NRC FORM 618
(9-86)
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
9200	1	USA/9200/B(M)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)*

Department of Energy
Idaho Operations Office
550 Second Street
Idaho Falls, ID 83401

b TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

Nuclear Packaging, Inc. application dated June 14, 1985, as supplemented.

c. DOCKET NUMBER 71-9200

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.: 125-B

(2) Description

A stainless steel and lead-shielded shipping cask. The contents are shipped dewatered. The cask is a right circular cylinder, 65.5-inch outer diameter by 207.5-inch length. The cavity dimensions are 51.25-inch diameter by 192.5-inch length. A 1.0-inch thick stainless steel inner shell, 3.88-inch thick lead annulus and 2.0-inch thick stainless steel outer shell and 7.50-inch thick welded stainless steel bottom plate make up the cask body. A ten gauge stainless steel thermal shield surrounds the cask outer shell with standoff provided by a wire wrap on a 3.3-inch pitch spacing. The outer lid is 7.50-inch thick stainless steel equipped with a 300 psig rupture disc. The seal is provided by 2 Neoprene O-rings secured by 32, 1-1/2-6 UNC closure bolts. A test port is provided between the O-rings. The lid is also provided with a vent port. Protrusions from the outer cask external cylindrical surface include 2 lifting and 4 tie-down trunnions, 1 shear block for fitting to the shipping skid, and 16 impact limiter attachment lugs (8 at each end of the cask). The impact limiters are 120 inches in diameter by 75 inches long fabricated from 1/4-inch thick stainless steel and filled with closed-cell polyurethane foam. Each impact limiter is secured to the cask by 8, 1-1/4-7 UNC bolts necked down to 1 inch. Plastic pipe plugs are provided in each impact limiter. The overall dimensions of the cask with upper and lower impact limiters are 120-inch outer diameter by 279.5-inch length.

(a) (2) Description (continued)

A separate inner vessel (fuel/canister basket) is positioned within the cask cavity. The inner vessel consists of 7, 14.5-inch ID by 0.38-inch wall pipes with a welded bottom plate and top end fixture plate which provides a 151-inch long cavity for the canisters. The pipe assembly is positioned within a 50.25-inch OD by 1.0-inch thick steel shell with a 2.0-inch thick welded bottom plate. The space between the pipes and steel shell contain stainless steel structural members and solid neutron moderator and absorber. The top of each tube is shielded by a 10-inch thick stainless steel plug. The inner lid is 5.0-inch thick stainless steel equipped with 2, 300 psig rupture discs in series. The lid has 2 Neoprene O-rings and is secured to the inner vessel by 24, 3/4-10 UNC closure bolts. A test port is provided between the O-rings. The lid is also provided with a vent port.

A fuel, filter, or knockout canister is positioned within the inner vessel with canister impact limiters and a top 10.0-inch thick stainless steel shield plug. Each canister is 14.0-inch OD by 150.0-inch long by 0.25-inch wall and contains Boral sheets or B_4C rods. Canister containment is not required with closure provided by welded or bolted plate with 2 or 4 fittings.

The weight of the cask (100,500 pounds), impact limiters (11,700 pounds each), inner vessel (37,000 pounds), canisters (1,046 to 1,440 pounds each), and canister contents (1,500 to 1,894 pounds each) is approximately 181,500 pounds.

(3) Drawings

(i) The packaging is constructed in accordance with Nuclear Packaging, Inc. Drawing No. X-101-100, Sheets 1 through 6, Rev. H.

(ii) The canisters are constructed in accordance with Babcock and Wilcox Company Drawing Nos.: 1161299D, Rev. 1; 1161300D, Rev. B1; and 1161301D, Rev. 1.

(b) Contents

(1) Type and form of material

(i) Byproduct and special nuclear material in the form of irradiated fuel particles, partial fuel rods, partial assemblies, and core debris. The maximum pre-irradiation U-235 enrichment must not exceed 2.98 weight percent. The average burnup of the fuel material must not exceed 3,165 MWD/MTU and must be cooled for at least 6.0 years.

(ii) Irradiated core structural components, contaminated defueling equipment, and filter-aid materials.

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

(2) Maximum quantity of material per package

Seven fuel, knockout, or filter canisters or any combination thereof within the inner vessel. The radioactive decay heat load must not exceed 100 watts in each canister. The gross weight of each canister must not exceed 2,940 pounds.

(c) Fissile Class III

Maximum number of packages per shipment (vehicle) One

6. The cask cavity and inner vessel must be dry when delivered to a carrier for transport, except for free water which may be present following drip drying of the canisters for a minimum of 2 minutes after removal from the storage pool. The canisters must be loaded and dewatered in accordance with Section 7.1.1 of the application which includes approximately 2 atm of argon, nitrogen, or helium cover gas. The cask cavity and inner vessel must be filled with argon, nitrogen, or helium at 1.0 atm pressure.

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

(i) Prior to each shipment, the inner and outer 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.

(ii) Each package must meet the Acceptance Tests and Maintenance Program of Section 8.0 of the application.

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

8. (Continued)

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 canister 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 that oxygen is limited to 5% by volume in those portions of the canister which could have hydrogen greater than 5%.

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

9. Bolt torque:

The outer cask lid must be secured by 32, ASTM A320, Grade L43, 1-1/2-6 UNC-2A x 5.5 long bolts torqued to 1,200-1,450 ft-lbs (lubricated).

The inner vessel lid must be secured by 24, ASTM A320, Grade L43, 3/4-10 UNC-2A x 2.25 long bolts torqued to 200-240 ft-lbs (lubricated).

The upper and lower overpack limiters must each be secured by 8, ASTM A320, Grade L43, 1-1/4-7 UNC-2A x 41.75 long bolts torqued to 350-415 ft-lbs (lubricated).

10. Prior to each shipment, the licensee must confirm that the cask and inner vessel are properly sealed by tests as specified in Appendix 7.4 or Section 8.2.2 of the application. The test is satisfied if no leakage is detected using a test with a minimum sensitivity of 1×10^{-3} atm-cm^3/s.

11. The package authorized by the certificate is hereby approved for use under the general provisions of 10 CFR §71.12.

12. Expiration date: April 30, 1991.

REFERENCES

Nuclear Packaging, Inc. application dated June 14, 1985.

Supplements dated: October 31 and November 22, 1985; and February 11, June 11, and July 16, 1986.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

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

Date: JUL 17 1986

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

Transportation Certification Branch
Approval Record
Model No. 125-B Cask
Docket No. 71-9200

By application dated June 11, 1986, as supplemented July 16, 1986, Nuclear Packaging, Inc. requested an amendment to Certificate of Compliance No. 9200. The principal changes include: (1) change from a metal to an elastomer canister seal and canister closure bolt torques, (2) provide for additional non-fuel contents, (3) modify procedures to include nitrogen and helium as well as argon for cover gas, (4) modify procedures to allow an additional leak test procedure for assembly verification, (5) modify drying specification to clarify acceptable residual water introduced into the cask during loading, and (6) revise acceptance criteria for borated BISCO neutron absorbers.

1. The TMI-2 fuel debris canister seal design has been changed. The Inconel metal O-ring has been replaced by an ethylene propylene seal, and the closure bolt torque has been increased from 40/50 ft-lbs to 50/60 ft-lbs. The principal concern associated with use of an elastomer seal is the temperature. Both normal conditions and hypothetical accident conditions result in seal temperatures within the service range of these seals (-67°F to +302°F).

2. Additional contents have been added. They are non-fuel materials that result from the defueling operation and are within the weight, thermal heat, and radioactivity currently authorized.

3. The procedures contained in the applicant's Safety Analysis Report have been revised to include nitrogen or helium as well as argon which was originally specified. This is consistent with the current certificate of compliance.

4. The assembly verification presently calls for a pressure rise leak test with a 1×10^{-3} atm-cm^3/s sensitivity. The test specification has been revised to allow a helium mass spectrometer test with sensitivity of 10^{-7} atm-cm^3/s. This allows more flexibility in applying the assembly verification while meeting the required 1×10^{-3} atm-cm^3/s leakage criteria.

5. Some residual water may be introduced during the canister loading. To minimize this, the loading specification has been modified to require a minimum of 2 minutes of drip drying before placing canisters into the cask. The applicant has evaluated the potential for pressurization due to water vaporization and the potential for combustible gas generation due to radiolysis. Neither of these were found to significantly effect the normal or hypothetical accident conditions of transport.

6. The borated BISCO neutron absorber acceptance criteria has been revised to take into account the lowest densities of hydrogen and boron-10. The densities must meet or exceed that considered in the criticality safety analysis. Possible stratification of the hydrogen and boron in the BISCO NS-3 has been estimated by extrapolating (linearly) from a minimum 3-foot high sample poured under similar conditions to assure the minimum densities are considered for the higher inner vessel. An alternate, but similar procedure using a full height prototype column is also provided. It is noted that significant reduction in densities results in a slight increase in k-effective.

Based on our review of the requested amendment, we have concluded that the Model No. 125-B cask design meets the requirements of 10 CFR Part 71.

Charles MacDonald

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

Date: JUL 17 1986

71-9200

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

July ~~June~~ 17, 1986

MEMORANDUM FOR: Richard E. Cunningham, Director
Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards

FROM: Brian K. Grimes, Director
Division of Quality Assurance, Vendor, and
Technical Training Center Programs
Office of Inspection and Enforcement

SUBJECT: NUPAC MODEL 125-B CASKS-CERTIFICATE OF COMPLIANCE (C of C) 9200

The purpose of this memorandum is to provide you with an update concerning the fabrication of Cask 2 as discussed in my memorandum to you dated July 2, 1986.

As a result of the continued evaluation of inspection findings related to the NUPAC Model 125-B Cask 2, it was decided to establish a task force of consultants to review these findings. These consultants were carefully selected to ensure that each was highly qualified and had extensive practical radiography experience. The consultants were Dr. S. Wenk, E. Martindale, and B. Clark, each a qualified Level III RT examiner.

On July 15, 1986, radiographs of the longitudinal welds on the two-inch outer shell for Cask 2 were reviewed by three NRC consultants. The consensus of the three examiners is that the 7/16-inch long linear indication, previously reported as a zone of incomplete penetration, is in fact slag. The linear length of this slag indication meets the Radiographic Acceptance Standards of the ASME Code Section III, Division I, Subsection NB, Article NB-5320. This finding was verbally discussed with DOE, EG&G, and members of your staff on July 15, 1986.

If you have any questions concerning this resolution, please contact John Craig of my staff (X 29043).

Brian K. Grimes, Director
Division of Quality Assurance, Vendor,
and Technical Training Center Programs
Office of Inspection and Enforcement