

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

1.(a) Certificate Number	1.(b) Revision No.	1.(c) Package Identification No.	1.(d) Pages No.	1.(e) Total No. Pages
9130	0	USA/9130/A	1	

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): Nuclear Packaging, Inc. 815 So. 28th Street Tacoma, WN 98409	3.(b) Title and identification of report or application: NUPAC application dated August 11, 1978, as supplemented.
	3.(c) Docket No. 71-9130

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.: NP-50-2.5L

(2) Description

A steel encased lead shielded cask for low specific activity radioactive material. The cask is a right circular cylinder 54.5 inches in diameter by 65.4 inches high with a 48.5-inch diameter by 52.5-inch high cavity. The walls of the cask contain a 2.5-inch lead thickness encased in 3/8-inch thick steel shells. The bottom and top covers of the cask are made up of two, 2-inch steel plates. The primary cask lid is secured to the cylindrical cask body by eight, 1-inch ratchet binders. A secondary cask lid is centered in the primary lid and is secured to the primary lid with eight, 3/4-inch studs. Each lid is provided with a Neoprene gasket seal. The cask is provided with four equally spaced lifting/tie down devices. Cask gross weight is 19,160 pounds.

(3) Drawing

The packaging is fabricated in accordance with Nuclear Packaging, Inc. Drawing No. X-20-2000, Sheets 1 and 2, Revision C.

(b) Contents

(1) Type and form of material

Solidified resins contained in secondary sealed containers meeting the requirements of low specific activity radioactive material.

(2) Maximum quantity of material per package

Greater than Type A quantities of radioactive material.

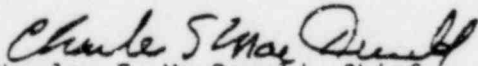
6. The package authorized by this certificate shall be transported on a vehicle, railroad car, aircraft, inland water craft, or hold or deck of a seagoing vessel assigned for sole use of the licensee.
7. Lid lifting devices shall be covered prior to transport to prevent its use as tie-down devices.
8. The package authorized for use by this certificate is hereby approved for use under license provision of 10 CFR §71.12(b).
9. Expiration date: October 31, 1980.

REFERENCES

Nuclear Packaging, Inc. application dated August 11, 1978.

Supplements dated: January 16 and December 20, 1979 and June 6, 1980.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

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

Date:         JUN 23 1980

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

Safety Evaluation by the  
Transportation Certification Branch

NUCLEAR PACKAGING, INCORPORATED, MODEL NO. NP-50-2.5L CASK

SUMMARY

By application dated August 11, 1978, Nuclear Packaging, Incorporated (NuPac) requested approval to deliver low specific activity material to a carrier for transport in the Model No. NP-50-2.5L shipping cask. Subsequent submittals, 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. NuPac application dated August 11, 1978.
2. NuPac supplement dated January 16, 1979.
3. NuPac supplement dated December 20, 1979.
4. NuPac supplement dated June 6, 1980.

DRAWING

The packaging is fabricated in accordance with Nuclear Packaging, Inc. Drawing No. X-20-200D, Sheets 1 and 2, Revision C.

PACKAGE DESCRIPTION

A steel encased lead shielded cask for low specific activity radioactive material. The cask is a right circular cylinder 54.5 inches in diameter by 65.4 inches high with a 48.5-inch diameter by 52.5-inch high cavity. The walls of the cask contain a 2.5-inch lead thickness encased in 3/8-inch thick steel shells. The bottom and top covers of the cask are made up of two, 2-inch steel plates. The primary cask lid is secured to the cylindrical cask body by eight, 1-inch ratchet binders. A secondary cask lid is centered in the primary lid and is secured to the primary lid with eight, 3/4-inch studs. Each lid is provided with a Neoprene gasket seal. The cask is provided with four equally spaced lifting/tie-down devices. Cask gross weight is 19,160 pounds.

### PACKAGE CONTENTS

(A) Type and form of material

Solidified resins contained in secondary sealed containers meeting the requirements of low specific activity radioactive material.

(B) Maximum quantity of material per package

Greater than Type A quantities of radioactive material.

### CONTAINMENT

The primary containment vessel is the inner cask shell and its closures. The primary containment vessel is sealed at top end with a primary and secondary cask lid each sealed with Neoprene gaskets. The bottom end is welded closed to a steel plate. Adequacy of the containment system to meet Regulatory Guide 7.4 was demonstrated by a full scale test.

### 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

Inadvertent opening of the package is prevented by means of positive closure devices. There are no other penetrations to the containment vessel.

Lifting Devices

- (1) Four lifting lugs are shown by analysis 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 primary and secondary lid lifting devices are capable of supporting three times the weight of lid and any attachments without generating stress in any material of the lid in excess of its yield strength.
- (3) The requirements of covering the lid lifting devices are met by imposing a licensing condition in the Certificate of Compliance.
- (4) The staff agrees with the applicant's conclusion that failure of lifting devices under excessive loads would not result in any 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 with a large safety margin.

### C. Normal Conditions of Transport

#### Heat

The maximum package equilibrium temperature has been estimated to be 176°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 vibration loading is judged not to have significant effects on packaging safety.

### Water Spray

Water spray will have no effect on the package.

### One-Foot Free Drop

The applicant's lead slump analysis results under the end drop impact loading may be nonconservative (underestimate lead slump) because the dynamic material strength values used were for higher drops. However, the stepped design of the package ends provides the maximum allowable slump, distance of 0.875 inch, which exceed greatly the analytically obtained maximum lead slump distance of 0.145-inch.

A top corner drop test of the package was performed to show that the design in the seal area is adequate to meet the containment requirement. The test results show that only small deformation of 0.06-inch was observed in the lid spacer ring/cask lip area. The seal remained leak-tight.

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.

The packaging is fabricated mainly from A-36 carbon steel. Fracture failure under the drop impact loading at a cold temperature environment was not addressed by the applicant. However, the limited use of this package (to October 31, 1980) should preclude the probability of container fracture failure.

Based on these calculations/evaluations/licensing conditions and engineering judgements, 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. Independent staff calculations show that a 0.145-inch lead gap at the top of the cask due to the Normal Conditions of Transport conditions will result in no significant increase in radiation levels.

CONDITIONS

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

1. The package authorized by this certificate shall be transported on a vehicle, railroad car, aircraft, inland water craft, or hold or deck of a seagoing vessel assigned for sole use of the licensee.
2. Lid lifting devices shall be covered prior to transport to prevent its use as tie-down devices.
3. Expiration date: October 31, 1980.

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

JUN 23 1980

Date: \_\_\_\_\_