TRANSNUCLEAR
AN AREVA COMPANY

August 24, 2010
E-29806

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Subject: Revision 8 to Transnuclear, Inc. (TN) Application for Amendment 1 to the NUHOMS® HD System (Docket No. 72-1030; TAC NO. L24153)

Based on a recent discussion with the NRC staff, changes to neutron absorber testing requirements in Updated Final Safety Analysis Report (UFSAR) Chapter 9 have been made and are included herein.

Enclosure 1 provides the Amendment 1 Revision 8 UFSAR replacement pages. On the UFSAR pages, Amendment 1 Revisions 0, 1, 2, 3, 4, 5, 6, 7 and 8 changes are shown using italics for inserted text and revision bars for changed areas; however, the Revision 8 changes are shaded to distinguish these new changes from Revisions 0, 1, 2, 3, 4, 5, 6 and 7 changes. For the UFSAR, the page footers for the replacement pages are annotated as "Amendment 1, Rev. 8, 8/10."

Should the NRC staff require additional information to support review of this application, please do not hesitate to contact Mr. Don Shaw at 410-910-6878 or me at 410-910-6881.

Sincerely,

Jayant Bondre

Jayant Bondre, Ph.D.
Vice President - Engineering

cc: B. Jennifer Davis (NRC SFST) (six paper copies of this cover letter and Enclosure 1, provided separately)

Enclosures:

1. NUHOMS® HD Amendment 1 Application Revision 8, Changed Proposed Updated Final Safety Analysis Report Pages

NMSS01

7135 Minstrel Way, Suite 300, Columbia, MD 21045
Phone: 410-910-6900 ♦ Fax: 410-910-6902

Enclosure 1 to TN E-29806

NUHOMS® HD Amendment 1 Application Revision 8, Changed Proposed Updated Final Safety Analysis Report Pages

9.1.7.2 Boron Carbide / Aluminum Metal Matrix Composites (MMC)

See the Caution in Section 9.1.7 before deletion or modification to this section.

The material is a composite of fine boron carbide particles in an aluminum or aluminum alloy matrix. The material shall be produced by either direct chill casting, permanent mold casting, powder metallurgy, or thermal spray techniques. The boron carbide content shall not exceed 40% by volume. ***The boron carbide content for MMCs with an integral aluminum cladding shall not exceed 50% by volume.***

The final MMC product shall have density greater than 98% of theoretical density demonstrated by qualification testing, with no more than 0.5 volume % interconnected porosity. For MMC with an integral cladding, the final density of the core shall be greater than 97% of theoretical density demonstrated by qualification testing, with no more than 0.5 volume % interconnected porosity of the core and cladding as a unit of the final product.

Boron carbide particles for the products considered here shall have an average size of 40 microns or less, although the actual specification may be by mesh size, rather than by average particle size. No more than 10% of the particles shall be over 60 microns.

Prior to use in the 32PTH DSC, MMCs shall pass the qualification testing specified in Section 9.5.3, and shall subsequently be subject to the process controls specified in Section 9.5.4.

The criticality calculations take credit for 90% of the minimum specified B10 areal density of MMCs. The basis for this credit is the B10 areal density acceptance testing, which is specified in Section 9.5.2. The specified acceptance testing assures that at any location in the final product, the minimum specified areal density of B10 will be found with 95% probability and 95% confidence.

9.1.7.3 Boral®

See the Caution in Section 9.1.7 before deletion or modification to this section.

This material consists of a core of aluminum and boron carbide powders between two outer layers of aluminum, mechanically bonded by hot-rolling an "ingot" consisting of an aluminum box filled with blended boron carbide and aluminum powders. The core, which is exposed at the edges of the sheet, is slightly porous. ***Before rolling, at least 80% by weight of the B_4C particles in BORAL® shall be smaller than 200 microns.*** **The nominal boron carbide content shall be limited to 65% (+ 2% tolerance limit) of the core by weight.**

The criticality calculations take credit for 75% of the minimum specified B10 areal density of Boral®. B10 areal density will be verified by chemical analysis and by certification of the B10 isotopic fraction for the boron carbide powder, or by neutron transmission testing. Areal density testing is performed on a coupon taken *from* the sheet produced from each ingot. If the measured areal density is below that specified, all the material produced from that ingot will be either rejected, or accepted only on the basis of alternate verification of B10 areal density for each of the final pieces produced from that ingot.

alloy (e.g., from 6000 to 1000 series aluminum), or if the boron content is reduced without changing the boron phase.

The thermal analysis in Chapter 4 assumes a 3/16 inch thick neutron absorber paired with a 5/16 inch aluminum 1100 plate. The specified thickness of the neutron absorber may vary, and the thermal conductivity acceptance criterion for the neutron absorber will be based on the nominal thickness specified. The minimum thermal conductivity shall be such that the total thermal conductance (sum of conductivity * thickness) of the neutron absorber and the aluminum 1100 plate shall equal the conductance assumed in the analysis, *4.774 BTU/hr.F,* as shown in Table 9-3, where the acceptance criterion is highlighted.

The aluminum 1100 plate does not need to be tested for thermal conductivity; the material may be credited with the values published in the ASME Code Section II part D. The neutron absorber material need not be tested for thermal conductivity if the nominal thickness of the aluminum 1100 plate is 0.425 inch or greater. This case is examined explicitly in chapter 4, where no credit is taken for the thermal conductivity of Boral®.

9.5.2 Specification for Acceptance Testing of Neutron Absorbers by Neutron Transmission

CAUTION

Section 9.5.2.a and portions of 9.5.2.b are incorporated by reference into the NUHOMS® CoC 1030 Technical Specifications (paragraph 4.3.1) and shall not be deleted or altered in any way without a CoC amendment approval from the NRC. The text of information incorporated by reference in these sections is shown in bold type to distinguish it from other sections.

a. **Neutron Transmission acceptance testing procedures shall be subject to approval by the Certificate Holder. Test coupons shall be removed from the rolled or extruded production material at locations that are systematically or probabilistically distributed throughout the lot. Test coupons shall not exhibit physical defects that would not be acceptable in the finished product, or that would preclude an accurate measurement of the coupon's physical thickness.**

A lot is defined as all the pieces produced from a single ingot or heat *or from a group of billets from the same heat.* If this definition results in lot size too small to provide a meaningful statistical analysis of results, an alternate larger lot definition may be used, so long as it results in accumulating material that is uniform for sampling purposes.

The sampling rate for neutron transmission measurements shall be such that there is at least one neutron transmission measurement for each 2000 square inches of final product in each lot.

The B10 areal density is measured using a collimated thermal neutron beam *up to 1.1 inch* diameter.

The neutron transmission through the test coupons is converted to B10 areal density by comparison with transmission through calibrated standards. These standards are composed of a homogeneous boron compound without other significant neutron absorbers. For example, boron carbide, zirconium diboride or titanium diboride