TRANSNUCLEAR
AN AREVA COMPANY

June 12, 2008
E-26723

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

Subject: Additional UFSAR pages for Revision 1 to Transnuclear, Inc. (TN) Application for Amendment 11 to the Standardized NUHOMS® System (Docket No. 72-1004; TAC NO. L24080)

References: 1. Letter from Robert Grubb (TN) to Document Control Desk (NRC), "Revision 1 to Transnuclear, Inc. (TN) Application for Amendment 11 to the Standardized NUHOMS® System (Docket No. 72-1004; TAC NO. L24080)," December 21, 2007

Gentlemen:

Reference 1 provided Transnuclear (TN) responses to RAI #1 for TN's application for Amendment 11 to the Standardized NUHOMS® System. This submittal provides five changed UFSAR pages which show changes that were inadvertently omitted from Reference 1. Please note that Page W.3-1 is a replacement page, while the other pages are new.

Should you have any questions regarding this, please do not hesitate to contact Mr. Don Shaw at 410-910-6878 or me at 410-910-6930.

Sincerely,

Robert Grubb
Senior Vice President - Engineering

cc: Jennifer Davis (NRC SFST) (11 paper copies of this cover letter and Enclosures 1 and 2, provided in a separate mailing)

Enclosures:

1. Amendment 11 Revision 1 UFSAR Pages W.1-2, W.1-3, W.1-4, W.3-1, and W.4-1
2. List of Changed Pages for UFSAR Appendix W

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Enclosure 1 to TN E-26723

Amendment 11 Revision 1 UFSAR Pages W.1-2, W.1-3, W.1-4, W.3-1, and W.4-1

W.1.1 Introduction

As stated in Section 1.2.1, the body of this UFSAR is dedicated to three on-site transfer cask types: the Standard cask, NUHOMS®-OS197 and NUHOMS®-OS197H TCs. The purpose of this Appendix is to provide the safety analysis of the design of a fourth type of on-site transfer cask, designated as the NUHOMS® OS197L TC, for use with the standardized NUHOMS® system.

W.1.2 General Description of the NUHOMS® OS197L TC

The 68 metric ton (Te) (75 tons) OS197L TC on-site transfer cask is designed to accommodate plants whose crane capacity cannot accommodate the use of the 94.6 Te (104.25 tons) OS197 TC or the 113.4 Te (125 Tons) OS197H TC cask for fuel transfer. The major differences between the OS197L TC and the OS197 casks are:

- Reduced cask weight,
  - No *integral* lead shielding (one 2.68" nominal thickness steel shell instead of a combination of a 0.5" nominal thickness steel inner liner, 3.5" nominal thickness lead shield and 1.5" nominal thickness steel structural shell),
- One piece solid trunnion configuration for the upper and lower cask trunnions,
- Two piece neutron shield (inner and outer shell of 1/4" nominal thickness versus an outer shell of 3/16" nominal thickness),
- *A 6" nominal thickness steel decontamination area shield (see Figure W.1-2) within which the Cask is placed for personnel shielding during fuel loading operations,*
- *A supplemental transfer trailer shielding (see Figure W.1-3), described in Section W.1.2.1.1, to be used for personnel shielding during transfer operations, and*
- *Remote crane operations in conjunction with optical targeting and remote cameras are to be used for handling the OS197L TC when it is not within the supplemental shielding.*

The OS197L TC key design parameters are compared to the OS197 TC in Table W.1-1.

The OS197L TC, *when used in conjunction with the supplemental shielding provided (see Figures W.1-2 and W.1-3), including the remote Cask handling procedures described in Chapter W.8,* provides shielding and protection from potential hazards during the DSC fuel loading/unloading operations and transfer to the Horizontal Storage Module (HSM). The design and configuration of the OS197L TC is a modified version of the NRC approved OS197 and OS197H TCs described in Section 1.3.2.1 of the UFSAR and is limited to on-site use under 10CFR72. The OS197L TC can be configured to meet a gross weight limit of 68 Te (75 tons).

Figure W.1-1 provides an overview of the OS197L TC *without the supplemental shielding*. The OS197L TC configuration also requires the use of additional shielding in the decontamination area (see Figure W.1-2) and on the skid/trailer (see Figure W.1-3).

W.1.2.1.1 Transfer Equipment

Transport Trailer: The NUHOMS® OS197L TC transport trailer consists of a heavy industrial trailer with a payload capacity of 136 Te (150 tons), including the skid and loaded cask. The OS197L TC transport trailer is the same as the one shown in Figure 1.3-7 of the UFSAR.

Cask Support Skid: The OS197L TC support skid differs from the OS197 TC support skid shown in UFSAR Figure 1.3-8 as described below:

1. The OS197L TC support skid has permanently mounted 2.5" thick side shielding and accommodates an additional 3" thick side shielding bolted to the permanent shielding when transferring the OS197L TC.

2. The OS197L TC *support skid* also has a 2.5" shielding inner top cover and an additional 3" shielding outer top cover to shield the upper sections of the cask.

The OS197L TC support skid utilized for the standardized NUHOMS® system is illustrated in Figure W.1-3.

Hydraulic Ram: The high capacity hydraulic ram system is similar to the hydraulic ram system described in the UFSAR. The capacity of this ram is increased in order to increase the ram capacity margin (and to accommodate other future DSC designs). There is no change to the maximum ram forces allowed (80 kips) during system operation.

A picture of the OS197L TC system is provided in Figure W.1-4.

W.1.2.2 Operational Features

The primary operations with the OS197L TC (in sequence of occurrence) for the NUHOMS® system are the same as the systems operation described in Section 1.3.3 of the UFSAR except as noted below for operations 8 and 13 (of Section 1.3.3):

Lifting Cask from Pool: The loaded OS197L TC is lifted out of the pool *for placement* (in the vertical position) in a decontamination area shield on the drying pad in the decon pit. Prior to the lift, the DSC water is pumped out and a helium gas blanket is provided for the fuel assemblies. The OS197L TC neutron shield and the TC/DSC annulus is maintained full. During *bare* cask movement from the fuel pool to the decontamination area, remote crane operation and an optical targeting system with remote camera monitoring will be used to minimize personnel exposure due to the reduced shielding configuration of the OS197L TC during this transit movement. The licensee shall meet the specific radiation protection program requirements associated with the use of OS197L TC as specified in *Technical Specification 5.3.2.4.a.*

The Cask is then placed inside the decontamination area lower shield and the upper shield or bell is then placed on top (see Figure W.1-2)

Prior to performing decontamination activities, the DSC cavity is refilled with water removed above.

DSC Welding, Drying and Sealing: No DSC blowdown with helium is required since the DSC cavity is filled with helium prior to lifting it out of the pool.

Placement of Cask on Transport Trailer Skid: The OS197L TC is then lifted onto the cask support skid. The neutron shield may be drained (required for 32PT DSC only) during this operation provided water is maintained in the DSC/TC annulus with an interim cask cover. The plant's crane is used to downend the cask from a vertical to a horizontal position. Inner top shielding is added to the skid and the cask is also covered with an additional outer top shielding. The outer top additional shielding is to be installed inside the fuel handling building if the floor loads can accommodate it (if floor loading is a concern, the additional shielding may be placed on the skid outside the fuel handling building). The neutron shield is filled, if previously drained, prior to draining of the annulus and replacement of the interim cover with the standard cask cover. The cask is then secured to the skid and readied for the subsequent transport operations.

W.1.3 Identification of Agents and Contractors

Transnuclear, Inc. (TN) provides the design, analysis, licensing support and quality assurance for the NUHOMS® OS197L TC. Fabrication of the NUHOMS® OS197L TC is done by one or more qualified fabricators under TN's quality assurance program described in Chapter W.13. This program is written to satisfy the requirements of Subpart G of 10CFR72, [1.2] and covers control of design, procurement, fabrication, inspection, testing, operations and corrective action.

TN provides specialized services for the nuclear fuel cycle that support transportation, storage and handling of spent nuclear fuel, radioactive waste and other radioactive materials. TN is the holder of NUHOMS® CoC 1004 [1.3].

W.1.4 Generic Cask Arrays

No change.

W.3 Structural Evaluation

This section describes the structural evaluation of the NUHOMS® OS197L Transfer Cask (TC). The OS197L TC is a modified version of the OS197/OS197H TCs (henceforth referred as the OS197 TC) designed to enable "under-the-hook" lift weights of 75 tons. The OS197L TC may be used for transfer of loaded DSCs currently licensed under CoC 1004 *with a heat load of 24kW or less* (24P, 52B, 61BT, 24PT2, 32PT and 24PHB) [3.1]. The structural evaluation for the OS197L TC is based on the OS197 TC evaluations documented in Chapter 8, and additional evaluations as described in Appendices K, L, M and N for payloads associated with the 61BT, 24PT2, 32PT and 24PHB DSCs, respectively. The additional evaluations provided in this section address specific design differences between the OS197L TC and the OS197 TC.

The OS197L TC requires use of supplemental shielding when the transfer cask is in the decontamination area during handling operations and when the transfer cask is placed on the transfer trailer skid. The structural evaluation of the supplemental shielding is summarized in Section W.3.10.

W.3.1 OS197L TC Description

The specific design differences in the OS197L TC relative to OS197 TC are summarized below:

- The 1.5" thick structural shell and the 0.5" thick inner liner (both SA-240 stainless steel) are replaced with a single thicker 2.68" thick shell of the same material. This represents an increase in the TC shell structural capacity relative to the OS197 TC.

- The encapsulated 3.56" thick lead thickness in the OS197 TC is eliminated to achieve the desired weight reduction.

- A neutron shield assembly is provided with the inner and outer shells made from ¼" thick plate material instead of a neutron shield assembly that is integral to the structural shell on the inside and a 3/16" thick outer shell. The neutron shield materials (type 304), total annulus water thickness of 3" and the configuration of the internal stiffening elements remain *essentially* unchanged.

- The two-piece upper trunnions assemblies made from SA-564 Type 630 steel trunnion and welded into a forged Type 304 steel trunnion sleeve with encapsulated NS-3 for the OS197 TC are replaced with one solid trunnion design made from SA-182 Type FXM-19 stainless steel. This modified trunnion design results in a stronger trunnion as it eliminates the SA564, Type 630 to SA 240, Type 304 weld.

- The two-piece lower trunnions made from Type 304 stainless with encapsulated NS-3 are replaced with solid Type 304 forgings.

Specific evaluations are performed to address the modified OS197L TC trunnion configuration. The evaluations also address the effect on local shell stresses. Thermal stresses of the cask are also evaluated. All other structural analyses for the OS197 TC bound the OS197L TC because

W.4 Thermal Evaluation

The shaded text portion of Chapter W.4 provided in this FCN is for completeness and information only. It is part of Amendment 11 to be submitted to the NRC for review and approval. Therefore, the OS197L TC shall not be used until Amendment 11 to CoC 1004 is approved by the NRC.

W.4.1 Discussion

This chapter documents the thermal evaluation of the OS197L TC for the loading and transfer of the DSCs currently licensed under CoC 1004 *with a heat load of 24kW or less* (52B, 24P, 61BT, 24PT2, 32PT and 24PHB).

The OS197L TC is a modified version of the OS197/OS197H TCs (henceforth referred to as OS197 TC) designed to allow use with a crane load limit of 75 tons. From a thermal analyses perspective, the following relevant modifications are implemented in the OS197L TC relative to the OS197 TCs:

- The 1.5" thick structural shell, the encapsulated 3.56" thick lead and the 0.5" thick inner liner (both SA-240, Type 304 stainless steel) in the OS197 are replaced with a single 2.68" thick shell made of SA-240, Type 304 stainless steel material.
- The neutron shield assembly that is integral to the structural shell on the inside and includes a 3/16" thick outer shell in the OS197 TC is replaced with a neutron shield assembly consisting of inner and outer shells made from ¼" thick plate material in the OS197L TC. The neutron shield materials, total water annulus thickness of 3" and the configuration of the internal stiffening elements remain essentially unchanged.
- Supplemental shielding is used around the OS197L TC as part of the OS197L TC system, when the TC is in the vertical orientation in the decontamination area and when the TC is in the horizontal orientation on the transfer trailer/skid.
- The supplemental OS197L TC shielding system in the decontamination area consists of a two-part assembly, with 6" thick cylindrical shaped upper and lower shields made from A-36 steel with rectangular openings at the top and at the bottom that allow free convection boundary layer development along the DSC shell. The decontamination area supplemental shielding is shown in Figure W.1-2.
- The supplemental OS197L TC shielding system used on the transfer skid consists of a series of plates that are attached to the sides and ends of the transfer skid. Two upper sections fit like a clamshell over the cask and skid after the cask is placed on the transfer skid. Clearances provided at the support legs of the skid and other openings at the ends of the skid permit cooling airflow to enter the enclosure and pass around the enclosed cask and exit via a long slot opening at the top of the upper sections of the shielding. The transfer skid supplemental shielding is shown in Figure W.1-3.

Enclosure 2 to TN E-26723

List of Changed Pages for UFSAR Appendix W

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Drawing NUH03-8012 Rev 0A
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Appendix W.3, Pages W.3-4 through W.3-12, Rev 1
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