



# PRESENTATION TO ONTARIO POWER GENERATION BOARD OF DIRECTORS MEETING – *LEARNING SESSION*

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# PURPOSE OF MEETING

- SMR readiness – focus on international collaboration
- CNSC's licensing and pre-licensing processes

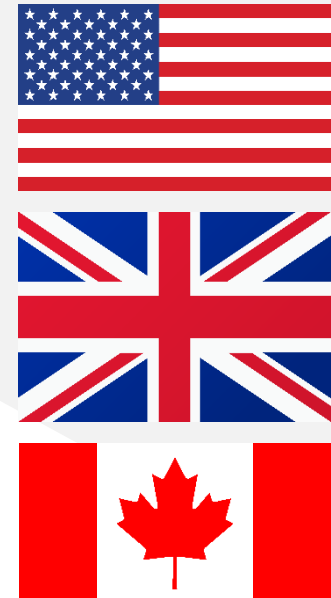
# CNSC PERSPECTIVE/EXPECTATIONS

- Objective, independent decision making and oversight
- Safety focus at all times; licensees ultimately responsible for safety
- Safety culture must be paramount in all Board actions and decisions
- Modern, agile and flexible regulator for innovative technologies
- Regulatory readiness depends upon sustained involvement in the process
- Relationship and trust building are key to social acceptance



# GLOBAL PERSPECTIVE

- CNSC cooperates and shares information with a number of countries and organizations on advanced reactor technologies
- Canadian Chairpersonship of Commission on Safety Standards
- Leads and participates in the IAEA advanced reactor initiatives, meetings, standards development, and peer reviews
- Participates in NEA advanced reactor working groups
- Collaborates with the US NRC and UK ONR under memoranda of cooperation
- Draft communique on NEA trilateral arrangement between Canada, the US and UK recently published



# Pre-licensing Engagement and Licensing Process Overview

## Pre-licensing Engagement (Optional)

No regulatory decision making

Potential applicant



Prepare application and submissions



Vendor leverages VDR results in discussions with potential applicant



- Feedback for reactor vendor(s)
- REGDOC-3.5.4, *Pre-licensing Review of a Vendor's Reactor Design*

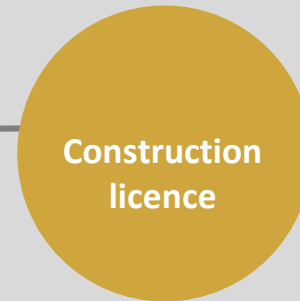
## Environmental Assessment

### Licensing Process

Transparent regulatory decision making



- REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities*



- REGDOC-1.1.2, *Licence Application Guide: Guide to Construct a Reactor Facility (under revision)*



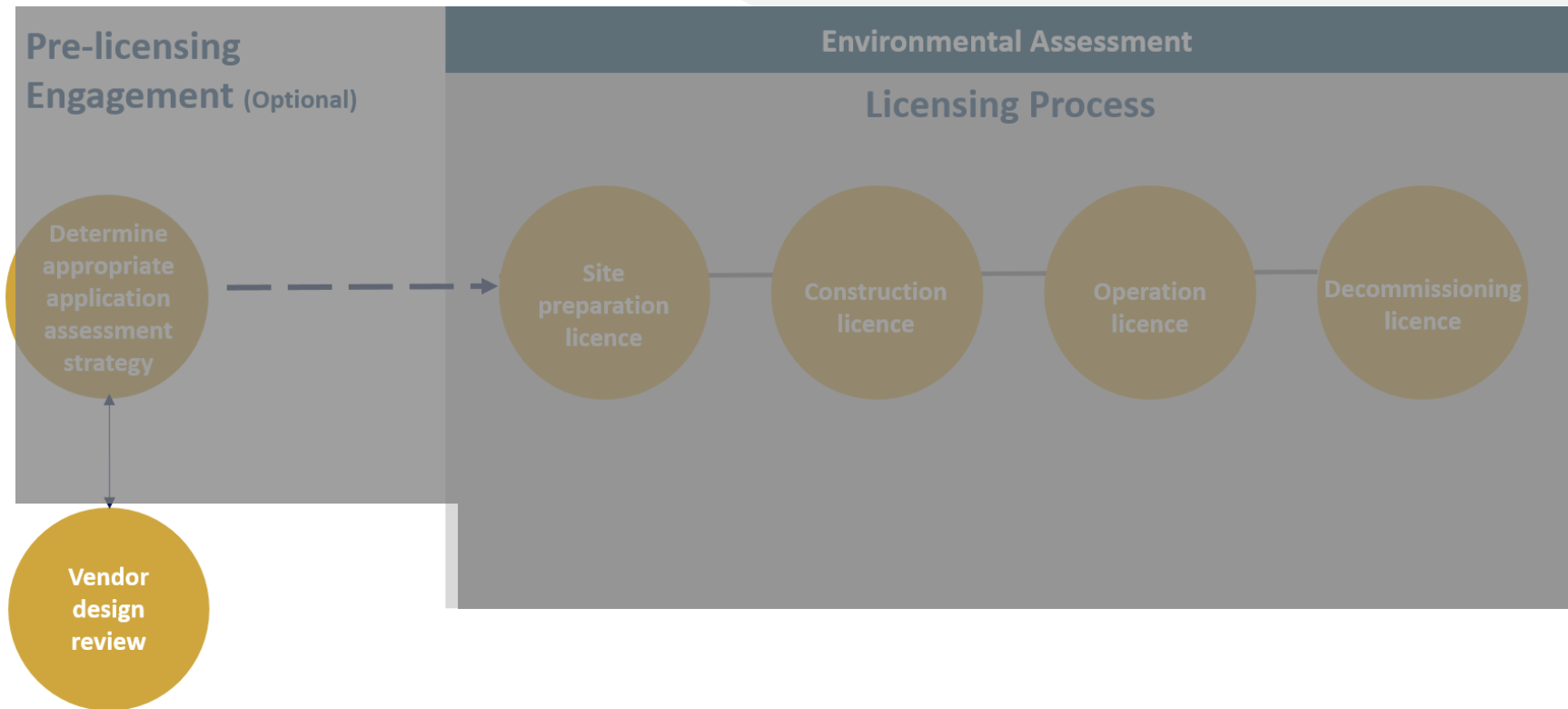
- REGDOC-1.1.3, *Licence Application Guide: Licence to Operate a Nuclear Power Plant*



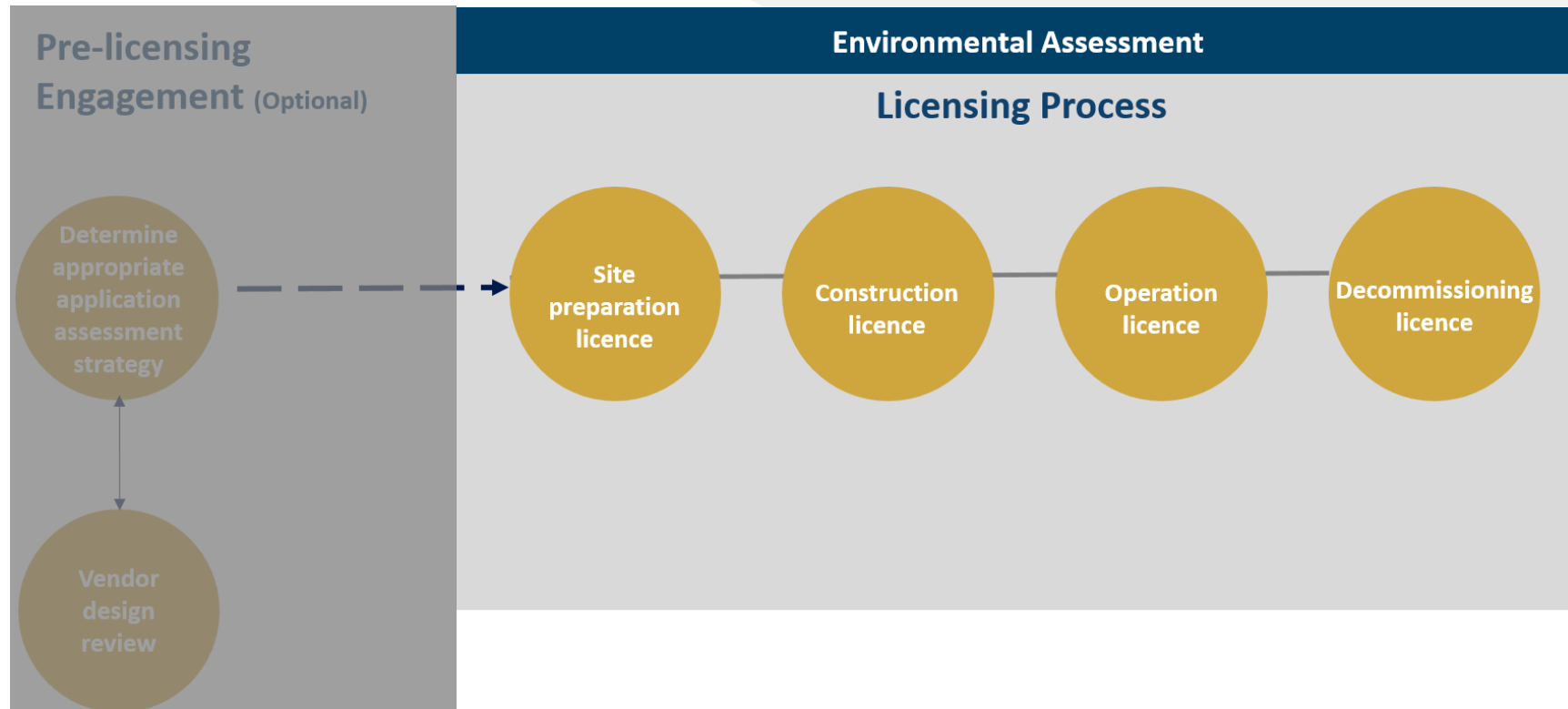
- REGDOC-2.11.2, *Decommissioning*

**REGDOC-1.1.5, *Supplemental Information for Small Modular Reactor Proponents***

# VENDOR DESIGN REVIEW

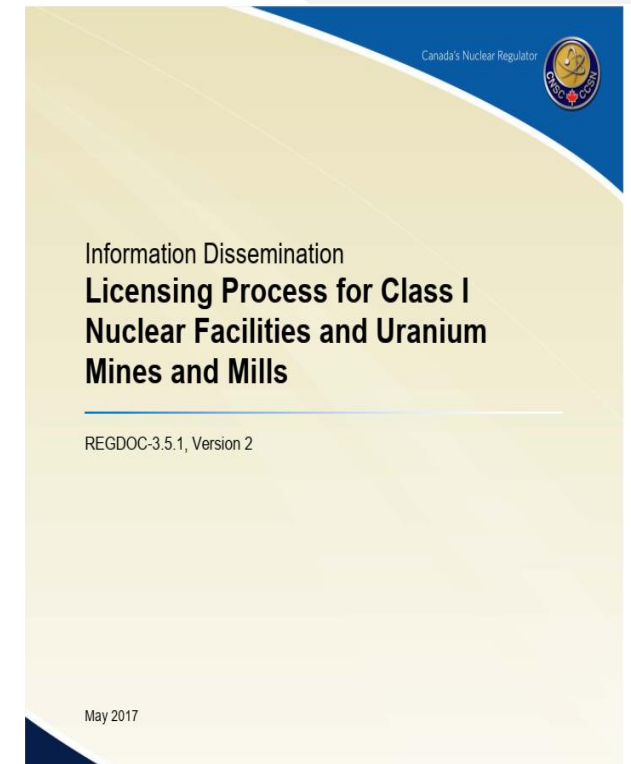


# LICENSING APPROACH FOR SMRS



# CNSC Licensing Approach

- The applicant submits info to meet requirements for each safety and control area; CNSC staff provide recommendations on licensing to the Commission
- The Commission is the decision maker and makes the decisions through a public hearing process
- It is the proponent's obligation to ensure a complete application submission
- The licensee has the primary responsibility for safety





# Safety and Control Areas

## Management

- Management systems
- Human performance management
- Operating performance

## Facility and equipment

- Safety analysis
- Physical design
- Fitness for service

## Core control processes

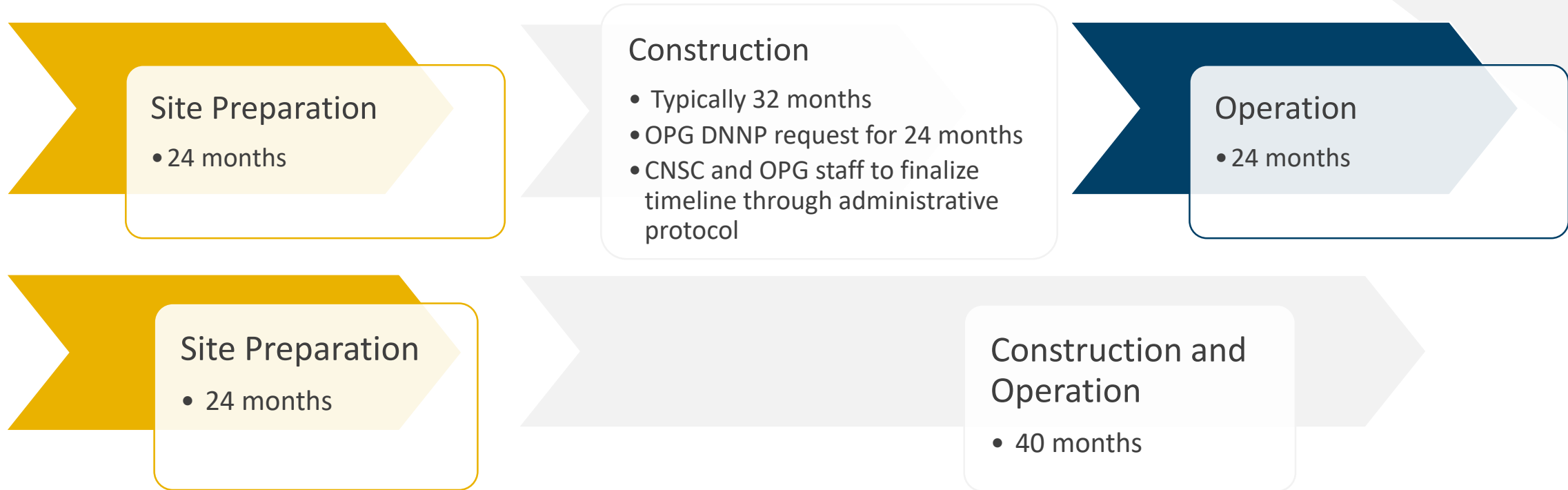
- Radiation protection
- Conventional health and safety
- Environmental protection
- Emergency management and fire protection
- Waste management
- Security
- Safeguards
- Packaging and transport

# CNSC Licensing vs Technology “Licenseability”

- The VDR process helps technology developers understand CNSC regulatory requirements
- VDR outputs identify any potential barriers to licensing – essentially the “licenseability” of the design
- The licensing process requires a licence application that includes sufficient information to demonstrate a reactor can be safely constructed, operated and decommissioned
- Submissions lacking sufficient details will cause delays
- Staff apply a graded approach to reviews and compliance verification throughout the lifecycle of nuclear facilities



# Licensing Process Timeline for Advanced Reactors



Agile full lifecycle licensing approach allows for combined licences and the use of hold points

# First of a Kind vs Nth of a Kind

- Technology developers have highlighted the benefit of modular construction and Nth of a kind reactor deployment
- CNSC's regulatory approach ensures lessons learned from first of a kind are implemented for future deployments or design improvements
- Review timeline may be significantly reduced if the design has been previously constructed and safely operated
- Other non-technical factors that must be considered include
  - engagement with Indigenous groups and the public
  - potential federal impact assessment and/or provincial environmental assessment
  - establishment of provincial emergency management capabilities for nuclear emergencies

# Conclusion

- The CNSC is ready to regulate SMRs, regardless of the technology selected
- Vendor design reviews provide CNSC staff important experience and knowledge regarding designs not present in Canada
- The CNSC's licensing process is clear, predictable, transparent and inclusive
- The timeliness of CNSC reviews is impacted by the quality and completeness of the information provided
- The CNSC is a modern, agile and flexible regulator, but will issue a licence only if the safety case is demonstrated



# JOIN THE CONVERSATION



[nuclearsafety.gc.ca](http://nuclearsafety.gc.ca)



# APPENDIX A: CANADIAN NUCLEAR SAFETY COMMISSION (CNSC) MANDATE

- Regulate the use of nuclear energy and materials to protect **health, safety, security** and the **environment**
- Implement Canada's **international commitments** on the peaceful use of nuclear energy
- Disseminate **objective** scientific, technical and regulatory **information** to the public



# APPENDIX B:

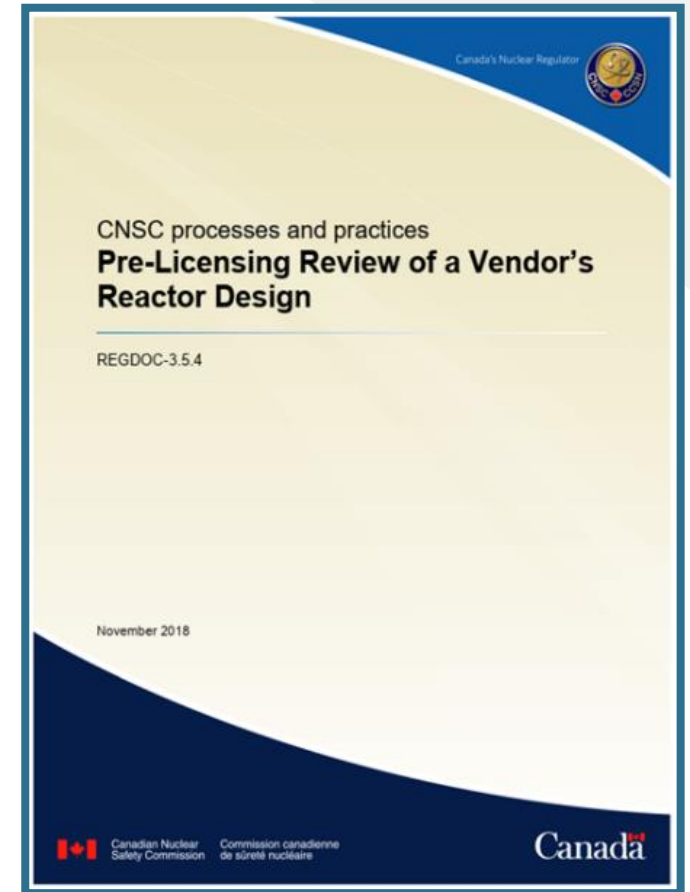
## Vendor Design Review Purpose

### Opportunity for vendors to

- verify understanding of Canadian requirements
- obtain early feedback from CNSC staff on how
  - Canadian requirements for design and safety analysis are being addressed
  - novel design features and approaches are being demonstrated

### Opportunity for CNSC staff to

- develop an understanding of both the vendor and its design concept
- anticipate regulatory challenges before a licensing process is triggered





# APPENDIX B (continued): Vendor Design Review Focus Areas

<b>1</b>	General plant description, defence in depth, safety goals and objectives, dose acceptance criteria	<b>11</b>	Pressure boundary design
<b>2</b>	Classification of structures, systems and components	<b>12</b>	Fire protection
<b>3</b>	Reactor core nuclear design	<b>13</b>	Radiation protection
<b>4</b>	Fuel design and qualification	<b>14</b>	Out-of-core criticality
<b>5</b>	Control system and facilities	<b>15</b>	Robustness, safeguards and security
<b>6</b>	Means of reactor shutdown	<b>16</b>	Vendor research and development program
<b>7</b>	Emergency core cooling and emergency heat removal systems	<b>17</b>	Management system of design process and quality assurance in design and safety analysis
<b>8</b>	Containment/confinement and safety-important civil structures	<b>18</b>	Human factors
<b>9</b>	Mitigation of design extension conditions	<b>19</b>	Incorporation of decommissioning in design considerations
<b>10</b>	Safety analysis (PSA, DSA, hazards)		

# APPENDIX B (continued): Vendor Design Review Process

- VDRs are carried out in 3 phases
  - *Phase 1*: determine whether the vendor's design and management system complies with the Canadian regulatory requirements
  - *Phase 2*: determine whether fundamental barriers to licensing exist, and whether any major, generic safety issues exist with the design
  - *Phase 3*: provide the vendor the opportunity to follow up with specific focus areas that have more scrutiny by the regulator
- Provides information that can be leveraged to inform licensing for a specific project – it is neither a design certification nor a licence
- No regulatory decisions are made