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**REMARKS OF ROBERT R. LOUX, EXECUTIVE DITECTOR,
NEVEADA AGENCY FOR NUCLEAR PROJECTS
TO THE
U. S. NUCLEAR WASTE TECHNICAL REVIEW BOARD
ON THE STATE OF NEVADA'S APPROACH TO HIGH-LEVEL
NUCLEAR WASTE TRANSPORTATION RISK MANAGEMENT**

February 25, 2003

Introduction

Let me preface my remarks this afternoon by saying the State of Nevada contends that DOE should have fully and adequately addressed transportation of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) to Yucca Mountain in the Final Yucca Mountain Environmental Impact Statement (FEIS). Instead, the transportation analysis contained in the FEIS is legally and substantively deficient and entirely inadequate.

We contend that the only acceptable vehicle for engaging in planning for SNF and HLW shipments in Nevada or nationally is the process set forth by the National Environmental Policy Act (NEPA) and its implementing regulations.

That means DOE must commit to the preparation of an Environmental Impact Statement (EIS) for the transportation program. Such EIS must encompass an integrated transportation program that covers both the national transportation system and the transportation system within Nevada.

The EIS must show how the national and Nevada components function in a consistent and integrated manner, and how decisions with respect to the national system affect the Nevada system, and vice versa. What DOE appears to be doing instead is a piecemeal approach to transportation planning, crafting the message to fit whatever audience the Department is trying to appease at the time.

That being said, for the better part of two decades, the State of Nevada has consistently and repeatedly recommended specific measures that the Federal government should take to manage the risks associated with transportation of spent nuclear fuel and high-level radioactive waste.

Despite our opposition to construction of a repository at Yucca Mountain, and to construction of an interim storage facility at the Nevada Test Site, the State of Nevada has taken virtually every possible opportunity to make constructive proposals to the appropriate Federal agencies: DOE, the U.S. Nuclear Regulatory Commission (NRC), and the U.S. Department of Transportation (DOT).

In addition, the Western Interstate Energy Board and the Western Governor's Association have done extensive work on nuclear waste transportation and provided DOE with detailed and substantive guidance over the past 15 or more years.

WIEB has even developed an extensive High-Level Waste Transportation Primer that provided DOE with a comprehensive framework for an adequate transportation system.

WGA has passed numerous resolutions urging DOE to adopt an integrated and comprehensive approach to transportation planning, including adequate preparations to deal with terrorism and to prevent catastrophic accidents through meaningful cask testing.

Nevada's Recommendations

Since 1997, Nevada's recommendations regarding high-level nuclear waste transportation risk management have been focused on four areas:

1) A comprehensive approach to risk assessment, risk management, and risk communication;

2) Development of a preferred transportation system;

3) Full-scale, physical testing of shipping casks; and

4) Accident prevention and emergency response.

Comprehensive Risk Management

Nevada advocates a comprehensive approach to risk management that includes, but is not limited to, probabilistic risk analysis.

a) Comprehensive risk assessment (CRA) should cover all transportation system phases, events, and consequences.
b) CRA calculates probabilities only where existing data, theories, and models are sufficient to support use of rigorous quantitative methods, and uses sensitivity analysis to illustrate impact of differing assumptions and variations in quality of data.
c) CRA should be used as a working risk management tool throughout life of project, with ongoing public participation
d) CRA should be basis of risk communication throughout life of the project

Preferred Transportation System

Nevada advocates development of a preferred transportation system, designed to reduce the radiological risks of routine shipments, severe accidents, and terrorist incidents.

a) Dual purpose casks should be used for at-reactor storage and off-site transportation of spent nuclear fuel;

b) The oldest, least-radioactive spent fuel, should be shipped first, and no fuel should be shipped off-site until it has been cooled for 20 years after removal from a reactor;

c) Rail should be the transport mode of choice, recognizing that the maximum practical use of rail will likely be about two-thirds of the projected total waste shipments;

d) Use of dedicated trains should be mandatory, operating under special safety protocols, and utilizing special cask car and buffer car designs, as recommended by the Association of American Railroads;

e) As early as possible, DOE and its potential carriers should identify the preferred cross-country mainline rail and interstate highway routes, in consultation with stakeholders; and

f) As early as possible, DOE should fully involve affected corridor states and Indian Tribes in system planning, and provide financial assistance under Section 180(c).

Accident Prevention & Emergency Response

Nevada advocates a comprehensive and coordinated approach to accident prevention and emergency response.

a) DOE should maximize use of regional organizations such as the Western Governors Association (WGA) and the Western Interstate Energy Board (WIEB) for planning, implementation, and program evaluation;

b) DOE and affected States should coordinate with Indian Tribes and local governments;

c) DOE should develop a comprehensive safety program modeled after WGA-State-DOE WIPP Transportation Program;

d) DOE should adopt the WIEB September1994 proposal for evaluation and final designation of preferred shipping routes;

e) DOE should implement Section 180(c) financial assistance to State, local, & tribal governments through rulemaking; and

f) DOE should revise its proposed Plan for Privatization of Transportation Services to emphasize safety and public acceptance.

Full-Scale Physical Testing of Casks

Nevada advocates full-scale physical testing of shipping casks. This topic deserves special attention because the NRC has recently published a draft proposal for cask testing.

Instead of full-scale testing, the NRC currently relies upon scale-model testing and computer analysis to assess cask performance under hypothetical accident conditions.

According to the NRC, seven spent nuclear fuel truck cask designs and nine rail cask designs are currently certified for use in the United States.

None of the sixteen cask designs has been tested full-scale to demonstrate the ability to survive severe accident conditions. DOE has no plans to independently conduct full-scale testing of the casks that would be used for shipments of spent nuclear fuel to Yucca Mountain.

Stakeholders have long urged NRC to require full-scale testing as part of certification. NRC has recently published a draft protocol (NUREG-1768) for demonstration testing of a representative truck cask and a representative rail cask, as part of the Package Performance Study (PPS).

The State of Nevada is currently preparing detailed comments on the NRC draft testing protocol, and will participate in upcoming NRC public meetings on the NRC proposal.

Based on our previous analyses, and on our preliminary review of NUREG-1768, Nevada remains committed to the position that demonstration testing would NOT be an acceptable substitute for a combination of full-scale testing, scale-model tests, and computer simulation *of each new cask design prior to certification.* Therefore, Nevada continues to advocate the following approach to cask testing:

a) Meaningful stakeholder role in development of testing protocols & selection of test facilities and personnel;

b) Full-scale physical testing (sequential drop, fire, puncture, and immersion) prior to NRC certification, or as a prerequisite for DOE procurement;

c) Additional computer simulations to determine performance in extra-regulatory accidents and to determine failure thresholds;

d) Reevaluation of the NRC Modal Study findings, and if appropriate, revision of NRC cask performance standards; and

e) Evaluation of the costs and benefits of destructive testing of a randomly selected production model cask.

Potential Shipments to Yucca Mountain

Nevada believes that DOE's recently-devised estimate of 175 shipments per year to a Yucca Mountain repository is not only inaccurate, but grossly underestimates the nature, magnitude, and scope of the shipping campaign required to support the repository program.

To realize such a low number of shipments, DOE will, among other things, have to ship over 90% of all SNF by rail; assure that each shipment is made up of at least 3 rail cars per train; make thousands of barge and/or heavy-haul truck shipments to move SNF from reactor sites without rail access to rail heads; create staging areas in rail yards and ports around the country in order to assemble the trains; and construct a 300 – 400 mile rail access line in Nevada at the cost of over $1 billion.

Nevada has carefully reviewed the estimates of future spent fuel shipments contained in the DOE Final Environmental Impact Statement for Yucca Mountain. The FEIS includes projections of spent nuclear fuel and high-level radioactive waste shipments for two inventory disposal scenarios (24 years and 38 years) and two national transportation modal scenarios ("mostly legal-weight truck" and "mostly rail").

According to the DOE FEIS, about 70,000 MTHM of spent fuel and high-level nuclear waste could be shipped to Yucca Mountain over 24 years, and about 119,000 MTHM could be shipped over 38 years (2010-2048).

The DOE "mostly legal-weight truck" scenario would result in the largest number of shipments, about 108,900 shipments over 38 years, or about 2,865 per year.

The DOE "mostly rail" scenario, over 38 years, could result in more than 45,000 shipments (about 1,185 per year) or as few as 13,500 (about 355 per year). Commercial spent fuel would compromise about 88% of the wastes shipped to the repository, and about 73 % of repository cask-shipments.

We conclude that estimates of projected shipments to Yucca Mountain must continue to consider a range of modal scenarios and shipment numbers.

The DOE "mostly legal-weight truck scenario" is the only national transportation scenario that is currently feasible. All 72 power plant sites and all 5 DOE sites can ship by legal-weight truck.

At present, there is no railroad access to Yucca Mountain. Construction of a new rail spur, 99 to 344 miles in length, could take 10 years and cost more than $1 billion. The alternative to rail spur construction, delivery of thousands of large rail casks by 220-foot-long, heavy-haul trucks, over distances of 112 to 330 miles on public highways, is probably not feasible.

Maximum utilization of rail for cross-country transportation, as described in the FEIS, appears unlikely. Even if DOE is able to develop rail access to Yucca Mountain, the objective of shipping 90 percent of the commercial SNF by rail is unrealistic. DOE acknowledges that 25 of the 72 power plant sites cannot ship directly by rail. Nevada studies show that number could be up to 32 sites.

The "mostly rail" scenario assumes that DOE can ship thousands of casks by barge into the Ports of Boston, New Haven, Newark, Jersey City, Wilmington (DE), Baltimore, Norfolk, Miami, Milwaukee, Muskegon, Omaha, Vicksburg, and Port Hueneme (CA).

Alternately, DOE would have to move thousands of casks from reactors to rail connections using large heavy-haul trucks, which will require special state permits and route approvals.

In the end, even if rail access to Yucca Mountain and all of the other impediments to rail transport can be resolved, "mostly rail" would mean moving no more than 60-75 percent of the commercial spent fuel by rail, and moving the remaining 25-40 percent by legal-weight truck.

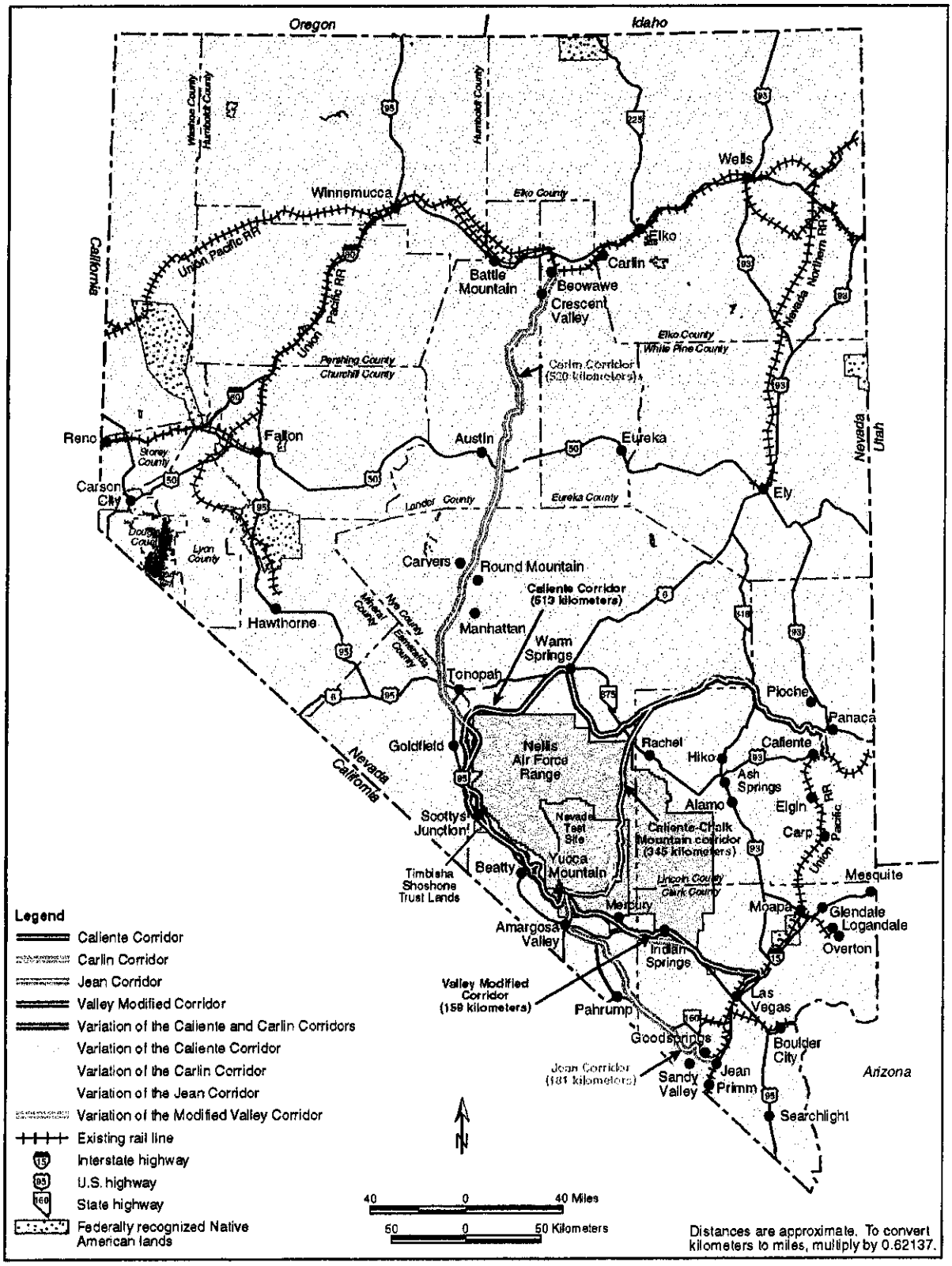

Figure S-13. Potential Nevada rail routes to Yucca Mountain.

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Projected Repository Shipments and Shipment-Miles, 2010-2048.

Repository Transportation Scenario & Modes	Shipments	Cask-Shipments	Shipment-Miles
Mostly Legal-Weight Truck			
Legal-Weight Truck Direct (77 sites)	108,544	108,544	227,735,000
General Freight Rail to NV (1 site)	355	355	181,000
Heavy-Haul Truck in NV	355	355	118,000
Mostly Rail (Maximum)			
Legal-Weight Truck Direct (6 sites)	3,122	3,122	8,657,000
Barge to Rail (17 sites)	3,004	3,004	186,000
Heavy-Haul Truck to Rail (7 sites)	1,061	1,061	19,000
General Freight Rail to NV (77 sites)	18,935	18,935	37,484,000
Heavy-Haul Truck in NV	18,935	18,935	6,267,000
Current Modal Capabilities			
Legal-Weight Truck Direct (25 sites)	27,435	27,435	65,784,000
General Freight Rail to NV (52 sites)	14,886	14,886	28,353,000
Dedicated Rail in NV	4,962	14,886	1,603,000
Mostly Rail (Minimum)			
Legal-Weight Truck (6 sites)	3,122	3,122	8,657,000
Barge to Rail (17 sites)	3,004	3,004	186,000
Heavy-Haul Truck to Rail (7 sites)	1,061	1,061	19,000
Dedicated Rail Direct (77 sites)	6,312	18,935	12,495,000

Source: Halstead & Dilger, "How Many Did You Say? Historical and Projected Spent Nuclear Fuel Shipments in the United States, 1964-2048," Waste Management'03 Conference, February 25, 2003, Tucson, AZ

U.S. Commercial Spent Fuel Shipment Experience (1964 –2001)

- Amount Shipped: 2,457 MTU (65 MTU per year)
- Truck Shipments: 2,396 (63 per year)
- Rail Shipments: 326 (9 per year)
- Rail Cask-Shipments: 479 (13 per year)
- Truck Share of Shipments: 88%
- Rail Share of MTU: 64%
- Average Truck Distance: 748 miles
- Average Rail Distance: 454 miles

Source: Halstead & Dilger, "How Many Did You Say? Historical and Projected Spent Nuclear Fuel Shipments in the United States, 1964-2048," Waste Management'03 Conference, February 25, 2003, Tucson, AZ

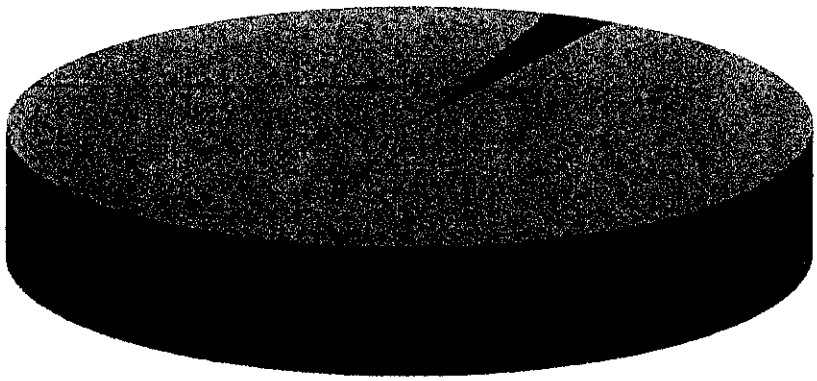
Repository Shipments Would Differ Dramatically (2010-2048)

- 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

Source: Halstead & Dilger, "How Many Did You Say? Historical and Projected Spent Nuclear Fuel Shipments in the United States, 1964-2048," Waste Management'03 Conference, February 25, 2003, Tucson, AZ

SNF Shipments - Yucca Mountain Vs. Past 40 Years

3,120
Shipments



108,500
Shipments

SNF Shipment Miles - Yucca Mountain Vs. Past 40 Years