

TRANSPORTATION OF SPENT NUCLEAR FUEL AND HIGH-LEVEL RADIOACTIVE WASTE TO YUCCA MOUNTAIN: THE NEXT STEP IN NEVADA

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ABSTRACT

In the U.S. Department of Energy's "Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada," the Department states that certain broad transportation-related decisions can be made. These include the choice of a mode of transportation nationally (mostly legal-weight truck or mostly rail) and in Nevada (mostly rail, mostly legal-weight truck, or mostly heavy-haul truck with use of an associated intermodal transfer station), as well as the choice among alternative rail corridors or heavy-haul truck routes with use of an associated intermodal transfer station in Nevada.

Although a rail line does not service the Yucca Mountain site, the Department has identified mostly rail as its preferred mode of transportation, both nationally and in the State of Nevada. If mostly rail is selected for Nevada, the Department would then identify a preference for one of the rail corridors in consultation with affected stakeholders, particularly the State of Nevada. DOE would then select the rail corridor and initiate a process to select a specific rail alignment within the corridor for the construction of a rail line.

Five proposed rail corridors were analyzed in the Final Environmental Impact Statement. The assessment considered the impacts of constructing a branch rail line in the five 400-meter (0.25mile) wide corridors. Each corridor connects the Yucca Mountain site with an existing mainline railroad in Nevada.

The five rail corridors, Caliente, Carlin, Caliente-Chalk Mountain, Jean and Valley Modified, vary in length from 98 to 323 miles. The Caliente-Chalk Mountain route is a nonpreferred alternative since it passes through the Nellis Training and Testing Range (formerly known as the Nellis Air Force Range).

In addition, three intermodal transfer station locations at rail terminals near Caliente, Apex/Dry Lake, and Sloan/Jean were evaluated. Three alternative heavy-haul truck routes were assessed

from the Caliente intermodal transfer station, and one route each was assessed from the Apex/Dry Lake and Sloan/Jean location.

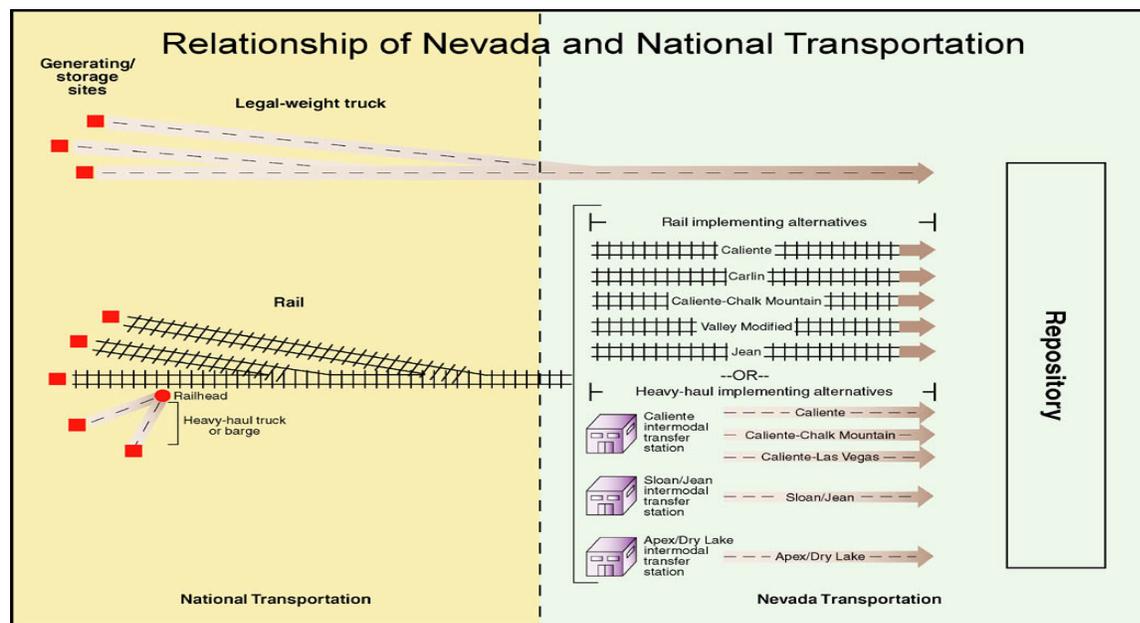
INTRODUCTION

In its *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (1) (Final EIS), the U.S. Department of Energy (DOE or Department) stated that certain broad transportation-related decisions can be made, based in part on the analyses of the Final EIS. The first such decision involves the choice of a mode of transportation, both nationally and in the State of Nevada. Nationally, DOE would either place primary reliance on legal-weight truck¹ (i.e., mostly legal-weight truck) or rail² (mostly rail), and in Nevada DOE would place primary reliance on legal-weight truck, rail, or heavy-haul truck with use of an associated intermodal transfer station³. In the Final EIS, DOE identified mostly rail as its preferred mode of transportation. DOE also stated that it intended to issue a Record of Decision to select the mode.

Within Nevada, the second decision involves the choice among the five alternative rail corridors, or among the three heavy-haul truck routes (including an intermodal transfer station) analyzed in the Final EIS. If mostly rail were selected, DOE would then identify a preference for one of the five rail corridors in consultation with affected stakeholders. DOE would then announce a preferred corridor in the *Federal Register* and other media. No sooner than 30 days after the announcement of a preference, DOE would publish its selection of a rail corridor in a Record of Decision.

BACKGROUND

As described in the Final EIS, DOE intends to ship spent nuclear fuel (SNF) and high-level radioactive waste (HLW) from 72 commercial sites and five DOE sites to a repository at Yucca Mountain. DOE examined two national transportation scenarios, referred to as the mostly legal-weight truck scenario and the mostly rail scenario, and three Nevada implementing alternatives, referred to as the legal-weight truck alternative, the rail alternative, and the heavy-haul truck alternative. These are shown in Figure 1.



DOE considered this alternative to be “preferred,” because of the smaller number of shipments relative to any truck alternative, coupled with the correspondingly reduced environmental impacts.

RAIL CORRIDORS

In the Final EIS, DOE determined the potential environmental impacts from the construction and operation of a rail line within each of the Caliente, Carlin, Caliente-Chalk Mountain, Jean and Valley Modified rail corridors, including various alternates. Each corridor, which is 0.25 mile wide, connects the Yucca Mountain site to an existing mainline railroad in Nevada (Figure 2). Table I provides the salient features and certain potential environmental impacts from the construction and operation of a rail line within each corridor.

Table I. Rail Corridor Impacts

Feature	Caliente	Carlin	Caliente-Chalk Mountain	Jean	Valley Modified
Length (miles)/trip time (hours, one-way)	319 10	323 9	214 8	114 4	98 3
Area disturbed (acres)	4,500	4,900	3,000	2,000	1,240
Jobs ^a created	842	783	647	526	245
Construction duration (months)	46	46	43	43	40
Life-cycle cost ^b (\$ million)	880	821	622	462	283
Other	One alignment passes through Timbisha Shoshone Trust Lands	One alignment passes through Timbisha Shoshone Trust Lands	Nonpreferred alternative – opposed by Air Force because of adverse effect on security and operations at Nellis Training and Testing Range	Could affect scenic quality lands and habitat for desert tortoise; passes near metropolitan Las Vegas	Could affect Desert National Wildlife Range on Nellis Training and Testing Range, passes nearby Las Vegas Paiute Indian Reservation and through metropolitan Las Vegas

^a Direct and indirect jobs created.

^b 2001 dollars.

DOE concluded in the Final EIS that the incident-free collective dose to the work force and members of the public over 24 years of shipping operations would result in about three and less than one latent cancer fatality, respectively. Furthermore, under an extremely unlikely (about 3 chances in 10 million per year) but severe transportation accident (referred to in the Final EIS as a maximum reasonably foreseeable accident) in an urban area, about 5 latent cancer fatalities among the general public could result under mostly rail.

INTERMODAL TRANSFER STATION AND HEAVY HAUL CORRIDORS

In addition to the possible construction and operation of a rail line in Nevada, DOE determined the potential environmental impacts from the construction and operation of an intermodal

transfer station at locations near rail terminals near Caliente, Apex/Dry Lake and Sloan/Jean in Nevada. The intermodal transfer station would transfer casks containing spent nuclear fuel and high-level radioactive waste from railcars to heavy-haul trucks and empty casks from heavy-haul trucks to railcars. In addition, DOE assessed three alternative heavy-haul truck routes from a Caliente intermodal transfer station—Caliente, Caliente/Chalk Mountain, and Caliente/Las Vegas—and one route each from the Apex/Dry Lake and Loan/Jean locations. The potential impacts are shown in Table II.

Table II. Heavy Haul Impacts

Feature	Caliente	Caliente-Chalk Mountain	Caliente-Las Vegas	Sloan-Jean	Apex/Dry Lake
Length (miles)/trip time (days, one-way)	331 2 days	175 2 days	234 2 days	118 ½ day	114 ½ day
Jobs ^a created	856	751 ^b	1,979	3,047 ^b	1,882 ^b
Construction duration (months)	35	26	46	48	28
Life-cycle cost ^c (\$ million)	669	548	607	444	387
Other	Would pass adjacent to Timbisha Shoshone Trust Lands	Nonpreferred alternative – opposed by Air Force because of adverse effect on security and operations at Nellis Training and Testing Range	Would pass near metropolitan Las Vegas; would pass near the Moapa Indian Reservation and through the Las Vegas Paiute Indian Reservation	Would pass near metropolitan Las Vegas; would pass through the Las Vegas Paiute Indian Reservation	Would pass near metropolitan Las Vegas; could pass near the Moapa Indian Reservation and through the Las Vegas Paiute Indian Reservation

^a Direct and indirect jobs created.

^b Levels of employment include estimates to complete portions of Las Vegas Beltway

^c 2001 dollars

NEXT STEPS

At some future date the Department of Energy would issue a Record of Decision to select a mode of transportation. If, for example, mostly rail was selected (both nationally and in Nevada), the Department of Energy would then identify a preference for one of the rail corridors in consultation with affected stakeholders. In this example, the Department of Energy would announce a preferred corridor in the *Federal Register* and other media. No sooner than 30 days after the announcement of a preference, the Department of Energy would publish its selection of a rail corridor in a Record of Decision. A similar process would occur in the event that the Department of Energy selected heavy-haul truck as its mode of transportation in the State of Nevada. Other transportation decisions, such as the selection of a specific rail alignment within a corridor, would require additional field surveys, State and local government and Native

American tribal consultations, environmental and engineering analyses, and appropriate National Environmental Policy Act reviews.

FOOTNOTES

¹ A truck with a gross vehicle weight (truck and cargo) of less than 80,000 pounds having dimensions, axle spacing, and if applicable, axle loads within Federal and state limits.

² Rail is defined to include vehicles, such as locomotives and specialized freight cars, with steel wheels running on steel rails using standard gauge that is compatible with the U.S. freight rail network.

³ A heavy-haul truck is an overweight, overdimension vehicle that must have permits from state highway authorities to use public highways. An intermodal transfer station is a facility at the juncture of rail and road transportation used to transfer shipping casks containing radioactive materials from rail to truck, and empty casks from truck to rail.

⁴ A cask is a heavily shielded container, certified by the Nuclear Regulatory Commission, used to ship spent nuclear fuel and high-level radioactive waste.

REFERENCES

1. U.S. Department of Energy (DOE), *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250F), February 2002.