



BWXT Nuclear Energy Canada Inc.

Application to renew operating licence
for Toronto and Peterborough facilities

CNSC Staff Presentation



Commission Hearing
March 2-6, 2020
CMD 20-H2.A





BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Corrections to CMD 20-H2

- **Section 3.5.5** (page 28): first paragraph: Licence conditions 15.1 and 15.2 should be 5.1 and 5.2
- **Licence change table** (page 97): Licence condition 15.1 should be worded the same way as licence condition 15.1 in the draft proposed licence



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Presentation Outline

- Licence renewal application
- Facility overview and regulatory oversight
- Technical assessment
- Public engagement and participant funding
- Conclusions and recommendations



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Licence Renewal Application

BWXT Nuclear Energy Canada requests:

- That the Commission renew its Class IB Nuclear Fuel Facility Operating Licence (FFOL-3620.01/2020) for a period of 10 years
- That its renewed licence authorize the conduct of pelleting operations in Peterborough, an activity that BWXT is currently licensed to conduct in Toronto
- The acceptance of a revised financial guarantee through two new instruments, a surety bond and a letter of credit

No increase in the production of fuel bundles at Peterborough



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

FACILITY OVERVIEW AND REGULATORY OVERSIGHT



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

BWXT Nuclear Energy Canada Inc.

- Two facilities together manufacture CANDU fuel bundles
- Industrial operation processing natural and depleted uranium dioxide
- No enriched uranium processing
- All hazards from operations have been assessed by CNSC staff and found to have mitigation measures as per requirements

 Uranium Pellet



Conventional hazards and radiological hazards



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Toronto Facility

- Two buildings onsite with one processing uranium and the other used for storage
- Licensed to produce uranium pellets using natural and depleted uranium-dioxide powder
- Possess up to 700 MgU anytime and process 150 MgU per month
- Facility located in an industrial zone



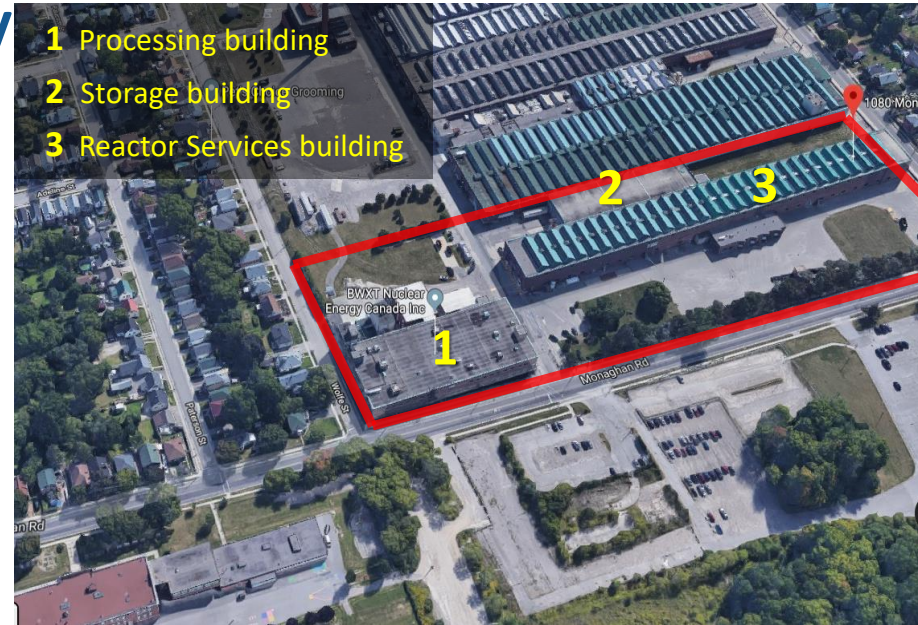
Toronto Facility has operated safely with no impact to the public and the environment



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Peterborough Facility

- Licensed to manufacture fuel bundles using pellets from Toronto and zircaloy tubes made in house
- Service contaminated equipment from nuclear facilities
- Possess up to 1500 MgU anytime and process 150 MgU per month
- Facility located in an industrial zone



Peterborough Facility has operated safely with no impact to the public and the environment



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Licence History

- In December 2010, the Commission issued a single licence for both Toronto and Peterborough facilities
- In December 2016, the Commission transferred the single licence to BWXT from GE Hitachi
- Reasons accepted by the Commission in 2010 to issue a combined licence are still valid
 - Both facilities operate under a single management system with clear responsibilities for licensed activities
 - Efficiency in regulatory oversight with common compliance verification
 - Annual Regulatory Oversight Report details licensee performance

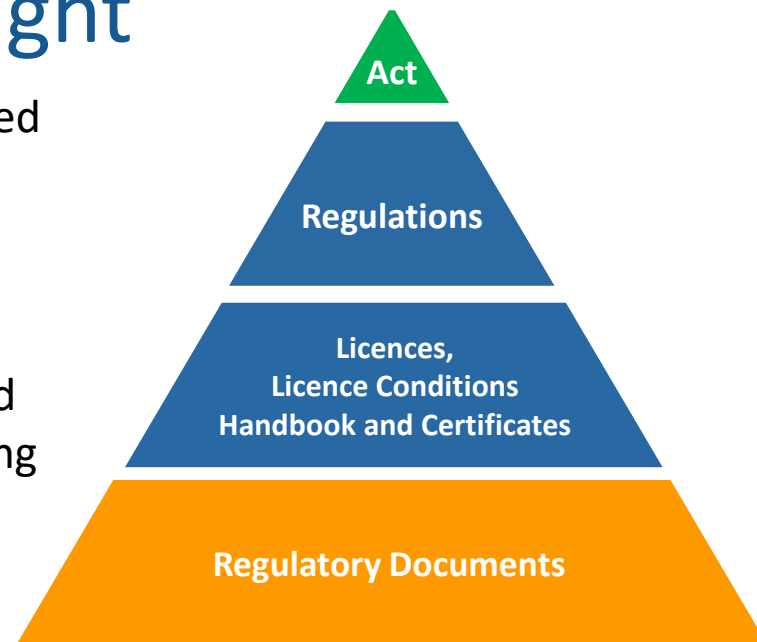
Staff recommend maintaining a single licence for both facilities



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

CNSC - Regulatory Oversight

- *Nuclear Safety and Control Act* and its associated regulations provide requirements
- CNSC Licence and Licence Conditions establish and set licensee-specific requirements
- Licence Condition Handbook provides clear and comprehensive criteria for compliance according to the Licence
- Regulatory documents and international guidance provide clarity on expectations



BWXT's performance is reported annually
and was rated "satisfactory"



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

BWXT – Performance and Compliance Activities

ACTIVITY	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
CNSC Inspections	3	2	2	4	4	5	4	4	2	30
Safeguards Inspections (IAEA)	4	2	3	3	4	4	5	7	6	38
Number of Events Reported	0	1	1	2	3	4	5	3	3	22
Information Requests Under Regulations	1	0	0	0	0	1	1	0	0	3

CNSC has a dedicated facility assessment and compliance team in place with oversight of all licensed activities



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

TECHNICAL ASSESSMENT



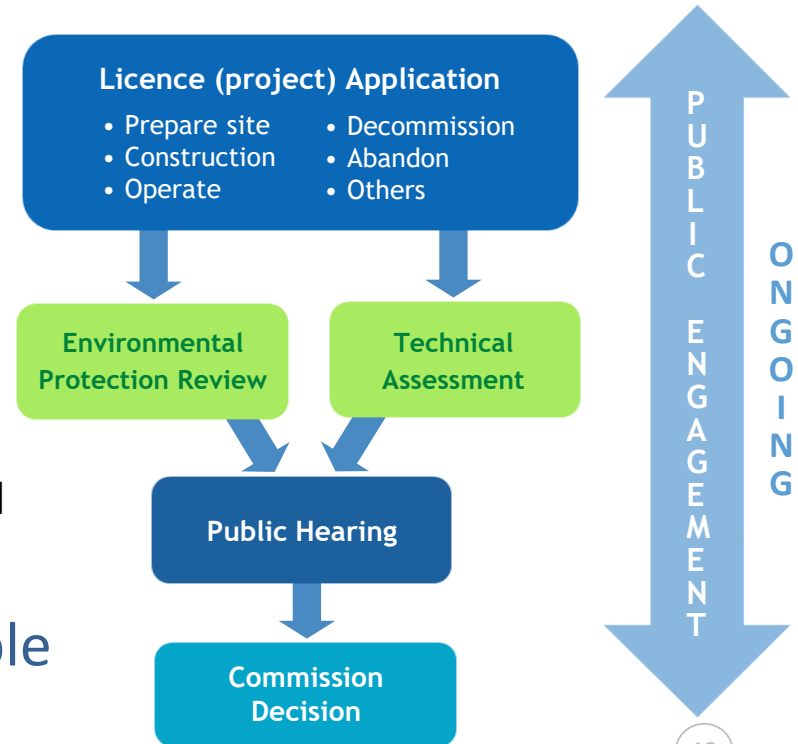
BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

CNSC Staff Assessment of BWXT's Renewal Application

CNSC staff:

- Verified that the information submitted in support of the application satisfies CNSC requirements under the NSCA and its regulations
- Technically assessed all programs and procedures
- Reviewed and confirmed all environmental protection data and trends

Risk informed and based on credible scientific evidence





BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Environmental Protection Review Report – Highlights (Appendix D, CMD: 20-H2)



*CNSC staff conducting IEMP sampling
near BWXT - Toronto*

CNSC Staff Environmental Protection Review Report was based on BWXT's:

- Licence application
- Environmental monitoring results and annual compliance monitoring reports
- Environmental Risk Assessments
- Preliminary Decommissioning Plan

As well as:

- CNSC's Independent Environmental Monitoring Program results
- Regional monitoring programs and/or health studies by other government agencies

**The environment and the health of persons
continues to be protected**

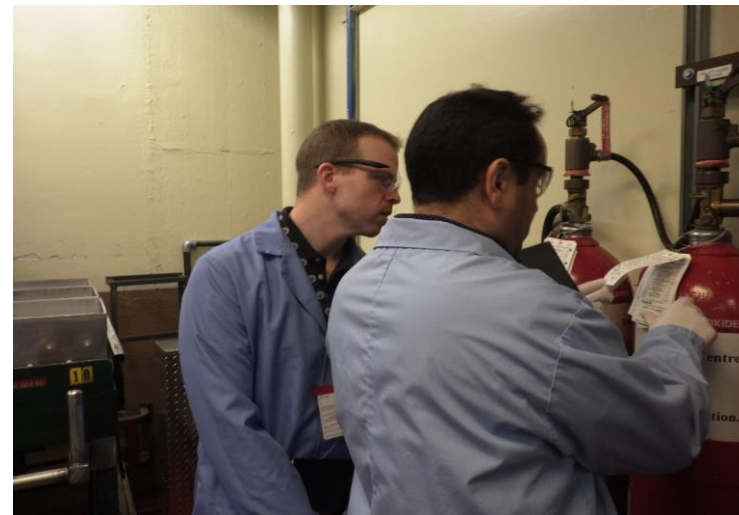


BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Assessment of Safety and Control Areas (SCA)

- CNSC staff reviewed BWXT's implementation of all programs and its performance during the existing licence period
- Assessment criteria and results are summarized in CMD 20-H2

BWXT's programs meet
regulatory requirements



CNSC staff during an inspection at BWXT – Toronto



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

SCA - Management System

CNSC staff assessed and concluded that BWXT's:

- Management system is compliant with CSA N286-12
- Management review of performance and internal audits meet requirements
- Change management and records management process is robust
- Safety Culture meets regulatory requirements



CNSC staff during an inspection at BWXT - Toronto

BWXT's management system governs all licensed activities and meets requirements



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

SCA – Safety Analysis

CNSC staff assessed and concluded that BWXT's:

- Safety Analysis of hazards is acceptable and demonstrated adequate safety through defence-in-depth
- Safety Analysis Report (SAR) which identifies facility hazards, analyzes consequences and documents mitigation measures for Toronto and Peterborough is acceptable

Engineered barriers and administrative controls are in place

Defence-in-Depth
Level 1 Prevent deviations from normal operations
Level 2 Detect, intercept and control deviations to prevent anticipated operational occurrences
Level 3 Minimize onsite consequences
Level 4 Reduce severity of hazardous consequences as low as practicable
Level 5 Mitigate offsite consequences



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

SCA – Physical Design

CNSC staff assessed and concluded that BWXT's:

- Design of the Toronto and Peterborough facilities (structures and equipment) complies with all applicable national codes and standards
- Facility design is in line with IAEA *SSR-4: Safety of fuel cycle facilities*, *SOG-6: Safety of fuel fabrication facilities*
- Fire protection program meets regulatory requirements
- The management system for both facilities governs all modifications and adequately mitigates hazards

BWXT's physical design meets requirements



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

SCA – Physical Design cont'd

CNSC staff assessed and concluded that BWXT's proposed pelleting operations at the Peterborough facility:

- Can be done safely
- Is within Commission approved operating limits of existing licence

Licence condition 15.2 is a facility specific regulatory requirement to satisfy CNSC staff and confirm to the Commission that the proposed pelleting operations will remain within the approved operating limits.

Licence condition to confirm BWXT's changes remain
within approved safety case



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

SCA – Radiation Protection

CNSC staff assessed and concluded that:

- BWXT's Radiation Protection (RP) program meets regulatory requirements
- BWXT's RP program is effectively implemented
 - No regulatory dose limit exceedances
- Doses are kept As Low As Reasonably Achievable (ALARA)

**BWXT's radiation protection program
is protective of workers**



CNSC staff sampling for contamination during an inspection at BWXT - Peterborough

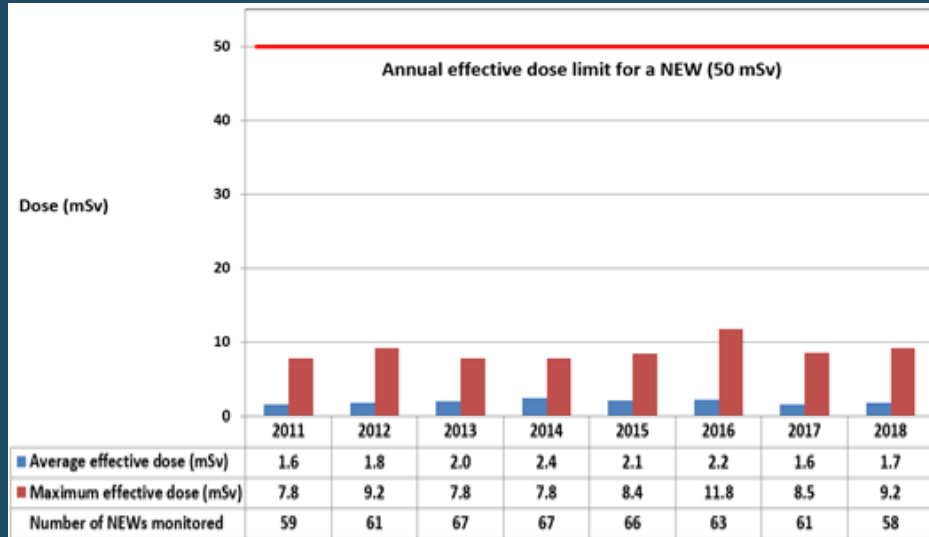


BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

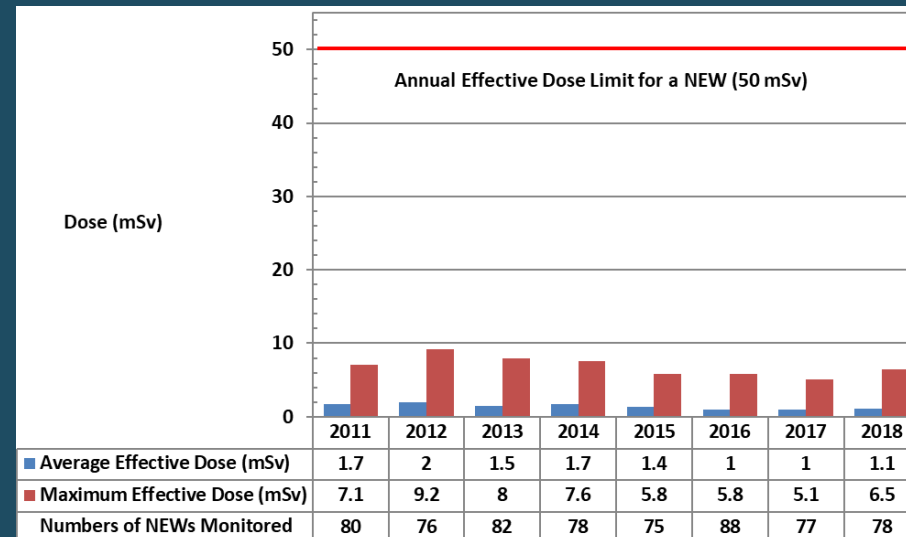
Radiation Protection

– Occupational Exposures to Nuclear Energy Workers (NEWs)

Annual effective doses to NEWs - Toronto



Annual effective doses to NEWs - Peterborough



Occupational exposures to NEWs are well below regulatory limits



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Radiation Protection - Dose to the Public

CNSC staff assessed and concluded that:

Radiation doses to the public are well below regulatory limits

Maximum Annual Effective Dose to a Member of the Public (mSv)								
Year	2011	2012	2013	2014	2015	2016	2017	2018
BWXT - Toronto	0.0006	0.0011	0.0006	0.0055	0.0101	0.0007	0.0175	0.0004
BWXT - Peterborough	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Regulatory dose limit for members of the public: **1 millisievert/year (mSv/yr)**

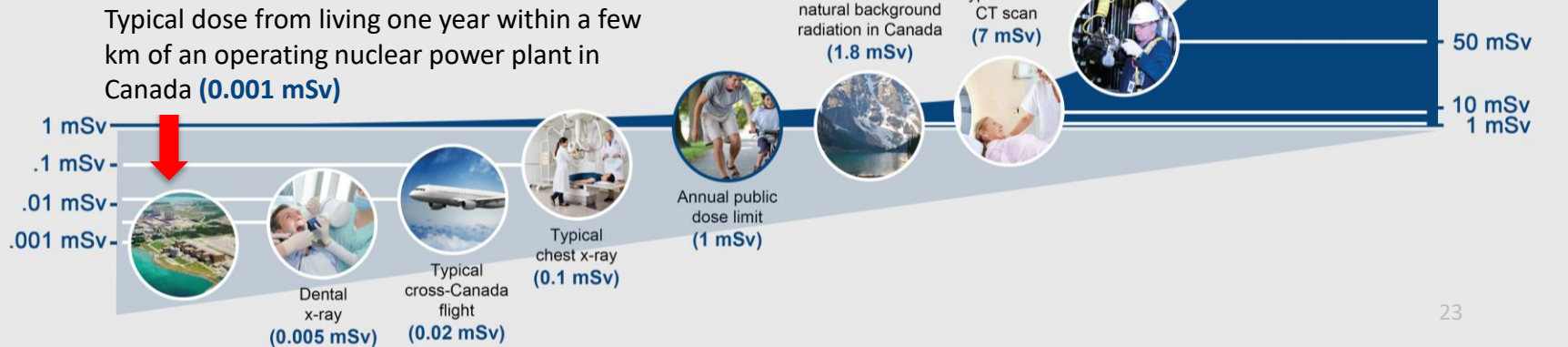


BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Radiation Protection - Dose to the Public

CNSC staff assessed and conclude that:

There is no impact to public health and safety from BWXT's continued operations





BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

SCA – Conventional Health & Safety

CNSC staff assessed and concluded that:

BWXT complies with the requirements under the *Canada Labour Code* and the *Canada Occupational Health and Safety Regulations* for hazardous chemical exposure

- Beryllium air concentrations in work areas are monitored and kept ALARA
- Occupational exposure to beryllium is ascertained using personal air samplers
- Corrective actions from the Beryllium event (CMD 17-M53) was implemented satisfactorily



CNSC staff during an inspection at BWXT

BWXT's Conventional Health & Safety program meets requirements

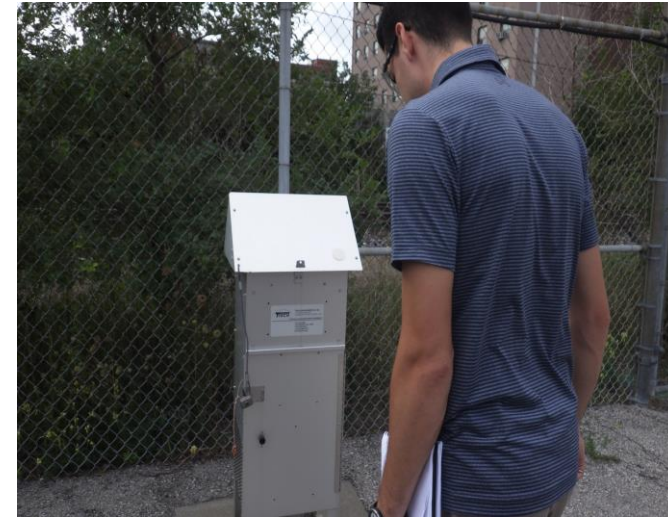


BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

SCA – Environmental Protection

CNSC staff assessed and concluded that:

- BWXT's environmental protection program is implemented effectively and meets regulatory expectations
- At Toronto - Uranium releases show that there is no health risk to the public from licensed activities
- At Peterborough - Uranium and beryllium releases show that there is no health risk to the public from licensed activities



*CNSC staff inspecting ambient air monitor
at BWXT -Toronto*

Monitoring data show that release levels
from both facilities are protective



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Actual Uranium Releases From Operations

Parameter	Uranium Air emissions in Kg/yr		Uranium Liquid Effluents in Kg/yr	
	Toronto	Peterborough	Toronto	Peterborough
Current licence release limits	0.76	0.55	9000	760
2014	0.01090	0.000003	0.72	0.00014
2015	0.01080	0.000003	0.39	0.00006
2016	0.01080	0.000004	0.65	0.00013
2017	0.00744	0.000002	0.94	0.00003
2018	0.00628	0.000002	0.94	0.00001

No impact to the public from uranium releases



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

New Environmental Release Limits in LCH

Facility	Contaminant	Medium	Exposure-based Release Limits
Peterborough	Uranium	Water	0.14 g/L
		Air	410 µg/m ³
Toronto	Uranium	Water	1 g/L
		Air-Furnace Exhaust 1	437 µg/m ³
		Air-Furnace Exhaust 2/4	55 µg/m ³
		Air-Furnace Exhaust 5/6	52 µg/m ³
		Air-Rotoclone	65 µg/m ³
		Air-6H68	47 µg/m ³
		Air-4H48	97 µg/m ³

New release limits are concentration based
and are applied for each release point



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

New Environmental Release Limits – cont'd

- CNSC staff directed BWXT to implement new Exposure Based Release Limits (EBRLs) that considered radiotoxicity, chemical toxicity and protection of aquatic life
- **Air releases:** EBRLs are harmonized with the Ontario provincial air quality standards for uranium 0.03 ug/m^3
- **Liquid effluents:** EBRLs are based on the Canadian Council of Ministers of the Environment (CCME) – Protection of Aquatic Life Guidelines for uranium of 0.015mg/L
- All releases are controlled by technological constraints with administrative and action levels to keep actual releases the lowest
- New EBRLs reduce current limits by a factor of half for air and one fifth for liquid effluents

New release limits are based on most stringent
exposure based criteria



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Ambient Environmental Monitoring

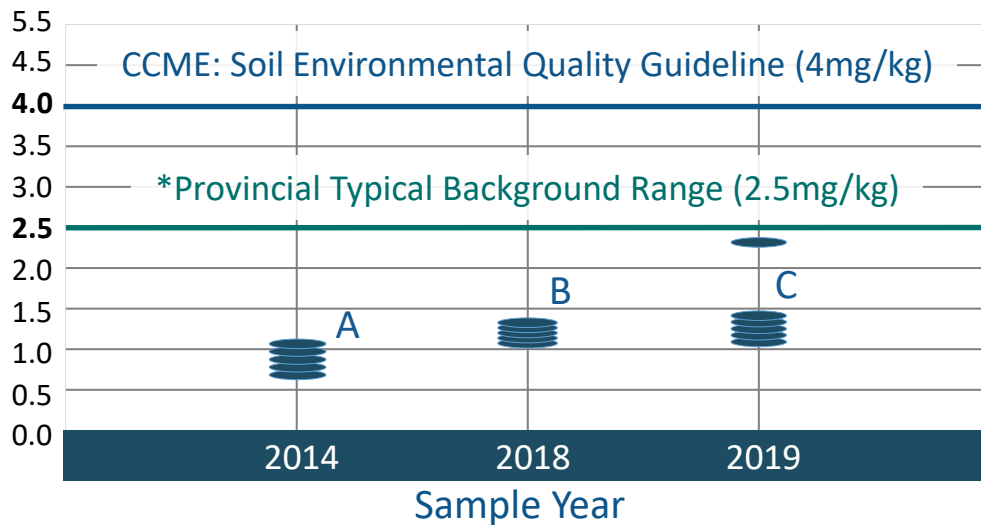
- Ambient air monitoring in 5 locations on site at the Toronto facility are well below Ontario Standard of 0.03 ug/m^3
- Soil monitoring at 49 locations around the Toronto facility are below Canadian Council of the Ministers of Environment soil quality guidelines
- Air emissions at the point of release from the stack at the Peterborough facility are below the Ontario Standard of 0.03 ug/m^3
- CNSC staff conducted Independent Environmental Monitoring Program (IEMP) sampling at Toronto and Peterborough in 2014, 2018 and 2019
- CNSC staff recommend that the Commission impose a facility-specific **licence condition 15.1** to add ambient environmental monitoring prior to the conduct of pelleting at the Peterborough facility



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

IEMP Beryllium Concentrations in Soil

Milligram of Beryllium per kilogram of soil



Beryllium values are within natural background

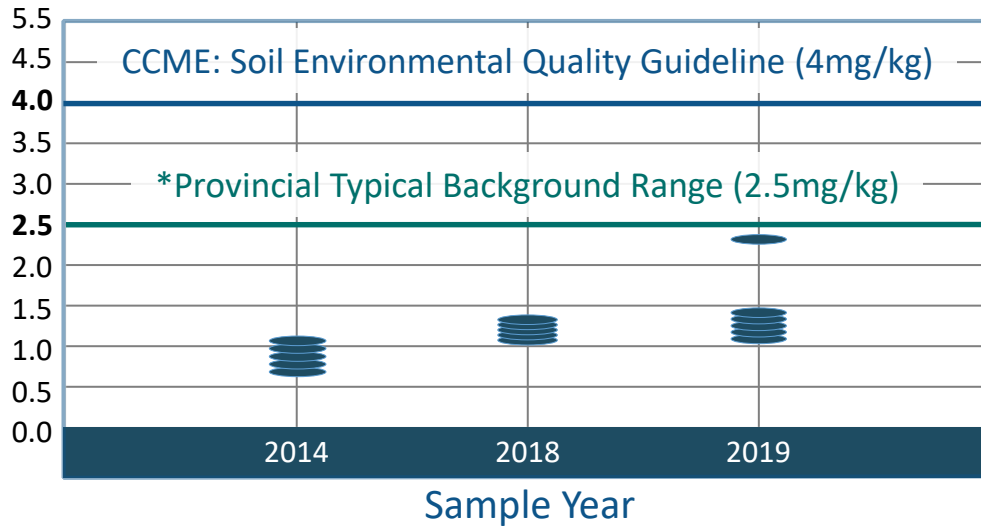
Sample ID Location	A	B	C
GP01	0.8	1.27	1.33
GP02	1.1	1.14	1.34
GP03	1.1	1.28	1.1
GP04	0.9	1.08	1.17
GP05	1.0	1.27	2.34
GP06	1.0	1.24	1.44
GP07	0.7	1.34	1.28
GP08	1.0	1.19	1.33
GP11*	NA	NA	1.25
*Reference location ~18 km from the facility			
Range of measured concentrations	0.70–1.10	1.08–1.34	1.10–2.34
Lab analytical uncertainty	+/- 40%	+/- 30%	+/- 10%



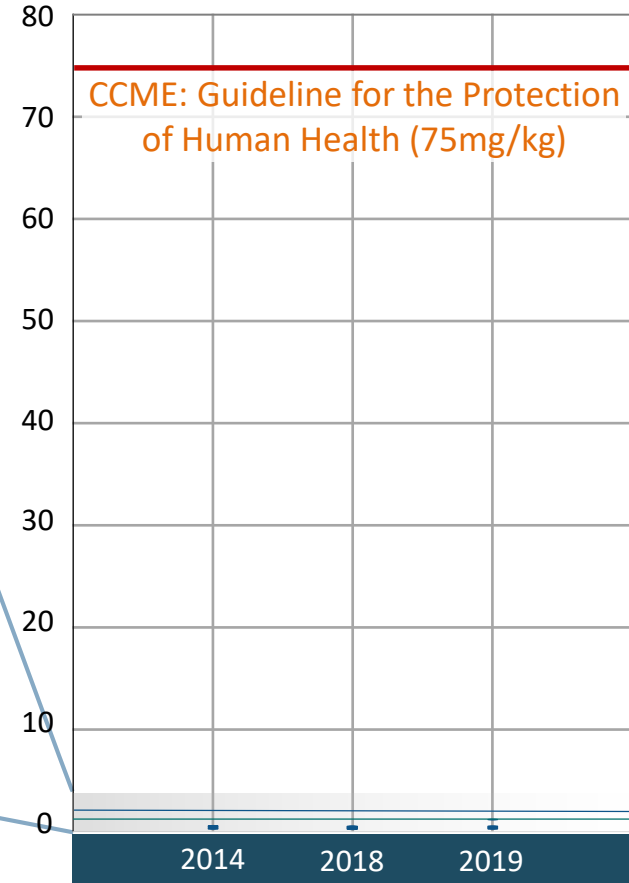
BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

IEMP Beryllium Concentrations in Soil – cont'd

Milligram of Beryllium per kilogram of soil



* Definition: representative of upper limit in soil not contaminated by point sources





BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

IEMP Beryllium Concentrations in Soil – cont'd

CNSC staff action in response to environmental monitoring data and public inquiries regarding beryllium:

- CNSC staff will conduct additional IEMP soil sampling in 2020
- CNSC staff require BWXT commit to dedicated environmental testing for uranium and beryllium to confirm levels remain within background
- As stated in the Peterborough Public Health intervention (CMD 20-H139) CNSC staff support BWXT establishing a Community Liaison Committee in Peterborough



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

SCA - Emergency Management and Fire Protection

CNSC staff assessed and concluded that BWXT's:

- Site emergency response plans for Toronto and Peterborough meet the requirements of REGDOC-2.10.1 on emergency response
- Emergency preparedness exercises are carried out periodically with first responders
- Fire protection program meets regulatory requirements



*Testing of emergency measures at BWXT – Toronto,
June 2018*

BWXT's emergency plan considers all credible accidents



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Preliminary Decommissioning Plan

CNSC staff assessed and concluded that BWXT's:

- Updated Preliminary Decommissioning Plan (PDP) meets the requirements of CSA N294-09 and CNSC regulatory guide *G-219*
- PDP captures strategies, activities and cost estimates for decommissioning Toronto and Peterborough facilities
- Targeted end state for the two facilities is unrestricted industrial use

Detailed decommissioning plans are required before any decommissioning activity can be conducted



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Financial Guarantee

- BWXT submitted an updated Financial Guarantee (FG) for the Commission's acceptance
- CNSC staff reviewed the FG and are satisfied it meets regulatory requirements
- BWXT's FG consists of two instruments
 - A surety bond
 - A Letter of credit



CNSC staff find that the proposed amounts are credible
and that the financial instruments are acceptable



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Accident Coverage

- BWXT is responsible to maintain its own liability
 - Commission reviewed this issue in 2013
{Minutes from December 9-11, 2013 meeting, paragraph 100-106}
- Under Section 6 of the NSCA, the Commission has the authority to use the Financial Guarantee funds for the purposes it deems necessary for the protection of people and the environment
- In the low likelihood of an event impacting offsite locations, BWXT is responsible for any remediation

BWXT is responsible for any offsite remediation



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Assessment summary of pelleting at the Peterborough facility

Activity	Current Licence
Pelleting	Authorized
Structural & Equipment modifications	Authorized

- BWXT has requested to commence pelleting at Peterborough within its currently authorized operating limits
- Two Peterborough facility specific licence conditions are recommended by CNSC staff to confirm implementation of programs will be within safety case
- Effective and rigorous regulatory oversight remains in place – delegation of authority requested by CNSC staff



BWXT Nuclear Energy Canada Inc Licence Renewal CMD 20-H2.A

PUBLIC INFORMATION AND PARTICIPANT FUNDING



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Public Information and Disclosure Program

In 2013, the Commission responded to community concerns and directed the licensee to improve its **public information and disclosure program (PIDP)** in Toronto.

CNSC staff required the licensee to revise its PIDP to include:

- Dedicated communication manager
- New Community Liaison Committee
- Organized Public outreach, BBQs and tours
- Newsletters targeting local community
- Updated website & social media presence





BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

CNSC Staff Oversight of BWXT's PIDP

CNSC staff maintain close oversight of BWXT public outreach.

- Yearly verification of licensee communications activities through annual compliance reporting
- Yearly observation of community liaison committee meetings
- Yearly attend licensee community outreach events



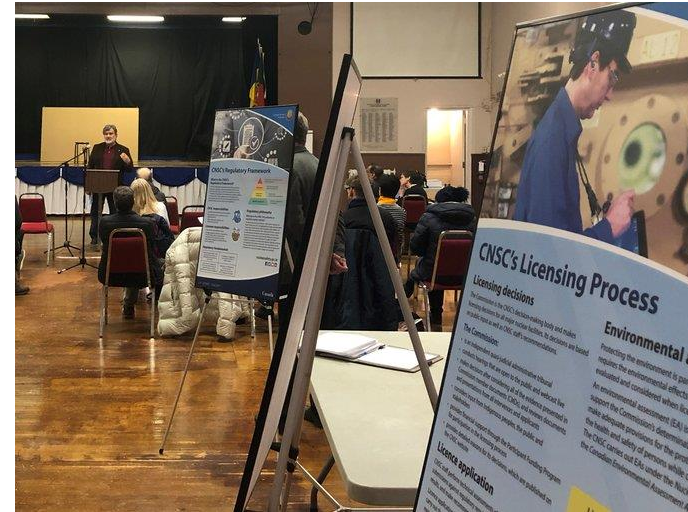
CNSC will continue to verify that BWXT's PIDP meets the changing public information requirements



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

CNSC Staff Public Outreach as part of Licence Renewal

Event	Date
Announcement for Notice of Hearing	June 3, 2019
Participation in BWXT summer BBQs	Peterborough - June 5, 2019 Toronto - June 11, 2019
Participation in BWXT public outreach	Toronto – October 22, 2019 Peterborough - October 08, 2019
CNSC Webinar	January 08, 2020
CNSC MTNR open houses	January 22, 2020 January 23, 2020



CNSC staff at the Toronto Meet the Nuclear Regulator outreach – January 22, 2020

Licensing information requests answered by CNSC staff



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Engagement with Indigenous Groups

Toronto and Peterborough sites are situated on traditional and treaty territories of many Indigenous groups.

CNSC staff confirm that BWXT maintains relationships and continues to communicate with interested Indigenous groups.

CNSC engagement activities included:

- Letters sent in April 2019 with follow-up phone calls
- Meetings held with First Nations and Métis Nation of Ontario to discuss licensing activities at BWXT facilities
- Provision of CMD 20-H2 in December 2019



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Participant Funding Program (PFP)

CNSC awarded ~ \$37,000 to the following 4 recipients:

Citizens Against Radioactive Neighbourhoods

Lake Ontario Waterkeeper

Curve Lake First Nation

Canadian Nuclear Workers Council



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Main Themes in Interventions

Radiation	Licensing of nuclear facilities
Health studies of workers and populations	Decommissioning plans and Financial Guarantees
BWXT operations	Safety Analysis and accident scenarios
Environmental monitoring and Environmental Assessment	Public Information
	Indigenous consultation

Annex A of supplemental CMD 20-H2.B provides
CNSC staff's assessment of the interventions



BWXT Nuclear Energy Canada Inc Licence Renewal: CMD 20-H2.A

CONCLUSIONS AND RECOMMENDATIONS



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Conclusions

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

- BWXT is qualified to carry on the activities requested in its renewal application
- BWXT's request for authorization to conduct pelleting operations at the Peterborough facility is acceptable:
 - The requested activities are within this facility's current operating limits
 - BWXT has the required management system in place to implement pelleting operations at the Peterborough facility
 - The hazards associated with the proposed activities are well characterized and controlled
 - BWXT's operations would remain protective of public health and the environment



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Conclusions – cont'd

BWXT's proposed financial guarantee is acceptable

- Cost estimate is credible
- Financial guarantee instruments are acceptable
 - Letter of Credit
 - Surety Bond



BWXT Nuclear Energy Canada Inc. Licence Renewal: CMD 20-H2.A

Recommendations

CNSC staff recommend that the Commission:

- Renew the nuclear fuel facility licence to BWXT for a 10-year period, with the proposed licence conditions
- Authorize the conduct of pelleting operations
- Authorize the delegation of authority as set out in the CMD
- Accept the proposed financial guarantee and direct BWXT to provide the original instruments (not copies of the instruments) within 90 days of the issuance of a decision on this matter



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Canada

Connect With Us

Join the conversation



nuclearsafety.gc.ca

