General Training On Methodologies For Geological Disposal in North America

IAEA Network of Centers of Excellence

Session 7:
Regulator's Perspective on Judging the Safety of a Proposed Repository - Japanese Perspective -

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Japanese Perspective in Safety Regulations

- **"Specified Radioactive Waste Final Disposal Act" (2000)**
  - Safety regulation shall be legislated separately
  - Active participation of NSC even in siting process required by the Congress at promulgation of the Final Disposal Act
- **"First Report on the Basis for Safety Standards for HLW Disposal" (NSC, 2000)**
  - Step-wise development of safety regulations in synchrony with implementation
  - Special attention on stability in geological environment
- **"Requirements of Geological Environment to Select Preliminary Investigation Areas (PIAs) of High-level Radioactive Waste (HLW) Disposal" (NSC, 2002)**

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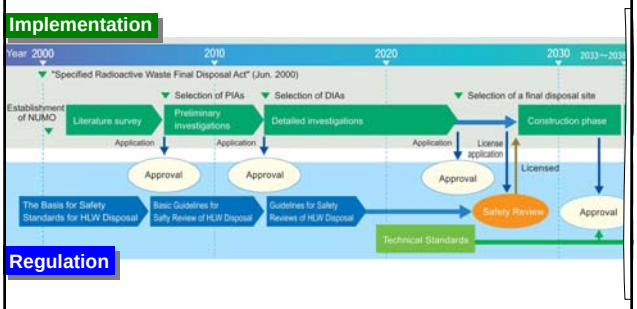
Schedule for Implementation and Regulation



(from NUMO, 2002)

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First Report on the Basis for Safety Standards for HLW Disposal (NSC, 2000)

Fundamentals

- Safety of geological disposal should be provided by intrinsic features of the system concept and PA should illustrate robustness of the barrier functions

Requirements for repository site

- Stable geological environment (in terms of uplift/denudation, fault movements and volcanic activities)
- No natural resources

Management of disposal site

- QA for design, manufacturing, construction and installation
- Need for monitoring of change in geological conditions due to repository development to confirm boundary conditions for the safety assessment
- Need to maintain retrievability before closure of the repository, by the time to confirm the SA results taking account of additional information obtained during repository construction and opearation

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First Report on the Basis for Safety Standards for HLW Disposal (continued)

Basic consideration for safety assessment

- Demostrate that the estimated maximum doses do not exceed the protection level (which will be defined at a later stage)
- Conduct supplementary analyses to demonstrate no significant increase of natural radiation levels on the very long term
- Two types of scenarios need to be considered:
  - *groundwater scenarios:*
    - the most likely evolutionary processes
  - *isolation failure scenarios:*
    - due to natural perturbation phenomena: take into account information on the site and the repository design
    - human intrusion scenarios should include only inadvertent intrusion and should be interpreted separately from other types of scenarios
- Models and parameters development:
  - taking into account information on the site and the repository design; in particular, uncertainties arising from long-term evolution of the geological environment should be considered

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Requirements of Geological Environment to Select Preliminary Investigation Areas (PIAs) of High-level Radioactive Waste (HLW) Disposal (NSC, 2002)

The requirements for exclusion of obviously unsuitable areas for a repository site by literature survey:

- be consistent with legal requirements specified in the Act
  - uplift / erosion
    - avoid the possibility that waste package and repository come close to the surface
  - quaternary volcanic activity
    - avoid the possibility of destruction of waste package and repository
  - active faults
    - avoid the possibility of destruction of waste package and repository
  - mineral resources
    - avoid the possibility of radiation impact due to exploratory activities
  - quaternary unconsolidated deposits
    - avoid the undue constraints for repository design

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