



UNITED NUCLEAR  
C O R P O R A T I O N

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NEW HAVEN, CONN. 06508  
777-5361

In Reply Refer To: NIS:REK-71-295

June 10, 1971

Director, Division of Materials Licensing  
U.S. Atomic Energy Commission  
Washington, D. C. 20545

Attention: Mr. Donald A. Nussbaumer, Chief  
Fuel Fabrication & Transportation Branch

Subject: Shipping Container Model UNC-2800

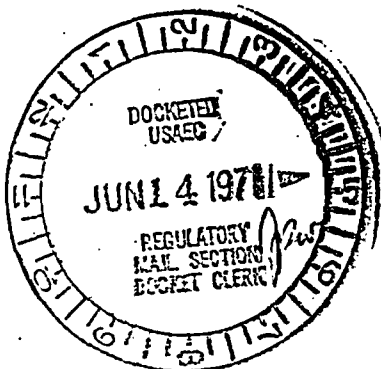
Dear Mr. Nussbaumer: Regulatory File Cy. 4.

United Nuclear Corporation requests amendment of its Special Nuclear Material License SNM-777, Docket 70-820, to include the use of Shipping Container Model UNC-2800 under modified conditions. The proposed modification involves shipments of one Yankee Rowe (PWR) fuel assembly in this package.

A new package structural re-evaluation was not performed since the weight limitations remain the same and the hardware is as shown on existing drawings. Thus, the previous structural evaluation remains valid. Attached are an additional criticality safety analysis and revised license pages for inclusion in the license. Modified portions of the license pages are indicated by vertical lines in the right hand margin. The number of allowable containers was determined by applying standard safety factors for accident conditions based on the results which show that greater than 512 packages are required for criticality. For convenience, 500 containers were selected as the maximum allowable number. It should be noted that the increase in number of containers is due to a more specific criticality analysis using advanced computer techniques.

We have not requested amendment for the use of this modified package under Special Nuclear Material Licenses Nos. SNM-33, Docket 70-36 or SNM-368, Docket 70-371. This package will, however, be used under the general license provisions of Paragraph 71.7(b) of Title 10 CFR 71. We consider this application as meeting the requirements of Subsection 71.7(b)(1)(iii) for use of this package under Special Nuclear Material Licenses Nos. SNM-368 and SNM-777.

Current commitments require the use of this package by 10/1/71. Your early review is respectfully requested. Upon completion of your review, please forward a copy of your approval to:



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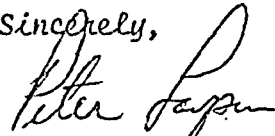
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Secretary, Hazardous Material Regulation Board  
Department of Transportation  
400 Sixth Street SW  
Washington, D. C. 20590

Sincerely,

A handwritten signature in cursive script, appearing to read "Peter Loyse".

Peter Loyse, Manager  
Nuclear & Industrial Safety

PL:g

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Issued 6/10/71

LICENSE: SNM-777, Docket 70-820  
SECTION: 700 - TRANSPORTATION  
Subsection: 703 - Shipping Containers  
Subpart:

Supersedes 6/20/70

Approved

Amendment No.

703. Shipping Containers

1. Container Number or Identification

UNC 2800

2. Description of Container

2.1 Inner container: 9 inch high x 10 inch wide x 192 inch long, 7 gage steel channel shaped strongback that is shock mounted to the outer container by means of eight heavy duty shear mounts.

For elements, the strongback contains adjustable end clamps and eight cross support brackets to support various size and configuration fuel elements. Lifting holes are provided for handling the strongback outside of the outer container. Four (4) BWR elements are packaged as per UNC Drawing D-304329.

Individual PuO<sub>2</sub> UO<sub>2</sub> rods not assembled into fuel elements are packaged as follows:

Ninety rods will be placed in the strongback channel. These will be located in a 9" (vertical) by 10" (horizontal) array on about 1" centers. Spacing will be maintained by sheets of Dow Ethafoam installed at seven equally spaced locations along the rods. At each of these locations, a metal "hold-down" bar will be used to retain the rods in the strongback channel.

The rods will be prevented from moving axially by an adjustable block at each end. These blocks will be fabricated of three layers (1" of rubber, 3/4" of wood and 1" of aluminum) and will be held in place against the rod ends by jack screws. Reference: Drawing REC 18253.

2.2 Outer Container: 36 inch ID x 207 inch long cylinder, constructed of 12 guage steel. The container is formed by two sections employing a centerline split (or closure flange). Both sections are completely seal welded. The closure flange contains an "O" ring rubber gasket and the two sections are bolted together by fifty-six 5/8 inch bolts and lock nuts. Metal skids and stacking brackets are welded to the shells. Stacking brackets are fitted with combination tie-down holes and corner locking bolt holes. The two sections are protected by metal roll rings. An air relief valve is provided.

3. Description of Material to be Packaged in Container

3.1 BWR and PWR rod type fuel elements and rods fabricated to reactor use specification with enrichments up to and including 4.1% as pellets.

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Amendment No.

3. Description of Material to be Packaged in Container (continued)

3.2 Special PuO<sub>2</sub> UO<sub>2</sub> Dresden rods and elements (BWR) fabricated to reactor use specifications.

4. Amount of Material per Container

4.1 Not to exceed 4 BWR standard or special elements, or

4.2 One (1) PWR element, or

4.3 90 special PuO<sub>2</sub> UO<sub>2</sub> fuel rods or two (2) special PuO<sub>2</sub> UO<sub>2</sub> elements.

5. Nuclear Safety Control

5.1 Mass

6. Number of Containers per Shipment

6.1 BWR Fuel Elements

1.1 Fissile Class I: Unlimited.

6.2 PWR Fuel Element

2.1 Fissile Class I: None.

2.2 Fissile Class II: Not to exceed 250 (0.2 transport units per container).

2.3 Fissile Class III: Not to exceed 500 containers.

6.3 PuO<sub>2</sub> UO<sub>2</sub> Rods or Elements

3.1 Fissile Class I: None

3.2 Fissile Class II: Not to exceed 7 (7.1 transport units per container).

3.3 Fissile Class III: Not to exceed 17 containers.

7. Special Restrictions

7.1 Containers will be marked in accordance with 49 CFR 73 and 78 (ICC Regulations) and 10 CFR 71 (AEC Regulations).

8. Design Requirements

8.1 Structural Determination: Free Fall, puncture and thermal tested.

8.2 Weight Limitations:

Total Weight of Container - 2,340 lbs.

Weight of Contents - 1,510 lbs.

Total Weight - 3,850 lbs.

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9. Shipping Criteria

Fissile Class I: Applicable for BWR shipments only  
Fissile Class II: Must meet "50 unit rule".  
Fissile Class III: Exclusive use of carrier or courier.

10. Reference

- 10.1 Drawings: Applied Design Drawings 874A1 through 874A136, REC 18253, UNC Drawing D-304329.
- 10.2 Structural Evaluation: Structural Evaluation Summary for UNC 2800, dated July 28, 1967. Supplement to Structural Evaluation Summary, dated January 9, 1969.
- 10.3 Nuclear Safety Evaluation: Nuclear Safety Evaluation, UNC 2800, dated September 15, 1967. Supplement to Nuclear Safety Evaluation--Dresden Fuel Element, dated January 9, 1969.
- 10.4 Nuclear Safety Evaluation: Criticality Safety Analysis for Shipping Container Model UNC 2800, with four (4) Dresden (BWR) fuel assemblies per container, NIS:REK-70-187, dated May 28, 1970.
- 10.5 Nuclear Safety Evaluation: Criticality Safety Analysis of Shipping Container Model UNC-2800 with One Yankee Rowe (PWR) Fuel Assembly per Container, NED-1239, dated May 27, 1971.

DESCRIPTION OF COMPONENTS

YANKEE ROWE FUEL ASSEMBLIES

I. GENERAL

1. Enrichment: 4.1%

I. PELLET DESCRIPTION

1. Size: 0.3105" X 0.6"  $\rightarrow$  1.0" long
2. Density: 94% theoretical

II. ROD DESCRIPTION

1. Fuel Stack Length: 91.00"  $\pm$  0.25"
2. Tube Length: 94.57"
3. Weight: 3.3 lbs.
4. Fuel Loading/Rod: 1182.8 gms. UO<sub>2</sub> (36.49 gms. U-235)
5. Zirc-4 Tubing:
  - a. Type: Standard
  - b. Wall Thickness: 0.024"
  - c. I.D.: 0.317"  $\pm$  0.001"
  - d. O.D.: 0.365"  $\pm$  0.002"

III. ELEMENT DESCRIPTION

1. Size 7.615" X 7.615" X 91.00" (active fuel length)
2. Length Between Grids: 95.44"
3. No. Rods/Element: 238
4. Rod Pitch: 0.468