

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIALS PACKAGES**

1. a. CERTIFICATE NUMBER 9033	b. REVISION NUMBER 7	c. PACKAGE IDENTIFICATION NUMBER USA/9033/B(II)	d. PAGE NUMBER 1	e. TOTAL NUMBER PAGES 2
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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):
 - b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION:

Amersham Corporation
40 North Avenue
Burlington, MA 01803

Amersham Corporation application dated
December 1, 1989, as supplemented.

c. DOCKET NUMBER 71-9033

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.: 660, 660B and 660E
- (2) Description

A steel encased uranium shielded Gamma Ray Projector. Primary components consist of an outer steel shell, polyurethane potting material, uranium shield, "S" tube, and end plugs. The contents are securely positioned in the "S" tube by a source cable locking device and shipping plug. Tamper-proof seals are provided on the packaging. The maximum total weight of the package is approximately 53 pounds.

(3) Drawings

The packaging is constructed in accordance with:

- (i) Technical Operations, Inc. Drawing No. 66025, Sheets 1, 2 and 3, Rev. D. or
- (ii) Technical Operations, Inc. Drawing No. 66025, Sheets 1, 2 and 3, Rev. B, and Sheet 4, Rev. -.

(b) Contents

(1) Type and form of material

Iridium-192 sources which meet the requirements of special form radioactive material.

(2) Maximum quantity of material per package

- (i) 140 Curies for packages constructed in accordance with 5(a)(3)(i) or
- (ii) 120 Curies for packages constructed in accordance with 5(a)(3)(ii).

CONDITIONS (continued)

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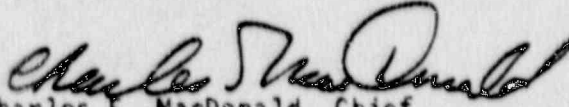
6. The source assembly for use with this packaging is limited to Technical Operations, Inc. Model No. 424-9 as shown in Technical Operations, Inc. Drawing No. 42409, Rev. B.
7. The name plate must be fabricated of materials capable of resisting the fire test of 10 CFR Part 71 and maintaining its legibility.
8. In addition to the requirements of Subpart G of 10 CFR Part 71:
 - (a) The package must meet the Acceptance Test and Maintenance Program of Chapter 8.0 of the application, as supplemented; and
 - (b) The package shall be prepared for shipment in accordance with the Operating Procedures in Chapter 7.0 of the application, as supplemented.
9. The package authorized by this certificate is hereby approved for use under general license provisions of 10 CFR §71.12.
10. Expiration date: October 31, 1995

REFERENCES

Amersham Corporation Application dated December 1, 1989.

Supplements dated: April 24, August 23, September 6 and September 17, 1990.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


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

Date: OCT 5 1990



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

APPROVAL RECORD
Model Nos. 660, 660B and 660E
Certificate of Compliance No. 9033
Revision 7

By application dated December 1, 1989, as supplemented, Amersham Corporation requested an amendment to Certificate of Compliance No. 9033 for the Model Nos. 660, 660B and 660E package. The amendment was requested to allow the following modifications to the package: (1) a new lock assembly with an automatic locking feature; (2) an improved uranium shield weighing 37 lbs., thus, increasing the package gross weight to 53 lbs; (3) a new shell manufactured from stainless steel with an unpainted finish, and (4) an increase in the maximum quantity of Iridium-192 to 140 Curies.

In support of their application, the applicant submitted a consolidated Safety Analysis Report (SAR). The staff reviewed the consolidated SAR and determined that it was complete.

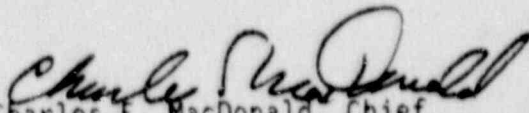
To demonstrate the adequacy of the modifications with respect to the structural performance requirements of 10 CFR Part 71, the applicant conducted a series of 30-foot drop and puncture tests on the package. In the 30-foot drop test, the package struck the target with the center of gravity over the locking assembly. Following the 30-foot drop test, the package was dropped twice onto the puncture pin per 10 CFR Part 71. In the first puncture test, the package impacted the pin squarely on the shipping cap of the locking assembly. In the second puncture test the package impacted the pin at the same spot as the 30-foot drop test. Results indicated no release of the package contents. Subsequent shielding tests showed that the combination of the 30-foot drop and puncture tests did not reduce the package's shielding efficiency.

The package shielding is provided by 37 pounds of depleted uranium. To show that this is adequate shielding for up to 140 Ci of Ir-192, the applicant performed a radiation survey of a package containing 107 Ci of Ir-192 and extrapolated the results to 140 Ci. Results of this analysis showed that, for the maximum capacity, the radiation levels remain below the regulatory limits. Independent analysis performed by the staff confirmed the applicant's results.

The Operating Procedures and the Acceptance Tests and Maintenance Program were presented in Chapters 7 and 8, respectively, of the application, as supplemented. These were reviewed by the staff and were found to be adequate. The Certificate of Compliance has been conditioned to require that the package be prepared for shipment in accordance with Chapter 7 of the application and be acceptance tested and maintained in accordance with Chapter 8 of the application.

The certificate authorizes use of the old package design, as fabricated in accordance with Technical Operations, Inc. Drawing No. 66025, Sheets 1, 2 and 3, Rev. B, and Sheet 4, Rev. -, and the modified package design, as fabricated in accordance with Technical Operations, Inc. Drawing No. 66025, Sheets 1, 2 and 3, Rev. D.

The staff concludes that the 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

Date: OCT 5 1966