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BEFORE THE
NUCLEAR REGULATORY COMMISSION

RIN 3150-AG71 COMPATIBILITY WITH IAEA TRANSPORTATION SAFETY STANDARDS (TS-R-1) AND OTHER TRANSPORTATION SAFETY AMENDMENTS

COMMENTS OF THE
ASSOCIATION OF AMERICAN RAILROADS

On behalf of its member railroads, the Association of American Railroads (AAR)[1] submits the following comments in response to NRC's notice of proposed rulemaking on the compatibility of NRC regulations on packaging and transportation of radioactive materials with the IAEA safety standards and other transportation safety amendments. Since the Department of Energy (DOE) would prefer that most shipments of spent nuclear fuel (SNF) be transported to the geologic repository by rail[2] once the repository is licensed and built, AAR members have an interest in the survivability of the shipping containers that will be transported by rail. AAR's comments today are entirely focused on the crush test for fissile material package design, issue #10.[3]

Currently, NRC regulations require crush tests on certain type B fissile material packages.[4] However, crush testing is not required for packages having a mass greater than 500 kg (1,100 lbs.).[5] According to DOE[6], rail SNF waste packages alone, not including the transportation casks, are estimated to weigh between 35,000 to 83,000 kilograms. Therefore, the rail casks will not be subject to crush testing. As part of its comments to NRC's re-evaluation of the modal study, AAR submitted a report to NRC entitled *"Rail Transport of Spent Nuclear Fuel – A Risk Review,"* G.W. English, et.al,

[1] A trade association whose membership includes freight railroads that operate 76 percent of the line-haul mileage, employ 91 percent of the workers, and account for 93 percent of the freight revenue of all railroads in the United States; and passenger railroads that operate the nation's intercity passenger trains and provide commuter rail service.

[2] "Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at yucca Mountain, Nevada," U.S. Department of Energy, Office of Civilian Radioactive Waste Management, February 2002, page 6-1.

[3] 67 Fed. Reg. 21407 (April 30, 2002).

[4] Ibid

[5] Ibid.

[6] "Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at yucca Mountain, Nevada," U.S. Department of Energy, Office of Civilian Radioactive Waste Management, July 1999, page 2-33.

7 AAR correspondence to Susan Shankman and Patricia Eng, Subject: "AAR Comments to the Nuclear Regulatory Commission's (NRC's) Reevaluation to the Conclusion of the Modal Study," January 21, 21. 2000.

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July 1995 (revised 11/95; 6/96; 12/97).[7] That report indicated that the inclusion of the test for small packages is based on the logic that they are transported in large numbers and in combination with other packages; and as a result demonstrate a higher possibility of experiencing crush loads than large packages would. While large packages transported by truck (and to a certain extent by European-trains) may not be as susceptible to dynamic crushing as to impact loads, North American rail transport usually involves multiple vehicles with car characteristics that demonstrate a high probability of dynamic crush loads upon derailment. Train accidents by definition involve multiple vehicles. Vehicles in the train after a collision or a derailment are more often than not subjected to crush loads in the radial direction.[8]

Appendix A of the Modal Study[9] relates the assessment of a severe derailment at Livingston Louisiana on September 28, 1982. The Modal Study[10] relates a rail incident involving extensive crushing damage to railway cars. The analysis in the Modal Study indicates that:

> under 4.1.10 Evidence of Bending/Deformation of Support Members the assessment is:
>
> ***"36 cars destroyed by crushing impacts during derailment or by post accident fires".***[11]

Many other railway accidents since the Livingston, LA derailment have involved crush loading or cars stacked on top of each other. The University of Illinois conducted an analysis of Federal Railroad Administration (FRA) railroad accident statistics and found that over the past 10 years, 25% of mainline derailments occurred at speeds greater than 39 mph. Of these 72% involve more than one car, and 45% involve more than 10 cars. The large number (and consequent mass) of cars (as well as other SNF casks) involved, and the high speed of derailments, indicates that there is substantial kinetic energy involved and that major pile-ups of railcars can occur. It is thereby necessary to understand the performance of SNF casks under crush-loading conditions such as might occur in these types of accidents.

For the reasons cited above, AAR submits that dynamic crush loads can develop

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7 AAR correspondence to Susan Shankman and Patricia Eng, Subject: "AAR Comments to the Nuclear Regulatory Commission's (NRC's) Reevaluation to the Conclusion of the Modal Study," January 21, 21. 2000.

8 *"Rail Transport of Spent Nuclear Fuel – A Risk Review,"* G.W. English, et.al, July 1995 (revised 11/95; 6/96; 12/97), pg 4-3.

9 Ibid.

10 "Shipping Container Response to Severe Highway and Railway Accident Conditions," L.E. Fisher et.al, Lawrence Livermore National Laboratory; February 1987.

11 An AAR reviewer's comment on our draft report indicated that these particular cars were more likely destroyed by post accident fire than by crushing impacts. It is not clear from LLNL's report whether this was known to them. In the absence of such knowledge, a conservative approach would be to consider the possibility of dynamic crush loads.

in railroad accidents and that the NRC regulations contained in 10 CFR §71.73 should require that rail transportation casks be subject to crush testing (scaled up to produce impact energies of the magnitude expected in a railway accident).

Respectfully submitted,

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