NUCLEAR WASTE TECHNICAL REVIEW BOARD
TRANSPORTATION & SYSTEMS PANEL

SUBJECT: NEVADA POTENTIAL REPOSITORY
PRELIMINARY TRANSPORTATION STRATEGY STUDY 1

PRESENTER: RICHARD D. MEMORY

PRESENTER'S TITLE AND ORGANIZATION: MANAGER, SYSTEMS ANALYSIS AND MODELING
MANAGEMENT AND OPERATING CONTRACTOR
LAS VEGAS, NEVADA

TELEPHONE NUMBER: (702) 794-1837

ARLINGTON, VA
JUNE 14, 1995
Study Purpose

- Support the NEPA information needs relative to transportation mode/corridor
  - Determine/document the process/timelines/costs associated with acquisition of SNF/DHLW transportation capability to the potential repository site at Yucca Mountain
Scope

- Emphasize Nevada transportation of waste leaving waste producer sites via rail transport (i.e. arriving in Nevada by rail)
Objectives

- Identify reasonable alternatives for transportation
- Categorize rail transportation options
  - Recommended for detailed evaluation
  - Eliminated from detailed evaluation but monitor for changes
  - Eliminated from further study
- Develop or update cost estimates
- Document EIS options with linkages to design and construction
Background

• 1990 Preliminary Rail Access Study
  – Evaluated 10 rail routes out of 13 identified
  – Provided rough-cost estimates
  – Recommended three routes (Carlin, Caliente & Jean) for greater detail evaluation

• 1992 Caliente Route Conceptual Design Report
  – Provided detailed analysis including land use, environmental and institutional aspects
  – Provided refined costs

• Other studies conducted by Eureka County, Lander County and University of Nevada, Reno
Route Selection Reminder

- Criteria to be used for Nevada transportation mode and route selection cannot be finalized until EIS scoping is complete

- EIS process will provide input to final mode/route selection
Transportation Modes Considered

- Rail
- Heavy haul truck (i.e. truck shipments in excess of 129,000 lbs. gross vehicle weight)
- Legal weight truck
Preliminary Rail Access Study
Proposed Routes

Legend
- Highway Routes
- Mainline Railroads
- - - - - Identified Rail Alternatives

NN - Nevada Northern Railroad
SP - Southern Pacific
UP - Union Pacific
1 Valley
2 Arden
3 Jean
4 Crucero
5 Ludlow
6 Mina
6A Mina Option
7 Caliente (Options A and B)
8 Carlin
9 Cherry Creek
10 Dike
11 Lincoln County Option A
12 Lincoln County Option B
13 Lincoln County Option C
# Rail Route Option Categorization

<table>
<thead>
<tr>
<th>Route Status</th>
<th>Recommended for Detailed Evaluation</th>
<th>Eliminated From Detailed Evaluation Monitor</th>
<th>Eliminated From Further Study</th>
<th>Remarks/Reasons</th>
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<tr>
<td>Caliente</td>
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<td>Minimal land use conflicts</td>
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<td>Carlin</td>
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<td>High probability of resolving land use conflicts</td>
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<td>Jean</td>
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<tr>
<td>Valley Modified</td>
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<td>Favorable topography, lowest cost, flexibility of personnel and freight transportation</td>
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<td>Cherry Creek</td>
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<td>Privately owned branch line connection. Track would require upgrading.</td>
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<td>Dike</td>
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<td>X</td>
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<td>Potential Nellis Air Force Range conflicts, combined with Valley Modified</td>
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<tr>
<td>Mina</td>
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<td>X</td>
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<td>Infringes on Walker River Paiute tribe right-of-way, possible Fallon Air Force Base expansion</td>
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<tr>
<td>Arden</td>
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<td>X</td>
<td></td>
<td>Significant potential land use conflicts with private and Nature area lands (Probable population growth in foothills of Spring Mountain)</td>
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<td>Crucero</td>
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<td>Significant portion of route traverses wilderness protection area (California Desert Conservation Act of 1994)</td>
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<td>Nellis Air Force Range conflicts, DOD lands</td>
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<td>Nellis Air Force Range conflicts, no direct access, would require intermodal transfer station, rough topography</td>
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<tr>
<td>Valley</td>
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<td>Significant potential land use conflicts with private and Nature area lands (Red Rock Canyon Conversation Act), combined with Valley Modified</td>
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**Remarks/Reasons**

- Minimal land use conflicts
- High probability of resolving land use conflicts
- Minimal land use conflicts, favorable topography, length and costs
- Favorable topography, lowest cost, flexibility of personnel and freight transportation
- Privately owned branch line connection. Track would require upgrading.
- Potential Nellis Air Force Range conflicts, combined with Valley Modified
- Infringes on Walker River Paiute tribe right-of-way, possible Fallon Air Force Base expansion
- Significant potential land use conflicts with private and Nature area lands (Probable population growth in foothills of Spring Mountain)
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- Significant potential land use conflicts with private and Nature area lands (Red Rock Canyon Conversation Act), combined with Valley Modified
Proposed Transportation Corridor, Caliente Route

Nevada Land Ownership

- Private
- State
- Water
- Indian
- Bureau of Land Management
- United States Forest Service
- National Parks, Monuments, and Recreation Areas
- Federal Wildlife Refuges and Management Areas
- Department of Energy
- Department of Defense
Nevada Land Ownership

- Private
- State
- Water
- Indian
- Bureau of Land Management
- United States Forest Service

National Parks, Monuments, and Recreation Areas
Federal Wildlife Refuges and Management Areas
Department of Energy
Department of Defense

Existing Railroad

Scale:
5 0 5 10 MILES
5 0 5 10 KM

Cherry Creek Route
Lincoln County Option A & B

Legend
- Highway Routes
- Mainline Railroads
- Identified Rail Alternatives

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OREGON
IDAHO
NEVADA
CALIFORNIA
ARIZONA
UTAH
Lincoln County Option C

Legend
- Highway Routes
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NN - Nevada Northern Railroad
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Cost Estimate Approach/Assumptions

- Utilized unit costs developed in Caliente Conceptual Design Report
- Costs estimated based on estimated length within a grade classification (0-3%, 3-6%, >6%)
- Also considered costs of tunnels, grade separations, and drain structures
- Added 35% contingency to construction costs
- Estimated planning, engineering, construction management, and administration costs as 24% of construction total
- Operations and Maintenance costs were based on DOE-owned and -operated equipment with single mission usage
Cost Comparison of Alternative Routes
(FY94 Million Dollars)

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<tr>
<th>Routes Selected for Future Evaluation</th>
<th>Route Mileage</th>
<th>Estimated Cost of Rail Design &amp; Construction</th>
<th>Estimated Annual Cost of Rail Operation &amp; Maintenance</th>
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Heavy Haul Option

• Road transportation requires heavy haul
  – SNF
    « 125 tons maximum loaded cask weight
    « 75 tons maximum loaded cask weight
  – HLW
    « 115 tons maximum loaded cask weight

• Heavy haul requirements*
  – Intermodal transfer station
  – Transporter

• Three heavy haul routes identified
  – Caliente
  – Arden
  – Valley/Dike Siding

* Assume use of existing highways only
Intermodal Transfer Station Concept

- It must be capable of transferring an MPC/transportation cask from rail to heavy haul truck
- Crane load capacity must be sufficient for 125 ton payload
Intermodal Transfer Station Concept

- RAIL MAINLINE
- MINIMUM FENCED AREA SIZE - 210' x 600'
- RAIL SIDING
- PAVED ROAD
- OFFICES
- WAREHOUSE
- 150 T OVERHEAD CRANE W/20' TRAVEL
- 70' X 200' HIGH BAY BUILDING
- 148' LONG HEAVY HAUL TRANSPORTER
- GRAVEL ROAD
Heavy Haul Transporter

- Maximum tandem axle loading 58,400 lbs
- 13 axles
- Total empty weight of tractor and trailer 120,000 lbs
- Steerable trailer
Proposed Heavy Haul Routes

- Proposed Routes for Heavy Haul Transport of 75 and 125 Ton Casks
- Potential Intermodal Transfer Station Areas
- Other Highway
- Rail
- Potential Repository Outline
- Conceptual Controlled Area Boundary
Heavy Haul Cost

- Annual permit from state of Nevada is approximately $30,000/year
- Truck company contract cost approximately $10,000 - $15,000/shipment
- Intermodal transfer facility approximately $2.6 million
- Total cost over 24-year period about $170 million (based on 11,230 shipments)
Heavy Haul Issues

- Caliente route (SR 375, US 6 & SR 317) requires rerouting three months each year due to Nevada frost restriction regulations

- Arden route (SR 160) currently has wide load restrictions (8’6” maximum width allowed vs. 11.0’ transportation cask width)

- Valley/Dike siding route (I 15 & US 95) traverses Las Vegas area

- Heavy haul shipments have time-of-day and day-of-week restrictions
Legal Weight Truck

- Legal weight truck (LWT) limited to a gross vehicle weight of not greater than 80,000 lbs.

- According to current DOE plan, 4-11% of SNF will be transported by LWT. Based on the assumption that 4-19 reactors cannot accommodate rail transport

- LWT routes in Nevada will be determined using United States Department of Transportation regulations, which allow for State designation of preferred alternatives (49CFR 397.101 & 397.103)
Yucca Mountain Railroad/Heavy Haul Truck Transportation Schedule
*(EIS Development with no Additional Analysis)*

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*FISCAL YEAR*

- **Construction Authorization Start**
- **Repository Construction Update License Application**
- **License to Receive and Process Waste**
- **Road Upgrades**
- **9 YEARS FLOAT**
- **5 YEARS FLOAT**
## Yucca Mountain Railroad/Heavy Haul Truck Transportation Schedule

*(EIS Development with Additional Analysis)*

### Fiscal Year Activities

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### Diagram

- **Fuel Receipt/Underground Emplacement/License to Receive and Possess Waste**
- **Selection of either rail or heavy haul from NEPA Process**
- **Design NEPA Process and Construction Schedule - Road Upgrades**
- **Removal of Contaminated Soil**
- **Reclamation - Site Restoration and Land Use**

31
Nevada Transportation Strategy

- IDENTIFICATION PHASE:
  - 4 Rail Corridors
  - 3 Heavy Haul Truck Routes
  - Legal Weight Truck

- EVALUATION PHASE:
  - NEPA
  - Conceptual Design

- DECISION
  - Mode
  - Schedule
  - Route
  - Usage