October 12, 2001

Mr. Robert M. Grenier
President and Chief Operating Officer
Transnuclear West Inc.
39300 Civic Center Drive, Suite 280
Fremont, CA 94538-2324

SUBJECT: SCHEDULES FOR REVIEW OF THE STANDARDIZED NUHOMS® SYSTEM LOW BURN-UP FUEL AMENDMENT (TAC NO. L23277) AND THE ADVANCED NUHOMS SYSTEM (TAC NO. L23203)

Dear Mr. Grenier:

This responds to a Transnuclear West Inc. (TN West) request made during a conference call with Nuclear Regulatory Commission (NRC) staff on October 5, 2001, to delay the issuance of the draft Safety Evaluation Report (SER) and draft Certificate of Compliance (CoC) No. 1029 for the Advanced Standardized NUHOMS® System. The request was made to afford TN West the opportunity to review modifications made to the SER since TN West initially commented on it on September 13, 2001. The modifications are attached and involve the addition of a new section, Section 15.0, to the SER that clearly defines which analytical methodologies NRC finds acceptable for use by the certificate holder and licensees when making future design changes to the Advanced Standardized NUHOMS® System. TN West should provide comments on the SER modifications no later than October 17, 2001.

In addition, by letter dated October 4, 2001, Transnuclear, Inc. (TN), the parent company of TN West, requested that NRC modify the Standardized NUHOMS® System CoC No. 1004, the MP-187 Transportation System CoC No. 9255, and the certificate that will be issued with the Advanced Standardized NUHOMS® System, to change the certificate holder from TN West to TN.

To accommodate these requests, NRC must delay issuance of the CoC No. 1004 and CoC No. 1029 from October 15, 2001, until no later than November 5, 2001. This date change was provided to your staff during a conference call on October 10, 2001. These requests do not affect the issuance date for Amendment 6 to CoC 9255.

If you have any questions on this matter please contact me at (301) 415-8538.

Sincerely,
/S/ /RA/
Timothy Kobetz, Project Manager
Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket Nos: 72-1029, 72-1004
71-9255

Enclosures: SER Section 15.0

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ENCLOSURE

(Note: This section is taken verbatim out of the proposed Standardized Advanced NUHOMS System Safety Evaluation Report (SER). Therefore, acronyms may not be spelled out in this enclosure if they were spelled out previously in other sections of the SER. In addition, this enclosure does not contain SER page numbers.)

15.0 CONCLUSIONS

15.1 Overall Conclusion

The staff performed a detailed safety evaluation of the application for a 10 CFR Part 72 CoC for the Standardized Advanced NUHOMS® System. The staff performed the review in accordance with the guidance in NUREG 1536, "Standard Review Plan for Dry Cask Storage Systems," January 1997. Based on the statements and representations contained in the SAR and the conditions in the CoC, the staff concluded that the Standardized Advanced NUHOMS® System meets the requirements of 10 CFR Part 72.

15.2 Conclusions Regarding Analytical Methods

The staff determined that all analytical methods used by the applicant in the design of the Standardized Advanced NUHOMS System, as described in the SAR, are acceptable with the following exceptions:

15.2.1 Shielding Methodology

The shielding analysis for the Advanced NUHOMS system was performed with DORT, a 2-D discrete ordinates code used to calculate the dose rates on and around the AHSM and OS-197 TC. The staff has considered this 2-D code acceptable for this application under the following limitations:

- the utilization of already proven technology in the Standardized NUHOMS® System
- the thickness improvements in the concrete of the AHSM,
- the relatively low design basis source term, and
- the relatively long fuel cooling times of 10 and 20 years.

However, the staff determined that use of a 2-D code for complex design configurations, such as those associated with dry cask storage systems, may not accurately characterize all possible radiation dose levels. Therefore, for future amendment applications, and safety evaluations performed in accordance with 10 CFR 72.48, a 3-D shielding analysis that has been validated against actual data should be performed. A 2-D shielding model analysis that has been validated against actual data may also be used provided that the analysis demonstrates that it is conservative with respect to a 3-D analysis.

15.2.2 Thermal Evaluation Methodologies

15.2.2.1 Calculation of Insolation for Normal Conditions

The staff determined that the value used by the applicant for solar insolation was well below the value recommended in NUREG-1536, “Standard Review Plan for Dry Cask Storage Systems,” for insolation upon a flat surface and, therefore, non-conservative. The staff determined that the value used by the applicant was derived from a misapplication of the information provided in the American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (ASHRAE) 1981 Fundamentals Handbook. The applicant revised its analysis to meet the guidelines presented in NUREG-1536. The staff found the applicant’s revised analysis acceptable, however, the staff considers the applicant’s misapplication of ASHRAE values as non-conservative and should not be used in future amendment applications or safety evaluations performed in accordance with 10 CFR 72.48.

15.2.2.2 Calculation of Peak Clad Temperature

The staff determined that the applicant’s methodology for calculating maximum fuel cladding temperatures, as presented in the SAR, is non-conservative for the following reasons:

- The applicant’s model uses a homogenized region for the fuel assembly with an effective thermal conductivity or “smeared” property approach in their fuel assembly model. This method uses data from spent fuel assemblies to determine the effective thermal conductivity, taking into account radiation, convection, and conduction within the assembly. This model provides an average temperature for the fuel assembly and does not provide a peak cladding temperature for the hottest fuel rod within the assembly. The result reported by the applicant in the SAR is actually a maximum average temperature for the fuel assembly region.

- The applicant provided a limited number of nodes in the fuel assembly model, which does not accurately capture the temperature gradient that exists across the fuel assembly, nor capture the location of the hottest individual fuel rod.

- The applicant’s thermal code has not been validated against actual fuel temperature data, applicable to the fuel assemblies to be stored and fill gas to be used in the 24 PT1- DSC. Therefore, the applicant’s fuel assembly model cannot be considered reliable for predicting peak fuel cladding temperatures given the current fuel parameters.

As a result, the staff finds the current methodology used by the applicant for determining fuel cladding temperatures to be non-conservative. The staff determined that the applicant's use of a HEATING7 model was not validated against actual data. The staff further determined that the applicant’s HEATING7 model was non-conservative to determine fuel cladding temperatures. Therefore, the HEATING7 model may not be used for future amendment applications, and safety evaluations performed in accordance with 10 CFR 72.48, until it has been validated against actual data.

15.2.3 Criticality Evaluation Methodologies

15.2.3.1 Sensitivity Studies

The applicant performed sensitivity studies for various fuel parameters for the WE 14x14 SS304. The results show that k_{eff}= 0.8588 $\pm$ 0.0011 when nominal cladding thickness is used and k_{eff} = 0.8631 $\pm$ 0.0012 when minimum cladding thickness is used. Use of bounding tolerance values is consistent with the NUREG-1536, thus the staff disagrees with the applicant’s use of nominal cladding thickness in the criticality models discussed below. However, the calculated k_{eff} for the most limiting normal condition for the NUHOMS 24PT1-DSC meets the upper subcritical limit (USL) of 0.9401 when increased to account for changes in k_{eff} due to cladding tolerance.   While the most limiting accident condition k_{eff} would exceed the USL, the staff has reasonable assurance that the accident scenarios, discussed in Section 6.3.1 of this SER are sufficiently conservative to bound this.

The staff determined for future amendment applications, and safety evaluations performed in accordance with 10 CFR 72.48, the applicant should use the bounding tolerance values as recommended by the NUREG-1536.

15.2.3.2 Material Properties

The applicant modeled the outer aluminum on the boral sheets as B_4C rather than as aluminum. Staff calculations determined that modeling of the outer aluminum on the boral can cause a slight increase in the calculated k_{eff}, depending on the scenario modeled, and thus should be considered in any future amendments, and safety evaluations performed in accordance with 10 CFR 72.48.