UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 11, 2005

Mr. Michael Mason, Chief Engineer
Transnuclear, Inc.
Four Skyline Drive
Hawthorne, NY 10532

SUBJECT: JULY 27, 2005, TELEPHONE CONFERENCE REGARDING NUHOMS® HD HORIZONTAL MODULAR STORAGE SYSTEM REVIEW (TAC NO. L23738)

Dear Mr. Mason:

By letter dated May 5, 2004, as supplemented on July 6 and October 28, 2004, Transnuclear, Inc., (TN) submitted an application for NUHOMS® HD Certificate of Compliance (CoC) No. 1030. This application proposes a new horizontal modular storage system, designated the NUHOMS® HD. In letters dated December 13, 2004, and April 21, 2005, the staff issued requests for additional information (RAI) regarding this design. In letters dated February 18, 2005, and May 20, 2005, TN provided responses to the staff's RAIs.

On July 27, 2005, a telephone call was held with TN to discuss TN's proposal to remove a portion of the structural analysis for the 75g end drop from the safety analysis report (SAR) for the NUHOMS® HD design. The participants in the phone call from the U.S. Nuclear Regulatory Commission (NRC) were Gordon Bjorkman and Joseph Sebrosky. The TN participants were Tara Neider and Daniel Kirch.

Background for July 27, 2005, Telephone Call

During a phone call on July 8, 2005, the NRC provided TN three options regarding the 75g end drop analysis for the NUHOMS® HD design (see ADAMS Accession No. ML052170214 for a summary of the July 8, 2005, phone call). Of the three options provided to TN by the NRC, TN chose the option that involves removing a portion of the 75g end drop analysis from the SAR. In a July 21, 2005, e-mail TN provided a draft of the affected SAR pages for NRC review (see ADAMS Accession No. ML052220109 for details of the July 21, 2005, e-mail).

Details of July 27, 2005, Telephone Call

Enclosure 1 to this letter provides NRC's initial feedback on TN's July 21, 2005, draft SAR pages. During the July 27, 2005, phone call TN stated it understood NRC's comments contained in enclosure 1 and clarified that it wanted to remove only a portion of the 75g end drop analysis from the SAR. Specifically, TN proposed that the 75g end drop analysis for the fuel cladding be removed from the SAR because this was the analysis for which the NRC had identified problems. TN stated that because the NRC did not question the 75g end drop analysis for the transfer cask and the canister TN wanted to retain these analyses in the SAR for future reference in either a 10 CFR Part 71 application or by a 10 CFR Part 50 licensee that needed to evaluate heavy load lifting. The staff stated that it expected additional areas of the SAR needed to be changed if TN's intent was to only remove a portion of the 75g end drop analysis from the SAR. The staff stated that the SAR needed to clearly define the licensing basis for the 75g end drop analysis and that any reference to this analysis needed to clearly state that the 75g end drop analysis for the cladding was outside of the licensing basis for the NUHOMS® HD design.

Based on the July 27, 2005, phone call TN agreed to revise its proposal regarding the 75g end drop analysis for the NUHOMS® HD design.

You may contact me at 301-415-1132 if you have any questions regarding our review of the application.

Sincerely,

Joseph M. Sebrosky, Senior Project Manager
Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket No.: 72-1030
TAC No.: L23738

Enclosure: NRC Comments Provided to Transnuclear, Inc.

basis for the 75g end drop analysis and that any reference to this analysis needed to clearly state that the 75g end drop analysis for the cladding was outside of the licensing basis for the NUHOMS® HD design.

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/RA/

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Docket No.: 72-1030
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Distribution:
Docket SBaggett JCuadrado
G:\SFPO\TN\TN-NUHOMS HD\7-27-05 phone call summary.wpd *see previous concurrence

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NAME	JSebrosky		DRiffle		GBjorkman		RLewis	
DATE	8/11/05		8/11/05		8/10/05		8/11/05	

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NRC Comments Provided to Transnuclear, Inc.
(NRC comments identified by an * in the margin)

TRANSNUCLEAR

Joe 11/23/05
Required changes.
Gordon

E-22577
July 21,2005

Mr. Jose Cuadrado
Spent Fuel Project Office, NMSS
U. S. Nuclear Regulatory Commission
11555 Rockville Pike M/S 0-6-F-18
Rockville, MD 20852

Subject: NUHOMS® HD Storage System Docket No. 72-01030.
(TAC No. L23738)

Dear Mr. Cuadrado:

Transnuclear, Inc. formally requests the removal of the fuel rod 75g end drop analysis presented in Chapter 3, Section 3.5.3.2 and one-foot end drop analysis described in Appendix 3.9.8, Section 3.9.8.10 of the NUHOMS® HD System Safety Analysis Report. The SAR did not demonstrate the structural integrity of the fuel during these events. However, as stated in Section 3.1.1.4 of SAR (new section added with this submittal), the end drop evaluation is not considered a credible event during 10CFR72 transfer operations. All lifts of the DSC in the transfer cask prior to transfer are governed under the nuclear plant's 10 CFR 50 Heavy Lifts Program.

As a result of the changes requested above, enclosed are revised SAR pages on a replacement basis. Additional revised SAR pages from our response to RAI2 (E-22383) will be sent in the near future.

Evaluations of the end drop on the DSC, basket and transfer cask are adequately addressed in the current Safety Analysis Report and no revisions are necessary.

Transportability in accordance with 72.236(m), is addressed below.

Although it has not been demonstrated that the fuel ~~assemblies~~ cladding will remain intact during an end drop, the DSC canister and internals have been evaluated for an end drop load of 75 g's. This value is equal or higher than evaluations performed on transportation systems using impact limiters. It is the intent to license the 32PTH canister for transport inside a transport cask with impact limiters similar to the MP-197. This cask was drop tested on the end. Measured acceleration values were between 62 and 70 g's. Therefore it is reasonable to expect that a transport cask with impact limiters can be designed to limit the g-loads for the end drop to less than 75 g's. Fuel evaluations for this type of load have been successfully performed in other applications, and will be evaluated in the transport application. *

2. Lifts Covered Under 10 CFR 72 Requirements

   - Side drop (the TC is transferred in the horizontal position and no lifting is required to move the canister from the TC to the HSM-H, therefore, the only credible drop event is the side drop).

All of the TC and canister components are analyzed for the drop scenarios described above except the fuel ~~assembly~~ cladding. The fuel ~~assembly~~ cladding integrity is evaluated only for the side drop analysis, (Section 3.5.3 of Chapter 3). The structural integrity of the fuel ~~assembly~~ cladding due to the end drop and corner drop will be addressed by the user under their site license, (10CFR50).

The drop analyses of the NUHOMS® HD components are performed in the following Appendices.

Appendix 3.9.1

This appendix describes the detail analysis of the canister and basket for all the loading conditions. For the drop loads, the canister is analyzed for the 75g side and end drops. The canister end closure welds are analyzed for the 22g corner drop.

The basket is analyzed for 75g the side and end drops. The basket is not analyzed for the 22g corner drop since the 75g end drop analysis bounds the 22g corner drop.

Appendix 3.9.2

This appendix describes the detail analysis of the TC for all the loading conditions. For the drop loads, the TC is analyzed for the 75g side and end drops. The results for the TC corner drop using LS-DYNA is reported in Appendix 3.9.10 (page 3.9.10-14).

Appendix 3.9.3

This appendix describes the detail analysis of the TC top cover bolt and ram cover bolt due to the 22g corner drop. The stress analysis is performed in accordance with NUREG/CR-6007.

Appendix 3.9.4

This appendix describes the detail analysis of the TC lead slump and inner shell buckling analysis. A 75g end drop load is used for these analyses.

Appendix 3.9.8

This appendix describes the detail structural analysis of the ~~damaged~~ fuel cladding due to 10CFR72 (Normal & Off-Normal) and 10CFR71 (Normal) loads.

Based on the evaluations, there is adequate space within the 32PTH DSC cavity for thermal and irradiation growth of the fuel assemblies and spacers.

3.5.3 Fuel Rod Integrity During Drop Scenario

The purpose of this section is to calculate Zircaloy clad fuel rod stresses due to transfer cask side drop incident.

3.5.3.1 Side Drop

The fuel rod side impact stresses are computed by treating the fuel rod as a continuous beam supported at locations of spacer grids. Continuous beam theory is used to determine the maximum bending moment in the entire beam. The maximum bending stress corresponding to the maximum bending moment in the cladding tubes is then calculated. The fuel gas internal pressure is also considered in the calculation. The cladding axial tensile stress due to the gas pressure is added to the bending stress due to the 75g drop load. The combined stresses in each cladding for different fuel assemblies are computed and tabulated in Table 3-12. It shows that among all fuel assemblies the highest axial stress is calculated to be 58,710 psi in the cladding of WE17×17OFA fuel assembly. This highest stress is lower than the yield strength of zircaloy (69,500 psi at 725 °F).

3.5.3.2 End Drop

cladding

The structural integrity of the ~~damaged~~ fuel ~~assembly~~ due to the end drop loading condition will be evaluated by the user under their 10CFR50 site license.

*

cladding

bounded by 1 foot end drop (30g) and 1 foot side drop (30g) transport load. The structural integrity of the ~~damaged~~ fuel for the normal condition Part 71 load is evaluated only for the one-foot side drop condition in this application. The one-foot end drop condition will be addressed in the 10CFR71 application.

Note that for the normal and accident off-site transport drops the impact limiters are attached at both ends of the horizontal loaded cask.

3.9.8.10 One Foot End Drop Damaged Fuel Evaluation

The structural integrity of the ~~damaged~~ fuel cladding ~~assembly~~ due to the one-foot end drop loading condition will be analyzed in the 10CFR71 application.