NRC FORM 618
(9-83)
10 CFR 71

U.S. NUCLEAR REGULATORY COMMISSION

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIALS PACKAGES

1.a CERTIFICATE NUMBER	b. REVISION NUMBER	c. PACKAGE IDENTIFICATION NUMBER	d. PAGE NUMBER	e. TOTAL NUMBER PAGES
6003	11	USA/6003/B( )	1	6

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)

U.S. Department of Energy
Division of Naval Reactors
Washington, DC 20585

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

Safety Analysis Report for M-130 shipping container dated December 30, 1968, as supplemented.

c. DOCKET NUMBER 71-6003

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.: M-130

(2) Description

The Model No. M-130 shipping container is an upright cylinder 84 inches in diameter by 158 inches overall height. The container walls consist of a finned 1-inch thick outer shell (fabricated from either carbon steel, carbon steel with stainless steel clad, or solid stainless steel), 10 inches of lead shielding, and a 1-inch thick inner pressure vessel (fabricated from carbon steel clad with stainless steel). The top of the container is covered with a shielded closure head which is bolted to the container and seals the pressure vessel. An access opening with a bolted shield plug is provided in the closure head for loading and unloading spent fuel.

The pressure vessel has an inside diameter of 55 inches. The central region contains a secondary heat exchanger (not used during shipment) surrounded by a 1/2-inch thick carbon steel backup cylinder 29 inches in diameter. The annulus which remains between the backup cylinder and the pressure vessel provides a space 13 inches wide and 130 inches high for spent fuel. The spent fuel is contained in the annulus by module holders designed for the particular core to be shipped.

The container has external penetrations to the pressure vessel for steam and water relief lines and a fill and drain line (which are capped during shipment) and a pressure sensing line which remains open to a pressure gage during shipment. The container also has penetrations which do not open to the pressure vessel for secondary heat exchanger lines (which are capped during shipment) and a temperature sensing line.

5. (a) Packaging (cont'd)

(2) Description (cont'd)

For LWBR spent fuel shipments, the heat exchanger and associated structures have been removed, external penetrations plugged and seal welded, and an external shield and energy absorber added during modifications.

The container is supported on its transport vehicle by an "A" frame structure. Gross weight of the loaded container without its support structure is approximately 228,000 pounds.

(3) Drawings

The packaging is constructed in accordance with General Electric Drawing Nos. 247E209, Sheet 1, Rev. R; Sheet 2, Rev. K; Sheet 3, Rev. T; Sheet 4, Rev. U; Sheet 5 of 5, Rev. F and 247E228, Rev. F.

For LWBR spent fuel shipments, the container has been modified in accordance with Westinghouse Electric Drawing 1176J48, Sheet 1 Rev. G, Sheet 2 Rev. E and an external energy absorber added in accordance with Westinghouse Electric Drawing 1525E32, Rev. A.

(b) Contents

(1) Type and form of material

Irradiated fuel assemblies, activated corrosion products and structural parts containing up to 40 gallons of residual contaminated water. The fuel assemblies and structural parts are of the following types:

(i) S3W/S4W fuel subassemblies of core type 2.

(ii) S5W fuel modules of core types 2 or 3.

(iii) S5W corner fuel modules of core types 2 or 3.

(iv) D1G fuel modules of core types 1 or 2.

(v) D1G removable fuel assemblies of core types 1 or 2.

(vi) S1C/S2C fuel modules with control rods.

(vii) S1C/S2C peripheral fuel modules.

(viii) S3G-3/3A fuel module with or without control rods.

(ix) SAD cell.

5. (b) Contents (cont'd)

(1) Type and form of material (cont'd)

(x) S3G-3/3A irradiated thermocouples and thermocouple cases.

(xi) S8G full size fuel cell with or without control rod.

(xii) S8G partial size fuel cell with or without control rod.

(xiii) S5W-4A recoverable irradiated fuel modules with control rod.

(xiv) S7G recoverable irradiated fuel cells.

(xv) D2W fuel cells with control rods.

(xvi) NR-1 fuel modules with or without control rods.

(2) Maximum quantity of material per package

(i) 52 fuel assemblies as described in 5(b)(1)(i).

(ii) 12 fuel assemblies as described in 5(b)(1)(ii) or 9 fuel assemblies as described in 5(b)(1)(ii) and 4 fuel assemblies as described in 5(b)(1)(iii).

(iii) 6 fuel assemblies as described in 5(b)(1)(iv) and 4 fuel assemblies as described in 5(b)(1)(v).

(iv) 9 fuel assemblies as described in 5(b)(1)(vi) and 8 fuel assemblies as described in 5(b)(1)(vii).

(v) 10 fuel assemblies as described in 5(b)(1)(viii).

(vi) 9 fuel assemblies as described in 5(b)(1)(viii) and one fuel assembly as described in 5(b)(1)(ix).

(vii) 9 fuel assemblies as described in 5(b)(1)(viii) and one structure as described in 5(b)(1)(x).

5. (b) (2) Contents (cont'd)

(viii) 4 fuel cells as described in 5(b)(1)(xi); or
2 fuel cells as described in 5(b)(1)(xi) and
2 fuel cells as described in 5(b)(1)(xii).

(ix) 6 fuel assemblies as described in 5(b)(1)(xiii).

(x) 8 fuel cells as described in 5(b)(1)(xiv).

(xi) 4 fuel cells as described in 5(b)(1)(xv) plus
2 corner fuel cells or 1 RFA fuel cell.

(xii) 4 fuel modules as described in 5(b)(1)(xvi).

(3) Shipments shall be further limited by thermal requirements as follows:

(i) Shipment of contents in 5(b)(1)(iv) and 5(b)(1)(v) and limited in 5(b)(2)(iii) shall be made no earlier than 75 days after shutdown and shall have a decay heat load not to exceed 33,500 Btu/hr per shipment.

(ii) Shipment of contents specified in 5(b)(1)(vi) and 5(b)(1)(vii) and limited in 5(b)(2)(iv) shall be made in a stainless steel M-130 container and shall have a decay heat load not to exceed 18,960 Btu/hr per shipment.

(iii) Shipment of contents specified in 5(b)(1)(viii), 5(b)(1)(ix) and 5(b)(1)(x) and limited in 5(b)(2)(v), 5(b)(2)(vi) and 5(b)(2)(vii) shall be made at a time after shutdown as determined from Bettis Atomic Power Laboratory report WAPD-OP(PP)S-4401 dated June 29, 1979 and shall have a decay heat load not to exceed 28,620 Btu/hr for the shipboard core and 30,000 Btu/hr for the prototype core.

(iv) Shipment of contents specified in 5(b)(1)(i), 5(b)(1)(ii) shall be made no earlier than 72 days after shutdown and shall have a decay heat load not to exceed 33,500 Btu/hr per shipment.

(v) Shipment of contents specified in 5(b)(1)(xi) or 5(b)(1)(xii) as limited by 5(b)(2)(vii) shall have a fully loaded container head load not to exceed 15,400 Btu/hr per shipment.

(vi) Shipment of contents specified in 5(b)(1)(xiii) and limited in 5(b)(2)(ix) shall have a heat load not to exceed 23,800 Btu/hr and shall be made no earlier than 92 days after shutdown.

5. (b) (3) Contents (cont'd)

(vii) Shipment of contents specified in 5(b)(1)(xiv) and limited in 5(b)(2)(x) shall have a heat load not to exceed 22,400 Btu/hr and shall be made no earlier than 122 days after shutdown.

(viii) Shipment of contents specified in 5(b)(1)(xv) and limited in 5(b)(2)(xi) shall have a heat load not to exceed 19,100 Btu/hr and shall be made no earlier than 420 days after shutdown.

(ix) Shipment of contents specified in 5(b)(1)(xvi) and limited in 5(b)(2)(xii) shall have a heat load not to exceed 6,000 Btu/hr and shall be made no earlier than 50 days after shutdown.

(c) Fissile Class III

Maximum number of packages per shipment: One

6. For shipments involving the contents specified in 5(b)(1)(ii) or 5(b)(1)(iii) the Model No. M-130 package shall be inspected to verify that boron poison plates are in the module holders.

7. For shipments involving the contents specified in 5(b)(1)(viii), 5(b)(1)(ix) or 5(b)(1)(x) the thermocouples and thermocouple cases if included or the vacant module holder shall be located in the mid-position of either cage and module holder assembly.

8. Shipments shall be made in the dry condition, except for residual water as limited in 5(b)(1), 5(b)(3)(v), and 5(b)(3)(vii).

9. Container number three (M-130-3) has been modified by adding two 4-inch thick by 8-inch wide steel plates welded between fins 25 and 50 and between fins 110 and 135 at approximately 14.75 inches from the bottom of the container. The cooling fins in this localized area are removed to permit attachment of the plate directly to the outer shell of the container.

10. Container number four (M-130-4) has been modified by adding a 2-inch thick by 4-inch wide steel plate welded between fins 32 and 49 at approximately 18.4 inches from the bottom of the container. The cooling fins in this localized area are removed to permit attachment of the plate directly to the outer shell of the container.

11. Containers M-130-3, M-130-4 and M-130-10 may be used for the contents specified in 5(b)(1)(viii) and 5(b)(1)(x) only.

12. Container M-130-11 may be used for NR-1 shipments only.

13. Expiration date: December 31, 1992.

REFERENCES

Safety analysis report for M-130 shipping container, MAO-E8-703 dated December 30, 1968.

Supplements: Naval Reactors letters A#2256 dated February 24, 1969 and G#1931 dated March 3, 1969; General Electric Company letter ONP-74520-526 dated April 3, 1972; Naval Reactors letter G#3207 dated April 27, 1972; General Electric Company letter ONP-74520-528 dated April 28, 1972; Naval Reactors letter G#3250 dated June 6, 1972; General Electric Company letters ONP-74570-638 dated October 25, 1972; ONP-74570-654 dated December 4, 1972; ONP-74570-666 dated December 12, 1972; ONP-74570-682 dated January 12, 1973; ONP-74570-698 dated January 31, 1973; ONP-74570-687 dated February 6, 1973; ONP-74390-65 dated March 26, 1973; DLGN-85570-854 dated September 24, 1973; DLGN-85570-901 dated January 10, 1974; Naval Reactors letter G#4061 dated January 29; 1974; General Electric Company letters DLGN-85570-924 dated February 15, 1974; DLGN-85570-923 dated March 6, 1974; DLGN-85570-963 dated May 24, 1974; Naval Reactors letter G#4991 dated November 25, 1975; General Electric Company letters ONP-74340-JTT-73 dated December 17, 1975; CGN-85570-1145 dated September 9, 1976; CGN-85570-1146 dated September 10, 1976; CGN-85570-1148 dated September 14, 1976; Bettis Atomic Power Laboratory letter WAPD-R(K)-1378 dated August 30, 1976; WAPD-OP(PP)S-4401 dated June 29, 1979; Naval Reactors letters G#6197 dated July 13, 1979; G#7136 dated March 17, 1982; Naval Reactors letter G#7022 dated July 14, 1981 and WAPD-LD-(CES)SE-181 dated September, 1981; WAPD-LP(CES)SE-96 dated February, 1982, WAPD-LP-(CES)SE-170 dated July 1981; Naval Reactors letter G#7160 dated May 18, 1982; Naval Reactors letter G#7582 dated September 7, 1983. Naval Reactors letter G#C87-5692 dated September 7, 1987; Naval Reactors letter G#C87-5689 dated September 23, 1987; and Naval Reactors letters G#C87-6008 dated January 19, G#C88-5931 dated May 12, and G#C88-5961 dated July 25, 1988. Naval Reactors letter G#C89-2863 dated August 11, 1989.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Charles E. MacDonald, Chief
Transportation Branch
Division of Safeguards and
Transportation, NMSS

Date: OCT 18 1989

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

Approval Record
M-130 Shipping Container
Certificate of Compliance No. 6003
Revision No. 11

By application dated August 11, 1989, Naval Reactors (NR), U.S. Department of Energy, requested an amendment to Certificate of Compliance No. 6003 to modify container no. 3 (M-130-3) to add additional shielding. The additional shielding would consist of two 8-inch high, 39-inch wide, 4-inch thick steel plates welded to the outside shell of the M-130-3 container. The application also requested that the contents of the M-130-3 container be limited to S3G spent fuel.

The additional shielding is being added because of two defects discovered during x-ray examination. The defects consist of either void spaces or regions of foreign material. Both defects are approximately 0.12 inch thick, and have a maximum depth of 9 inches. The defects in the lead shielding are located approximately 14-3/4 inches above the bottom of the container in an area which would correspond to the surface formed between lead pours.

The applicant calculated dose rates for the modified M-130-3 container for normal and accident conditions for S3G spent fuel. The applicant's calculations for dose rates in the area of the worse defect are summarized in the following table:

Dose Rates for Shipment of S3G Spent Fuel
in Modified M-130-3 Container
(Mrem/hr)

	Applicant	Regulatory Limit
Normal condition		
surface	126	200
two meters	9.1	10
Accident condition		
one meter	18	1000

Staff agrees with the applicant that the modified M-130-3 container meets the shielding requirements of 10 CFR Part 71 for shipment of S3G fuel.

Cooling fins in the areas where the plates are attached will be removed so that the plates can be welded directly to the container outer shell. Removal of these cooling fins will not have a significant impact on the container's thermal behavior during normal or accident conditions, since the number of fins removed is a small fraction of the total.

The NRC staff agrees that the amendment meets the requirements of 10 CFR Part 71.

Charles E. MacDonald, Chief
Transportation Branch
Division of Safeguards
and Transportation, NMSS

Date: OCT 19 1989