



Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire

Canada



# Regulatory Oversight Report for Canadian Nuclear Power Generating Sites: 2019

Commission Meeting  
December 9, 2020  
CMD 20-M24.A



CNSC Staff  
Presentation

e-Doc 6396604 (PPTX)  
e-Doc 6435777 (PDF)





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# Outline

- Introduction
- Collective results for nuclear power plants (NPPs) and waste management facilities (WMFs)
- Highlights for each NPP and the WMFs
- Regulatory response to pandemic
- Closing remarks



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## CNSC RORs

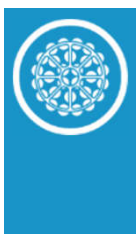
- **November 5, 2020** Use of Nuclear Substances in Canada
- **December 8, 2020** Uranium Processing and Nuclear Processing Facilities
- **December 9, 2020** Canadian Nuclear Power Generating Sites
- **December 10, 2020** Canadian Nuclear Laboratories Sites
- **December 10, 2020** Uranium Mines, Mills and Historic and Decommissioned Sites

### Reporting on licensee performance based on CNSC oversight



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# INTRODUCTION



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# Nuclear Power Generating Sites in 2019

## LEGEND

### Waste Types

Low-level waste



Intermediate-level waste



Spent fuel



### Reactor Status

In-service



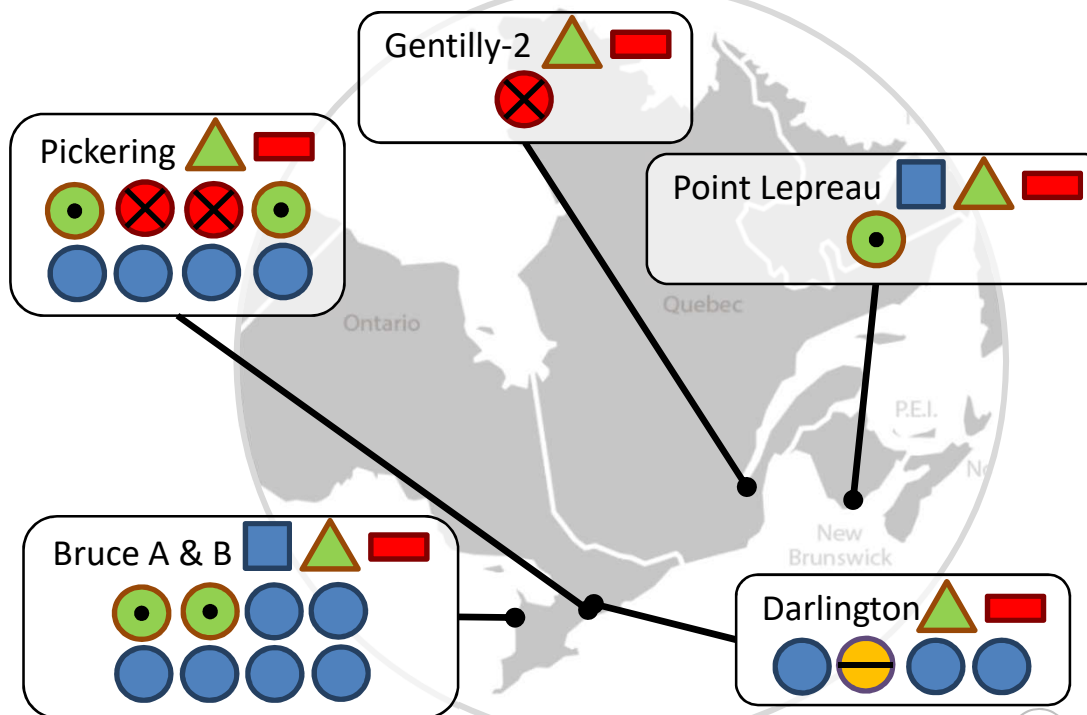
In-service & refurbished



In refurbishment



Safe storage





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# Indigenous Engagement and Consultation

Nuclear power generating sites fall within the traditional and treaty territories of many Indigenous communities

- CNSC staff inform Indigenous groups of this report and participant funding opportunities
- CNSC staff continue to engage and identify opportunities to discuss and address all topics of interest and concern
- CNSC staff continue to develop Terms of Reference with Indigenous groups

**CNSC committed to building long-term relationships with Indigenous groups**



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# CNSC's Compliance Verification Program (CVP)

- Extensive, risk-informed program
  - CNSC staff includes more than 30 site inspectors at NPPs
- Verification of compliance with requirements
  - ~100 inspections, >1,600 findings in 2019
- Other activities provide additional performance information
  - Compliance assessments and surveillance/monitoring
  - Review of event, periodic, and other licensee reports
  - Tracking of licensee corrective actions





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# Regulatory Oversight Report (ROR)

- ROR team activities
  - Assembled findings and performance information for the specific areas (SpAs) that comprise each safety and control area (SCA)
  - Rated each SpA based on the compliance and performance information
  - Rated each SCA based on the SpA ratings
- 2019 NPGS ROR is similar in structure to 2018 ROR
- Introduces “General Description of Regulatory Framework for Nuclear Power Generating Sites”





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# COLLECTIVE RESULTS FOR NPPs AND WMFs



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# Safety Observations

- All reportable events were of low safety significance
  - Licensees took appropriate follow-up actions
- Reactor trips, other transients were infrequent and managed safely
- Public, environment and workers were protected
  - Radiological releases to environment (water, air) were below derived release limits
  - Radiological doses to workers did not exceed regulatory limits
- Lost-time accidents were infrequent

**Safe operations, protection of the environment, worker safety**



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## Other Observations

- Licensees met requirements related to nuclear security and Canada's international obligations
  - IAEA safeguards conclusion: all nuclear material in Canada remained in peaceful activities, including material at the NPPs and WMFs
- Licensees had dedicated Indigenous engagement programs
  - Consistent with guidance and requirements
  - Included letters, meetings, site visits and tours, community visits, workshops, development of collaborative agreements, and incorporation of Indigenous Knowledge

**Effective measures for safeguards and security**  
**Active Indigenous engagement**



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## SCA Ratings

- All SCAs were rated “Satisfactory” (SA) for all NPPs and WMFs
- No “Fully Satisfactory” (FS) SCA ratings were awarded for 2019
  - Due to constraints on CNSC project team related to pandemic
  - Does not reflect decline in licensee performance for certain SCAs that were previously rated FS
- No “Below Expectations”(BE) SCA ratings warranted for 2019



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## Corrective action and improvement

- Licensees worked to effectively address non-compliances and performance issues
- Licensees continued to implement new safety measures, e.g.
  - Safety culture
  - Fitness for duty
  - Safety analysis

**Licensees demonstrated commitment to compliance with requirements and continuous improvement.**



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## HIGHLIGHTS FOR EACH NPP & THE WMFs



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# Darlington Nuclear Generating Station (DNGS)

## Power reactor operating licence: Jan 2016 to Nov 2025

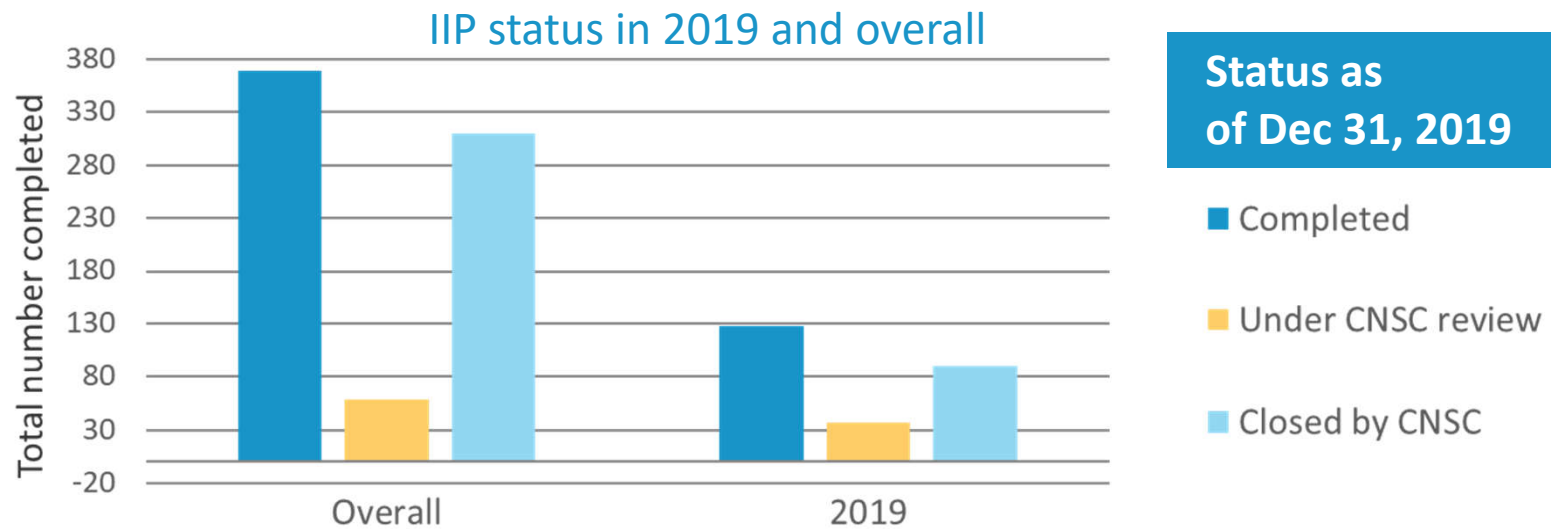
- Units 1, 3, 4 operational in 2019
- Unit 2 refurbishment completed installation stage by end of 2019
- July 2019, Commission authorized OPG to revise refurbishment safety improvements in integrated implementation plan (IIP)
- Dec 2019, CNSC staff revised licence conditions handbook (LCH)





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## Darlington Nuclear Generating Station Highlights (1/4)



**Satisfactory progress on IIP actions**





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## Darlington Nuclear Generating Station Highlights (2/4)

CNSC staff's oversight of refurbishment confirmed that

- IIP was being implemented, as required
- refurbishment activities complied with regulatory requirements
- People, Plant and Programs were available and ready for return to service
- All pre-requisites required for the removal of RHP-1 were met

**CNSC staff continued effective oversight of refurbishment  
during pandemic**



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## Darlington Nuclear Generating Power Station Highlights (3/4)

CNSC staff confirmed “satisfactory” ratings for all SCAs at the DNGS in 2019, with a few areas exceeding regulatory requirements:

- Chemistry Control was strong and compared favourably with industry averages
- OPG made a considerable effort to maintain worker doses ALARA by implementing several tools to allow for improved monitoring and control of those doses
- Preventive maintenance deferrals and backlogs for corrective and deficient maintenance remained low and were better than industry averages



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## Darlington Nuclear Generating Power Station Highlights (4/4)

- In 2019, CNSC staff confirmed satisfactory responses to two regulatory requests (June 2018 and December 2018) related to OPG's radiation protection program
- CNSC staff continued oversight of OPG's radiation protection program in 2019
  - Identified some non-compliances of low safety significance related to worker dose control
- CNSC staff confirmed satisfactory progress of OPG's corrective actions to address the noted issues and continue to monitor their implementation



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# Pickering Nuclear Generating Station (PNGS)

## Power reactor operating licence:

**Sept 2018 - Aug 2028**

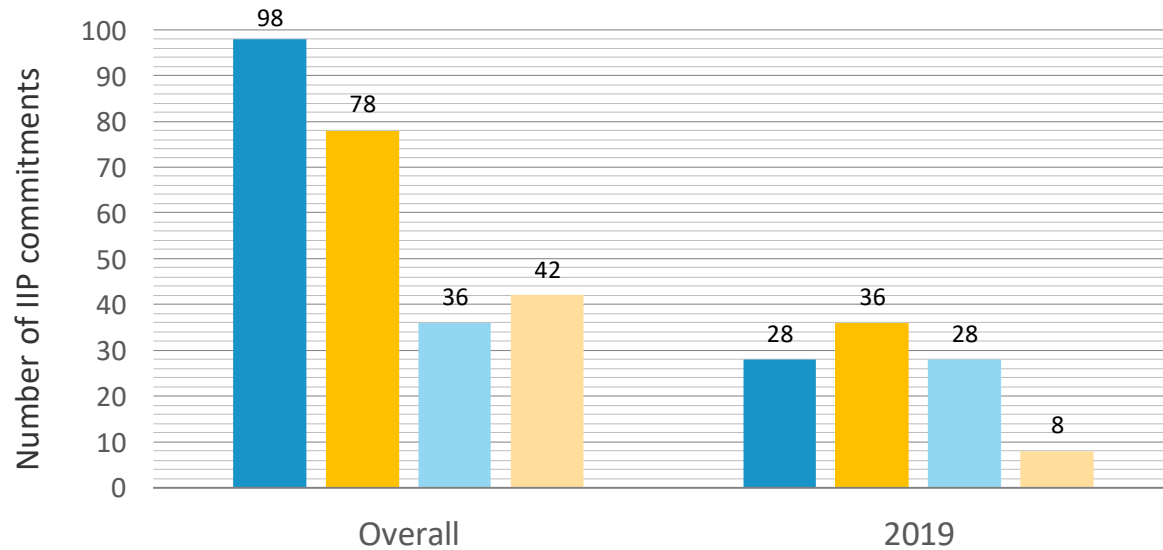
- Units 1, 4, 5, 6, 7 and 8 operational in 2019
- Units 2 and 3 defueled in 2008
- CNSC staff monitoring IIP progress
- Dec 2019, CNSC staff revised LCH





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## Pickering Nuclear Generating Station Highlights (1/4)



Status as of Dec 31, 2019

- Planned by OPG
- Completed by OPG
- Under CNSC review
- Closed by CNSC

### Status update on IIP commitments



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## Pickering Nuclear Generating Station Highlights (2/4)

Fish impingement monitoring and compliance with *Fisheries Act* authorization (FAA)

- No observed impingement in 2019 of Schedule 1 (*Species at Risk Act*) fish species
- Fish impingement reported: 5,616 kg in 2018 and 15,114 kg in 2019
  - OPG submitted analysis of two-year impingement threshold
  - Fisheries & Oceans Canada working with OPG to convert values to Age-1 equivalents to determine compliance
  - If there are impingement exceedances, FAA requires OPG to account for losses in offsetting measures
  - Fisheries & Oceans Canada working with OPG to amend the FAA
- OPG initiatives
  - Mitigation measure assessments
  - Early warning system
  - Algae mitigation plan for fish diversion system



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## Pickering Nuclear Generating Station Highlights (3/4)

- Probabilistic safety assessment
  - PSA submitted in 2018 & 2019 complied with regulatory requirements
  - OPG expected to implement REGDOC-2.4.2, *Probabilistic Safety Analysis for NPPs*, by the end of 2020 with the submission of revised methodologies
- Conventional health and safety
  - Numerous inspections noted findings of compliances in multiple areas
  - Safety performance indicators (SPIs) remained good (better than last year and better than Industry average)



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## Pickering Nuclear Generating Station Highlights (4/4)

- At the end of 2019, the longest operating pressure tubes had approximately 250,000 Effective full-power hours (EFPH) of service (below the limit of 295,000 EFPH)
- Maintenance SPIs continued improving trend
  - Preventive maintenance deferrals
  - Backlogs for corrective and deficient maintenance



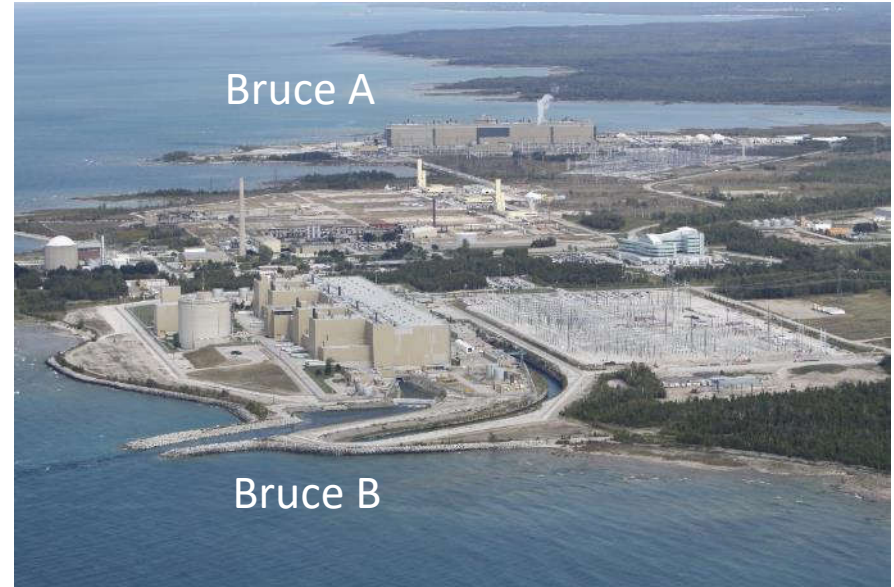


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# Bruce A and Bruce B Nuclear Generating Stations

## Power reactor operating licence: Oct 2018 - Sept 2028

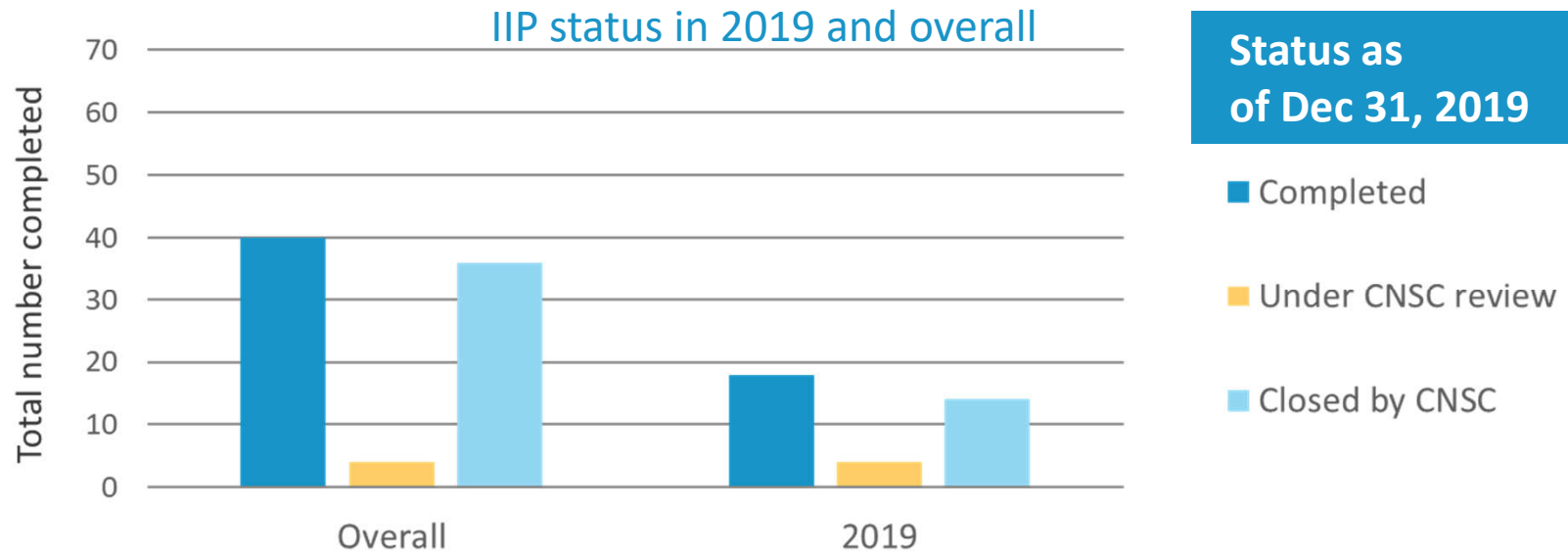
- Units 1 – 8 operational in 2019
- Bruce Power completed preparation for major component replacement (MCR) outage
- CNSC staff monitoring IIP progress
- Apr 2019, CNSC staff revised LCH





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## Bruce A and Bruce B Highlights (1/3)



**Satisfactory progress on IIP actions**



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## Bruce A and Bruce B Highlights (2/3)

- Bruce Power submitted threshold break-size assessment
  - Supported analysis of large-break loss-of-coolant accidents
- CNSC staff confirmed acceptability of Bruce Power's aging management of steam generators
- CNSC staff confirmed that special safety systems for all units met availability targets with one exception for Bruce B
  - No significant safety impact
  - CNSC staff satisfied with corrective actions



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## Bruce A and Bruce B Highlights (3/3)

- CNSC staff confirmed that:
  - Preventive maintenance completion ratios for Bruce A and Bruce B improved
  - Huron Resilience corporate exercise demonstrated Bruce Power's ability to respond to a nuclear emergency
  - Bruce Power's environmental protection program met requirements
- CNSC staff also focused in 2019 on
  - Strengthening relations with Indigenous groups
  - Demonstration of adequate fracture toughness of pressure tubes should concentration of equivalent hydrogen exceed 120 ppm



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# Point Lepreau Nuclear Generating Station

## Power reactor operating licence: July 2017 - June 2022

- Reactor operational in 2019
- Periodic Safety Review (PSR) for next licence renewal ongoing
- Dec 2019, CNSC staff revised Licence Conditions Handbook





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## Point Lepreau Highlights (1/2)

CNSC staff issued a major revision of the LCH

- Update to minimum shift complement
- Expanded allowable exemption to pressure boundary registration requirements for fittings in fire protection systems
- Changed required frequency of leak rate test of reactor building from once per 3 years to once per 4 years
- Revision of derived release limits



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## Point Lepreau Highlights (2/2)

- CNSC staff confirmed successful planning and execution of 2019 outage
  - CNSC staff noted numerous findings of compliance during inspection
  - NB Power met all regulatory undertakings and commitments
- Maintenance SPIs continued to be good
  - Deferrals of preventive maintenance
  - Backlog of corrective maintenance
- CNSC staff satisfied with Solid Radioactive Waste Management Facility reports



Réunion de la Commission, le 9 décembre 2020  
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# Installations de Gentilly-2

## Permis de déclassement d'un réacteur nucléaire de puissance: de juillet 2016 à juin 2026

- Les activités de déclassement à Gentilly-2 (Campagne de stockage à sec) suivent leur cours en 2019
- Février 2019, le personnel de la CCSN a révisé le manuel des conditions de permis







Réunion de la Commission, le 9 décembre 2020  
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## Gentilly-2 Faits Saillants

En 2019, le personnel de la CCSN a réalisé des inspections portant sur les sujets suivants aux installations de Gentilly-2:

- Activités de transfert du combustible
- Exercice incendie
- Programme de formation du personnel de sécurité
- Surveillance environnementale
- Surveillance des effluents
- Gestion des déchets dangereux

**Hydro-Québec a apporté les correctifs et les améliorations demandées dans tous les cas**



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# Waste Management Facilities



Darlington Waste Management Facility (DWMF)



Pickering Waste Management Facility (PWMF)



Western Waste Management Facility (on Bruce site) (WWMF)

ACRONYMS  
LLSB - Low Level Storage Building  
WVRB - Waste Volume Reduction Building  
TPMB - Transportation Package Maintenance Building  
SGSB - Steam Generator Storage Building  
RCSB - Refuse Component Storage Building  
UFDSB - Used Fuel Dry Storage Building



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## DWMF, PWMF and WWMF Licensing

- Waste Facility Operating Licences are in place for approximately 10-year periods for the WMFs
  - **DWMF** Mar 2013 to Apr 2023
  - **PWMF** Apr 2018 to Aug 2028
  - **WWMF** June 2017 to May 2027
  - The DWMF, PWMF and WWMF are operated by OPG
- CNSC staff did not revise the WMF LCHs in 2019



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## DWMF, PWMF and WWMF Highlights (1/3)

CNSC staff confirmed that:

- OPG operated DWMF, PWMF, and WWMF in 2019 in accordance with the operating policies, principles and operational safety requirements
- Maximum reported worker doses at WMFs were well below regulatory limits
  - Maximum dose at DWMF was 1.6% of limit (0.8 mSv)
  - Maximum dose at PWMF was 1.8% of limit (0.9 mSv)
  - Maximum dose at WWMF was 3.6% of limit (1.8 mSv)
- There were no lost-time injuries at any WMF in 2019
- Releases to environment from WMFs were low
  - Below environmental action levels and <1% of derived release limits



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## DWMF, PWMF and WWMF Highlights (2/3)

- CNSC staff inspected OPG's/Bruce Power's fire response drill at the DWMF, PWMF and WWMF
  - CNSC staff noted no non-compliances for PWMF and WWMF, however CNSC staff noted a non-compliance during DWMF inspection
  - Corrective actions have been implemented that were satisfactory to CNSC staff
- CNSC inspection at the WWMF found that legacy waste labelling was non-compliant with regulatory requirements
  - OPG provided CNSC staff with acceptable corrective action plan
- CNSC inspections confirmed satisfactory human performance management at the OPG WMFs
  - OPG staff worked in an organized and safe manner and worker training records were appropriate for the tasks performed



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## DWMF, PWMF and WWMF Highlights (3/3)

- OPG reported eight events for the WMFs in 2019
  - Three at DWMF
  - Two at PWMF
  - Three at WWMF
- Example: unplanned fire impairment at the Retube Waste Storage Building at DWMF caused from loss of power
- CNSC staff were satisfied with OPG's actions to address the events and corrective measures



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# REGULATORY RESPONSE TO PANDEMIC



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## Regulatory Response to Pandemic (1/2)

- Initially, CNSC activated business continuity plan and modified regular compliance activities
  - Oversight and reviews related to release of regulatory hold points for DNGS Unit 2 continued
- CNSC developed procedures to plan and conduct compliance activities for NPPs and WMFs until return to normal
  - Where feasible, field inspections being conducted with remote participation from subject matter experts





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## Regulatory Response to Pandemic (2/2)

- May 2020, CNSC staff resumed limited on-site oversight at NPPs
  - Staff continued to conduct compliance activities
  - Utilize cross-directorate support to minimize travel for CNSC staff
- CNSC staff confirmed that licensees had adequate contingency plans to maintain safe operations

**CNSC staff continued regulatory oversight of NPPs and WMFs during pandemic**



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# CLOSING REMARKS



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## Engagement on 2019 NPGS ROR

- Notice of Meeting and Participant Funding posted on July 8, 2020
- Four applicants awarded funding to review and submit comments
  - Canadian Environmental Law Association
  - Grand Conseil de la Nation Waban-Aki
  - Lake Ontario Waterkeeper
  - Curve Lake First Nation
- Interventions received from the funded participants and three other intervenors

**Interventions summarized in supplemental CMD 20-M24.B**



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# Engagement on 2019 NPGS ROR

- Some main themes noted from interventions
  - Absence of background information in the ROR
  - Indigenous groups consultation and engagement, their acknowledgment in the report
  - Covid-19 response and emergency planning
  - Tritium emissions to the environment
  - Assessment of radiation protection at DNGS
  - Fish impingement at PNGS
  - The use of RIB actions in RORs
  - Absence of fully satisfactory ratings



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## Next Steps

- Revise the NPGS ROR
  - Fix identified errors and omissions
  - Address comments from intervenors and Commission, as needed
  - Edit English and French versions
- CNSC staff to confirm closure of non compliances that were not resolved by the end of 2019; will provide updates in next ROR
- Prepare for publication (June 2021)
- Continue to fulfill Commission requests for information updates



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# Final Conclusions

- Effective CNSC compliance verification program
- Issues identified during compliance verification activities and events were either addressed or are being addressed by licensees
- Licensees implementing new measures, and conducting other activities to improve safety
- SCAs rated Satisfactory for all NPPs and WMFs
- Reported doses to workers and public were below regulatory limits
- Public and environment were protected

**Operations at NPPs and WMFs were conducted safely**



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# Update on the Status of the Darlington Refurbishment Project

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CNSC Staff  
Presentation







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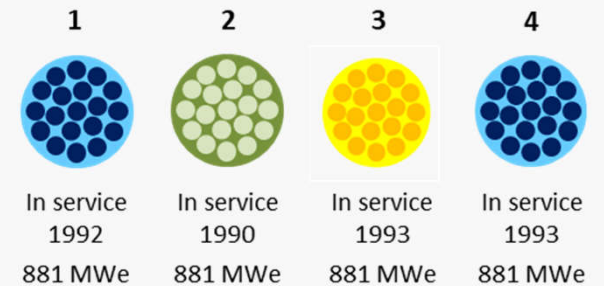
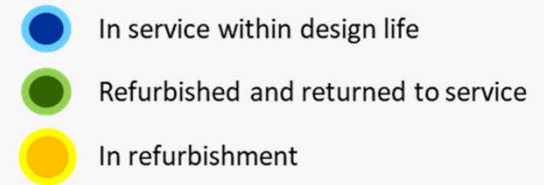
# Introduction

## Scope of the Presentation:

- In 2015 the Commission requested an update on the status of the Darlington Refurbishment Project
- Overview of the CNSC regulatory oversight activities for the refurbishment project and return to service of Darlington Unit 2, including compliance verification
- Subsequent unit refurbishments

## Darlington Nuclear Generating Station Status

- Units 1, 2, 4 – Operational
- Unit 2 – Resumed commercial operation in June 2020 after a ~3.5 year refurbishment outage
- Unit 3 – Currently being refurbished





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# Regulatory Oversight Objectives

## Refurbishment Project Execution and Return to Service

- Confirm that improvements identified in the OPG's Integrated Implementation Plan are being completed as scheduled
- Confirm that the refurbishment and return to service activities are being performed safely and in compliance with regulatory requirements
- Confirm that the systems, equipment, procedures, and qualified staff are available and ready for the unit return to service
- Confirm that all pre-requisites required for the removal of RHPs were met, including completion of IIP items associated to a unit's Return to Service (RTS)





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# Background and Overview

**2007/2008** – OPG begins planning and conducts feasibility studies for mid-life refurbishment

**2015** – Public hearing-Commission renews PROL, approves IIP and authorizes refurbishment of all 4 units

**2016** –Unit 2 Refurbishment outage begins

**2020** –Unit 2 resumes commercial operations (June), Unit 3 enters refurbishment( September)





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# Regulatory Basis

## *RD-360, Life Extension of Nuclear Power Plants*

- CNSC's regulatory requirements and expectations for life extension projects contained in RD-360, *Life Extension of Nuclear Power Plants*
- Describes the steps to take to identify and address environmental, safety and regulatory aspects to extend the life of a nuclear power plant including:
  - Environmental Assessment (EA)
  - Integrated Safety Review (ISR)
  - Global Assessment Report (GAR)
  - Integrated Implementation Plan (IIP)
- Includes requirement and expectations for project execution and return to service

**CNSC staff oversee all aspects of refurbishment projects from initial planning to return to service**



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# Regulatory Basis

## Power Reactor Operating Licence, PROL 13.02/2025

- **LC 15.2 states:** *“The licensee shall implement a return to service plan for refurbishment.”*
- **LC 15.3 states:** *“The licensee shall implement the Integrated Implementation Plan.”*
- **LC 15.4 states:** *“The licensee shall obtain the approval of the Commission, or of a person authorized by the Commission [Executive Vice President (EVP)], prior to the removal of established regulatory hold points.”*

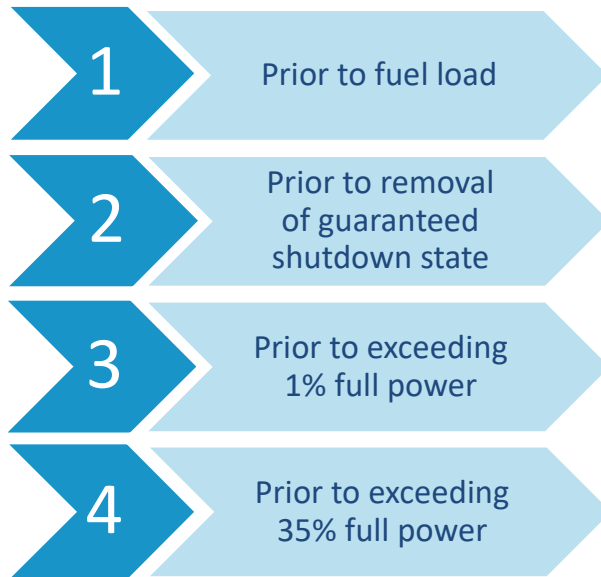
## Three refurbishment-specific Licence Conditions



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# Regulatory Basis

## Licence Condition Handbook, Regulatory Hold Points



- The process of returning to service includes a phased approach for the removal of regulatory hold points, aligned with commissioning activities
- Delegation of consent to remove regulatory hold points granted by the Commission to the Executive Vice-President and Chief Regulatory Operations Officer (EVP-CROO)
- The same approach was followed as for previous refurbishment projects



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# Regulatory Basis

## LCH, Prerequisites for removal of RHPs

1. All IIP commitments required prior to an RHP are complete;
2. All SSCs required for safe operation beyond an RHP are available for service;
3. Staffing levels to safely operate the unit are adequate; **(only for RHP-1)**
4. Specified operating procedures for an RHP have been formally validated;
5. Specified training for an RHP is complete and staff qualified;
6. Specified SSCs meet the quality and completion requirements of **CSA standard N286, *Management system requirements for nuclear facilities***;
7. All non-conformances and open items identified leading up to an RHP are addressed; and
8. Verification by CNSC staff that all construction, commissioning, re-start, and available for service activities required prior to an RHP have been successfully completed.



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# Regulatory Basis

## Pre-requisites for the removal of each RHP

### PEOPLE/PROGRAMS

- Staffing levels adequate
- Operating procedures validated
- Specified training is complete and staff qualified

### PLANT

- Required Systems, Structures, and Components (SSCs) are Available for Service
- SSCs procurement, installation and testing meet regulatory requirements
- Required analyses have been conducted

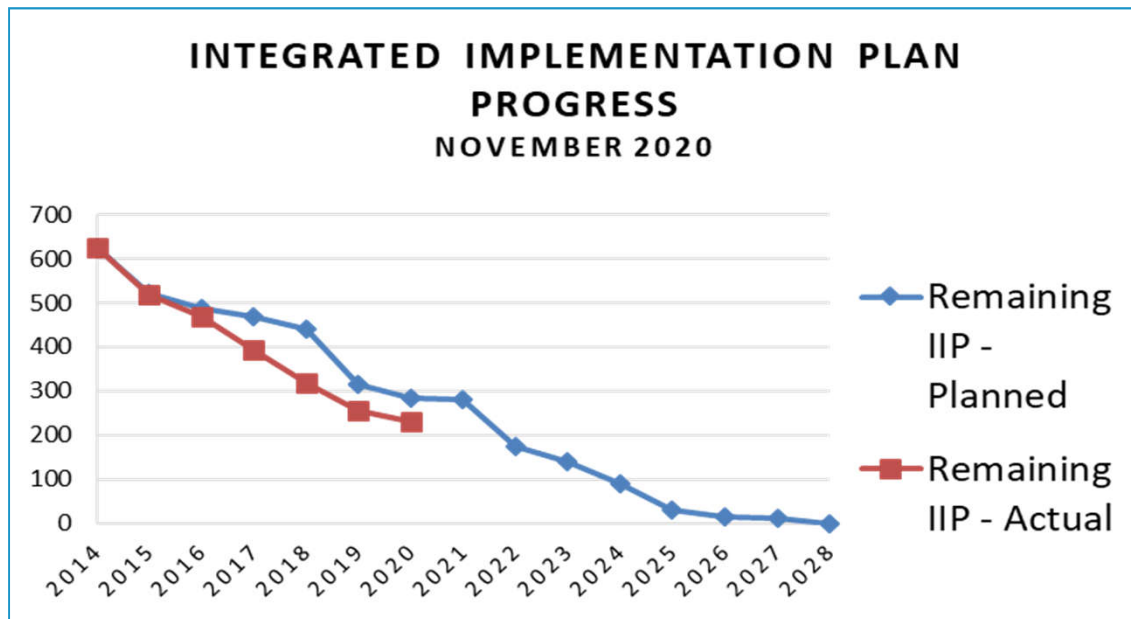




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# Integrated Implementation Plan

## All Darlington Units



The Integrated Implementation Plan (IIP) consists of **625 IIP commitments**.

OPG has completed **369 commitments** of the IIP.

**OPG is on track with completing their IIP commitments**



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# Integrated Implementation Plan

## Included the replacement of major components

- Pressure tubes, calandria tubes, feeders and end fittings

## Installation of Auxiliary Shutdown Cooling Pumps

## Safety Improvement Opportunities

- Shield Tank Over Protection (STOP)
- Containment Filtered Venting System (CFVS)
- A third Emergency Power Generator (EPG-3)
- Power House Steam Venting System (PSVS) upgrade
- Connection from the Emergency Service Water (ESW) system to the Heat Transport System (HTS)





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# Compliance Verification

## The CNSC Unit 2 compliance plan for the Darlington Refurbishment Project:

- Based on the Generic Refurbishment Regulatory Oversight Project Plan
- Risk informed
- Conducted throughout all phases of refurb.
- Includes verification across all SCAs
- Incorporates lessons learned from previous projects
- Verified compliance with:
  - Power Reactor Operating Licence (PROL)
  - Nuclear Safety and Control Act (NSCA)
  - All other applicable regulatory requirements covering all Safety and Control Areas (SCAs)



**Compliance verification activities are planned and risk informed**



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# Compliance Verification

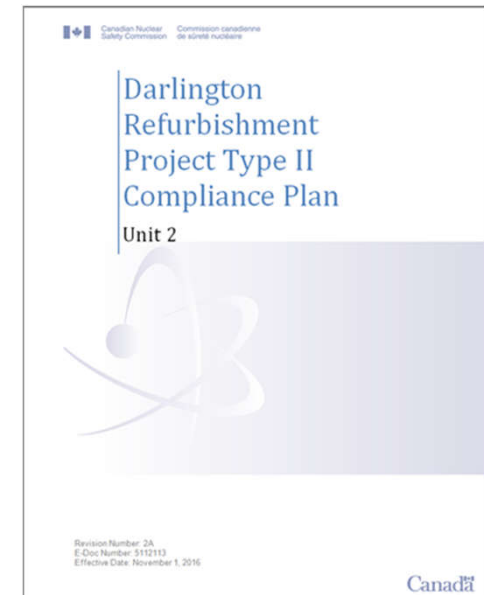
## Unit 2 Refurbishment Compliance Plan

Compliance Plan reflected OPG's implementation schedule and activities during the phases of refurbishment.

- Modified to correspond with changes to refurbishment schedule
- Additional inspections added in response to emergent refurbishment issues of regulatory interest

CNSC staff have completed 31 Type II inspections and 35 Field inspections focused on Unit 2 refurbishment.

CNSC staff have completed the entirety of the Compliance Plan for Unit 2, as planned; with one Type II inspection remaining to be conducted during post-refurbishment.





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## Compliance Verification

### Unit 2 Refurbishment Compliance Plan Outcome

Licensee was in compliance with the regulatory requirements.

- No medium or high findings were identified
- No impediments to the release of regulatory hold points
- OPG provided acceptable CAPs for non-compliances
- OPG has implemented all of the CAPs to staff's satisfaction and as a result, all non-compliances observed during the refurbishment of Unit 2 have now been closed



Overall, CNSC staff confirmed that the refurbishment and return to service activities were performed safely and in compliance with regulatory requirements.

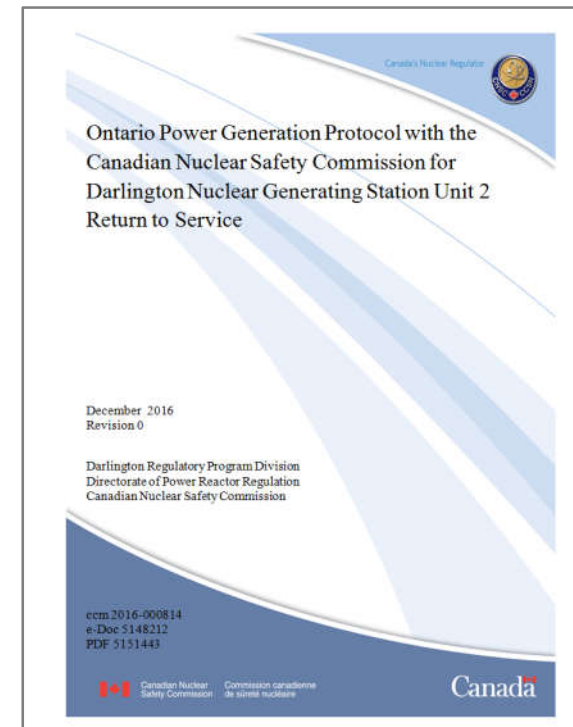
**Safe and compliant with regulatory requirements**



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## Return to Service of Unit 2 RTS Protocol

- Identifies IIP commitments, detailed pre-requisites and deliverables for the removal of each Regulatory Hold Point
- Establishes schedule for OPG submissions and CNSC staff assessments
- Tracks progress of activities to a specific schedule
- Defines process to resolve issues
- Identifies points of contact for communication
- Documents guiding principles for the review of work
- Establishes mechanism for removal of RHPs
- Incorporates lessons learned from previous projects



**Return to Service was well defined and managed**



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# Return to Service of Unit 2

## RTS Protocol, Mechanism for RHP removal

OPG submission  
of Rev. 0  
Completion  
Assurance  
Document (CAD )  
(no later than 10  
business days  
prior to RHP)

CNSC Staff Report  
to CNSC EVP  
(7 business days  
prior to RHP )

OPG submission  
of REV. 1 CAD  
with letter  
requesting RHP  
release  
(2 days prior  
to RHP)

CNSC staff's Final  
Memorandum to  
EVP-CROO with  
Recommendation

CNSC Hold Point  
Removal



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## Return to Service of Unit 2 Completion Assurance Documents (CAD)

- For each RHP, OPG submitted a first revision of their Completion Assurance Document (CAD) to the CNSC
- CADs confirmed that all pre-requisites, modification commissioning, testing, system restart activities and commitments were completed or were being addressed
- Any open items were identified, assessed and tracked in the CAD
- OPG submitted a second revision of the CAD and formally requested removal of the hold point
- Once all pre-requisites, including completion all Open Items, were met, CNSC provided the EVP-CROO a recommendation to remove the given RHP





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# Return to Service of Unit 2

Systems, equipment, procedures, and qualified staff are available and ready for the unit RTS

Pre-requisites for RHP removal		
1	All IIP commitments required prior to an RHP are complete	✓
2	All SSCs required for safe operation beyond an RHP are AFS	✓
3	Staffing levels to safely operate the unit are adequate	✓
4	Specified operating procedures for an RHP have been validated	✓
5	Specified training for an RHP is complete and staff qualified	✓
6	Specified SSCs meet requirements of CSA standard N286	✓
7	All non-conformances and open items leading up to an RHP are addressed	✓



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# Return to Service of Unit 2

## CNSC verification of Pre-requisites

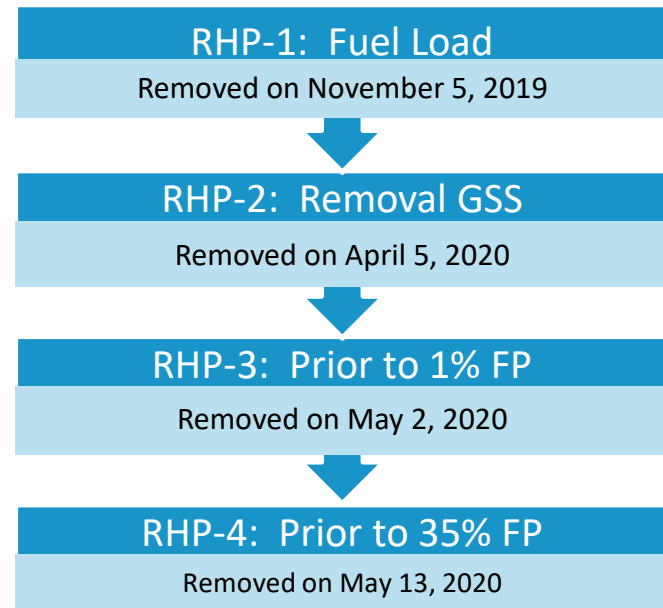
RHP	CNSC staff report to EVP-CROO	Final Memo to EVP-CROO with Recommendation
1	“Request by Ontario Power Generation Inc. to Remove Regulatory Hold Point for Prior To Fuel Load for Unit 2”, <a href="#">October 21, 2019</a>	“Removal of Regulatory Hold Point 1 – Prior to Fuel Load for Darlington NGS Unit 2”, <a href="#">November 5, 2019</a>
2	“Request by Ontario Power Generation Inc. to Remove Regulatory Hold Point for Prior to Guaranteed Shutdown State for Unit 2”, <a href="#">March 26, 2020</a>	“Removal of Regulatory Hold Point 2 – Prior to GSS Removal for Darlington NGS Unit 2”, <a href="#">April 5, 2020</a>
3	“Request by Ontario Power Generation Inc. to Remove Regulatory Hold Point for Prior to Exceeding 1% Full Power for Unit 2”, <a href="#">April 28, 2020</a>	“Removal of Regulatory Hold Point 3 – Prior to Exceeding 1% Full Power for Darlington NGS Unit 2”, <a href="#">May 2, 2020</a>
4	“Request by Ontario Power Generation Inc. to Remove Regulatory Hold Point for Reactor Power Increases Prior to Exceeding 35% Full Power for Unit 2”, <a href="#">May 7, 2020</a>	“Removal of Regulatory Hold Point 4 - Prior to Exceeding 35% Full Power for Darlington NGS Unit 2”, <a href="#">May 13, 2020</a>



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## Return to Service of Unit 2 Recommendation to EVP-CROO

- CNSC staff reports to EVP-CROO provided 7 working days ahead of RHP date
- Final recommendations provided once all remaining open items confirmed/verified closed
- The recommendations were based on:
  - Compliance assessments
  - Desktop reviews
  - Surveillance and verification activities
  - Inspections
- EVP-CROO provided regulatory consent to remove the RHP, once all pre-requisites and regulatory commitments were shown to be met



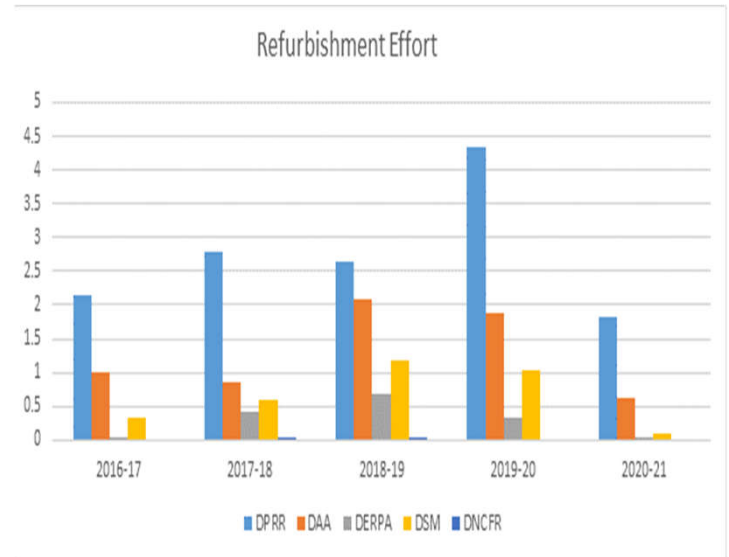


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# Refurbishment and the RTS of Unit 2

## Oversight of the Darlington Refurbishment Project

- Led by the Darlington Regulatory Program Division
  - Headquarter and Site Office staff
- Supported by the Technical Services Branch and Regulatory Operation Branch
- From FY 2016-17 to September 2020
  - Approximately 6435 person days of effort
- A rigorous approach has been applied to staff reviews, compliance activities and the removal of RHPs



**We Will Never Compromise Safety**

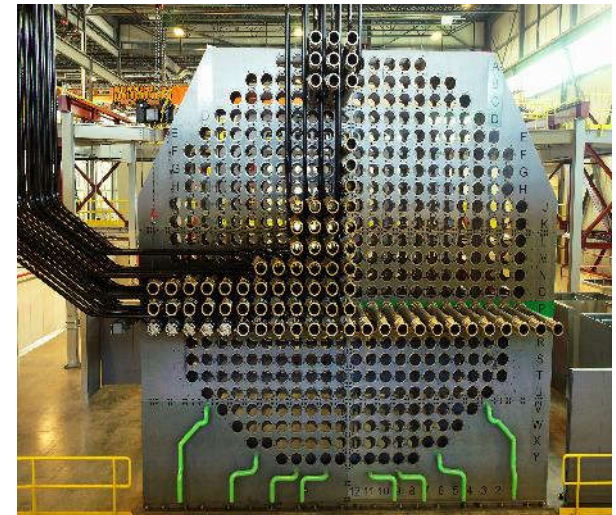


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# Unit 3 Refurbishment Overview

## Unit 3 refurbishment began on September 3, 2020

- Will provide 30 more years of power
- Covid-19 measures are in place
- Defueling completed on November 25, 2020
- HTS Bulk Drain began on November 26, 2020
- Next major phase: Installation of Bulkhead





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## Unit 3 Refurbishment

### CNSC tools in place for Unit 3 Refurbishment:

#### **Project Plan**

- Comprehensive Regulatory Activity Plan that integrates the processes, resources, planning, key activities, and schedule to meet the refurbishment project requirements

#### **Unit 3 Return to Service Protocol**

- Based on the Unit 2 Protocol
- Lessons learned incorporated

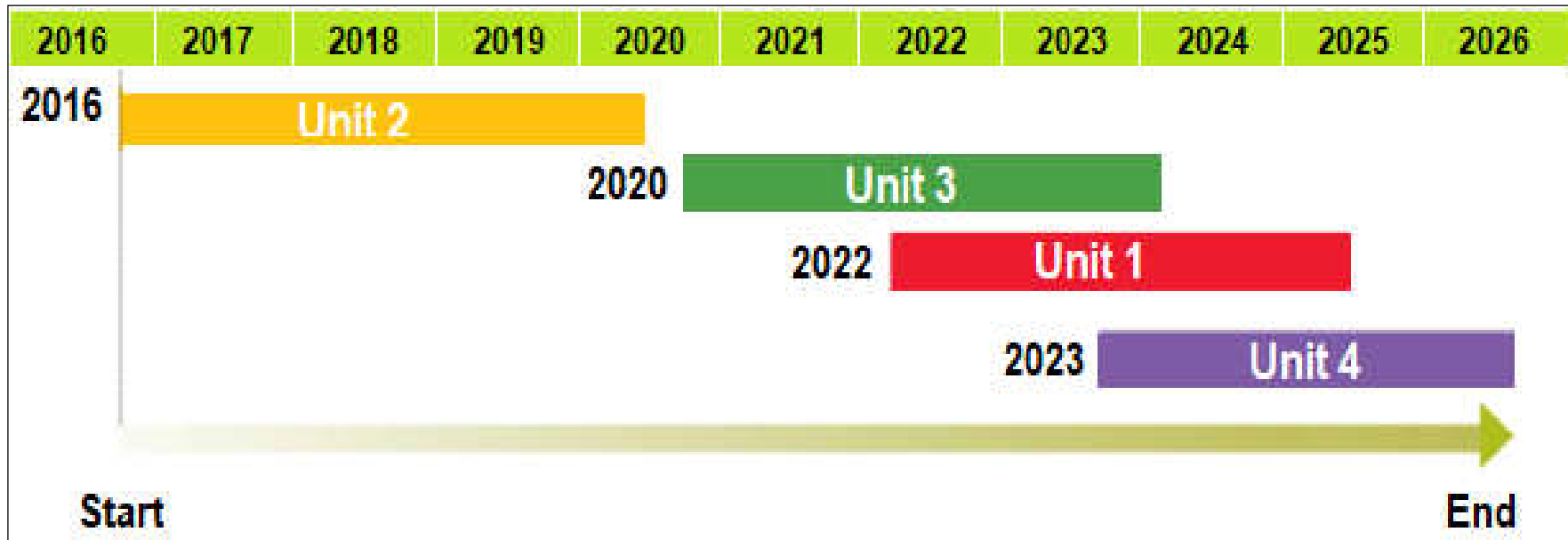
#### **Unit 3 Compliance Plan**

- Based on the Unit 2 compliance plan and Generic Refurbishment Regulatory Oversight Project Plan
- 18 Type II's and 18 Field inspections planned



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# Overall Refurbishment Schedule





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## Closing Remarks

- Refurbishment is being executed safely and in accordance with regulatory requirements
- CNSC staff have processes for regulatory oversight of the refurbishment project and monitoring of return to service activities
- Processes incorporate past CNSC refurbishment experience
- The CNSC has an adaptable and efficient team in place to ensure proper oversight of subsequent units at Darlington
- Staff will update the Commission on Refurbishment through regular NPP Status Update and future Regulatory Oversight Reports



CNSC staff will continue to provide effective regulatory oversight of subsequent units and will continue to update the Commission on the status of the refurbishment project





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