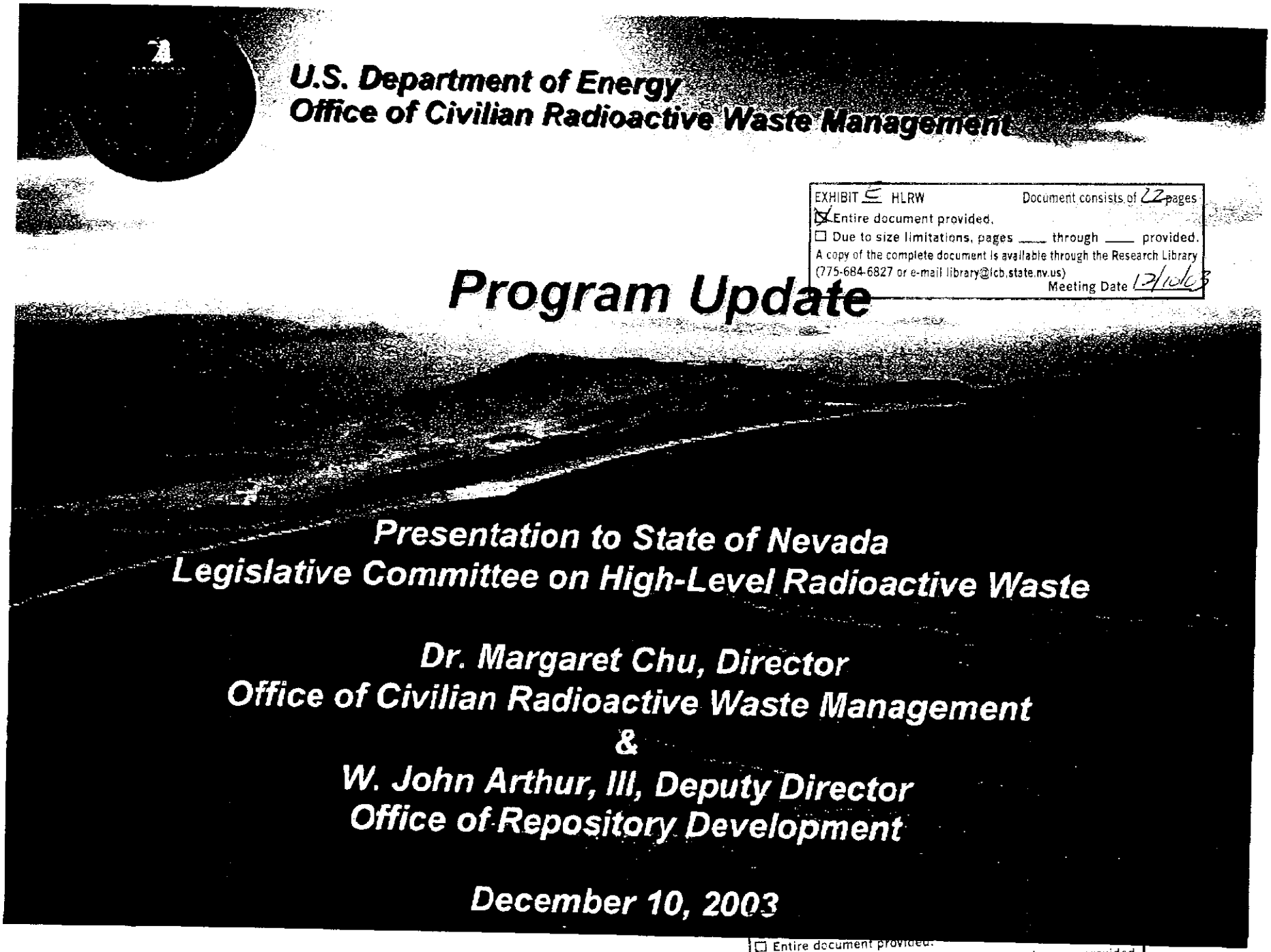


U.S. Department of Energy
Office of Civilian Radioactive Waste Management

Program Update

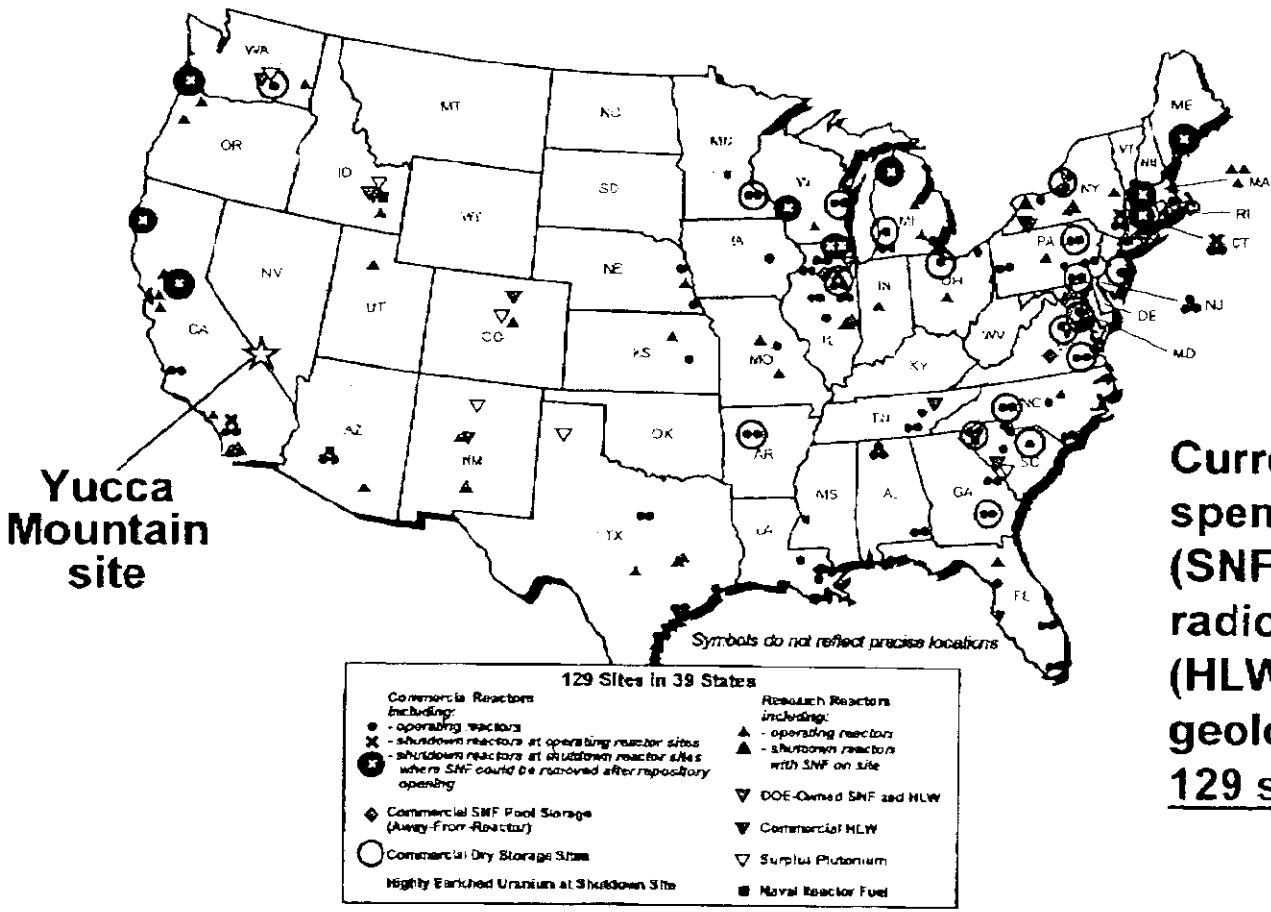
Presentation to State of Nevada Legislative Committee on High-Level Radioactive Waste

Dr. Margaret Chu, Director
Office of Civilian Radioactive Waste Management
&
W. John Arthur, III, Deputy Director
Office of Repository Development

December 10, 2003

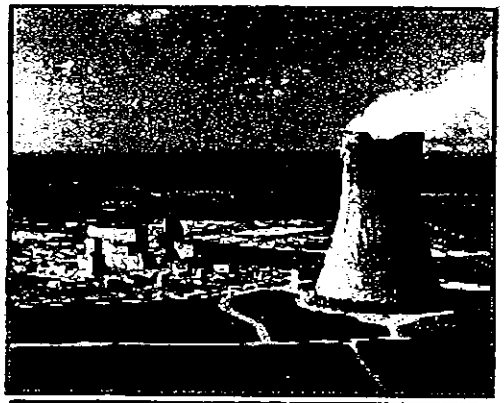
Program Mission

Our Mission is to implement the Federal policy for permanent disposal of high-level radioactive waste and spent nuclear fuel, in order to protect public health and the environment.

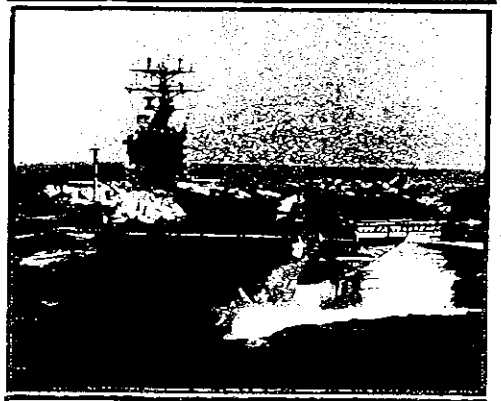


Current locations of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) destined for geologic disposal:
<u>129 sites in 39 states</u>

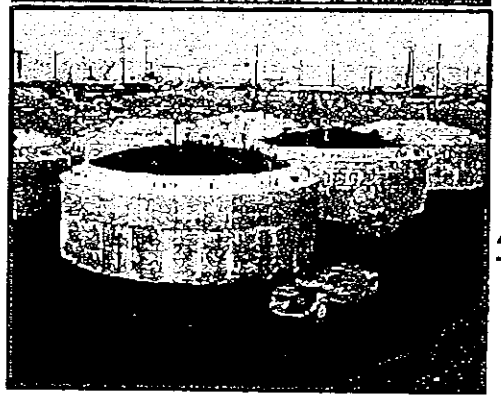
Waste for Yucca Mountain



Commercial Spent Nuclear Fuel:
63,000 MTHM

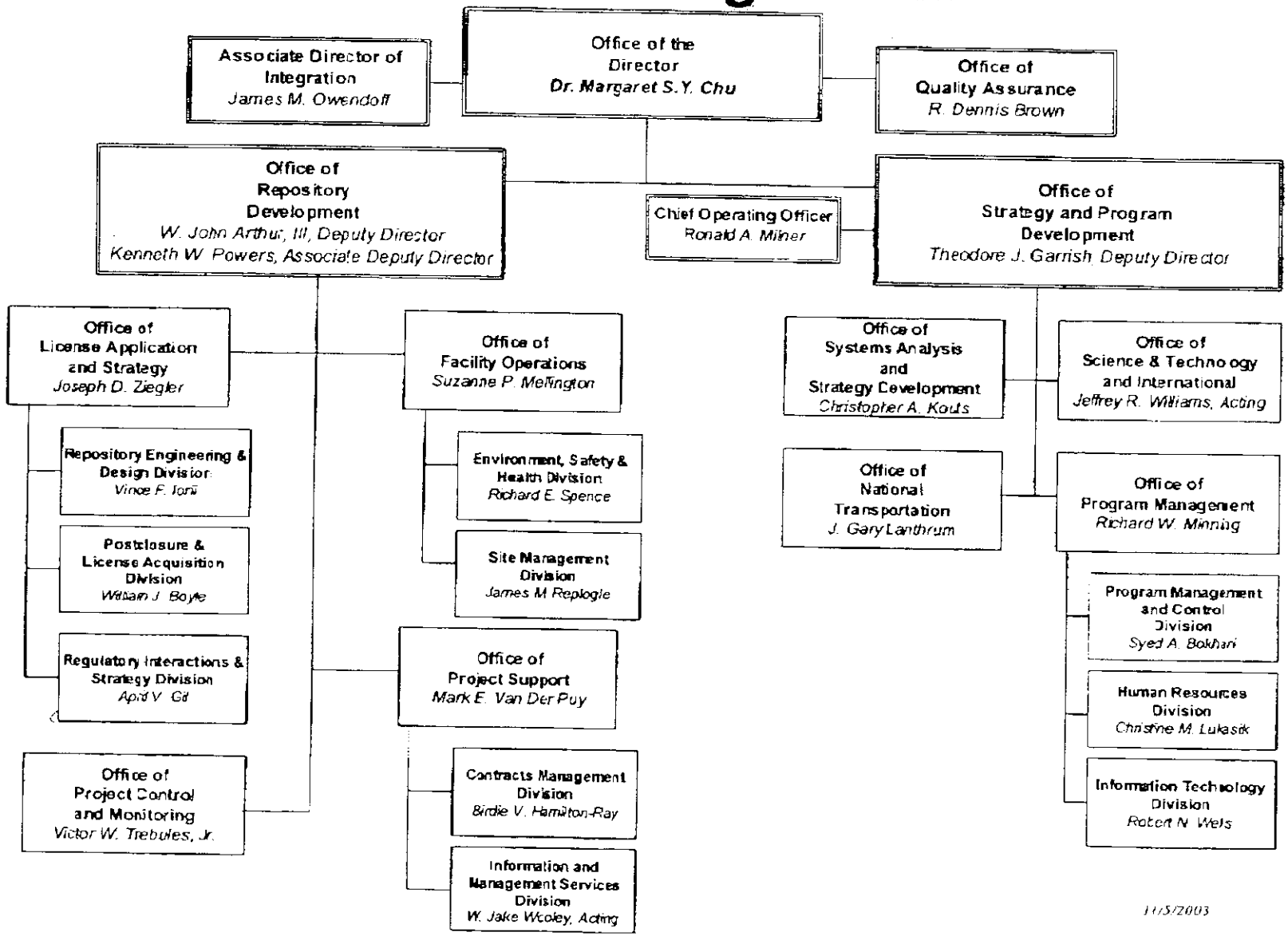


DOE & Naval Spent Nuclear Fuel:
2,500 MTHM

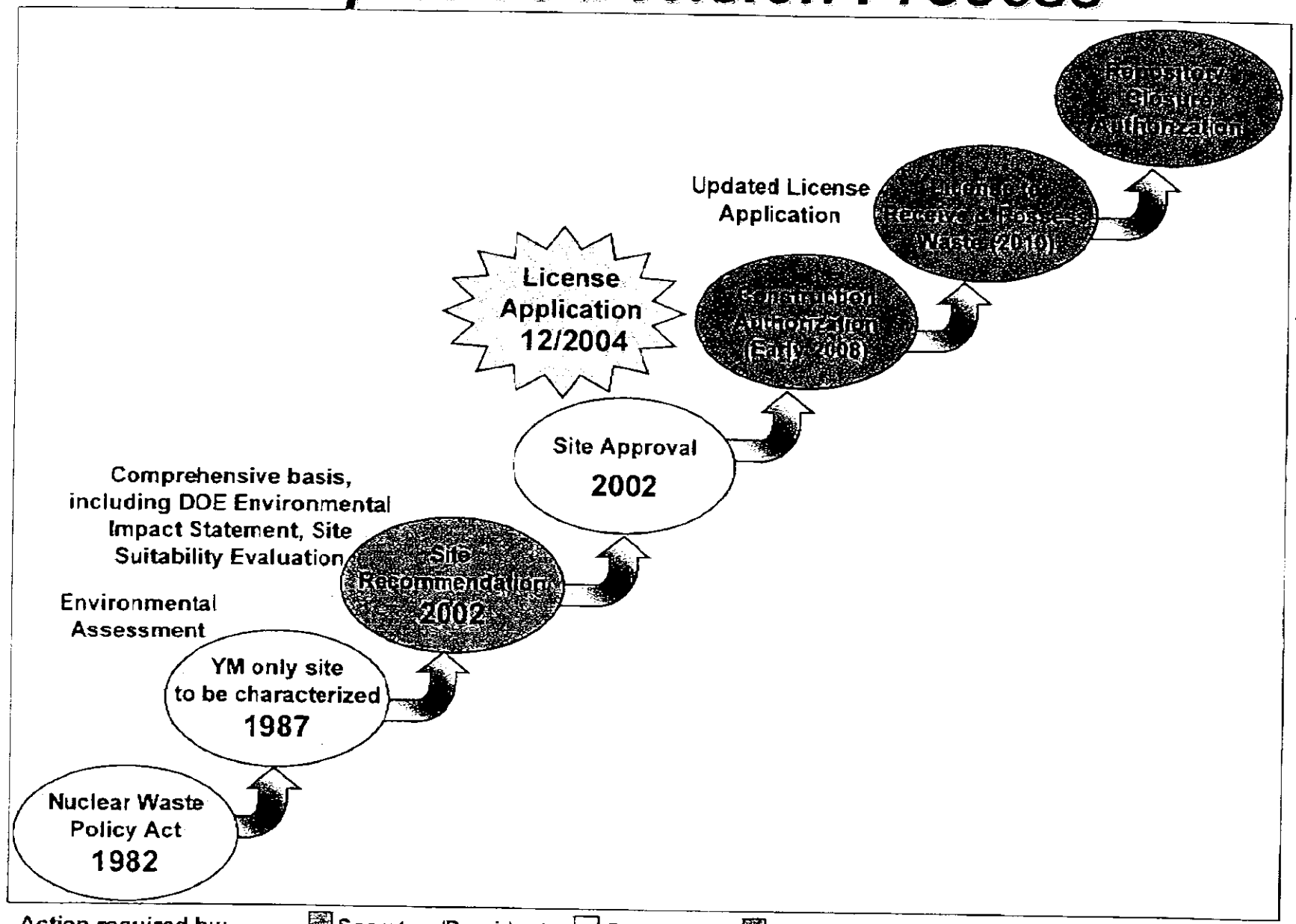


DOE & Commercial High-Level Waste:
4,500 MTHM

Office of Civilian Radioactive Waste Management



Step-Wise Decision Process



Repository Licensing Overview

- We are completing the scientific, technical, and design work necessary to prepare a license application for submittal to the Nuclear Regulatory Commission (NRC)
- License application will present the safety analysis for the repository
- The goal is to demonstrate that the repository can be constructed, operated, and closed in a manner that protects the public and worker health and safety and preserves the quality of the environment

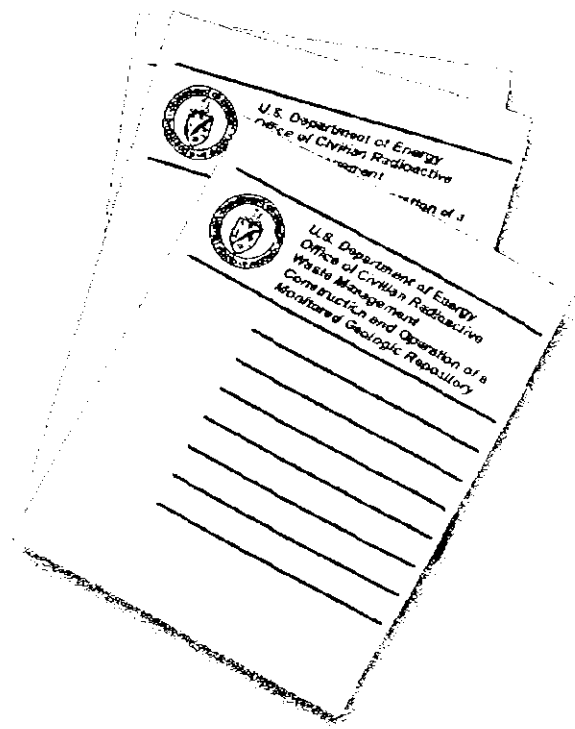
Major Milestones in Licensing

- **December 2004: Submit License Application to NRC**
  - **Progress to date:**
    - **Total License Application effort 46% complete**
    - **Currently 207 Key Technical Issues have been issued to the NRC***
    - **Design 42% complete**
    - **Preclosure safety assessment 51% complete**
    - **LA document preparation 7% complete**
- **2005-2007: NRC licensing proceedings**
- **Early 2008: NRC could grant construction authorization**
- **2010: Following license amendment to receive and possess waste, waste acceptance and transportation would begin**

*All Key Technical Issues will be addressed prior to LA

License Application Will Include...

1. Introduction and general description
2. Important features of natural and engineered systems
3. Site description
4. Repository design
5. Waste package design
6. Engineered barrier system design
7. Preclosure radiological safety
8. Postclosure total systems performance assessment
9. Radioactive waste management
10. Radiation protection
11. Conduct of operations
12. Performance confirmation
13. Land ownership and control
14. Quality assurance



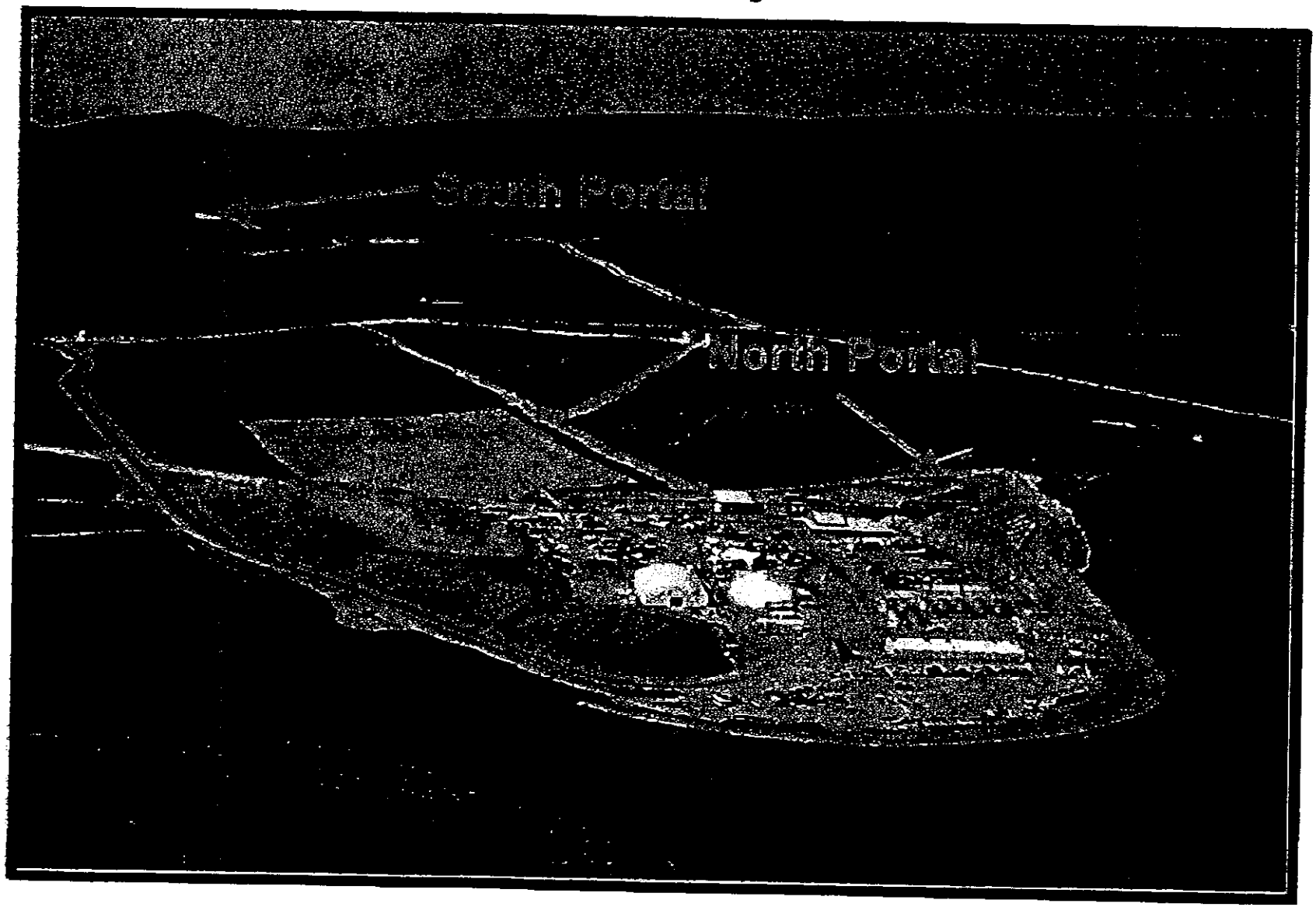
Essential Points of Post-Closure Total System Performance Assessment

- Demonstrate "safety" of repository for 10,000 years through predictive analysis
- Need to consider plausible future scenarios
- Need to consider uncertainties
- Dose-based regulation: *not to exceed 15 mrem/yr at 18 Km*

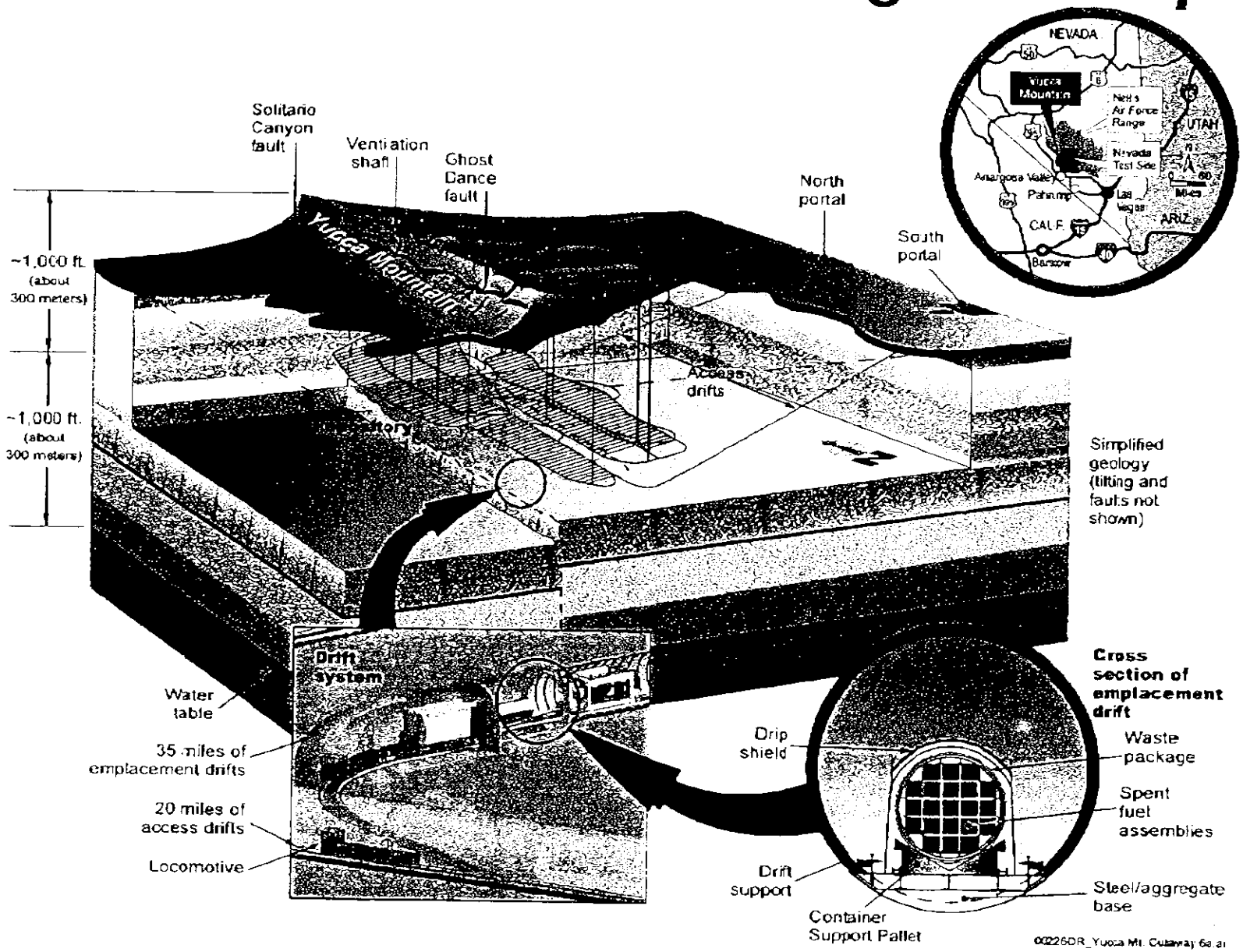
Repository Licensing – NRC Actions

- **After determining if the application is suitable for docketing, the NRC will hold extensive technical reviews and legal hearings**
  - **NRC staff will conduct a technical review (18 months)**
  - **The Atomic Safety and Licensing Board, appointed by the NRC, will conduct the hearings (18 months)**
  - **Administrative hearings will be open to the public**
  - **Electronic discovery will facilitate the licensing proceedings**
- **A construction authorization will be granted only if the NRC concludes that the repository would meet reasonable expectations that the safety and health of workers and the public would be protected**

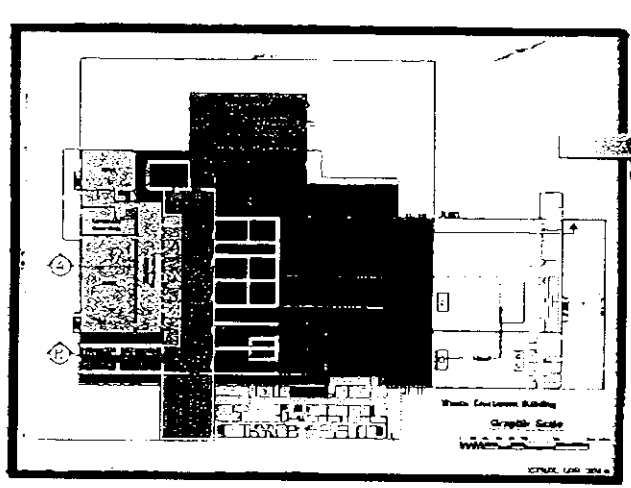
Yucca Mountain Surface at Exploratory Studies Facility Portals



Repository Reference Design Concept

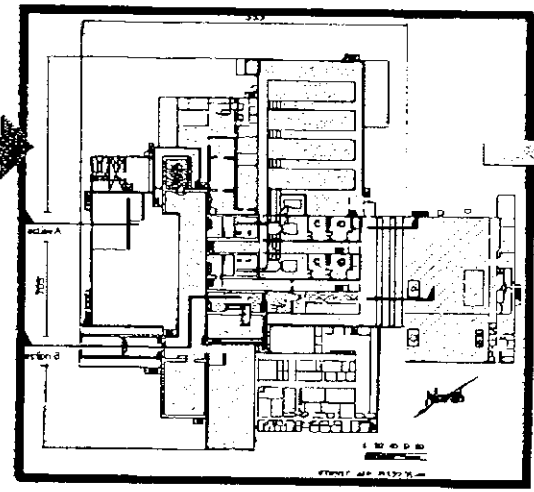


Surface Facility Evolution



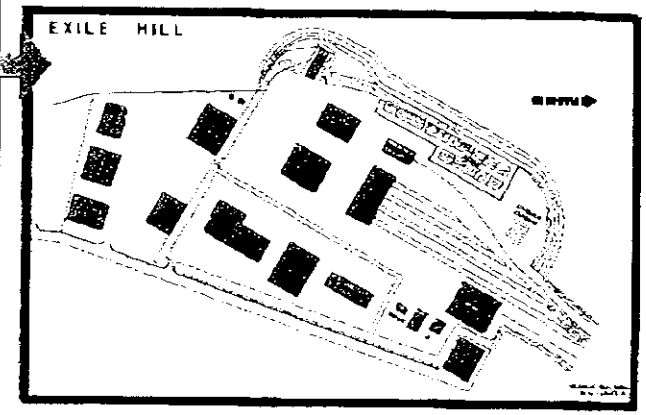
VA Design

- Wet Handling for CSNF
- Single large building
- 5 transfer lines



SR Design

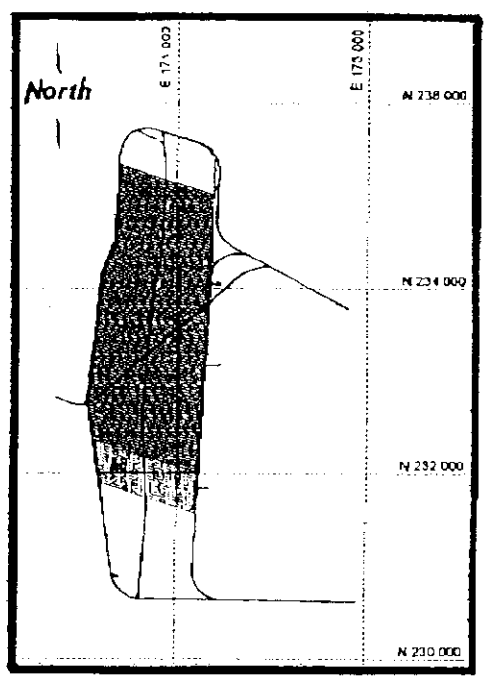
- Wet Handling for CSNF
- Single large building
- 3 transfer lines
- 5,000 MTHM blending pools (to accommodate thermal blending)



Conceptual Design

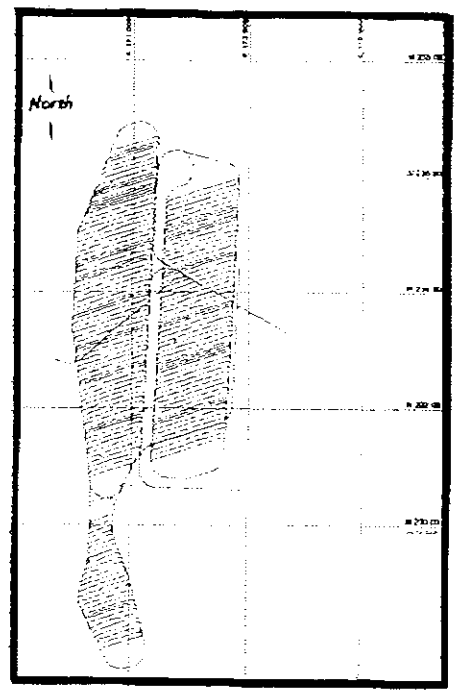
- Dry Handling
- Multiple buildings
- Small pool for off-normal waste
- Phased construction
- Dry cask aging

Subsurface Repository Evolution



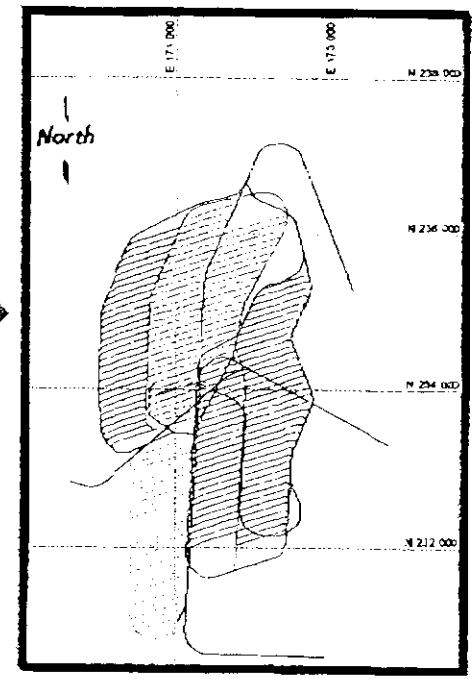
VA Design

- 92 ft Drift Spacing
- Above Boiling Temperature in Rock Pillar
- Single Level
- Minimal Ventilation



SR Design

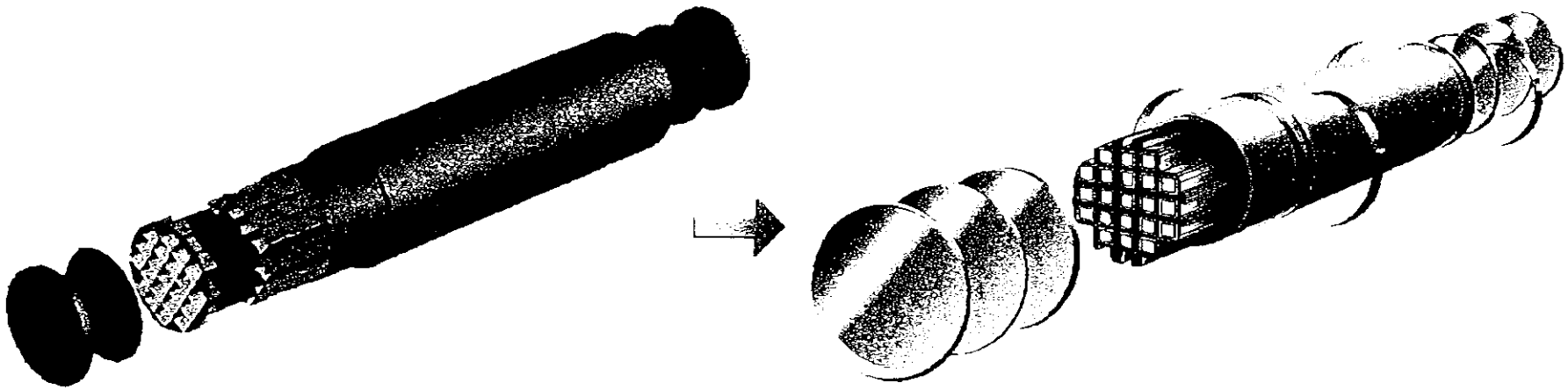
- 266 ft Drift Spacing
- Sub-boiling Temperature in Rock Pillar
- Two Level
- Robust Ventilation with Allowance for Natural Ventilation



Conceptual Design

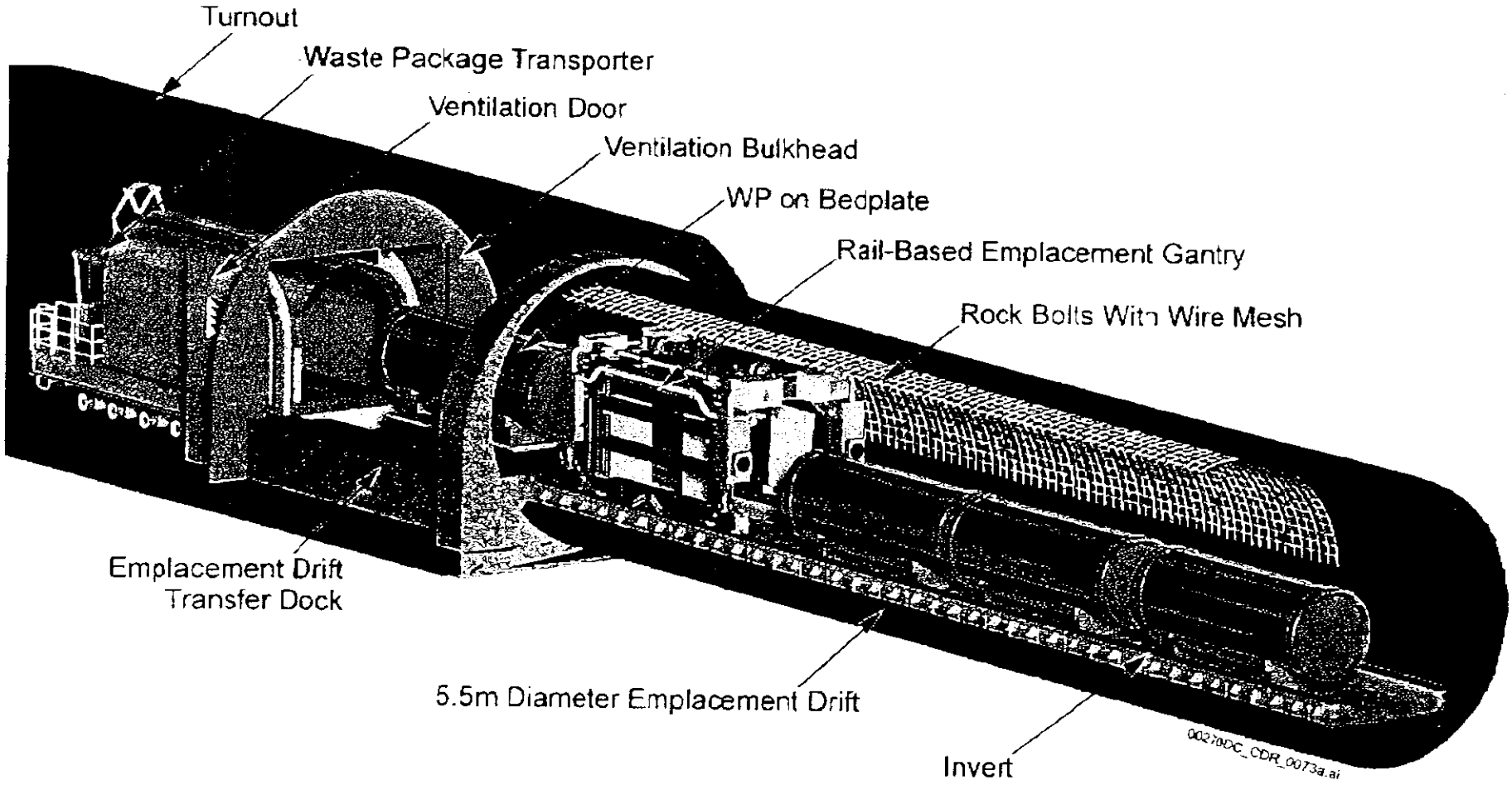
- 266 ft Drift Spacing
- Sub-boiling Temperature in Rock Pillar
- 5 Panel - Two Levels
- Robust Ventilation

Waste Package Evolution

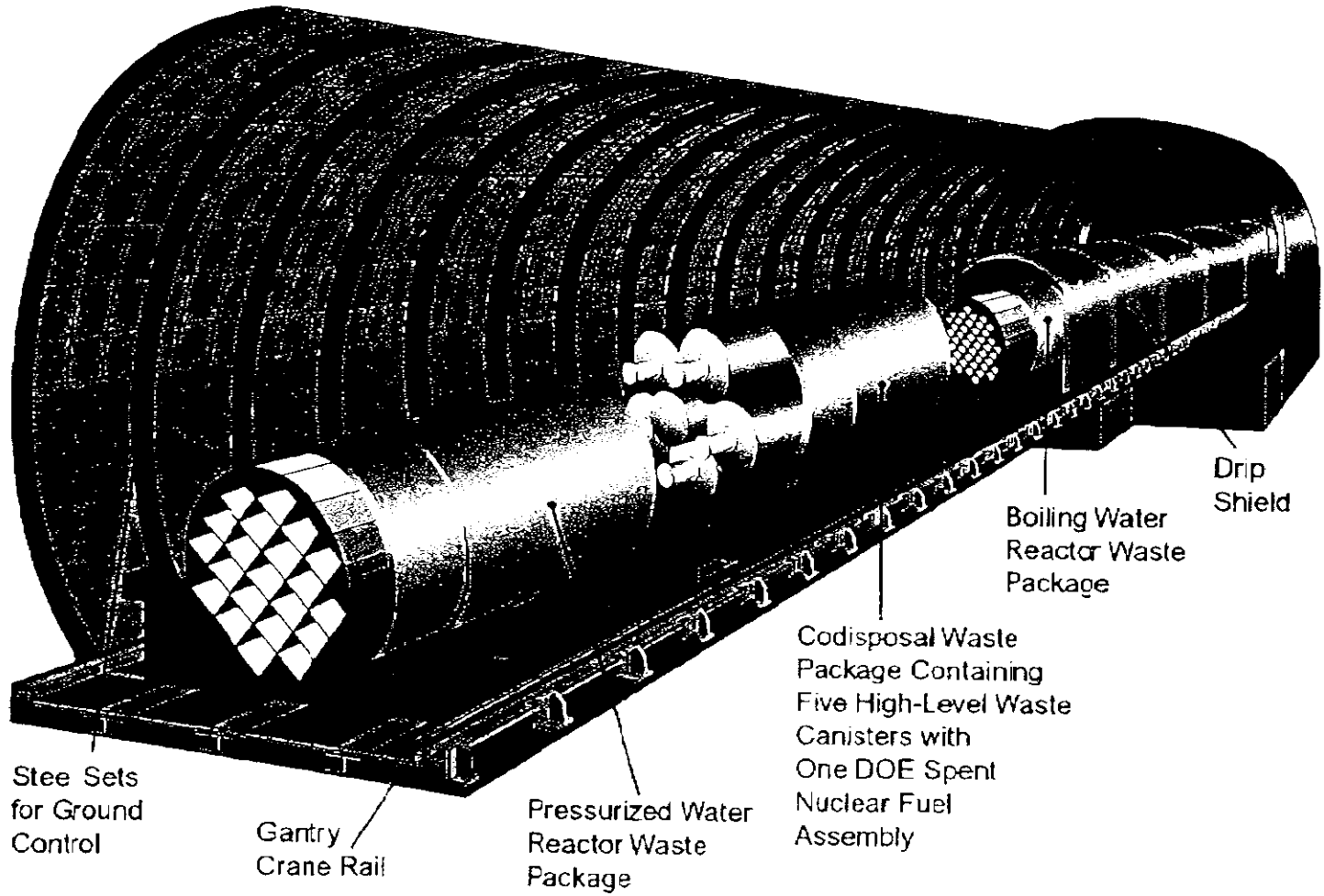


- VA Design
  - Outer Barrier Carbon Steel
  - Inner Barrier Alloy C-22
  - 18 kW Power Limit
- SR and Conceptual Design
  - Outer Barrier Alloy C-22
  - Inner Barrier Stainless Steel
  - 11.8 kW Power Limit

Emplacement Operations



Cutaway of a Drift with Three Types of Waste Packages



Drawing Not to Scale
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Transportation Overview

- After many years of deferral due to budget shortfalls, we are accelerating our planning
- We will build on the experience and proven safety record in the U.S. and Europe
- Over the next 6 years, we will develop a transportation system ready to ship SNF and HLW to the repository
- Near-term activities:
  - Begin consultation with states and tribes to develop an approach for coordination of transportation planning and operational aspects
  - Initiate long-lead-time cask acquisition activities
  - Review path forward on Nevada transportation

Summary

- DOE is committed to the safe disposal of high-level radioactive waste and spent nuclear fuel
- Submittal of license application is planned for the end of 2004
  - Testing, scientific and engineering analyses, and design will continue to address licensing needs
- Interaction with stakeholders is the key to development of the transportation system
- We continue to support interactions with the State of Nevada and Affected Units of Local Government
- DOE is proceeding toward the goal of waste acceptance in 2010