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Honorable Dale Klein, Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: *Inscrutability of DOE's TSPA for Yucca Mountain*

Dear Chairman Klein:

We understand that DOE may now be running or is about to run its Total System Performance Assessment ("TSPA") simulation program, the results of which will form the basis for DOE's license application for its proposed Yucca Mountain nuclear waste repository, which DOE plans to file with NRC by June 2008. Accordingly, Nevada has been paying special attention to the new TSPA. We have purchased the GoldSim computer model (for \$10,000) and have run various scenarios that arose in DOE's earlier Site Recommendation TSPA ("TSPA-SR").

After our detailed review, we thought it imperative to call your attention to a glaring and critical problem with DOE's TSPAs, including its newest one. In short, the TSPA *does not meet* the basic requirements of a calculation intended to form the basis for a government license. The model is so complicated and so large, and takes so many computers to run it, and it must be run so many times for the answer to converge, that it is fundamentally not capable of being checked by any third party, including the NRC Staff. We doubt there is even anyone in DOE who has a comprehensive command of the entire model.

We understand that NRC Staff has developed its own model (the "TPA"), less complicated than DOE's, in order to help Staff to understand the issues. But the Staff is not the applicant, and its model cannot be the primary ground for license approval. The application has to stand or fall on the validity of DOE's model and results. That model must be transparent and capable of being checked. NRC cannot license Yucca Mountain on results from a black box, and it should so inform DOE.

Nevada has been reviewing the record illustrating the development of the new TSPA. There are a variety of documents that attempt to decipher DOE's TSPA process. Perhaps the best is from a DOE/NRC Technical Exchange meeting on TSPA for Yucca Mountain held on October 24-25, 2006, where Mr. S. David Sevougian gave a presentation on DOE's "TSPA Model Development and Implementation." We and our experts have studied the slides from that presentation in detail, and they raise grave concerns that the hardware configuration adopted by DOE – involving hundreds of computers – is wholly inappropriate for a major safety-related license application that should be accessible for scrutiny by interested third parties reviewing the application, including NRC Staff, Nevada, other interested parties, the Nuclear Waste Technical Review Board, and NRC's Advisory Committee on Nuclear Waste.

Specifically, Slide 13 of the presentation (attached) shows the so-called "TSPA-wulf" configuration that is proposed by DOE for use in licensing. A footnote states that "TSPA-wulf" is a reference to the "Beowulf Project" developed at NASA's Goddard Space Center, after which this type of computer cluster configuration is named (*i.e.*, a "Beowulf Computer Cluster").

Nevada was most surprised to learn that the specific Beowulf Computer Cluster proposed by DOE for Yucca's licensing requires use of an immense cluster of computers and processors that no participant can reasonably expect to duplicate:

- A Windows 2000 File Server (Dell PowerEdge 6600):
- 30 Windows 2000 or 2003 Master Servers (Dell PowerEdge 4600s/2650s/2850s/2950s), described as job distribution servers and connected via a Terminal Services Client to unspecified PCs for off-site development:
- 752 Processors, comprising:
 - 240 Windows Server 2003 Processors (60 Dell PowerEdge 2950s);
 - 440 Windows 2000 Processors (220 Dell PowerEdge 2650s/2850s);
 - 36 Windows 2000 Processors (9 Dell PowerEdge 6450s);
 - 36 Windows NT 4.0 Processors (9 Dell PowerEdge 6350s).

In other words, simply running, or likely even inspecting, the structure of DOE's TSPA for Yucca requires the coordinated use of literally *hundreds of computers and processors and software*, some of which is already obsolete.

Worse, within this Byzantine hardware and software context, the GoldSim simulation software is then required to implement the enormously complicated TSPA, with the computations for individual portions of the simulation being distributed to the various processors noted above. GoldSim is an expensive proprietary software package that requires extensive training to operate. While Nevada has purchased this model and paid the annual fees, and has engaged experts devoted to understanding and running GoldSim, it is hard to imagine that we will be able to check DOE's work adequately, not