

CERTIFICATE OF COMPLIANCE  
FOR RADIOACTIVE MATERIALS PACKAGES

1. CERTIFICATE NUMBER	2. REVISION NUMBER	3. PACKAGE IDENTIFICATION NUMBER	4. PAGE NUMBER	5. TOTAL NUMBER PAGES
9186	6	USA/9186/B( )F	1	4

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)

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

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

Safety Analysis for Shipping S8G Power Units  
in the S-6213 Container, Rev. 7, dated  
June 16, 1975, as supplemented.

c. DOCKET NUMBER 71-9186

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.: S-6213 Power Unit Shipping Container
- (2) Description

A power unit shipping container (PUSC) for shipment of a power unit complete with control rods and control rod drive mechanisms installed.

The PUSC consists of a carbon steel cylindrical shell approximately 9-1/4 feet in outside diameter by 39-1/2 feet long, including hemispherical steel end impact limiters, with 10-3/4-foot outside diameter central flanges joining the barrel and cover halves. A power unit is supported in the PUSC by a centrally located thick circular steel plate (PU head) which is clamped between the central mating flanges of the PUSC and fastened by 94, 2-inch diameter high strength studs. The upper and lower extremities of the power unit cantilever into the barrel and cover halves without additional support except for the longest control rod drive mechanisms (S8G Power Unit Type B only). A lower support adapter is installed in the barrel end of the container during shipment of the S6W prototype power unit and the S6W shipboard power unit.

The PUSC is shipped in the horizontal position on a support frame which is secured to a specially built flatbed rail car. The PUSC, including frame and contents, weighs approximately 490,000 pounds for shipments of Type A and B, S8G power units.

The weight of the PUSC, including frame and contents is approximately 438,900 pounds for shipment of the S6W prototype power unit and 429,900 pounds for shipment of the S6W shipboard power unit.

CONDITIONS (continued)

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5. (a) Continued

(3) Drawings

The Model No. S-6213 PUSC is constructed in accordance with the Drawing Nos. specified in the attachment to this certificate.

(b) Contents

(1) Type and form of material

- (i) Unirradiated Naval Reactors Type A or B S8G power unit as described in Chapter 5 of the application and containing uranium enriched in the U-235 isotope.
- (ii) Unirradiated S6W prototype power unit or unirradiated S6W shipboard power unit as described in Chapter 6 of "S6W Prototype Power Unit in S-6213 Power Unit Shipping Container Safety Analysis Report". WAPD-REO(c)1219, Revision 1, and containing uranium enriched in the U-235 isotope.

(2) Maximum quantity of material per package

- (i) One Type A or Type B S8G power unit.
- (ii) One S6W prototype power unit or one S6W shipboard power unit.

(c) Fissile Class

III

Maximum number of packages per shipment One (1)

- 6. All control rods shall be restrained in the power unit fuel cells by the control rod holddown latches.
- 7. In addition to the requirements of Subpart G of 10 CFR Part 71, a determination shall be made, for each shipment, of the "g" forces that the package or packaging has been subjected to during transport.
  - (a) A nondestructive examination of the entire length of both inner and outer surfaces of the four tie-down support bracket-to-container wall butt welds shall be conducted:
    - (1) if the packaging (with or without contents) has been subjected to "g" forces in excess of 2 g's in any direction through the center of gravity of the package since the last inspection, and

CONDITIONS (continued)

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7. Continued

- (2) following the fourth shipment,\* and
- (3) after every second shipment\* following the fourth shipment.

\*This requirement shall not be construed to require an inspection if the previous shipment had been inspected in accordance with (7(a)(1)) above.

(b) The nondestructive examination in accordance with a written procedure may be by either:

(1) The liquid penetrant method in accordance with:

- (i) Article 6, Section V, ASME Code, or
- (ii) MIL-STD-271E, "Nondestructive Testing Requirements for Metals," Section 5, October 31, 1973, or
- (iii) NAVSHIPS 250-1500-1, "Welding Standard," Section 12.5

(2) or the magnetic particle method in accordance with:

- (i) Article 7, Section V, ASME Code (Yoke Technique; Dry Particle Method; direct or rectified current), or
- (ii) MIL-STD-271E, Section 4; specifically 4.3.1 (General) and 5.6.1 (coatings), 4.3.3 (Dry Powder), 4.3.3.3.6 (Continuous), and 4.3.3.3 (Procedure) as excepted by using direct or rectified current, 4.3.3.3.3 (Yoke Technique), 4.3.2.5 (sensitivity and cleaning), and 4.3.1.3 (smoothness), or
- (iii) NAVSHIPS 250-1500-1, Section 12.4, 12.4.1 (General), 12.4.3 (Dry powder), 12.4.3.3.2.1 (Yoke Technique) using direct or rectified current.

(c) If any indications, as defined in accordance with either:

- (i) Paragraph UA-93(a), Appendix VIII, Division 1, Section VIII, ASME Code (with 7(b)(2)(i), above), or
- (ii) Paragraphs UA-72 and UA-73, Appendix VI, Division 1, Section VIII, ASME Code (with 7(b)(2)(i), above), or

CONDITIONS (continued)

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- (iii) Class 1 acceptance criteria of NAVSEA 0900-LP-003-8000, "Surface Inspection Acceptance Standards for Metal," with Change 2, July 1, 1974 (with 7(b)(1)(ii) or 7(b)(2)(ii), above), or
- (iv) NAVSHIPS 250-1500-1, Section 10.3.2 (with 7(b)(1)(iii) or 7(b)(2)(iii), above), as noted,

are detected, the packaging shall be repaired and reinspected prior to use and shall be inspected prior to each shipment thereafter. Any defects shall be reported in accordance with 10 CFR §71.95.

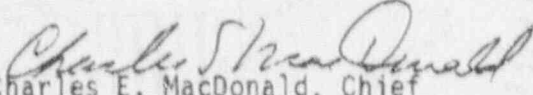
8. Expiration date: July 31, 1992

REFERENCES

U.S. Naval Reactors application dated July 24, 1975.

Supplements dated: June 3, 1977; and July 24, 1978, Naval Reactors letter G#C89-2838, dated May 22, 1989, and Naval Reactors letter G#C90-03664, dated September 5, 1990.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

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

Date: JAN 16 1991

ATTACHMENT

The packaging is constructed in accordance with Bingham-Willamette Co.  
Drawing Nos.:

F-358, Sh. 1 of 1, Rev. A  
F-372, Sh. 1 of 1, Rev. A  
F-373, Sh. 1 and 2 of 2, Rev. A  
F-374, Sh. 1 of 1, Rev. A  
F-376, Sh. 1 of 1, Rev. A  
F-377, Sh. 1 of 1, Rev. A  
F-404, Sh. 1 of 1, Rev. J  
F-405, Sh. 1 of 1, Rev. G  
F-406, Sh. 1 of 1, Rev. J  
F-408, Sh. 1 of 1, Rev. K  
F-409, Sh. 1 of 1, Rev. J  
F-424, Sh. 1 of 1, Rev. J  
F-425, Sh. 1 of 2, Rev. L  
F-425, Sh. 2 of 2, Rev. H  
F-494, Sh. 1 of 2, Rev. J  
F-495, Sh. 1 of 2, Rev. M  
F-495, Sh. 2 of 2, Rev. M  
F-496, Sh. 1 of 1, Rev. N

The S8G power unit contents are as shown in Royal Industries, Inc.,  
Drawing No. 130J039, Sh. 1 of 2 Rev. M and General Electric Drawing Nos.:

127D9647, Sh. 1 and 2 of 4, Rev. C  
284E809, Rev. 0  
291E201, Sh. 1 through 3 of 3, Rev. F  
291E234, Rev. C  
291E246, Sh. 1 and 2 of 2, Rev. C  
291E258, Rev. C  
291E284, Rev. C  
294E810, Sh. 1 of 2, Rev. C  
294E811, Sh. 1 of 2, Rev. C  
294E812, Rev. C  
294E902, Sh. 1 of 4, Rev. N  
294E902, Sh. 2 of 4, Rev. M  
294E902, Sh. 3 of 4, Rev. K  
294E902, Sh. 4 of 4, Rev. N  
294E912, Sh. 1 and 2 of 2, Rev. J  
294E930, Sh. 2 of 2, Rev. 0

ATTACHMENT (Continued)

294E963, Sh. 1 through 3 of 3, Rev. B  
294E966, Sh. 2, 4, 5, and 8 of 8, Rev. B  
296E204, Rev. B  
296E261, Sh. 2 of 2, Rev. C  
299E411, Rev. B  
299E412, Rev. D  
7543E10, Rev. J  
7543E23, Sh. 1 of 2, Rev. D  
7543E27, Sh. 1 and 2 of 4, Rev. C  
7543E29, Sh. 1 and 2 of 3, Rev. C  
7543E30, Rev. A  
7543E65, Rev. E  
7543E68, Rev. O  
7543E83, Rev. O

The S6W prototype power unit contents are shown in Westinghouse Electric Corporation Drawings Nos.:

3D39624, Rev. B  
3D39627, Rev. A  
1480J01, Rev. C  
1480J63, Sheets 1 through 12, Rev. B  
1755E07, Sheets 1 through 4, Rev. O  
1755E08, Sheets 1 through 6, Rev. O  
1927E02, Rev. A  
2501F02, Rev. O  
2501F12, Rev. O  
2501F13, Rev. O  
2501F14, Rev. O  
8418C26, Rev. O  
8418C27, Rev. O  
8418C28, Rev. O

The S6W shipboard power unit contents are as shown in Westinghouse Electric Corporation Drawing Nos.:

3D39625, Sheets 1 and 2, Rev. C  
3D39626, Rev. B  
3D39627, Rev. A  
1480J01, Rev. C  
1480J88, Sheets 1 through 4, Rev. B  
1936F43, Sheets 1 through 8, Rev. J  
1582E81, Sheets 1, 2, 4, and 5 of 9, Rev. J  
1582E81, Sheets 3, 6, 8, and 9 of 9, Rev. H  
1582E81, Sheets 7 of 9, Rev. F



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

APPROVAL RECORD

Model No. S-6213 Power Unit Shipping Container  
Certificate of Compliance No. 9186  
Revision No. 6

By application dated September 5, 1990, Naval Reactors requested that Certificate of Compliance No. 9186 for the Model No. S-6213 Power Unit Shipping Container be amended to include the S6W shipboard power unit as authorized contents.

The S6W shipboard power unit is nearly identical to the S6W prototype power unit, which was previously approved as authorized contents. The total weight of the shipboard package is approximately 1% less than the weight of the prototype package. Because of the similarity of the two packages, many of the analyses performed for the prototype unit package were applicable to the shipboard unit package and were not repeated in the application. The application provided additional analyses to address the structural differences between the two packages, which included a smaller diameter closure head and core barrel for the shipboard power unit.

Based on the structural analyses the only significant damage to the container results from the 30 foot side drop accident. Some localized yielding occurs, but the power unit remains intact and the fuel configuration remains unchanged. During the thirty foot side drop, the inert atmosphere within the container could be lost due to the localized main flange deformation. Loss of the seal of the container would not affect the safety of the shipment. There would be no release of radioactive contents since the fuel remains intact. The loss of the seal does not affect the criticality safety of the package since criticality analyses were performed assuming water inleakage into the package. Criticality analyses were also performed assuming that the control rods were withdrawn a distance greater than the maximum withdrawal distance which could occur due to hypothetical accident conditions.

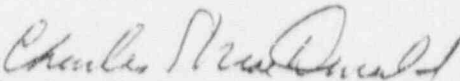
Damage to the package due to the puncture accident was limited to slight deformation of the core barrel, and no contact with the fuel modules was expected. Penetration of the core barrel nozzles by the puncture pin was prevented by protective plates welded to the container at the locations of the nozzles.

The prototype power unit components were evaluated for brittle fracture due to the worst case stresses occurring in any thirty foot drop. The shipboard power unit has the same acceptable design margins against brittle fracture.

The fissile loading in the shipboard unit was slightly higher than the prototype unit. The previous criticality analyses for the S6W prototype unit conservatively used the fissile loading of the shipboard unit. The analyses showed that the shipboard unit contents meet the criticality safety requirements for fissile material packages.

The Certificate of Compliance package identification number was changed from USA/9186/AF to USA/9186/B( )F. This was a correction in the identification number, since the package had been previously evaluated and approved for Type B quantities of radioactive materials.

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

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

JAN 16 1991

Date \_\_\_\_\_