Repository Transportation Planning, Risk Management, and Public Acceptance: Lessons Learned

Bob Halstead
State of Nevada Agency for Nuclear Projects, Carson City, NV

Fred Dilger, PhD
Black Mountain Research, Henderson, NV

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Additional documentation available at www.state.nv.us/nucwaste/trans.htm
Overview

• Yucca Mountain terminated
• Blue Ribbon Commission evaluating options
• Yucca Mountain transportation lessons learned applicable to future storage and disposal facilities:
  o National Impacts
  o Facility Licensing
  o Site Selection

• Larger Lessons Learned
  o WGA-DOE WIPP Transportation Experience
  o NAS Safety Recommendations
  o NRC Regulation of NWPA Shipments
Conclusions - General

• Transportation must be given equal consideration with storage and disposal, at every stage, in planning and implementing a successful national nuclear waste management program.

• Critical transportation requirements, such as mainline rail access and interstate highway access, must be addressed at the very beginning of site selection. Otherwise, transportation could become the Achilles Heel of a proposed site.

• Risk assessment, risk management, and risk communication will be required over the entire life of operations - for storage, transportation, and disposal.
Yucca Mountain Lesson: Future Shipments Will Be A Matter of National Concern

- SNF & HLW currently stored at 76 sites in 34 states
- SEIS “representative routes” to Yucca Mountain would have traveled 22,000 miles of railways and 7,000 miles of highways
- SEIS “representative routes” to Yucca Mountain would have traversed 44 states, the District of Columbia, 33 Indian nations, and about 836 counties with a population of about 161 million (2005 Census estimates)
- 10 - 12 million people live within one-half mile (800 meters) of these rail and highway routes
- Routes to Yucca Mountain would have affected most of the nation's congressional districts (330 in the 110th Congress).
Yucca Mountain Lesson: Transportation Will Likely Be Considered in Licensing

• “...the NRC’s NEPA responsibilities do not end at the boundaries of the proposed repository, but rather extend to the transportation of nuclear waste to the repository. ... Without the repository, waste would not be transported to Yucca Mountain. Without transportation of waste to it, construction of the repository would be irrational. Under NEPA, both must be considered.” NRC ASLB, May 2009

• NRC ASLB admitted 46 NEPA transportation contentions

• Admitted contentions include virtually all aspects of transportation risks and impacts
Yucca Mountain Lesson: Address Transportation in Site Selection

- 1984 DOE repository siting guidelines (10 CFR 960.5-2-7) qualifying, favorable & potentially adverse conditions
- 1986 DOE first repository EAs: Yucca Mountain worst site for rail access, interstate highway access, system impacts
- 1987 Congress ignored Yucca Mountain transportation
- DOE SEIS 2008 selected Caliente rail alignment – longest new US rail project in 80 years, 300+ miles, $2.7 billion; rail routes to Caliente would have traversed downtown Las Vegas
- DOE SEIS 2008 routed all highway shipments through Las Vegas metropolitan area
Public Acceptance: Adopt DOE-WGA

WIPP Transportation Program Principles

• Cooperative planning between DOE and SRGs
• Comprehensive accident prevention and emergency response program (extra-regulatory)
• Formal documentation similar to WIPP Program Implementation Program Guide (WIPP PIG)
• Shared Risk Communication Program
• DOE responsible for all costs associated with assuring safe transportation (assume NWF funding for NWPA shipments)
Public Acceptance: Implement NAS 2006 Risk Management Recommendations

• Address social risk
• Additional analyses of severe accident fires
• Full-scale testing (not to destruction)
• Identify suite of preferred rail and truck routes as soon as practicable, involving states and tribes
• Ship older fuel first (with few exceptions)
• Immediately implement section 180© of the NWPA, and include emergency responders in program planning and communication with affected communities
• Mostly rail option, avoid extended truck transportation
• Use dedicated trains (avoid general trains)
• Protect sensitive information, facilitate access to open information

[Last three items largely adopted by DOE in 2008]
Public Acceptance: Extend NRC Regulation to NWPA Shipments

- Regulate DOE SNF and HLW shipments to NWPA facilities the same as NRC licensee shipments (Possible exception: Naval SNF)
- NRC Proposed Rule 10 CFR 73.37 satisfactorily addresses sabotage concerns (apply to NWPA shipments, except possibly Naval SNF)
- Consider NRC regulation of DP or TAD canister loading at reactors, if canisters are destined for NWPA storage or geologic disposal
Now-Terminated Yucca Mountain Transportation System (2008 SEIS)

- Ship 9,495 rail casks (2,800 trains) & 2,650 truck casks over 50 years [p.6-8]
- If No 2\textsuperscript{nd} Repository: 21,909 rail casks (about 6,700 trains) & 5,025 truck casks [p.8-41]
- Average 1-3 trains (3-5 casks per train) & 1-2 trucks (1 cask per truck) per week for 50 years
- Every day, for 50 years, one or more loaded casks on rail or road, from 76 shipping sites to a single national repository or storage site
OCRWM Transportation

- Total Transportation (a) (b) $20.250 billion
- Development and evaluation .740 billion
- Cask systems (c) 10.870 billion
- Rolling stock & facilities .380 billion
- System support 2.450 billion
- Operations execution 3.120 billion
- Nevada rail infrastructure project 2.690 billion

(a) $780 million spent 1983-2006
(b) $96.180 billion total for repository including transportation thru 2133
(c) Unit costs: truck casks-$4.4 million; rail casks- 4.5 million; rail overpacks- 4.5 million; TAD canisters-0.7-0.8 million
NDOT B ROUTE
US6: Murry Summit
NDOT B ROUTE
US95: Goldfield
Yucca Mountain Transportation Access Routes – DOE
1986 EA
Railroad Roots: City of Caliente and Lincoln County Lobbied DOE for Rail Spur
Proposed Caliente Rail Corridor
Caliente Corridor Terrain Challenges

Caliente Rail Profile

Caliente Corridor Water Features

Legend
- Private Property
- Caliente 1 Mile Corridor
- Yucca Mt
- Railroad
- Caliente Stream Type

3D View of Flood Hazard Area
Caliente Corridor Land Use Conflicts
Land Use Conflict - Major Outdoor Art Installation: M. Heizer, “City”

An Artist at the End of the World

...ument to finish what may be the biggest sculpture on earth.

By Michael Kimmelman
Bridge Washout at MP 431.81
(January 2005)
Rail & Truck Routes to Yucca Mountain Through Las Vegas & Clark County
Proximity of The Strip to UP Mainline to Caliente
In Addition to Trains 1-2 Trucks per Week through Metro Las Vegas to Yucca Mountain

Rail Casks through Las Vegas to Yucca Mountain via Caliente
Minimum – 8%  Maximum – 79%

Located in Las Vegas within 0.5 mile (800 m) of Truck Routes to Yucca Mountain:
-113,000 Residents

Located in Las Vegas within 0.5 mile (800 m) of UPRR Route to Caliente:
-95,000 Residents
-34 Hotels, 49,000 Hotel Rooms
-40,000 Visitors & Workers

Legend
- Railroad
- Hotels
- Radiological ROI (rail)
- Radiological ROI (Truck)