YUCCA MOUNTAIN PROJECT

Studies

Low Temperature Repository Enhanced Design Alternatives

Presented to:
Nuclear Waste Technical Review Board
Panel For the Repository

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January 25, 1999

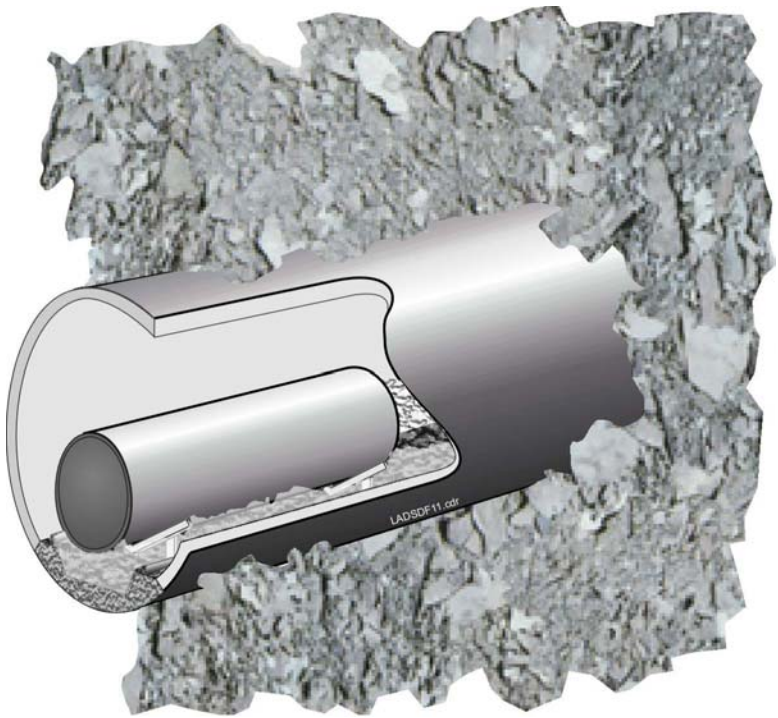
U.S. Department of Energy
Office of Civilian Radioactive
Waste Management

Low Temperature Repository Goals

- **Predictability of thermally activated processes more defensible**
- **More benign environment for waste packages**
- **Preservation of natural barriers**
- **Facilitates access to waste packages**

Optional Design Objectives

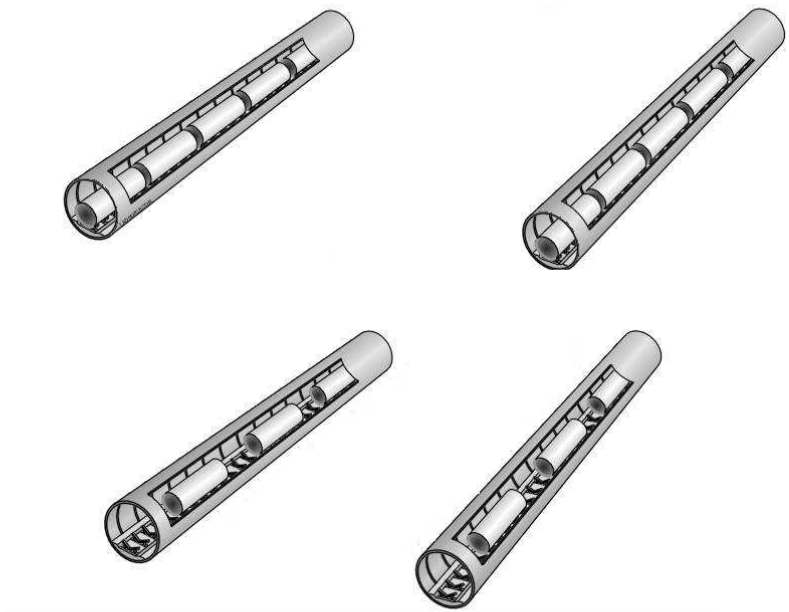
- Near field rock (drift wall to 10m) below normal boiling point (~96°C)
- Drift wall below normal boiling point
- Waste package surface below normal boiling point
- Waste package surface below 80°C



Low Temperature Concept Summaries

Line loading @ 50 MTU/A

Point loading @ 40 MTU/A

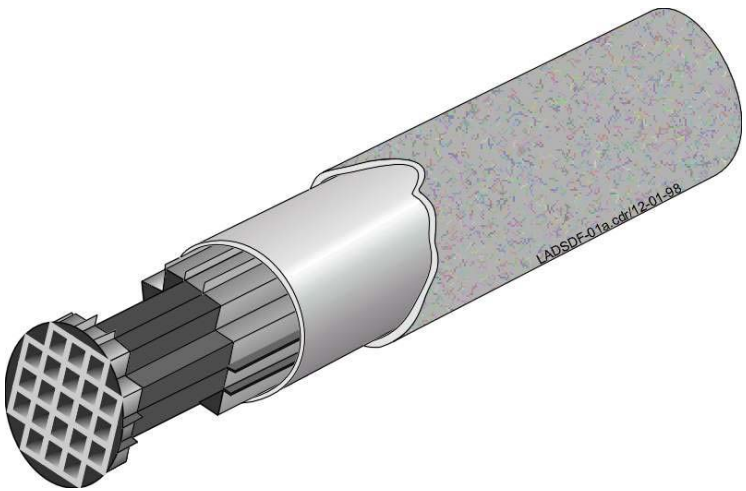


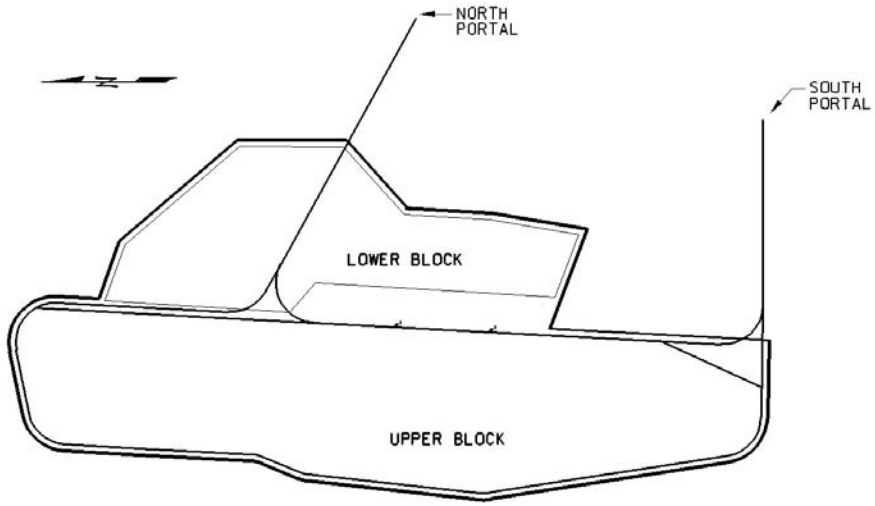
Low Temperature Concept Summaries

(continued)

Assumptions:

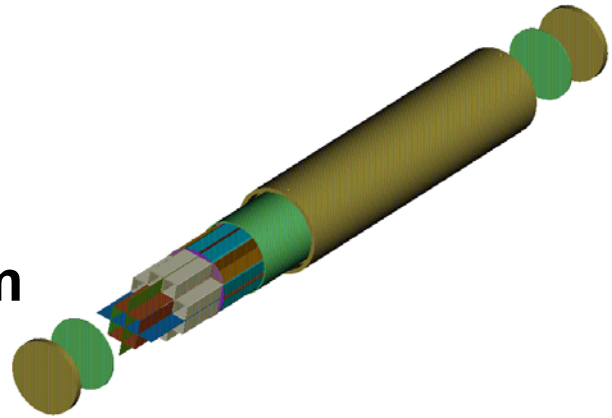
- **+/- 20% variance from perfect blending**
- **All waste in Primary Area**
- **In-drift emplacement of multi-assembly waste packages**

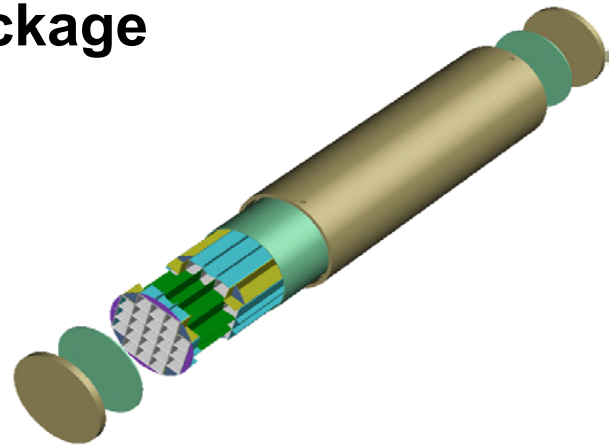




Concept Description - Low Temperature, Line Load

- Repository
  - Line load; 50 MTU/A; 1300 acres
  - Drift diameter 4.5m; spacing 45m
- Waste Package
  - 12 PWR assemblies
  - Ni alloy over carbon steel waste package
- Operating Concept
  - Blending in waste packages
  - Aging up to 30 years
  - Preclosure ventilation





Concept Description - Low Temperature, Point Load

- **Repository**
  - **Point load; 40 MTU/A; 1600 acres**
  - **Drift diameter 5.5m; spacing 60m**
- **Waste Package**
  - **21 PWR assemblies**
  - **Ni alloy over carbon steel waste package**
- **Operating Concept**
  - **Blending in waste packages**
  - **Aging up to 50 years**
  - **Preclosure ventilation**

Implementing Features

- **Integral:**
  - **Low Thermal Design**
  - **Aging & Blending**
  - **Preclosure ventilation**
  - **Timing of Repository Closure**
  - **Drift/WP spacing**
  - **Waste Package Corrosion Resistant Material**
- **Other:**
  - **Enhanced Access**
  - **Drift Diameter**
  - **Canistered Assemblies**
  - **Ceramic coatings**
  - **Drip shields**
  - **Backfill and Richard's barrier**
  - **Rod consolidation**
  - **Additives and fillers**

Implementing Features