

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

**NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING**

**SUBJECT: UPDATE ON WASTE CONTAINMENT
AND ISOLATION STRATEGY**

PRESENTER: DR. STEPHAN J. BROCOUM

**PRESENTER'S TITLE
AND ORGANIZATION: ASSISTANT MANAGER FOR SUITABILITY AND LICENSING
LAS VEGAS, NEVADA**

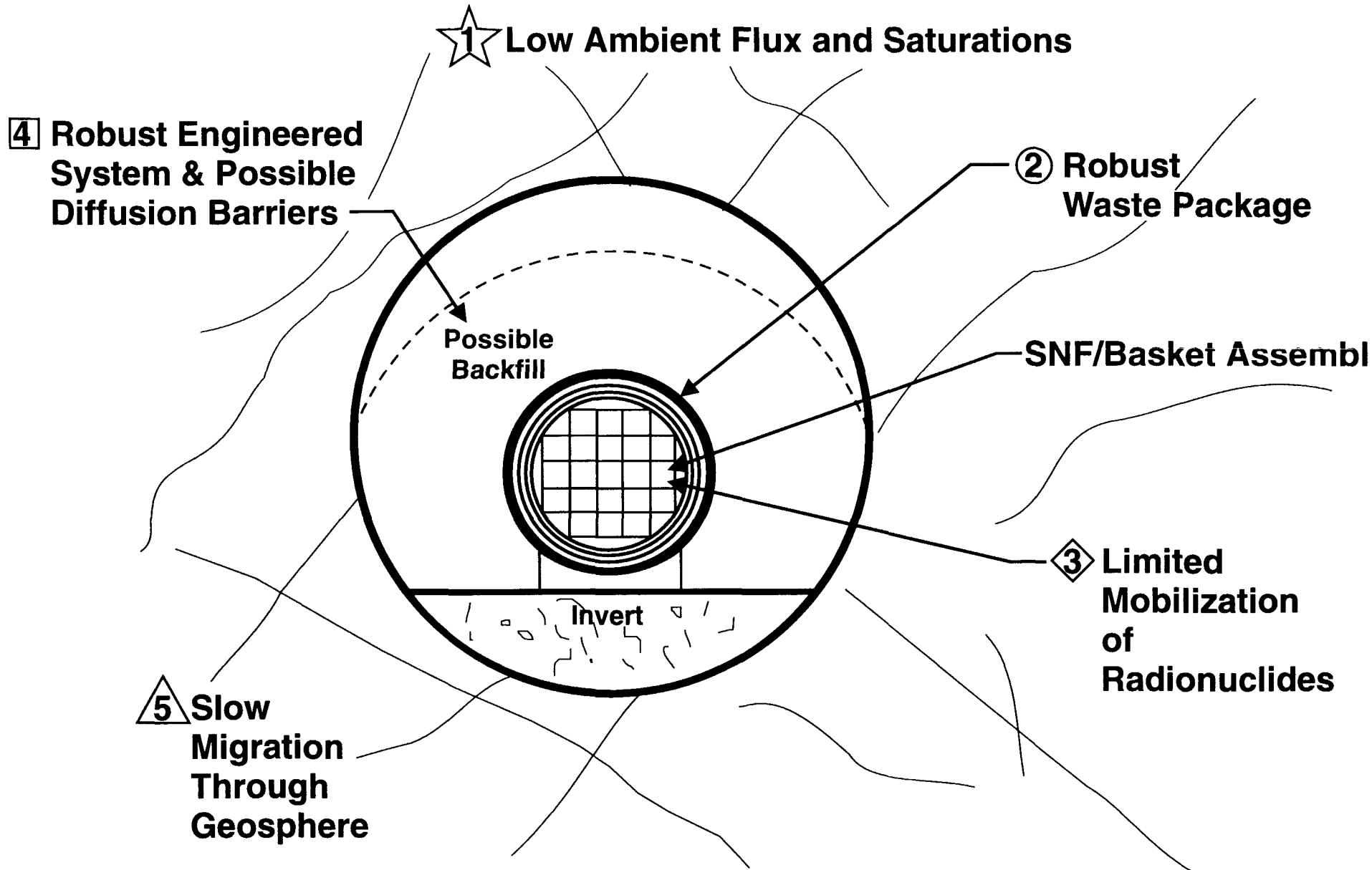
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**LAS VEGAS, NEVADA
APRIL 19-20, 1995**

Outline

- **Review strategy for waste containment and isolation**
- **Importance of barriers at key milestones**
- **Ongoing activities to mature the strategy**

Top-Level Strategy for Waste Isolation



Key Elements of Waste Containment and Isolation Strategy


- ★ **Favorable environment for waste package provided by unsaturated rock**
- ② **Robust waste packages to address uncertainties in waste package environment**
- ◇ **Limited mobilization of radionuclides within waste packages**
- **Slow release of radionuclides through engineered barriers**
- △ **Slow migration of radionuclides in the geosphere**

Relative Roles of Barriers and Strategy Elements

- **Strategy utilizes multi-barrier defense-in-depth approach to increase confidence in postclosure performance**
- **Unsaturated environment and engineered barriers are equally important in the near-field system**
- **Natural barriers add confidence that long-term waste isolation will be achieved**
- **Uncertainties in all these elements and barriers will be evaluated through testing and performance assessment**

Importance of Various Barriers at Key Milestones

		1998 Technical Site <u>Suitability</u>	2001 License <u>Application</u>	2008 License Application <u>Update</u>
★ 1	Low flux environment	✓✓✓	✓✓✓	✓✓✓
②	Waste package	✓✓	✓✓✓	✓✓✓
◇ 3	Radionuclide mobilization	✓✓	✓✓✓	✓✓✓
□ 4	Engineered system and diffusion barrier	✓	✓✓	✓✓✓
△ 5	Natural barriers to transport	✓	✓✓	✓✓✓




Reliance on Barrier

Conservative/Bounded ✓

Realistic/Bounded ✓✓

Full Reliance ✓✓✓



Update on Activities Related to Waste Isolation and Containment Strategy

- **Linkages from key uncertainties to site and engineering plans are being further refined and analyzed**
- **Integration with thermal strategy is a key interface**
- **Appropriate changes in testing or engineering plans will be worked as part of mid-year 95 replanning and FY96 planning process**

Topics in the Site Program Highlighted by the Strategy

- **Testing to characterize potential for fast flow-paths**
- **Thermal testing sequence and data needs for Technical Site Suitability and licensing**
- **Possible need for testing related to backfill performance**
- **Saturated zone testing to support dose-based standard**
- **Options for extended performance-confirmation testing**

Topics in the Engineering Program Highlighted by the Strategy

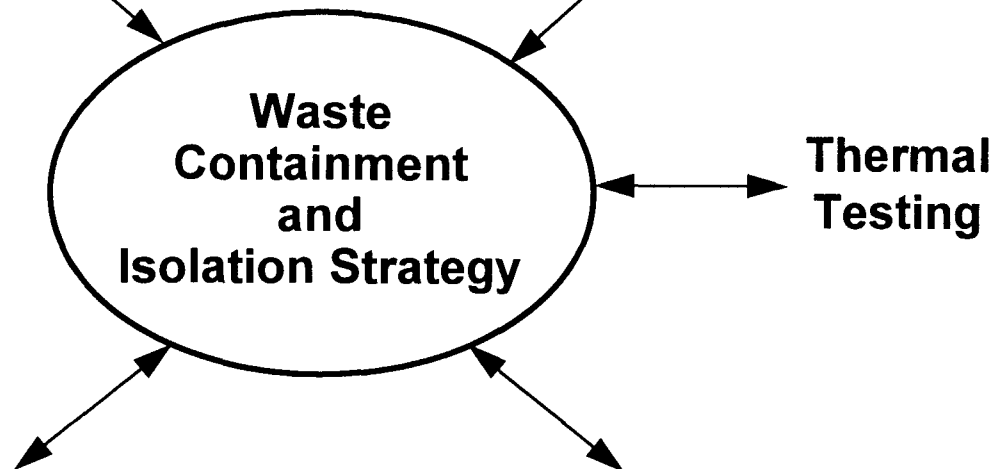
- **Interface from thermal strategy to waste package and repository design**
- **Robust waste package with multi-purpose canister as waste form**
- **Options for backfills**
- **Issues related to extended retrievability period**

Agenda Topics that Tie to the Strategy

Engineered Barrier Performance

- Corrosion Research Update
- Waste Package Design
- Repository Criticality

Thermal Management Strategy



Concept of Operations

- Interfaces to Multi-purpose Canister

Calico Hills System Study