U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

PRESENTATION TO THE NUCLEAR WASTE TECHNICAL REVIEW BOARD ENGINEERED BARRIER SYSTEM PANEL

SUBJECT: GEOLOGIC DISPOSAL OPTION FOR PLUTONIUM DISPOSITION

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JUNE 15, 1994

Total System - Pu Disposition

- Pu (dismantling)
- Interim Storage (10 - 20 years)
- Conversion of Pu
  - Reactor
  - Immobilization
  - Accelerators
- Disposal
  - Geologic disposal
  - Deep bore-hole disposal

Interfaces to Geologic Disposal

Physical:

- Waste form characteristics
- Transportation (including containers)

Administrative

- Materials Control and Accountability
- Safeguards and security

Regulatory/Statutory

- Statutes
- Regulation

Interface Philosophy

Geologic Disposal

- Requirements imposed on geologic disposal
- Geologic disposal imposes requirements on "front-end" of system
- Iterative process to ensure successful implementation

Nuclear Materials Dispostion Project

- Sandia National Laboratory lead for technical integration
- Interface control document (ICD) being developed
- Geologic disposal requirements feed to ICD
- Sandia to facilitate technical interchanges

Geologic Disposal Scope of Work

Primary Driver

PEIS	Record of Decision	April 1996
	Initial Data Flow	January 1995

System Engineering Task

- Develop issues and assess impacts on disposition concepts
- Develop interface requirements
- Perform sub-system level analyses
- Integrate Geologic disposal functions
  - Design
  - Regulatory
  - Performance Assessment
  - Cost/Schedule Impacts

Geologic Disposal Scope of Work

Regulatory Task

- Review applicable regulations/statutes
- Establish special requirements for Pu disposal
- Identify modifications needed (if any)
- Examples:

10 CFR 60	10 CFR 75
10 CFR 73	EPA
10 CFR 74	ES&H

NWPAA

Geologic Disposal Scope of Work

Design and Operations Task

- Impacts of waste forms on:
  - + Criticality
  - + Thermal loads
  - + Waste Package Design
  - + Surface/Subsurface design
  - + Handling and Logistics
- Compare to existing designs, establish cost/ schedule impacts
- Data input to performance assessment

Geologic Disposal Scope of Work

Performance Assessment Task

- Performance
  - Long term prediction of waste package performance
- Total System Performance
  - Performance based on:
    + Waste forms, repository design configurations
    + Radionuclide inventory
    + Alteration rates
    + Radionuclide solubilities
    + Thermal Characteristics

Geologic Disposal Scope of Work

<u>Performance Assessment Task</u> (Cont'd)

- **Compared against**
  - **+ Table 1 40 CFR 191**
  - **+ Other Pu release limits**