

April 24, 2006

Mr. Jayant Bondre  
Director, Licensing and Engineering  
Transnuclear, Inc.  
7135 Minstrel Way, Suite 300  
Columbia, MD 21045

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION NO. 2 FOR AMENDMENT NO. 1  
TO THE TN-68 STORAGE CASK (TAC NO. L23802)

Dear Mr. Bondre:

By letter dated January 14, 2005, Transnuclear, Inc. (TN) submitted an application for Amendment No. 1 to Certificate of Compliance (CoC) No. 1027 for the TN-68 Storage Cask System. The amendment requested, among several changes, to increase the allowable fuel burnup, minimum cooling times, decay heat, and fuel enrichment. The amendment also requested to include damaged fuel as authorized contents of the cask and to reduce the cask spacing on the storage pad. On July 15, 2005, the staff issued a Request for Additional Information (RAI) to TN, in which it specified the information needed by the staff to complete its review. On November 14, 2005, TN provided a response to the staff's RAI.

After reviewing the November 14, 2005 response to the RAI, the staff has determined that additional information is required to assess compliance with 10 CFR Part 72. Enclosed is the staff's second request for additional information (RAI) for the continued review of your request. To the extent practicable, we request that TN respond to this RAI by providing a response to each item in the RAI. We would be willing to meet with you to discuss and clarify the enclosed RAI. Your response to the enclosed RAI is expected by June 30, 2006. If you are unable to meet the June 2006 milestone, you must notify us in writing, at least two weeks prior to this date of your new response date and the reasons for the delay. The staff will assess the impact of the new response date and issue a revised schedule.

Please reference Docket No. 72-1027 and TAC No. L23802 in future correspondence related to this request. If you have questions concerning this request, please contact me at (301) 415-1309.

Sincerely,

/RA/

Jose R. Cuadrado, Project Engineer  
Licensing Section  
Spent Fuel Project Office  
Office of Nuclear Material Safety  
and Safeguards

Docket No. 72-1027  
TAC No. L23802

Enclosure: Request for Additional Information

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## Request for Additional Information No. 2

### Docket No. 72-1027 Certificate of Compliance No. 1027 TN-68 Spent Fuel Dry Storage Cask

By application dated January 14, 2005, Transnuclear, Inc. (TN) requested an amendment to Certificate of Compliance No. 1027 for the TN-68 Spent Fuel Dry Storage Cask. This request identifies additional information needed by the U.S. Nuclear Regulatory Commission (NRC) staff in connection with its review of the application. NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems," was used by the staff in its review of the application. This request describes information needed by the staff to complete its review of the application and to determine whether the applicant has demonstrated compliance with the requirements of 10 CFR Part 72. The requested information is listed by chapter number and title in NUREG-1536.

#### Chapter 3 - Structural Evaluation

- 3-1 Provide an analysis to demonstrate that high burn-up damaged fuel assemblies can withstand applicable regulatory loading conditions for storage, including the non-mechanistic tip-over event, without reconfiguring or causing gross rupture of the fuel cladding.

The proposed amendment indicates that the high burn-up damaged fuel assemblies will not be placed in a damaged-fuel-can, but instead will be placed in the eight compartments of the basket that have been fitted with an additional extension at the top, and caps at the top and bottom of the compartment. ISG-1, Revision 1, allows for an alternative to placing some forms of damaged fuel into a damaged-fuel-can if it can be shown through analysis that the assembly in question is capable of withstanding all design loads without reconfiguring. Appendix 6B presents analysis for 10 CFR Part 72 normal, off-normal loading conditions loads, and 10 CFR Part 71 normal loading conditions. However, the 1-foot side drop load of 35g used in the analysis does not envelope the 65g load for the non-mechanistic tip-over event (See Appendix 3D of the application).

The regulatory normal, off-normal and accident-level conditions must all be addressed. This information is needed to comply with the requirements of 10 CFR 72.24 (d)(2), and 72.122 (h)(1) and (l). Guidance to comply with the applicable regulations is provided in NUREG -1536, Section 3 (V)(1)(d)(i)(3a).

- 3-2 Provide justification that demonstrates that the *stress intensity allowable* ( $K_{IC}$ ) = 35ksi<sup>1/2</sup> shown in the Tables in Appendix 6B, Section 6B.7, "Fracture Toughness Evaluation," is valid for high burn-up damaged fuel assemblies.

In response to the previous Request for Additional Information (RAI) dated July 15, 2005, TN revised and resubmitted (on November 15, 2005) the analysis presented in Appendix 6B of this amendment, which used a flaw tolerance methodology to demonstrate the structural integrity of the damaged fuel assemblies. The amendment requests that high burn-up damaged fuel assemblies be allowed to be placed in the eight compartments of the basket that have been fitted with an additional extension at

the top, and caps at the top and bottom of the compartment, instead of placing the damaged fuel in a damaged-fuel-can.

The regulations require that spent fuel cladding be protected during storage against degradation that leads to gross rupture or the fuel must be otherwise confined. The option to omit the use of a damaged-fuel-can, as outlined in ISG-1 Revision 1, was intended for cases where it can be shown through analysis that the assembly in question is capable of withstanding all design loads without reconfiguring or causing gross rupture of the cladding. Upon meeting these criteria, the damaged fuel assembly does not have to be placed in a damaged-fuel-can, and can be stored in the eight peripheral compartments of the TN-68 fuel basket.

The staff does not agree with the analysis submitted to justify placing uncanned damaged fuel in the eight specifically designated compartments of the basket. The fuel cladding data, the crack length to diameter ratios, and the flaw opening to diameter ratios have not been substantiated for high burnup fuel. In addition, the calculated stress intensity factor  $K_I = 33\text{ksi}^{1/2}$  and the allowable value of  $(K_{IC}) = 35\text{ksi}^{1/2}$  does not provide sufficient margin, because the error bounds for this allowable are + (-) 10%, as shown in the referenced publication (ASTM STP 551 (1974)). The staff believes that the information described in this publication is only valid for low burn-up fuel.

This information is needed to verify that the damaged fuel assemblies will be readily retrievable per the requirements of 10 CFR 72.122 (h)(1) and (l).

#### **Chapter 4 - Thermal Evaluation**

- 4-1 Provide a heat balance that accounts for convective and radiative heat transfer from the sides and top surface of the cask to the environment.

In accordance with Chapter 4, Section 5.d of NUREG 1536, "Standard Review Plan for Dry Cask Storage Systems," a heat balance on the surface of the cask is requested in order to verify that the effects of convection and radiation from the cask surface are properly accounted for in the analysis model.

This information is needed to satisfy the provisions of 10 CFR 72.11 and 10 CFR 72.24(d).

- 4-2 Justify the value for the view factor of the cask to the environment calculated in section 4.10.1 (Page 4.10-2).

The view factor calculated (0.62) is derived from a correlation for a cylindrical body with view of a finite plane wall of equal height. This does not appropriately capture the actual view of the environment that the cask would have if placed in an array per the Safety Analysis Report (SAR) (Figure 4.10-1).

This justification is needed to satisfy the provisions of 10 CFR 72.11 and 10 CFR 72.24(d).

## **Chapter 12 - Conditions for Cask Use/Technical Specifications**

- 12-1 Provide a revised version of the proposed Technical Specifications that incorporates or references neutron absorber material specifications as a design characteristic of special importance in Section 4.0, "Design Features," of the Technical Specifications.

Neutron absorber materials are important-to-safety cask components. However, a standard that specifies fabrication and qualification requirements of these materials is not available, nor addressed by other standards for cask materials (i.e., ASME code). Therefore, detailed descriptions of these specifications are required in the appropriate sections of the SAR. Because of these reasons, the staff believes that descriptions of the specifications, qualifications, and acceptance requirements for the neutron absorber materials should also be included, or incorporated by reference, in the Technical Specifications.

This information is required to comply with the provisions of 10 CFR 72.124 and 72.236(b) and (c).