

CERTIFICATE OF COMPLIANCE  
FOR RADIOACTIVE MATERIALS PACKAGES

U.S. NUCLEAR REGULATORY COMMISSION

1. a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. PACKAGE IDENTIFICATION NUMBER	d. PAGE NUMBER	e. TOTAL NUMBER PAGES
9111	11	USA/9111/A	1	3

## 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 of Radioactive Materials for Transport and Transportation of Radioactive Material Under Certain Conditions."
- 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. PREPARED BY (Name and Address):

Chem-Nuclear Systems, Inc.  
220 Stoneridge Drive  
Columbia, SC 29210

## b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION:

Chem-Nuclear Systems, Inc., application  
dated June 29, 1983, as supplemented.

71-9111

## c. DOCKET NUMBER

## 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.: CNS 6-80-2 and CNS 6-80-2A

(2) Description

A steel encased, lead shielded cask for solid radioactive material meeting the requirements for low specific activity material. The overall dimensions of the cask are 70-1/2-inch diameter by 78-5/8-inch height. The cask consists of two concentric carbon steel cylindrical shells surrounding a 4-1/4-inch thick lead shield. The 3/8-inch thick inner shell has a 59-inch ID, and the 1-inch thick outer shell has a 70-1/2-inch OD; the base consists of 4-inch thick welded steel plates of 60-inch diameter and 70-1/2-inch diameter, and a stepped welded lid comprised of two, 4-inch thick steel plates containing a centered 29-inch diameter secondary lid of similar construction with an additional 1-inch thick upper plate. The containment cavity is 59-inch diameter by 58-inches high. Closure of the primary lid is accomplished by eight, 1-1/4-inch bolts or studs and nuts. Both lids on Model No. CNS-6-80-2 are sealed using silicone gaskets. The secondary lid has a redundant Neoprene seal. Both lids on Model No. CNS 6-80-2A are sealed using a double O-ring configuration as shown on Drawing No. C-110-D-0020, Rev. -. A plugged drain port is located at the cask bottom. The cask is lined with 12 gauge stainless steel. Three lift lugs, located on the secondary lid are used for lifting both the cask and the primary lid. Four lugs, welded to the outer shell are used for tie-down. The package gross weight is approximately 51,500 pounds.

(3) Drawing

The packaging is fabricated in accordance with Chem-Nuclear Systems, Incorporated Drawing No. C-110-D-0028, Sheets 1 and 2 of 2, Revision A.

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5. (b) Contents

(1) Type and form of material

- (i) Greater than Type A quantity of byproduct material contained in solids and solidified waste, meeting the requirements for low specific activity material, in secondary containers.
- (ii) Greater than Type A quantity of byproduct material contained in activated solid components meeting the requirements for low special activity material.

(2) Maximum quantity of material per package

Greater than Type A quantity of radioactive material with the weight of the content, secondary containers and shoring not exceeding 7,500 pounds. The decay heat load must not exceed 60 watts. The contents may include fissile materials provided the mass limits of 10 CFR §71.53 are not exceeded.

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<sup>3</sup> 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 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, shoring must be placed between secondary containers and the cask cavity to prevent movement during normal conditions of transport.

8. The cavity drain line must be sealed with appropriate sealant applied to the pipe plug threads prior to transport.

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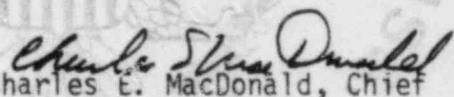
9. Packages must be leak tested initially and at least once every 12 months. A pressure drop test shall be used. The cavity or volume between the double O-ring seals (Model No. CNS 6-80-2A) shall be pressurized to 14.0 psig. Seal acceptance must be based on no observable leakage over a ten minute period using a pressure gauge with a maximum graduation of two pounds and the pressure supply line disconnected from the cask and test fixture.
10. The package authorized by this certificate must 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.
11. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.12.
12. Expiration dated: October 31, 1988.

REFERENCES

Chem-Nuclear Systems, Incorporated application dated June 29, 1983.

Supplement dated: September 19, 1983.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

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

Date: MAY 22 1985



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

Transportation Certification Branch  
Approval Record  
Combustible Gas Mixtures

Conditions were imposed on packages containing water and/or organic substances to limit the accumulation of radiolytically generated gases over the shipping period to preclude the possibility of significantly reducing the packaging effectiveness due to explosion.

Part of the conditions included "...it must be determined by tests and measurements of a representative package whether or not...."

There is no reason to believe that calculational methods could not be used as means of determining gas generation. So as not to preclude a valid analysis, part of the condition to limit the accumulation of radiolytically generated gases is revised to read "...it must be determined by tests and measurements or by analysis of a representative package whether or not...."

The analytic approach involves determining the hydrogen generated in the waste by radiolysis based on the absorbed dose of the waste over a given period of time. To satisfy the condition to preclude a combustible mixture, the period since closure and twice the shipping time must be considered. The calculation requires that the properties of the waste are known. These properties may be determined from test and measurement of representative waste forms or from data that is applicable to the waste form. The determination should be documented and retained as part of the records for the shipment.

*Charles E. MacDonald*  
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