



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Canada



USE OF IAEA SAFETY STANDARDS IN CANADA

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INTRODUCTION



- Canadian Nuclear Safety Commission
- Canadian Regulatory Framework
- CNSC support for IAEA Safety Standards program
- CNSC regulatory documents that reference IAEA Safety Standards
- CSA National Consensus Standards
- Conclusions/Challenges



OUR 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.

OVER 70 YEARS OF REGULATORY EXPERIENCE



SAFETY – THE CORNERSTONE OF THE CNSC MANDATE



Section 24(4) of the Nuclear Safety and Control Act (NSCA)

No licence shall be issued, renewed, amended or replaced... unless, in the opinion of the Commission, the applicant...

- (a)** is qualified to carry on the activity that the licence will authorize the licensee to carry on; and
- (b)** will, in carrying on that activity, make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed

3-S REGULATOR – SAFETY, SECURITY, SAFEGUARDS



INDEPENDENT COMMISSION



Ms. Rumina Velshi
President and CEO



Dr. Sandor Demeter



Ms. Kathy Penney



Dr. Marcel Lacroix



Mr. Timothy Berube

Quasi-judicial administrative tribunal
Agent of the Crown (duty to consult)

Reports to Parliament through Minister of Natural Resources

Commission members are independent and part time

Commission hearings are public and webcast

Decisions are reviewable by Federal Court

TRANSPARENT, SCIENCE-BASED DECISION MAKING



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



Transportation of nuclear substances



Nuclear security and safeguards



Import and export controls



Waste management facilities



CNSC REGULATORY FRAMEWORK



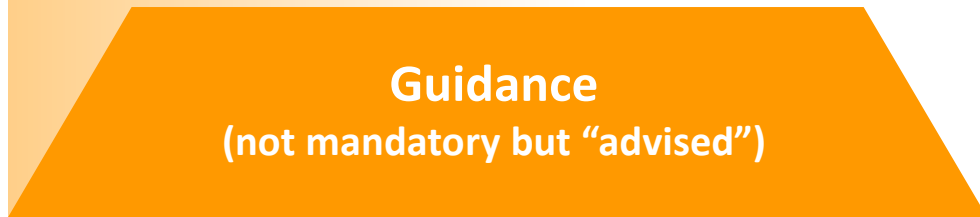
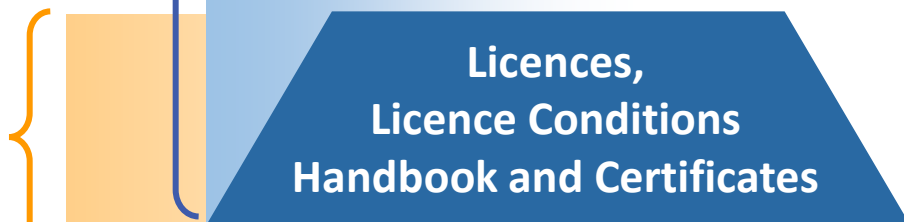
Enabling legislation



Requirements
“must meet”



Regulatory documents
(REGDOCs)



Example regulation:
Class 1 Nuclear Facilities Regulation § 4(e):
“...the effects on the environment and the health and safety of persons that may result from the activity to be licensed, and the measures that will be taken to prevent or mitigate those effects.”

Requirements language:
“shall”, “must”

Guidance language:
“should”, “may”, “can”, or passive voice in the case of disseminating info for context in the document



CNSC LICENSING AND COMPLIANCE (1)



Management System
Human Performance Management
Operating Performance
Safety Analysis
Physical Design
Fitness for Service
Radiation Protection
Conventional Health and Safety
Environmental Protection
Emergency Management and Fire Protection
Waste Management
Security
Safeguards and Non-Proliferation
Packaging and Transport



FOURTEEN SAFETY AND CONTROL AREAS



CNSC LICENSING AND COMPLIANCE (2)



- Licences are issued by the Commission (or a Designated Officer)
 - define how the licensee is to conduct the authorized activity
- Licences comprise:
 - requirements set out in applicable laws and regulations
 - the safety and control measures described in the licence application and documents needed to support the application – this forms the licensing basis
- Licence Conditions Handbook clarifies the regulatory requirements and other relevant parts of the licensing basis for each licence condition



CANADIAN REGULATORY FRAMEWORK (1)



- Balances prescriptive and performance-based requirements
- Applicant/Licensee **proposes** how to **meet the requirements** of the regulations under the *Nuclear Safety and Control Act*
 - based on REGDOCs and applicable Canadian Codes and Standards
- REGDOCs provide clarity for the applicant through compliance verification criteria and guidance



- REGDOCs consider best regulatory practices from other countries and international standards, such as IAEA
 - used in a manner consistent with the CNSC’s overall regulatory approach
- The CNSC has based many of its REGDOCs on IAEA Safety Standards and will continue to do so as they are revised
- CSA nuclear standards are also influenced by IAEA Safety Standards
 - being integrated into the CNSC Regulatory Framework
 - available via the CNSC website
 - <http://www.nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/csa-standards.cfm>



- Where applicable, the CNSC relies on IAEA Safety Standards in developing its regulatory framework
 - as core components of new draft documents
 - as best practice when updating current documents
 - REGDOCs are reviewed at least every five years
- Key benefits to this approach
 - reflects state-of the-art knowledge
 - accounts for most recent international OPEX
 - is technology neutral



CNSC SUPPORT FOR IAEA SAFETY STANDARDS PROGRAM



- Provides representatives for four Safety Standard Committees (SSC) and an alternate for a fifth:
 1. **Nuclear Safety Standards Committee (NUSSC):** [Phil Webster \(Chair\)](#)
 2. **Radiation Safety Standards Committee (RASSC):** [Caroline Purvis](#)
 3. **Transport Safety Standards Committee (TRANSSC):** [Karen Owen-Whitred](#)
 4. **Waste Safety Standards Committee (WASSC):** [Shirley Oue](#)
 5. **Emergency Preparedness and Response Standards Committee (EPreSC):** Health Canada ([Christopher Cole alternate](#))
- Facilitates National Stakeholder reviews of draft IAEA Safety Standards
 - recently implemented a new process across all SSCs/NSGC (Nuclear Security Guidance Committee)
 - process improves clarity and consistency of Canadian submissions
- The CNSC is a major contributor to the International Nuclear Terminology Repository Platform – INTERP project



CNSC REGDOCS THAT REFERENCE IAEA SAFETY STANDARDS



- Extensive use has been made of IAEA Safety Standards in REGDOCs including Security - REGDOCs
- Many have been issued since last Commission on Safety Standards (CSS) update by the CNSC
- Several more are in preparation
- Five-year review cycle is planned for REGDOCs
- Breakdown by Safety Standard Committee (SSC) and Nuclear Security Guidance (NSG) to follow



CNSC USE OF EMERGENCY PREPAREDNESS AND RESPONSE STANDARDS



CNSC Regulatory Framework for Nuclear Emergency Preparedness and Response

- Emergency Preparedness and Response Regulatory Requirements are currently patterned after:
 - *IAEA General Safety Requirements (GSR) Part 7*
 - *IAEA GSR Part 3*
 - *Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series GS-R-2, Vienna, 2002*
 - *Arrangements for Preparedness for a Nuclear or Radiological Emergency, IAEA Safety Standards Series GS-G-2.1, Vienna, 2007*
 - *Preparation, Conduct and Evaluation of Exercises to Test Preparedness for a Nuclear or Radiological Emergency, EPR-Exercise, Vienna, 2005*
- CNSC Emergency Preparedness and Response Regulatory Requirements also align with CSA N1600-16, *General requirements for nuclear emergency management programs*
- Regulatory guidance for a framework for recovery after a nuclear emergency under development



CNSC USE OF NUCLEAR SAFETY STANDARDS (1)



REGDOC #	Title	Safety Standards Referenced
1.1.1	<i>Site Evaluation and Site Preparation for New Reactor Facilities</i>	NS-R-1, -3, GSR Part 2, GS-R-2, NS-G.3.2, SSG-9, SSG-21, NS-G-1.5, -3.1, -3.6, SSG-18, GS-G-3.1, -3.5, WS-G-2.3
1.1.3	<i>Licence Application Guide: Licence to Operate a Nuclear Power Plant</i>	SSG-3, SSG-4
2.1.2	<i>Safety Culture</i>	SF-1, GSR Part 1, GSR Part 2, GS-G-3.5, NS-G-2.4
2.2.4	<i>Fitness for Duty, Volume II : Managing Alcohol and Drug Use</i>	GSR Part 1, NS-R-2, GS-G-1.2, -1.3, NS-G-2.4, -2.8
2.3.1	<i>Conduct of Licensed Activities: Construction and Commissioning Programs</i>	SSG-28, SSR-2/2, GS-R-2, -3, GS-G-3.1, -3.5, NS-G-2.2, GS-G-2.1



CNSC USE OF NUCLEAR SAFETY STANDARDS (2)



REGDOC #	Title	Safety Standards Referenced
2.3.3	<i>Periodic Safety Reviews</i>	SF-1, SSG-25, NS-G-2.6, -2.12
2.4.1	<i>Deterministic Safety Analysis</i>	NS-R-4, SSG-2, GSR Part 4
2.4.2	<i>Probabilistic Safety Assessment for Nuclear Power Plants</i>	SSG-3, SSG-4
2.5.2	<i>Design of Reactor Facilities: Nuclear Power Plants</i>	SSR-2/1, SSR-2/2, SSG-2, -3, -4, -9, -18, NS-G-1.1, -1.2, -1.3, -1.4, -1.5, -1.6, -1.7, -1.8, -1.9, -1.10, -1.11, -1.12, -1.13, NS-G-2.1, -2.2, -2.5, -2.6, -2.9, -2.11, -2.15, NS-G-3.1, -3.3, -3.4, -3.5, GS-R-2, -3, GS-G-3.3, -3.5, RS-G-1.1, WS-G-2.1



CNSC USE OF NUCLEAR SAFETY STANDARDS (3)



REGDOC #	Title	Safety Standards Referenced
2.6.2	<i>Maintenance Programs for Nuclear Power Plants</i>	NS-R-2, NS-G-2.6
2.6.3	<i>Fitness for Service: Aging Management</i>	NS-R-1, NS-R-2, NS-G-2.4, NS-G-2.6
3.5.3	<i>Regulatory Fundamentals</i>	SF-1

REGDOCs under development

2.4.3	<i>Nuclear Criticality Safety</i>	NS-R-5, GS-R-2, SSR-6, SSG-6, SSG-26
2.1.1	<i>Management System</i>	GSR Part 2



CNSC Regulatory Framework for Radiation Protection

- *Radiation Protection Regulations*
 - currently patterned after *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, GSR Part 3 (1996)*
 - amended in 2017 to align with *Preparedness and Response for a Nuclear or Radiological Emergency, GSR Part 7 (2015)* for the protection of persons involved in the control of an emergency
 - further amendments currently ongoing to align with *GSR Part 3 (2014)*
 - supported by two CNSC REGDOCs currently under development:
 - REGDOC-2.7.1, *Radiation Protection*
 - REGDOC-2.7.2, *Dosimetry, Volume I: Ascertaining Occupational Dose*



Packaging and Transport of Nuclear Substances Regulations, 2015 (PTNSR 2015)

- Based on requirements set out in IAEA *Regulations for the Safe Transport of Radioactive Material, SSR-6*
- Automatically incorporates new versions of SSR-6 (within a specified timeframe) to allow easier and faster transition to new editions of the IAEA regulations
 - SSR-6 2012 Edition is currently enforced in Canada
 - SSR-6 2018 Edition should come into effect in 2020 in Canada
- Linkages between PTNSR 2015 and SSR-6 laid out in CNSC REGDOC-2.14.1, *Information Incorporated by Reference in Canada's Packaging and Transport of Nuclear Substances Regulations, 2015*



CNSC USE OF WASTE SAFETY STANDARDS



REGDOC #	Title	Safety Standards Referenced or Influenced By
1.2.1	<i>Guidance on Deep Geological Repository Site Characterization</i>	SSR-5, SSG-14
1.1.4	<i>Licence Application Guide: Licence to Decommission Reactor Facilities</i>	GSR-6
2.11	<i>Waste Management: Oversight of Canada’s Framework for Radioactive Waste Management</i>	GSR-5, GSG-1, SSR-5, GSR-6
2.11.1 Volume I	<i>Waste Management: Management of Radioactive Waste</i>	GSR-5, GSG-1, SSG-40, SSG-41, WS-G-6.1, SSR-5, SSG-15, SSG-29, SSG-31, SSG-14
2.11.1 Volume II	<i>Waste Management: Assessing the Long-term Safety of Radioactive Waste Management</i>	GSR-5, SSR-5, SSG-23, GSG-3
2.11.1 Volume III	<i>Waste Management: Management of Uranium Mine Waste Rock and Mill Tailings</i>	WS-G-1.2, NF-T-1.2
2.11.2	<i>Decommissioning Planning</i>	GSR-6, GSR-4, WS.G-2.4, WS-G-2.1, WS-G-5.2
3.3.1	<i>Financial Guarantee for Decommissioning of Nuclear Facilities and Termination of Licensed Activities</i>	GSR-6



CSA NUCLEAR STANDARDS INFORMED BY IAEA SAFETY STANDARDS



CSA Nuclear Standards often cited in CNSC REGDOCs

- Published CSA Standards listed on REGDOCs page of the CNSC website
 - N1600, *General requirements for nuclear emergency management programs*
 - N286, *Management system requirements for nuclear facilities*
 - N286.7, *Quality assurance of analytical, scientific, and design computer programs*
 - N289.1, *General requirements for seismic design and qualification of nuclear power plants*
 - N290.17, *Probabilistic safety assessment for nuclear power plants*
- See also N292.0 to N292.6 on *Management of Radioactive Waste and Irradiated Fuel*



CNSC Regulatory Framework for Security:

- *Nuclear Security Regulations* are based on IAEA Nuclear Security Series NSS 20 Nuclear Security Fundamentals and Recommendations, No. 13, 14, and 15
 - IAEA NSS No. 20 - *Objectives and Essential Elements of a State's Nuclear Security Regime*
 - IAEA NSS No. 13 - *Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities* (INFCIRC/225/Revision 5)
 - IAEA NSS No. 14 - *Nuclear Security Recommendations on Radioactive Material and Associated Facilities*
 - IAEA NSS No. 15 - *Nuclear Security Recommendations on Nuclear and Other Radioactive Material out of Regulatory Control*

Nuclear Security Regulations and REGDOCs align with Implementing Guides and Technical Guidance

- Also align with CSA N290.7, *Cyber-security for nuclear power plants and small reactor facilities*



SECURITY GUIDANCE REFERENCED IN CNSC REGDOCS



REGDOC #	Title	References
2.12.1	<i>High Security Facilities, Volume I: Nuclear Response Force, Version 2</i>	Nuclear Security Series No. 7 – Nuclear Security Culture
2.12.1	<i>High-Security Facilities, Volume II: Criteria for Nuclear Security Systems and Devices</i>	Nuclear Security Series No. 7 – Nuclear Security Culture
2.12.2	<i>Site Access Security Clearance</i>	Nuclear Security Series No. 8 – Preventive and Protective Measures against Insider Threats
2.12.3	<i>Security of Nuclear Substances: Sealed Sources and Category I, II, and III Nuclear Material, version 2</i>	Safety Guide No. RS-G-1.9, SSR-6, Nuclear Security Series No. 7 – Nuclear Security Culture Nuclear Security Series No. 14 Recommendations on Radioactive Material and Associated Facilities



CONCLUSIONS/CHALLENGES (1)



- IAEA Safety Standards are seen as “de facto” international regulations
- New Roadmap for Safety Requirements was well thought out
 - will be complete when SSR-1 is approved by Board of Governors
- Five Safety Requirements were revised by amendment to clarify certain elements post-Fukushima Daiichi
- Challenge now is to revise the Safety Guides accordingly
 - better program management is needed
 - documents could move through the process faster
 - clearer look-ahead of timelines would help the SSCs to make decisions
 - ways to streamline the Strategies and Processes for the Establishment of IAEA Safety Standards (SPESS) for revisions should be sought



CONCLUSIONS/CHALLENGES (2)



- Safety Standards should be based on science
 - not the personal opinion of the Technical Officer
- Interface with Security remains to be resolved
 - consultation across Review Committees is working well for now
 - interface Committee reviews draft Document Preparation Profiles
 - example of Canadian security REGDOCs provided in this presentation



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