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**AUTHOR:** Martin Malsch, (Attorney)  
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# EGAN, FITZPATRICK & MALSCH, PLLC

Counselors at Law

2001 K Street, N.W. • Suite 400  
Washington, D.C. 20006  
Tel: (202) 662-2103  
Fax: (202) 662-2105

[www.nuclearlawyer.com](http://www.nuclearlawyer.com)

12500 San Pedro Avenue • Suite 555  
San Antonio, TX 78216  
Tel: (210) 496-5001  
Fax: (210) 496-5011

Joseph R. Egan (1954-2008)  
Martin G. Malsch

Charles J. Fitzpatrick  
John W. Lawrence

July 21, 2008

## VIA MESSENGER

Secretary  
U.S. Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852

Dear Madam Secretary:

Enclosed for filing with the Commission is the State of Nevada's Supplement to its June 4, 2008 Petition Asking the NRC to Reject Doe's Yucca Mountain License Application as Unauthorized and Substantially Incomplete.

Sincerely,



Martin G. Malsch  
Egan, Fitzpatrick & Malsch, PLLC  
Counsel for the State of Nevada

**STATE OF NEVADA'S SUPPLEMENT TO ITS JUNE 4, 2008 PETITION  
ASKING THE NRC TO REJECT DOE'S YUCCA MOUNTAIN LICENSE  
APPLICATION AS UNAUTHORIZED AND SUBSTANTIALLY  
INCOMPLETE**

On June 4, 2008, the State of Nevada ("Nevada" or "State") asked the Commission to reject and return the application for an authorization to construct a high-level radioactive waste repository at Yucca Mountain, Nevada ("LA"), tendered by the Department of Energy the day before, on the grounds that it was unauthorized and substantially incomplete. The Commission has not responded to Nevada's Petition. However, the State has continued to review the LA and, although its review is far from complete, it is apparent from the review conducted thus far that the LA tendered on June 3 it is even more incomplete than Nevada's initial review had suggested. This is explained below.

The Commission should include this Supplement in its consideration whether to reject DOE's LA. If the Commission itself refuses to entertain Nevada's Petition, or this Supplement, then Nevada respectfully requests that the Petition and Supplement be referred to NRC Staff for its consideration in deciding whether to docket the LA.

## **Level of Design Detail**

Exhibit A is a brief listing and summary of those portions of the LA where DOE concedes that important design information is missing and will need to be supplied later. In its June 4, 2008 Petition, the State established that the Commission's Yucca Mountain licensing regulation (10 C.F.R. Part 63) required the LA to include final design information for structures, systems, and components, important to safety or waste isolation, but that the relevant design information in the LA fell far short of this level of design detail, making the LA far too incomplete to docket and to initiate a full merits review. DOE and the NRC Staff opposed Nevada's Petition, offering an unsupported opinion that the level of design detail in the LA should be considered sufficient if all of the required safety findings could be made, even if no final design information was provided. Nevada believes that DOE's and Staff's position is contrary to Part 63. However, even if DOE and NRC Staff were correct in their reading of the regulation, Exhibit A demonstrates that the LA would still be substantially incomplete.

To offer just a few examples from Exhibit A (which refers to specific sections of the LA and SAR), DOE concedes that the codes and standards and design requirements for the critically important TEV (waste transport and emplacement vehicle) necessary to ensure safety do not exist, and that selection of TEV systems and components "important to safety" cannot be made. This is

directly contrary to 10 C.F.R. §§ 63.21 (c)(2), 63.21( c)(5) and 63.112(e), which provide that the LA must identify applicable codes and standards and include “an analysis of the performance of the structures, systems, and components to identify those that are important to safety.” Similarly, the design detail, event sequence, and reliability analysis needed to determine the nuclear safety design basis for the DOE MCO (“multi-canister overpack”) have not been completed. This is directly contrary to 10 C.F.R. §§ 63.21(c)(3)(iii), 63.21(c)(5), 63.102(f), and 63.111, which require a specification of the nuclear safety design basis and a pre-closure safety evaluation of event sequences that could result in radiation exposures. The safety findings required by 10 C.F.R. § 63.31(a)(3)(i) and (ii) cannot possibly be made without this information regarding the TBV and MCO.

### **DOE Misconduct in Submitting the LA**

10 C.F.R. § 63.11(a)(2) provides that DOE is guilty of deliberate misconduct if it “deliberately submits to the NRC...information that [it] knows to be incomplete...in some respects material to NRC.” 10 C.F.R. § 63.10(a) provides that “information provided to the Commission by an applicant ...must be complete and accurate in all material respects.” Contrary to these requirements, the LA DOE submitted omits important safety information that DOE must have known was material.

First, the LA omits any mention whatsoever of the independent review of DOE's infiltration model performed at DOE's request by ORISE (Oak Ridge Institute for Science and Education). ORISE provided the results of this independent review to DOE's Yucca Mountain Project on April 30, 2008, after considering comments on a January 2008 draft of the report submitted by DOE on February 14, 2008 (see HQO.20080512.0001 (LSN accession number DEN001594989) and HQO.20080512.0002 (LSN Accession number DEN001595302)). The conclusions of this independent review are stark and unquestionably material. ORISE concludes (at Summary pg.1) that "the model report does not provide a technically credible spatial representation of net infiltration at Yucca Mountain." The report cites here (Summary, page 1) to-

(1) a "critical lack of site-specific hydrological, surface, and subsurface information,"

(2) a failure to incorporate "at least one potentially important hydrologic process," which "may be one reason the model results appear to underestimate net infiltration beneath wash environments and therefore imprecisely represent the spatial variability in net infiltration," and

(3) "assumptions [that] oversimplify a complex landscape and associated hydrologic processes" and that "have not been adequately corroborated by field and laboratory observations at Yucca Mountain."

One searches in vain for any mention of this report in section 2.3.1.3.2.1.3 of the LA SAR entitled “Soil Properties,” which would be the most pertinent section, in any other part of the LA, or in any LA reference.

Second, in 2004 DOE commissioned an update to the Probabilistic Volcanic Hazards Analysis expert elicitation so that, among other things, new aeromagnetic data in the Yucca Mountain environs being gathered could be taken into account. This update came to be known as the “PVHA-U.” As DOE explained in an April 8, 2002 internal briefing of a Project official, “new aeromagnetic data could increase our volcanism probability estimates” and “new NRC contractor work by top-notch volcanologists is suggesting new scenarios and issues that could potentially have major effects on dose” (see LSN accession number DEN001219732). Another DOE Project document admits that (as of May 15, 2007) “the available scientific situation, including both observational evidence and models to explain it, is insufficient to support a single interpretation that the broad community of experts agrees to as ‘correct’ or ‘appropriate’ as- of- today” (DN2002462565). Moreover, DOE’s original basis for estimating volcanic hazards (the “PVHA”) did not extend beyond 10,000 years. Now, of course, the post-closure assessment period is on the order of 1,000,000 years. Yet, while the LA SAR briefly discusses the new aeromagnetic data (in sections 1.1.6.1 and

2.3.11.2.2.6), and the TSPA extends to 1,000,000 years, the mysterious PVHA-U is nowhere to be found.

Under ordinary circumstances, one could not fault DOE for failing to include a document that does not yet exist. However, a calculated and cynical effort to prevent an important safety study from being completed in time for inclusion in a June, 2008 LA would surely be as reprehensible as a failure to include a completed study. A posture of calculated neglect, whereby no effort would be made to ensure the completion of an important safety study known to be lagging behind, would be just as bad. DOE must have had the ability to control the schedule of its PVHA-U, and it surely had the ability to delay the filing of the LA so that a completed PVHA-U could be included, if that became necessary. In fact, we now know that the decision not to include the PVHA-U in the LA was made over one and on-half years ago (see DN2002500340, item 32). This is another violation of 10 C.F.R. §§ 63.10(a) and 63.11(a)(2) because DOE has submitted an LA it knows is incomplete in its treatment of volcanic hazards.

The NRC has imposed severe civil penalties on applicants and licensees who failed to disclose important safety information and has barred individuals who submitted false and misleading information to the NRC from licensed activities (see, e.g., NRC Press Release III-06-001, January 5, 2006, and Virginia Electric & Power Co. v. NRC, 571 F.2d. 1289 (4<sup>th</sup> Cir. 1978)). At the very least, the NRC

should refuse to docket the LA without the PVHA-U and, with respect to the infiltration model, an explanation why the conclusions of this report are in error or substituting a new and technically supportable infiltration model. The NRC should insist that DOE provide for a full written explanation why these material omissions occurred.

### **Drip Shields**

Nevada's argument in its Petition about drip shields will not be repeated here. However, to emphasize the importance of this issue, exhibit B hereto includes the results of a preliminary Nevada calculation of the peak dose to the RMEI without drip shields, based on DOE's own estimates in the LA of the RMEI doses in the early drip shield failure case. No LA would be reasonably complete without such a calculation. The State would also like to point out that, on May 15, 2008, Doctor B. John Garrick, the Chairman of the Nuclear Waste Technical Review Board, testified (in prepared remarks) before the House Committee on Energy and Commerce Subcommittee on Energy and Air Quality that "DOE assumptions about drift degradation and repository tunnel tolerances may make installation of the drip shields, as currently designed, problematic." Clearly, the LA cannot be docketed without detailed, credible, and implementable plans for drip shield procurement, assembly, and emplacement.

**Conclusion**

For the above reasons, and for the reasons given in Nevada's original Petition, DOE's LA cannot be docketed.

Dated this 21 day of July, 2008.  
Respectfully submitted,  
Catherine Cortez Masto  
Attorney General  
Marta A. Adams  
Senior Deputy Attorney General  
STATE OF NEVADA  
100 North Carson Street  
Carson City, NV 89701  
Tel: 775.684.1237  
Fax: 775.684.1108



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Martin G. Malsch  
Special Deputy Attorney General  
Charles J. Fitzpatrick  
Special Deputy Attorney General  
EGAN, FITZPATRICK & MALSCH, PLLC  
2001 K St., N.W., Suite 400  
Washington, D.C. 20006  
Tel: 202.662.2103  
Fax: 202.662.2105  
Attorneys for Petitioner  
State of Nevada

# EXHIBIT A

## Incomplete Designs and Plans in the LA

### General Information (GI):

Fig. 2-1 – p. 2-9 – 2-15 -

Initial Handling Facility (IHF) design complete 4<sup>th</sup> quarter FY11;  
Surface Aging Pad (17K) design complete 4<sup>th</sup> quarter FY12;  
CRCF1 (Canister Receipt and Closure Facility) design complete unspecified;  
Subsurface Panel 1 design complete 1<sup>st</sup> quarter FY12;  
Wet Handling Facility (WHF) design complete 2<sup>nd</sup> quarter FY13;  
Receipt Facility (RF) design complete 2<sup>nd</sup> quarter FY13;  
CRCF2 design complete 4<sup>th</sup> quarter FY14;  
Aging Pad 17L design complete 3<sup>rd</sup> quarter FY12;  
CRCF3 design complete 3<sup>rd</sup> quarter FY16;  
Subsurface Panel 2 design complete 3<sup>rd</sup> quarter FY14;  
Subsurface Panel 3 design complete 4<sup>th</sup> quarter FY15;  
Subsurface Panel 4 design complete 3<sup>rd</sup> quarter FY16.

### Safety Analysis Report (SAR):

1.3.1.2.4 – p. 1.3.1-18 – However, the thermal capability of the TAD canister as well as its capability to meet radiation dose limits have been left to the cask vendors to determine for their designs as design bases or criteria for certification under 10 CFR Part 71 regulations in the form of performance specifications for the canister.

1.3.3.5.1.1 – p. 1.1.1-30 – Codes and standards have been evaluated and design requirements and testing specifications are being developed to ensure the functions performed by the TEV [Transport and emplacement Vehicle] meet the ITS reliability, safety, and performance objectives (BSC 2008d, Section 1; BSC 2008e, Sections 4, 8 and 9).

BSC 2008d (*Waste Package Transport and Emplacement Vehicle Gap Analysis Study, ENG.20080306.0006*). P.6 states:

This gap analysis study is based on the design development completed for license application only. Accordingly, the identification of ITS SSCs beyond those defined within the BOD is based on designs that may be subject to further development during detail design. Furthermore, several design alternatives may still be under consideration to satisfy certain safety functions, and that final selection will not be determined until further design development has occurred.

DSC 2008e (*Waste Package Transport and Emplacement Vehicle Design Development Plan, ENG.20080306.0008*). P. 5 states:

Design development requirements and activities identified in this DDP are commensurate with the level of design completed for the License Application and the associated gap analysis study. However, specific design details and the selection of specific SSCs may not be known, and all design development requirements may not have been identified in the gap analysis study.

1.5.2.7.1 – p. 1.5.2-18 – The outer corrosion barrier is solution annealed after initial fabrication. Once solution annealing is complete, machining of the outer surface of the corrosion barrier is not permitted... After heat treatment, the solution anneal film will be removed from the outer barrier surface of the waste package. Numerous treatment options are available for this process, including electropolishing and grit blasting. A decision on treatment option will be made after consideration of the technology available and the effectiveness of the available options.

1.6.1 – p.1.6-4 – Representative waste containers, rather than those of specific designs or specific suppliers, were analyzed for their failure potential associated with event sequences. A range of container dimensions and materials were considered within these representative analyses.

1.6.1.4 – p. 1.6-7 – As mentioned previously, these were developed using representative containers.

1.7.1 – p. 1.7-7 – The design and the analyses needed to determine and demonstrate that the MCOs [DOE multicannister overpack] can be safely received and handled at the repository during the preclosure period will be completed, documented, and included in an update to the license application (Section 1.5.1.3.1.2.9). *which says:* MCOs will be accepted for disposal at the repository when the design details, event sequence, and reliability analyses needed to determine the nuclear safety design basis for the MCOs are completed and establish that the MCOs can be safely received and handled at the repository during the preclosure period.

1.7.2.4 – p. 1.7-35 – Because much of the equipment design is in a preliminary stage, the fragility calculations are based upon a design that exactly meets the allowable stress levels, and does not provide any extra design margin... It would be expected that the final equipment design would provide some conservative margin between the calculated design stress level and the allowable stress level.

1.10.2.11.1 – p. 1.10-20 –

**Design Refinement** – Because of uncertainties in the final configuration of facilities and equipment, including TAD canisters, simplifying assumptions are made for equipment and facility layout. These assumptions will be revised to realistically reflect actual equipment configurations, hardware tooling, and facility layout.

**Analysis Refinement** – Because of uncertainties in the final configuration of facilities and equipment, simplifying assumptions are made in the physical modeling of radiation sources and worker exposure pathways. These assumptions will be revised to more realistically reflect expected source terms, shielding design, and layout.

**Task Refinement** – Estimates of worker doses are based on a set of worker activities and assumed unit doses to workers. Initial estimates assume that the maximum dose for an activity applies to each worker in a workgroup. As the design progresses, individual

worker dose and annual collective doses will be reduced due to a more realistic representation of operations and worker activities.

1.10.3.5.1.2 – p. 1.10-34 – No permanent shielding is anticipated around the Aging Facility because of the shielding provided by the aging overpacks and aging modules, combined with the location which provides significant distance attenuation from normally occupied areas.

1.10.3.5.1.3 - p. 1.10-35 – No permanent shielding is anticipated for the rail or truck buffer areas.

1.10.3.5.1.4 – p. 1.10-35 – Representative rail transportation casks are used to evaluate shielding from transient sources.

1.11.1.1.1 – p. 1.11-4 – Retrieval operations would be performed using mobile transportation and emplacement equipment used for emplacement or equipment developed for retrieval and to be described in an amendment to the license application.

1.13.4 – p. 1.13-7 – Active electrical and active mechanical equipment that are ITS and credited with preventing the initiation of or mitigating the consequences of a seismically initiated event sequence will be designed to perform their safety functions during and after the appropriate design basis ground motion seismic event.

1.14.2.3.1.1 – p. 1.14-6 – The results for analyses of TAD canisters and DPCs with close-fitting full-thickness reflectors in the safety analysis (BSC 2008b) are expected to be representative or bounding for transportation casks containing commercial SNF.

1.14.2.3.1.2 – p. 1.14-7 – Analysis of operations involving DPCs is performed using representative DPC designs for pressurized water reactor (PWR) and boiling water reactor (BWR) SNF.

1.14.2.3.1.3 – p. 1.14-7 – Analysis of operations involving TAD canisters was performed using conceptual representations of the PWR and BWR TAD canisters compliant with the criticality performance requirements of the TAD canister performance specification (DOE 2008). Details of the TAD canister basket designs and dimensions of many internal components were assumed (BSC 2008b, Section 1.4.1) because they are not given in the performance specification.

Note: from BCS 2008b, Section 1.4.1, p. 19: (*Preclosure Criticality Safety Analysis. ENG.20080307.0007*)

**Confirmation Status** – The dimensions and internal arrangement of the TAD canisters and baskets must be verified to be bounding or  $k_{eff}$  calculations and safety analyses must be performed using dimensions and arrangements from DOE-accepted TAD canister designs.

# EXHIBIT B

# No Drip Shield Case

