



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

CNSC Response to Fukushima and Enhancements to the Regulatory Framework for the Protection of Workers

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Presentation Overview



- Overview of the Canadian Nuclear Safety Commission (CNSC)
- CNSC Response to Fukushima Daiichi Nuclear Accident
- Enhancements to the CNSC regulatory framework

Canadian Nuclear Safety Commission



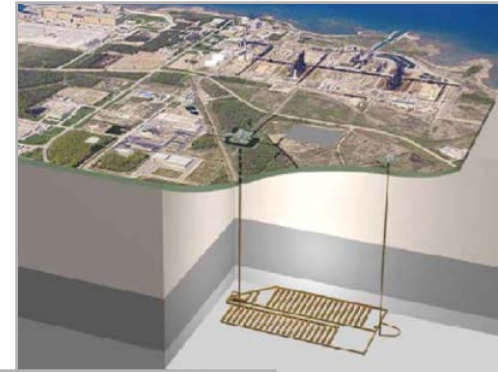
Regulates the use of nuclear energy and materials to protect **health, safety** and **security** and the **environment**, and to **implement** Canada's **international commitments** on the peaceful use of nuclear energy; and to disseminate **objective scientific, technical and regulatory information** to the public



The CNSC Regulates All Nuclear-Related Facilities and Activities



- Uranium mines and mills
- Uranium fuel fabricators and processing
- Nuclear power plants
- Waste management facilities
- Nuclear substance processing
- Industrial and medical applications
- Nuclear research and educational
- Export/import control



... from cradle to grave

CNSC Technical Support Branch (TSB)



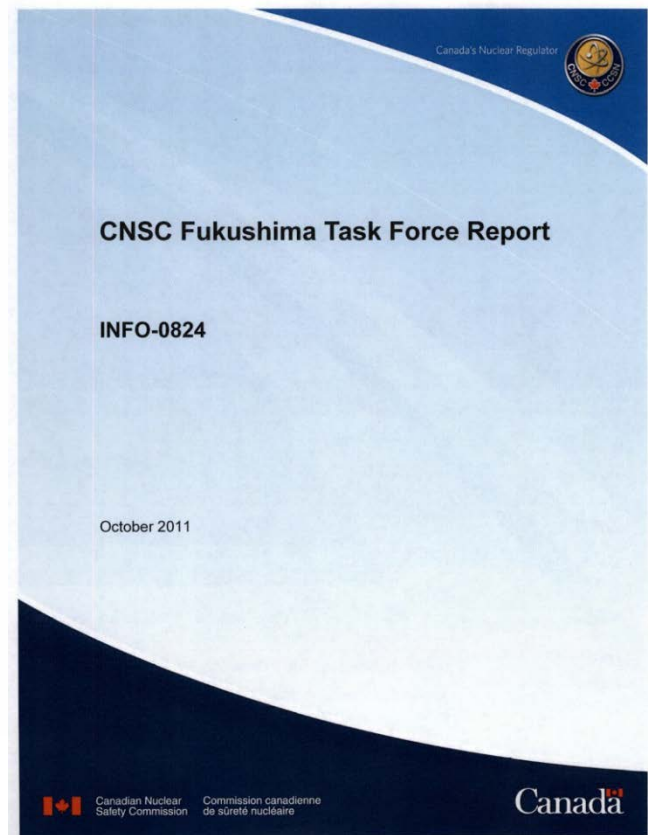
TSB supports the CNSC mission and mandate by providing leadership and specialized expertise in the areas of:

- nuclear science, engineering and safety analysis
- safety management, human factors, personnel training and certification
- environmental and radiation protection
- security, nuclear emergency management, safeguards, and nuclear non-proliferation

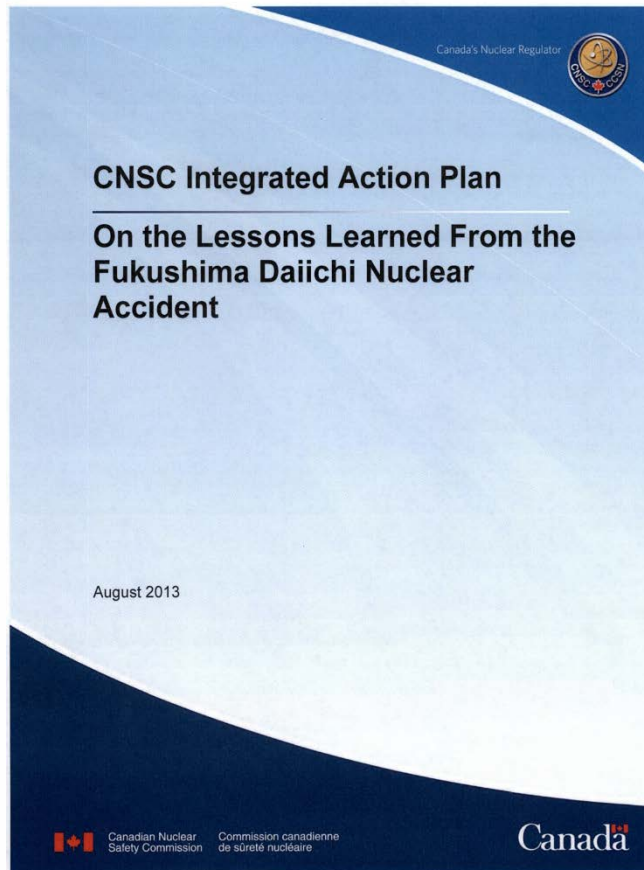
CNSC Response to Fukushima Accident



- Activated the Emergency Operations Centre in Ottawa and staffed it 24/7 to monitor the emergency
- Requested Canadian nuclear power plants (NPPs) to review lessons learned from the Fukushima accident
- Performed inspections of all NPPs and other nuclear facilities in Canada
- Established a multidisciplinary CNSC Fukushima Task Force



CNSC Response to Fukushima Accident (2)



- Established an integrated action plan to further strengthen the safety of NPPs and other major nuclear facilities
- Task Force Report and Action Plan were subject to several rounds of public consultation and two independent evaluations
- The Commission concluded that the CNSC response to the events in Fukushima was prompt, appropriate and comprehensive

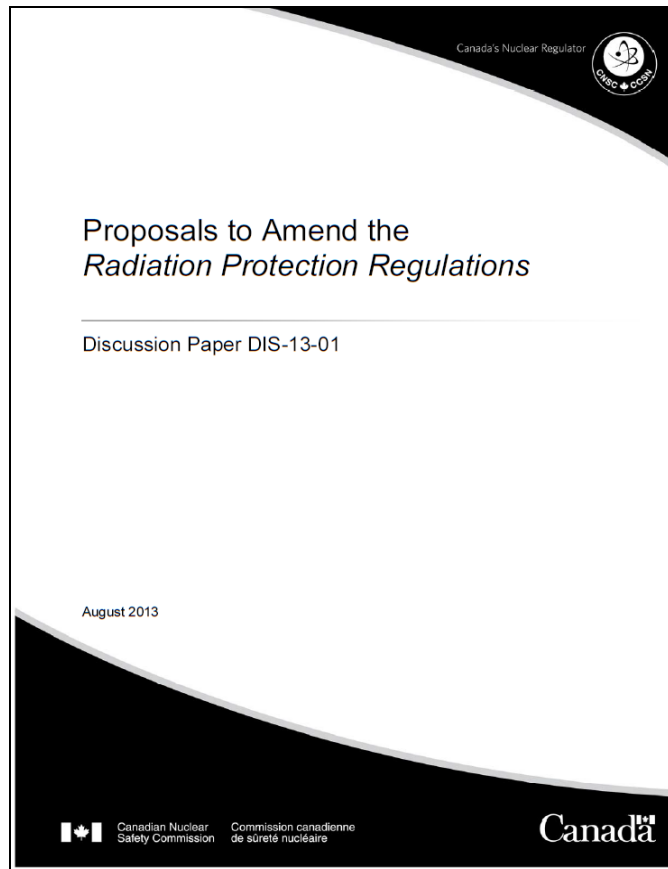
Enhancements to the CNSC Regulatory Framework



Enhancements to the CNSC regulatory framework for the protection of emergency workers, members of the public and the environment, include but are not limited to the following:

- amendments to the *Radiation Protection Regulations*
- strengthening Federal and Provincial nuclear emergency planning
- upgrading on-site emergency facilities and equipment
- updating probabilistic safety assessment (PSA) of NPPs
- evaluating the habitability of control facilities under severe accident conditions
- implementation of severe accident management guidelines (SAMG) at Canadian NPPs

Amendments to the Radiation Protection Regulations (RPRs)



- [DIS-13-01](#) was published on the CNSC website in August 2013 for a 120-day public consultation period
- Proposed revisions include changes to strengthen requirements with respect to nuclear emergencies
- Approximately 380 comments from stakeholders were received

Key Comments from Stakeholders



Section 15 – Emergencies

- Reduction of the current effective dose limit of 500 mSv during the control of an emergency to 50 mSv
- Addition of new specific dose limits for undertaking emergency tasks based on international benchmarking

| Task | Effective dose | Skin dose |
|------|----------------|-----------|
| 1 | 500 mSv | 5000 mSv |
| 2 | 100 mSv | 1000 mSv |

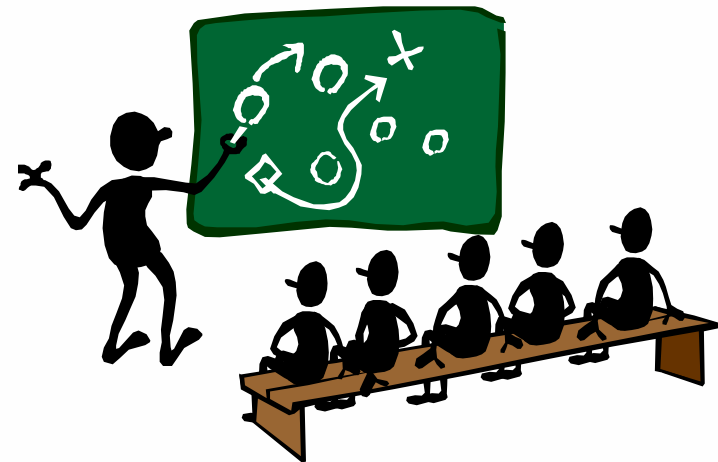
- General stakeholder support for the proposed change
- Need to define 'emergency'

Key Comments from Stakeholders (2)



Section 7 - Provision of Information

Addition of a requirement for licensees to provide information to workers of their responsibilities in the event of an emergency



Questions on the scope of the requirement to inform all workers, including off-site organizations, of their duties during an emergency

Strengthening Federal and Provincial Nuclear Emergency Planning



- Establishment of a formal, transparent, national-level oversight process for off-site nuclear emergency plans, programs and performance
- Scheduling of regularly planned full-scale exercises
- Integrated emergency plans were assessed at the federal, provincial and municipal levels during the following full scale emergency exercises:
 - Exercise “Intrepid” at Point Lepreau (2012)
 - Exercise “Huron Challenge” at Bruce (2013)
 - Exercise “Unified Response” at Darlington (May 2014)

Update On-site Emergency Facilities and Equipment at Canadian NPPs



- Design improvements implemented or planned:
 - Emergency Filtered Venting System (EFVS) for containment
 - Diversifying coolant make-up capabilities to be used in SAMG
- Update of onsite emergency facilities and equipment
 - Backup power for emergency facilities and equipment
 - Emergency Filtered Air Systems (EFADs)
 - Hydrogen Passive Autocatalytic Recombiners (PARs)
 - Automated real-time station boundary radiation monitoring systems with appropriate backup power and communications systems
- Formalizing all arrangements and agreements for external support

Upgrading Probabilistic Safety Assessment of NPPs



- Amendment of Regulatory Standard S-294 to REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*
- Updating PSA of NPPs to take credit of the Fukushima driven enhancements (emergency mitigating equipment)
- Development of whole-site PSA for multi-unit impacts

Habitability of Control Facilities



- Evaluation of habitability of control facilities under conditions arising from beyond-design-basis accident and severe accident
- CNSC expectations include, where required, strengthening radiation shielding and protection against airborne radioactivity in control facilities to ensure that doses are kept as low as reasonably achievable (ALARA) to the extent practicable
- Habitability assessments are expected to be completed, including detailed plans and schedules for upgrades, by the end of 2014

Implementation of Severe Accident Management Guidelines (SAMG)



- SAMG were developed by building on the existing structure of emergency operating procedures taking into consideration international experience
- SAMG have been fully implemented at all plants including the development of procedural guidance for workers, specific training and appropriate drills
- Canadian NPPs have carried out validation drills and table top exercises of SAMG

Conclusions



- CNSC Task Force concluded that Canadian NPPs are safe and that the risk posed to the health and safety of Canadians and the environment is small
- CNSC staff have verified that all Canadian NPPs are located far from tectonic plate boundaries and that the threat of a major earthquake at a Canadian NPP is negligible
- CNSC Task Force is confident that the improvements implemented or to be completed by 2015 will further enhance the safety of nuclear power in Canada and will reduce the associated risk to as low as reasonably practicable



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