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

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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:
 - \circ National Impacts
 - \circ Facility Licensing
 - \circ Site Selection
- Larger Lessons Learned
 - \odot WGA-DOE WIPP Transportation Experience
 - NAS Safety Recommendations
 - \odot 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 2nd 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 Life Cycle Cost Estimates (2007 \$)

- Total Transportation (a) (b)
- Development and evaluation
- Cask systems (c)
- Rolling stock & facilities
- System support
- Operations execution
- Nevada rail infrastructure project
- (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

\$20.250 billion .740 billion 10.870 billion .380 billion 2.450 billion 3.120 billion 2.690 billion

NDOT B ROUTE US6: Murry Summit



NDOT B ROUTE US95: Goldfield



Yucca Mountain Transportation Access Routes – DOE 1986 EA



DOE Rail Route Studies, 1990-1991





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 Land Use Conflicts









Land Use Conflict - Major Outdoor Art Installation: M. Heizer, "City"



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



Rail Casks through Las Vegas to Yucca Mountain via Caliente



595

1-2 Trucks per Week

In Addition to Trains