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**Docket ID: NRC-2012-0108, Spent Fuel Transportation Risk Assessment, NUREG-2125,
Draft Report for Comment**

The State of Nevada Agency for Nuclear Projects submits the attached preliminary comments on NUREG-2125 in response to the Federal Register notice published May 14, 2012 (77 FR 28406-28407).

We will submit additional comments on NUREG-2125 for consideration by NRC staff as soon as possible.

We will submit written comments for consideration by the Advisory Committee on Reactor Safeguards (ACRS), and will request an opportunity to make an oral statement at the ACRS meeting on September 5, 2012, in accordance with the procedures published in the Federal Register on October 17, 2011 (76 FR 64126-64127).

Sincerely,

A handwritten signature in blue ink, appearing to read "Robert J. Halstead".

Robert J. Halstead
Executive Director

RJH/sja
cc

Nevada Congressional Delegation
Marta Adams, Deputy Attorney General
Affected Units of Local Government and Tribes
Western Interstate Energy Board HLW Committee

**State of Nevada
Office of the Governor
Agency for Nuclear Projects
Preliminary Comments
On
Spent Fuel Transportation Risk Assessment,
NUREG-2125,
Draft Report for Comment,
Docket ID: NRC-20212-0108
July 13, 2012**

GENERAL COMMENTS

Inadequate Time for Public Review and Comment

The 60-day comment period is inadequate for the following reasons:

- The length of the report (509 pages), the scope of the report, and the technical complexity of the subject matter justify a longer comment period of at least 90 days and, preferably, 120 days.
- Specific technical issues, such as 1) the selection of shipping cask designs for analysis (and the decision not to include two currently licensed casks, the NAC LWT and the IF-300); 2) assumptions about spent fuel burn up history and cooling time; 3) selection of origin-destination pairs, routes, and buffer distances used for routine dose and accident risk analyses; and 4) consequence analyses for transportation accidents resulting in release of radioactive materials, have required that our agency contract with an outside technical reviewer to assist us in preparing our comments.
- The subject report references in its bibliography, but apparently does not actually include in its analyses, a number of recent NRC-sponsored studies of transportation accidents involving long-duration, high-temperature fires. This will require additional time to evaluate possible contradictions between those NRC studies and the findings of NUREG-2125.

The comment period announced in the Federal Register notice, from May 14 to July 13, included two major Federal holidays – Memorial Day on Monday, May 28 and Independence Day on Wednesday, July 4 – which fell on what would otherwise have been normal work days, effectively reducing the time for review by 2-10 days.

The NRC denial of Nevada's request for an extension contrasts with the NRC decision to grant a 14-day extension (to 60 days total) for review of a 138-page draft report, "Identification and Prioritization of the Technical Information Needs Affecting Potential Regulation of Extended Storage and Transportation of Spent Nuclear Fuel," (May 2012). In February 2012, the NRC granted a 31-day extension (to 90 days total) for review of a 23-page draft report, "Background and Preliminary Assumptions for an Environmental Impact statement – Long-Term Waste

Confidence Update,” (December 2011). (See <http://www.nrc.gov/waste/spent-fuel-storage/public-involvement.html>) Please explain why extensions were granted for review of these draft reports, which were much shorter and, in our opinion, much less technically complex than NUREG-2125.

In denying Nevada’s request for a 60-day extension, NRC cited the scheduling of a review of NUREG-2125 at the Advisory Committee on Reactor Safeguards (ACRS) meeting on September 5, 2012. The ACRS meeting is scheduled to occur 54 days after the July 13 comment deadline. Please explain why NRC did not grant an extension of, at a minimum, 30 days, or even 45 days. Please assist us in understanding how the original 60-day comment period was established by answering the following questions:

- When did the concept for this project originate?
- When did the contractors at Sandia National Laboratories begin work on this project?
- When did the peer review occur, and how long was the peer review period?
- What was the total budget for this project, including peer review?
- What efforts were made by NRC and Sandia to solicit stakeholder comment on this project, prior to publication of the draft report in May 2012?

Potential Implications of NUREG-2125 for NRC Licensing Proceedings

Finalization of Draft Report NUREG-2125 will likely have significant implications for the evaluation of transportation impacts in future NRC licensing proceedings for interim storage facilities and geologic disposal facilities.

NRC administrative law judges have already established the ground rules for evaluation of transportation impacts under the National Environmental Policy Act (NEPA) in the currently suspended licensing proceeding for the proposed Yucca Mountain repository:

Transportation of nuclear waste is a foreseeable consequence of constructing a nuclear waste repository. As California persuasively argues, “[w]ithout transportation of the waste to it, Yucca Mountain would be just a very large, fancy, and expensive hole in a mountain.” The Commission, for example, has stated that there can be “no serious dispute” that the NRC’s environmental analysis in connection with licensing nuclear facilities should extend to “related offsite construction projects – such as connecting roads and railroad spurs.” Likewise, there can be no serious dispute that the NRC’s NEPA responsibilities do not end at the boundaries of the proposed repository, but rather extend to the transportation of nuclear waste to the repository. The two are closely interdependent. Without the repository, waste would not be transported to Yucca Mountain. Without transportation of waste to it, construction of the repository would be irrational. Under NEPA, both must be considered.¹

¹ NRC, Atomic Safety and Licensing Boards, Memorandum and Order Identifying Participants and Admitted Contentions, Docket NO. 63-001-HLW (May 11, 2009).

As part of the Yucca Mountain licensing process, NRC staff reviewed and adopted the 2008 U.S. Department of Energy (DOE) Final Supplemental Environmental Impact Statement (FSEIS) for Yucca Mountain (DOE/EIS-0250F), including the transportation impact calculations for the mostly rail transportation scenario.² The Draft Report makes no reference to the 2008 DOE FSEIS, although it cites DOE's earlier 2002 EIS.

As part of its finalization of Draft Report NUREG-2125, NRC staff must assess the implications of the findings and conclusions of the Draft Report for the FSEIS transportation impact calculations adopted by NRC staff in the Yucca Mountain licensing proceeding. The DOE FSEIS adopted by NRC staff evaluated radiological impacts in three categories related to routine transportation and transportation accidents:

- (1) "incident-free" exposures to members of the public residing near transportation routes, cumulative total up to 2,500 person-rem dose and 1.5 latent cancer fatalities, and in certain special circumstances (for example, 0.016 rem to a person in a traffic jam); [FSEIS, Pp.6-20, 6-21, 8-41]
- (2) "incident-free" exposures to transportation workers such as escorts, truck drivers, & inspectors, cumulative total up to 13,000 person-rem and 7.6 latent cancer fatalities (by administrative controls, DOE would limit individual doses to 0.5 rem per year; the allowable occupational dose is 5 rem per year); [FSEIS, Pp.6-21, 8-41] and
- (3) release of radioactive material as a result of the maximum reasonably foreseeable transportation accident (probability about 5 in one million per year), involving a fully engulfing fire, 34 rem dose to the maximally exposed individual, 16,000 person-rem population dose and 9.4 latent cancer fatalities in an urban area, and cleanup-costs of \$300,000 to \$10 billion. [FSEIS, Pp.6-15, 6-24, G-56]

Significance of National Transportation Impacts

The Draft Reports fails to adequately assess the national impacts of spent fuel transportation from the current 72 reactor sites to one or more storage and/or disposal facilities. The highway and rail route maps presented in the Draft Report (Pp. 23-26) traverse more than 30 states. A complete routing analysis of all origin-destination pairs would likely demonstrate more widespread impacts similar to those identified in studies prepared for the State of Nevada. These Nevada studies, which are not referenced in the Draft Report, concluded that an extraordinary number of people, communities, and political jurisdictions would have been impacted by shipments to the proposed Yucca Mountain repository. Most of the nation's spent fuel and high-level waste is currently stored at 72 reactor sites and 4 DOE sites in 34 states. The "representative routes" identified by DOE in the FSEIS, from these sites to Yucca Mountain, would have utilized 22,000 miles of railways and 7,000 miles of highways traversing 44 states. (Attachment 1) An updated report, using 2010 census data, found that the representative routes would have traversed 955 counties with a total population of more than 177,000,000. About 56

² NRC, U.S. Nuclear Regulatory Commission Staff's Adoption Determination Report for the U.S. Department of Energy's Environmental Impact Statements for the Proposed Geologic Repository at Yucca Mountain, Pp. 3-13, 3-15, 5-1 (September 5, 2008).

percent of the total US population resides in counties that would have been traversed by spent fuel and high-level waste shipments to Yucca Mountain. (Attachment 2)

Sweeping Conclusions Unsupported by the Analyses

The Draft Report contains a number of sweeping conclusions that are not supported by the analyses presented in the document. For example, the Draft Report concludes that the collective radiological doses from spent fuel transportation are "vanishingly small" (Pp. xxii, 128, 139, F-11). This conclusion is based on the analysis of the movement of a single spent fuel cask from four different sites to four different destinations. The report states that its findings are meant to be applied to "a large scale shipping campaign." (Pp.10, 13) From this miniscule sample, the report claims its findings can be extrapolated to future shipping campaigns. This conclusion is not supported by the evidence presented by the report.

Cask Designs Chosen for Analysis

Among the cask designs chosen for analysis in the Draft Report were the GA-4 truck cask, the NAC-STC rail cask, and the HI-STAR 100 rail cask. (Pp.9-13) It is our understanding that these casks have been used for few, or any, spent fuel shipments in the United States. Please answer the following questions about these casks:

- How many GA-4 truck casks are currently being used in the United States? How many shipments of spent fuel in the United States have been made in GA-4 casks?
- How many NAC-STC rail casks are currently being used in the United States? How many shipments of spent fuel in the United States have been made in NAC-STC casks?
- How many HI-STAR 100 rail casks are currently being used in the United States? How many shipments of spent fuel in the United States have been made in HI-STAR 100 casks?
- If the purpose of the report is to assess the adequacy of the existing NRC regulations, why did NRC decide to perform detailed analysis of these three casks, which have been used for few, if any, spent fuel shipments in the United States, under the existing regulations?

Cask Designs Not Chosen for Analysis

Among the cask designs not chosen for analysis in the Draft Report were the NAC LWT truck cask and the IF-300 rail cask. (Pp. 9-13) It is our understanding that these are the two casks that were used for the majority of spent nuclear fuel shipments in the United States over the past two decades. It is also our understanding, based on previous studies, that the performance of these casks in severe accidents involving fires could be significantly different than the casks selected for analysis. It is also our understanding that there have been a number of incidents involving human error in the fabrication and loading of these casks.

Please answer the following questions about these casks:

- How many NAC LWT truck casks are currently being used in the United States? How many shipments of spent fuel in the United States have been made in NAC LWT casks since 1990?
- How many IF-300 rail casks are currently being used in the United States? How many shipments of spent fuel in the United States have been made in IF-300 casks since 1990?

- Have any previous studies known to the NRC evaluated the performance of NAC LWT truck casks in severe accidents involving long-duration, high-temperature fires? How do these studies compare to the findings reported in the Draft Report?
- Have any previous studies known to the NRC evaluated the performance of IF-300 truck casks in severe accidents involving long-duration, high-temperature fires? How do these studies compare to the findings reported in the Draft Report?
- Have any previous studies known to the NRC evaluated human errors involving fabrication and loading of NAC LWT truck casks used for spent fuel shipments in the United States? Did any reported human error incidents result in NRC enforcement actions?
- Have any previous studies known to the NRC evaluated human errors involving fabrication and loading of IF-300 rail casks used for spent fuel shipments in the United States? Did any reported human error incidents result in NRC enforcement actions?
- If the purpose of the report is to assess the adequacy of the existing NRC regulations, why did NRC decide not to perform detailed analysis of the casks which are actually being used for spent fuel shipments at the present time, under the existing regulations?
- Is the NRC aware of any regulation which would prohibit the use of NAC LWT and IF-300 casks for future shipments to an interim storage facility or geologic repository?

Full-Scale Cask Testing

It is our understanding that none of the spent fuel shipping casks currently in use in the United States has been tested full-scale to confirm their performance in regulatory or extra-regulatory accidents. (Attachment 3) Is this correct? Has any of the computer models used for dynamic finite element calculations of the NAC-STC and HI-STAR 100 rail casks in the Draft Report been validated or benchmarked with results from full-scale testing of casks currently in use in the United States?

In 2006, the National Academies (NAS) report, Going the Distance?, endorsed full-scale testing of shipping casks under certain conditions. The Draft Report cites this report, but does not address full-scale cask testing. The NAS finding and recommendation are as follows:

“FINDING: The committee strongly endorses the use of full-scale testing to determine how packages will perform under both regulatory and credible extra-regulatory conditions. Package testing in the United States and many other countries is carried out using good engineering practices that combine state-of-the-art structural analyses and physical tests to demonstrate containment effectiveness. Full-scale testing is a very effective tool for both guiding and validating analytical engineering models of package performance and for demonstrating the compliance of package designs with performance requirements. However, deliberate full-scale testing of packages to destruction through the application of forces that substantially exceed credible accident conditions would be marginally informative and is not justified given the considerable costs for package acquisitions that such testing would require.

RECOMMENDATION: Full-scale package testing should continue to be used as part of integrated analytical, computer simulation, scale model, and testing programs to validate the performance of package performance. Deliberate full-scale testing of packages to destruction should not be carried out as part of this integrated analysis or for compliance demonstrations.”

Why did NRC decide not address full-scale testing as proposed by the NAS in the Draft Report? How might the findings of the Draft Report be used to support full-scale cask testing as proposed by the 2006 NAS report?

In 1999, NRC began the process of developing a cask testing demonstration study as part of the Package Performance Study (PPS). The most recent NRC testing proposal (SECY-05-001), approved by the Commission in June 2005, calls for a demonstration test in which a cask mounted on a railcar is impacted by a speeding locomotive, and then subjected to a 30-minute fire engulfing fire. "The staff's proposed test plan as provided in this SECY is not the final word on this issue, as the project is subject to additional modifications and Commission direction once additional information becomes available."

Nevada believes the test proposed in SRM SECY-05-0051 would not determine if the rail cask meets the accident performance standards set forth in the NRC regulations and would provide little data useful for validating the computer models used in safety evaluations. The demonstration test appears to have the same limits noted by NRC staff regarding the tests proposed in 2004. However, Commission stated that this plan "is not the last word of this issue."

Why did NRC decide not address full-scale testing as proposed in SRM SECY-05-0051 in the Draft Report? How might the findings of the Draft Report be used to support full-scale cask testing as proposed in SECY-05-0051?

Insufficient Detail to Allow Independent Confirmation of Findings

In a number of important instances, the Draft Report does not sufficient data to confirm its findings. For example, regarding the routes evaluated, it provides only national maps of the routes studied, rather than the detailed printouts from the WEBTRAGIS software that would have permitted detailed confirmation of the routes shown in the maps. The WEBTRAGIS outputs for each of the routes evaluated should be included in the final version. Moreover, it is difficult to confirm the population data used in the Draft Report. Nevada submits an alternative approach to assessment of population data along potential shipping routes at the national level (Attachment 4) and at the state and county level (Attachment 5).

Routine Dose Calculations for Truck Shipments Ignore Over-weight Truck Operations and Traffic Gridlock Incidents

The Draft Report routine dose calculations for truck shipments must be completely re-evaluated. The Draft Report assumes that the GA-4 can be shipped as a legal-weight cask. In the 2008 FSEIS, DOE determined that the GA-4 (and GA-9) casks would need to be transported as over-weight truck shipments. As a result, the report's results are incomplete, misleading and tentative at best. The Draft Report completely ignores the potential dose to members of the public resulting transportation gridlock incidents during truck shipments.

Routine Dose Calculations for Rail Shipments Ignore Intermodal Transfers and New Security Regulations

The Draft Report routine dose calculations for rail shipments must be completely re-evaluated. The Draft Report ignores the fact that about one-third of the current 72 reactor sites cannot make

direct rail shipments. Many sites once thought to have rail access, no longer do. Previous examinations of this problem by DOE have found that it will be necessary to use a mix of barge, overweight and heavy trucks to move spent fuel in rail casks to the nearest railhead. The Draft Report ignores past shipping plans which envisioned heavy haul truck, barge, intermodal and overweight truck as all being necessary to ship these materials, and fails to consider potentially lengthy delays due to normal traffic congestion, rail incidents, equipment failure or other causes. Moreover, the Draft Report completely fails to consider the new rail security regulations adopted by the Federal Railroad Administration and the Department of Homeland Security in 2008. These new regulations will dramatically affect routing decisions and create significantly increased stop time for routine rail shipments, even if all shipments are assumed to be made in dedicated trains. These issues regarding rail shipments are addressed in detail in Attachment 1.

Accident Scenarios Underestimate Potential Fire Durations and Temperatures

Nevada believes that the Draft Report underestimates the potential fire durations and fire temperatures to which casks may be exposed in transportation accidents.

Accident Scenarios Underestimate Consequences on Damage to Cask Impact Limiters

Nevada believes that Draft Report underestimates the potential damage to casks in accident fire environments following damage to cask impact limiters.