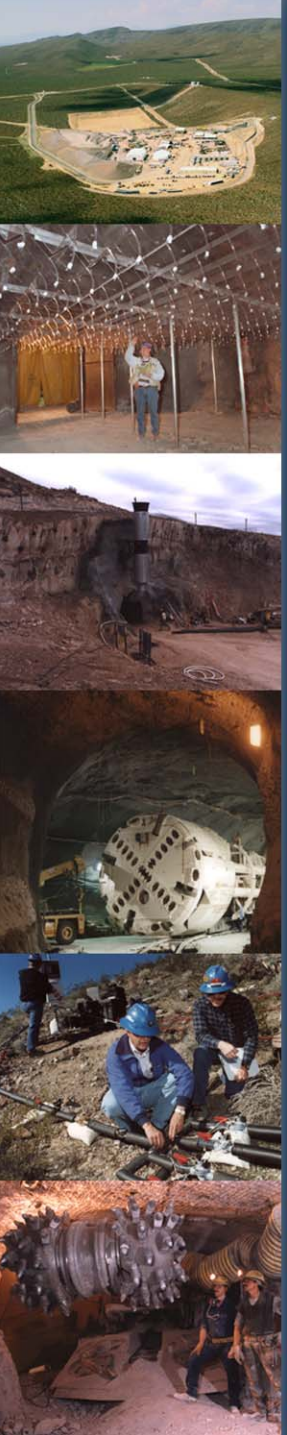

Perspectives on EIS Implementing Alternatives

Presented to:
Nuclear Waste Technical Review Board

Presented by:
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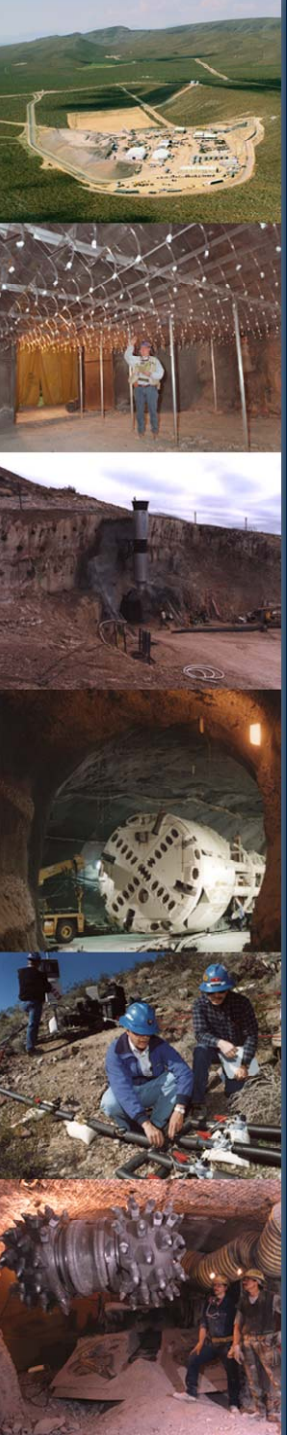
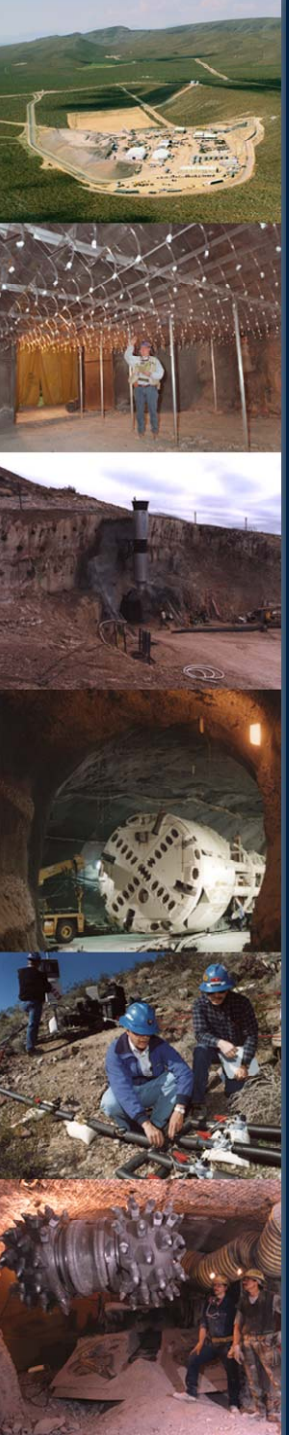
Assistant Manager
Environment, Safety and Health
Repository EIS Project Manager
U.S. Department of Energy YMSCO

June 24, 1998



Discussion Elements

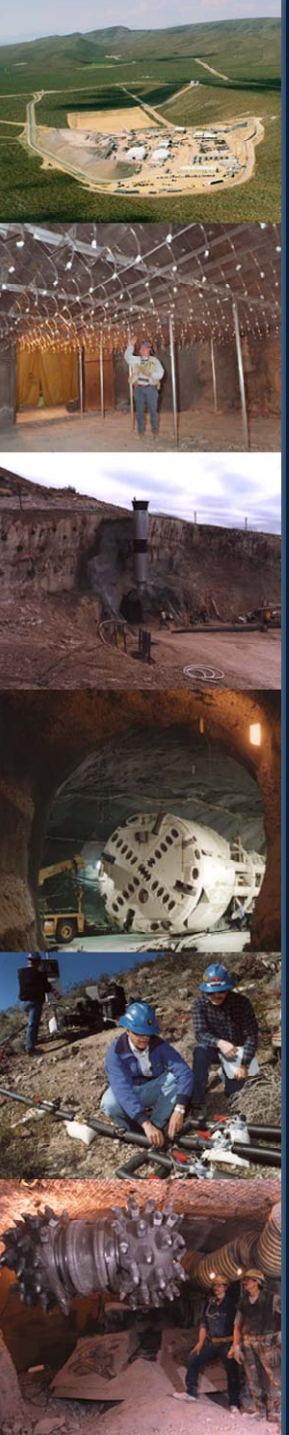
- NWPA considerations
- Goals of the EIS Construct
- Background on selection of thermal load as the foundation for EIS implementing alternatives
- Analysis of design features and their integration into the EIS



NWPA Considerations

- **The EIS is intended to support a Secretarial recommendation to the President on development of the Yucca Mountain site as a repository**

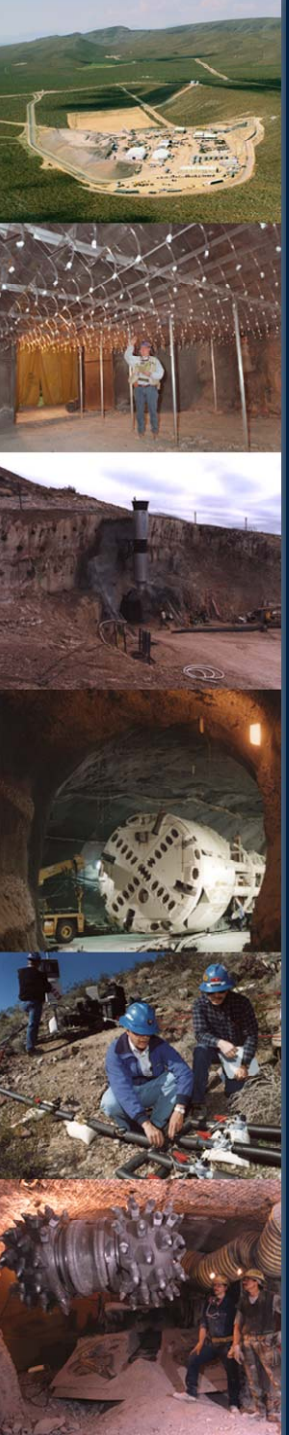
- **The approach to alternatives in the EIS was developed based on the NWPA's "NEPA Roadmap"**
  - **Need not consider:**
    - **need for a repository**
    - **alternatives to geologic disposal**
    - **alternative sites to the Yucca Mountain site**



NWPA Considerations (cont)

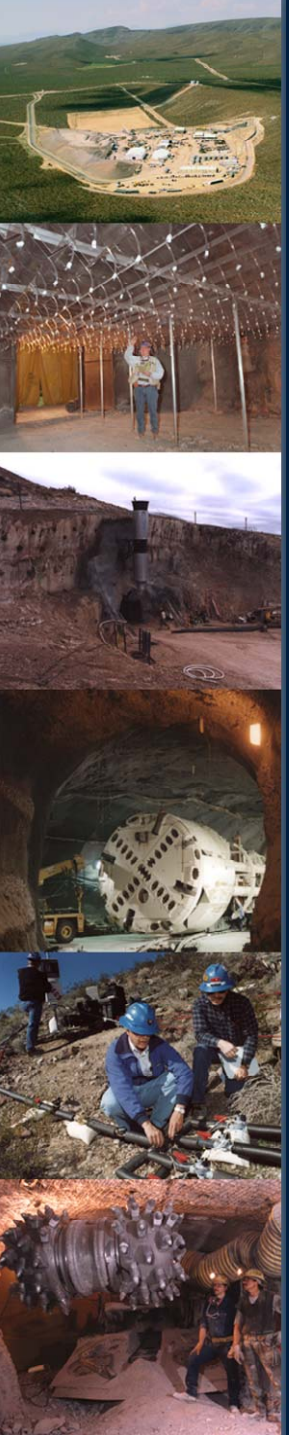
- Congress already made these decisions and directed DOE to streamline its evaluations in the EIS

- Thus, the proposed action is to construct, operate and monitor, and close a repository for disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain



Goals of the EIS Construct

- **Focus on significant environmental issues**
  - **Provide information on issues that are important to the decisionmaker : e.g., long-term repository performance, and human health and safety**
  - **Preserve engineering flexibility and ability to accommodate eventual LA design**
  - **Do not anticipate decisions on implementing alternatives; will be made as part of the evolutionary design process**
  - **Recognize that EISs typically evaluate conceptual designs, are not intended to optimize final design (e.g., value engineering occurs during design after EIS is completed)**



Goals of the EIS Construct (cont)

  - Recognize a need to take advantage of all previous engineering & characterization results
  - Recognize uncertainties in continued evolution of reference design (performance-related), as well as operational aspects

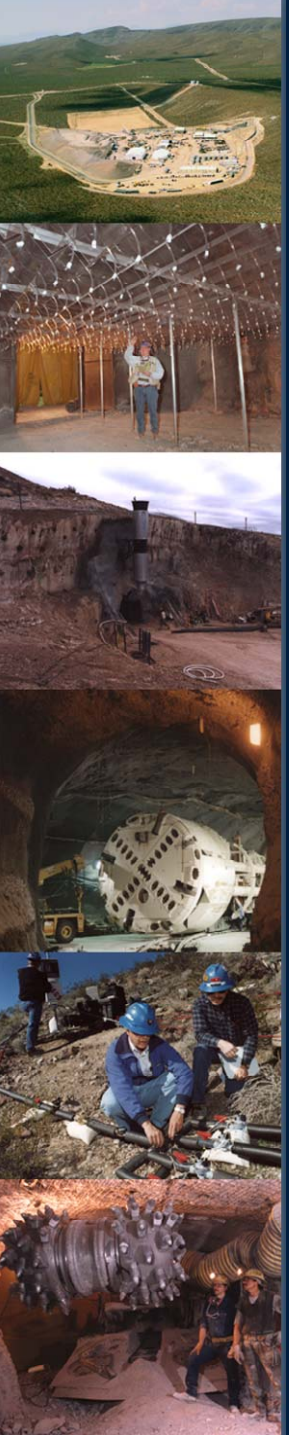
- Reasonably represent the range of environmental impacts from the proposed action





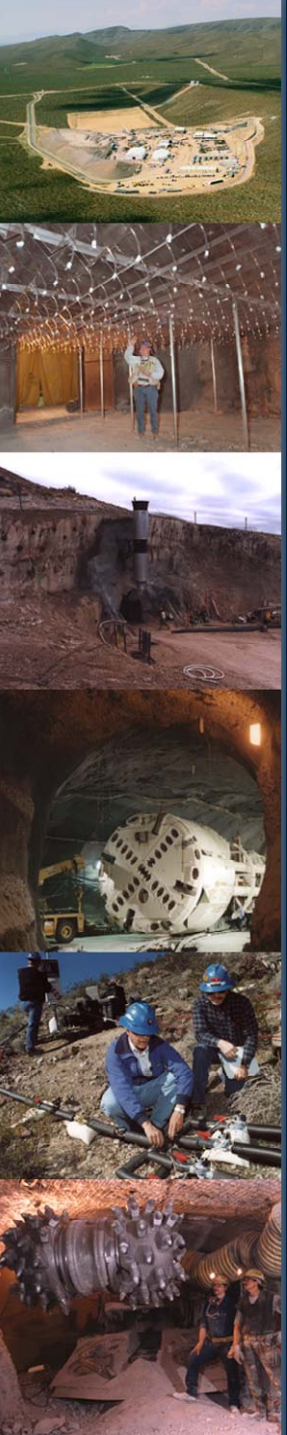

The EIS Construct

- **Implementing alternatives were developed as tools to analyze a range of environmental impacts. Examples included:**
  - **Types of disposal containers & materials**
  - **Drift size & spacing**
  - **Waste emplacement schemes**
  - **Canisters versus uncanistered fuels**
  - **Surface facilities sizing and capabilities**
- **Because of limitless possibilities and in recognition of then-current reference design, features were categorized as performance-related or operational**



The EIS Construct (cont)

- Examination showed that performance-related features and resulting long-term impacts could best be captured by thermal load (lowest common denominator), which influences:
  - corrosion rate of waste packages
  - groundwater flow and transport of radionuclides
- Many operational features could also be captured by thermal load



Full Range of Impacts Encompassed by Thermal Load Implementing Alternatives

Operational Impacts

- Land Use
- Air Quality
- Safety
- Ecosystem
- Socioeconomics
- Waste Management
- Utilities

Performance-Related Impacts

- Radiological Impacts to the Public
- Ecosystem impacts

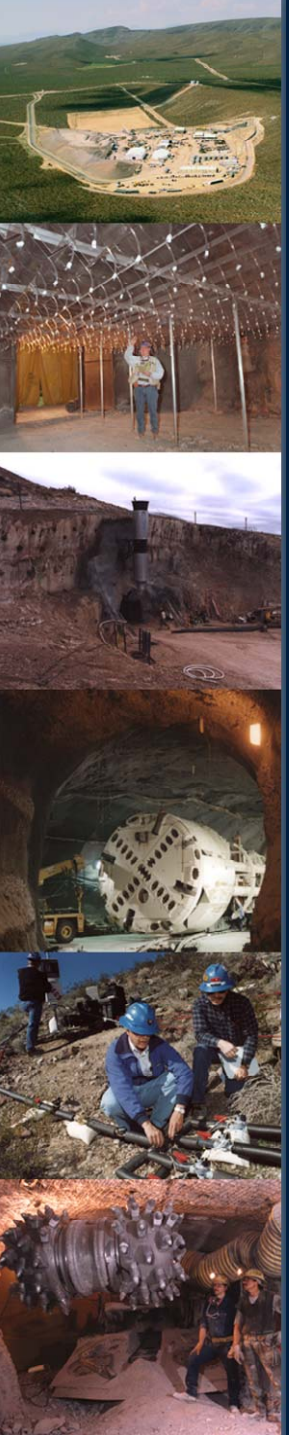





Example of Impacts Bounded by Thermal Load: Utilities

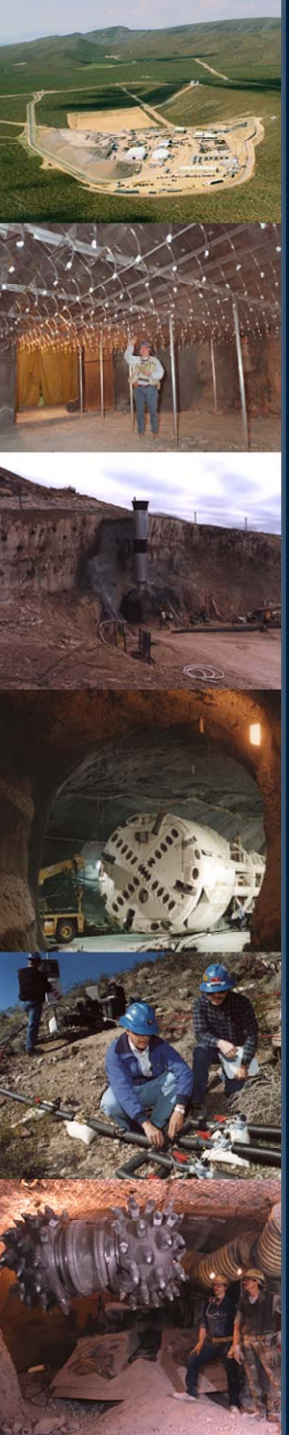
IMPACT FACTOR	BOUNDING CASE*	IMPACT CONTRIBUTORS
ELECTRICAL POWER	MAXIMUM USE CAPTURED BY LOW THERMAL LOAD	# TUNNEL BORING MACHINES, CONVEYORS, VENTILATION FANS, WASTE TRANSPORTERS
POTABLE AND CONSTRUCTION WATER USE	MAXIMUM USE CAPTURED BY LOW THERMAL LOAD	# WORKERS, EXCAVATION VOLUME
SANITARY SEWER	MAXIMUM USE CAPTURED BY LOW THERMAL LOAD	# WORKERS
COMMUNICATIONS	MAXIMUM USE CAPTURED BY LOW THERMAL LOAD	# WORKERS, EXTENT OF EXCAVATION

*Upper Environmental Impact Bounds. Lower Bounds Are Captured By High Thermal Load



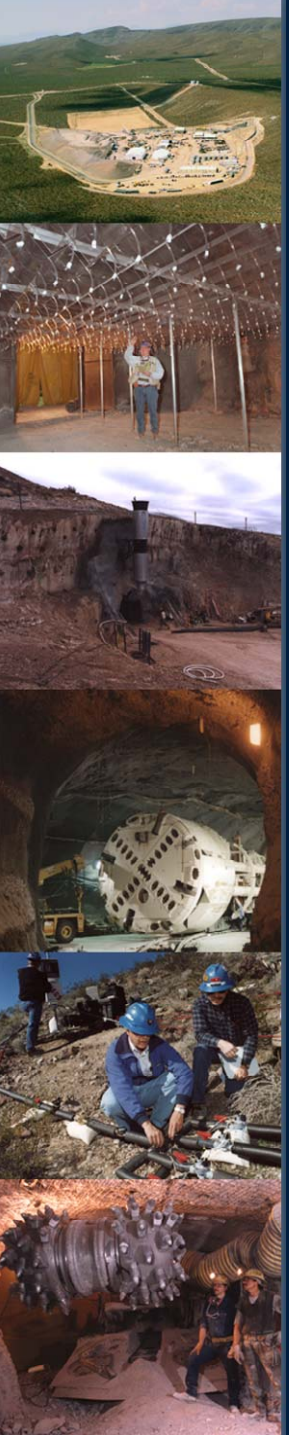
Examples of Operational Impacts Dependent on Thermal Load Implementing Alternatives

- Workforce Size
- Extent of Excavation
- Support Facility Layout
- Utility Usage
- Dust Generation
- Muck, Scrap, Anti-Freeze & Oils Generated
- Failed Equipment
- Temporary Forms & Supports
- Equipment Usage (e.g.Tunnel Boring Machines, conveyers, ventilation, fuel use, test apparatus, muck handling)
- Transportation of construction materials (e.g. cement, aggregate, fuel)
- Ground support
- Waste package piers
- Transporter railway & inverts



Analysis of Potential Impacts

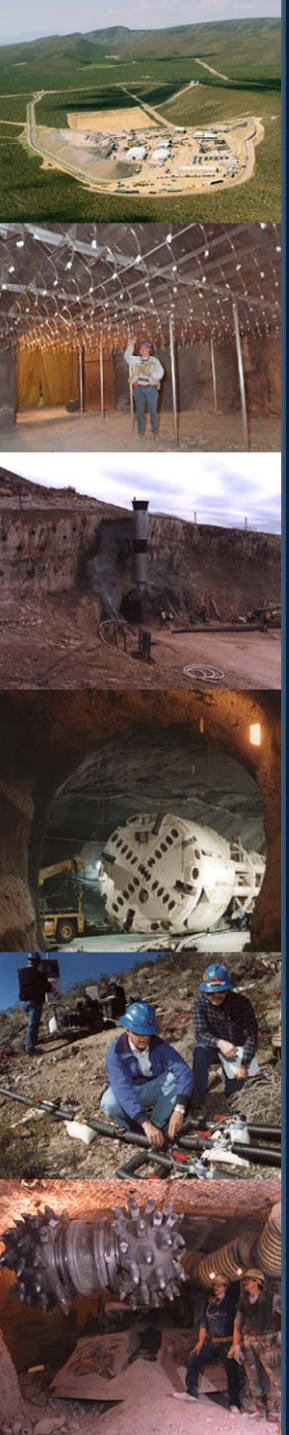
- Selected three thermal load implementing alternatives to “bound” the long-term performance impacts of any likely LA design variations
- Many short-term operational impacts are thus also “bounded” by thermal load implementing alternatives



Analysis of Potential Impacts (cont)

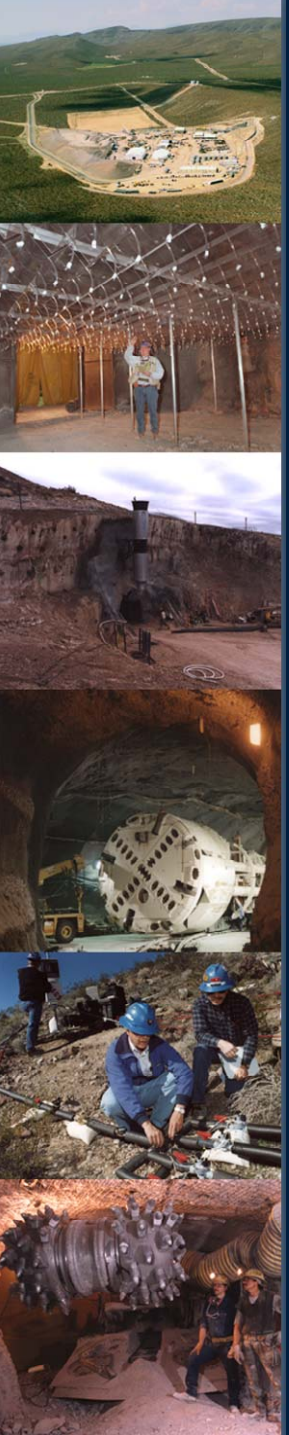
Packaging and transportation options bound other short-term operational impacts such as:

- **Land Use**
- **Air Quality**
- **Health & Safety**
- **Utilities**
- **Ecosystem**
- **Cultural Resources**
- **Socioeconomics**



Bounding Defined

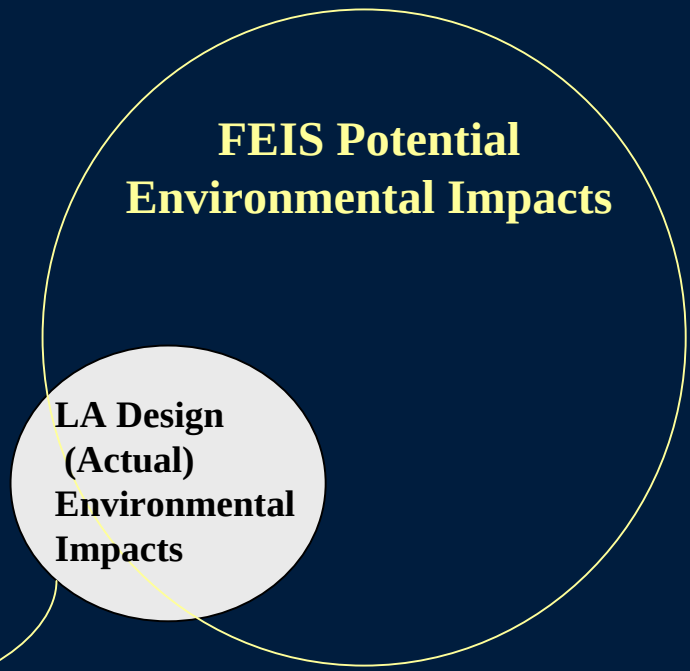
- Reasonably represent the uppercase environmental impacts from a particular feature or combination of features
- Only considers lower case environmental impact limits if impacts are deemed significant
  - Significant environmental impacts will be factored into design features/alternatives study being conducted to determine the design to carry into License Application



Bounding Defined

Impacts Bounded

Impacts Not Bounded



Additional Environmental Impact Analysis






REPOSITORY ENVIRONMENTAL IMPACT STATEMENT ANALYSES

Whether or not to Recommend the YM Site to the President

"GO" ALTERNATIVE

"NO GO" ALTERNATIVE

IMPLEMENTING DESIGN ALTERNATIVES

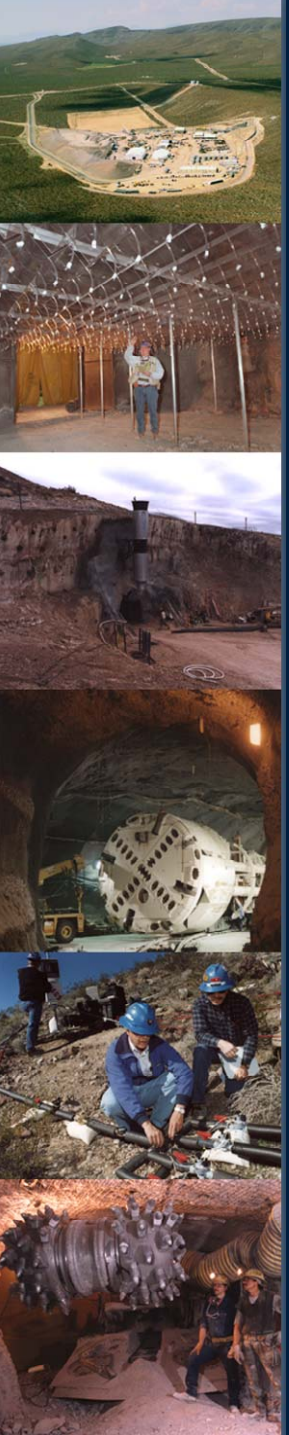
- HIGH
- INTERMEDIATE THERMAL LOADS
- LOW

TRANSPORTATION OPTIONS

- ***NATIONAL***
  - RAIL
  - LEGAL WEIGHT TRUCK
- ***NEVADA***
  - RAIL/ INTERMODAL IMPLEMENTING ALTERNATIVES
    - RAIL
    - INTERMODAL/ HEAVY HAUL
    - LEGAL WEIGHT TRUCK

SNF PACKAGING OPTIONS

- **CANISTERED**
  - some commercial SNF
  - all DOE SNF
- **UNCANISTERED**
  - some commercial SNF



Conclusion

- To date our analyses show that the combination of implementing alternatives with packaging and transportation options produces a full range of reasonably foreseeable environmental impacts
- However, we recognize the need to continue to assess the potential impacts of engineered design features on this construct