Canadian Nuclear Laboratories

Whiteshell Laboratories Licence Renewal

Commission Hearing
October 2-3, 2019
CMD 19-H4.C

CNSC Staff Presentation

e-Doc 5952117 PPTX
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PURPOSE OF HEARING

Purpose of Hearing

Canadian Nuclear Laboratories (CNL) is requesting that the Commission:

- Renew CNL's Whiteshell Laboratories (WL) decommissioning licence for a period of 10 years from January 1, 2020 to December 31, 2029

CNL is not seeking any changes to its currently approved licensed activities

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SITE OVERVIEW

Site Overview

- Owned and operated by Atomic Energy of Canada Limited (AECL)
  - 1963 to 2014
- Operated by CNL
  - 2014 to present

Source: CNL

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REVIEW OF LICENCE APPLICATION

Current WL Decommissioning Licence

NRTEDL-W5-08.05/2019

Current licence authorizes CNL to:

- Operate and decommission the Whiteshell Laboratories,
- Produce, possess, process, refine, transfer, use, package, manage, import, export and store the nuclear substances,
- Possess, use, produce and transfer prescribed equipment,
- Possess, use and transfer prescribed information,
- Carry out the site preparation, construction or modifications required for the decommissioning of the Whiteshell Laboratories.

The current licence expires on December 31, 2019

CNL Activities Highlighted in Application

- Waste Management
- Decommissioning of remaining Whiteshell Laboratories facilities
- Continuous improvement of CNL's management system
- Decommissioning of Whiteshell Reactor 1 (WR-1)

Proposed *In Situ* Decommissioning (ISD) of WR-1

- The proposed *in situ* decommissioning of WR-1 is **not** included in the licensing basis for WL
- ISD is subject to an EA under *Canadian Environmental Assessment Act, 2012*
- *In situ* decommissioning of WR-1 will be considered by the Commission for decision at a separate hearing

Proposed ISD of WR-1 is not under consideration in this licensing request

CNSC Staff Recommended Licence

- CNSC staff recommend a 10-year licence period from January 1, 2020 to December 31, 2029
- Proposed licence applies
  - standardized wording of licence conditions which refer to licensee programs
  - one facility-specific licence condition related to security
- Regulatory documents and standards are in the LCH to include enforceable compliance verification criteria

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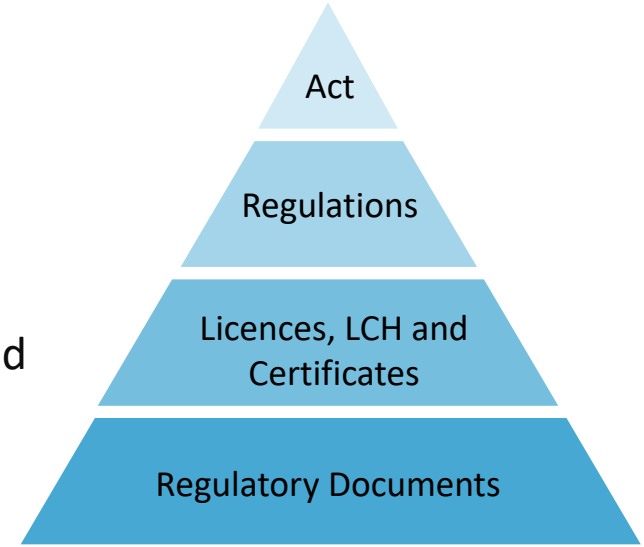
REGULATORY OVERSIGHT

Regulatory Oversight

- *Nuclear Safety and Control Act* and its associated regulations
- CNSC licence requirements
- CNSC compliance program includes inspections and desktop reviews, reporting and enforcement activities as needed



CNSC oversight is risk-informed and varies based on the activities carried out at the regulated facility

Licensing Basis

- Set boundary conditions of the licensing envelope
- Establishes a basis for the compliance program
- Changes that are beyond the licensing basis must be authorized by the Commission
- Changes within the licensing basis may be approved by delegated CNSC staff

Licensee is required to operate within its licensing basis at all times

Licensing and Compliance Activities

Licensing period refers to 2009-2018

Compliance verification activities include desktop reviews, reviews of event notifications and response, review of follow-up reports, and onsite inspections

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Number of inspections (CNSC)	3	2	3	2	3	2	3	2	4	2	26
Safeguards Inspections (IAEA)	NA	4	3	3	2	2	2	1	0	1	18

CNSC regulatory oversight is commensurate with the risk

Environmental Protection Review (EPR) Report

Addendum D to CMD 19-H4.C

- Comprehensive CNSC review of all environmental components
- CNSC staff verification that environmental monitoring data reported by CNL are within those predicted in the 2001 Comprehensive Study Report
- Results from other regional monitoring programs and/or health studies completed by other levels of government in proximity to the WL site
- Results of CNSC's Independent Environmental Monitoring Program

EPR concludes that CNL has made adequate provisions for the protection of the public and the environment

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PERFORMANCE ASSESSMENT

CNSC Staff Assessment of Licensee Performance and Review of the Renewal Application

- CNSC regulatory oversight is carried out according to a standard set of 14 Safety and Control Areas (SCAs)
- SCAs are technical topics used across all CNSC regulated facilities and activities to assess, evaluate, review, verify and report on licensee regulatory requirements and performance
- Staff review includes assessment of non technical areas like public information programs and Indigenous engagement

CNSC staff assessment of Licence application is comprehensive

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Overall Performance Rating

FS = Fully Satisfactory
SA = Satisfactory
BE = Below Expectations

SAFETY AND CONTROL AREA (SCA)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Management System	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Human Performance Management	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Operating Performance	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Safety Analysis	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Physical Design	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Fitness for Service	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Radiation Protection	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Conventional Health and Safety	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Environmental Protection	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Emergency Management and Fire Protection	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Waste Management	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Security	SA	SA	FS	FS	FS	SA	SA	SA	SA	BE
Safeguards and Non-Proliferation	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
Packaging and Transport	SA	SA	SA	SA	SA	SA	SA	SA	SA	SA

Performance Summary

- Operating performance remains satisfactory
- Radiation doses to workers and the public continue to be below regulatory limits
- Environmental emissions are low
- Safety performance is satisfactory in 13 of 14
  - Improvement needed for Security

Management System Overview

- CNL has updated its management system to align with CSA N286-12
  - This update applies to all CNL sites
- WL has developed a Quality Assurance Plan to describe Site specific Aspects.
- CNSC staffs' review confirms that CNL is compliant with regulatory requirements
- **Regulatory focus for the next licensing period:**

  CNSC staff will verify the implementation of the revised WL Decommissioning Quality Assurance Plan

Human Performance Management
Overview

- CNL has incorporated the requirements of REGDOC 2.2.2, *Personnel Training*
- CNL has implemented REGDOC 2.2.4, *Fitness for Duty Volume I: Managing Worker Fatigue*
- CNL is in the process of Implementing REGDOC 2.2.4, *Fitness for Duty Volume II: Managing Alcohol and Drug Use*
- **Regulatory focus for the next licensing period:**

  CNSC staff will monitor the implementation of REGDOC-2.2.4 volume II by CNL during the next licence period

Operating Performance
Overview

- CNSC staff have verified that WL and the facilities onsite are operated safely and in compliance with CNSC regulatory requirements
- No Event initial Reports made to the Commission since 2009
- CNL has been reporting in accordance with its requirements
- CNL's primary activities during the next licence period will be decommissioning, and waste management and transport

Safety Analysis
Overview

- CNSC staff verified that CNL's safety analysis program:
  - Applied CNSC regulatory documents and CSA standards for safety analysis appropriately
  - Established and maintained safety analysis reports (SAR) for all Class I facilities at WL
- As decommissioning progresses, CNL will continue to produce safety analysis reports to ensure decommissioning work is carried out safely
- **Regulatory focus for the next licensing period:**

  CNSC staff will review SARs for new activities

Physical Design
Overview

- CNSC staff verified CNL's design documentation meets regulatory requirements
- CNSC staff assessment of physical design focused on facility design and suitable application of design codes and standards
- CNSC staff review of CNL designs included:
  - Shielded Modular Above Ground Storage Building
  - Soil Storage Compound
- **Regulatory focus for the next licensing period:**

  CNSC staff will review designs for new or modified facilities

Fitness for Service
Overview

- CNL conducts annual inspections of the concrete bunkers in the waste management area in accordance with the Periodic Inspection Plan
- CNL conducts monthly inspection of the Concrete Canister Storage Facility (CCSF)
- **Regulatory focus for the next licensing period:**

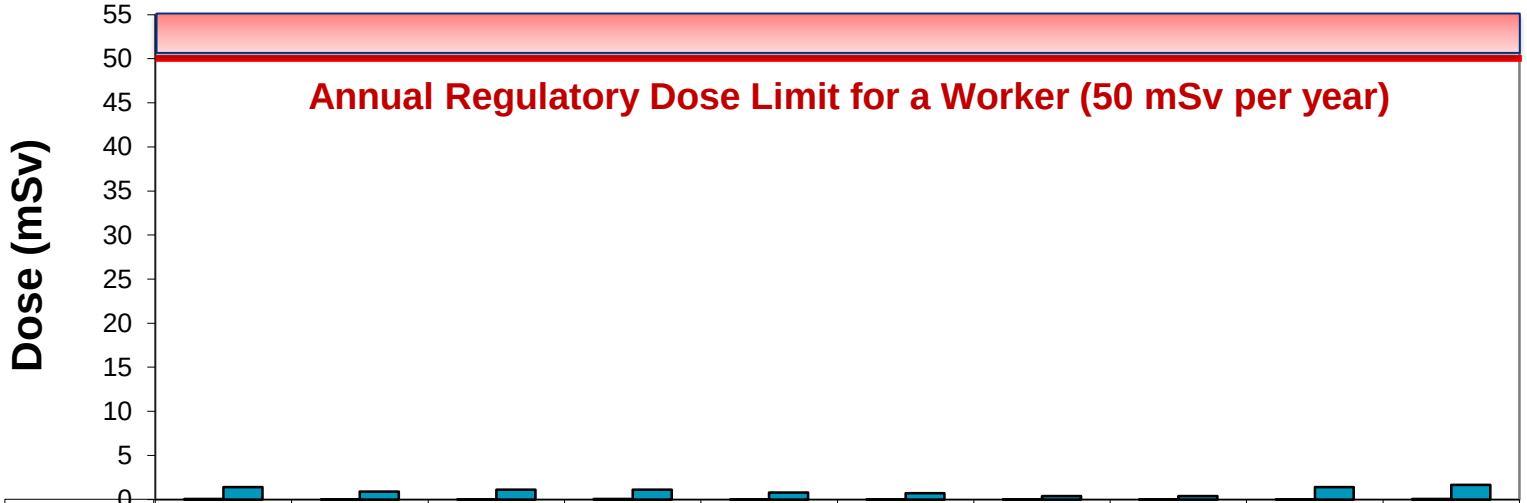
  CNSC staff will continue to monitor the condition of the concrete bunkers and the canisters in the CCSF until such a time as they are emptied of their contents

Radiation Protection Overview

CNSC staff verified that CNL's radiation protection (RP) program meets regulatory requirements

- **RP program is effectively implemented**
  - No regulatory dose limit or action level exceedances
  - Maximum individual dose was 1.65 mSv (<4% of the annual dose limit)
  - > 97.9% of workers received less than the public dose limit of 1mSv/year
- **Doses are kept ALARA**
  - Program includes management commitment and oversight, personnel qualification and training, optimization of processes design features, provision of protective equipment

Radiation Protection
Dose to Workers



Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Average	0.06	0.03	0.03	0.05	0.02	0.02	0.04	0.02	0.03	0.07
Maximum	1.40	0.90	1.10	1.10	0.80	0.70	0.40	0.40	1.40	1.65

Radiation Protection
Dose to the Public

- CNSC staff confirm that radiation doses received by the public are monitored, controlled and maintained ALARA

Maximum Annual Effective Dose to a Member of the Public (2009-2018)										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Maximum effective dose (µSv)	0.170	1.80	0.650	0.110	0.280	1.40	0.048	0.077	0.048	0.036

Regulatory dose limit for members of the public: 1 milli-sievert/year (mSv/ yr) or 1000 micro-sieverts/ year (µSv/yr)

Conventional Health and Safety
Overview (1/2)

- CNL's occupational health and safety program applies to all work performed by CNL employees, and to work performed by others on sites and work places controlled by CNL
- CNL's Conventional Health and Safety Program meets *Canada Labour Code Part II: Occupational Health and Safety*
- CNL conducted a company-wide safety stand down in 2019
- **Regulatory focus for the next licensing period:**

  CNSC staff will increase focus on safety practices as construction and decommissioning activities onsite increase

Conventional Health and Safety
Overview (2/2)

RECORDABLE LOST TIME INJURIES (RLTI), FREQUENCY, AND SEVERITY FOR WL (2009-2018)

Year	RLTIs	RLTI Frequency *	RLTI Severity *
2009	5	1.6	8.5
2010	7	2.0	12.2
2011	8	2.1	13.1
2012	5	1.2	9.2
2013	7	1.6	14.4
2014	4	0.9	12.2
2015	0	0.0	0
2016	1	0.29	1.46
2017	3	0.86	7.67
2018	1	0.28	1.45

* Frequency and severity are calculated per 100 full-time workers (equivalent to 200,000 worker-hours per year) using the following formulas:
Frequency rate = (# of Lost-Time Injuries) x (200 000 hrs of exposure) / (person hours worked)
Severity rate = (# of Working Days Lost) x (200 000 hrs of exposure) / (person hours worked)

Environmental Protection
Overview

- The WL Environmental Monitoring Program consists of three distinct programs:
  - The Effluent Verification Monitoring Program
  - The Environmental Monitoring Program
  - The Groundwater Monitoring Program
- The programs cover both radionuclides and hazardous substances
- WL uses Derived Release Limits (DRLs) and action levels to monitor and control releases
- CNSC staff verified that CNL's environmental protection program meets applicable regulatory requirements for effluent and emissions control, environmental monitoring and environmental risk assessment

Environmental Protection
Weekly Airborne Releases

Parameter	Releases (range Min & Max) (Bq/wk)	Release limits (Bq/wk)	
		2009- 2015	2016*-2018
Tritium	(4.00 to 36.6)E+08	7.64E+14	1.65E+14
Gross Beta Particulates (Cs-137)	(4.31 to 15)E+03	1.19E+10	6.92E+09
Gross Alpha Particulates (Pu-239)	(1.70 to 2.20)E+03	5.8E+08+	1.73E+09

Bq/ wk= becquerel/ week
** Release limits were revised in 2016 to meet CSA N288.1-08*
+ Errata in Staff CMD 19-H4, Table 7: actual release limit for Gross Alpha Particulates 2009-2015 was 5.8E+08

Actual releases are 1/ 10,000th the release limits or lower

Environmental Protection
Monthly Liquid Effluent Release to Water

Parameter	Releases (range Min & Max) (Bq/month)+	Release limits (Bq/month)+	
		2009-2015	2016*-2018
Cs-137	(0.12 to 1.30)E+07	2.41E+11	1.16E+10
Sr-90	(3.30 to 13)E+06	1.46E+12	1.3E+10
Gross Alpha Particulates	(2.90 to 9.50)E+06	2.8E+11	1.1E+09

Bq=becquerel
** Release limits were revised in 2016 to meet CSA N288.1-08*
+ Errata in Staff CMD 19-H4, Table 6: releases are reported in Bq/ month and not Bq/ week

Actual releases are 1/ 1,00th the release limits or lower

Environmental Protection

Updated Requirements

Updated requirements during the next licence period:

- REGDOC-2.9.1 (2017), *Environmental Principles, Assessment and Protection Measures*,
  - CSA N288 series standards for environmental protection
  - Implementation expected by January 1, 2020
- The federal requirements for the total residual chlorine in wastewater come into force in 2021 for CNL's lagoon
- **Regulatory focus for the next licensing period:**

  CNSC staff will monitor the implementation of these requirements

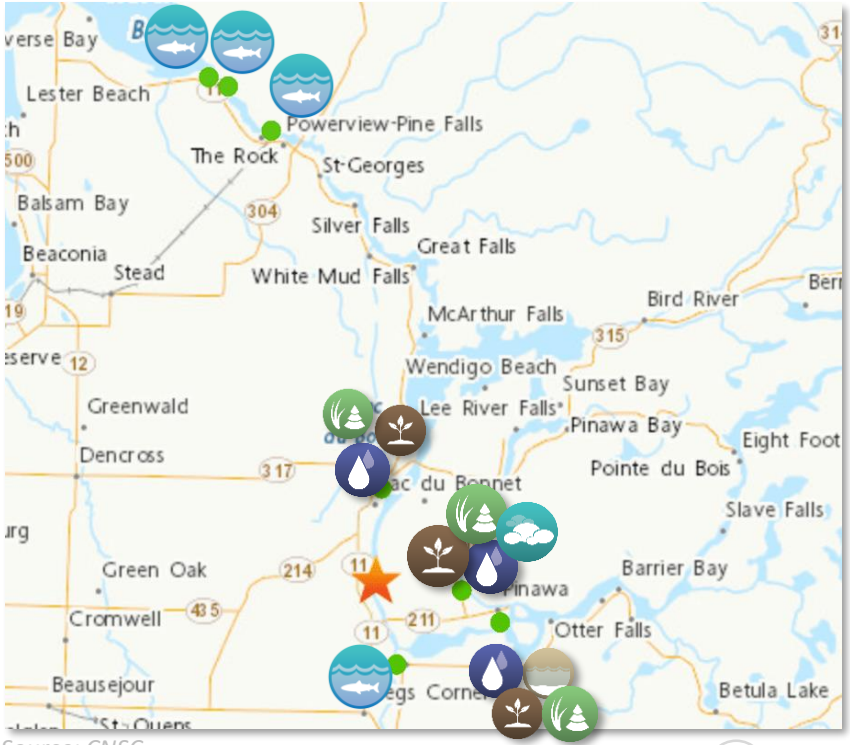
CNSC Independent Environmental Monitoring Program (IEMP)

- Verify that public health and the environment is not adversely affected by releases from WL
- A site-specific sampling plan is used
- CNSC uses screening levels based on conservative assumptions about the exposure that would result in a dose of 0.1 mSv/year, which represents one tenth of the CNSC's public dose limit of 1 mSv/year

Source: CNSC

IEMP for the Whiteshell site (2017)

- CNSC staff worked with the Sagkeeng First Nation to sample a Northern Pike from the Winnipeg River, caught downstream from the WL site
- Focused on radioactive contaminants
- CNSC staff collected air, soil, sediment, vegetation, food and water samples in publicly accessible areas
- The levels of radioactivity in all the samples were below available guidelines and CNSC screening levels. No health or environmental impacts are expected at these levels



Source: CNSC

Independent Environmental Monitoring Program (IEMP)

Emergency Management and Fire Protection
Overview

Source: CNSC

CNSC staff verified that:

CNL's fire response program meets the requirements of CSA N293, Fire Protection for Facilities that Process Handle, or Store Nuclear Substances

CNL's site emergency response plan meets the requirements of CNSC REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*

Waste and Decommissioning
Overview (1/2)

- CNL's waste program covers the characterization, segregation and minimization of waste
- Waste generated at the WL site are radiologically screened and segregated at the source
- CNSC staff have verified that CNL's waste program meets all regulatory requirements

Waste and Decommissioning
Overview (2/2)

- CNL is planning, preparing for, executing and completing decommissioning of WL site in a staged manner
- Detailed Decommissioning Plans for each facility are reviewed and accepted by CNSC staff
- Upon completion of decommissioning, CNSC staff review end-state reports to verify compliance with the plans
- CNSC staff have verified that CNL's decommissioning program meets all regulatory requirements

Security
Overview

- CNL performance prior to 2018 was satisfactory (SA) or better
- CNSC staff have identified deficiencies with the security arrangements at WL
  - Order issued in 2018 remains open
  - Performance rating in 2018 was Below Expectations (BE)
- No immediate risk to security of nuclear substances
  - Acceptable compensatory measures are in place
- CNL has begun implementation of a corrective action plan accepted by CNSC staff

Security
Proposed Licence Condition

In response to the BE rating, CNSC staff are recommending the following facility-specific licence condition be added to the WL site licence:

- LC 12.2 (Security):

  The licensee shall complete the implementation of all security arrangements as outlined in the corrective action plan, *Implementation Plan: Tiered Response Force (TRF) 119-508710-PLA-010,* no later than May 1, 2020.

Safeguards Overview

CNSC staff verified that:

- CNL's safeguards program enables Canada's compliance with its safeguards obligations and commitments
- CNL has implemented reporting through CNSC's Nuclear Materials Accountancy Reporting (NMAR) portal
- IAEA conducted 18 inspections at WL between 2009 and 2018

Packaging and Transport
Overview

- CNL has implemented a packaging and transport program that ensures safety of packaging and transport of nuclear substances to and from CRL
- Shipments from WL are compliant with the *Packaging and Transport of Nuclear Substances Regulations, 2015* and *Transportation of Dangerous Goods Regulations*
- Transport has been performed safely, and there have been no events related to transport during the current licence period
- **Regulatory focus for the next licensing period:**

  With increase in volumes of waste transported, CNSC staff will verify that CNL continues to maintain its programs diligently

Other Matters of Regulatory Interest

CNSC staff have verified that:

- CNL's public information and disclosure program meets the requirements of CNSC RD/GD-99.3 *Public Information and Disclosure*
- CNL continues to comply with CNSC's Cost Recovery Fees Regulations
- CNL has adequate nuclear liability insurance as required by the *Nuclear Liability and Compensation Act* and as confirmed by NRCan
- CNL maintains a suitable financial guarantee in place for decommissioning

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ENGAGEMENT AND PARTICIPANT FUNDING

Public Outreach

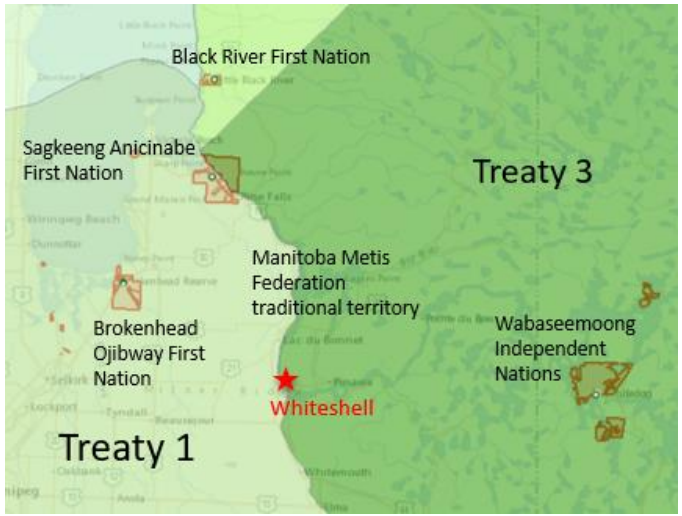
Event	Date
Notice of hearing published	February 18, 2019
Participation in CNL public liaison committee meetings	November 14, 2018 May 21, 2019
Booth at Lac du Bonnet trade fair	May 25, 2019
Booth at CNL Open House	June 8, 2019
Booth at Pinawa Summer Town Market	July 21, 2019
Whiteshell Licence Renewal Webinar	August 21, 2019

Source: CNSC

Engagement with Indigenous Groups (1/3)

The WL facility is located on the border of Treaty 1 and Treaty 3 and within the traditional territories of the Manitoba Metis Federation

Brokenhead Ojibway Nation	**Manitoba Metis Federation**
Black River First Nation	**Northwest Angle No.33**
Grand Council of Treaty 3	**Sagkeeng Anicinabe**
Hollow Water First Nation	**Shoal Lake #40 First Nation**
Iskatewizaagegan #39 Independent First Nation	**Wabaseemoong Independent Nations**



Source: CNSC

Engagement with Indigenous Groups (2/3)

The CNSC is committed to:

- Maintaining open channels of communication and engagement with Indigenous groups
- Learning about and addressing Indigenous communities' issues and concerns
- Supporting Indigenous communities' participation in CNSC regulatory processes
- Strengthening CNSC's relationships with Indigenous groups

Source: CNSC

Engagement with Indigenous Groups (3/3)

- Letters of information were sent in February, 2019 with follow-up phone calls
- CMD 19-H4 was provided to the identified groups in August, 2019
- Various meetings held with First Nations and Métis to discuss licensing activities at WL
- CNSC staff confirmed that CNL maintains relationships with Indigenous groups

Source: CNSC

Participant Funding Program (PFP)

Independent Funding Review Committee recommended funding to:

Recipient Group	Amount (up to)
Canadian Environmental Law Association	$8,100.00
Concerned Citizens of Renfrew County	$4,000.00
Northwatch	$6964.50
Sagkeeng First Nation	$28,010.00
Manitoba Metis Federation	$16,225.00

CNSC made up to $63,299.5 available through PFP

Main Themes in Interventions

- Inadequate Indigenous consultation
- Need for better communication and more transparency by CNL and CNSC on regulated activities
- Need for Indigenous involvement in compliance monitoring
- Concerns about the transportation of waste from WL to Chalk River Laboratories
- The accelerated timeframe for decommissioning at Whiteshell
- The increased burden from storage of WL waste at Chalk River Laboratories
- Lack of a permanent disposal facility in Canada for high level waste
- Opposition to the proposed ISD of WR1

Annex A of supplemental CMD 19-H4.B contains a detailed disposition of the comments made by intervenors

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CONCLUSIONS AND RECOMMENDATIONS

Summary of CNSC Staff Assessment

CNSC staff assessment of the licence application and supporting information found:

- WL's performance is rated Satisfactory in all SCAs, except for Security in 2018
  - Compensatory measures are in place
  - A corrective action plan has been reviewed and accepted by CNSC
- CNL has demonstrated commitment to continuous improvement of programs and the site
- 10-year licence period is appropriate for WL

Conclusions

CNSC staff conclude that pursuant to paragraphs 24(4) (a) and (b) of the *Nuclear Safety and Control Act*:

- CNL is qualified to carry out the activities authorized by the licence; and
- In carrying out the licensed activities, CNL will continue to make, adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed

Recommendations

CNSC staff recommend that the Commission:

- Include a licence condition related to security as specified in CMD 19-H4.B;
- Authorize the delegation of authority as set out in section 4.7 of CMD 19-H4 for licence condition 3.2 on reporting; and
- Renew the licence to authorize Canadian Nuclear Laboratories to continue to decommission WL from January 1, 2020 to December 31, 2029

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