

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIALS PACKAGES

U.S. NUCLEAR REGULATORY COMMISSION

1. a. CERTIFICATE NUMBER 5942	b. REVISION NUMBER 10	c. PACKAGE IDENTIFICATION NUMBER USA/5942/B()F	d. PAGE NUMBER 1	e. TOTAL NUMBER PAGES 4
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2. PREAMBLE

- a. This certificate is issued to certify that the packaging and contents described in Item 5 below, meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."
- b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

a. ISSUED TO (Name and Address)

General Electric Company
P.O. Box 460
Pleasanton, CA 94566

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

General Electric Application dated May 30, 1985,
as supplemented.

c. DOCKET NUMBER

71-5942

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

(a) Packaging

(1) Model No.: 700

(2) Description

A steel encased lead shielded shipping cask enclosed by a double-walled protective jacket of the same shape with a rectangular baseplate. The cask is a double-walled steel circular cylinder, 37-inch-diameter by 65-inch high with a central cavity 15-inch-diameter by 40-inch high. Approximately 10.25 inches of lead surround the central cavity. The cask is equipped with a cavity drain line, pressure relief valve set at 100 psig, and lifting device. Closure is accomplished by a silicone rubber gasketed and bolted steel lead filled plug. The maximum gross weight of the package (contents, cask assembly, protective jacket and base) is 35,500 pounds.

The cask may be modified with a 14-inch high cavity extension with an additional silicone rubber gasket. The modified cask is 79 inches high. The maximum gross weight of the package (contents, modified cask assembly, protective jacket and base) is 40,200 pounds.

(3) Drawings

The packaging is constructed in accordance with the following General Electric Company Drawing Nos.: 129D4768, Rev. 3; 129D4769, Rev. 4; and 129D4770, Rev. 5.

Lifting and/or tie-down devices which are a structural part of the package must be in accordance with the above drawings.

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5. (b) Contents

(1) Type and form of material

Byproduct, source, and special nuclear material contained in solid oxide or metal form and in special form.

(2) Maximum quantity of material per package

Not to exceed 700 pounds (including shoring), and

- (i) 740 gm U-235, provided that the maximum U-235 enrichment does not exceed 6 weight percent; or
- (ii) 1,200 gm U-235, provided that the fuel material is in the form of MTR-type fuel elements with a minimum active fuel length of 23 inches; or
- (iii) 220 gm fissile material; or
- (iv) 1,650 gm U-235, provided that the maximum U-235 enrichment does not exceed 3.5 weight percent and the fuel material is in the form of 88 rods loaded with 0.376-inch-diameter pellets with a minimum active fuel length of 37 inches; or
- (v) those values presented in Figure 1, UO₂ Weight Limits for Model 700 Shipping Container, of Exhibit A to this application, applicable to fuel material in the form of rods with a minimum pellet diameter of 0.40 inch; or
- (vi) 5,100 gm U-235, provided the fuel is in the form of ETR-type fuel elements (GETR Fuel) with each element containing no more than 510 gm U-235 and inserted in the spaced stainless steel fuel shipping basket described in GE Drawing No. 106D4150, Rev. 0.; or
- (vii) 6,200 gm U-235, provided the fuel is in the form of MURR TRTR type elements containing not more than 775 gm U-235 per element; loaded and spaced in the stainless steel fuel shipping basket as described in MURR Drawing No. 1228, Sheets 1 thru 5, Revision 0. Fuel elements shall have at least 150 days cooling time since last reactor operation; or
- (viii) 3,510 gm U-235 provided the fuel is in the form of MTR-type fuel elements with each element containing no more than 351 gm U-235 and inserted in a spaced stainless steel fuel shipping basket described in GE Drawing No. 106D4150, Rev. 1 for GETR fuel. A shoring device to limit vertical motion of the fuel elements must be included.
- (ix) 7,020 gm U-235 provided the fuel is in the form of MTR-type fuel elements with each element containing no more than 351 gm U-235 inserted in a spaced stainless steel fuel shipping basket described in GE Drawing No. 106D4150, Rev. 1, for 24-inch length fuel. Each shipment must contain 20 fuel elements in 2 fuel baskets with the spacer plate shown on GE Drawing No. 218B6061, Rev. 0, located between the baskets.

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5. (b) Contents (continued)

(3) Maximum quantity of radioactive decay heat per package

- (i) 6,500 watts for dry shipments, or
- (ii) 1,500 watts for wet shipments, provided that the cavity shall contain at least a 1,000 cu in air void (at standard temperature and pressure) at the time of delivery to a carrier for transport.

(c) Fissile Class

III

Maximum number of packages per shipment

2

- 6. The radioactive material must be in the form of fuel rods, or plates, fuel assemblies, or meeting the requirements of special form radioactive material.
- 7. Shoring must be provided to minimize movement of contents during accident conditions of transport.
- 8. Prior to each shipment (except for contents meeting the requirements of special form radioactive material), the package must be leak tested by a method capable of determining that a leakage of 10^{-3} atm cm³/s at standard temperature and pressure is not exceeded.
- 9. Prior to each shipment the silicone rubber lid gasket(s) must be inspected. This gasket(s) must be replaced if inspection shows any defects or every twelve (12) months, whichever occurs first. Cavity drain line must be sealed with appropriate sealant applied to threads of pipe plug.
- 10. The applicant must confirm annually that the pressure relief valve is operable at 100 psig.
- 11. When needed, sufficient antifreeze in the cask must be used to prevent damage of any component of the package due to freezing.
- 12. Fabrication of additional packagings is not authorized.
- 13. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.12.
- 14. Expiration date: July 31, 1990.

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REFERENCES

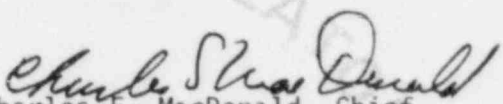
General Electric application dated May 30, 1985.

Supplements dated: June 5 and 7, August 7, and September 16, 1985.

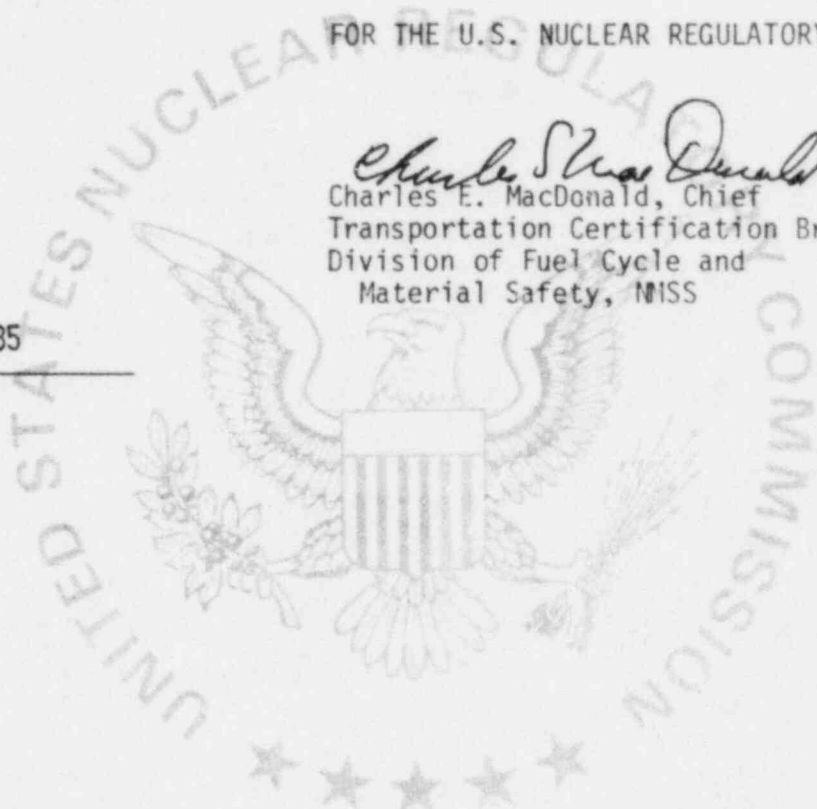
University of Missouri letter dated March 20, 1980.

Appendix 6-A regarding University of Missouri's quality assurance program is not considered part of this application.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, MISS

Date: SEP 18 1985





UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Transportation Certification Branch
Approval Record
Model No. 700 Package
Docket No. 71-5942

By application dated August 7, 1985, as supplemented September 16, 1985, General Electric Company (GE) requested an amendment to the Model No. 700 cask to permit the shipment of 20 MTR-type fuel assemblies.

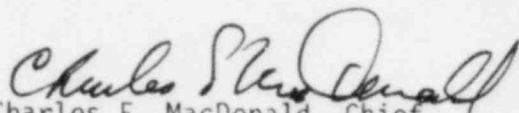
The current fuel basket has been modified by reducing its height from 39.0 inches to 26.0 inches. Through the use of the previously approved 14-inch high cavity extension, two fuel baskets may be stacked within the modified cask. The fuel baskets are separated by a 0.188-inch thick stainless steel plate.

GE did not provide a structural analysis for the stacked fuel baskets. However, even if some basket welds cracked with the cavity very tightly packed, the configuration of the fuel and basket components are not expected to change. The approval has been conditioned to require the shipment of a full load (20 assemblies).

GE has analyzed the criticality of both the 10 and 20 MTR-type assembly loadings in the Model 700 cask using KENO-IV, 27 neutron group cross-sections. An extremely conservative representation (September 16, 1985) of the Model 700 cask for the 10 MTR-type loading gave a Keff of 0.924 ± 0.007 . This model assumed the lead too close to the stainless steel baskets at the top, bottom, and sides of the cask. The KENO-IV geometry option was used to represent the discrete fuel-plate/water regions, basket regions and outer regions of the cask and water reflector. For the 20 assembly loading in the Model 700 (August 7, 1985), generalized geometry option was used to represent the discrete plate/water regions, basket regions, and shield reflector region. This model represented a realistic 700 cask with contents. It resulted in a keff of 0.887 ± 0.004 .

The staff has performed homogenized calculations (KENO-IV, 123-group) for the 10 and 20 assembly loadings. In both cases, a 3x3 array of MTR-type assemblies within a steel basket (length of fuel array, 57.79 cms for 10 MTR-type assemblies; 115.57 cms for 20 MTR-type assemblies) represented the required loading with each assembly fissionable content increased by 11% to account for 9 vs 10 and 18 vs 20 assemblies. Water, Pb, water reflector region surrounded the above basketed loadings. The keff for 10 assemblies was calculated to be 0.889 ± 0.006 ; for 20 assemblies, the keff was 0.957 ± 0.007 .

Based on the above, the additional contents do not effect the ability of the package to meet the requirements of 10 CFR Part 71.


Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

Date: SEP 18 1985