Perspectives on Radioactive Waste Management Integration

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Protecting People and the Environment

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Nuclear Waste: Fully Integrated Fuel-Cycle Planning Is Vital

- Final disposition plan essential for nuclear waste
- Nuclear waste requires careful management
- Best to have a plan developed at the beginning of a nuclear power program
- An unknown endpoint for waste is inefficient and raises additional safety and security issues that have to be addressed

Role of the Regulator

- A strong, independent regulator is needed “cradle-to-grave” to ensure safety and security of waste
- Politics or promotion of nuclear power will undermine public confidence

Final Disposition Plan Essential for Nuclear Waste

- Pursuit of nuclear power results in an irreversible commitment to maintain the long-term stewardship of its waste.
  - Long-lived byproducts of uranium enrichment
  - Contaminated and activated low-level waste
  - Spent nuclear fuel
  - Reprocessing byproducts
  - Reactor plant decommissioning
- While safe and secure waste management is a top priority, no temporary storage solution should take the place of a permanent repository for spent nuclear fuel.

The Need for a Plan

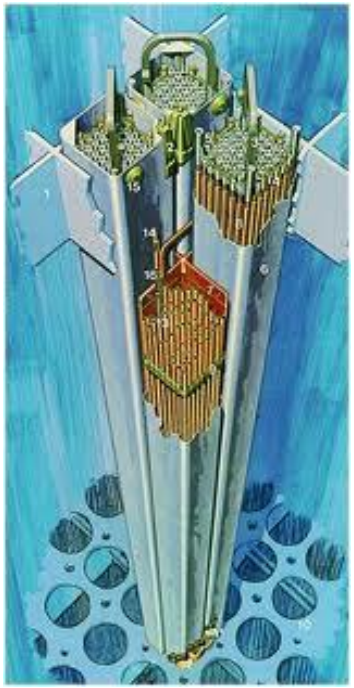
- Lessons from Fukushima
  - Spent fuel pools densely packed at the site; high source term
  - Need a working plan for long-term management and disposal
  - Need to monitor water levels in pools
  - Need to assure pool water level under potentially challenging conditions

Fukushima Dai-ichi Unit 4 spent fuel poolside

Nuclear Waste Requires Careful Management

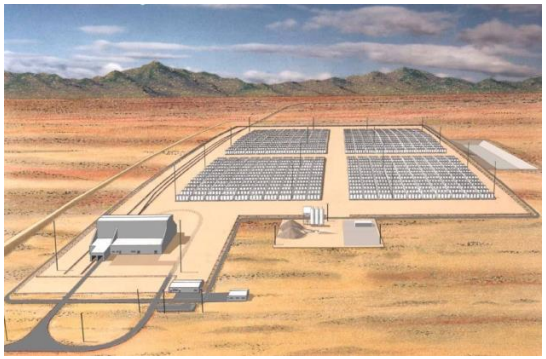
- Fuel Design
- Reactor Use
- Discharge Cooling in Pools
- Long-Term Storage in Pools
- Long-Term Storage in Casks
- Transportation
- Decommissioning
- Low-Level Waste
- Disposal

Considerations Across the Fuel Cycle



Fuel design and fabrication

On-site storage



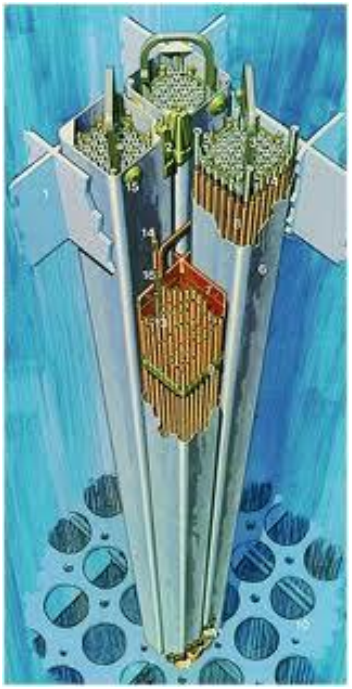
Consolidated interim storage

Transportation

Repository acceptance criteria

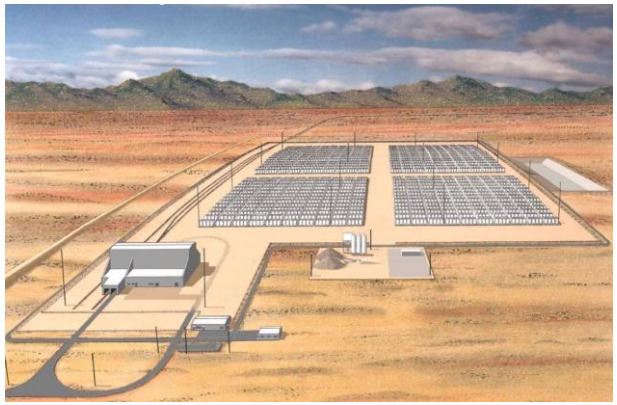
Considerations Across the Fuel Cycle

- Front-end fuel design:
  - Consider long-term performance, not just reactor performance
- Dry storage:
  - Compatibility of systems with transport and disposal
  - Impact of high burn-up fuel
  - Aging management



Considerations Across the Fuel Cycle

- Centralized Interim Storage
  - Closed and operating sites
  - Avoid permanence
- Transportation
  - Address safety/security
  - Long-term storage and disposal implications of transport canister
  - Need to address public concerns



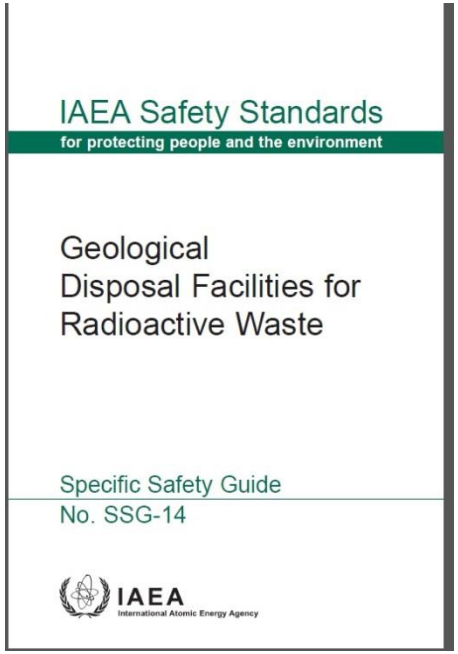
Decommissioning

- Regulatory framework should address the decommissioning phase
- Sufficient funds must be established
  - Dismantle plant
  - Maintain spent fuel safely and securely

Low-Level Waste Considerations

- Physical form of wastes
- Volume and concentrations
- Short-term decay needs
- Long-term storage needs
- Transportation needs
- LLW disposal design
- Long-term and short-term environmental monitoring

Geologic Disposal: How to Be Successful?



Siting Criteria:
- tectonic stability
- low groundwater flow
- stable geochemistry
- excavatable rock

- Spent fuel management options vary, international consensus on need for geologic disposal
- Iterative policy process – achieving public acceptance can be more challenging than technical feasibility
- Countries are making progress

Repository Siting Prerequisites

- Organization to manage and disposition waste
  - Autonomous, long-term stability, diversity of expertise and perspectives represented
- Funding available when needed, at the amount needed
- Credible technical analysis, including
  - Siting criteria
  - Site evaluation methodology
- Socio-political/societal agreement
  - Consensus at local/higher government levels
  - Transparency, trust-building, and independent oversight
  - Economic Opportunity/Compensation

Completing the Totality: Emerging Countries

- Important to get it right from the beginning
  - A plan to site and manage final disposition of spent fuel and high-level waste should be formulated and accepted when a country embarks on a nuclear power program
  - Low-level waste facilities should be sited for the lifetime of the facility, including decommissioning
- IAEA “Milestones” document & peer reviews
- International assistance

Thank You