

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIALS PACKAGES

U.S. NUCLEAR REGULATORY COMMISSION

1. a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. PACKAGE IDENTIFICATION NUMBER	d. PAGE NUMBER	e. TOTAL NUMBER PAGES
9019	12	USA/9019/AF	1	4

2. PREAMBLE

- 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."
- 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 780
Wilmington, NC 28401

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

General Electric Company application dated
June 3, 1981, as supplemented.

c. DOCKET NUMBER

71-9019

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.: BU-7.

(2) Description

The packaging consists of either two, 5-gallon or three, 2.5 or 3-gallon, 11.25-inch ID, minimum 24-gauge steel pails contained in a 13.75 to 14.05-inch diameter by nominal 27-inch long inner container constructed of 18-gauge steel, with bolted and gasketed (1/8-inch thick silicone rubber with a durometer hardness between 45 to 75) top flange closure. The inner container is centered and supported in a 22.5-inch ID, 18-gauge steel 55-gallon capacity DOT Specification 17H steel drum by solid insulating material composed of fire-retardant phenolic foam (7-9 pounds per cubic foot). Drum closure is provided by a DOT Specification 17H, 16-gauge drum cover and a DOT Specification 17H, 12-gauge closure ring with drop forged lugs, drilled and threaded for 5/8-inch diameter bolt and nut. The maximum weight of the package is 370 pounds.

(3) Drawing

The container is constructed in accordance with General Electric Company Drawing No. 112D1592, Revision 4.

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5. (b) Contents

(1) Type and form of material

- (i) Uranium oxide powder with a maximum bulk density not greater than 4.2 grams/cc. Uranium may be enriched to not more than 4.0 w/o in the U-235 isotope. The maximum H/U atomic ratio considering all sources of the hydrogenous material within the inner container shall not exceed 0.45.
- (ii) Uranium oxide powder with a maximum bulk density not greater than 4.2 grams/cc. Uranium may be enriched to not more than 4.0 w/o in the U-235 isotope. The maximum H/U atomic ratio considering all sources of the hydrogenous material within the inner container shall not exceed 1.6.
- (iii) Uranium oxide as pellets with a maximum bulk density of 4.2 grams/cc. Uranium may be enriched to a maximum 4.0 w/o in the U-235 isotope. The maximum H/U atomic ratio considering all sources of the hydrogenous material within the inner container shall not exceed 0.45.

(2) Maximum quantity of material per package

(i) For the contents described in 5(b)(1)(i):

The maximum contents per package and pail for the maximum U-235 enrichment shall be limited in accordance with the following table:

Maximum U-235 enrichment, w/o	Maximum UO_2 per pail, kgs	Maximum UO_2 per package kgs
3.0	44.5	89.0
3.2	38.9	77.8
3.4	34.6	69.2
3.6	31.1	62.2
3.8	28.3	56.6
4.0	25.7	51.4

(ii) For the contents described in 5(b)(1)(ii):

The maximum contents of uranium oxide powder per package and pail shall be limited to 70 kgs and 35 kgs, respectively.

(iii) For the contents described in 5(b)(1)(iii):

The maximum contents per package and pail for the maximum U-235 enrichment shall be limited in accordance with the following table:

Maximum U-235 enrichment, w/o	Maximum UO ₂ per pail, ² kgs	Maximum UO ₂ per package, kgs
2.7	45.0	90.0
2.8	42.9	85.8
2.9	40.1	80.2
3.0	38.1	76.2
3.2	34.1	68.2
3.4	31.0	62.0
3.6	28.5	57.0
3.8	26.4	52.8
4.0	24.7	49.4

(c) Fissile Class

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6. For mixtures of contents (powders and pellets) described in 5(b)(1), the maximum quantity of material per package shall be limited to the quantity given in 5(b)(2)(iii).
7. For mixtures of contents as described in 5(b)(1)(ii), ammonium oxalate and/or ammonium bicarbonate additives are permitted in the UO₂ powder to the extent that the C/U ratio does not exceed 1.27.
8. In addition to the requirements of Subpart G of 10 CFR Part 71:

Prior to each shipment, the inner drum (container) silicone rubber gasket must be inspected. The gasket must be replaced with a new gasket if inspection shows any defects or every 12 months, whichever occurs first. Based on gasket age considerations alone, no gasket need be replaced until after December 31, 1985.
9. The packaging must be marked in accordance with 10 CFR §71.85(c).
10. The four, 1/4-inch diameter holes located near the top of the outer DOT Specification 17H steel drum shall be covered with weatherproof tape to preclude the entry of water.
11. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.12.
12. Expiration date: April 30, 1989.

CONDITIONS (continued)

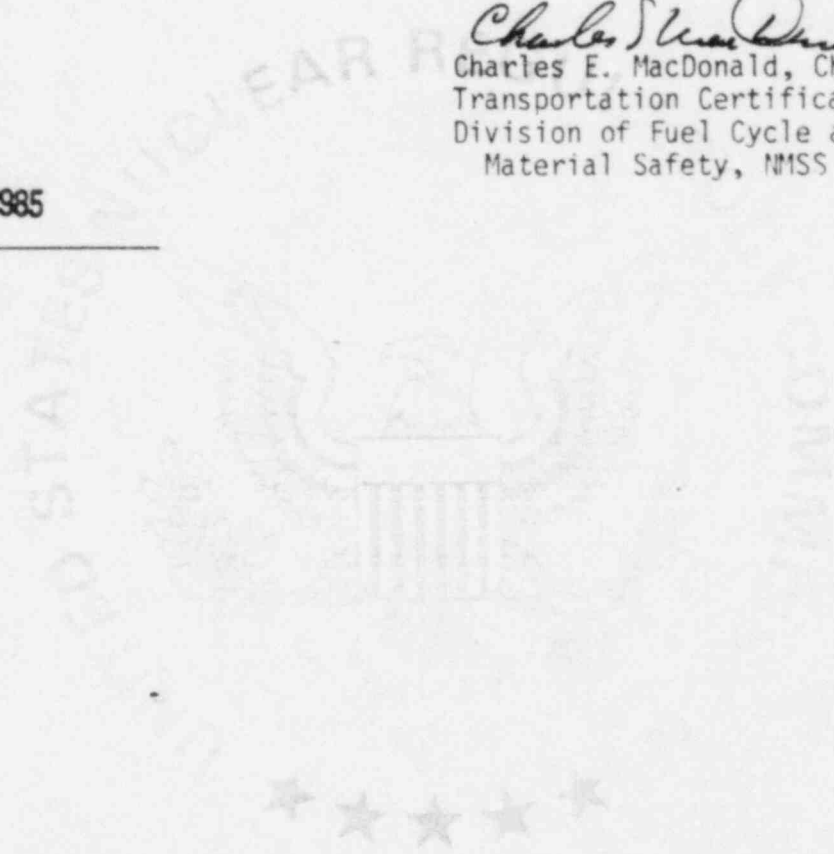
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REFERENCES

General Electric Company application dated June 3, 1981.

Supplements dated: June 25, 1981; November 13, 1984; and April 29, 1985.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


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

Date: SEP 19 1985



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

Transportation Certification Branch
Approval Record
Model No. BU-7 Package
Docket No. 71-9019

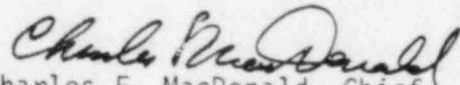
By application dated November 13, 1984, as supplemented April 29, 1985, General Electric Company (GE) has requested several small changes to the Model No. BU-7 package. Among other things, these changes include dimensional changes to the outer and inner drums (adding tolerances) and inner drum gasket testing changes.

GE requests dimensional changes be approved for the Model No. BU-7 shipping container. Those changes that can affect criticality are the inner container increasing its inner diameter from 13.75 to 14.05 inches and the inner height from 26.75 to 27.25 inches. Thus, the inner container volume increases about 6.5 percent. All contents are to remain identical as per previous approvals. Thus, these contents fill the extra volume and the expected increase in keff is about 2.5 percent in units of keff. GE used the same criticality methods (KENO IV with the Hansen-Roach 16-group cross section set, successfully benchmarked against appropriate criticals) that were used in establishing subcriticality of the Model No. BU-7 with old inner container dimensions with identical fissile contents.

The maximum k_{∞} (202 kg $U(4)O_2$) per Model No. BU-7 container 60% resin density, $H/U = 1.58$, $C/U = 1.260$ was calculated to be 0.913 ± 0.005 for normal conditions, maximum reactivity. The corresponding maximum keff for 256 damaged (9x9x4) H_2O reflected with maximum interspersed moderator was calculated to be 0.955 ± 0.005 . The maximum keff for a single (70 kg $U(4)O_2$) plus 40 w/o water flooding) package was calculated to be 0.904 ± 0.004 .

The staff has reviewed the KENO IV input and output for selected cases and found them to be accurate and representing the cases intended.

The GE Drawing No. 112D1592, Revision 4, shows the use of a 1/8-inch thick silicone rubber gasket with a hardness range of 45 to 75 durometer. Test results have been included to demonstrate the acceptability of the proposed gasket material. However, the reuse of the gasket material has not been satisfactorily addressed because only the change in hardness was considered (inspection frequency was not specified). Because of uncertainties in specifying performance criteria for reused gaskets, we have previously required elastomer gaskets to be replaced at least annually. In a new application, we would be willing to consider additional information which includes tests for (1) tensile strength, (2) elongation, and (3) durometer hardness. Except for defective gaskets, replacement of gaskets need not be made until after December 31, 1985, in order to allow for a transition time.


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

Date: SEP 19 1985