| NRC FORM 618 (8-2000) 10 CFR 71 | | | U.S. NUCLEAR REGULATORY COMMISSION | | |
|---|---|---|---|---|---|
| **CERTIFICATE OF COMPLIANCE FOR RADIOACTIVE MATERIAL PACKAGES** | | | | | |
| 1. a. CERTIFICATE NUMBER | b. REVISION NUMBER | c. DOCKET NUMBER | d. PACKAGE IDENTIFICATION NUMBER | PAGE | PAGES |
| 9023 | 9 | 71-9023 | USA/9023/B( )F | 1 OF | 5 |

2. PREAMBLE

a. This certificate is issued to certify that the package (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)*

NAC International, Inc.
3930 East Jones Bridge Road
Norcross, GA 30092-2107

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

Nuclear Assurance Corporation, application dated November 18, 1991, as supplemented

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.: NLI-10/24

(2) Description

A lead, water, depleted uranium and high temperature polymer shielded shipping cask, encased in stainless steel, equipped with balsa impact limiters, and mounted to a railcar which is considered to be an integral part of the packaging for normal conditions of transport. The cask body is 204.5 inches long by 96 inches in OD. The principal shielding consists of 6 inches of lead and 9 inches of water. Depleted uranium plates are encased in the bottom end forging and cask inner closure head. High temperature polymer sheet is encased in the bottom end and positioned between the inner and outer closure heads at the top end.

The lead shield is bonded between 0.75-inch stainless steel inner shell and a 2-inch stainless steel outer shell. The outer shell is surrounded by a 0.75-inch stainless steel water jacket shell. The three shells are welded to stainless steel forgings at both ends. Four water expansion tanks are mounted to the railcar and are connected to the water jacket by a flexible metal hose.

The primary containment vessel is comprised of the 0.75-inch inner shell and the inner closure head. It is 179.5 inches long and has a 45-inch inside diameter. The inner closure head is held in place by sixteen bolts and is sealed with a metallic O-ring. Secondary containment is provided by the outer closure head which is bolted and has a Viton or silicone O-ring seal. There is no direct penetration between the containment cavity and the ambient. The two penetrations into the containment cavity are from the space between the inner and outer closure heads, which has a single penetration through the cask body connecting it with the ambient. The two lid penetrations are sealed with 1.5-inch quick-disconnect valves and metal O-ring seals each in a valve box arrangement.

5.(a)(2) con't

The radioactive contents are positioned within the containment cavity using neutron poisoned aluminum baskets and internal support structures. The PWR and BWR fuel basket cavities are lined with neutron absorber sleeves composed of a silver-indium-cadmium (80-15-5 w/o) alloy.

An auxiliary cooling system, mounted to the railcar, is used to maintain the cask and fuel temperatures so as to facilitate handling and cooldown.

The fully loaded cask, excluding the railcar, is approximately 194,000 pounds, which includes a maximum gross weight of the cavity contents of 34,100 pounds (fuel, spacers, fuel basket, etc.).

(3) Drawings

The Model No. NLI-10/24 shipping cask is constructed in accordance with the NL Industries, Inc., and National Lead Company Drawing Nos. as specified on page XVIII-1, Rev. 9, and page XVIII-2, Rev. 8, in Section XVIII of the application.

5.(b) Contents

(1) Type and form of material

Irradiated PWR and BWR uranium oxide fuel assemblies of the following specifications:

| | PWR | BWR |
|---|---|---|
| Fuel form | Clad $UO_2$ pellets | Clad $UO_2$ pellets |
| Cladding material | Zr or SS | Zr or SS |
| Maximum initial U content/assembly, kg | 475 | 200 |
| Maximum average initial U-235 enrichment, w/o | 3.5 | 2.8 |
| Maximum initial U-235 content/assembly, kg | 16.6 | 5.6 |
| Maximum bundle cross section, inches | 9.00 | 5.75 |
| Fuel pin array size, number of pins | 14x14/15x15 16x16/17x17 | 7x7/8x8 |
| Maximum active fuel length, inches | 144 | 144 |

5.(b)(1) con't

Irradiated PWR and BWR uranium oxide fuel assemblies of the following specifications:

| | PWR | BWR |
|---|---|---|
| Maximum specific power, kw/kgU | 40 | 27 |
| Maximum average burnup, MWD/MTU | 35,500 | 29,700 |
| Minimum cooling time, days | 150 | 150 |

The PWR type assemblies may be shipped either with or without control rods.

5.(b)(2) Maximum quantity of material per package

The maximum decay heat load per package not to exceed 70 kilowatts, and:

Ten PWR fuel assemblies or twenty-four BWR fuel assemblies.

Above assemblies must be contained in their respective fuel baskets as shown on NL Industries, Inc., and National Lead Company Drawing Nos.:

70652F, Sheet 1, Rev. 7 PWR Fuel Basket,
Sheet 2, Rev. 5 10/24 Rail Cask
70653F, Sheet 1, Rev. 7 BWR Fuel Basket,
Sheet 2, Rev. 5 10/24 Rail Cask

5.(c) Transport Index for Criticality Control (Criticality Safety Index)

Minimum transport index to be shown on label for nuclear criticality control: 100

6. The maximum gross weight of the cavity contents must not exceed 34,100 pounds (fuel, spacers, basket, etc.).

7. The containment vessel must be dry (no free water) when delivered to a carrier for transport. Residual moisture must be promptly removed from the containment vessel by the methods described in Section XVI of the application. The containment vessel must be promptly filled with helium to 1.0 atm pressure.

8. Known or suspected failed fuel assemblies (rods) and fuel with cladding defects greater than pin holes and hairline cracks are not authorized.

9. The cask contents must be so limited under normal conditions of transport that the following measured dose rates be satisfied:

a) at one meter from the external radial midplane surface of the package: 625 times the neutron dose rate plus 2.5 times the gamma dose rate will not exceed 1,000 millirems per hour; and

b) at one meter from the external surface of the bottom of the package: 115 times the neutron dose rate plus 2.0 times the gamma dose rate will not exceed 1,000 millirems per hour.

10. The neutron shielding system and auxiliary cooling system must be filled with a mixture of water and ethylene glycol (53% to 58% by weight ethylene glycol).

11. The neutron shielding system must be equipped with two pressure relief valves (one on the cask and one on an expansion tank) set at 220 psig.

12. Any system used for cooling down the package must be provided with a pressure relief device set so that the maximum pressure in the containment vessel cannot exceed 233 psig during the cooldown process.

13. The systems and components of each packaging must meet the criteria for the periodic tests specified in Section XVII of the application.

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

(i) Each packaging must meet the acceptance tests and be maintained in accordance with Section XVII of the application, and

(ii) The package must be prepared for shipment and operated in accordance with the Operating Procedures of Section XVI of the application.

15. Prior to first use, each packaging shall meet the criteria for the acceptance tests specified in Sections XIV and XV of the application, except that the prototype railcar test, meeting the stated design criteria, need be performed only once.

16. Packaging is authorized for rail mode of transport only.

17. Fabrication of new packages or major packaging components, including the fuel basket, is not authorized.

18. Expiration date: July 31, 2008.

REFERENCES

Nuclear Assurance Corporation application dated November 18, 1991.

Supplements dated: February 7, 1992; February 28 and November 25, 1997; and June 11, 2003.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION
/RA/
John D. Monninger, Chief
Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Date July 2, 2003