



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

CNSC Update on Radiation Protection Regulatory Activities and Observed Industry Trends

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Presentation Overview



- Overview of the Canadian Nuclear Safety Commission (CNSC)
- Radiation protection expertise at the CNSC
- *Radiation Protection Regulations*
- Overview of the safety and control areas
- Radiation protection safety and control area
- Compliance activities
- Observed industry trends

Canadian Nuclear Safety Commission (CNSC)



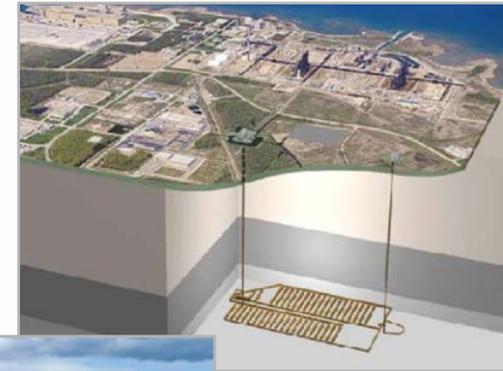
Regulates the use of nuclear energy and materials to protect the **health, safety and security** of Canadians and the **environment**, and to **implement** Canada's **international commitments** on the peaceful use of nuclear energy



The CNSC Regulates All Nuclear-related Facilities and Activities ...

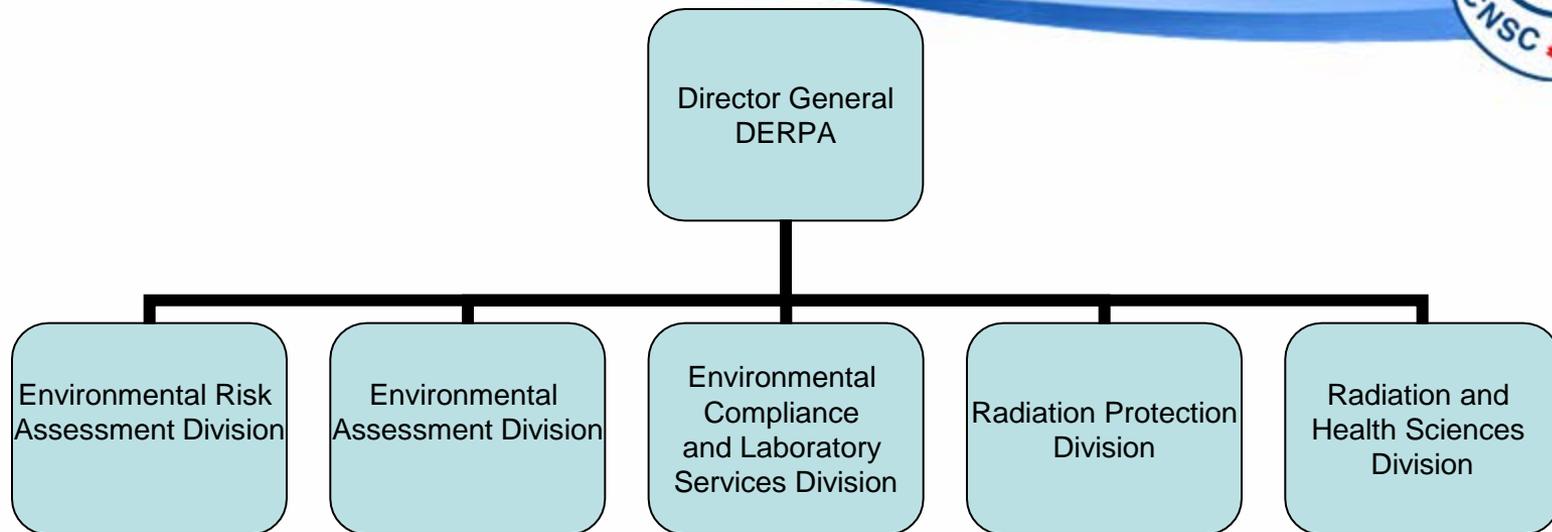


- Uranium mines and mills
- Uranium fuel fabricators and processing
- Nuclear power plants
- Waste management facilities
- Nuclear substance processing
- Industrial and medical applications
- Nuclear research and educational
- Export/import control



... from cradle to grave

Radiation Protection Expertise at the CNSC



The Directorate of Environmental and Radiation Protection and Assessment (DERPA) provides leadership and technical expertise in radiation protection, environmental assessment, geosciences, environmental protection and laboratory services. DERPA is also accountable for the licensing of dosimetry services.

Radiation Protection Division

(RPD)



- Centre of excellence for operational radiation protection (RP) for all proposed and licensed nuclear facilities and activities
- RP experts, who assess the adequacy of licensee RP programs, participate in compliance monitoring, and provide technical recommendations for licensing decisions
- Represent CNSC interests in national and international initiatives on the development and implementation of operational RP best practices

Radiation and Health Sciences Division (RHSD)



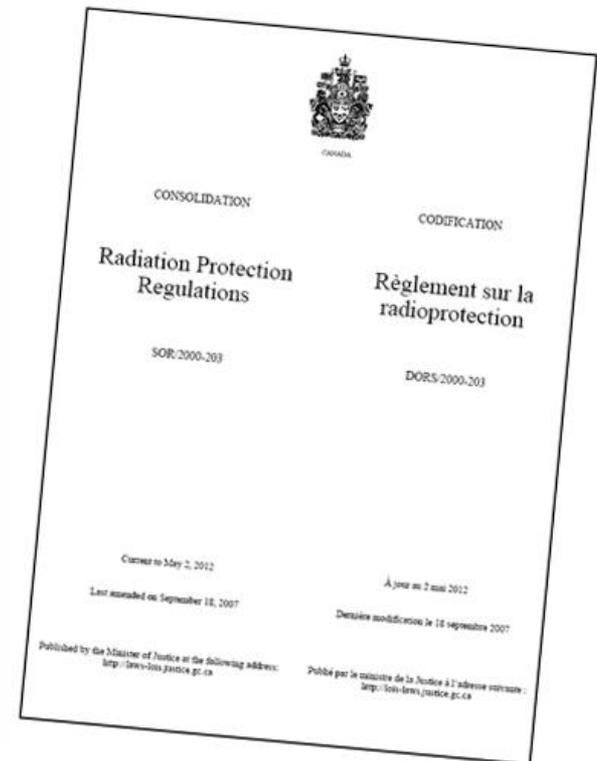
- Corporate authority for the assessment of radiological risks to workers and the public from all proposed or licensed nuclear facilities and activities
- Responsible for licensing and compliance of dosimetry services
- Combination of experts in dosimetry (internal and external), epidemiology and radiobiology
- Interact nationally and internationally in the assessment and scientific reviews related to the health effects of ionizing radiation

Radiation Protection Regulations



The *Radiation Protection Regulations* require that all licensees implement a RP program which ensures:

- doses received by persons are as low as reasonably achievable (ALARA)
- management control over work practices
- personnel qualification and training
- control of occupational and public exposure to radiation
- planning for unusual situations



CNSC Safety and Control Area Framework (1)



- Safety and control areas (SCA) are the technical topics CNSC staff use across all regulated facilities and activities to assess, evaluate, review, verify and report on regulatory requirements and performance
- The SCA framework provides a common set of safety and control terms that are applicable across the entire CNSC

CNSC Safety and Control Area Framework (2)



Functional Area	Safety and Control Area
Management	<ul style="list-style-type: none">• Management Systems• Human Performance Management• Operating Performance
Facility and Equipment	<ul style="list-style-type: none">• Safety Analysis• Physical Design• Fitness for Service
Core Control Processes	<ul style="list-style-type: none">• Radiation Protection• Conventional Health and Safety• Environmental Protection• Emergency Management and Fire Protection• Waste Management• Security• Safeguards• Packaging and Transport

Radiation Protection SCA



Radiation Protection SCA

- Covers the implementation of a radiation protection program in accordance with the RP regulations
- This program must ensure that contamination levels and radiation doses received by individuals are monitored, controlled and maintained ALARA

Specific Areas

- Application of ALARA
- Worker Dose Control
- Radiation Protection Program Performance
- Radiological Hazard Control
- Estimated Dose to Public

Compliance Oversight



- Conduct desktop reviews of RP programs
- Review of routine reports and performance data (e.g. safety performance indicators)
- Review of event reports and corrective action plans
- Participate in routine baseline inspections at licensed facilities to assess compliance with requirements
- Participate in reactive inspections and investigations
- Participate in licensing actions

Inspection Program (1)



Baseline Program

- Routine inspections verifying effective implementation of a licensee's RP program
- Inspection topics are aligned with the specific areas defined in the RP SCA framework
 - desktop reviews and/or inspections in the area of RP Program Performance
 - desktop reviews and inspections in the areas of:
 - Application of ALARA
 - Radiological Hazard Control
 - Worker Dose Control

Inspection Program (2)



Enhanced Oversight

- Follow-up visits or reactive inspections/investigations based on events
- Focused inspections in areas where weaknesses have been previously observed

Inspection Process



- A five-year baseline compliance plan for all SCAs
- Minimum of one baseline RP inspection annually
- Development of inspection guides for each specific area (includes criteria and site-specific references)
- Same guides and criteria are applied to all licensees (consistency and benchmarking)

RP Oversight Program



Alpha Program Enhancements (2011/12)

- Inspections completed at all nuclear power plants (NPPs)
- Desktop review for all other relevant Class I licensed facilities

Radiological Hazard Control (2012/13)

- Inspections completed at all NPPs

Worker Dose Control (2013/14)

- Inspections completed at all but one NPP to date

ALARA (2014/15)

- Inspections planned at all operating NPPs this year

Alpha Program Enhancements



- CNSC regulatory request sent in 2010 to all NPP licensees required immediate action to:
 - conduct a risk identification and characterization survey for alpha hazards in their facility
 - implement work controls to mitigate future alpha exposures for workers
 - enhance radiation protection program requirements related to alpha monitoring and control
- Immediate conservative measures are put in place at all NPPs for the protection of workers from alpha hazards

Industry Status: Alpha Program Enhancements (1)



- Alpha contamination level classification system and methodology are adopted by all NPPs
- Work controls and procedures have been revised to incorporate controls to mitigate alpha exposures at all NPPs
- Initial alpha characterization completed at all NPPs; however, further work is required
- Retrospective dosimetry was conducted at all NPPs

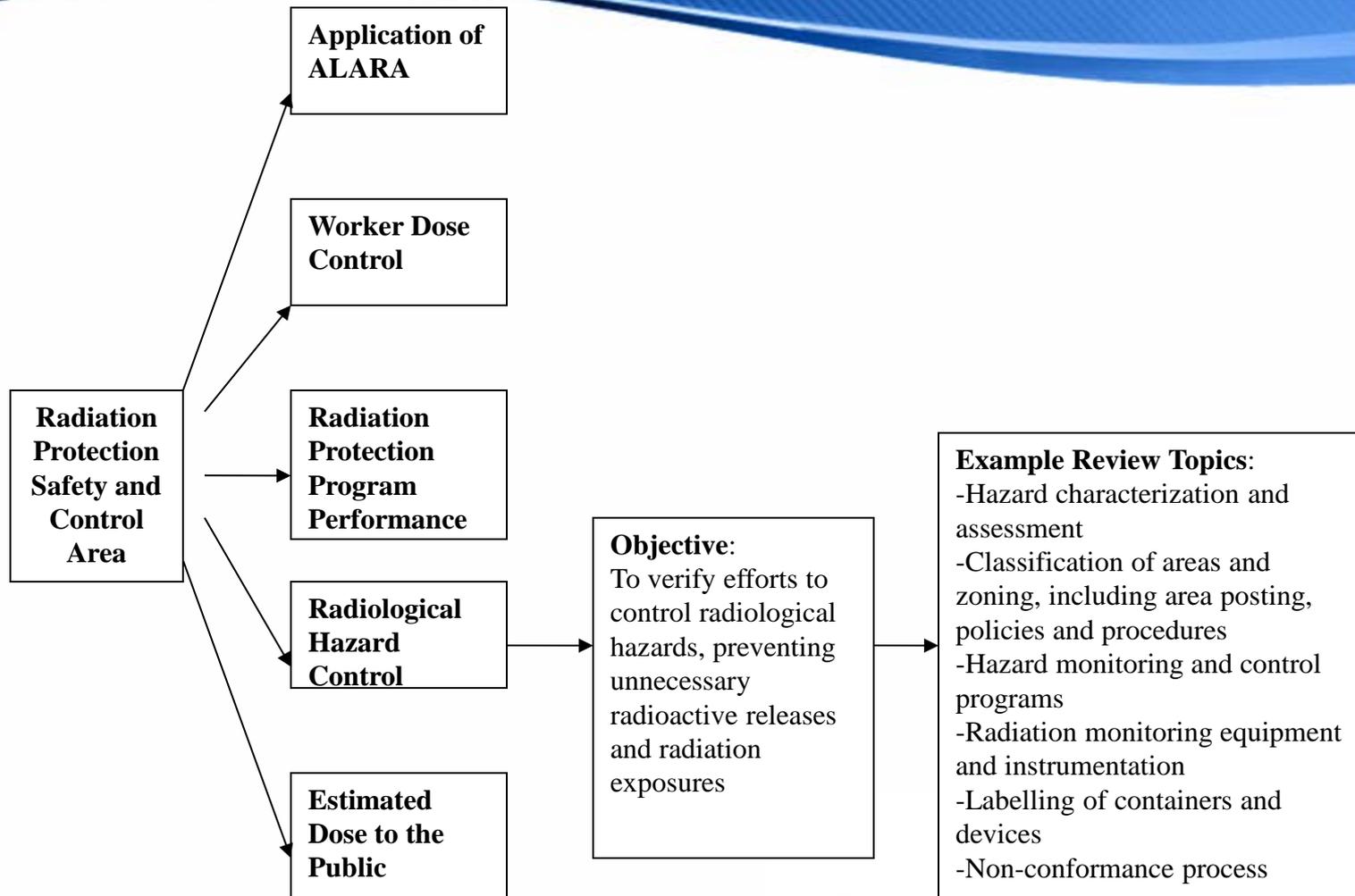
Industry Status:

Alpha Program Enhancements (2)



- Improvements in the following areas are expected at some NPPs:
 - personnel screening approaches
 - alpha detection capability (PAS, α WBM, iCAMs, etc.)
 - relevant radiological exposure permits need to adequately address alpha requirements
- Follow up inspections are planned in 2014/15 for all operating NPPs to verify effective implementation of long-term alpha monitoring and control program enhancements

Radiological Hazard Control



Industry Status: Radiological Hazard Control (1)



- Radiological zoning system is found to be well established
- Multiple barrier approach is in place to isolate and control radioactive contamination
- In general, radiation hazard postings are up-to-date and contain the required information
- Radiation monitoring equipment and instruments are available at inter-zonal boundaries

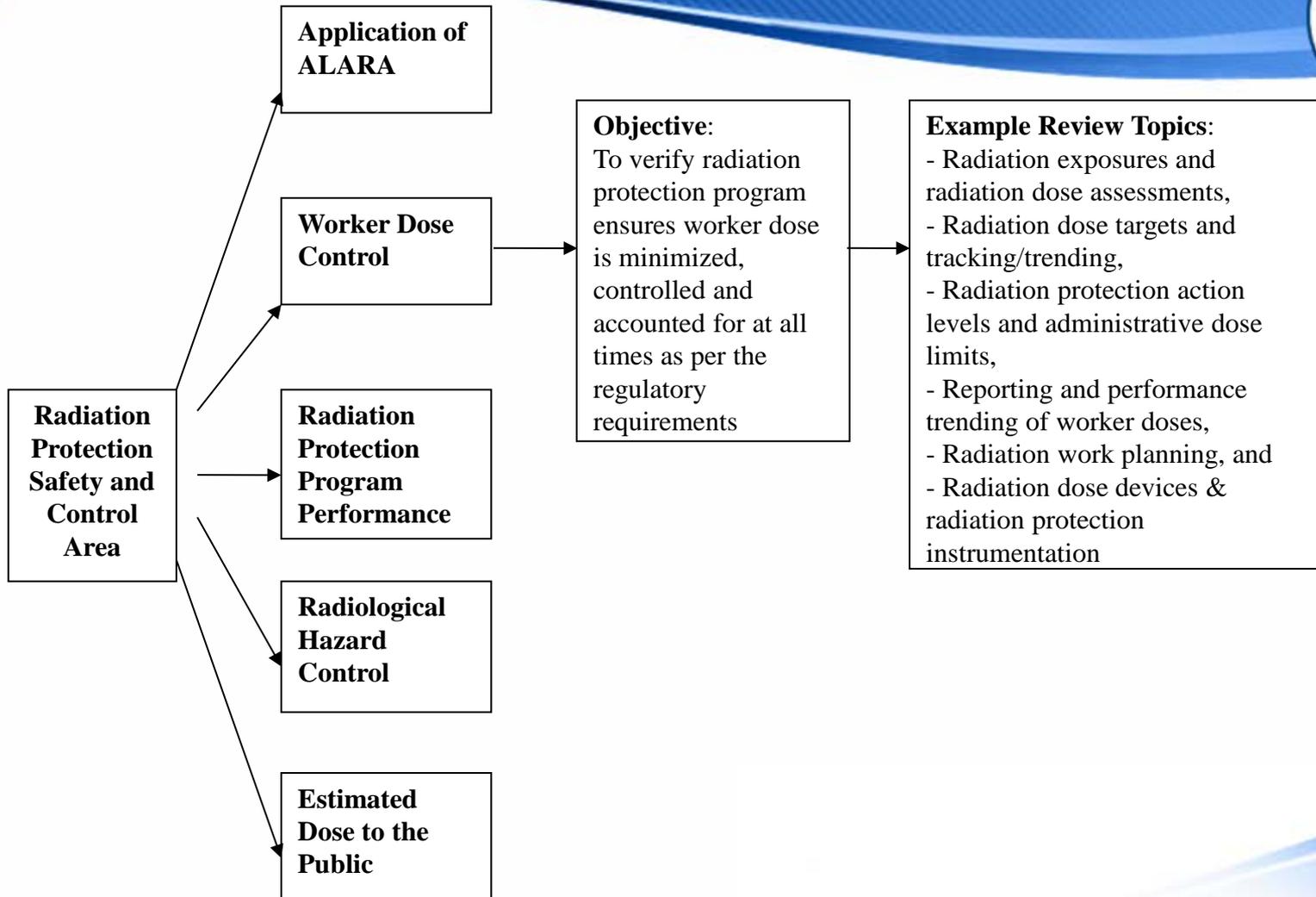
Industry Status: Radiological Hazard Control (2)



Improvements in the following areas are expected at some NPPs:

- instrument calibration and response checks not performed as required by procedure or regulation
- commissioning of radiation monitoring equipment and instruments
- documentation of the requirements for the design, fabrication, testing and use of temporary ventilated enclosures
- condition of rubber areas
- performance of routine radiation surveys
- adherence to documented RP requirements

Worker Dose Control



Industry Status: Worker Dose Control (1)



- No observed deficiencies in the control of worker doses in the field
- For work execution, required dosimetry and appropriate tools are used for dose control
- Doses to individuals (contractors, workers, and visitors) are ascertained/recorded and filed with the National Dose Registry (NDR) in accordance with regulatory requirements
- Established process for the use of exposure control levels (ECLs) and administrative dose limits (ADLs) to maintain worker doses ALARA and to minimize risk of exceeding regulatory dose limits

Industry Status: Worker Dose Control (2)



- Process in place for investigating and resolving discrepancies between thermo-luminescent dosimeter (TLD) and electronic personal dosimeter (EPD) readings on a quarterly basis
- Enhanced measures are implemented to reduce collective tritium dose
- Inage and outage collective doses are tracked on a daily basis, and dose targets are adjusted as required

Industry Status: Worker Dose Control (3)



Improvements in the following areas are expected at some NPPs:

- process for exposure control level (ECL) changes is not optimized
- verification of historical doses of contractors with the NDR prior to employment is not consistently performed
- temporary storage of assigned EPDs not adequately controlled
- Long range (5Y) ALARA plan not systematically updated/approved

Thank you



Questions?



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