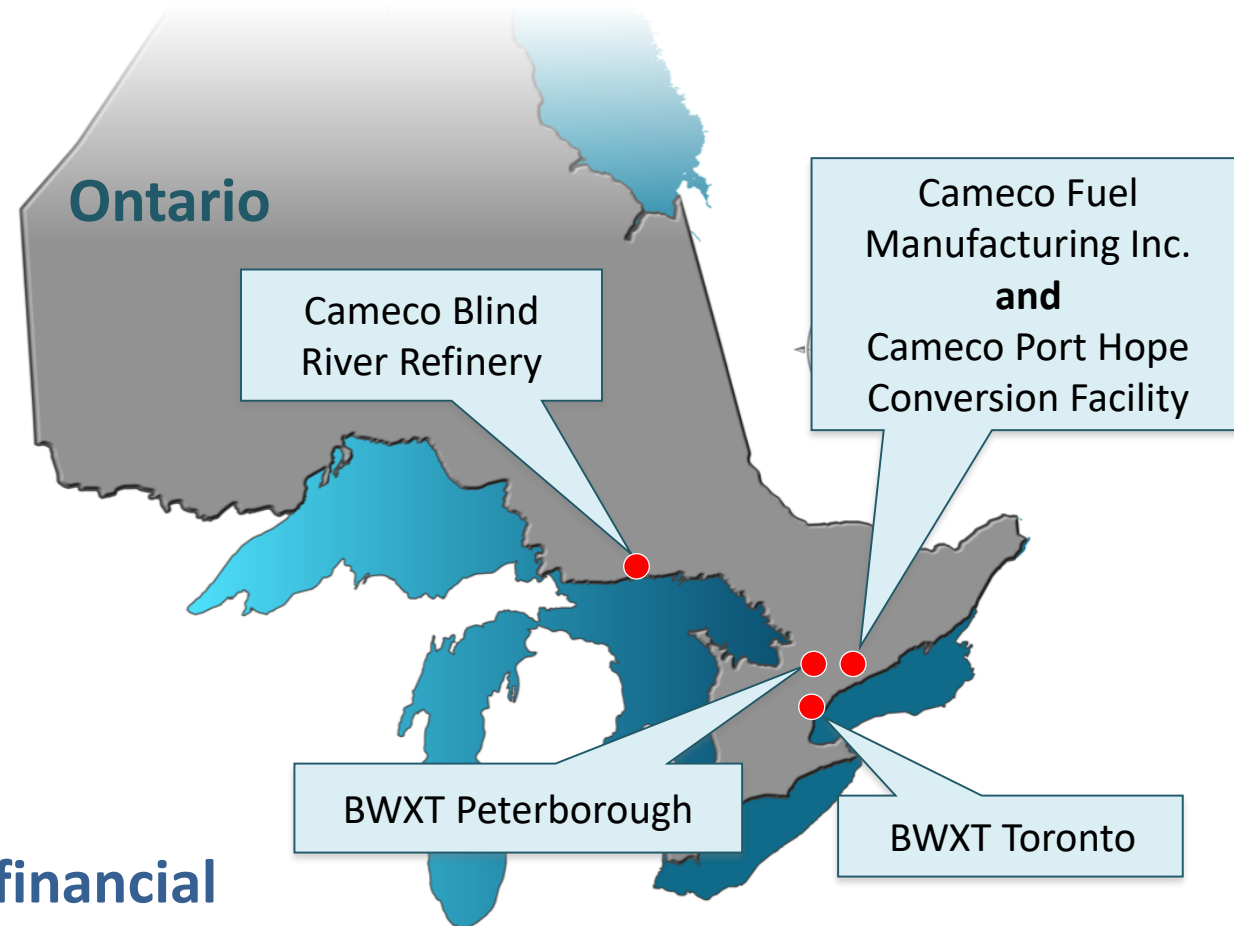


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Uranium Processing Facilities

Facility	Licence Expiry	Financial Guarantee (approx.)
Cameco Blind River Refinery	February 2022	\$48M
Cameco Port Hope Conversion Facility	February 2027	\$128.6M
Cameco Fuel Manufacturing Inc.	February 2022	\$21M
BWXT Toronto and Peterborough	December 2020	\$52.4M



All uranium processing facilities have valid financial guarantees in place for decommissioning



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Uranium Processing Facilities Regulatory Oversight 2018

Legend: Trend arrows indicate change from 2017
↓ Denotes Decrease ↑ Denotes Increase → Denotes No change

	Blind River Refinery	Port Hope Conversion Facility	Cameco Fuel Manufacturing	BWXT Toronto and Peterborough	Totals
Person Days for Licensing	3 ↓	3 ↓	1 ↓	108 ↑	115 ↓
Person Days for Compliance	280 ↑	393 ↑	166 ↓	225 ↑	1064 ↑
Number of Inspections	5 ↑	6 ↑	2 ↓	4 ↓	17 ↓
Inspection Action Items	19 ↑	29 ↑	5 ↓	7 ↓	60 →
Enforcement Actions	0 →	0 ↓	0 →	0 ↓	0 ↓
Number of Safeguards Inspections led by IAEA*	3 →	4 ↓	2 ↓	4 ↓	13 ↓

*Note: Canada has met its international obligations on the peaceful use of nuclear energy.



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Uranium Processing Facilities Performance Ratings 2018

Legend

FS = Fully Satisfactory

BE = Below Expectations

SA = Satisfactory

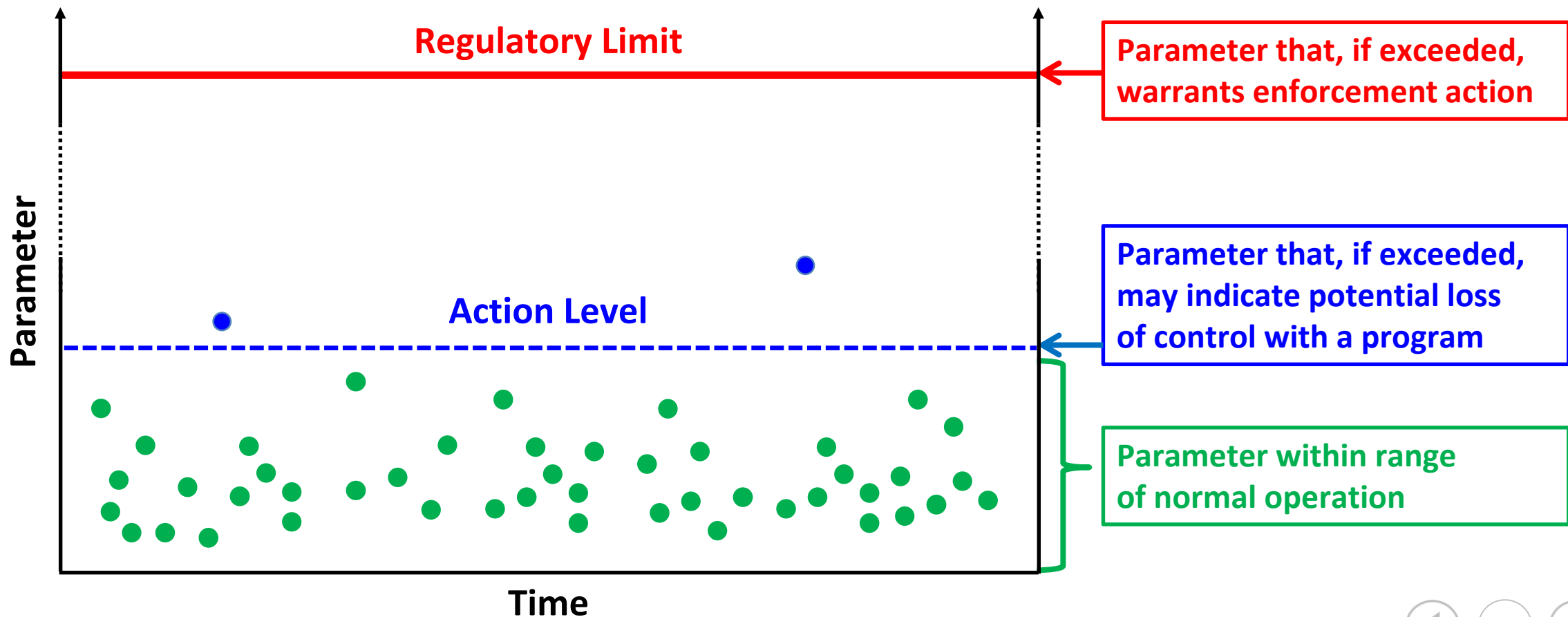
UA = Unacceptable

Safety and Control Area	Blind River Refinery	Port Hope Conversion Facility	Cameco Fuel Manufacturing	BWXT Toronto and Peterborough
Management System	SA	SA	SA	SA
Human Performance Management	SA	SA	SA	SA
Operating Performance	SA	SA	SA	SA
Safety Analysis	SA	SA	SA	SA
Physical Design	SA	SA	SA	SA
Fitness for Service	SA	SA	SA	SA
Radiation Protection	SA	SA	SA	SA
Conventional Health and Safety	FS	SA	SA	SA
Environmental Protection	SA	SA	SA	SA
Emergency Management and Fire Protection	SA	SA	SA	SA
Waste Management	SA	SA	SA	SA
Security	SA	SA	SA	SA
Safeguards and Non-Proliferation	SA	SA	SA	SA
Packaging and Transport	SA	SA	SA	SA



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CNSC Regulatory Oversight Regulatory Limits and Action Levels

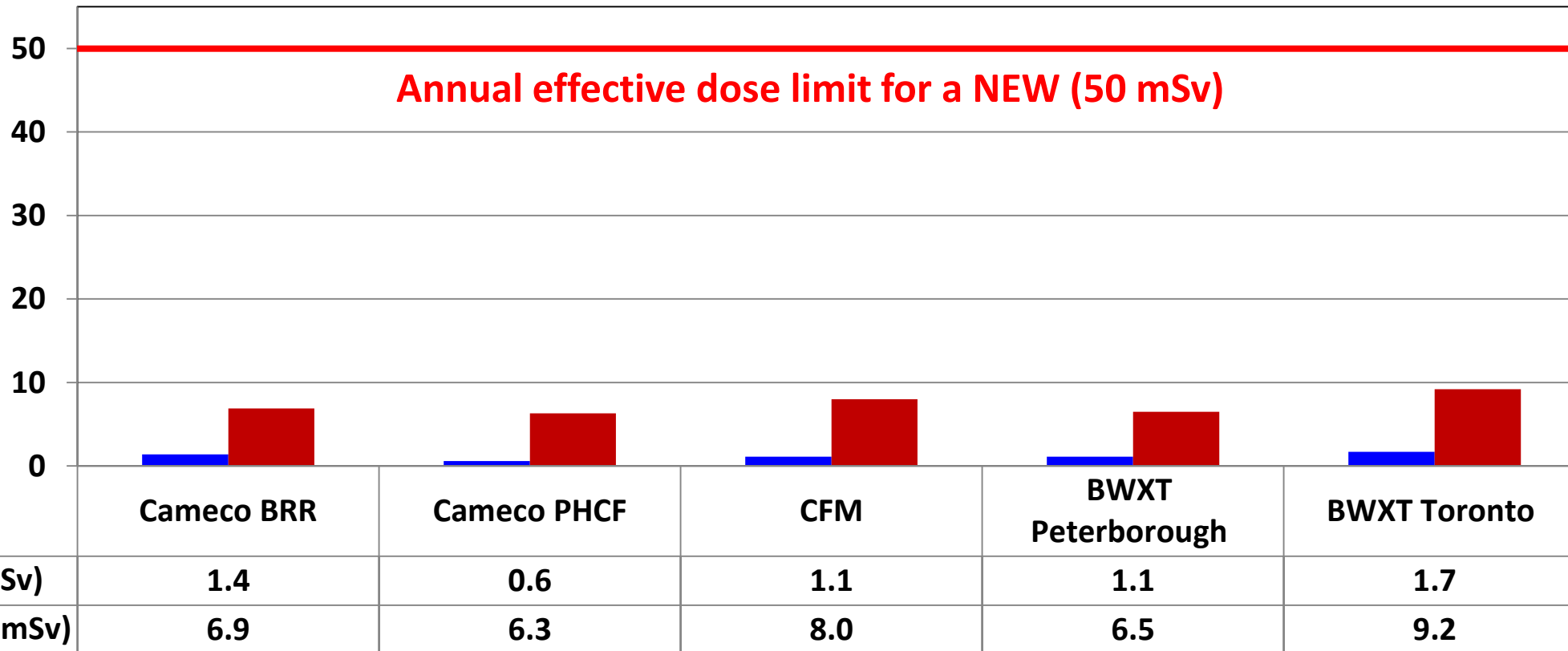




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Radiation Protection 2018 Average and Maximum Effective Doses to Nuclear Energy Workers (NEWs)

Dose (mSv)



Note: In addition to the annual effective dose limit of 50 mSv in any one year, a regulatory dose limit of 100 mSv over a defined five-year dosimetry period is applied for a NEW

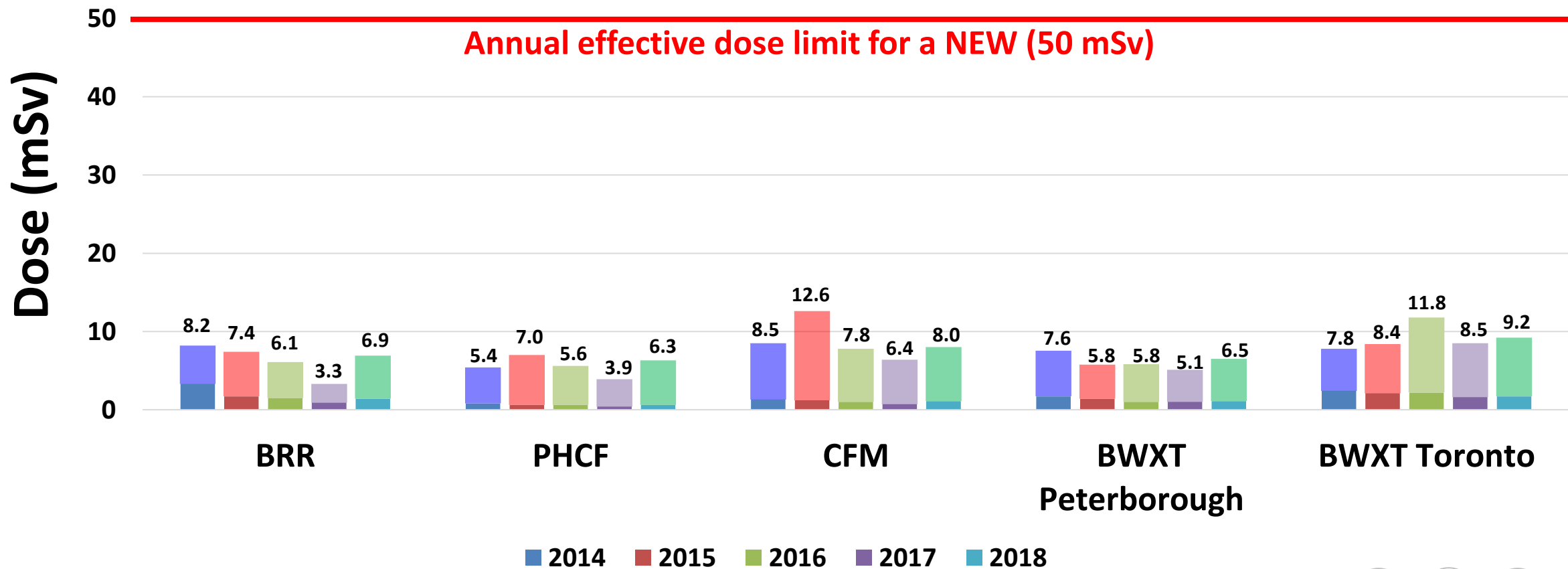


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Radiation Protection

Dose to Nuclear Energy Workers (NEWs) 2014-2018 – 5 Year Trend





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Radiation Protection Action Level Exceedances

One radiation protection action level exceeded at PHCF

- January 2018, worker whole-body dose measurement of 2.45 mSv exceeded the monthly action level of 2.0 mSv
- Cameco initiated an investigation in accordance with their corrective action process
- Cameco has implemented additional administrative controls

CNSC staff reviewed and are satisfied with the reporting and response taken by licensee



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Uranium Processing Facilities Dose to Public (mSv) 2014-2018 – 5 Year Trend

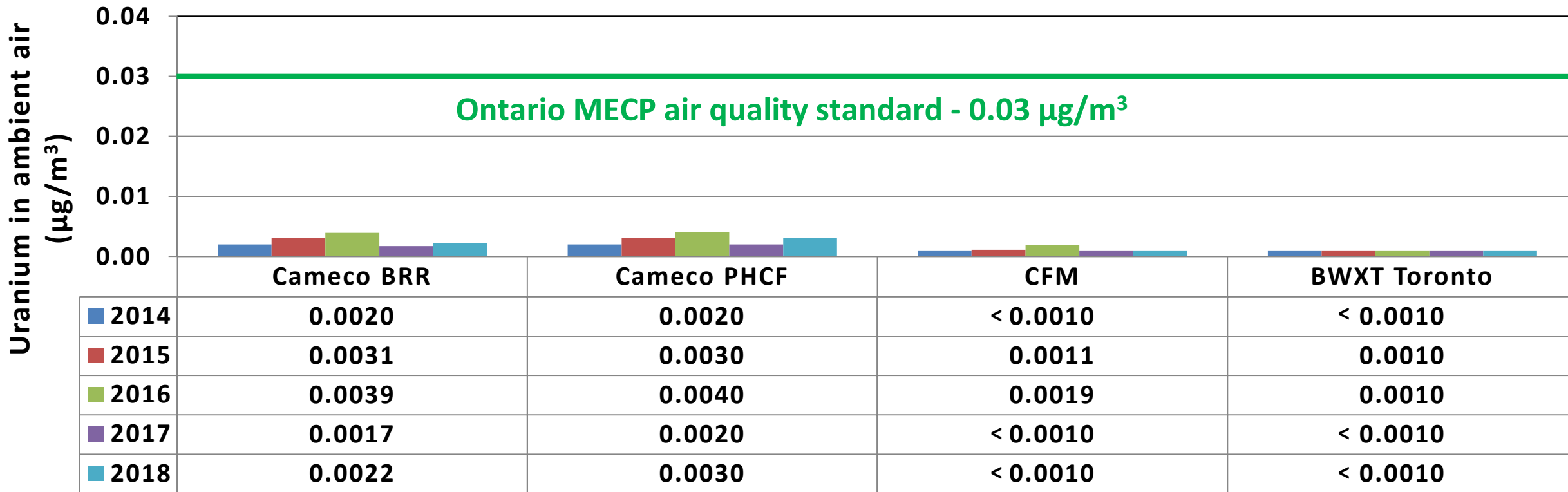
Facility	Year					Regulatory Limit
	2014	2015	2016	2017	2018	
Cameco Blind River Refinery	0.005	0.005	0.005	0.005	0.005	1 mSv/year
Cameco Port Hope Conversion Facility	0.012	0.006	0.020	0.153*	0.173	
Cameco Fuel Manufacturing	0.018	0.025	0.023	0.022	0.030	
BWXT Toronto	0.0055	0.010	0.0007	0.0175	0.0004	
BWXT Peterborough	<0.001	<0.001	<0.001	<0.001	<0.001	

*For 2017, Cameco PHCF's increased dose to the public is due to an update to their public dose calculations which include a more conservative dose estimate compared to previous years. There has been no increase in environmental releases or gamma dose from the PHCF and, as a result, there is no increased risk to the public.



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Environmental Protection Uranium in Ambient Air 2014-2018 – 5 Year Trend



Note: BWXT Peterborough does not conduct ambient air monitoring as emissions at the point of release are already below the Ontario Ministry of the Environment, Conservation and Parks (MECP) air quality standard for uranium.

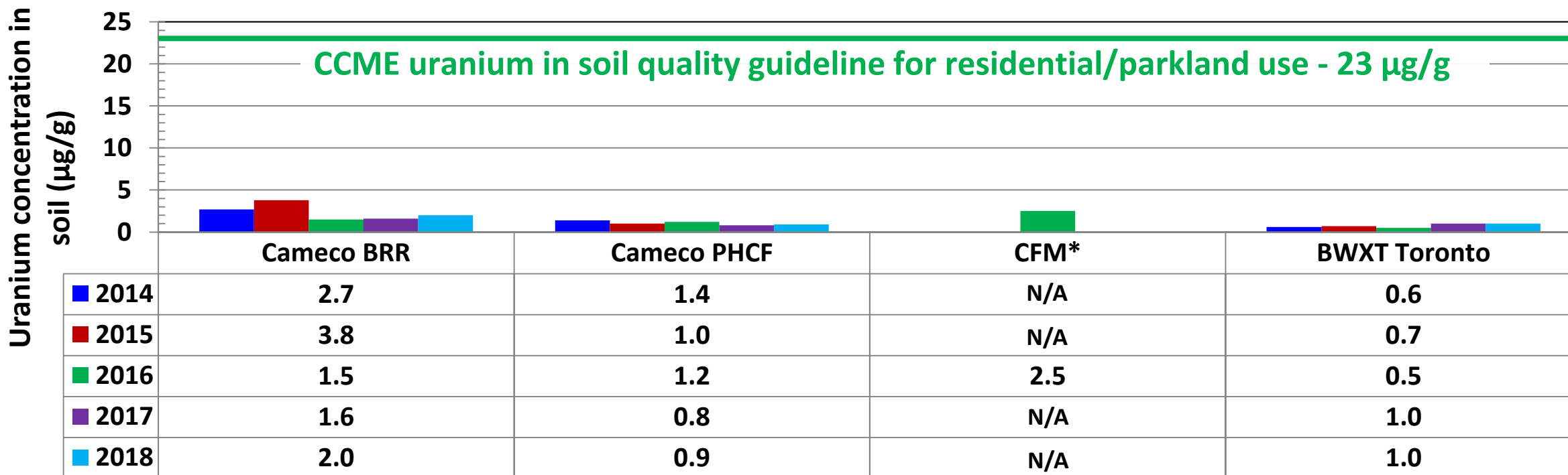


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Environmental Protection

Uranium Concentrations in Soil 2014-2018 – 5 Year Trend



*Cameco Fuel Manufacturing (CFM) samples soil on a 3-year frequency

BWXT Peterborough does not conduct soil monitoring due to extremely low stack emissions.

CCME = Canadian Council of Ministers of the Environment



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Environmental Protection Action Level Exceedances

- In 2018, PHCF reported 9 action level exceedances for uranium discharges from the sanitary sewer
- Cameco's investigations attributed this to heavy rainfall leading to groundwater infiltration into sanitary sewer piping
- Releases were below licence limit with no impact on the environment
- Corrective actions are part of Vision In Motion Project, including sealing the identified infiltration sources and upgrading the sanitary sewer system

**CNSC staff reviewed and are satisfied with the
corrective actions taken by licensee**



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Environmental Protection Action Level Exceedances

- CFM reported an action level exceedance during the first quarter of 2018 for liquid effluent releases to the municipal sewer system
- Cameco measured a sample at 0.11 mg U/L, above the action level of 0.10 mg U/L
- Cameco's investigations attributed this to recent equipment modifications
- The release had no impact on the environment
- Subsequent liquid effluent monitoring results were all below 0.10 mg U/L for the remainder of 2018

**CNSC staff reviewed and are satisfied with the
corrective actions taken by licensee**



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Conventional Health and Safety Lost-Time Injuries (LTI) 2014-2018 – 5 Year Trend

Facility	Statistic	2014	2015	2016	2017	2018
Cameco Blind River Refinery	LTI	0	0	0	0	0
	Severity Rate	0	0	0	0	0
	Frequency Rate	0	0	0	0	0
Cameco Port Hope Conversion Facility	LTI	1	1	4	1	2
	Severity Rate	7.58	7.64	2.40	1.67	7.58
	Frequency Rate	0.27	0.26	0.80	0.28	0.49
Cameco Fuel Manufacturing	LTI	0	1	0	0	0
	Severity Rate	0	0.6	0	0	0
	Frequency Rate	0	0.6	0	0	0
BWXT Peterborough and Toronto	LTI	1	0	0	0	0
	Severity Rate	3.55	0	0	0	0
	Frequency Rate	1.77	0	0	0	0

Severity rate: Total days lost to injury/200,000 person-hours worked

Frequency rate: Number of LTIs/200,000 person-hours worked



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Conventional Health and Safety Lost-Time Injuries

Cameco reported two LTIs at PHCF

- Employee fell approximately four feet while taking confined space training off site
- Contracted truck driver sprained their ankle while stepping down onto a rig mat in the loading area of Centre Pier

Cameco conducted investigations and implemented corrective actions to prevent recurrence

CNSC staff reviewed and are satisfied with the corrective actions taken by licensee



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FACILITY HIGHLIGHTS



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Facility Highlights Uranium Processing Facilities

Highlights	BRR	PHCF	CFM	BWXT
Changes to facility operations	0	0	0	0
Licensing decisions	0	0	0	0
Licence Conditions Handbook Update	0	0	0	0
Regulatory limit exceedances	0	0	0	0
Action Level exceedances	0	10	1	0
Lost-time Injuries	0	2	0	0

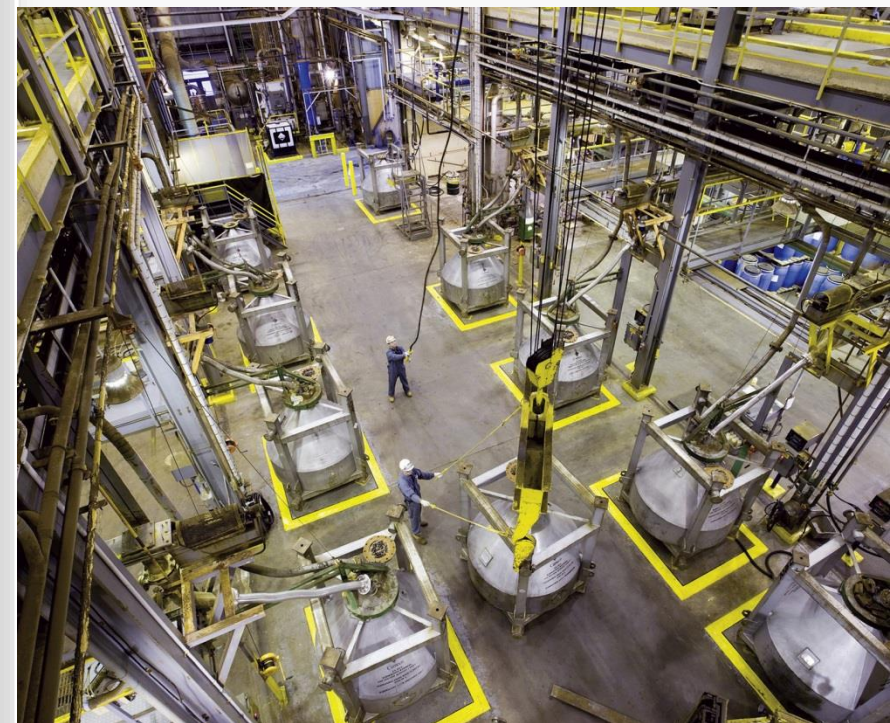


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Facility Highlights Blind River Refinery

- Regular compliance verification activities
- CNSC staff conducted five inspections in 2018:
 - Environmental Protection
 - Management System
 - Waste Management
 - Emergency Management and Fire Protection
 - Radiation Protection
- Two events reported to the CNSC in accordance with Cameco's reporting requirements



UO₃ tote bin loading and handling station at the Blind River Refinery.

Photo source: Cameco



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Facility Highlights Port Hope Conversion Facility

- Regular compliance verification activities
- CNSC staff conducted six inspections in 2018:
 - Fitness for Service
 - Waste Management
 - Radiation Protection and VIM
 - Emergency Management
 - Environmental Protection
 - Management System
- Thirteen events reported to the CNSC in accordance with Cameco's reporting requirements



Side view of Port Hope Conversion Facility
Source: Cameco



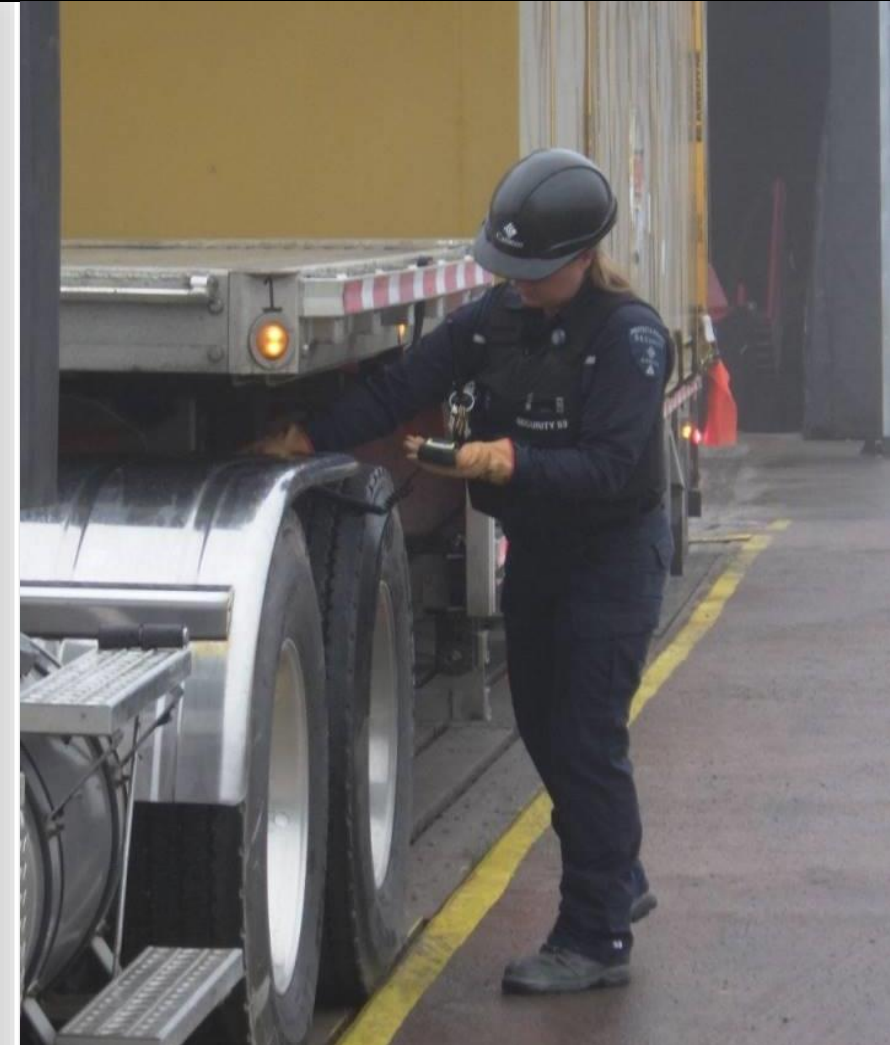
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Facility Highlights Port Hope Conversion Facility

In July 2018, CNSC staff conducted an inspection at Cameco PHCF on the Vision in Motion Project.

CNSC staff verified:

- Repackaging legacy waste and transfer of stored waste to the Long Term Waste Management Facility
- Asbestos abatement and removal of process hazards from the former UF₆ plant
- Mobilization for Center Pier building demolition
- Construction of project support trailers
- Establishment of supplemental ambient air monitoring equipment



Cameco worker performing contamination check prior to truck departing from Centre Pier in Port Hope, 2018.

Source: CNSC



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Facility Highlights Cameco Fuel Manufacturing

- Regular compliance verification activities
- CNSC staff conducted two inspections in 2018:
 - Fire Protection
 - Waste Management
- One event reported to the CNSC in accordance with Cameco's reporting requirements



A CFM worker performing a final inspection on a fuel bundle prior to packaging.

Photo source: Cameco



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Facility Highlights BWXT Toronto and Peterborough

- Increase in regulatory effort due to licence renewal application submission in November 2018
- Regular compliance verification activities
- CNSC staff conducted four inspections in 2018:
 - General
 - Fire Protection
 - Environmental Protection
 - Emergency Management
- BWXT reported two events in accordance with its regulatory reporting requirements



CNSC inspector collecting swipe samples during inspection at BWXT Peterborough, 2018.

Source: CNSC



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NUCLEAR SUBSTANCE PROCESSING FACILITIES



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Nuclear Substance Processing Facilities

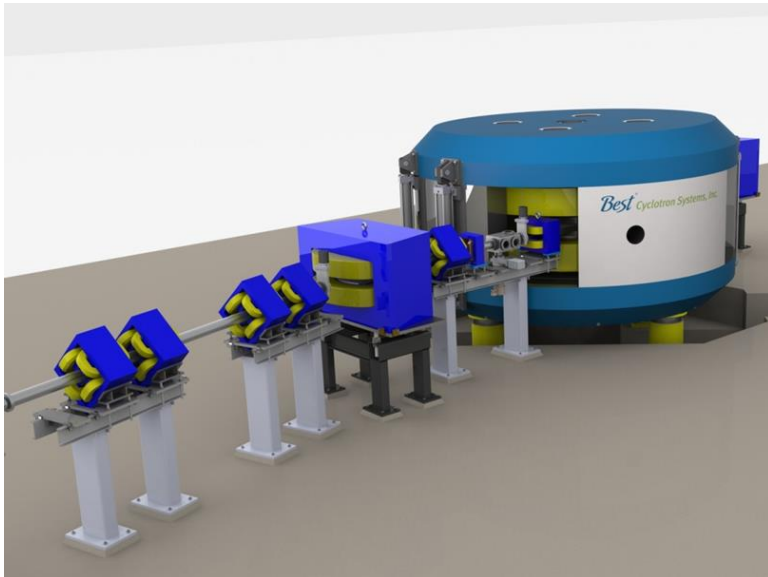
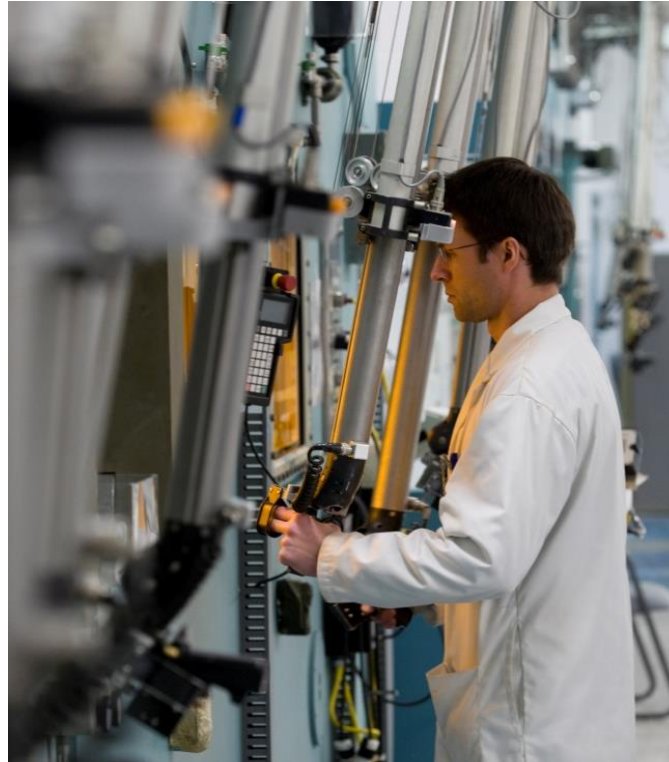


Image of a 70 MeV cyclotron manufactured by BTL.

Source: BTL



Nordion personnel working with a hot cell manipulator.

Source: Nordion



Exit Signs



Safety Markers



Raw Light Sources



Safety Signs



Tactical Devices

Source: SRB Technologies

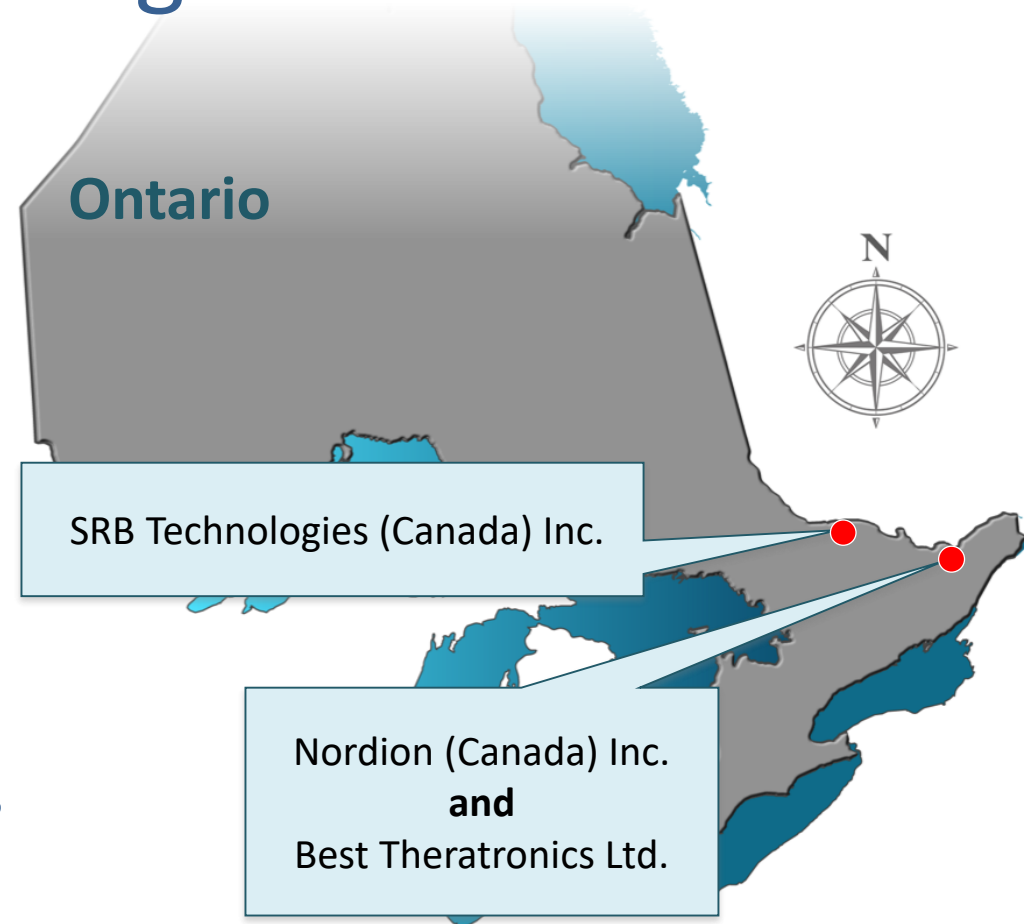


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Nuclear Substance Processing Facilities

Facility	Licence Expiry	Financial Guarantee (approx.)
SRB Technologies (Canada) Inc.	June 2022	\$0.68M
Nordion (Canada) Inc.	October 2025	\$45.1M
Best Theratronics Ltd.	June 2029	\$1.8M



All nuclear substance processing facilities have valid financial guarantees in place for decommissioning



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Nuclear Substance Processing Facilities Regulatory Oversight in 2018

Legend: Trend arrows indicate change from 2017
↓ Denotes Decrease ↑ Denotes Increase → Denotes No change

	SRB Technologies (Canada) Inc.	Nordion (Canada) Inc.	Best Theratronics Ltd.	Totals
Person Days for Licensing	2 ↓	24 ↑	85 ↑	111 ↑
Person Days for Compliance	57 ↓	181 ↓	82 ↓	320 ↓
Number of Inspections	2 →	2 ↓	1 ↓	5 ↓
Inspection Action Items	1 ↓	4 ↓	4 ↓	9 ↓
Enforcement Actions	0 →	1 →	0 →	1 →
Number of Safeguards Inspections led by IAEA*	0 →	0 ↓	0 →	0 ↓

*Note: Canada has met its international obligation on the peaceful use of nuclear energy.



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Nuclear Substance Processing Facilities Performance Ratings 2018

FS = Fully Satisfactory
SA = Satisfactory
BE = Below Expectations
UA = Unacceptable
N/A = Not Applicable

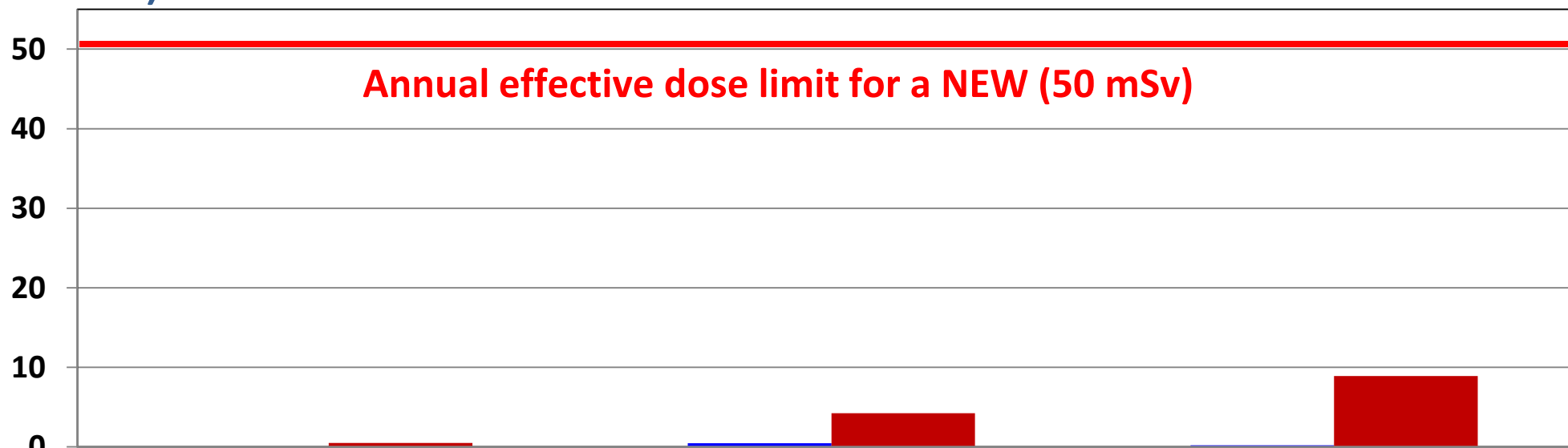
Safety and Control Area	SRB Technologies (Canada) Inc.	Nordion (Canada) Inc.	Best Theratronics Ltd.
Management System	SA	SA	SA
Human Performance Management	SA	SA	SA
Operating Performance	SA	SA	SA
Safety Analysis	SA	SA	SA
Physical Design	SA	SA	SA
Fitness for Service	FS	SA	SA
Radiation Protection	SA	SA	SA
Conventional Health and Safety	FS	SA	SA
Environmental Protection	SA	FS	SA
Emergency Management and Fire Protection	SA	SA	SA
Waste Management	SA	SA	SA
Security	SA	FS	SA
Safeguards and Non-Proliferation	N/A	SA	SA
Packaging and Transport	SA	SA	SA



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Radiation Protection 2018 Average and Maximum Effective Doses to Nuclear Energy Workers (NEWs)



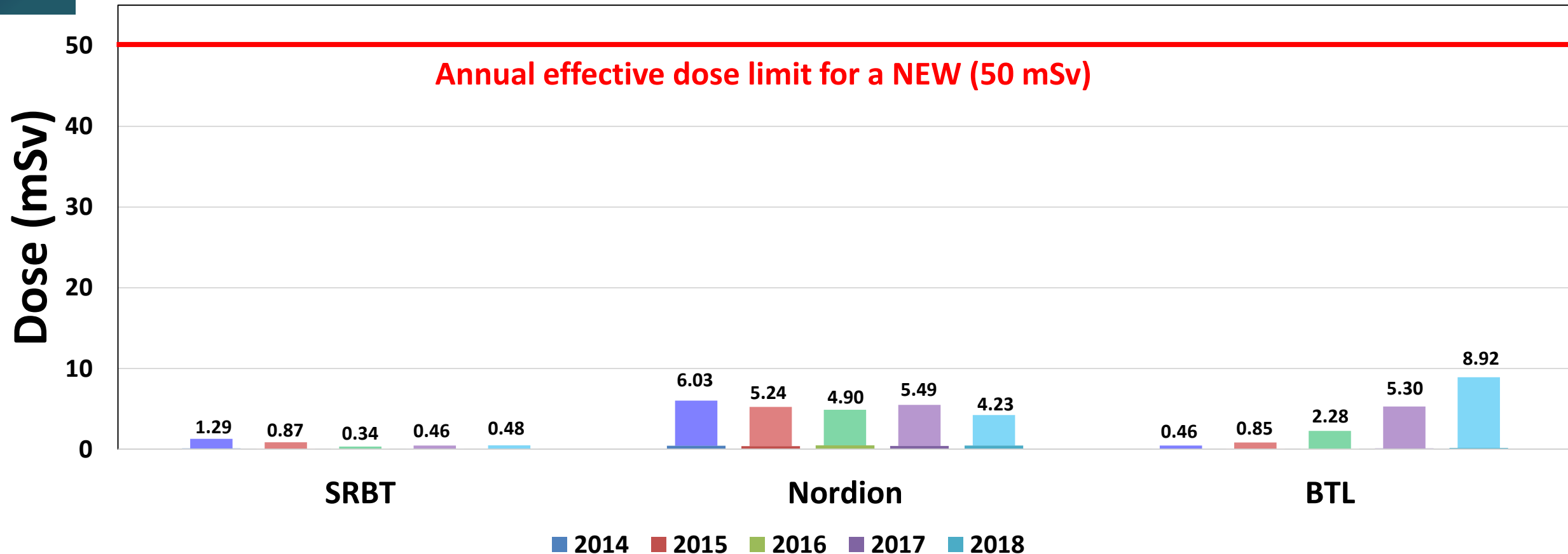
	SRBT	Nordion	BTL
■ Average effective dose (mSv)	0.04	0.45	0.20
■ Maximum effective dose (mSv)	0.48	4.23	8.92

Note: In addition to the annual effective dose limit of 50 mSv in any one year, a regulatory dose limit of 100 mSv over a defined five-year dosimetry period is applied for a NEW



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Radiation Protection Dose to Nuclear Energy Workers (NEWs) 2014-2018 – 5 Year Trend





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Radiation Protection Action Level Exceedances

In October 2018, BTL reported that two servicing technicians exceeded radiation protection action levels during source loading procedure for a prototype design teletherapy head.

- First worker exceeded the monthly extremity action level of 10 mSv, with an equivalent dose to the right extremity of 13.51 mSv
- Second worker exceeded the monthly whole body dose action level of 4 mSv, with an effective dose of 8.65 mSv
- BTL's corrective actions included replacing the tungsten screws with stainless steel screws along with taking radiation measurements to ensure localized dose rates at screw locations remain low

**CNSC staff reviewed and are satisfied with the reporting
and response taken by licensee**



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Nuclear Substance Processing Facilities Dose to Public 2014-2018 (mSv) – 5 Year Trend

Facility	Year					Regulatory limit
	2014	2015	2016	2017	2018	
SRB Technologies	0.0067	0.0068	0.0046	0.0033	0.0038	1 mSv/year
Nordion	0.010	0.0056	0.0021	0.0001	0.000067	
Best Theratronics	N/A	N/A	N/A	N/A	N/A	

N/A = Not applicable

Public dose estimates are not provided for Best Theratronics Ltd. because its licensed activities involve sealed sources and there are no discharges to the environment



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Conventional Health and Safety Lost-Time Injuries (LTI) 2014-2018 – 5 Year Trend

Facility	Statistic	2014	2015	2016	2017	2018
SRBT	LTI	0	0	0	3	0
	Severity Rate	0	0	0	17.7	0
	Frequency Rate	0	0	0	7.6	0
Nordion	LTI	3	0	3	1	0
	Severity Rate	23.08	0	70.04	5.61	0
	Frequency Rate	2.39	0	2.32	0.93	0
BTL	LTI	1	1	3	1	2
	Severity Rate	4.79	0.68	37.61	15.04	8.21
	Frequency Rate	0.68	0.68	2.05	0.68	1.37

Severity rate: Total days lost to injury/200,000 person-hours worked

Frequency rate: Number of LTIs/200,000 person-hours worked



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Conventional Health and Safety Lost-Time Injuries

BTL reported two LTIs in 2018.

- An employee had a cut and abrasion to the stomach area while using a grinder
- An employee hurt their back when applying an upward force to a large pipe wrench

BTL conducted investigations and implemented corrective actions to prevent recurrence.

**CNSC staff reviewed and are satisfied with the
corrective actions taken by licensee**



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FACILITY HIGHLIGHTS



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Facility Highlights Nuclear Substance Processing Facilities

2018 Highlights	SRBT	Nordion	BTL
Changes to facility operations	0	0	0
Licensing decisions	0	0	0
Licence Conditions Handbook Updates	0	0	0
Regulatory limit exceedances	0	0	0
Action Level exceedances	0	0	2
Lost-time Injuries	0	0	2



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Facility Highlights SRB Technologies (Canada) Inc.

- Regular compliance verification activities
- CNSC staff conducted two inspections in 2018:
 - Security
 - Packaging and Transport
- One event reported to the CNSC in accordance with SRBT's reporting requirements



SRBT employee performing tritium filling operations
Source: SRBT

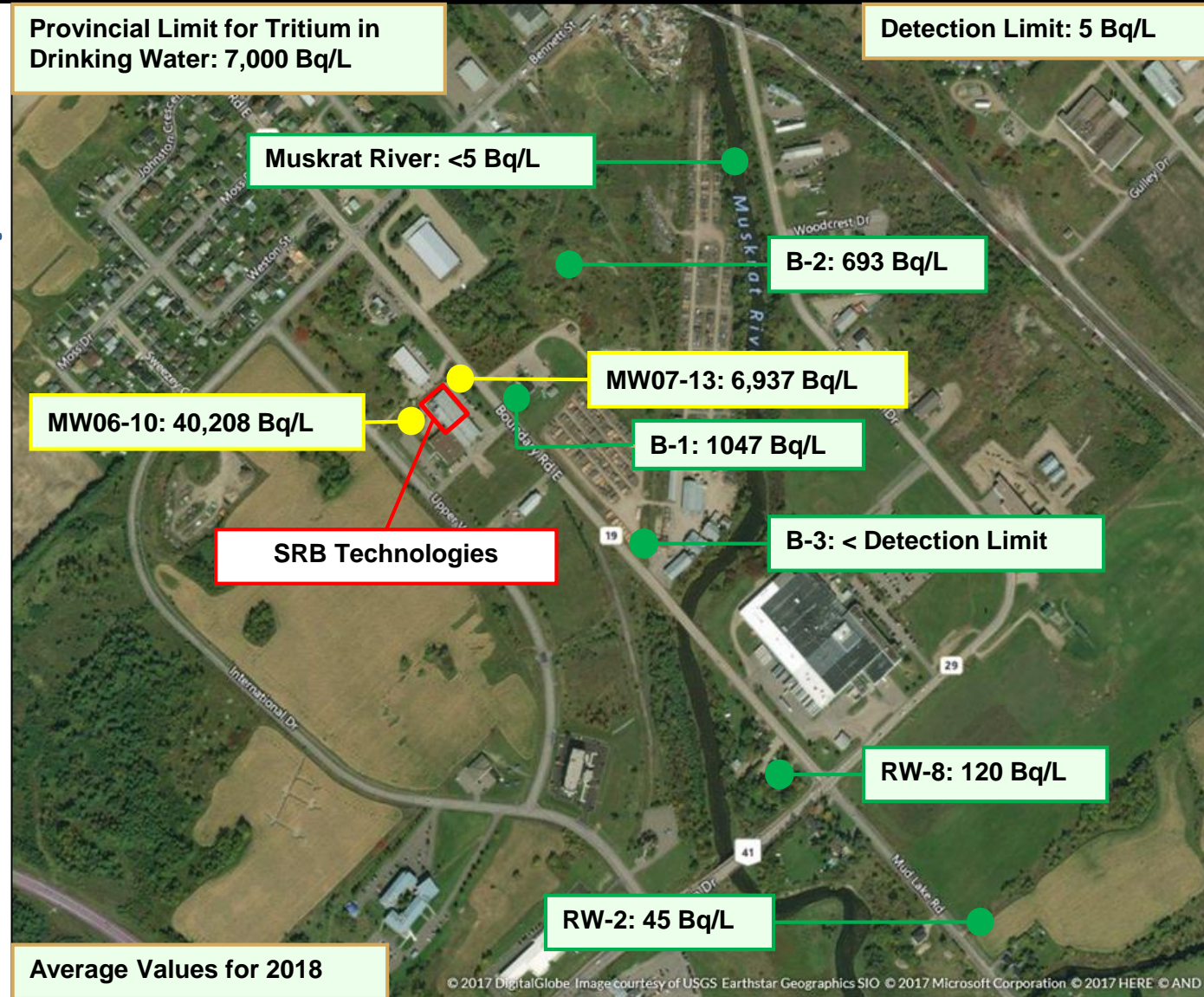


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Facility Highlights SRB Technologies (Canada) Inc. Groundwater Concentrations

- Tritium levels surrounding the facility continue to decrease compared to previous years
- Elevated tritium concentrations originated from past operations
- Low values near and in Muskrat River and residential areas

Public and environment around the facility remain protected





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Facility Highlights Nordion (Canada) Inc.

- Regular compliance verification activities
- CNSC staff conducted two inspections in 2018:
 - Management System
 - General
- Eight events reported to the CNSC in accordance with Nordion's reporting requirements
- In April 2018, BWXT announced an agreement to acquire Nordion's medical isotope business



Nordion personnel working with a hot cell manipulator

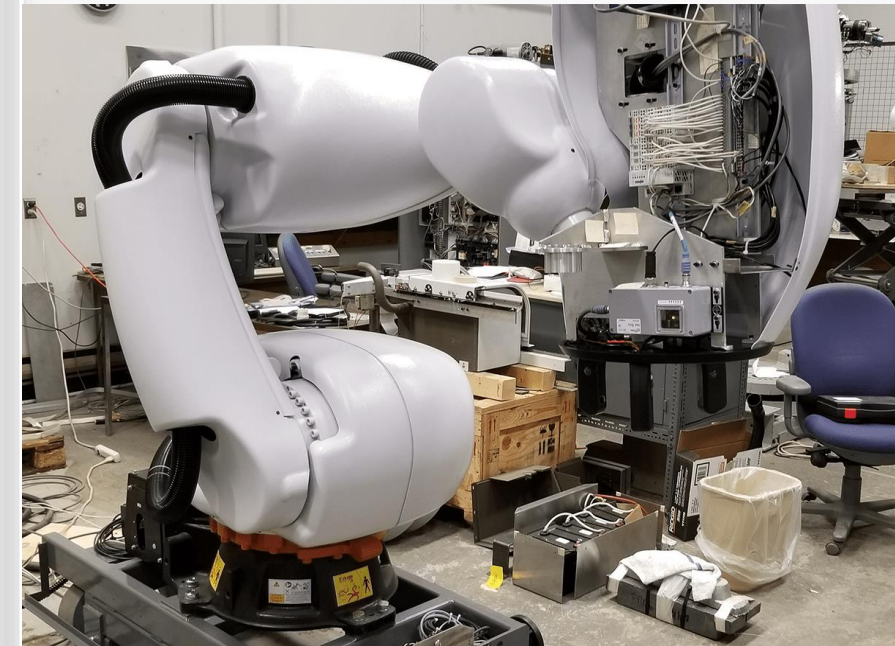
Source: Nordion



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Facility Highlights Best Theratronics Ltd.

- Increase in regulatory effort due to licence renewal application submission in September 2018
- Regular compliance verification activities
- CNSC staff conducted one inspection in 2018
- BTL reported four events in accordance with its regulatory reporting requirements



Photograph of Cobalt-60 teletherapy machine

Source: BTL



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SAFETY PERFORMANCE CONCLUSIONS



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Safety Performance Conclusions Uranium and Nuclear Substance Processing Facilities

CNSC staff have confirmed that in 2018, licensees operating uranium and nuclear substance processing facilities in Canada:

- Adequately controlled radiation exposures to keep doses ALARA
- Maintained releases to levels protective of the environment
- Continued to protect workers with conventional health and safety programs
- Continued to effectively implement programs in support of all SCAs
- Addressed all areas of non-compliance in a timely manner

CNSC staff are satisfied that licensees continue to protect the health and safety of workers, public and the environment



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PARTICIPANT FUNDING AND INTERVENTIONS



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Participant Funding Program (PFP) and Interventions

Total of four interventions received

PFP Recipients	Other intervenors
Swim Drink Fish Canada/ Lake Ontario Waterkeeper	Canadian Nuclear Workers Council
Thessalon First Nation	Canadian Nuclear Association



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Participant Funding Program (PFP) and Interventions

Key Themes from Interventions

Positive Comments	Concerns/Recommendations
Satisfaction with safe operation for workers, the public and the environment	Challenges around access to detailed environmental data
Industry well regulated	Inadequate cooperation and communication with external groups
Support for the annual assessment process	Timeliness of information-sharing
	Concerns with water quality
	Setting of release Limits
	Engagement on decommissioning plans

Concerns and Recommendations from interventions dispositioned in annex to presentation



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CONCLUSION



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Conclusions

CNSC staff's regulatory oversight activities confirmed that:

- Licensees are taking action in a timely manner
- Licensees' programs are implemented effectively
- Priority areas using a risk-informed approach and verification activities are maintained
- Trends across the uranium and nuclear substance processing facilities demonstrate that the industry continues to operate safely

**Operations at Uranium and Nuclear Substance
Processing Facilities were conducted safely**



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Regulatory focus in 2019

CNSC staff will continue to:

- Use a risk-informed approach to ensure regulatory oversight
- Disseminate objective scientific, technical and regulatory information to the public
- Meet commitments for meaningful outreach and engagement with Indigenous groups and the public

**Regulating the nuclear industry in a manner
that maintains public trust and confidence**



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ANNEX 1 – INTERVENTION COMMENTS



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CMD 19-M35 - Interventions

Concerns or recommendations from the following interventions are addressed:

- CMD 19-M35.2 – Canadian Nuclear Workers' Council
- CMD 19-M35.3 – Swim Drink Fish Canada/ Lake Ontario Waterkeeper
- CMD 19-M35.4 – Thessalon First Nation



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Interventions

CMD 19-M35.2 – Canadian Nuclear Workers Council

Comment	CNSC Disposition
More consideration for a rating of Fully Satisfactory for Worker Health and Safety	CNSC staff use expert professional judgment to rate safety and control area (SCA) performance at uranium and nuclear substance processing facilities. Ratings are based on the review of key performance indicators [e.g., accident/event occurrences, responses to accidents/events, desktop review of reports, dose information, environmental (radiological and non-radiological) results] and the results of compliance verification activities such as inspections and technical assessments.



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (1/13)

Comment	CNSC Disposition
<p>That CNSC staff clarify how they select which environmental data to publish in RORs, and that they specify the basis of these decisions in future RORs</p>	<p>The reporting within the main body of the ROR for Environmental Protection (EP) has been simplified in order to summarize the overall environmental performance for a number of facilities. Documenting and discussing all aspects of an Environmental Protection Program (EPP) for every facility would add substantially to the text and make interpretation of all the data significantly more complex and overwhelming for those not familiar with the facilities.</p> <p>CNSC staff are committed to working with Civil Society Groups to better engage on data of interest via other reporting mechanisms.</p>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (2/13)

Comment	CNSC Disposition
<p>That Commissioners require more fulsome and standardized disclosure of environmental data in all future CNSC staff RORs. This should include at least a description and analysis of all known discharges of liquids that could carry contaminants from facilities to local ground and surface water. This should include: process water, cooling water, groundwater, and sanitary and storm sewers.</p>	<p>Environmental Risk Assessments (ERAs) developed by licensed nuclear facilities identify the possible discharges of liquids which could carry Contaminants of Potential Concern (COPCs) and cause unacceptable off-site environmental impacts. The preliminary screening process is used to identify COPCs that would require further evaluation in the ERA. This involved comparing the maximum measured concentrations in soil, groundwater, sediment and surface water to an appropriate standard (ie. MECP or CCME). By identifying the COPCs and completing an overall risk characterization, the licensee will base their Effluent and Environmental Monitoring programs off the results provided in the ERA.</p> <p>Although not reported in ROR, all sources of liquid effluent are identified in the quarterly and annual compliance reports submitted by the licensees, which provide detailed monitoring results from each source. Annual compliance reports are made publicly available on licensees websites. Appendix I of this ROR (CMD 19-M35) lists each of the licensee’s websites as well as provides a link to their respective annual compliance reports.</p> <p>The ROR is intended to be a high-level document to summarize the overall EP performance of nuclear facilities. The objective is to provide an update to the Commission and members of the public about the preceding year’s overall EP performance at nuclear facilities. CNSC acknowledge that there are differences in terms of the overall content and level of detail within the EP sections/sub-sections for each facility. Although this is dependent on the nature of the facilities operations and the risk to the environment, CNSC staff recognize the importance of providing consistent reporting throughout the ROR. In future RORs, CNSC staff will consider revising some of the facility specific EP subsections, primarily groundwater sections, to align with the details/quantity of information provided by other facilities, where appropriate.</p>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (3/13)

Comment	CNSC Disposition
<p>That links to reference documents relied on by CNSC staff in their RORs be made publicly available (electronically) along with the publication of future RORs to ensure interveners can reference these additional sources of information as early as possible in the intervention process</p>	<p>CNSC staff note the recommendation and are making improvements to ensure that more information is made publicly available electronically.</p> <p>The annual compliance reports provided by the licensees are key reference documents reviewed by CNSC staff to determine the conclusions in the Regulatory Oversight Reports (ROR). The licensees covered in this ROR post their annual compliance reports to their websites in accordance with their public information and disclosure programs. Appendix I of this ROR (CMD 19-M35) lists each of the licensee’s websites as well as provides a link to their respective annual compliance reports.</p>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (4/13)

Comment	CNSC Disposition
The CNSC should immediately initiate a comprehensive review of access to information or interrogatory processes for future Commission meetings and hearings in consultation with stakeholders.	CNSC staff strive to respond to requests received from intervenors in a timely way. Sometimes these requests are for licensee documents, for which permission to release must be obtained from the licensee. This can introduce delays in responding to requests. Intervenors are encouraged to seek licensee documentation from the licensee directly.



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (5/13)

Comment	CNSC Disposition
<p>In the meantime, the CNSC should immediately institute the following changes concerning access to information by intervenors for future Commission meetings:</p> <p>c. When notifying organizations of their funding grants, Participant Funding Program officers should also provide contact information for designated individuals representing the nuclear facilities that are subject to the meeting reviews. These representatives should be prepared to field questions and should be made aware of intervenors' timeframes and deadlines; and</p> <p>d. Some CNSC staff time, and industry/proponent staff time must be designated to providing intervenor-requested information and engaging in follow-up information requests and/or site visits.</p>	<p>c. It is not the role of the CNSC to provide contact information for licensee staff.</p> <p>d. CNSC staff strive to respond to requests received from intervenors in a timely way. CNSC staff are exploring the creation of a facility registry on our website, where facility-specific documentation and information would be made available. CNSC staff have no mandate or authority to provide site visits for intervenors.</p>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (6/13)

Comment	CNSC Disposition
<p>That all governments and government agencies proactively and publicly release monitoring data. As much as possible, data should be provided in real time and machine readable formats.</p>	<p>To make radionuclide release data more publicly accessible, CNSC and ECCC-NPRI have formed a task team to include links between the NPRI and CNSC web pages so users may obtain data from both sources.</p> <p>The CNSC is making radionuclide release data more readily accessible to the public as part of its commitment to open government and its mandate to disseminate this information to the public. The CNSC is creating downloadable digital databases with radionuclide effluent release data. These databases are posted on the Open Government portal and will be accessible from the CNSC facility specific web pages.</p> <p>On the CNSC facility specific web pages, there is a section called “Focus on safety and the environment” with links to detailed environmental data from the CNSC’s IEMP, other government monitoring programs, and the licensee’s environmental monitoring program.</p> <p>CNSC is consulting with stakeholders to get their feedback on the digital database linkages between the CNSC and NPRI website. Once the feedback has been received, the linkages can be finalized on the CNSC website.</p>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (7/13)

Comment	CNSC Disposition
<p>That CNSC staff, CNL, Cameco, and the municipality of Port Hope consider collaborating more on major incident communications to ensure the public knows in a timely way:</p> <ul style="list-style-type: none"> d) when the incident occurred; e) measured environmental effects (including sharing available monitoring data); and f) a description of any mitigation and/or remediation efforts undertaken to address incidents after they occur. 	<p>The onus is on the licensee to communicate with the public during major incidents. CNL and Cameco both maintain public information and disclosure programs for the release of information on major incidents. CNSC staff routinely communicate with licensees when events have been reported, and ensure that their reporting requirements have been met.</p> <p>The CNSC also provides links to licensees' posting of events from the CNSC website.</p>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (8/13)

Comment	CNSC Disposition
<p>That more water quality testing be conducted by Cameco, CNL, and CNSC staff in the lake outside of the harbour and downstream from the PHCF to ensure the harbour water is being adequately contained</p>	<p>Harbour water quality results have historically shown that contaminant concentrations in the Port Hope Harbour are at levels which are protective of the health and safety of people and the environment. Although Cameco’s harbour water quality results for uranium were elevated in Q4 2018 following the west wall collapse, uranium concentrations returned to baseline in Q1 2019 and are at levels below CCME guidelines for the protection of aquatic life and below Health Canada’s drinking water standard. This indicates that downstream locations in Lake Ontario are not being impacted by PHCF’s operations, so additional downstream monitoring is not warranted at this time. To confirm that the harbour water quality is protective of the health and safety of people and the environment, CNSC staff perform IEMP sampling in the vicinity of PHCF’s operations. This includes taking water samples downstream of PHCF in publically accessible areas. Results from the IEMP sampling campaign in 2017 indicated that the health and safety of people and the environment remained protected.</p> <p>In addition, CNSC staff performed sampling in 2018 outside of the turbidity curtain at the mouth of the harbour in response to the collapse of the west turning basin wall. . Results of these water samples Results of these water samples indicated there are no risks to the aquatic environment in Lake Ontario.</p>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (9/13)

Comment	CNSC Disposition
<p>a) In future NSPF Reports the discussion for each featured facility should include a description and analysis of each of the possible discharges of liquids which could carry contaminants and potentially cause unacceptable off-site environmental impacts:</p> <ul style="list-style-type: none"> - process water; - cooling water; - off-site groundwater flow which may carry contaminants leaching from on-site soil contamination; - sanitary sewer discharges; - storm sewer discharges. <p>b) Full references and/or links should be provided to the more detailed documentation/reporting which has been summarized in the report's section for each facility.</p>	<p>Please see the response to slide 65, Swim Drink Fish Canada/Lake Ontario Waterkeeper (2/13).</p>



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Interventions CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (10/13)

Comment	CNSC Disposition
<p>The CNSC should develop and implement requirements for a minimum groundwater and surface water quality monitoring program for any industrial facility which is processing uranium and/or other nuclear substances.</p>	<p>The requirement for an environmental monitoring program is a risk-based decision. CNSC staff requires licensees to adhere to groundwater and surface water quality monitoring programs in accordance with CNSC’s regulatory documents (REGDOC 2.9.1) and the suite of CSA standards (N288.4, N288.5, and N288.7).</p> <p>For example, CSA N288.7 outlines a set of criteria that needs to be met to establish a groundwater monitoring program. If the licensee determines that certain programs are not required, they are required to provide a gap analysis against the appropriate regulatory documents and CSA standards to support their decision, in this case against CSA N288.7 for groundwater. CNSC staff would review the licensee’s submission to determine whether these programs are required.</p> <p>In general, an environmental monitoring or effluent monitoring program is required if the level of risk from a potential spill or other uncontrolled release of contaminants from the facility cannot be determined due to uncertainties or information gaps. Furthermore, the results from an ERA will ultimately characterize the amount of risk and identify the Contaminates of Concern (COCs) that require monitoring in the licensees EPP.</p> <p>CSA N288.4 <i>Environmental Monitoring</i> states that an EMP is required if:</p> <ul style="list-style-type: none"> (a) environmental monitoring of that contaminant, physical stressor, or effect is required by Authorities Having Jurisdiction (AHJ); or (b) based on the results of the ERA (and considering the associated uncertainty), there is a reasonable likelihood that the concentration of a contaminant or the intensity of a physical stressor could pose a potential risk.



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (11/13)

Comment	CNSC Disposition
<p>The CNSC should initiate a process to review the licence limits for liquid discharges of radiological contaminants from each of the facilities featured in the 2018 NSPF Report. The licence limits for liquid discharges of any given radionuclide should consider both its radiological properties as well as its chemical properties, and should be protective of both human health and the health of aquatic organisms.</p>	<p>PHCF established a concentration-based release limit in 2016, which considers both radiotoxicity and chemical toxicity. This is the current approach being implemented by licensees when revising release limits.</p> <p>CNSC has drafted a regulatory document (REGDOC) for controlling releases to the Environment from Nuclear Facilities which provides a new approach to establishing licence limits which closes an existing gap regarding CNSCs regulatory framework for controlling releases to the environment. Licensees will be required to comply with this REGDOC when it is published, which will likely lower licensees allowable licence limits in keeping with the ALARA principal. One section of this REGDOC provides a process for establishing release limits for hazardous substances, such as uranium.</p> <p>Licence limits on releases to the environment are used to constrain releases from normal operations. Licence limits are set with sufficient headroom above the upper bound of normal operation to represent a clear loss of control of part of the licensee’s program(s) and/or control measure(s). Exceedance of a licence limit is subject to enforcement action. These licence limits are representative of technology-based release limits that are derived considering the best available pollution prevention technologies and techniques economically achievable (BATEA). Once set, the release limits would be incorporated into each facilities’ Licence Conditions Handbook for compliance verification.</p> <p>The REGDOC is anticipated to be ready for public consultation within the next year.</p> <p><i>These licence limits will be established by:</i></p> <ul style="list-style-type: none"> • <i>identifying the final release points where the licence limit will apply</i> • <i>identifying the contaminants and/or physical stressors that require a licence limit</i> • <i>identifying and harmonizing, where appropriate, with existing federal, provincial/territorial and municipal requirements. If this does not apply, the licence limit is established based on maximum predicted design release concentration(s) and/or quantity.</i> <p><i>Licensee/applicant shall demonstrate that releases at the licence limits:</i></p> <ul style="list-style-type: none"> • <i>respect the regulatory public dose limit</i> • <i>pose no unreasonable risk to humans or the environment through the ERA</i>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (12/13)

Comment	CNSC Disposition
<p>a) Monitoring should be done at every active storm sewer outlet at the PHCF, and should be done on a quarterly basis.</p> <p>b) If an outlet is dry on a scheduled monitoring date, then follow ups should be done on days with sufficient precipitation that flow is occurring.</p> <p>c) PHCF storm sewer monitoring should be done for the full list of COCs for the PHCF.</p> <p>d) Storm sewer discharges from the PHCF to the Port Hope Harbour need to be regulated by the CNSC. Monthly release limits and daily action levels for storm sewer discharges should be developed and enforced by the CNSC for the PHCF, and for the other facilities featured in the 2018 NSPF Report.</p>	<p>Stormwater monitoring at PHCF is performed at storm sewer outlets immediately upstream of the harbour at catch basins/manhole access points. The access points are ultimately subject to the availability of storm water flow, so it's an intermittent measurement. In addition, if outlets are inundated by water due to the high water levels from Lake Ontario, this creates unavailability. PHCF sampled at 6 outlets (there are 10 outlets total) in 2017 and 2018 based on availability. Storm sewer outlet 8 is typically dry throughout the entire year due to its catchment area comprising of granular cover. PHCF performed sampling at the 5 other storm sewer outlets to capture storm water quality. PHCF only performs stormwater monitoring during precipitation events > 10+ mm preceded by 48 hours of dry weather.</p> <p>CNSC staff have determined that semi-annually stormwater monitoring is acceptable based on the results of the ERA and PHCF's compliance with the requirements outlined in CSA N288.4. The semi-annual monitoring allows PHCF to capture sampling events during the Spring and Fall periods. It is important to note that considerable updates to the stormwater monitoring program are anticipated in relation to the MECP ECA amendment associated with the VIM storm sewer works upgrades. Once VIM is complete, the stormwater program will be revised which will consider the sampling frequency/interval (ie. semi-annually vs quarterly). The completion of VIM will also allow PHCF to sample stormwater at all outlets.</p> <p>Stormwater monitoring is done for the following COC's: uranium, fluoride, ammonia, nitrate, and arsenic. The identification and monitoring of these COCs are based on the results of PHCF's ERA. Release limits and actions levels are not required for PHCF since stormwater loadings and the exposure pathways assessed in the ERA did not result in meaningful human health and ecological effects based on the current stormwater loadings/discharges.</p> <p>All stormwater water is discharged into the Port Hope Harbor. Contaminates associated with stormwater is captured in PHCF's Surface Water Monitoring Program. Surface water quality monitoring of the Port Hope Harbor is the best indicator for environmental performance. This program includes monitoring of cooling water intakes/discharges directly from/to the harbor, which is regulated by Ontario's MECP and requires compliance with the release limits identified in the ECA.</p>



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Interventions CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (13/13)

Comment	CNSC Disposition
<p>a) The CNSC should require Cameco to produce an annual overview report on water quality and the various liquid discharges from the PHCF. The report should include information, references and links regarding the following:</p> <ul style="list-style-type: none"> - the full list of COCs for the PHCF; - the area of contaminated groundwater and the extent to which it is being contained by the Pump and Treat system; - discharges to the sanitary sewer system; - coolant water discharges; - storm water discharges; - calculations of mass loading of uranium and other key COCs to the Harbour from each liquid discharge stream; - water quality in Port Hope Harbour; - water quality in Lake Ontario in proximity to the PHCF. <p>b) The other Uranium and nuclear substance processing facilities featured in the 2018 NSPF Report should likewise be required by CNSC to produce an annual overview report on water quality and the various liquid discharges from their facilities.</p>	<p>CNSC requires PHCF to produce an Annual Groundwater and Surface Water Report which is reviewed by CNSC staff. This report is separate from Cameco’s Annual Compliance Monitoring and Operational Performance Report (ACMOPR) and is meant to provide additional information and details on groundwater and surface water quality monitoring.</p> <p>The reports include information and provide references about the risk assessment process that’s performed to identify the list of COC’s for the PHCF. In addition, it provides extensive details on the groundwater monitoring program and information on the groundwater model updates and estimates of mass flux of COCs to the harbour. The groundwater pump-and-treat system is discussed in detail and provides information on the average pumping rates for the active pumping wells associated with the system. Furthermore, the surface water quality in the harbour is monitored and reported at 13 different locations (8 locations in the turning basin and 5 additional locations in the approach channel) including the south cooling water intake, which is specifically highlighted in PHCF’s ACMOPR. Tables are provided in the report which indicate the surface water quality concentrations at each location. The COCs analyzed are ammonia, arsenic, fluoride, nitrate, uranium, radium-226 and VOCs.</p> <p>[Response continued next slide]</p>



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Interventions

CMD 19-M35.3 – Swim Drink Fish Canada/Lake Ontario Waterkeeper (13/13)

Comment	CNSC Disposition (Continued)
	<p>In the ACMOPR, CNSC requires PHCF to report on the annual discharges to the sanitary sewer. PHCF reports the annual average flow, the annual average uranium concentrations, and the total annual uranium loadings to the sanitary sewer system. In the ACMOPR, PHCF also reports specifically on the cooling water intake and discharges at the south cooling water intake (SCI), UF₆ plant and Building 2 cooling water return (UO₂N), and UO₂ plant cooling water return (UO₂S). The average and maximum concentrations for uranium, pH, fluoride, ammonia, and nitrate concentrations are provided in the ACMOPR. In addition, PHCF reports on their semi-annual storm water monitoring program which provides the concentrations for uranium, fluoride, ammonia, nitrate and arsenic and also on the results of the acute lethality tests for <i>Daphnia magna</i> and <i>rainbow trout</i>.</p> <p>All process water at PHCF is evaporated to avoid discharge to the environment. PHCF has point source discharges including cooling water returns, sanitary sewer discharges, and storm water. PHCF has a liquid effluent licence limit for discharges to the sanitary sewer. PHCF is required to report an annual uranium loadings to the sanitary sewer to verify compliance against the licence limit. The cooling water intakes and discharges are regulated by the MECP via a Permit to take Water (PTTW) and an ECA to satisfy MISA requirements. There are no licence limits for storm water discharges, but PHCF does perform storm water loading calculations by determining the runoff volume and using the concentrations from the storm water quality sampling results, which are provided in the ACMOPR.</p> <p>Each nuclear facility requires specific environmental protections programs depending on the nature of the operations. These are captured in the licensees Environmental Protection Program (EPP) and are reviewed and accepted by CNSC staff. A licensees EPP is very robust, so not all environmental protection aspects can be discussed in the ROR, since the report is attended to be at a high-level. The reporting within the main body of the ROR has been simplified in order to summarize the overall environmental performance.</p>



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Interventions

CMD 19-M35.4 – Thessalon First Nation

Comment	CNSC Disposition
<p>Plans in place for decommissioning of the facility (BRR) after operations ceased, Want to be ensured all sources of contamination will be removed and the land footprint of the facility is rehabilitated to its pristine pre-construction condition</p>	<p>Cameco is currently maintaining preliminary decommissioning plans (PDP) for each of its licensed facilities, including the Blind River Refinery (BRR). The PDP serves as a planning tool to form the basis for establishing a financial guarantee for decommissioning. CNSC staff review the PDPs to ensure that the plans provide a credible cost estimate for decommissioning. In accordance with the <i>Nuclear Safety and Control Act</i>, the financial guarantees must be acceptable to the Commission. The PDPs are reviewed at least every five years to ensure that it incorporates the most current information available for decommissioning. CNSC staff recently reviewed Cameco’s PDP for BRR in 2017 and the updated financial guarantee amount of \$48 million was approved by the Commission in November 2017.</p> <p>The current end-state objective of the BRR PDP is the removal of all facility structures and the development of a Long Term Waste Management Facility (LTWMF) on site. The BRR LTWMF would contain the low level radioactive waste from decommissioning the BRR facility as well as Cameco’s facilities in Port Hope, ON (Port Hope Conversion Facility and Cameco Fuel Manufacturing).</p> <p>Note that the PDP is preliminary in nature. If the licensee were to decide to decommission the facility, the licensee would have to develop a detailed decommissioning plan and apply for a decommissioning licence from the CNSC. Members of the public would have the opportunity to provide input during this process.</p>