

FACT SHEET

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Nuclear Waste Transportation Accidents in the U.S.

No one maintains that the transportation of nuclear waste to Yucca Mountain will be without accident. The Department of Energy has commissioned accident rate assessment studies at various points in time and come up with different figures ranging from up to 66 accidents¹ in one study to up to 310 accidents² in another (during the first 24 years of waste transportation). The state of Nevada undertook an analysis applying the actual accident and incident rates from past shipments to the projected shipment numbers and distances that would result under the DOE Yucca Mountain proposal. The Nevada analysis concluded that 160-390 accidents would be expected over 38 years if future shipments were to proceed on the same basis as past shipments.³

DOE and the nuclear industry have tried to create the impression that past transportation of irradiated nuclear fuel has been entirely safe. The Nuclear Energy Institute (NEI) claims that the U.S. has an “outstanding safety record of no radioactive leakage in more than 3000 shipments covering more than 1.7 million miles.”⁴ This claim is false.

In a 1996 report based on Atomic Energy Commission and DOE data entitled *Reported Incidents Involving Spent Nuclear Fuel Shipments, 1949 to Present*, the Nevada Agency for Nuclear Projects documents 72 nuclear waste transportation accidents. Four involve accidental radioactive material contamination beyond the vehicle (Table 1); four involve contamination confined to the vehicle (Table 2); 13 involve traffic accidents with no release or contamination; 49 involve accidental container surface contamination; and two accidents include no description.

Table 1: Accidents Involving Radioactive Material Contamination Beyond the Transportation Vehicle⁵

Date	Mode	Accident Description
Jan. 27, 1984	Truck	Slow drip from bottom front end of empty cask while stored in transportation terminal
Nov. 11, 1964	Truck	Cask leakage, trailer, packages and terminal contaminated
Aug. 21, 1962	Truck	Cask leakage, trailer and small portion of road contaminated
June 2, 1960	Rail	Leak from cask, small area at three rail yards contaminated, no run-off or aerial dispersion.

Table 2: Accidents Involving Radioactive Material Contamination Confined to the Transportation Vehicle⁶

Date	Mode	Accident Description
July 4, 1976	Truck	Pinhole leak of, reported as, coolant/moderator on outside jacket of cask. Shipment continued without risk to public.
Dec. 10, 1963	Rail	Cask leakage, cask contaminated, contamination confined to trailer.
Sept. 22, 1961	Truck	Leak from cask onto trailer floor, result of shifting, contamination confined to vehicle.
Nov. 20, 1960	Truck	Small leak from cask onto trailer floor, result of shifting cask, contamination confined to vehicle.

The report lists incidents as late as the early 1990s, but notes the scant nature of available data: “Description of the events and equipment are insufficient to evaluate the failure mechanisms or sources of

contamination.” Such poor documentation will make it difficult to learn from past accidents. It also obfuscates the true extent of the risk and the shortfall in public safety.

Closer examination reveals that some of the accidents are actually quite significant. For example, an August 25, 1980 accident is reported as “surface contamination on cask,” but there is much more to the events according to Dr. Marvin Resnikoff, author of *The Next Nuclear Gamble: Transportation and Storage of Nuclear Waste*.⁷

A truck transportation cask capable of shipping one irradiated fuel assembly was delivered to the San Onofre nuclear plant in California on August 20, 1980. Unknown to the workers about to handle the cask at San Onofre, the cask had been used four months earlier to ship a leaking fuel assembly from the Oyster Creek, NJ nuclear plant. The cask had become so severely contaminated in the process that officials added external lead shielding in an effort to lower the exposure to workers and the public from the harmful emission of radiation.

When the empty cask arrived at San Onofre, the radiation level in the truck driver’s cab was more than twice the maximum legal limit. Two cask technicians arrived to decontaminate the cask, which at certain points on the exterior of the cask emitted 11 to 40 times the legal limit of radiation. A San Onofre health physics technician was on the scene to safeguard the workers’ health against radioactivity. However, NRC documents reveal that the health technician was not qualified for this particular task.

The technicians opened a capped pipe leading to the interior of the cask, prompting highly contaminated water to pour out. One technician caught it in a plastic bag and measured the radiation. The water emitted up to 100 rem/hour of radiation, a level high enough to deliver a lethal dose to an adult after five hours of whole-body exposure. The technicians used a paper towel to wipe up moisture in the pipe. The paper towel gave off an even higher 300 rem/hour reading. One technician attempted to place the plastic bags filled with contaminated water into a shielded container. When it became apparent that they would not fit, he held his breath, turned his head and pushed the bags into the cavity while puncturing them with a screwdriver. No standard air samples were taken, and no proper respiratory safety equipment was used. San Onofre was subsequently fined \$125,000 for lax health physics supervision.⁸

U.S. experience in transporting spent nuclear fuel spans several decades. However, 2,700 shipments transported over 1.6 million miles in the course of the past 30 years⁹ averages out to 90 shipments per year. Under the proposed Yucca Mountain program, there could be 105,985 truck shipments traveling more than 200 million miles, which averages out to more than seven shipments daily over the course of four decades.

When confronted with the scant transportation history in the U.S., DOE and the nuclear industry often rely upon the European experience. There has been a much greater volume of irradiated fuel shipments in Europe, because these countries send irradiated fuel to reprocessing facilities. However, Europe has experienced its own nuclear waste transportation accidents.

Nuclear Waste Transportation Accidents in Europe

Several European nations, most notably France and Germany, have been shipping nuclear waste by truck and train for several decades. The European experience has included serious incidents involving the release of radiation.

In June 1998, the World Information Service on Energy of Paris (WISE-Paris) released the results of an investigation revealing that French and German authorities had experienced massive contamination of nuclear waste transportation casks and vehicles.¹⁰

The investigation disclosed that 26 percent of spent fuel casks and 36 percent of transport vehicles (trucks, trains or both) coming into the Valognes waste transfer facility from French power plants, between

January and November of 1997, were contaminated with radioactive material. It also revealed that 13 of 17 power reactor sites had shipped contaminated casks and that 16 of the same reactor sites had experienced contaminated transportation vehicles. The investigation further revealed that of 192 casks and transportation vehicles surveyed, 50 were identified as being contaminated up to 200 Bq (per centimeter squared) of radioactive material - 50 times the legal limit (the legal limit is four Bq per centimeter squared).

On April 27, 1998, the French Environment Minister acknowledged in an official statement that the Ministry has "recently noted an abnormally high radioactive contamination, very clearly above the limits defined by law." On the same day the waste transportation company in question provided a document to the French nuclear safety authority admitting that in the course of 1997-1998 "the maximum contamination noted on the rail cars was 700 Bq for the external contamination and 8,000 Bq for the internal contamination." The figure for internal rail car contamination, 8,000 Bq, represents 2,000 times the limit permitted by law.

At the same time, German shipments of nuclear waste from France to Germany were halted by the German authorities in May of 1998. Shipments did not resume until the spring of 2001. This halt in shipments was ordered after it was found that casks and rail cars from several nuclear plants were contaminated well beyond the legal safety limit - including almost 2,000 times the legal limit in some instances.¹¹

These examples show that, despite DOE and industry assertions to the contrary, there are inherent dangers in the transportation of nuclear waste that the Europeans have not been able to avoid.

¹ DOE Final EIS, Appendix J, p. J-63.

² DOE Draft EIS, Appendix J.

³ State of Nevada, *Mountain of Trouble*, February 2002, p. 34 (updated April 2002).

⁴ NEI website, June 5, 2002, <http://www.nei.org/index.asp?catnum=1&catid=15>.

⁵ State of Nevada, *Reported Incidents Involving Spent Nuclear Fuel Shipments 1949 to Present*, May 1996.

⁶ State of Nevada, *Reported Incidents Involving Spent Nuclear Fuel Shipments 1949 to Present*, May 1996.

⁷ Resnikoff, M. *The Next Nuclear Gamble: Transportation and Storage of Nuclear Waste* (Council on Economic Priorities: New York, 1983).

⁸ Resnikoff, M. *The Next Nuclear Gamble* (Council on Economic Priorities: New York, 1983), p. 207

⁹ DOE, *Spent Nuclear Fuel Transportation*, p. 2 downloaded from www.ymp.gov, May 20, 2002.

¹⁰ WISE-Paris, *Plutonium Investigation*, May-June 1998.

¹¹ WISE-Paris, *Plutonium Investigation*, May-June 1998.