

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

1.(a) Certificate Number 9103	1.(b) Revision No. 1	1.(c) Package Identification No. USA/9103/B()F	1.(d) Pages No. 1	1.(e) Total No. 4
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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): NL Industries, Inc. P. O. Box 2046 Wilmington, Delaware 19899	3.(b) Title and identification of report or application: NL Industries, Inc. application dated September 7, 1977, as supplemented.
	3.(c) Docket No. 71-9103

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 Reference

(a) Packaging

- (1) Model No.: NLI-6502
- (2) Description

A steel, lead, and depleted uranium shielded shipping cask. Its overall dimensions are 33.5 inches in diameter by 130 inches long. The loaded cask weighs about 45,300 pounds. The wall thickness of the cavity and outer shell is 1/2 inch. The wall thickness of the inner shell is 1 inch. The main body of the cask is divided into two regions. The inner region, which is a maximum of 5-3/4 inches thick, contains uranium shielding angles at the four corners, the remainder of the shielding region is filled with chemical grade lead. The outer (sacrificial) 3-inch thick region is filled with lower melting point 6% antimonial lead. The cask contains six (6) fusible "weep holes" around the cask at each end. This

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5. (a) (2) Description (Cont'd)

sacrificial region also contains 10 layers of 0.018-in terne plate. The main body of the cask is equipped with two (2) lids, one on each end. The two lids are similar in construction, each being 24.5 inches in diameter and extending 5 inches into the cask recess. The lids, like the main cask body, contain an outer sacrificial region (2" thick containing ten 0.018-in terne discs with the remaining volume filled with 6% antimonial lead) and an inner region (4-5/8" thick) containing chemical grade lead. The sacrificial region in each lid is fitted with exterior weep holes.

One lid contains a 1/2-inch drain line and valve. The other lid contains two 1/2-inch lines for a pressure relief valve with filter and the other line is capped.

The fuel rods are contained within an approximate 11-1/2-inch square by 128-1/2-inch long openwork basket constructed of stainless steel angle and strap. The basket has a full-length lid along one side, for horizontal loading, and a lid on one end for vertical unloading. A vertical, stainless steel-clad Boral poison plate divides the basket into two, full-length halves, and two partial poison plates are incorporated into the sides of the basket.

A metal screen enclosure surrounds the package in transport to serve as a sun-shade and prevent inadvertent use of structural parts of the package, other than the tie-down devices for securing the package to the vehicle during transport.

The cask rests horizontally on its integral supporting structure at each end, and the supporting structure is bolted to a separate structure attached to the deck of the special trailer provided for its use.

(3) Drawings

The Model No. NLI-6502 shipping package is constructed in accordance National Lead Company Drawings Numbers:

5797-P, Rev. 1	Details-Safety Shield
5798-0, Rev. 1	Cask Tie-Down
6502-01, Rev. 5	Basket Details
6502-03, Rev. 4	Latch and Basket Details
6502-04, Rev. 3	Basket and Lid Assembly
6502-07, Rev. 5	Cask
6502-08, Rev. 4	Lid Assembly and Details

5. (b) Contents

(1) Type and form of material

Irradiated NRU-NRX aluminum-uranium alloy fuel rods enriched in the U-235 isotope with the following specifications:

	<u>NRU</u>	<u>NRX (MKI&IV)</u>
Number of elements per rod	12	7
Maximum U-235 content per rod prior to irradiation, g	495 (1.8 per cm)	550 (2.0 per cm)
Minimum average burnup, %	45	45
Minimum decay time, days	120	120

(2) Maximum quantity of material per package

The maximum decay heat load per package not to exceed 14,000 Btu/hr, and 20 NRU fuel rods or 28 NRX fuel rods per package.

(c) Fissile Class

III

Maximum number of packages per shipment

One (1)

f. Poison inspection and loading of fuel rods shall be subject to the following conditions:

(a) Poison inspection and loading of fuel rods in accordance with Section VII-B.2.(B.)(3.) (pp. VII-10 thru VII-11) of the application, and

(b) The package shall not be loaded with a mass which exceeds 75% of critical, determined by extrapolation to zero reciprocal count rate.

7. Dummy fuel rods consisting of empty aluminum pipes shall be installed in every fuel rod position not occupied with fuel.

8. The cask cavity shall be dry (no free water) when delivered to a carrier for transport.

9. The cask contents shall be so limited under normal conditions of transport that the dose rate will not exceed 10 mrem/hr at three (3) feet from the external surface of the cask.

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10. Construction of additional packaging is not authorized.

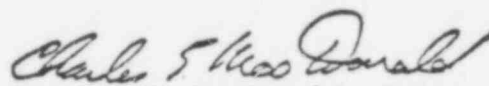
11. Expiration Date: May 31, 1983.

REFERENCES

NL Industries, Inc. application dated September 7, 1977.

Supplement dated: May 1, 1978.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION


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

Date: MAY 3 1978

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