Yucca Mountain Transportation Update

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Presentation to
California State Agency Representatives
California Energy Commission
Sacramento, CA
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Yucca Mountain Transportation Update

- Spent Fuel Transportation Hazards
- National Transportation Issues
- Nevada Transportation Issues
- California Transportation Issues
- Routing/GIS Issues (TRAGIS)

Additional documentation available at www.state.nv.us/nucwaste/trans.htm
Yucca Mountain Shipments Potential Impact on California

Over 24 Years:
6,867 – 48,374 truck shipments (13%-91% of total); or
660 – 9,643 rail cask shipments (6%-90% of total)

Over 38 Years:
14,479 – 89,554 truck shipments (13%-82% of total); or
1,207 – 18,046 rail cask shipments (5%-82% of total)
Fresh Fuel Assemblies
Spent Fuel Storage Pool
Spent Fuel Transportation Hazards

- Direct SNF exposure deadly for 50+ years
- Each cask contains enormous amount of dangerous radioactive materials
- Routine radiation from casks hazardous to workers and to some members of public
- Cask breach in worst-case accident: 5-4,000+ latent cancer fatalities (LCFs) and $300,000-$10 billion+ cleanup costs
- Cask breach in successful terrorist attack: 48-1,800+ LCFs and $10 billion+ cleanup costs
- Shipping casks not tested full-scale
National Transportation Issues

• No DOE Plan for national transportation to Yucca Mountain
• DOE FEIS (2002) for Yucca Mountain evaluated mostly rail and mostly truck shipping scenarios for 24 and 38 years
• DOE ROD (2004) for Yucca Mountain selected mostly rail as preferred mode
• Feasibility of rail transportation has not been demonstrated
Potential Repository Shipments
Over 24 Years, 2010-2033

DOE Mostly Rail Scenario: 10,725 Cask-Shipments (about 8 rail casks and 1 truck cask per week; additionally there would be 2,000 + barge and/or heavy haul truck shipments from 24 reactors to rail connections)

DOE Mostly Truck Scenario: 53,086 Cask-Shipments (about 6 trucks per day, plus 300 rail casks of naval SNF shipped from Idaho in 100-300 trains)

Source: DOE-EIS-0250, Appendix J
Potential Repository Shipments
Over 38 Years, 2010-2048

DOE Mostly Rail Scenario: 22,057 Cask-Shipments (about 10 rail casks and 2 truck casks per week; additionally, there would be 3,500+ barge and/or heavy haul truck shipments from 24 reactors to rail connections)

DOE Mostly Truck Scenario: 108,899 Cask-Shipments (about 8 trucks per day, plus 355 rail casks of naval SNF and other wastes shipped from Idaho in 119-3355 trains)

Source: DOE-EIS-0250, Appendix J
Yucca Mountain Shipments Compared to Past Shipments

- 43 Times More SNF Shipped Per Year
- 8 to 38 Times More Casks Shipped Per Year
- 5 to 40 Times More Shipments Per Year
- 443% Increase In Average Rail Shipment Distance
- 280% Increase In Average Truck Shipment Distance
- Western Route Characteristics and Operating Conditions
- Potential Unprecedented Reliance on Heavy Haul Truck and Barge Shipments

DOE “Representative” Rail Routes to Yucca Mountain
DOE “Representative” Truck Routes to Yucca Mountain
Affected Jurisdictions & Populations
Along Yucca Mountain Routes

• Truck and rail routes could traverse up to 45 states, 700 counties, and 50 Indian Reservations
• More than 120 million people live in counties traversed by truck routes
• More than 100 million people live in counties traversed by rail routes
• More than 11 million people live within one-half mile (800 meters) of a potential highway route

Source: Dilger & Halstead, Many Roads to Travel, WM’03, February 2003
Nevada Rail Transportation Issues

- Currently no rail access to Yucca Mountain
- DOE FEIS (2002) evaluated 5 options
- DOE ROD (2004) selected Caliente corridor
- DOE preparing Caliente Rail DEIS (May 2005)
- Caliente would be longest (320 miles) new rail construction in US since 1930s (cost>$1 billion)
- Significant environmental challenges & conflicts with ranching, mining, recreation, and Native American lands & cultural resources
- Caliente option impacts City of Las Vegas
- Heavy Haul Truck (HHT) options infeasible
Caliente Corridor

City of Caliente
Caliente Corridor
Cathedral Gorge State Park
Caliente Corridor

Timber Mountain Pass
Caliente Corridor

Golden Gate Range
Caliente Corridor
Heizer Land Sculpture “City”
Caliente Corridor
Joe Fallini and Cow Canyon
Western Shoshone Land Claims
(Caliente Rail Route)
Military Aircraft Over-flights
Endangered Species
Union Pacific RR – Las Vegas
(Looking West from Stratosphere)
Heavy Haul Truck Rig for Use With Yucca Mountain Shipments
Rail Access Summary

• Direct rail access to national rail network is highly desirable for repository site
• Yucca Mountain site lacks rail access
• DOE has not demonstrated feasibility of any of the 5 rail access options identified in the FEIS
• Alternative to rail spur, HHT delivery from intermodal transfer station, probably not feasible
• Rail shipments through downtown Las Vegas will be a major issue in any future DOE transportation planning activities
Legal-Weight Truck Access

DOE FEIS Proposed Truck Routes
NDOT B ROUTE

I-80/US93A: West Wendover
NDOT B ROUTE

US6: Murry Summit
NDOT B ROUTE
US95: Goldfield
POSSIBLE LWT/HHT ROUTE

US93: Caliente
POSSIBLE LWT/HHT ROUTE

US93: 9-Mile Ascent to Summit
POSSIBLE LWT/HHT ROUTE

SR375: Hancock Summit
POSSIBLE LWT/HHT ROUTE
SR375: Rachel
<table>
<thead>
<tr>
<th>Location</th>
<th>24 Years</th>
<th>38 Years</th>
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<tbody>
<tr>
<td>Diablo Canyon</td>
<td>121</td>
<td>308</td>
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<tr>
<td>Humboldt Bay</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Rancho Seco</td>
<td>21</td>
<td>21</td>
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<tr>
<td>San Onofre</td>
<td>138</td>
<td>277</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>286</strong></td>
<td><strong>612</strong></td>
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## Base Case California Truck Shipments to Yucca Mountain

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<th>Location</th>
<th>24 Years</th>
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<tr>
<td>Diablo Canyon</td>
<td>729</td>
<td>2,101</td>
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<tr>
<td>Humboldt Bay</td>
<td>44</td>
<td>44</td>
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<tr>
<td>Rancho Seco</td>
<td>124</td>
<td>124</td>
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<tr>
<td>San Onofre</td>
<td>853</td>
<td>1,698</td>
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<tr>
<td><strong>Total</strong></td>
<td>1,750</td>
<td>3,967</td>
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## Base Case Cask-Shipments to Yucca Mtn through California

<table>
<thead>
<tr>
<th>Scenario</th>
<th>24 Years</th>
<th>38 Years</th>
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<tr>
<td>Mostly Truck Scenario</td>
<td>6,867 (13%)</td>
<td>14,479 (13%)</td>
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<tr>
<td>Mostly Rail Scenario</td>
<td>660 (6%)</td>
<td>1,207 (5%)</td>
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## Maximum Cask-Shipments to Yucca Mtn through California

<table>
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<td>Mostly Truck Scenario</td>
<td>48,374 (91%)</td>
<td>89,554 (82%)</td>
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<tr>
<td>Mostly Rail Scenario</td>
<td>9,643 (90%)</td>
<td>18,046 (82%)</td>
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Truck Shipments Through California (Southern Consolidated Routing)
Rail Shipments Through California (Southern Consolidated Routing)
East-West Rail Routes via Chicago
UP Proviso Yard, Chicago
UP Proviso Yard, Sears Tower
Gibbon, NE
Western Rail Routes
Using GIS to inform Policy

• Transparent to the stakeholders
  – No hidden formulas
  – No obscure procedures
  – No unavailable data

• Answer relevant stakeholder questions

• Provide outputs in useful forms
  – Numbers and pictures
The Questions

• Where will the greatest effects be for shipping HLW to Yucca Mt?
• What is a legitimate method for allocating 180c funds based on these effects
• Are there unique conditions in the west?
Limitations of WebTragis

• Designed to meet operational agency needs, not stakeholder policy needs
• Difficult to show cumulative impacts and environmental justice impacts
• Unstratified demographic data-only population for an entire route
• Obscure data sources (Landscan satellite)
• Poor output (jurisdictions, scaling)
Black Mountain Model

- Windows XP Caliper (TransCAD or Maptitude)*
- Publicly available data sources
- Flexible path definition-no delays for stops or refueling calculated---Alternative routing schemes.
- Multi-modal, potentially intermodal
- Uses census demographic data
- Uses a common GIS format
- User friendly way to replicate and evaluate DOE route proposals

*Software in use by most affected agencies in their Dept. of Transportation or in local Planning agencies