NRC FORM 618
(8-85)
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	16	USA/6003/B( )F	1	7

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 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)

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.

(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.

(xvii) ATC fuel modules with or without control rods.

(xviii) A1W-3 recoverable irradiated fuel modules. Fuel modules that use control rods shall have control rods inserted.

(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).

(xiii) 10 fuel modules as described in 5(b)(1)(xvii).

(xiv) For contents described in 5(b)(1)(xviii), 6 fuel modules, or
8 fuel modules, as described in supplement dated March 30, 1992.

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

(i) Shipment of contents specified 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 28,020 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 heat 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.

(x) Shipment of contents specified in 5(b)(1)(xvii) and limited in 5(b)(2)(xiii) shall have a heat load not to exceed 27,400 Btu/hr and shall be made no earlier than 195 days after shutdown.

(xi) Shipment of contents specified in 5(b)(1)(xviii) and limited in 5(b)(2)(xiv) shall have a heat load not to exceed 43,800 BTU/hr and shall be made no earlier than 400 days, or 175 days for A1W-3E and A1W-3J fuel, after shutdown.

(c) Fissile Class — III

Maximum number of packages per shipment:

Except for the contents described in 5(b)(1)(viii) and limited in 5(b)(2)(v)	One (1)
For the contents described in 5(b)(1)(viii) and limited in 5(b)(2)(v)	Two (2)

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).

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, M-130-6, and M-130-7 may be used for the contents specified in 5(b)(1)(viii) and 5(b)(1)(x) only. Containers M-130-10 and M-130-15 may be used for the contents specified in 5(b)(1)(viii), 5(b)(1)(x) and 5(b)(1)(xviii) only.

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

13. For shipments involving the contents specified in 5(b)(1)(xvii) which do not contain a full complement of fuel modules (i.e. one position is occupied by either two flux thimbles or a vacant fuel module holder with pocket shield plug), that position shall be located in the middle module holder of either half of the cage assembly.

14. Expiration date: December 31, 1997.

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-74570-635 dated October 25, 1972; ONP-74570-654 dated December 4, 1972; ONP-14570-666 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-85570-969 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 2, 1987; Naval Reactors letter G#C87-5689 dated September 23, 1987; and Naval Reactors letters G#C87-8008 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; Naval Reactor letter G#C89-2825 dated March 29, 1989; Naval Reactors letter G#C92-03392 dated March 30, 1992; Naval Reactors letter G#92-03729 dated October 20, 1992; and Naval Reactors letter G#C93-10935 dated October 8, 1993.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Cass R. Chappell

Cass R. Chappell, Section Leader
Cask Certification Section
Storage and Transport Systems Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Date: JAN 13 1994

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

APPROVAL RECORD

Model No. M-130
Certificate of Compliance No. 6003
Revision No. 16

By application dated October 8, 1993, Naval Reactors requested that Certificate of Compliance No. 6003, for the Model No. M-130 package, be amended to reduce the minimum decay time for the A1W-3E and A1W-3J fuel elements from 400 days to 175 days. The 175 days corresponds to the minimum decay period assumed in the thermal analysis. The analysis method is the same as the previous application for the A1W-3 fuel.

The applicant used the SPENT computer program to calculate the new gamma source strength. The decreased decay time is due to using more realistic reactor power assumptions based on a longer actual power history. The assumed remaining power history to shutdown is conservative. The applicant calculated the source term and dose rates for both 175 days and 300 days.

For the gamma-ray evaluation, the applicant used the SPAN computer program to calculate the dose rates. The analysis used energy dependent build-up factors for iron, except in the bottom corner puncture where the build-up factor is for a material with an atomic number of 50. Since the previous neutron source strengths are conservative and not affected by the new power history, the neutron radiation levels were increased to account for the shorter decay time. The applicant performed dose rate calculations for both normal and accident conditions of transport.

The estimated normal condition dose rates at the package surface and 2 meters from the package surface are less than the regulatory limits of 200 and 10 mrem/hr, respectively.

The accident condition analysis assumed that all of the lead ran out of the package. The maximum calculated dose rate at one meter from the package surface is below the regulatory limit of 1000 mrem/hr.

The Description, Drawings, and Condition number 8 were updated to remove specifications for the LWBR fuel content that was deleted on August 30, 1988.

The changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Cass R. Chappell

Cass R. Chappell, Section Leader
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Date: JAN 13 1994