August 13, 2012

Mr. Donis Shaw
Licensing Manager
Transnuclear, Inc.
7135 Minstrel Way, Suite 300
Columbia, MD 21045

SUBJECT: SECOND REQUEST FOR ADDITIONAL INFORMATION FOR REVIEW OF AMENDMENT NO. 13 TO THE STANDARDIZED NUHOMS® SYSTEM (TAC NO. L24519)

Dear Mr. Shaw:

By letter dated February 9, 2011, Transnuclear, Inc. (TN) submitted an amendment request to the U.S. Nuclear Regulatory Commission (NRC) for Certificate of Compliance (CoC) No. 1004. This amendment proposes to include the following changes to the Standardized NUHOMS® storage system:

- Adds the 69BTH and 37PTH dry shielded canisters (DSC).
- Evaluates the 24PHB DSC to accommodate control components other than burnable poison rod assemblies (BPRAs), and to allow for storage of damaged fuel assemblies, and other minor enhancements.
- Evaluates the 32PT DSC for incorporation of high burn-up fuel assemblies with and without control components (CCs), and other minor enhancements.
- Evaluates the 61BTH and 24PTH DSCs for storage of failed fuel.
- Evaluates the high-seismic horizontal storage module (HSM) Model HSM-HS for storage of the following DSCs: 61BT, 32PT, 24PTH, 61BTH, 69BTH, and 37PTH.
- Extends the use of metal matrix composites (MMC) as a neutron absorber material in the 61BTH Type 1 and Type 2 DSCs for higher heat loads.
- Evaluates DSCs for the addition of BLEU fuel assemblies as authorized contents.
- Evaluates HSM-H and HSM-HS inlet vent shielding design modifications to achieve dose reductions.
- Evaluates the OS200 transfer cask (TC) to allow transfer of the 61T, 32PT, 24PTH, and 61BTH DSCs.
- Adds language in the updated final safety analysis report (UFSAR) to allow the use of Type III cement as an alternate equivalent to the Type II cement used in HSM construction.
- Changes Technical Specifications (TS) neutron absorber testing and acceptance requirements in order to remain consistent with similar requirements in other ongoing licensing actions, plus certain new changes in this area.
- Makes certain additional changes for consistency within the TS and the UFSAR.

The staff has determined that further information is needed to complete its technical review. The request for additional information (RAI) is in the enclosure. Your response should be provided by September 24, 2012. If you are unable to meet this deadline, please notify us in writing, at least one week in advance, of your new submittal date and the reasons for the delay. The staff will then assess the impact of the new submittal date and notify you of a revised

schedule. We have developed an updated schedule, as follows. This schedule assumes a second round RAI. If no second RAI is necessary, the schedule may be accelerated.

ACTION	SCHEDULED DATE
Request for Additional Information #2	8/10/12
Response to RAI #2	9/24/12
Complete Safety Evaluation Report, Draft CoC, and Draft TS	10/26/12

Please reference Docket No. 72-1004 and TAC No. L24519 in future correspondence related to this licensing action. If you have any questions, please contact me at (301) 492-3371.

Sincerely,

/RA/

B. Jennifer Davis, Senior Project Manager
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No. 72-1004
TAC No. L24519

Enclosure:
1. Second Request for Additional Information

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Docket No. 72-1004
TAC No. L24519

Enclosure:
1. Second Request for Additional Information

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*See Previous Concurrence

TRANSNUCLEAR INC.

DOCKET NO. 72-1004

SECOND REQUEST FOR ADDITIONAL INFORMATION

RELATED TO AMENDMENT NO. 13 TO THE

STANDARDIZED NUHOMS® SYSTEM

By letter dated February 9, 2011, Transnuclear Inc. (TN) submitted an amendment request to the U.S. Nuclear Regulatory Commission (NRC) for Certificate of Compliance (CoC) No. 1004. This amendment proposes to include the changes listed in the cover letter, to the Standardized NUHOMS® storage system.

This second request for additional information (RAI) identifies additional information needed by the NRC staff in connection with its review of the amendment. The requested information is listed by section number and/or page number in TN's Safety Analysis Report (SAR) and associated documentation. NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems," was used by the staff in its review of the amendment application.

Each individual RAI section describes information needed by the staff to complete its review of the application and the SAR and to determine whether the applicant has demonstrated compliance with the regulatory requirements.

3.0 Structural Evaluation

RAI 3-1: Provide clarification of Report TN E-32402, titled, "Benchmarking of LS-DYNA to Extract Stress Intensity," dated March 9, 2012, for analysis of the 37PTH DSC basket assembly as discussed below:

The guidance in NUREG-1536, Rev. 1, provides details that the NRC has accepted two approaches for analyses regarding the structural capability of the basket to acceptably survive a cask drop during transfer.

The applicant has analyzed the 37PTH DSC basket assembly using transient finite element analysis [LS-DYNA], only.

The NRC staff can not determine that a basket stress analysis based solely on transient LS-DYNA is adequate to demonstrate safety without a benchmark of the finite element code capabilities and the applicant's development and use of the code.

NRC staff wrote RAI Round 1, question 3-8, to require the applicant to benchmark their use of LS-DYNA and LS-DYNA's capability of post-processing section-cut internal stress quantities (i.e., the ability to extract validated stress intensities consistent with ASME code criteria) relevant for a comprehensive structural integrity evaluation of the 37PTH fuel basket assembly.

The applicant responded to RAI 3-8 by providing TN E-32402, "Benchmark of LS-DYNA to Extract Stress Intensity," dated March 9, 2012. Staff reviewed TN E-32402 using Appendix 3A – Computational Modeling Software, of NUREG-1536, Rev. 1, and noted several inconsistencies.

If the applicant chooses to pursue the proposed methodology in the CoC No. 1004, Amendment No. 13 application, for the 37PTH basket (rather than the two approaches discussed in 3.5.1.4 ii (3) (a), of NUREG-1536, Rev. 1), then a complete discussion of modeling techniques and practices, discussion of computer model development, computer model validation, justification of bounding conditions/scenarios, description of boundary conditions and assumptions, documentation of material properties, description of model assembly, discussion and justification of selected loads and time steps, and sensitivity studies consistent with Appendix 3A must be provided for the application.

Specifically, the staff has the following questions (and observations) related to TN E-32402 benchmarking report and the side drop analysis:

1. Damping is not discussed. Was there any damping in the benchmark report's rectangular beam models? If not, how is that applied to the side drop scenario? Do the modeled structures exhibit self-damping, and how is it evaluated in LS-DYNA during a side drop scenario? How is the damping between structural contacts (soil, target, transfer cask, DSC shell, DSC basket, etc.) evaluated in LS-DYNA during a side drop scenario? Why were those values chosen? It was stated in TN-E-32402 that "the robust contact algorithms of LS-DYNA enables to model contact between the different components in the finite element model." How was this statement established?
2. Was friction due to contact and materials incorporated in the benchmark models or side drop analysis in the SAR? A sensitivity study specific to this issue may be warranted.
3. How was the post-processing done in LS-DYNA to isolate the different types of stress intensity limits (e.g., P_M vs. P_B+P_M)? Was the load path evaluated, and the maximum shear stress applicable to membrane only, extracted, or is primary bending somehow post-processed out? How does the meshing/discretization scheme associated with the result of a sensitivity study govern how stress intensity is extracted? (For example, if five elements through the thickness are modeled, then the center element gives membrane only (neutral axis – Mid), while the outer fiber (outer fiber - Max Ipt) represents membrane plus bending. Discuss the implication and post-processing of localized and peak stresses?

This information is required to demonstrate compliance with 10 CFR 72.236(c).

8.0 Confinement Evaluation

RAI 8-1: Provide the following modifications to the redundant closure and confinement boundary description to ensure that both the redundant closure and confinement boundary are each continuous.

Based on the response provided to RAI Round #1, RAI 8-1 and FSAR Figures Y.3.1-1 and Z.3.1-1, the test port plug and test port plug weld are part of the redundant closure, therefore any reference to the test port plug being "Optional" or "If used" should be removed from the drawings and FSAR to ensure that the test port plug is in place and a continuous redundant closure is provided. For example, but not limited to: on Drawing Nos. 69BTH-72-1001 and 37PTH-72-1001 remove or appropriately edit note 12. Any reference to the use of a test port plug with a metal seal instead of a test port plug with a test port plug weld should be removed from the drawings and the FSAR to ensure a redundant closure. For example, but not limited to: in Drawing Nos. 69BTH-72-1001 and 37PTH-72-1001 remove note 6. The staff has noticed that the quality category for the test port plug is quality category B in Drawing Nos. 69BTH-72-1001 and 37PTH-72-1001. NUREG 6407, "Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Important to Safety" recommends that the leak check port plug should be category A. The staff recommends updating the drawings such that the test port plug is category A instead of category B. Finally, to ensure a continuous confinement boundary, include notes on Drawing No. 37PTH-72-1004 similar to those found on Drawing No. 69BTH-72-1004 sheets 3 and 4 related to, "Hole for helium purge to be covered by welding."

This information is necessary to satisfy the regulatory requirements of 10 CFR 72.236(e).

RAI 8-2: Modify the Technical Specification/SAR Table, "Alternatives to the ASME Code for the NUHOMS 69BTH DSC Confinement Boundary," by including the following parenthetical statement under the alternatives, justification, and compensatory measures for Section NB-4243 and NB-5230:

> "(Including optional design configurations for the inner top cover as described in the 69BTH DSC drawings)"

The staff requests this modification because similar language is used in the Technical Specification/SAR Table, "Alternatives to the ASME Code for the NUHOMS 37PTH DSC Confinement Boundary" under the alternatives, justification, and compensatory measures for Sections NB-4243 and NB-5230. Like the 69BTH DSC, the 37PTH DSC also has optional design configurations for the inner top cover as described in the 37PTH DSC drawings.

This information is necessary to satisfy the regulatory requirements of 10 CFR 72.236.

RAI 8-3: Correct the maximum internal pressures listed in SAR Section Y.7.2.2 for normal and off normal conditions (i.e., 8.3 and 16.7 psig, respectively) that do not agree with the values identified in Table Y.4-13 (i.e., 8.2 and 15.9 psig, respectively).

This information is necessary to satisfy the regulatory requirements of 10 CFR 72.236.

RAI 8-4: Correct Drawing No. 69BTH-72-1004 sheet 6, to include the vent and siphon port cover weld location markers that are not shown (see Drawing No. 37BTH-72-1004 sheet 6 for comparison showing weld location markers).

This information is necessary to satisfy the regulatory requirements of 10 CFR 72.236.

Quality

RAI Q-1: Clarify if Drawing No. NUH69BTH-72-1004 Rev-0C, item # 1 should have a part or identifying number, NUH69BTH-72-1002, instead of the part or identifying number that is listed, NUH32PTH1-72-1002. Correct this on the drawing if necessary.

This information is necessary to satisfy the regulatory requirements of 10 CFR 72.236.