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38

April 30, 2003

Ms. Amy M. Snyder
Spent Fuels Project Office
Mail Stop: 013-D13
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

RE: City of Las Vegas Comments on the Nuclear Regulatory Commission's Package Performance Study Proposal for Full-Scale Testing of Truck and Rail Casks for the Transportation of High-Level Radioactive Nuclear Waste to Yucca Mountain

Dear Ms. Snyder:

As you recall, the Nuclear Regulatory Commission (NRC) recently released a draft of NUREG-1768, *United States Nuclear Regulatory Commission Package Performance Study Test Protocols* for the proposed full-scale testing of casks to transport high-level nuclear waste to Yucca Mountain.

The NRC has requested public comments on the specific testing protocols proposed in NUREG-1768 as they relate to the feasibility of full-scale testing of high-level waste casks. The protocols for comment include the type and number of cask designs that should be tested, the speed and orientation used in the impact tests, the methods used to conduct the impact tests, the proposed range of speeds for the impact tests, cask scale size, and the duration and size of the fire test, to list some.

Please find enclosed the City of Las Vegas' comments on the full-scale testing proposals outlined in NUREG-1768. If you have questions, please contact Jim Pegues or Stoney Douglas at 702-229-6551.

Sincerely,

Lesa Coder, Director
Office of Business Development

Enclosure

cc: Doug Lein, Manager Marketing Division
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City of Las Vegas
Comments on the Nuclear Regulatory Commission's
Package Performance Study Proposal for Full-Scale Testing of Truck and Rail Casks for the Transportation of High-Level Radioactive to Yucca Mountain

Test Protocols for Public Comment

The NRC has requested comments on the following testing protocols for full-scale testing.

1. The type and number of cask designs that should be tested.
2. The speed and orientation used in the impact tests.
3. The method used to conduct the impact tests: dropped from a tower or propelled along a horizontal track on a rocket sled.
4. The proposed range of speeds (96 to 144 kph {60 to 90 mph}).
5. The appropriateness of the 120 kph (75 mph) impact speed proposed by NRC staff for the rail cask collision test and the appropriate speed for the truck cask collision test.
6. Cask scale size - full or partial scale size.
7. The duration and size of the fire test.
8. The position of the casks relative to the fire.

City of Las Vegas Comments

The NRC currently relies upon scale-model testing and computer analysis to assess cask performance under hypothetical accident conditions. According to the NRC, seven (7) spent nuclear fuel truck cask designs and nine (9) rail cask designs are currently certified for use in the United States. None of the sixteen (16) cask designs have been tested full-scale to demonstrate their ability to survive severe accident conditions. Former NRC Chairman R. A Meserve has confirmed these facts in his April 2, 2002 correspondence to the Honorable Senator Harry Reid. (1,7)

Regarding the question of full-scale testing of truck and rail transportation casks, like the State of Nevada and Clark County, the City of Las Vegas believes that full-scale testing of each new cask model prior to certification is necessary to demonstrate its effectiveness as an acceptable means of transporting high-level radioactive waste to Yucca Mountain.

For example, the City proposes that the 1993 Sandia National Laboratories (SNL) report prepared for DOE evaluating technical issues associated with cask testing makes a good case for full-scale testing. The SNL report specifically addressed the advantages and disadvantages of full scale testing as compared to model testing. According to the SNL report, "full-scale" package testing has several advantages the City believes lends credibility to the argument that full-scale testing is necessary. (2,7)

1. **For packages tested in full scale, a single test article can be subjected to all normal and hypothetical accident conditions defined by the regulations.** The data collected can directly demonstrate the compliance design with the radiological acceptance criteria of 10 CFR 71.

2. **Through full-scale testing, a clear characterization can be developed for the behavior of a package when subjected to normal conditions and accident environments.** Refinements can be explored that can lead to increased confidence and reliability in cask design.

3. **Prototypic full-scale package closure and seal response can be directly measured.** At full-scale, the closure seal response to the different test conditions represents the actual package containment system.

4. **The fabrication of full-scale prototypic hardware allows evaluation and monitoring of the fabrication process before production and manufacturing of several packages.** Problems that might not be encountered during a scale-model fabrication can be identified and resolved. Fabrication of a full-scale package also allows an accurate measure of the cost and fabrication schedule.

5. **The full-scale package could be used to perform operational testing of the system.** Loading and unloading operations can be evaluated and integrated into the transportation cycle.

6. **Data collected during testing, such as acceleration and surface deformations, are direct measurements of the structural response.** These direct measurements could possibly eliminate the need for scaling relationships based on scale factors, time, or weight.

7. **The visual impression of full-scale testing is significant.** Videotapes and photos of full-scale testing of truck and rails systems taken in the late 1970s continue to show the robustness of transportation packages almost 15 years later. The size and weight of a large Type B package cannot be visually appreciated in a scale model. (2)

Further, the City supports the five-part approach to full-scale testing proposed by the State of Nevada: (1) meaningful stakeholder participation in development of testing protocols and selection of test facilities and personnel; (2) full-scale physical testing (sequential drop, puncture, fire, and immersion) prior to NRC certification; (3) additional computer simulations to determine performance in extra- regulatory accidents and to determine failure thresholds; (4) reevaluation of previous risk study findings, and if appropriate, revision of NRC cask performance standards; and (5) evaluation of costs and benefits of destructive testing of a randomly-selected production model cask. (3,7)

Stakeholder Participation

The NRC should provide a meaningful and substantive role for stakeholders in specifying the objectives of the tests, developing the testing protocols, selecting the testing contractors, and overseeing the implementation of the test program. (3,7)

Selection of Cask Testing Facilities

Sandia National Laboratory has identified 12 facilities in the United States with various capabilities for testing 40-ton and 100- ton containers. A report prepared for Nevada identified five (5) potential testing facilities in the United States, two (2) in the United Kingdom, and one (1) in Canada. Before final selection of test facilities, the NRC should discuss all relevant issues and options with stakeholders before selecting a cask-testing facility. (4,7)

Selection of Casks to Be Tested

The NRC should test the actual cask designs most likely to be used for spent nuclear fuel and HLW shipments to the proposed Yucca Mountain repository. For example a legal-weight truck cask should be tested, since legal-weight truck is the only transport mode for Yucca Mountain that is currently feasible. All 72 power plant sites and all five (5,7) DOE sites can ship by legal-weight truck. (5)

Selection of Test Scenarios

The City believes the best approach to testing package performance should be a combination of computer analyses and full-scale cask testing, supplemented by scale-model testing, full-size component testing, and spent fuel testing.

Evaluation of Costs

It is postulated that the costs of full-scale fire tests for a truck cask would be less than $5 million. Comprehensive regulatory testing (drop, fire, puncture, and immersion) of a truck cask (up to 30 tons) would be between $8 million and $15 million. Comprehensive regulatory testing of a large rail cask (up to 125 tons) would cost $12 million to $25 million for the first cask, including the cost of required upgrading at the testing facility. By comparison, the estimated life-cycle cost of the repository transportation system is about $9.2 billion. (Source State of Nevada) A recent report for Nevada estimated that the minimum cost of a regulatory fire test, using a purchased truck cask, would be $3.3 to 3.8 million. (6,7) The City also believes that the cost of full-scale testing is fractional when compared to the cost of the overall repository program.

Conclusions

The NRC currently relies upon scale-model testing and computer analysis to assess cask performance under hypothetical accident conditions. Unless another site is chosen, spent nuclear fuel and high-level radioactive waste shipments to Yucca Mountain are possible. The City believes the only way to make a clear safety case for the proposed truck and rails casks are full-scale testing. We believe the 1993 Sandia National Laboratories (SNL) report prepared for DOE evaluating technical issues associated with cask testing supports this premise.

The City purports that the best approach to testing package performance is a combination of computer analyses and full-scale cask testing, supplemented by scale-model testing, full-size component testing, and spent fuel testing. A logical course of action would be to test each cask design, full-scale, to demonstrate compliance with existing regulations. In the final analysis, an extensive cask testing and analysis program will offer the best chance to evaluate the design and fabrication of all of the transportation system components, improve equipment designs to increase safety and ensure efficient operations, and demonstrate safety to the public and stakeholders alike.

REFERENCES

1. NRC, Physical Testing of Spent Fuel Transport Casks, " Correspondence from R. A. Meserve, Former NRC Chairman to the Honorable H. Reid, United States Senate (April 2, 2002)."

2. S.E. GIANOULAKIS, "A description of Technical Issues Relative to the Testing of the Cask Systems Development Program (CSDP) Radioactive Material package Designs," TTC# 1265, Prepared by SNL (May 14, 1993)

3. Testimony of Robert J. Halstead on Behalf of the State of Nevada before the Committee on Energy and Natural Resources, United States Senate, May 22, 2002.

4. DF SNEDDKER, Nuclear Waste Transportation Package Testing: "A Review of Selected Programs in the United States and Abroad," NWPO-TN-004-90, Prepared for NANP (December 1990).

5. DOE, Final Environmental Impact Statement for a Geological Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County Nevada, DOE/EIS-0250 (February 2002) Available on the web at http://www.ymp/gov/documents/feis_a/index.htm)

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7. Implications of the Baltimore Rail Tunnel Fire for Full-Scale Testing of Shipping Casks. Robert J. Halstead, State of Nevada Nuclear Projects; Fred Dilger, Clark County Nuclear Waste Diavision