



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Canadian Regulatory Perspective - ICRP-103 Recommendations



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Outline



- Introduction to the CNSC
- CNSC Regulatory Framework
- Current Radiation Protection Regulation
- ICRP-103 Recommendations
 - How does Canada compare?
- CNSC Path Forward

CNSC - Background and History



- In 1946, the Atomic Energy Control Act created the Atomic Energy Control Board (AECB)
- On May 31, 2000, the Nuclear Safety and Control Act (NSCA) came into force, modernizing Canada's nuclear regulatory regime, and replacing the AECB with the Canadian Nuclear Safety Commission (CNSC)
- The CNSC's responsibilities are broadened relative to those of the AECB, reflecting changes in the nuclear industry since 1946.

CNSC: Our Mission



To protect the health, safety, security, and the environment; and to respect Canada's international commitments on the peaceful use of nuclear energy.

CNSC: Regulatory Philosophy



- **Licensees are responsible** for the protection of health, safety, security, and the environment and respecting Canada's international commitments.
- **The CNSC is responsible** for regulating licensees, assessing whether licensees are compliant with NSCA, regulations, and international obligations.

CNSC: Regulatory Scope



- The CNSC licenses approximately 2,050 licensees, with approximately 3,300 licences
- Licences are issued for many types of facilities and activities:
 - Nuclear power plants
 - Uranium fuel fabricators
 - Uranium mines & mills
 - Nuclear substance processing
 - Industrial nuclear substance users, such as industrial radiographers
 - Hospitals and universities
 - Research and test facilities
 - Importers/exporters of nuclear-related dual-use equipment
 - Waste management facilities
 - Dosimetry Services

CNSC: Regulatory Framework



- **NSCA & regulations** set general limits, restrictions, and obligations
- **Licences** set activity and site specific requirements
- **Regulatory Standards** can be referenced in licences to provide specific requirements
- **Regulatory Guides** are not legally binding, but provide guidance to licensees on how to meet requirements

Regulatory Framework: Nuclear Safety and Control Act



- Establishes the CNSC, its mandate and powers
- Prohibits certain activities without a licence
- Establishes the powers of Inspectors and Designated Officers
- Sets out offences and punishments

Regulatory Framework: Regulations

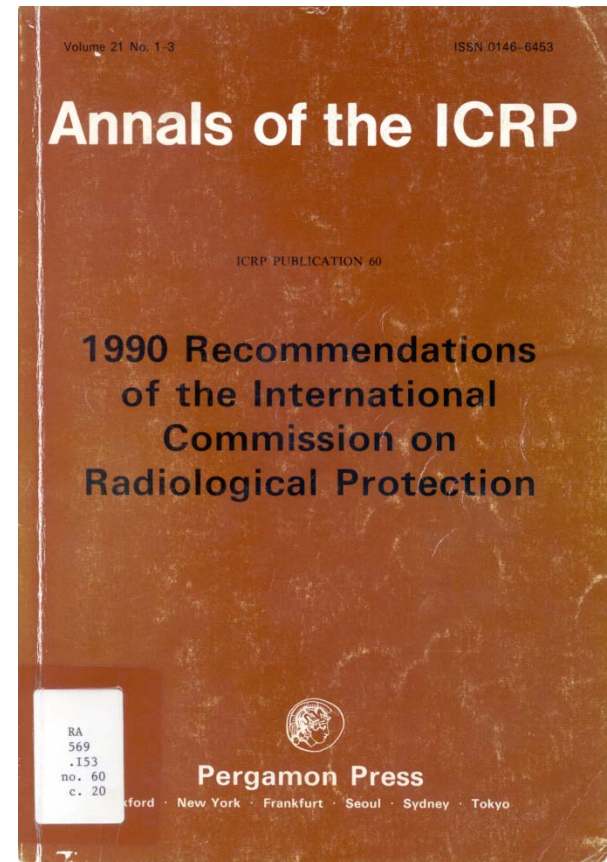


- General Regulations
- Uranium Mines and Mills
- Class I Nuclear Facilities
- Class II Nuclear Facilities and Prescribed Equipment
- Nuclear Substances and Radiation Devices
- Packaging and Transport of Nuclear Substances
- Radiation Protection
- Nuclear Security Regulations
- Nuclear Non-Proliferation Import and Export Control

Current Radiation Protection Regulations: Basis



- Based on ICRP-60 and the IAEA's Basic Safety Standards (BSS)
- Developed in parallel with the BSS
- Essentially follows both ICRP-60 and BSS with two exceptions:
 - Pregnant worker dose limits
 - Exemption quantities



Radiation Protection Regulation: Basis (Pregnant Worker Dose Limits)



- Originally proposed the ICRP 60 dose limit of 2 mSv for the balance of pregnancy
- Stakeholders opposed 2 mSv limit because
 - difficult to monitor
 - believed it would lead to discriminatory hiring
 - fetus has no legal standing in Canada
- CNSC dose limit is 4 mSv to the worker for the balance of pregnancy

Radiation Protection Regulation: Basis (Exemption Quantities)

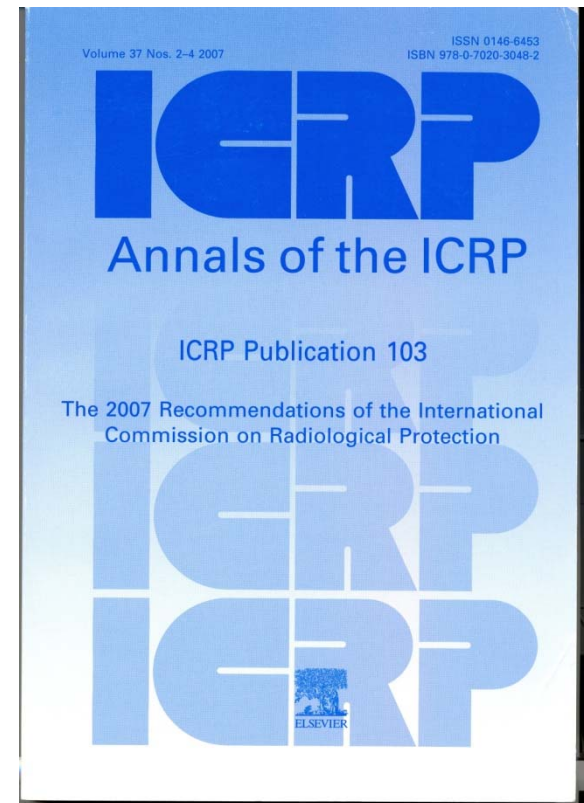


- In 2000, exemption quantities (EQ) in Canadian regulation were established in parallel with BSS quantities
 - CNSC EQ's were based on potential occupational exposures of 1 mSv/a
 - BSS values are based on 10 μ Sv/a to member of the public
- CNSC has since adopted BSS values which have been reflected in NSRD regulations since April 2008.

ICRP 103: Annals of the ICRP



- ICRP published a new set of fundamental recommendations in January 2008
- Recommendations are non-binding but form fundamental basis of the radiation protection framework worldwide
- The international community is working to adapt the practical implementation of radiation protection framework to align with ICRP recommendations



Canadian Commitment to the Application of International Standards



- The NSCA states:
 - “...it is essential in the national interest that consistent national and international standards be applied to the development, production and use of nuclear energy.”
- The Cabinet Directive on Streamlining Regulation states:
 - “...agencies are to take advantage of opportunities for...adopting or contributing to...international standards...limiting the number of specific Canadian regulatory requirements...to instances when they are warranted by specific Canadian circumstances.”

CNSC: Taking ICRP-103 into consideration



- CNSC staff has been working to analyze the ICRP recommendations and trends emerging from the BSS revision process
- Commission was presented with areas within the CNSC regulatory framework that merit review and potential revisions

Potential Impact on Canadian RP Regulation....



- Dose constraints for Planned Exposure Situations
- Reference Levels for Existing Exposure Situations
- Dose Limits for Emergency Situations
- Nuclear Energy Workers
- Dose Limits for Pregnant Nuclear Energy Workers
- Radiation and Tissue Weighting Factors

Dose constraints for Planned Exposure Situations



- Not an entirely new concept; however, a controversial aspect of the new ICRP recommendations.
- How should these be best applied in regulatory practice?
 - CNSC Regulatory Guidance
 - G-228 – “Developing and Using Action Levels”
 - G-129, R1 – “Keeping Radiation Exposures and Doses ALARA”
 - CRPPH EGOE – Case Study on Dose Constraints

Reference Levels for Existing Exposure Situations



CNSC:

- Covered in the “contaminated land” provisions of the *NSCA* and the *General Nuclear Safety and Control Regulations*.
- Dose limits in the *Radiation Protection Regulations* apply only to licensees and not contaminated land provisions.

ICRP-103:

- Recommends that dose limits not be applied to existing exposure situations.
- Recommends the use of reference levels in the optimization process when choosing to intervene in an existing exposure situation.

Dose Limits for Emergency Situations



CNSC:

- The *Radiation Protection Regulations* specify that dose limits can be applied in emergency situations.

ICRP-103:

- Makes use of reference levels in emergency exposure situations and explicitly apply dose limits only to planned exposure situations.

Nuclear Energy Workers



CNSC:

- The *NSCA* and the *Radiation Protection Regulations* define and make use of the concept of Nuclear Energy Workers (NEWs).

ICRP-103:

- Recommends against the classification of workers and continues to recommend classification of areas of work.

Dose Limits for Pregnant Nuclear Energy Workers



CNSC:

- The Radiation Protection Regulations specify a dose limit for pregnant NEWs substantially less than that of other NEWs.

ICRP-103:

- Working conditions for a female worker who has notified her employer that she is pregnant should be such that the dose to the embryo/fetus during the remainder of the pregnancy would not exceed the approximate annual dose limit for a member of the public.

Radiation and Tissue Weighting Factors



CNSC:

- The radiation and tissue weighting factors (identical to those in ICRP-60) are specified in Schedules 1 and 2 of the *Radiation Protection Regulations* and are used in the calculation of radiation dose.

ICRP-103:

- New scientific evidence has resulted in changes to the recommended radiation and tissue weighting factors.

Path Forward.....



- The current Canadian radiation protection framework is based on the recommendations of ICRP-60.
- ICRP-103 represents an evolutionary change in the system of radiological protection to introduce incremental improvements.
- CNSC will be embarking on a comprehensive review of the *Radiation Protection Regulations*.
- Two issues that will likely require additional attention are dose constraints and classification of workers.



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