



E-32078

January 6, 2012

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

Subject: Supplemental Information (Docket No. 71-9301, TAC No. L24570)

Reference: Request for Clarification from Jennivine Rankin, Project Manager (NRC) in a
Phone Call to Kamran Tavassoli (TN) on 01/03/2012

The NRC staff requested clarification regarding the use of specification ASTM C996-96 on page 6-2 of the Safety Analysis Report (SAR) for TNF-XI package.

The specification ASTM C996-96 has been currently superseded by the specification ASTM C996-10. These specifications define the impurity and uranium isotope limits for Enriched Commercial Grade UF₆ used in manufacturing of reactor fuel. These specifications do not cover provisions for preventing criticality accidents.

The uranium isotopes which affect the criticality evaluation are listed in Table 6-3 of the SAR. The design basis criticality analysis models do not include minor uranium isotopes. Therefore, the upgrade of the ASTM C996 document from -96 to -10 does not affect the criticality evaluation and its conclusions.

For clarification and consistency purposes, page 6-2 of Chapter 6 of the SAR is revised as shown in Enclosures 1 and 2 for proprietary and non-proprietary versions. Changed areas are indicated by italicized text and revision bars. The revised page does not contain any proprietary information. A global search of the SAR pages has shown that no other page is affected.

Transnuclear looks forward to working with the NRC staff on this application. Should the NRC staff require additional information to support review of this application, please do not hesitate to contact Mr. Kamran Tavassoli at 410-910-6944 or me at 410-910-6881.

Sincerely,

A handwritten signature in black ink that reads 'Jayant Bondre'.

Jayant Bondre, PhD
Vice President - Engineering

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N145501

cc: Jennivine Rankin, Project Manager, NRC SFST, as follows:

- 5 paper copies of this cover letter and Enclosure 1

Enclosures:

1. Changed Pages for Safety Analysis Report, Revision 8, Proprietary Version
2. Changed Pages for Safety Analysis Report, Revision 8, Non-Proprietary Version

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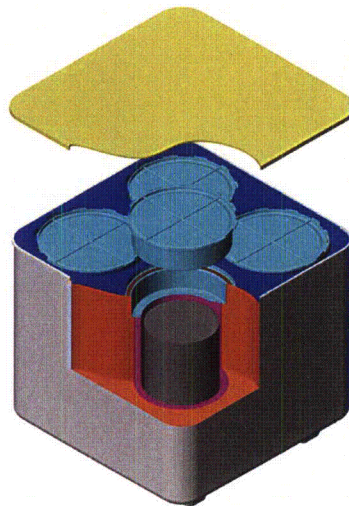
Enclosure 2 to TN E-32078

**Changed Pages
for Safety Analysis Report, Revision 8
Non-proprietary Version**

NON-PROPRIETARY



TRANSNUCLEAR, INC.
TNF-XI Package



SAFETY ANALYSIS REPORT

Docket Number 71-9301

Revision 8
January 2012

7135 Minstrel Way, Suite 300 • Columbia, MD 21045

Based on the current analysis, the Criticality Safety Index (CSI) for the TNF-XI package with the above specified contents is shown in Table 6-2. The number of undamaged or damaged (10 CFR §71.73) packages that will remain subcritical in any arrangement with close water reflection and optimum interspersed hydrogenous moderation is 216. Using the rounded CSI result of $50/108 = 0.5$, the maximum allowable number of packages per non-exclusive use vehicle is $50/0.5 = 100$.

Table 6-2. Criticality Safety Index for Nuclear Criticality Control

| Case | N | Array Size | Packages | CSI |
|----------------------------------|-----|------------|----------|-----|
| Normal Conditions of Transport | 115 | 8×9×8 | 576 | 0.5 |
| Hypothetical Accident Conditions | 108 | 6×6×6 | 216 | 0.5 |

6.2 Package Fuel Loading

6.2.1 Contents

The package shall be used to transport homogeneous uranium in oxide form (UO_2 , U_3O_8 , or $UO_{x, x>2}$) which meet the requirements for Enriched Commercial Grade Uranium defined in ASTM C996-10. The uranium isotopic distribution is shown in Table 6-3.

This analysis demonstrates safety for UO_2 powder over the entire range of UO_2 densities. The maximum net UO_2 equivalent payload demonstrated safe in the TNF-XI is presented in Table 6-1.

Table 6-3. Uranium Isotopic Distribution

| Isotope | wt % | Modeled wt % |
|-----------|-------------------|--------------------|
| ^{234}U | 0.0054 - 0.0500 | 0.0000 |
| ^{235}U | 0.7110 - 5.0000 | 4.0500 to 5.0000 |
| ^{236}U | 0.0000 - 0.0250 | 0.0000 |
| ^{238}U | 99.2836 - 94.9295 | 95.9500 to 95.0000 |

6.2.2 Packaging

A discussion of the TNF-XI package designed for transportation of UO_2 enriched up to 5% ^{235}U is provided in Section 1.2.1, *Packaging*. A detailed set of drawings of the TNF-XI package is provided in the general packaging arrangement drawings (refer to Appendix 1.3.1, *Packaging General Arrangement Drawings*).

Table 6-4 provides a listing of the applicable material specifications used in the TNF-XI model construct. Atomic density is calculated by the SCALE package [3] for the KENO-Va results.