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
9073	15	USA/9073/A	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)

Nuclear Packaging, Incorporated
1010 South 336th Street
Federal Way, WA 98003

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

Nuclear Packaging, Incorporated, application dated May 6, 1985, as supplemented.

c. DOCKET NUMBER 71-9073

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 Nos.: OH-142, OH-142 MKI, OH-142 MKIB, OH-142 MKII, and NUS 10-135

(2) Description

Steel encased, lead shielded casks for solid radioactive material. The overall dimensions of the casks are 101-inch diameter by 120-inch height. The casks consists of two concentric carbon steel cylindrical shells surrounding a 3-1/2-inch thick lead shield. The 1/2-inch thick inner shell has a 66-inch ID, and the 1- or 1-1/8-inch thick outer shell has a 76-1/4-inch OD; the base consists of two, 3-inch thick welded steel plates of 66- and 74-inch diameters. The base is either welded to the steel cylindrical shells or sealed and held by ratchet binders. A stepped welded lid, secured by eight ratchet binders or eight studs and nuts, is comprised of two, 3-inch thick steel plates containing openings for secondary lids of similar construction with at least one additional 1-inch thick upper plate. The containment cavity is 66 inches in diameter by 72 inches high. A plugged drain port is located at the cask bottom. The Model No. NUS 10-135 package design is provided with a lid test port in lieu of a cask drain line. Toroidal impact limiters are located at the top and bottom of the cask. The impact limiters are 10-gauge steel sheets filled with rigid polyurethane, and are equipped with fusible plastic plugs. As an option, interior and exterior surfaces of the cask body and interior surfaces of the upper lid may be covered with 12-gauge 304 stainless steel cladding and seal welded.

There are four alternate lid closure designs for the Model No. OH-142 Series casks. The designs are referred to as: 1) Baseline design, 2) Mark 1, 3) Mark 1 with bolt on lid, and 4) Mark 2.

5. (a) (2) Description (Continued)

Baseline closure design. Closure of the primary lid is accomplished by eight ratchet binders; and of the 24-inch (29-inch) secondary lid by eight, 7/8-inch (1-inch) diameter stud bolts. Both lids are sealed using silicone gaskets bonded to the lid plates. Lifting is facilitated with three lugs welded to the primary lid. The secondary lid has a redundant Neoprene seal, and a centrally located lift lug.

Mark 1 closure design. Closure of the primary lid is accomplished by eight ratchet binders, and a bonded silicone gasket provides the primary seal. Lifting is facilitated with three lugs welded to the primary lid. Six, 19-inch (or one, 16-inch, centered) diameter secondary lids with centers located on a 44-inch circle each have six, 3/4-inch diameter hex head bolts. They each have a primary bonded silicone seal, a redundant Neoprene seal, and a centrally located lift lug.

An alternate Mark 1 configuration utilizes eight, 1-3/8-inch studs and nuts for primary lid closure and two lifting lugs on the primary lid.

Mark 2 closure design. Closure of the primary lids located at the top and bottom of the cask is accomplished by eight ratchet binders, and a bonded silicone gasket on each primary lid provides a seal. Lifting is facilitated with three lugs welded to the upper primary lid. The upper lid contains a centrally located 24-inch (or 29-inch) diameter secondary lid comprised of two stepped and welded 3-inch steel plates above and below a 1-inch steel plate. Closure of the secondary lid is provided by eight, 7/8-inch (or 1-inch) diameter stud bolts. The secondary lid has a bonded silicone seal, a redundant Neoprene seal and three lift lugs.

The Model No. NUS 10-135 cask is nearly identical to the baseline Model No. OH-142 cask with a 29-inch diameter secondary lid.

All exposed side walls are coated with an intumescent material or covered with a stainless steel thermal barrier. Four skewed lugs, welded to the outer shell are used for tie-down. The package gross weight is approximately 64,000 pounds.

(3) Drawings

The Model No. OH-142 Series packagings are fabricated in accordance with Nuclear Packaging, Incorporated Drawing Nos.: OH-142 - Y-20-201D, Sheets 1 through 3, Rev. Q; OH-142 MKI - AL-20-202, Sheets 1 through 3, Rev. L; OH-142 MKIB - AL-20-203, Sheets 1 through 3, Rev. J; and OH-142 MKII - Y-20-202D, Sheets 1 through 3, Rev. M.

The Model No. NUS 10-135 packaging is fabricated in accordance with NUS Corporation Drawing No. 5025-M-2001, Sheets 1 and 2, Rev. B.

(b) Contents

(1) Type and form of material.

(i) Dewatered, solids, or solidified waste meeting the requirements for low specific activity material in secondary containers; or

(ii) Activated solid components meeting the requirements for low specific activity material in secondary containers.

(2) Maximum quantity of material per package.

Greater than Type A quantities of radioactive materials which may contain fissile contents not to exceed the generally licensed mass limits as specified in 10 CFR §§71.18, 71.20, and 71.22. Internal decay heat not to exceed 400 watts and the maximum weight of contents including secondary containers not to exceed 10,000 pounds.

6. (a) For any package containing water and/or organic substances which could radiolytically generate combustible gases, determination must be made by tests and measurements or by analysis of a representative package such that the following criteria are met over a period of time that is twice the expected shipment time:

(i) The hydrogen generated must be limited to a molar quantity that would be no more than 5% by volume (or equivalent limits for other inflammable gases) of the secondary container gas void if present at STP (i.e., no more than 0.063 g-moles/ft^3 at 14.7 psia and 70°F); or

(ii) The secondary container and cask cavity must be inerted with a diluent to assure that oxygen must be limited to 5% by volume in those portions of the package which could have hydrogen greater than 5%.

For any package delivered to a carrier for transport, the secondary container must be prepared for shipment in the same manner in which determination for gas generation is made. Shipment period begins when the package is prepared (sealed) and must be completed within twice the expected shipment time.

(b) For any package containing materials with radioactivity concentration not exceeding that for low specific activity material, and shipped within 10 days of preparation, or within 10 days after venting of drums or other secondary containers, the determination in (a) above need not be made, and the time restriction in (a) above does not apply.

7. Except for close fitting contents, dunnage must be provided in the shipping cask cavity sufficient to prevent significant movement of the contents or secondary containers relative to the outer packaging under normal conditions.

8. In addition to the requirements of Subpart G of 10 CFR Part 71:

   (i) Prior to each shipment, the packaging lid seals must be inspected. The seals must be replaced with new seals if inspection shows any defects or every 12 months, whichever occurs first. Cavity drain and vent lines must be sealed with appropriate sealant applied to the pipe plug threads.

   (ii) Each cask must meet the Acceptance Tests and Maintenance Program of Section 7.0 of the application. Maintenance and Gamma Scanning may be in accordance with NUS Process Services Procedures WM-022, Rev. A and WM-013, Rev. E. In addition, the cask must be leak tested in accordance with Section 7.2.5 of the application or NUS Process Services Procedure WM-023, Rev. B, every 12 months and when repairs are made to the seal area.

9. Packagings fabricated after March 28, 1980 must be constructed of A-516 Grade 70 carbon steel.

10. The packaging authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.12.

11. Expiration date: March 31, 1988.

REFERENCES

Nuclear Packaging, Incorporated application dated May 6, 1985.

Supplements dated: May 16, June 3 and 12, July 30 and September 6, 1985.

NUS Process Services supplements dated: July 31, October 15, and December 13, 1984.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

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

Date: NOV 25 1985

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

Transportation Certification Branch
Approval Record
Model Nos. OH-142 Series and NUS 10-135 Packages
Docket No. 71-9073

On December 31, 1985, Certificate of Compliance No. 9073 for the Model No. OH-142 shipping container will be amended to authorize contents of low specific activity material only. The package identification number will also be changed to USA/9073/A at that time.

For this package, the Nuclear Packaging, Inc. safety analysis of hypothetical accident conditions is based upon the ultimate (breaking) strength of the ratchet binders. The staff recently obtained manufacturer's literature for these devices. The literature for ratchet binders states: "Breaking strengths are approximate and should be used as reference only. Good common practice dictates use of a safety factor suitable to the application; usually no less than 3 to 1." The unsuitability of basing ratchet binder designs on ultimate strength is further exemplified by the AISC code which specifies a safety factor of 5 to 1 for simple turnbuckles.

In addition, the Nuclear Packaging, Inc. safety analysis of the ratchet binders does not address the following:

1. The magnitude of the clamping force provided by ratchet binders. (With bolts, the clamping force can be controlled by the amount of torque applied to the bolt).

2. The extent to which the clamping force could vary under routine operations due to temperature changes, wear of the ratchet binder components, vibration, fatigue, etc.

3. The effectiveness of ratchet binders for resisting lateral loads imposed by cover plates and impact limiters under side and oblique angle impacts.

4. The adequacy of using ratchet binders for shipping container closures as demonstrated by actual physical testing to the hypothetical accident conditions in 10 CFR Part 71.

Based upon the foregoing and in the absence of conclusive safety information, the authorized contents for the Model No. OH-142 packaging will be limited as indicated above so that the ratchet binders need not be effective under hypothetical accident conditions.

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

Date: NOV 25 1985