TRANSNUCLEAR INC.

DOCKET NO. 72-1030

REQUEST FOR ADDITIONAL INFORMATION

RELATED TO AMENDMENT 1 TO THE

NUHOMS® HD SYSTEM

By application dated November 1, 2007, Transnuclear Inc. (TN) requested approval of an amendment to Certificate of Compliance (CoC) No. 1030. This amendment has two main purposes:

- allow additional fuel assembly types as authorized contents, and
- allow additional control components as authorized contents.

This request for additional information (RAI) identifies additional information needed by the U.S. Nuclear Regulatory Commission (NRC) staff in connection with its review of the amendment. The requested information is listed by chapter number and title in the applicant's safety analysis report. NUREG -1536, "Standard Review Plan for Dry Cask Storage Systems," was used by the staff in its review of the amendment application.

The RAIs describe information needed by the staff to complete its review of the application and the Safety Analysis Report (SAR) and to determine whether the applicant has demonstrated compliance with the regulatory requirements.

1.1 (Response to Round 1: RAI 8.1)
Quantify the "flammability limit" in terms of hydrogen concentration in Section 5.6 of the Technical Specifications.

The limiting concentration of hydrogen required for ignition (2.4%), which is specified in Section 8 of the application should be specified in the proposed Technical Specifications to prevent a hydrogen burn during welding.

This information is needed to determine compliance with 10 CFR 72.166.

1.2 (Response to Round 1: RAI 9-6)
Clarify in Section 9.1.7.2 of the application if the maximum total porosity (3%) and maximum open porosity (0.5%) refers to the volumetric porosity of the "core" of the neutron absorbing material, or the volumetric porosity of the total material, which includes the cladding.

The open porosity of the material can influence the material's resistance to blistering and corrosion.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.3 (Response to Round 1: RAI 9-8)
Provide evidence or justification that rapid heating during vacuum drying of the clad neutron absorber after submersion will not damage the neutron absorbing material.

Rapid heating of low-porosity-type Boral plates under a vacuum have resulted in blistering of the Boral. Although these plates had a higher degree of open porosity (one to three-percent) than the proposed clad neutron absorber, the staff requests reasonable assurance that the proposed material will not blister during drying.

If sufficient justification that blistering will not occur is not available, the applicant should consider adding a qualifying testing program to the proposed Technical Specifications requiring some type of modified thermal shock test to ensure that blistering of the cladding is not an issue.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.4 (Response to Round 1: RAI 9.12)
Clarify or remove the, "alternate material" from the licensing drawing 10494-72-1 when referring to "SA240, Type 304 Steel."

Any material equivalent to SA240, Type 304 steel should have identical or superior properties, *and* should be certified to a widely recognized industry standard which ensures a level of quality identical or superior to materials meeting ASME Code requirements.

This information is needed to determine compliance with 10 CFR 72.236(b).

1.5 Clarify in Section 9.5.2, the type of standard (e.g., zirconium diboride, metal matrix composite, etc.) that is being used to calibrate the neutron attenuation beam.

The staff is unclear whether the applicant is using a standard that may be heterogeneous and therefore not appropriate for neutron attenuation calibration standards.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.6 Justify in Section 9.5.2 the use of a larger neutron attenuation beam and larger radioscopic image for acceptance testing of the neutron absorbing materials.

Internal studies by the staff suggest that neutron attenuation beam sizes up to 1-inch in diameter with a 10% tolerance, (or 1 square inch total) may be satisfactory for acceptance testing of the neutron absorbing materials.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.7 Clarify in Section 9.5.2 if the radioscopic images are taken using digital techniques, or using photographic film.

The staff is unclear as to the method used for determining quantitative values of the areal density of boron-10 in neutron absorbing materials. While the staff agrees that photographic film is capable of detecting defects in materials, it may not be appropriate for calculating areal densities.

ASTM C1671-07, "Standard Practice for Qualification and Acceptance of Boron Based Metallic Neutron Absorbers for Nuclear Criticality Control for Dry Cask Storage Systems and Transportation Packaging," describes the use of neutron attenuation for determining the areal density of boron-10 in neutron absorbers.

Since this document does not describe radioscopic imaging, the adequacy of this alternative method for quantifying attenuation to ensure its equivalency to standard neutron attenuation methods should be provided.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.8 Specify the visual inspection criteria in Section 9.1.7.4 of the proposed Technical Specifications.

The visual inspection criterion is used to determine the general condition of the neutron absorbing materials. Plates with gross cracking, large pores, excessive open porosity, etc. should be rejected on the basis of structural unsoundness, poor corrosion resistance, and (for clad materials) susceptibility to blistering.

The Section was removed from the proposed Technical Specifications in the supplemental response to the Round 1 Request for Additional Information.

This information is needed to determine compliance with 10 CFR 72.236(b).

1.9 Specify an increase of open porosity or change in surface treatment as necessitating corrosion testing in the second paragraph of Section 9.5.3.3.

The staff considers that thermal damage and corrosion testing may be necessary if materials with the same chemical composition are used (even in the matrix is 1100 aluminum alloy), but the open porosity is increased.

The staff has previously discussed with the applicant the potential effects that open porosity can have on the neutron absorbing material. The application must indicate the need for thermal damage and corrosion testing if the open porosity is increased or if there is change in surface treatment.

The staff requested that Section 9.5.3.3 be put into the Technical Specifications in Request for Additional Information 9-1.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.10 Include the second paragraph of Section 9.5.3.3 in the proposed Technical Specifications.

Thermal damage and corrosion testing may be necessary when the open porosity is increased or if there is change in surface treatment to the neutron absorbing material, even if materials with the same chemical composition are used (1100 aluminum alloy and boron carbide).

The staff requested that Section 9.5.3.3 be incorporated into the proposed Technical Specifications in the Round 1 Request for Additional Information 9-1.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.11 (Response to Round 1: RAI 9-1)
Specify the qualification tests in Section 9.5.3.4 in the proposed Technical Specifications.

These tests are necessary to ensure the mechanical durability of the neutron absorbers and to limit the amount of interconnected porosity.

The staff requested that this Section be incorporated into the proposed Technical Specifications in Request for Additional Information 9-1.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.12 Clarify the criterion requiring re-qualification testing.

a) Specify the changes to key processes in Section 9.5.4.3 in the Technical Specifications.

The list in Section 9.5.4.3 provides significant examples of key process changes which should require requalification testing. This Section was removed from the proposed Technical Specifications during the supplemental response to the Request for Additional Information.

b) Revise the wording in Section 9.5.4.3 so that the listed changes will be regarded as key process changes.

Current wording in Section 9.5.4.3 states that certain key process changes (e.g., a change in billet production) "*may* be established as key process changes." Significant changes to the production of the neutron absorbing material as listed in Section 9.5.4.3 should be considered a change to a key process, and require the mechanical testing and porosity measurements listed under Section 9.5.3.4.

After further review of the application, the Staff considers that the word, "may" could lead to an unintended interpretation of key process changes.

c) Add a reference to Section 9.5.3.3 and Section 9.5.3.4 in Section 9.5.4.1, and ensure that there is language in the proposed Technical Specifications requiring the mechanical tests and porosity measurements in Section 9.5.3.4 if any key process (Sections 9.5.4.1, 9.5.4.2, or 9.5.4.3) is changed.

Section 9.5.4.1 references Section 9.5.4 for re-qualification, however Section 9.5.4 does delineate the tests that would be part of a re-qualification program.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.13 Incorporate Section 9.5.2(b) into the proposed Technical Specifications.

Section 9.5.2(b) provides language for how the minimum design thickness is determined, and that plates with areal densities below 90% of the minimum design thickness will be rejected.

This Section was removed from the proposed Technical Specifications in the supplemental response to the Round 1 Request for Additional Information.

This information is needed to determine compliance with 10 CFR 72.124(b).

1.14 Clarify the method used to establish the nonparametric lower tolerance limit to determine the lower tolerance limit for areal density of the neutron absorber.

The methodology used to determine the areal density of boron-10 is important to ensuring the efficacy of the neutron absorbing plates.

The staff considers ASTM C1671-07, "Standard Practice for Qualification and Acceptance of Boron Based Metallic Neutron Absorbers for Nuclear Criticality Control for Dry Cask Storage Systems and Transportation Packaging" as directly applicable to the acceptance testing of neutron absorbers, which states in Note 2 under Section 5.2.6.2(3) that "If the data set is not normally distributed, then a nonparametric lower tolerance limit may be used. In this case, the method must be documented."

This information is needed to determine compliance with 10 CFR 72.124(b).

1.15 (Editorial; Response to Round 1: RAI 1.4)
Clarify the definition of "Reconstituted Fuel Assembly" in the proposed Technical Specifications.

The definition provided by the applicant implies that rods (of unknown composition), containing other rods of specific material will be used to replace missing fuel rods in the fuel assembly. The staff believes this is a typographical error, and that the applicant meant that hollow rods of stainless steel or of a zirconium alloy containing rods of: stainless steel, low enriched uranium, natural uranium or zirconium based alloy will be used to replace the missing fuel rods.