71-9302

TRANSNUCLEAR, INC.

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Mr. Steven Baggett, Senior Project Manager
Spent Fuel Project Office
Division of Industrial and Medical Nuclear Safety
Office of Nuclear Material Safety and Safeguards
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Subject: Docket No. 71-9302 (TAC No. L23328), Additional Clarification for the NUHOMS®-MP197 Transport Package Application dated October 24, 2001

Dear Mr. Baggett:

Enclosed for your review is additional clarification to our RAI response submittal on January 31, 2002. They consist of the following attachments:

a. Attachment 1 – Clarification for MP-197 RAI #1 Response 3-3
b. Attachment 2 – Clarification for MP-197 RAI #1 Response 5-6
c. Revised SAR pages, 7-1 and 7-2. (8 copies)
d. Revised SAR pages, 7-19 and 7-20. (8 copies)

If you have any questions or comments, please call me.

Sincerely,

Peter Shih
Project Manager

cc: 1093 File
Jayant Bondre – TNW
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Attachment #1

Clarification for MP-197 RAI #1 Response 3-3

A solar absorptivity factor of 0.3 is used for the white painted surfaces of the impact limiters in the MP197 packaging. The NRC requested more information about the validity and conservatism in using absorbtivity factors less than 1.0 for the white painted surfaces.

Section 3.5.2.1 of the Standard Review Plan for Transportation Packages for Spent Nuclear Fuel (SRP) does not preclude using absorptivity factors less than unity. It states that "Consideration of a proposed value of less than unity in the SAR should be based on demonstration that controls and procedures will be in place to ensure such a value throughout the package lifetime." The insolance values specified in 10CFR71.71 should be interpreted as the amount of solar heat to which the external surfaces are exposed. Section 3.5.2.1 of SRP also states that "Periodic visual examination followed by paint touch-up or washing may be sufficient if absorptivity takes adequate account of weathering." As described in Section 3.2 of SAR the solar absorbtivity of white paints varies between 0.12-0.18. These values are specified in the following references:

- **Rohsenow, Hartnett, "Handbook of Heat Transfer Fundamentals", 2nd Edition, 1985**
- **Bolz, Tuve, "CRC Handbook of tables for Applied Engineering Science", 2nd Edition, 1973**
- **Kreith, "Principles of Heat Transfer", 3rd Edition, 1973**
- **Touloukian, "Thermophysical Properties of Matter – Vol.9, Thermal Radiative Properties – Coatings", 1972**

A visual examination, cleaning, and paint touch-up of the impact limiters is discussed in Chapter 7 of the SAR. However, to account for dust, dirt and weathering effects the absorptivity factor is increased from the referenced values to 0.3 in the thermal analysis.

The same methodology is used in the thermal analysis for the licensed TN-68 transport packaging. It should be noted that the lower external surfaces of the transport cask are in shade and cannot be exposed to the solar heat. This effect is not considered in the quarter-symmetric model of the MP197 cask, which adds more conservatism into the calculation of maximum temperatures.

Attachment #2

Clarification for MP-197 RAI #1 Response 5-6.

The intent of the response was to show that the combined gamma plus neutron dose is greatest for Group II. The information below should help clarify this:

From SAR Table 5.1-2, one can see that the side dose rate at 2 meters is composed of 2.9 mrem/hr gamma and 7.1 mrem/hr neutron. Therefore, the total dose consists of 29% gamma and 71% neutron.

If we look at the gamma and neutron sources given in the RAI response and find the ratio of $group_1/group_2$, we have the following:

	Group 1	Group 2	Group 3	Group 4
gamma*	1.002E+15	7.619E+14	8.136E+14	7.712E+14
ratio	1.315E+00	1.000E+00	1.068E+00	1.012E+00
neutron	4.897E+07	7.382E+07	6.082E+07	7.016E+07
ratio	6.634E-01	1.000E+00	8.239E-01	9.504E-01

*- (total – energy grp 45); since its dose contribution is nill

By using the gamma and neutron source ratio and the total dose contribution fractions, the total dose from the four source groups can be compared as follows:

$$ratio_{(gamma)} \times 0.29 + ratio_{(neutron)} \times 0.79 = \text{dose rate fraction}$$

Group 1	Group 2	Group 3	Group 4
8.523E-01	1.000E+00	8.946E-01	9.683E-01

As can be seen, the total dose rate from groups 1, 3, and 4 are less than the group 2 total dose rate.

CHAPTER 7

OPERATING PROCEDURES

This chapter contains NUHOMS-MP197 loading and unloading procedures that are intended to show the general approach to cask operational activities. A separate Operations Manual (OM) will be prepared for the NUHOMS-MP197 to describe the operational steps in greater detail. The OM, along with the information in this chapter, will be used to prepare the site-specific procedures that will address the particular operational considerations related to the cask.

7.1 Procedures for Loading the Package

The NUHOMS®-MP197 Cask will be used to transport fuel off-site. This mode of use requires (1) preparation of the cask for use; (2) verification that the fuel assemblies to be loaded meet the criteria set forth in this document; and (3) installation of a DSC and fuel assemblies into the cask.

Offsite transport involves (1) preparation of the cask for transport; (2) assembly verification leakage-rate testing of the package containment boundary; (3) placement of the cask onto a transportation vehicle; and (4) installation of the impact limiters.

During shipment, the packaging contains up to 61BWR spent fuel assemblies in the NUHOMS-61BT DSC. Procedures are provided in this section for transport of (1) the cask/DSC directly from the spent plant fuel pool and (2) transport of a NUHOMS 61BT DSC after storage in a NUHOMS® Horizontal Storage Module (HSM). A glossary of terms used in this section is provided in Section 7.1.6.

7.1.1 Preparation of the NUHOMS®-MP197 Cask for Use

Procedures for preparing the cask for use after receipt at the site are provided in this section.

a. Remove the impact limiter attachment bolts from each impact limiter and remove the impact limiters from the cask. Wash the cask and impact limiters to remove mud dirt & grime and touch-up paint as required.

b. Anytime prior to removing the lid, sample the cask cavity atmosphere through the vent port. Flush the cask interior gases to the site radwaste systems if necessary.

c. Remove the personnel barrier(s) from the transport frame.

d. Remove the transportation skid tie down straps.

7.3 Preparation of an Empty Cask for Transport

Previously used and empty NUHOMS®-MP197 casks shall be prepared for transport per the requirements of 49 CFR 173.427 [2].