Comments on Spent Nuclear Fuel Transportation

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While important details about the nuclear waste management system are uncertain, future spent nuclear fuel (SNF) shipments will likely be dramatically different than current shipments. Assuming no new reactors, and license extensions for all operating reactors, the current inventory will grow by about 2,000 MTU per year. Once regular shipments to centralized storage, geologic disposal, and/or reprocessing begin, annual shipments of at least 3,000 MTU seem likely. At that rate, assuming mostly rail (95 percent) transportation of commercial SNF, and all rail transportation of DOE SNF and HLW, there would likely be about 7,000 train shipments (3-5 casks per train) and 5,000 truck shipments (one cask per truck) over about 50 years. That works out to about 100-150 train-load shipments and 100 truck shipments every year in the future, compared to about 10-15 train-loads and 10-15 truck shipments per year currently. Put another way, under a mostly rail scenario, about 7-10 times more shipments would occur each year, using larger capacity casks, and about 50 times more spent fuel would be shipped each year. Greater reliance on legal-weight truck shipments would significantly increase the number of shipments. About 14,000 to 20,000 truck shipments would be required to move 20 percent of the projected commercial SNF inventory.

Aside from a successful terrorist attack, the spent fuel transportation incident of greatest concern would be a severe accident in which a cask was engulfed in a long-duration, high temperature fire, resulting in a release of radioactive material that was dispersed in the smoke plume from the fire. On this point the NAS, the NRC, the DOE, and the State of Nevada generally agree. In the Final SEIS for Yucca Mountain, DOE estimates the probability of such an accident at 5 in one million per year, costing up to $10 billion to cleanup, in an urban area. NRC staff accepted DOE's transportation analysis in the Yucca Mountain licensing docket. However, the NRC licensing board accepted Nevada's contention that accident consequences and cleanup costs could be significantly greater. If the licensing proceeding should resume, accident consequences and cleanup costs would be further examined in great detail. In addition to issues raised in the licensing proceeding, Nevada has long advocated measures that would reduce the probability and consequences of severe accident fires, including shipment of oldest fuel first, mandatory use of dedicated trains, and full-scale regulatory confirmation testing. Nevada has also advocated extra-regulatory testing to determine cask performance in very severe, but credible, fire environments, similar to those recently studied by the NRC (Baltimore Tunnel Fire, MacArthur Maze Fire, and Newhall Pass Fire).

One important lesson from the DOE repository program is that critical transportation requirements, such as mainline rail access and interstate highway access, should be addressed in the earliest phases of site selection for storage and disposal facilities. As early as 1986, DOE's own analyses showed that Yucca Mountain had the most difficult rail access, the most difficult interstate highway access, and most adverse overall transportation system impacts, of all the sites studied for the first repository. DOE's 1986 environmental assessment for Yucca Mountain assumed rail access could be attained by constructing a 100-mile railroad at a cost of $151 million (1985$). By 2008, DOE was proposing construction of a 300-plus-mile railroad, longer than the distance between Washington DC and New York City, crossing 8 mountain ranges, and costing $2.7 billion or more. Even if built, the Caliente rail line to Yucca Mountain would not eliminate rail shipments of spent nuclear fuel through downtown Las Vegas.