

U.S. NUCLEAR REGULATORY COMMISSION
CERTIFICATE OF COMPLIANCE
For Radioactive Materials Packages

1.(a) Certificate Number	9139	1.(b) Revision No.	0	1.(c) Package Identification No.	USA/9139/A	1.(d) Pages No.	1	1.(e) Total No. Pages	
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2. PREAMBLE

- 2.(a) This certificate is issued to satisfy Sections 173.393a, 173.394, 173.395, and 173.396 of the Department of Transportation Hazardous Materials Regulations (49 CFR 170-189 and 14 CFR 103) and Sections 146-19-10a and 146-19-100 of the Department of Transportation Dangerous Cargoes Regulations (46 CFR 146-149), as amended.
- 2.(b) The packaging and contents described in item 5 below, meets the safety standards set forth in Subpart C of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Materials for Transport and Transportation of Radioactive Material Under Certain Conditions."
- 2.(c) 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—

3.(a) Prepared by (Name and address):
General Electric Company
P.O. Box 460
Pleasanton, CA 94566

3.(b) Title and identification of report or application:
General Electric Company application dated
March 24, 1980, as supplemented.

3.(c) Docket No. 71-9139

4. CONDITIONS

This certificate is conditional upon the fulfilling of the requirements of Subpart D of 10 CFR 71, as applicable, and the conditions specified in item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Fissile Class, Other Conditions, and References:

(a) Packaging

- (1) Model No.: 589
- (2) Description

A steel encased lead shielded cask for low specific activity radioactive material. The cask is a right circular cylinder with 79-inch OD by 80-inch height, and a cavity 74-inch ID by 74-inch height. The 1.5-inch thick lead shield is supported by outer and inner carbon steel shells 0.75-inch and 0.375-inch thick, respectively. The bottom 1.56-inch thick lead shield is supported by outer and inner carbon steel plates 1.0-inch and 0.375-inch thick, respectively. The 1.5-inch thick lead lid shield is supported by outer and inner carbon steel plates 1-inch and 0.5-inch thick, respectively. The carbon steel used is SA516, Grade 70. The lid is attached to the cask with eight (26,000 lb proof load each) ratchet type load binders and sealed with a Buna "N" O-ring. The cask is equipped with a 3/4-inch drain line, sixteen-hole bolt-down flange (1-inch bolts) and two, 2-1/2-inch diameter lifting lugs. The cask lid seal and lifting lugs are protected by a wooden sacrificial impact limiter (about 8 x 10 inches thick). Gross weight of package and impact limiter, 50,000 lbs.

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5. (a) Packaging (continued)

(3) Drawing

The packaging is constructed in accordance with PX Engineering Company Inc. Drawing No. 589-L, Sheets 1 through 3, Revision No. 0.

(b) Contents

(1) Type and form of material

Cement solidified material in sealed secondary containers or solid irradiated hardware, meeting the requirements for low specific activity radioactive material.

(2) Maximum quantity of material per package

Greater than Type A quantities of radioactive material with the weight of the contents, secondary containers and shoring not exceeding 20,150 pounds.

6. Shoring shall be placed between secondary containers (or activated components) and the cask cavity to prevent movement during normal conditions of transport.
7. The lid lifting lugs shall not be used for lifting the cask and shall be covered in transit.
8. The packaging acceptance tests and maintenance program shall be in accordance with Section 7.0 of the application except:
 - (a) The lid O-ring seal shall be replaced if inspection prior to each shipment shows any defects or every twelve (12) months, whichever occurs first.
 - (b) During inactive periods, the maintenance and testing frequency may be disregarded provided that the packaging is brought into full compliance prior to the next use of the package.
9. The package authorized by this certificate shall be transported on a motor vehicle, railroad car, aircraft, inland water craft, or hold or deck of a seagoing vessel assigned for sole use of the licensee.

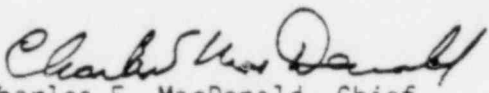
10. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.12(b).
11. Expiration date: July 31, 1985.

REFERENCES

General Electric application dated March 24, 1980.

Supplement dated: May 29, 1980.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


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

Date: JUL 22 1980

U. S. Nuclear Regulatory Commission
Division of Fuel Cycle and Material Safety

Safety Evaluation by the
Transportation Certification Branch

GENERAL ELECTRIC COMPANY, MODEL NO. 589 CASK

SUMMARY

By application dated March 24, 1980, General Electric Company requested approval to deliver low specific activity radioactive material to a carrier for transport in the Model No. 589 shipping cask. A subsequent submittal, indicated below, transmitted additional information and revisions to the original application. Based on the statements and representations as contained in the application, as supplemented, we have concluded that the contents and packaging meet the requirements of 10 CFR Part 71 subject to the conditions stated below.

SUBMITTALS

1. General Electric Company application dated March 24, 1980.
2. Supplement dated May 29, 1980.

DRAWING

The packaging is constructed in accordance with PX Engineering Company, Inc. Drawing No. 589-L, Sheets 1 through 3, Revision No. 0.

PACKAGE DESCRIPTION

A steel encased lead shielded cask for low specific activity radioactive material. The cask is a right circular cylinder with 79-inch OD by 80-inch height, and a cavity 74-inch ID by 74-inch height. The 1.5-inch thick lead shield is supported by outer and inner carbon steel shells 0.75-inch and 0.375-inch thick, respectively. The bottom 1.56-inch thick lead shield is supported by outer and inner carbon steel plates 1.0-inch and 0.375-inch thick, respectively. The 1.5-inch thick lead lid shield is supported by outer and inner carbon steel plates 1-inch and 0.5-inch thick, respectively. The carbon steel used in SA516, Grade 70. The lid is attached to the cask with eight (26,000 lb proof load each) ratchet type load binders and sealed with a Buna "N" O-ring. The cask is equipped with a 3/4-inch drain line, sixteen-hole bolt-down flange (1-inch bolts) and two, 2-1/2-inch diameter lifting lugs. The cask lid seal and lifting lugs are protected by a wooden sacrificial impact limiter (about 8 x 10 inches thick). Gross weight of package and impact limiter, 50,000 lbs.

PACKAGE CONTENTS

(A) Type and form of material:

Cement solidified material in sealed secondary containers or solid irradiated hardware meeting the requirements for low specific activity radioactive material.

(B) Maximum quantity of material per package

Greater than Type A quantities of radioactive material with the weight of the contents, secondary containers and shoring not exceeding 20,150 pounds.

CONTAINMENT

The primary containment vessel is the inner cask shell and its closures. The primary containment vessel is sealed at top end with a cask lid, sealed with a Buna "N" O-ring. The bottom end is welded closed to a steel plate. Adequacy of the containment system to meet Regulatory Guide 7.4 is demonstrated by first use and annual leak tests.

STRUCTURAL

The applicant has performed various structural analyses, engineering evaluations, and drop test to satisfactorily demonstrate the package has adequate structural integrity to meet the requirements of 10 CFR Part 71. The staff agrees with the applicant's conclusion that the package has adequate structural integrity to meet the requirements of 10 CFR Part 71 subject to the conditions listed below.

A. General Standards for All Packaging

Chemical and Galvanic Reaction

There is no significant chemical, galvanic, or other reaction among the packaging components, or between the packaging components and the package contents.

Positive Closure

The closure of the cask lid is provided by eight ratchet-type load binders. The drain is sealed with a shielded 3/4-inch pipe plug.

Lifting Devices

- (1) Two lifting trunnions are shown by both analysis and a test to be capable of lifting three times the maximum package weight without exceeding material yield stress in any material of the packaging.
- (2) It is also shown by analysis that the lid lifting devices are capable of supporting three times the weight of the lid and any attachments without generating stress in any material of the lid in excess of its yield strength.
- (3) The lid and impact limiter lifting hooks are securely covered with sheet metal covers during transport to prevent their unintentional use.
- (4) The staff agrees with the applicant's conclusion that failure of lifting devices under excessive loads would not result in significant loss of packaging effectiveness or release of radioactive materials.

Tie-Down Devices

Applicant has shown by analysis that the tie-down devices which are structural parts of the package are adequately designed to meet the regulatory requirements of 10 CFR §71.31.

B. Structural Standards for Type B and Large Quantity Packaging

Load Resistance

The package is shown by analysis to be capable of withstanding statically five times of its fully loaded weight uniformly distributed along its length without generating stress in any material of the packaging in excess of its yield strength.

External Pressure

Applicant has shown by analysis that the packaging design meets the regulatory requirement.

C. Normal Conditions of Transport

Heat

The maximum package equilibrium temperature has been estimated to be 190°F. The effects of this temperature increase from the room temperature on material properties are insignificant and on stresses are not expected to cause the stresses to exceed material yield stress.

Cold

The stresses caused by thermal contraction under the cold (-40°F) environment are judged not to reduce packaging effectiveness substantially.

Pressure

The cask containment vessel has been shown to withstand atmospheric pressure considerably greater than 0.5 times standard atmospheric pressure.

Vibration

The staff agrees with the applicant's assessment based on tests and comparison with those packages in long service, that the normal transport vibration loading has no appreciable effect on containment and shielding effectiveness of the package.

Water Spray

Water spray will have no effect on the package.

One-Foot Free Drop

The potential problem areas such as the seal and trunnion areas that can cause containment and shielding problems are adequately protected from developing large impact stresses via an impact limiter.

The applicant has shown by analysis that the lid ratchet binders have sufficient strength to withstand a top end oblique drop impact loading with the package C.G. directly above the point of impact.

Based on these evaluations, the staff has concluded that under the drop impact loading, the packaging effectiveness will not be substantially reduced.

Corner Drop

Not applicable for this design case.

Penetration

The staff agrees with the applicant's judgement that this regulatory loading has insignificant adverse effects on the package design.

Compression

Not applicable to the present design case.

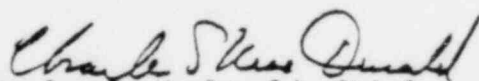
SHIELDING

The ability of the packaging to meet the shielding requirements of 49 CFR §173.393i or j will be demonstrated prior to each shipment by taking actual radiation measurements. Possibility of lead slumping has been negated by additional shielding material added to the lid.

CONDITIONS

The safety of the cask was confirmed by the Transportation Certification Branch on the basis of the following conditions:

1. Shoring shall be placed between secondary containers (or activated components) and the cask cavity to prevent movement during normal conditions of transport.
2. The lid lifting lugs shall not be used for lifting the cask and shall be covered in transit.
3. The packaging acceptance tests and maintenance program shall be in accordance with Section 7.0 of the application except:
 - (a) The lid O-ring seal shall be replaced if inspection prior to each shipment shows any defects or every twelve (12) months, whichever occurs first.
 - (b) During inactive periods, the maintenance and testing frequency may be disregarded provided that the packaging is brought into full compliance prior to the next use of the package.
4. The package authorized by this certificate shall be transported on a motor vehicle, railroad car, aircraft, inland water craft, or hold or deck of a seagoing vessel assigned for sole use of the licensee.


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

Date: JUL 22 1980