



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Nuclear Energy University Programs

Fiscal Year 2025

Annual Planning Webinar

**NE-81: Disposal Research
Topic Area 5**

May 9, 2024

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The *Grand Challenge* for the Spent Fuel and High-Level Waste Disposition Campaign is to provide a sound technical basis for the safety and security of long-term storage, transportation, and disposal of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) from the nuclear energy enterprise



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NE-81: Office of Spent Fuel & High-Level Waste Disposition



Identify Alternatives



Provide Sound Technical Basis



Develop New Technologies, Models, and
Validation Techniques



Identify and Research Generic Sources of
Uncertainty



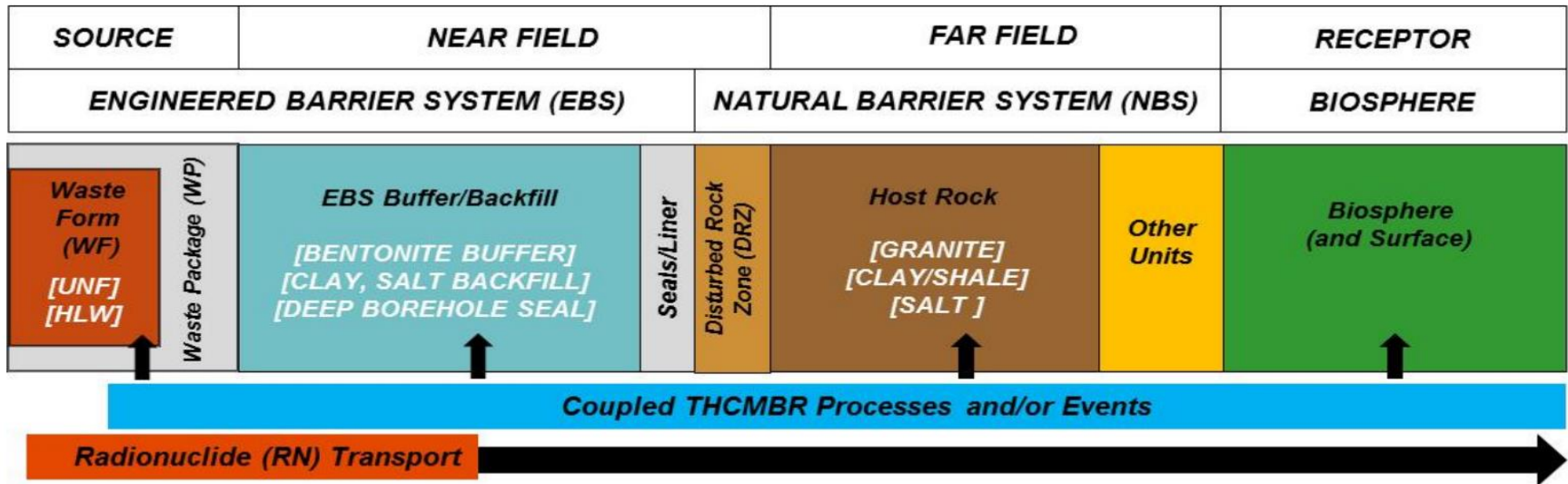
Increase Confidence



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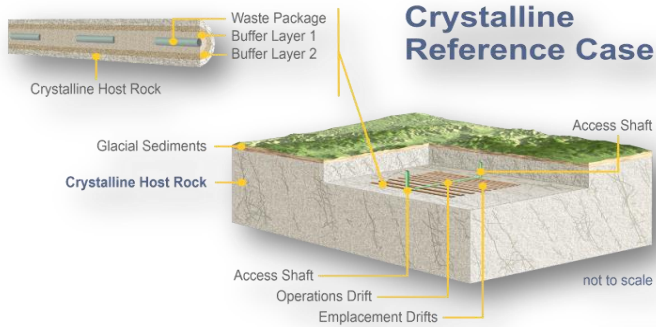
Schematic diagram of the conceptual model framework of a generic geologic disposal system



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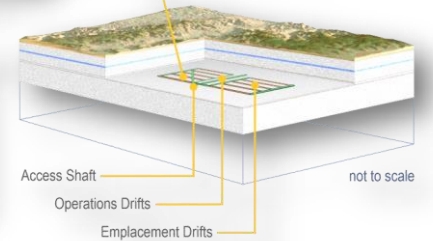
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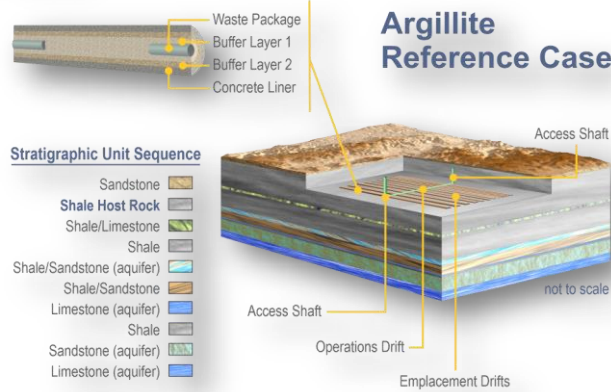


Stratigraphic Unit Sequence

- Surface Sediments
- Halite
- Dolomite (aquifer)
- Halite
- Anhydrite
- Halite (host rock)**
- Anhydrite
- Halite

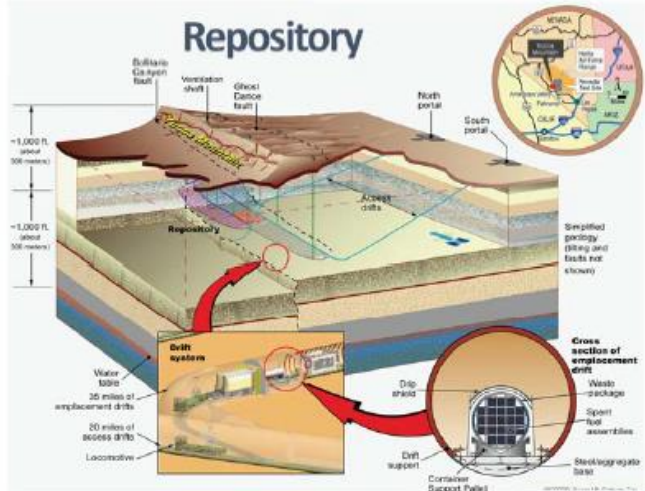


*2019 commercial waste case





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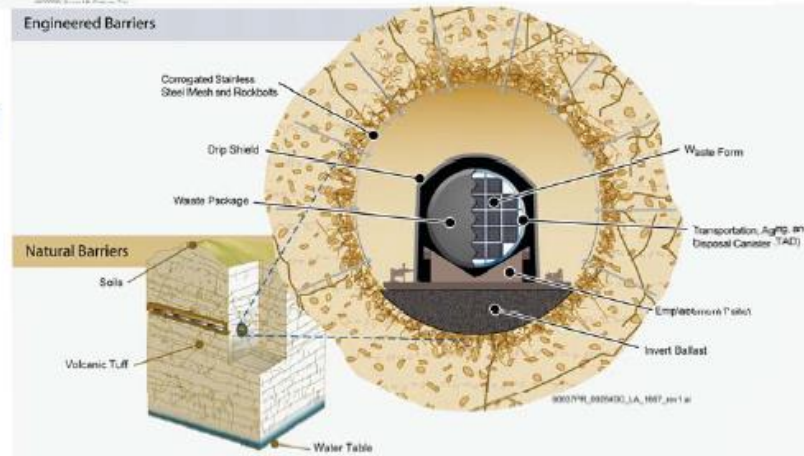


Candidate Geologies

- argillite (clay/shale)
- salt
- crystalline rock
- tuff

Barriers for Waste Isolation

- Unsaturated Zone
- Waste Form
 - **Glass or hard ceramic**
- Engineered Barrier System





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Current Areas of Research

Argillite Disposal R&D

Crystalline Disposal R&D

Salt Disposal R&D

Engineered Barrier System R&D

Direct Disposal of Dual-Purpose Canisters

Geologic Disposal Safety Assessment

International Collaboration on Disposal Research

Technical Support for Underground Research Lab Activities

Inventory and Waste Form Characteristics and Performance

Knowledge Management



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**This
Year's
NEUP
Topics:**

**1. Improving THMC Modeling through
Improving Interfaces between Various
Model Scales**

**2. Improving Geologic Characterization
through Field Tests**

**3. Improving Performance Assessment
Models through Improved Uncertainty
Quantification**
