Management of Low-and Intermediate-Level Radioactive Waste


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CNSC Staff Presentation
Presentation Outline

- Canada’s Approach to Radioactive Waste Management
- Radioactive Waste Defined
- Principles of Radioactive Waste Management
- L&ILW Management
  - Generation, Characteristics, Packaging, Acceptance Criteria
- OPG’s Management of L&ILW
- OPG’s Proposed DGR for L&ILW
Canada’s Approach to Radioactive Waste Management

• The 1996 Federal Government Policy on Radioactive Waste requires management of radioactive waste to be safe & protective of the environment; comprehensive; cost effective; integrated

• This policy adopts the internationally-supported “polluter pays principle”

• The policy requires waste producers/owners to be responsible for the waste at all stages (funding, organization, management and operation of required facilities, including disposal)
Radioactive Waste Defined

- Any material that contains a radioactive “nuclear substance” as defined in section 2 of the *Nuclear Safety and Control Act* and which the owner has declared as waste

- Exempted waste is waste that meets the criteria for clearance, exemption or exclusion from regulatory control for radiation protection purposes as set out in Schedule 1 of the *Nuclear Substances and Radiation Devices Regulations*
Radioactive Waste Defined

• Low-level radioactive waste (LLW) defined:
  – waste that contains nuclear substances above clearance levels or exempted quantities
  – does not require significant shielding during handling and interim storage
  – limited amounts or concentration of long-lived radioactivity
  – requires isolation and containment for periods of up to a few hundred years
  – a dose rate less than 10 mSv/h at 30 cm
  – examples: clothing, cleaning materials, decontamination materials

Example of OPG’s interim storage of LLW
Radioactive Waste Defined

- Intermediate-level radioactive waste (ILW) defined:
  - contains quantities of long lived radionuclides, but is not used nuclear fuel
  - requires containment and isolation for more than several hundreds of years
  - requires shielding, but no provision or only limited provision for heat dissipation
  - a dose rate greater than or equal to 10 mSv/h at 30 cm
  - examples: reactor core components, bulk ion exchange resins, filters and ion exchange columns

Example of OPG’s interim storage of ILW
Principles of Radioactive Waste Management

- CNSC regulatory principles for waste:
  - Ensure safety at all stages of waste management
  - Minimize wastes produced to extent possible
  - Account for interdependencies in stages of waste management
  - Account for any biological, chemical and other hazards associated with the waste
  - Avoid burdens on future generations
  - Avoid reasonably-predictable impacts on future generations greater than currently accepted

Consistent with International Conventions and Best Practices
L&ILW Management

Waste Generation

• L&ILW is generated by various processes and activities at the nuclear power plants

• Waste generators are responsible for understanding and characterizing their wastes at all stages (production, processing, transfer, transport, storage, and disposal)

• L&ILW is segregated and characterized at source as part of a Waste Management Program

Waste Characteristics / Characterization Requirements

• reflective of the materials, processes and activities producing it

• includes the physical, radiological, chemical, and biological properties

• characterization commensurate with hazards, stage of management
Waste Packaging

- Waste and container form a ‘waste package’
- Container to be compatible with waste characteristics, and the purpose and management stage
- Licensee is responsible for handling the waste and waste package for transfer, or for transport compliant with CNSC Packaging and Transport of Nuclear Substances Regulations.
- Storage or disposal facility licensee/operator is responsible for the waste package, following receipt
Waste Acceptance Criteria (WAC)

- WAC reflects the waste package characteristics used in the safety assessments of the waste receiver.
- WAC is established by the licensed receiver of the waste.
- Verification activities of the receiver vary, and consider if: packages are storage or disposal ready; plans for additional processing; waste generator and waste receiver are the same organization.
OPG’s Management of L&ILW

- OPG has managed L&ILW at Nuclear Generating Stations (NGS) and at the Western Waste Management Facility (WWMF) for over forty years.

- All L&ILW is being controlled and tracked through the various stages of waste management (cradle to grave approach).

- L&ILW wastes at the NGS and the WWMF are segregated into processible wastes and non-processible waste.

- OPG has funding in place for storage and disposal plans for the L&ILW.

- CNSC compliance verification activities confirm OPG has acceptable programs for waste control, characterization, packaging, transportation, processing, and storage; and manages L&ILW at the NGS and WWMF safely.
OPG’s Proposed DGR for L&ILW

- CNSC considers OPG’s existing NGS and WWMF waste management programs and practices to be safe and protective of workers, the public and the environment.

- OPG’s proposed DGR operational programs and practices build on the existing programs and practices at the NGS and WWMF.

- OPG’s proposed DGR waste acceptance criteria (WAC) reflects the interdependencies with other stages of OPG’s L&ILW management.

- CNSC considers interdependencies in CNSC licensing.