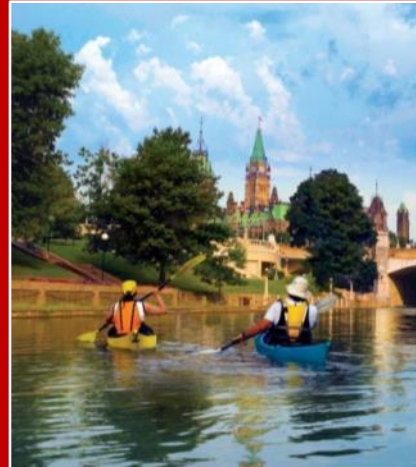


# Canada





Government  
of Canada

Gouvernement  
du Canada

Canada

# The Joint 8th & 9th Review Meeting of the Convention on Nuclear Safety

Canada's  
Presentation  
Country Group 4  
March 22, 2023  
Vienna

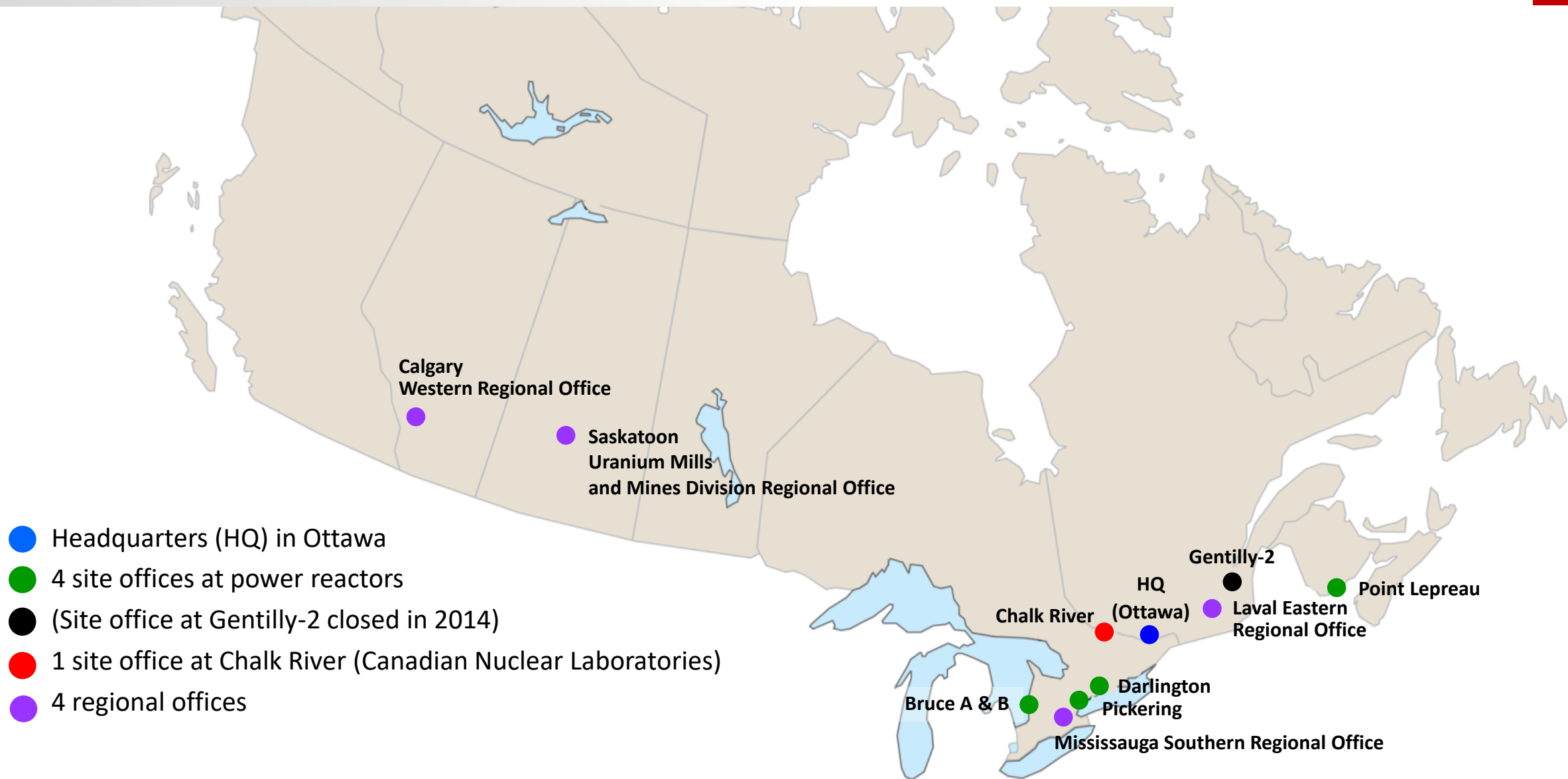


# Presentation Outline

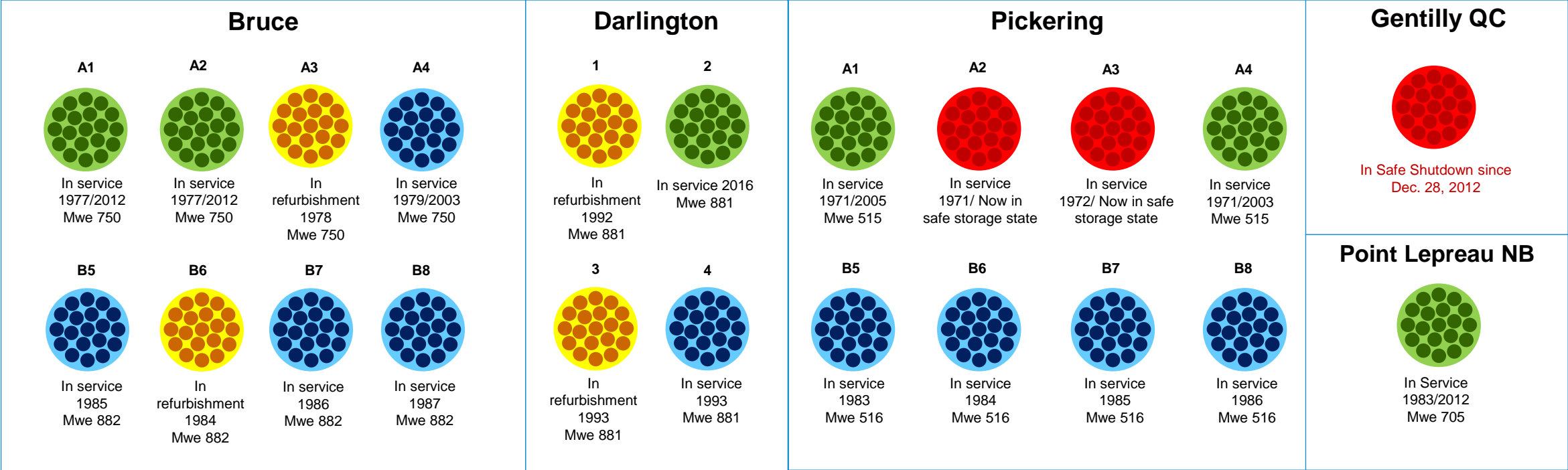
- 🍁 Introduction
- 🍁 Highlights of Canada's Report
- 🍁 Responses to CNS Challenges to Canada
- 🍁 Peer Review Missions
- 🍁 Vienna Declaration on Nuclear Safety
- 🍁 Fukushima Follow-up
- 🍁 Responses to Questions and Comments
- 🍁 Themes of Topical Sessions
- 🍁 Proposed Challenges, Good Practices and Areas of Good Performance
- 🍁 Updates to Canada's Report
- 🍁 Response to COVID-19 Pandemic
- 🍁 Response to Invasion of Ukraine
- 🍁 Conclusions

# INTRODUCTION




# Locations of CNSC Offices and NPPs in Canada

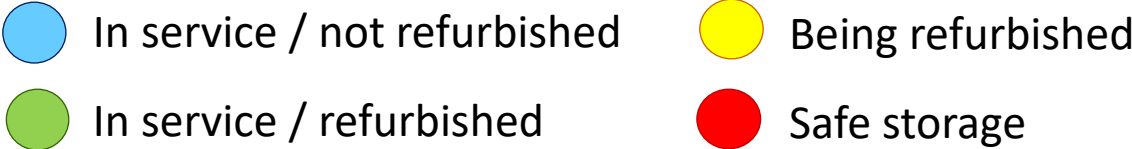


# Status of NPPs in Canada



## Typical share of nuclear energy in total electricity generation

-  Canada - **17%**
-  Ontario - **66%**
-  New Brunswick - **31%**



# The Canadian Nuclear Safety Commission

7

Established in May 2000, under the ***Nuclear Safety and Control Act***

- ❖ Replaced the Atomic Energy Control Board, founded in 1946 under the ***Atomic Energy Control Act***
- ❖ Assigns power and authority necessary to independently regulate nuclear activities



**Over 75 years of nuclear safety**

Canada



# The Commission

- ❖ Independent, quasi-judicial tribunal and court of record
  - Consists of up to seven members
  - One member is designated as President of the Commission and Chief Executive Officer of the CNSC
- ❖ Commission makes all licensing decisions and regulations
- ❖ Supported by scientific, technical and professional staff

**The Commission's decisions are reviewable only by the Federal Court of Canada**





# The Canadian Nuclear Safety Commission

## 🍁 **Mission:**

The CNSC regulates the use of nuclear energy and materials to protect health, safety, security and the environment; implements Canada's international commitments on the peaceful use of nuclear energy; and disseminates objective scientific, technical and regulatory information to the public

🍁 **Technical Support Branch** forms an integral part of the CNSC

🍁 **In-house Legal Services**

Transparent, science-based decision making

# CNSC Four Priorities

- ❁ To have a **modern** approach to nuclear regulation
- ❁ To be a **trusted** regulator
- ❁ To maintain **global** nuclear influence
- ❁ To be an **agile** organization

# Licensees of Operating Canadian NPPs (1/2)

## Ontario Power Generation (OPG)

- 🇨🇦 Public company owned by the Government of Ontario
- 🇨🇦 Licensed by the CNSC to operate the Darlington and Pickering sites (ten operating CANDU reactors and two reactors in safe storage)
- 🇨🇦 Capacity: 6,600 megawatts of nuclear electricity



Darlington Nuclear Generating Station (DNGS)



Pickering Nuclear Generating Station (PNGS)



# Licensees of Operating Canadian NPPs (2/2)

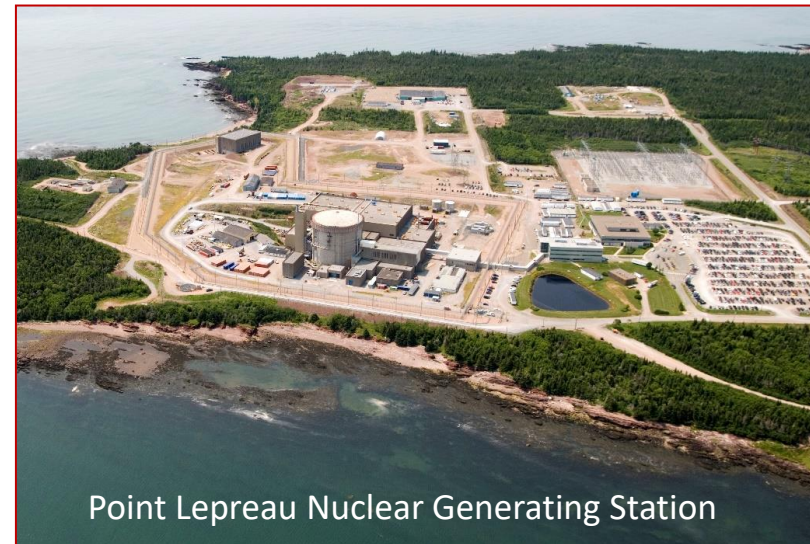
## Bruce Power

- 🇨🇦 Private corporation
- 🇨🇦 Licensed by the CNSC to operate the Bruce A & B sites (eight CANDU reactors)
- 🇨🇦 Capacity: 6,400 megawatts of nuclear electricity
- 🇨🇦 Largest operating NPP in the world in terms of electricity capacity



## New Brunswick Power

- 🇨🇦 Crown corporation owned by the Government of New Brunswick
- 🇨🇦 Licensed by the CNSC to operate the Point Lepreau site (one CANDU reactor)
- 🇨🇦 Capacity: 660 megawatts of nuclear electricity



# Associated Organizations

## **CANDU Owners Group (COG)**

- Not-for-profit organization of licensees and international operators (Argentina, Canada, China, India, Republic of Korea, Pakistan and Romania)
- Coordinates research and development activities and promotes sharing of operating experience
- Provides various programs for its members

## **CSA Group (formerly the Canadian Standards Association)**

- Canada's largest, member-based standards development organization
- Sets voluntary consensus standards (CSA Group standards) developed by national stakeholders and public interests related to NPPs and other nuclear facilities and activities

# Other Government Organizations Involved in NPP Safety

## **Health Canada**

- Establishes radiological protection guidelines and assessments
- Responsible for the Federal Nuclear Emergency Plan

## **Global Affairs Canada**

- Responsible for Canada's nuclear non-proliferation policy

## **Provincial emergency authorities**

- Responsible for planning and executing nuclear emergency response

## **Natural Resources Canada**

- Administers *Nuclear Energy Act*, *Nuclear Liability and Compensation Act* and *Nuclear Fuel Waste Act*
- Establishes policies, priorities and programs for energy science and technology
  - Led development of Action Plan for Small Modular Reactors (SMRs) to coordinate work by diverse set of stakeholders



# HIGHLIGHTS OF CANADA'S REPORT

# Safety Record

## Excellent safety record during reporting period

- 🍁 Licensees fulfilled their responsibilities for safety and their regulatory obligations
- 🍁 Radiation exposures well below regulatory limits to workers, the public and the environment
- 🍁 Radiological releases to the environment extremely low and well below regulatory limits
- 🍁 No serious process failures

All events addressed in an orderly fashion with no resulting harm to the health, safety or security of persons or the environment

# Regulatory Framework (1/2)

- 🍁 The *Nuclear Safety and Control Act* is the CNSC's enabling legislation
- 🍁 The Commission makes regulations through a transparent process, which includes public participation and public meetings
- 🍁 The Commission issues licences with general requirements
- 🍁 Regulatory documents and CSA Group standards provide detailed requirements and guidance
- 🍁 Extensive consultation with stakeholders in developing regulatory documents and CSA Group standards





## CNSC regulatory documents

- Aligned with IAEA safety standards
- Cover all CNSC safety and control areas
- Reviewed and updated, as needed, in five-year plan

## CSA Group standards

- Developed through collaboration between industry, the CNSC and other international stakeholders
- Continuously updated

## Regulatory documents and CSA Group standards

- Integrated in regulatory framework
- Reviewed and updated following the Fukushima Daiichi accident

## Operating reactors

### 🍁 Licence for operating power reactors

- Standardized licence conditions
- Supported by licence conditions handbook (LCH) which provides detailed compliance criteria and guidance
- In accordance with the licensing basis of the facility as approved by the Commission

### 🍁 Licence renewal

- In accordance with the requirements in the *Nuclear Safety and Control Act*, regulations, regulatory documents and CSA Group standards
- Conducted multiple times over the life of the reactor
- Systematic review of licensee's past performance
- Improvement plans over the proposed operating period, which involves implementation of new regulatory documents and CSA Group standards
- Licence renewals incorporate periodic safety reviews (PSRs), which are conducted on 10-year cycle



## Inspections and verifications of NPPs

- ✦ CNSC inspectors on site at each operating NPP
- ✦ Five-year baseline compliance program
- ✦ Additional inspections are risk-informed and performance-based

## Enforcement

- ✦ Set of graduated enforcement actions to compel compliance
  - Select and Apply Enforcement Tools process assists inspectors in choosing the most appropriate tool



# Openness and Transparency (1/2)

- ❖ CNSC has mandate to disseminate scientific, technical and regulatory information to all stakeholders
- ❖ CNSC outreach programs
- ❖ Participant Funding Program
- ❖ Public participation during CNSC hearings or meetings held in Ottawa or local communities
  - Use of webcasts for public hearings/meetings
  - “Hybrid” hearings/meetings also conducted to allow in-person and virtual participation



# Openness and Transparency (2/2)


- ❖ Extensive licensee programs for proactive disclosure and public information program
  - Public disclosure protocols
- ❖ Licensee outreach programs
  - Consultation with Indigenous nations and communities
  - Consultation with municipal governments and local stakeholders
- ❖ Licensees make their regulatory information, including environmental monitoring results, available through
  - Corporate websites
  - Social media
- ❖ Social media used to disseminate information, e.g.,
  - Facebook, Instagram, LinkedIn, Twitter, YouTube




# Independent Environmental Monitoring Program

## The Independent Environmental Monitoring Program (IEMP)

- Complements CNSC regulatory oversight
- Complements monitoring programs of other government agencies, such as Health Canada's Canadian Radiation Monitoring Network, as well as provincial and licensee monitoring programs
- Complements and confirms licensees' environmental programs

 CNSC staff collects samples in public areas from air, water, soil, sediment, vegetation and foodstuffs

 IEMP results for all Canadian NPPs available to public through technical reports and interactive map on the CNSC website

# Safety Improvements at Existing NPPs During Review Period

- ❖ Refurbishment of Darlington Units 2 and 3
- ❖ Major component replacement of Bruce Unit 6
- ❖ Completion of PSR for Bruce A and B
- ❖ Completion of full-scope PSAs at all operating NPPs and development of a methodology for whole-site PSA
- ❖ Installation of passive containment filtered venting system at Bruce A and B



# Activities Related to SMRs

## Provinces, utilities, vendors pursuing initiatives on several fronts

### Darlington New Build

- CNSC renewed OPG's licence to prepare site
- OPG selected design (GE Hitachi's BWRX-300) and submitted application to CNSC for licence to construct

### Chalk River

- Global First Power submitted application for licence to prepare site (Ultra Safe Nuclear Corporation's Micro Modular Reactor)
- Environmental assessment ongoing

### CNSC Vendor Design Reviews (VDRs)

- Multiple reviews completed and ongoing for variety of SMR designs
- VDRs are optional "licensability" assessments – not design certification or binding

# Major Common Issues

Issue Common to Contracting Parties	Section of National Report
Safety Culture	Summary, 10(b)
Peer Reviews	Summary, 8.1(e), 14(i)(e)
Legal Framework/Independence	Summary, 7.1, 7.2
Financial/Human Resources	Summary, 8.1(a)(b)(c)
Knowledge Management	Summary, 11.2(b)
Supply Chain	Summary, 13(b), 19(v)
Aging Management	Summary, 14(i)(b),(ii)(b)
Emergency Preparedness	Summary, 16
Stakeholder Consultation	Summary, 7.2(i)(a)(b), 8.1(f), 17(iv)

RESPONSES TO  
CNS CHALLENGES  
TO CANADA

# Response to remaining 6th Review Meeting Challenges (1/2)

## Challenge 3:

Establish guidelines for the return of evacuees post-accident and to confirm public acceptability of it.

## Response:

- ✳️ CNSC requested public review of draft **REGDOC-2.10.1**, *Nuclear Emergency Preparedness and Response, Volume II*
- ✳️ In 2020, following amendments based on comments from CNSC's public consultation, Health Canada published content of draft REGDOC as *Guidance on Planning for Recovery Following a Nuclear or Radiological Emergency*
  - Seed document, **REGDOC-2.10.1** Volume II, not published and no longer needed
- ✳️ Additional recovery phase measures at federal level in the Federal Nuclear Emergency Plan

Canada recommends this challenge be closed



# Response to remaining 6th Review Meeting Challenges (2/2)

## Challenge 5:

Update emergency operational interventional guidelines and protective measures for the public during and following major radiological events.

## Response:

- 🍁 During reporting period, Health Canada published the updated *Canadian Guidelines for Protective Actions during a Nuclear Emergency*
- 🍁 Guidelines address protective measures and operational intervention levels for the public, including evacuation, sheltering, iodine thyroid blocking and water and food consumption
- 🍁 Aligns with the latest recommendations from the IAEA and International Commission on Radiological Protection

Canada recommends this challenge be closed

# Response to the 7<sup>th</sup> Review Meeting Challenges (1/3)

## Challenge 1:

Publish the drafted amendments to the *Class I Nuclear Facilities Regulations* and the *Radiation Protection Regulations* that address lessons learned from Fukushima.

## Response:

- 🍁 In 2017, amendments to the Class I Nuclear Facility Regulations and the Radiation Protection Regulations to address lessons learned from Fukushima came into force


Canada recommends this challenge be closed

# Response to the 7<sup>th</sup> Review Meeting Challenges (2/3)

## Challenge 2:

Complete the transition to the improved regulatory framework (CNSC regulatory documents).

## Response:

-  The transition to the improved regulatory framework was completed during the reporting period
  - Full alignment with CNSC safety and control areas
  - During the 9<sup>th</sup> reporting period 31 REGDOCs were either published or revised

Canada recommends this challenge be closed

# Response to the 7<sup>th</sup> Review Meeting Challenges (3/3)

## Challenge 3:

Formalize the planned approach to end-of-operation of multi-unit NPPs.

## Response:

- 🇨🇦 **REGDOC-3.5.1**, Information Dissemination: Licensing Process for Class I Nuclear Facilities and Uranium Mines and Mills contains the regulatory process for end of commercial operations
- 🇨🇦 The CNSC is applying this approach for Pickering
- 🇨🇦 **REGDOC-2.11.2**, *Decommissioning* contains additional requirements and guidance for the preparation for decommissioning

Canada recommends this challenge be closed

# Response to the 7<sup>th</sup> Review Meeting Suggestion (1/2)

## Suggestion 1:

Canada should address any CANDU safety issues that are Category 3 referenced in the 7<sup>th</sup> national report and provide a report to the 8<sup>th</sup> RM.

## Background:

- ✳ In Canadian context, “addressing a CSI” effectively means re-categorizing it from Category 3 to Category 2
  - Category 3 - experiments and/or analysis are required to improve knowledge/understanding and to confirm adequacy of safety margins
  - Category 2 - appropriate control measures are in place to address the issue and maintain safety margins
- ✳ A group of CSIs are related to large-break loss-of-coolant accidents – “LBLOCA CSIs”
- ✳ Others are referred to as “non-LBLOCA CSIs”



# Response to the 7<sup>th</sup> Review Meeting Suggestion (2/2)

## Suggestion 1:

Canada should address any CANDU safety issues that are Category 3 referenced in the 7<sup>th</sup> national report and provide a report to the 8<sup>th</sup> RM.

## Response:

### Progress on LBLOCA CSIs

- Three remaining Category 3 CSIs were re-categorized for Bruce during the reporting period and re-categorized for Darlington after the reporting period
- They remain Category 3 for Pickering and Point Lepreau; assessment of re-categorization is ongoing

### Progress on Non-LBLOCA CSIs

- Re-categorization of the two remaining Category 3 CSIs was completed in 2020

Canada will continue to report on CSI progress in CNS reports

Canada recommends this suggestion be closed

# PEER AND OTHER REVIEW MISSIONS

# Reviews Including International Peer Reviews

- ❖ **Integrated Regulatory Review Service (IRRS) mission**
  - Full-scope IRRS mission in September 2019 highlighted 6 good practices and provided 16 suggestions and 4 recommendations
- ❖ **Emergency Preparedness Review (EPREV)**
  - Mission in June 2019 reported 5 Good Practices, and provided 6 recommendations and 6 suggestions
- ❖ **Office of Auditor General (OAG) of Canada**
  - Audits in 2022
- ❖ **World Association of Nuclear Operators (WANO)**
  - Evaluations done every two years at each NPP
- ❖ **Operational Safety Review Team (OSART)**
  - Pickering in 2016 (with follow-up in 2018)



# IRRS Review

## 2019 IRRS Mission – Good Practices (NPP related):

- Comprehensive system for collecting, analyzing and sharing regulatory experience feedback
- The CNSC is very committed to ensuring a high level of transparency and openness
- Proactively developed extensive guidance and processes to assist potential applicants determine the content of SMR application

All findings can be found on [IAEA Website - 2019 Review Missions](#). Follow up mission in 2024 to confirm closure of recommendations and suggestions



## **2019 EPREV mission – Good Practices:**

- Streamlined process for timely submission and processing of claims after a nuclear or radiological emergency, including a fully accessible web platform
- The implementation of the arrangements for pre-distribution of KI pills maximizes the public awareness and the effectiveness of the protective action
- The Warden Service in New Brunswick is an innovative approach to help ensure that relevant information is provided to the public during the preparedness stage
- The use of social media simulators in exercises has enhanced the ability of response organizations to respond to misinformation
- Completion of a self-assessment prior to EPREV mission

All findings can be found on [IAEA Website - 2019 Review Missions](#). Follow up mission in June 2023 to confirm closure of recommendations and suggestions



## **2022 update on past OAG audit on inspection of NPPs found:**

- The CNSC successfully implemented actions addressing all recommendations from the 2016 report
- Significant progress has been made in performance metrics related to these recommendations

## **2022 OAG audit on the management of low and intermediate level radioactive waste also had findings relevant to regulation of NPPs, including**

- The CNSC is effective in its role as Canada's nuclear regulator
- CNSC uses risk-based planning

## **Pickering 2016 – Good Practices:**

- Obsolescence management that considers long-term aging management assessments
- Severe Accident Software Simulator application for supporting multi-unit severe accident management guideline development
- Longstanding positive relationship with community partners to develop young leaders and improve environmental stewardship

## **Follow-up Missions also conducted**

- Bruce B in 2017
- Pickering in 2018

# VIENNA DECLARATION ON NUCLEAR SAFETY

# Vienna Declaration on Nuclear Safety – Fulfilling Principle 1

## Principle 1 addressed through technical criteria and standards that align with objective of preventing accidents

- ✳ Regulatory documents clarifying requirements for new NPP projects
  - **REGDOC-1.1.1**, *Site Evaluation and Site Preparation for New Nuclear Facilities*
  - **REGDOC-1.1.3**, *Licence Application Guide: Licence to Operate a Nuclear Power Plant*
- ✳ Technical criteria and standards to address the objective of mitigating and avoiding releases
  - **REGDOC-2.5.2**, *Design of Reactor Facilities: Nuclear Power Plants*
    - Based on IAEA SSR-2/1, *Safety of Nuclear Power Plants: Design*
    - Engineered systems to protect containment and to cool the core debris
    - Containment to maintain leak-tight barrier for sufficient time to allow implementation of offsite emergency procedures
  - **REGDOC-2.3.2**, *Accident Management*
    - Severe accident management guidelines

# Vienna Declaration on Nuclear Safety – Fulfilling Principle 2 and 3

## Principle 2 addressed by National requirements on periodic comprehensive and systematic safety assessments of existing NPPs:

- **REGDOC-2.4.1**, *Deterministic Safety Analysis*
- **REGDOC-2.4.2**, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*
- **REGDOC-2.3.3**, *Periodic Safety Reviews*

## Periodic safety reviews (PSRs), including integrated implementation plans

- Required by licence conditions
- Details found in **REGDOC-2.3.3**, including 10-year periodicity
- Specific risk/engineering objectives and limits provided in list of modern codes, standards, and practices

**Principle 3 is addressed by aligning and/or informing the regulatory framework with IAEA safety standards**

# FUKUSHIMA FOLLOW-UP



# Fukushima Follow-up

- ❖ **Class I Nuclear Facilities Regulations** and the **Radiation Protection Regulations** were updated in 2017 to address lessons learned from Fukushima
- ❖ **Full-scope PSAs completed** incorporating new regulatory requirements as part of lessons learned from Fukushima
- ❖ **REGDOC-2.10.1, Nuclear Emergency Preparedness and Response, Version 2** and **N1600, General requirements for emergency management for nuclear facilities** updated as part of lessons learned from Fukushima
- ❖ **Standardized emergency mitigating equipment across NPPs**
- ❖ **Implementation of post-Fukushima updates in SAMGs**, and the demonstration of SAMG effectiveness through exercises and plant drills
- ❖ **Remaining seven items from DG-IAEA report on Fukushima were addressed** by Health Canada's proposed publication of *Guidance on Planning for Recovery Following a Nuclear or Radiological Emergency*

Canada's Fukushima enhancements and follow-up completed

# RESPONSES TO QUESTIONS AND COMMENTS

# Questions to Canada on the National Report (1/3)

## **Knowledge Management (Article 11)**

Knowledge transfer course and  
a retirement transition program  
(33777)

Formal succession plans in place  
(32624)

Student co-op programs  
(32575)

Certified staff refresher training  
(32038)

## **Counterfeit, Fraudulent and Suspect Items (Article 13)**

Licensee management system  
required to have a process to  
prevent, detect, control CFSI  
(32934)

Supplier requirements  
(32040)

CNSC inspection of supply chain  
(31795)

(#s are CNS question IDs)

# Questions to Canada on the National Report (2/3)

## **KI pill distribution (Article 16)**

Consumption criteria  
(3296)

Provincial guidelines  
(31802)

Stockpiles and distribution  
(31801)

Replacement of expired pills (31803)

## **Radiation dose limits (Article 15)**

Requirements on monitoring of workers  
(32474)

Lens of the eye limits  
(32476, 32044, 32047)

Dose from various radiation sources  
(32477)

Pregnant worker dose limits  
(32046, 31799)

Nuclear Energy Worker limits vs.  
general public  
(31800)

# Questions to Canada on the National Report (3/3)

## **Small modular reactors (Article 18)**

Regulatory training on SMRs (32321)  
Design requirements for power levels  
(31796)  
Design requirements (31804)  
Licensing process (31246)  
Graded approach (30534)  
Regulatory readiness strategy (30170)  
Recruitment of expertise (30172)

## **Safety Culture (Article 10)**

Honest disclosure vs disciplinary action  
(31932)  
Self-assessments for regulator  
and licensees  
(31790, 31244, 30171)  
Objectivity  
(31792)  
Corrective actions  
(30845)

# THEMES OF TOPICAL SESSIONS



# Aging Management

- ❖ **REGDOC-2.6.3, *Aging Management*** discusses the impact on safety margins, as determined by an updated deterministic safety analysis. Licensees are revising analyses in the context of **REGDOC-2.4.1 *Deterministic Safety Analysis***
  - OPG completed the planning for Darlington loss of flow analysis, loss of reactor power regulation and in-core LOCA
  - NB Power identified additional analyses to further address plant aging and legacy gaps with REGDOC-2.4.1 and incorporated them in multi-year planning
- ❖ **REGDOC-2.5.2, Design of Reactor Facilities: Nuclear Power Plants** states that the final safety analysis report shall account for postulated aging effects of SSCs
- ❖ **COG programs** address aging of heat transport system
  - Fuel channel lifecycle management program
  - Safety analysis improvement program

## Operator Safety Culture:

- ✦ CSA Standard N286-12, *Management System Requirements for Nuclear Facilities* includes a requirement on safety culture
- ✦ NPP licensees have implemented CNSC **REGDOC-2.1.2**, *Safety Culture*, which was published in 2018
- ✦ NPP licensees adopted nuclear safety culture monitoring panel process and conduct regular safety culture self-assessments

## **CNSC Oversight of Operator Safety Culture:**

- 🍁 For safety culture self-assessments at NPPs, CNSC assesses licensees' approaches and provides feedback on self-assessments
- 🍁 CNSC examines evaluation of security culture in the context of safety culture at NPPs

CNSC co-hosted, with OECD Nuclear Energy Agency and World Association of Nuclear Operators, a Country-Specific Safety Culture Forum in Sept 2022

## Regulatory safety culture:

- ❁ CNSC has an executive champion for safety culture
- ❁ “Open Door Policy”, “town hall meetings” and emphasis on diversity and inclusion promote dialog and improve/broaden culture
- ❁ Conflict management options include process for difference of professional opinion
- ❁ CNSC assessed its own safety culture and is executing plan to address findings, e.g.,
  - Created an opportunity for improvement tool and a regulatory safety culture policy

CHALLENGES,  
GOOD PRACTICES  
AND AREAS OF  
GOOD PERFORMANCE

# Proposed Challenges (1/2)

- ❖ Update guidance document Generic Criteria and Operational Intervention Levels for Nuclear Emergency Planning and Response and include guidance on protection strategies and reflect guidance in provincial plans
- ❖ Approve and implement revision of Ontario's Provincial Nuclear Emergency Plan



## Proposed Challenges (2/2)

- ❁ Optimize regulatory capacity and capability to effectively and efficiently assess licence applications for SMRs and potentially other nuclear technologies
- ❁ Ensure an effective approach between federal departments to provide proponents with certainty related to process and timelines for environmental/impact assessments

## Good Practices/Performance (1/4)

**In the 8<sup>th</sup> and 9<sup>th</sup> review cycles, other Contracting Parties identified the following as noteworthy achievements:**

- ❖ Systematic approach for NPP related knowledge and on-the-job training for NPP site inspectors in both technology and regulatory processes
- ❖ Use of Licence Condition Handbooks and specifically the compliance verification criteria to promote consistency and objectivity of regulatory oversight
- ❖ Development of methodology and submission to CNSC of whole-site PSAs for multi-unit NPPs

## Good Practices/Performance (2/4)

### **Continuation of list of achievements identified as noteworthy by other Contracting Parties during 8<sup>th</sup> and 9<sup>th</sup> review cycles:**

- 🍁 Publication of discussion papers to solicit early public feedback on regulatory initiatives
- 🍁 CNSC readiness to regulate SMRs
- 🍁 Development of policy roadmap for SMRs and adjustment of regulatory framework to enable new technologies

## Other notable achievements for Canada

- 🍁 Development of, and executing, Canadian SMR Action Plan
- 🍁 Readiness for CNSC oversight of SMRs
  - Regulatory strategy
  - Enhancement to regulatory framework for deployment of new technology
  - Capacity building
  - International collaboration
- 🍁 Measures to enhance regulatory safety culture
- 🍁 Increased participant funding to further facilitate stakeholder engagement in Commission proceedings
- 🍁 Annual, comprehensive regulatory oversight reports, presented in public forum, that summarize safety performance at nuclear facilities
- 🍁 Canada's Indigenous engagement, including interweaving of Indigenous knowledge with western science

### Continuation of list of other notable achievements for Canada

- ✳ Updates to analyses in safety reports for existing NPPs based on modern requirements, including CNSC **REGDOC-2.4.1**, *Deterministic Safety Analysis*
- ✳ Effective aging management programs for existing NPPs based on clear requirements using guidelines informed by research and diverse and innovative technologies
- ✳ Rigorous planning for safe execution of extensive refurbishments, including replacement of major components, of multiple units in parallel

# UPDATES TO CANADA'S REPORT



# Updates to National Report to Joint 8<sup>th</sup> and 9th RM (1/2)



OPG nearing completion of refurbishment of Darlington Unit 3 and studying feasibility of life extension of Pickering Units 5 to 8



Bruce Power started outage for major component replacement for Bruce Unit 3 in March 2023



A major emergency exercise, Huron Endeavour, was conducted at Bruce in October 2022



OPG submitted application for licence to construct an SMR at Darlington in Oct 2022



NB Power and SaskPower selected SMR technologies

- NB Power has selected the site in New Brunswick
- SaskPower is exploring two site options in Saskatchewan

# Updates to National Report to Joint 8<sup>th</sup> and 9th RM (2/2)



Government of Canada granted \$121M to support regulatory readiness and research related to SMRs

- Includes \$30M to help develop SMR supply chain and fund research on SMR waste management

Potential for large new-build

- Exploratory discussion ongoing for possible large new-build in Ontario

CNSC published/revised three CNSC REGDOCs

- Including Version 2 of **REGDOC-1.1.2**, *Licence Application Guide: Guide to Construct a Reactor Facility* in Oct 2022

# RESPONSE TO COVID-19 PANDEMIC

## CNSC undertook various activities to adjust to pandemic

- 🍁 Activated business continuity plan
- 🍁 Adopted hybrid methods to verify compliance and revised procedures to allow for remote inspection
- 🍁 Included pandemic-related information to pre-job briefs for on-site activities and provided PPE
- 🍁 Benchmarked with regulators worldwide regarding inspection practices
- 🍁 Increased focus on licensees' adherence to pandemic response plans and health protocols
- 🍁 Exercised regulatory flexibility

# Response to COVID-19 pandemic (2/2)

## NPP licensees also adjusted to the pandemic

- ❁ Activated business continuity plans
- ❁ Ensured minimum staff complement was not compromised:
  - Restricting access to control room
  - Cleaning crews more frequent
  - Staggering shift changes, using larger rooms for shift turn-over
  - Using thermal-imaging cameras for active screening
- ❁ Delayed major activities (emergency/security exercises)
- ❁ Provided on-site testing and vaccines to employees / families, as well as PPE to hospitals and medical institutions

**During pandemic, Darlington Unit 2 returned to service safely and on schedule following refurbishment**

PLANNED  
ACTIVITIES FOR  
CONTINUOUS  
IMPROVEMENT  
DURING NEXT  
REPORTING PERIOD



# Planned Activities During Next CNS Reporting Period (1/2)

Bruce Power's ongoing replacement of major components in Units 6, 3

Bruce Power to begin replacement of major components in Unit 4

OPG's ongoing refurbishment of Darlington Units 1 and 3

OPG to begin refurbishment of Darlington Unit 4

OPG to decide on life extension for Pickering Units 5-8 with request for approval of CNSC

CNSC review of OPG's application and Commission decision for licence to construct an SMR at Darlington

Completion of environmental assessment for SMR at Chalk River and CNSC decision on licence to prepare site

# Planned Activities During Next CNS Reporting Period (2/2)

- 🍁 Industry, regulatory, and government readiness for expected deployment of SMRs and, potentially, large reactors
- 🍁 Continued advocacy for enhanced international collaboration and harmonization of requirements and approaches with focus on SMRs
- 🍁 Follow-up missions for EPREV in June 2023 and IRRS in 2024



# RESPONSE TO INVASION OF UKRAINE

## Escalation of emergency operations

- Escalated the response level of Canada's Federal Nuclear Emergency Plan, activated emergency operations centres and the Federal Technical Assessment Groups to address a range of humanitarian and nuclear safety issues
- Ongoing risk assessments for potential releases from Zaporizhzhia (ZNPP) and other NPPs in Ukraine
- Developed health impact and protective action messaging for Canadian missions in eastern Europe and situation reports

## Tangible support

- Canada providing funding and equipment through IAEA to enhance nuclear safety in Ukraine

## Dissemination of timely information to public

- Public statements, interviews with media outlets, website updates

## **Revising emergency plans**

- Updating Health Portfolio Emergency Response Plan
- Reviewing Federal Nuclear Emergency Plan and associated arrangements

## **Enhancing radiation monitoring and protection**

- Enhance environmental radiation monitoring capabilities to improve emergency preparedness and response at Health Canada's Radiation Protection Bureau

# CONCLUSIONS



# Conclusions

## Canada has demonstrated

- ✳ Commitment to the Convention's objectives
- ✳ Compliance with the Articles of the Convention
- ✳ Fulfillment of the *Vienna Declaration on Nuclear Safety*
- ✳ Commitment to continuous improvement based on operating experience, best practices, research
- ✳ Openness and transparency

## Canada's plans for continuous safety improvements

- ✳ Ongoing refurbishment at Bruce, Darlington and other aging management activities
- ✳ Robust licensing and PSR processes
- ✳ Readiness for expected SMR deployment to assure their safe construction and operation
- ✳ Continuing engagement with all stakeholders and international involvement and leadership

Canada encourages Contracting Parties to commit to peer reviews, openness and transparency

# Recommendations to IAEA and Contracting Parties (1/2)

## **Contracting Parties should:**

- **Continue to meet their CNS obligations** and make their national reports publicly available
- **Actively commit** to strengthening CNS processes to adapt to changing circumstances while continuing to effectively achieve its objectives

## **To enhance the accountability of the CNS:**

- **The Summary Report** should continue to identify Contracting Parties that do not meet the obligations of the CNS
- **The President's Report** should identify Contracting Parties that do not meet the obligations of the CNS
- **The President of the Review Meeting** should communicate this information to the national governments of the Contracting Parties in question

Holding one another accountable to the highest standards

## Recommendations to IAEA and Contracting Parties (2/2)

- ✦ The IAEA and Contracting Parties should continue to **encourage countries to sign and ratify the CNS**, especially those with existing or emerging nuclear power programs
- ✦ **The IAEA should work with WANO** to engage non-responsive operators and to report them to their respective regulator and national government
- ✦ The IAEA and Contracting Parties should **continue to aid and support Ukraine** to enable it to fulfill its CNS obligations

Holding one another accountable to the highest standards



Canada

