71-9302

TRANSNUCLEAR, INC.

January 31, 2002 E-19322

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), Responses to First Request for Additional Information for the NUHOMS®-MP197 Transport Package Application dated October 24, 2001
Errata

Dear Mr. Baggett:

Enclosed please find the errata pages for the NUHOMS®-MP197 SAR. The errors noted by the NRC have been corrected and TN has performed a QA review of the document (Pages 6-9, 6-10, 7-13, and 7-14). Additional errors were found in Chapter 3 table and Chapter 1 drawing, which have been corrected and are included with this submittal (Table 3-1, 3-2, and drawing no. 1093-71-17). A total of eight copies of each corrected page is included.

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

Sincerely,

Peter Shih
Project Manager

cc: 1093 File
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TABLE 3-1

COMPONENT TEMPERATURES IN THE NUHOMS®-MP197 PACKAGING

Component	Normal Transport			Fire Accident	
	Maximum (°F)	Minimum* (°F)	Allowable Range(°F)	Peak(°F)	Allowable Range(°F)
Thermal Shield	186	-40	**	1172	**
Impact Limiters	195	-40	**	1456	N/A
Resin	249	-40	-40 to 300	N/A	N/A
Lead	299	-40	620 max.	478	620 max.
Cask Body	302	-40	**	535	**
Outer Shell	263	-40	**	N/A	**
Flourocarbon Seals, Ram Plate	217	-40	-40 to 400	270	-40 to 400
Flourocarbon Seals, Lid	204	-40	-40 to 400	279	-40 to 400
Canister	388	-40	**	485	**
Basket Peripheral Inserts	482	-40	**	564	**
Basket	578	-40	**	661	**
Fuel Cladding	598	-40	1058 max.	680	1058 max.
Average Cavity Gas (Cask Body)	345	-40	N/A	504	N/A
Average Cavity Gas (Canister)	493	-40	N/A	583	N/A

* Assuming no credit for decay heat and an ambient temperature of -40°F
** The components perform their intended safety function within the operating range.

TABLE 3-2

TEMPERATURE DISTRIBUTION IN THE NUHOMS®-MP197 PACKAGE
(MINIMUM AMBIENT TEMPERATURES)

Component	Maximum Component Temperature	
	-20 °F Ambient	-40 °F Ambient
Thermal Shield	65	47
Impact Limiters	73	56
Resin	128	111
Lead	183	167
Cask Body	187	170
Flourocarbon Seals, Ram Plate	187*	170*
Flourocarbon Seals, Lid	187*	170*
Canister	282	267
Basket Peripheral Inserts	381	367
Basket	482	468
Fuel Cladding	505	492

* Taken to be the maximum temperature within cask body and lid.

$k_{KENO} + 2\sigma_{KENO} < USL$,

where USL is the upper subcritical limit established by an analysis of benchmark criticality experiments. From Section 6.5, the minimum USL over the parameter range (in this case, pitch) is 0.9414. From Table 6-8 for the most reactive case,

$$k_{KENO} + 2\sigma_{KENO} = 0.9340 + 2\ (0.0012) = 0.9364 < 0.9414.$$

6.5 Critical Benchmark Experiments

The criticality safety analysis of the NUHOMS®-MP197 System used the CSAS25 module of the SCALE system of codes.

The analysis presented herein uses the fresh fuel assumption for criticality analysis. The analysis employed the 44-group ENDF/B-V cross-section library because it has a small bias, as determined by the 125 benchmark calculations described in reference [6.2]. The upper USL-1 was determined using the results of these 125 benchmark calculations.

The benchmark problems used to perform this verification are representative of benchmark arrays of commercial light water reactor (LWR) fuels with the following characteristics:

(1) water moderation

(2) boron neutron absorbers

(3) unirradiated light water reactor type fuel (no fission products or "burnup credit") near room temperature (vs. reactor operating temperature)

(4) close reflection

(5) Uranium Oxide

The 125 uranium oxide experiments were chosen to model a wide range of uranium enrichments, fuel pin pitches, assembly separation, concentration of soluble boron and control elements in order to test the codes ability to accurately calculate k_{eff}. These experiments are discussed in detail in reference [6.2]. The file-input names referred to in the following sub-sections are identical to those used in [6.2].

6.5.1 Benchmark Experiments and Applicability

A summary of all of the pertinent parameters for each experiment is included in Table 6-9 along with the results of each run. The best correlation is observed for fuel assembly separation distance with a correlation of 0.65. All other parameters show much lower correlation ratios indicating no real correlation. All parameters were evaluated for trends and to determine the most conservative USL.

The USL is calculated in accordance to NUREG/CR-6361 [6.3]. USL Method 1 (USL-1) applies a statistical calculation of the bias and its uncertainty plus an administrative margin (0.05) to the linear fit of results of the experimental benchmark data. The basis for the administrative margin is from reference [6.4]. Results from the USL evaluation are presented in Table 6-10.

The criticality evaluation used the same cross section set, fuel materials and similar material/geometry options that were used in the 125 benchmark calculations as shown in Table 6-9. The modeling techniques and the applicable parameters listed in Table 6-11 for the actual criticality evaluations fall within the range of those addressed by the benchmarks in Table 6-9.

6.5.2 Results of the Benchmark Calculations

The results from the comparisons of physical parameters of each of the fuel assembly types to the applicable USL value are presented in Table 6-11. The minimum value of the USL was determined to be 0.9414 based on comparisons to the limiting assembly parameters as shown in Table 6-11.

e.	Cask Lifting Yoke:	Passive, open hook lifting yoke used for vertical lifts of the cask.
f.	Ram Trunnion Support Assembly:	Frame attached to the cask bottom which provides an anchor for the hydraulic ram during DSC insertion and retrieval.
g.	Skid Positioning System:	Hydraulically operated alignment system that provides the interface between the onsite transfer trailer and the onsite support skid.
h.	Hydraulic Ram:	Hydraulic cylinder used to insert/withdraw DSCs to/from HSMs.
i.	Cask/HSM Restraints:	Provides the load path between the cask and HSM during DSC transfer operations.

7.2 Procedures for Unloading the Cask

Unloading the NUHOMS®-MP197 Cask after transport involves removing the cask from the railcar and removing the canister from the cask. The cask is designed to allow the canister to be unloaded from the cask into a NUHOMS® staging module, or hot cell, and provisions exist to allow wet unloading into a fuel pool. The necessary procedures for these tasks are essentially the reverse of those described in Section 7.1.

7.2.1 Receipt of the Loaded NUHOMS®-MP197 Cask

Procedures for receiving the loaded cask after shipment are described in this section. Procedures for receiving an empty cask are provided in Section 7.1.1.

a. Verify that the tamperproof device is intact.

b. Remove the tamperproof device.

c. Remove the impact limiter attachment bolts from each impact limiter and remove the impact limiters from the cask.

d. Remove the transportation skid tie down strap.

e. Take contamination smears on the outside surfaces of the cask. If necessary, decontaminate the cask until smearable contamination is at an acceptable level.

d. Install the front and rear trunnions. Lubricate, install and preload the trunnion bolts and torque them to 250 ft-lbs in the first pass and to 520 - 540 ft-lbs in the final pass follow the torquing sequence shown in Figure 7-1.

f. Place suitable slings around the cask front and rear trunnions.

g. Using a suitable crane, lift the cask from the railcar. Place cask onto the onsite transfer trailer. Remove the slings from the cask.

h. Install the onsite support skid pillow block covers.

i. Transfer the cask to a staging module, fuel pool, or dry cell and unload using the procedures described in the following sections.

FIGURE WITHHELD UNDER 10 CFR 2.390

NO.	DATE	REVISIONS	DWN.	CHK'D.	M.E.	N/T	Q/A	PROJ.
2	1/31/02	SEE DCN 1093-83	RM	PS	PS	WO	[illegible]	PS
1	1/25/02	SEE DCN 1093-79	R.M.	P.S.	P.S.	M.M.	R.F.	P.S.

APPROVALS		DATE
PROJ.	P.S.	1 MAY 01
Q/A	W.R.S.	1 MAY 01
N/T		
MECH. ENG.	J.C.	1 MAY 01
CHK'D. BY	P.S.	1 MAY 01
DWN. BY.	J.T.G.	27 APR. 01

TRANSNUCLEAR, INC.
HAWTHORNE, N.Y.

NUHOMS®-61BT TRANSPORTABLE CANISTER
FOR BWR FUEL
CANISTER DETAILS

SAR

SCALE	SIZE	DWG. NO.	REV.
NONE	B	1093-71-17	2