Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Issues and Challenges in Radiation Protection in Canada: A Status Update

Terry Jamieson
Vice-President, Technical Support Branch

2017 International ISOE ALARA Symposium
Ft. Lauderdale, U.S.

nuclearsafety.gc.ca

January 9, 2017

e-Doc: 5141391

CANADA 150

The Canadian Nuclear Safety Commission

- 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
- Disseminates objective scientific, technical and regulatory information to the public

We will never compromise safety

CNSC Regulates All Nuclear Facilities and Activities in Canada…

- Uranium mines and mills
- Uranium fuel fabrication and processing
- Nuclear power plants
- Nuclear substance processing
- Industrial and medical applications
- Nuclear research and educational activities
- Import and export controls
- Waste management facilities

Over the entire lifecycle

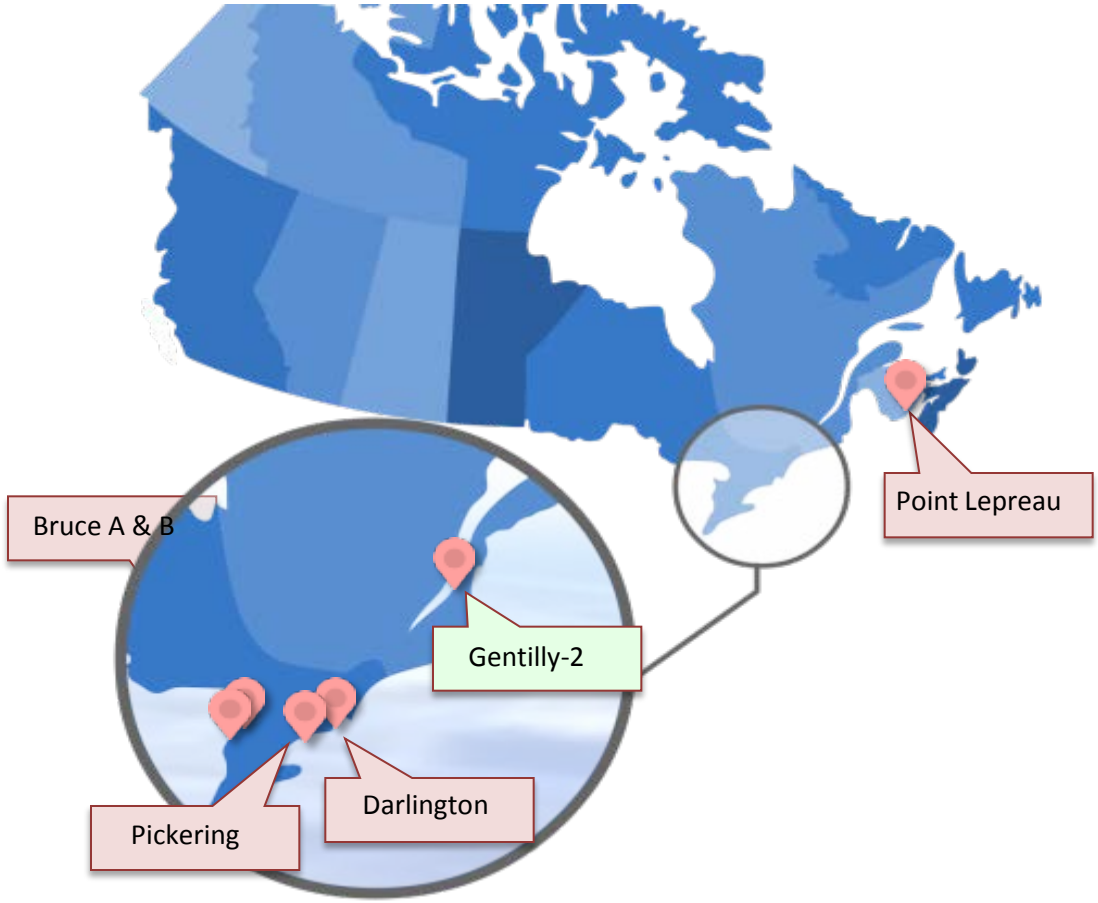
The Commission

- Quasi-judicial administrative tribunal
- Reports to Parliament through the Minister of Natural Resources
- Commission members are independent and part-time
- Commission hearings are public and webcast
- Staff presentations in public

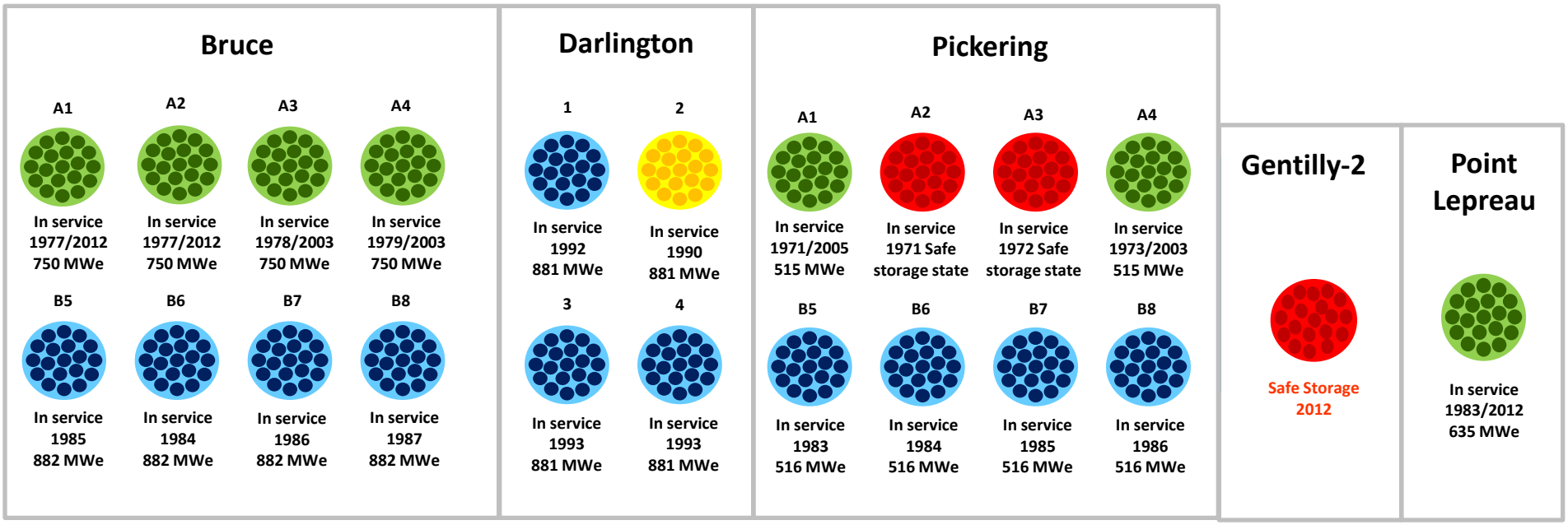
Transparent, science-based decision making

Canada's Nuclear Power Plants

- Four nuclear power plants (NPPs) with operating licences
  - 19 reactor units were operational in 2016
  - Darlington Unit 2 started refurbishment in October 2016
- Three reactor units in safe storage
  - Gentilly-2
  - Pickering units 2 and 3



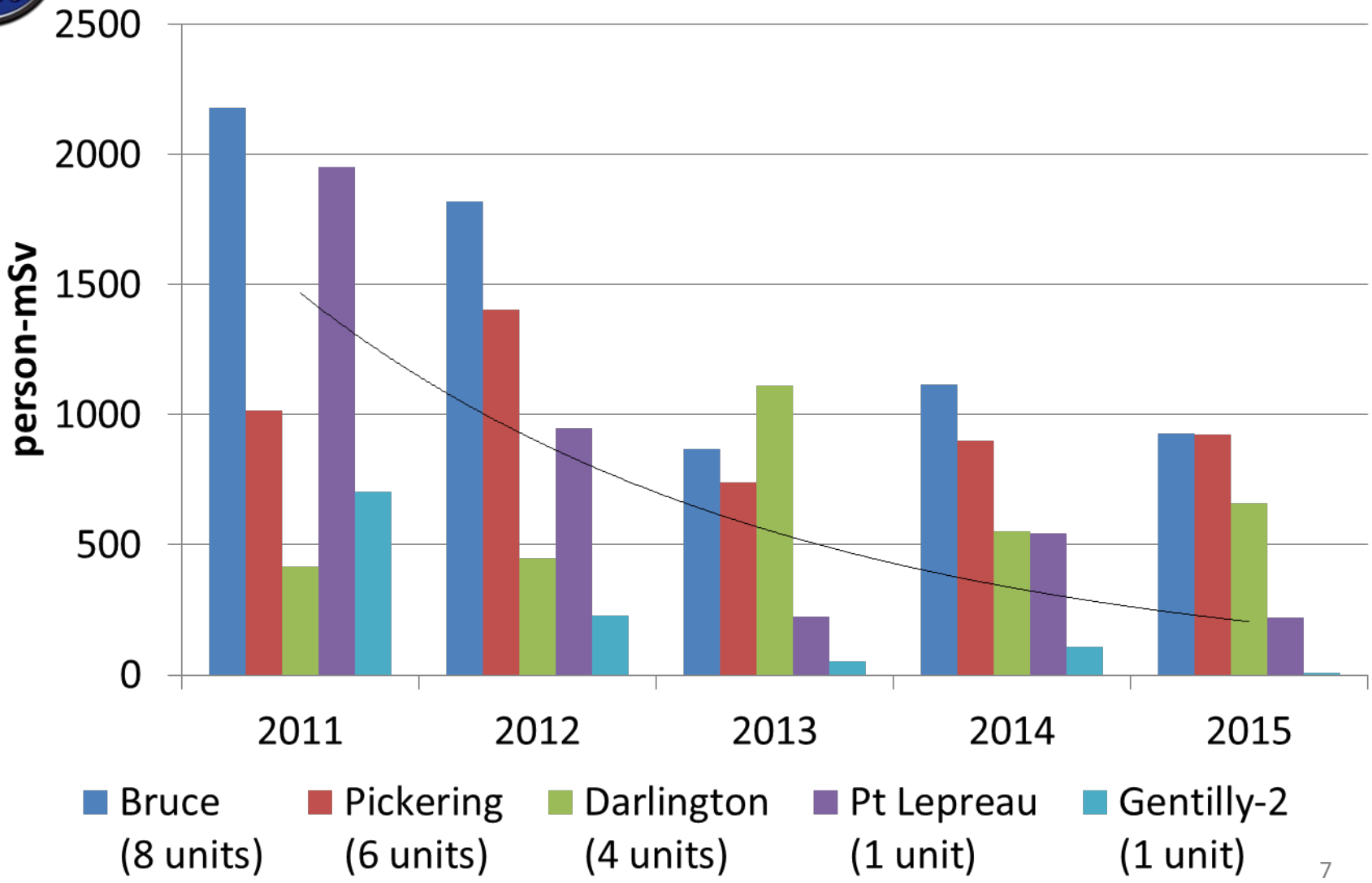
Status of Canadian NPPs



Operational status (average age – 25 years)

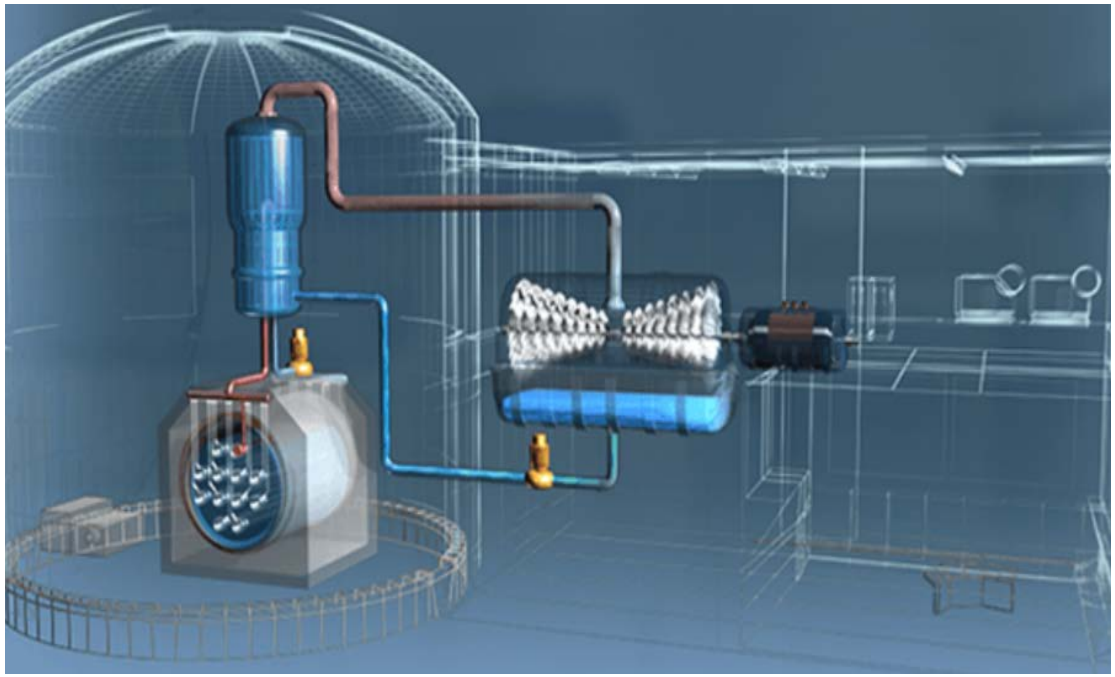
- In service within design life
- In service / Returned to service
- Safe storage state
- In refurbishment

Canadian NPPs
Collective Radiation Exposure



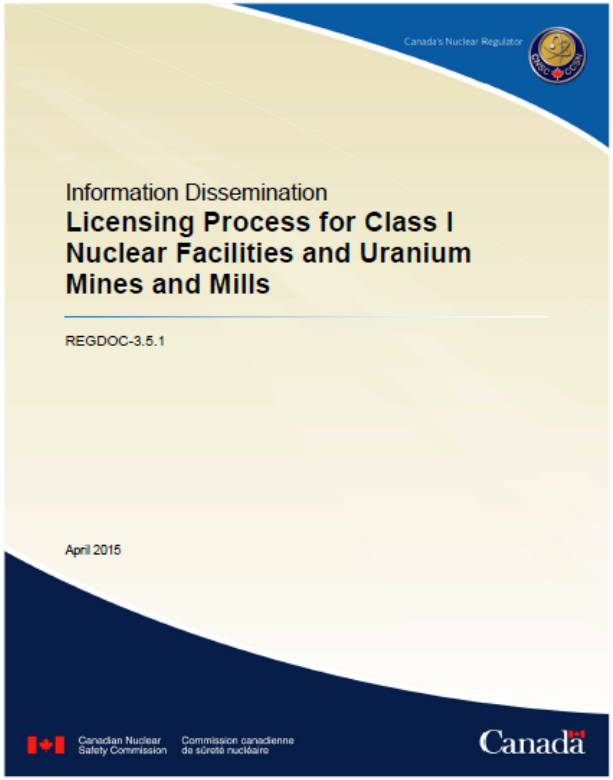
Refurbishment and Life Extension

- Darlington units 1-4
  - timeframe 2016–2025
- Bruce units 3-8
  - timeframe 2020–2033



Canadian Licensing Process

- Application
- Technical assessment
- Public hearing
- Deliberation and decision
- Licence to operate for a defined period of time, after which licensee must apply for a renewal



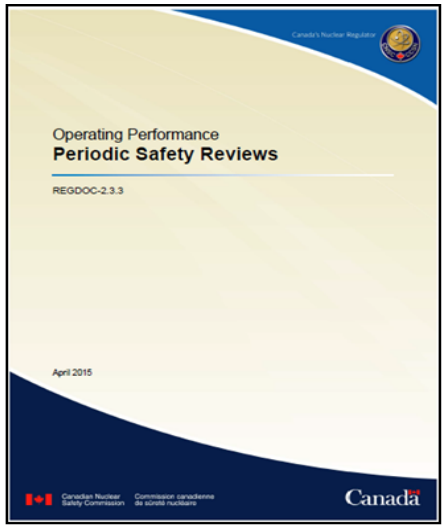
We will never compromise safety

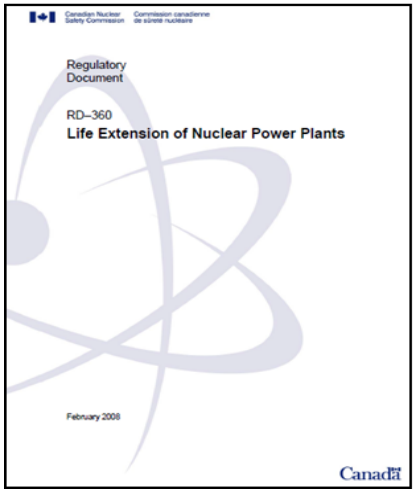
Technical Assessment

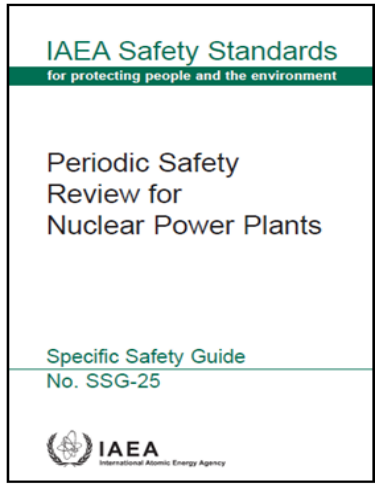
- Integrated safety review
  - regulatory requirements
  - international practices
  - modern codes and standards
  - environmental assessment

Periodic Safety Review

- CNSC regulatory document REGDOC-2.3.3, *Periodic Safety Reviews*
- IAEA SSG-25, *Periodic Safety Review For Nuclear Power Plants*







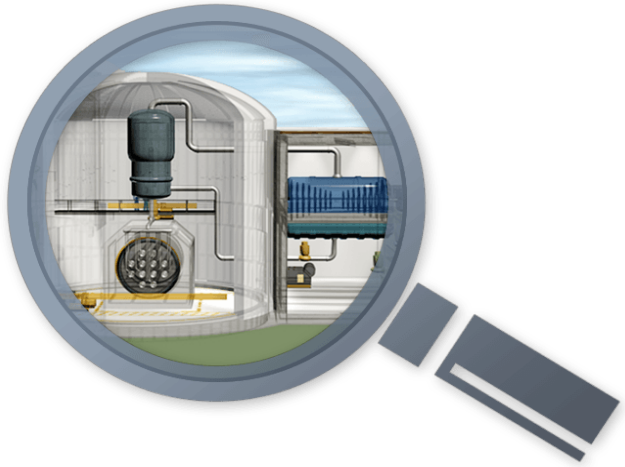
Consistent with international guidance

Project Execution

- Replace
  - pressure tubes
  - calandria tubes
  - feeders
  - in-core systems (e.g., flux detectors)
- Rehabilitate
  - fuel handling systems
  - steam turbines
  - electrical generators
  - balance of plant components

Regulatory Oversight

- Qualified staff verify that work is:



  - performed according to process/procedures
  - performed according to licence conditions
  - installed and commissioned according to design
  - done safely

Return to Service

- Refill PHT and moderator
- Reload fuel
- Regulatory hold points for restart
  - prior to fuel load
  - prior to removal of guaranteed shutdown state
  - prior to exceeding 1 percent full power
  - prior to exceeding 35 percent full power

Regulatory Experience (1)

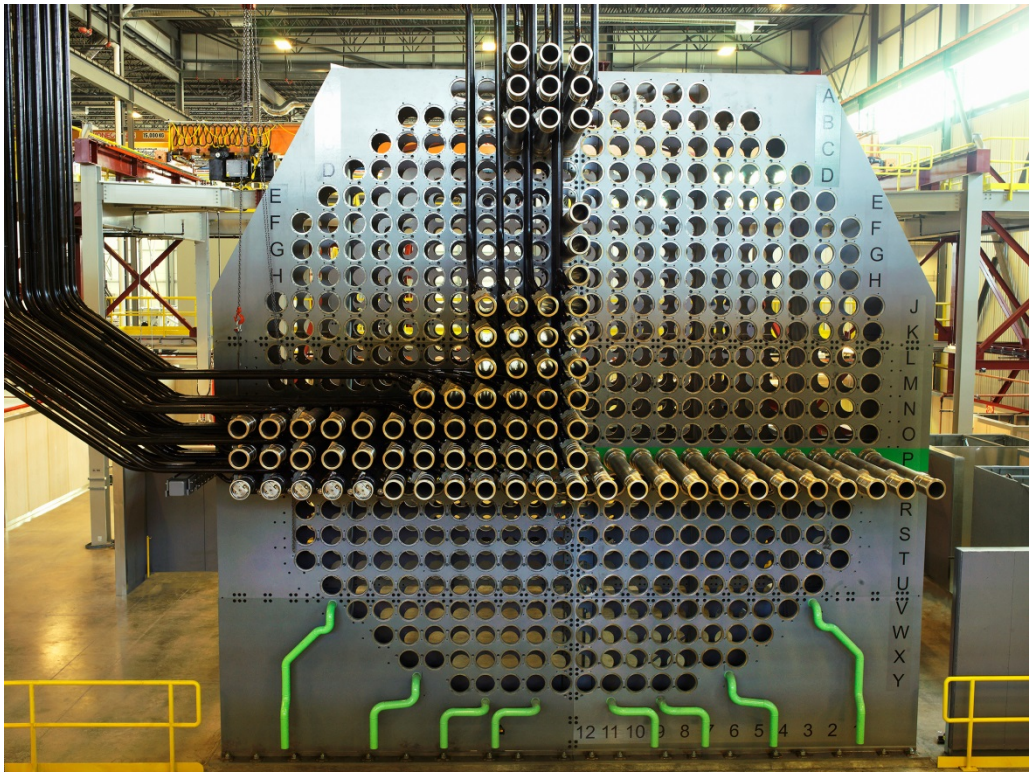
- Refurbishment is not new – both licensees and the CNSC have experience
  - Pickering units 1 and 4
  - Bruce units 1 and 2
  - Pt Lepreau
- CNSC generic project plan
  - Basis for managing regulatory oversight

Regulatory Experience (2)
CNSC Generic Project Plan - RP

- CNSC staff will verify that the licensee has:
  - identified radiological hazards
  - produced work plans and ALARA plans
  - performed ALARA reviews
  - monitored and controlled radiological hazards
  - prevented unplanned exposures
  - maintained doses ALARA

Regulatory Experience (3) Lessons Learned

- Mockups
- Contractor oversight and training
- Scope creep and rework
- Need for a questioning attitude



Canadian Involvement in ISOE

- Member since ISOE's inception (1992)
- CNSC staff have held active roles within the ISOE
  - Vice-Chair ISOE, Vice-Chair EG-SAM, Member WGDA, Member WGDECOM
- Canadian utilities have also accepted the responsibilities
  - Chair ISOE, Chair WGDA, Member WGDECOM

Questions?

Thank You!

Participate and Contribute!

CANADA 150

- Visit us online
- Like us on Facebook
- Follow us on Twitter
- View us on YouTube
- Subscribe to updates
- Contact us