

# Net Zero New Nuclear Reactors for Energy Production and Beyond Regulator Perspective

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Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire

2023

# Canada's Nuclear Landscape is Changing

- Industry reports proposing new builds (20 large reactors and 45 SMRs) to address Canada's net zero goals
- Federal funding
- Interest in new builds across Canada
  - SMRs and large reactors
- SMR Applications from 3 utilities: OPG, Global First Power and NB Power
- Additional SMR and large reactor applications expected in 2024



We must be agile and prepared to regulate these new technologies

## Achievements

# IAEA Recognition of Readiness for Novel Technologies

### **IRRS**

Noted the following good practices:

- Proactive guidance and processes to assist potential applicants with SMR applications
- Comprehensive regulatory framework
- Robust authorization/licensing system
- Comprehensive, open and transparent engagement

### **IPPAS**

Concludes that Canada follows strong and sustainable nuclear security practices.

### **EPREV** (recently completed follow up mission)

Noted remote data transfer, virtual emergency operations centre, and cloud-based applications.

**Achievements**

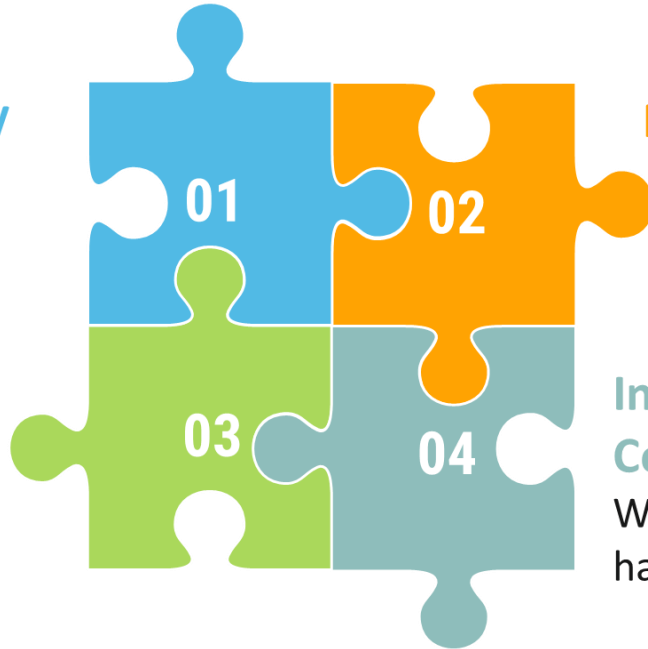
# SMR Readiness Project

## Capacity and Capability

More people, wider skills  
and research

## Policy and Shared Responsibilities

Improved domestic  
regulatory efficiency and  
harmonization



## Regulatory Predictability

Optimizing regulatory  
framework for SMRs

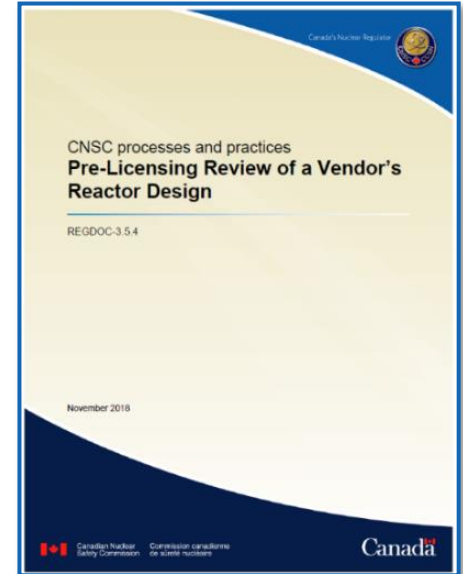
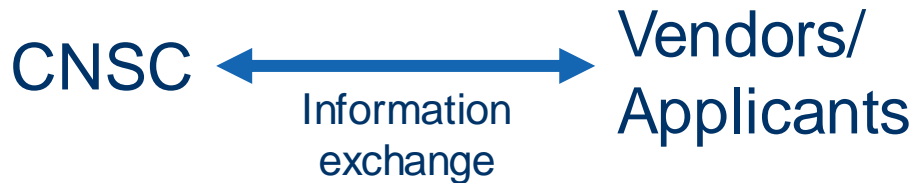
## International Collaboration

Working towards  
harmonization

## Achievements

# Pre-licensing Engagement with Vendors and Applicants

- **Vendor Design Review** is an optional pre-licensing activity where CNSC reviews a vendors' reactor design and provides feedback on proposed designs
- Pre-licensing engagement with vendors and applicants facilitate sharing of information
- Beneficial to both regulator and vendor in better understanding the technology and Canadian requirements



# International Collaboration

## Standardization of regulatory reviews

Creation and strengthening of relationships that support information exchanges for regulatory decision making (US NRC, UK ONR/ MOUs with PAA, Netherlands)

## International leadership for regulatory efficiency

- 5 Party Charter for review of the BWRX-300 (CNSC, US NRC, GEH, OPG & TVA)
- Moving from one of a kind → fleet approach, standardized design
- 4 joint products published and publicly available

## Information sharing and staff exchanges

- Excellent examples with ASN, PAA
- Need for coordination through IAEA and RCF

## Nuclear Harmonization Standardization Initiative (NHSI)

## Achievements

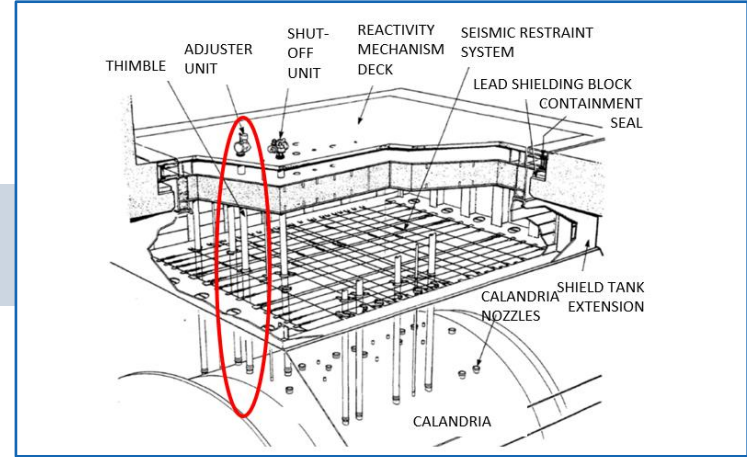
# Timely Review of Novel Applications

Industry proposed to use **spare rods** for production of Moly-99 in an operating power reactor.

**CNSC assessed the proposal, deemed it safe, and amended the licence for Mo-99 production.**

November 2020, Bruce Power applied to the CNSC amend its licence to produce Lu-177.

**The Commission amended the licence and CNSC staff released the regulatory hold point.** CNSC licensing of the Lu-177 IPS was a first-of-a-kind activity.



An Ytterbium target contained inside an aluminum container.

*Source: Bruce Power*



## Achievements

# Research and Outreach

### Forum between CNSC and Canadian ENGOS

- Meets quarterly to exchange information and ideas

### CNSC SMR Research Grant Initiative

Natural Science and Engineering Research Council (NSERC)

- To date, disbursed \$9.4M/ 3 years

### Indigenous engagement

- Duty to consult
- Ongoing engagement and relationship building
- Funding support (*Participant Funding Program and Indigenous and Stakeholder Capacity Fund*)





# Future Challenges

- Sustainable international lifecycle collaboration
  - Ensuring a coordinated approach that is technology specific
- Continued research addressing regulatory questions on novel technologies
- Leadership and continuity are key
  - Important to document processes
  - Knowledge management and transfer
  - Fostering an inclusive, innovative workplace



# Conclusions

**CNSC's regulatory framework is flexible and applicable to innovative technologies**

**The vendor design review (VDR) fosters mutual understanding of technologies and requirements early in the process**

Licensing the first production of Mo-99 and Lu-177 in CANDU demonstrates **CNSC's regulatory framework effectiveness**

**CNSC is ready to regulate innovative technologies and the SMR readiness project drives continuous improvement**

# Thank you!

## Questions?

### Connect With Us

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