

71-9221



DEPARTMENT OF ENERGY
NATIONAL NUCLEAR SECURITY ADMINISTRATION
1000 INDEPENDENCE AVENUE SW
WASHINGTON DC 20585-1000

NR:RM:TJHesse S#12-03559
August 10, 2012

Catherine Haney
Director, Office of Nuclear Material Safety and Safeguards
Nuclear Regulatory Commission
Washington, DC 20555

**NUCLEAR REGULATORY COMMISSION CERTIFICATE OF COMPLIANCE FOR THE
NRBK-41 SHIPPING CONTAINER [USA/9221/B(M)F-96]; REQUEST FOR RENEWAL**

Background: NRBK-41 radioactive material shipping containers are used to ship small quantities of irradiated test specimens between Naval Nuclear Propulsion Program (NNPP) sites and subcontractors. The NRBK-41 transportation package consists of the outer NRBK-41 cask, an inner container, and a shipping skid assembly.

Request for NRC Renewal: This letter requests renewal of the NRC Certificate of Compliance [USA/9221/B(M)F-96] for the NRBK-41 radioactive material shipping container. Revision 6 of the NRC Certificate of Compliance and revision 9 of the Department of Energy – Naval Reactors (DOE-NR) Certificate of Compliance both expire on April 30, 2013. Since the last renewal of the Certificate of Compliance, NRBK-41 containers have been used to make 11 loaded shipments. There have been no operational experiences or container modifications that preclude the continued use of the container. Enclosure (1) to this letter provides a draft of revision 10 of the DOE-NR Certificate of Compliance for your use. The revision number, date of issuance, and expiration date will be the only changes to the Certificate of Compliance. If you have any questions, please do not hesitate to call Tanner Hesse at (202) 781-6129.

J. C. Demko
Naval Reactors

Enclosure: (1) DOE-NR CERTIFICATE OF COMPLIANCE FOR THE NRBK-41
RADIOACTIVE MATERIAL SHIPPING CONTAINER, USA/5814-
1/B(M)F-96, REVISION 10 (DRAFT)

Copy to:
D. Weaver, Director, Spent Fuel Storage & Transportation (SFST), NMSS, NRC
M. Waters, Chief, Licensing Branch, SFST, NMSS, NRC
B. White, Senior Project Manager, Licensing Branch, SFST, NMSS, NRC

LMSS01

ENCLOSURE (1)

**DOE-NR CERTIFICATE OF COMPLIANCE FOR THE NRBK-41 RADIOACTIVE
MATERIAL SHIPPING CONTAINER, USA/5814-1/B(M)F-96, REVISION 10 (DRAFT)**

The enclosed draft Certificate of Compliance only contains minor editorial changes from Revision 9 of the certificate.

Enclosure (1) to
Ser 08S#12-03559

U. S. DEPARTMENT OF ENERGY
CERTIFICATE OF COMPLIANCE
For Radioactive Materials Packages

1a. Certificate Number USA/5814-1/B(M)F-96 (DOE-NR)	1b. Revision No. 910 (Draft)	1c. Package Identification No. USA/5814-1/B(M)F-96 (DOE-NR)	1d. Page No. 1	1e. Total No. Pages 4
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2. PREAMBLE

- 2a. This certificate is issued under the authority of 49CFR Part 173.7(d).
- 2b. The packaging and contents described in item 5 below, meets the safety standards set forth in subpart E, "Package Approval Standards" and subpart F, "Package, Special Form, and LSA-III Tests" Title 10, Code of Federal Regulations, Part 71.
- 2c. 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

(1) Prepared by (Name and address): Bettis Atomic Power Laboratory P. O. Box 79 West Mifflin, PA 15122-0079	(2) Title and Identification of report or application: NRBK-41 Cask Safety Analysis Report for Packaging	(3) Date June 5, 2009
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4. CONDITIONS

This certificate is conditional upon the fulfilling of the applicable Operational and Quality Assurance requirements of 49CFR Parts 100-199 and 10CFR Part 71, and the conditions specified in item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Transport Index for Criticality Control, Other Conditions, and References:

NRBK-41 Radioactive Materials Shipping Casks

a. Description of Packaging

The NRBK-41 is a top-loading, cylindrical, lead-shielded, Type 304L stainless steel-clad cask that is used for the shipment of fissile and non-fissile materials. The cask has a one-inch thick stainless steel plate welded to the bottom. A second one-inch thick stainless steel plate with a 1/8-inch deep, 25.5-inch diameter recess is welded to the first plate to provide a thermal break for the bottom surface of the cask. In addition, the cask has an all-welded 48-inch square "I" beam skid, which is bolted to the bottom of the cask and utilized to distribute the cask load. The cavity of the cask is formed by 1/4-inch thick stainless steel surrounded by poured lead shielding with a 1/2-inch thick, stainless steel, cylindrical outer shell. Also, the cask has a seal-welded, 1/4-inch thick, stainless steel outer thermal shield which provides a 1/16-inch thermal break (air gap) between the outer surface of the cask outer shell and the inside surface of the thermal shield. The NRBK-41 cask is shown on Westinghouse Drawing 6235E21.

An inner container, either the MIN-41 or the HIP-41, is required for all cargo shipments, both fissile and non-fissile. The housing of the MIN-41 container is a seamless stainless steel pipe, 4.95 inches in diameter (0.25 in. nominal wall thickness over most of its length increasing to 0.537 in. in the closure region) and 15.87 inches in length. The bottom of the container is formed by a 0.38 inch thick plate welded inside the end of the housing. The top closure consists of: (1) a metallic C-ring which is installed on a step in the housing, (2) a flat plate (cap) which is used to compress the C-ring and which incorpo-

6a. Date of Issuance: June 12, 2009 TBD	6b. Expiration Date: April 30, 2013 TBD
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FOR THE U.S. DEPARTMENT OF ENERGY

7a. Address (of DOE Issuing Office) Naval Reactors U. S. Department of Energy Washington, D. C. 20585	7b. Signature, Name and Title (of DOE Approving Official) S. J. Trautman Deputy Director, Naval Reactors
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5. (Continued)

rates a leak test fitting and leak test plug that seals of the leak test penetration, (3) a plug assembly which mates with the upper end of the housing by means of a breech-lock arrangement, (4) eight screws which are threaded through the plug assembly and tightened against the cap to compress the C-ring and secure the plug assembly within the housing, and (5) eight jam nuts to prevent loosening of the screws. The MIN-41 inner container is shown on Westinghouse Drawing 2D77456.

The housing of the HIP-41 inner container is essentially a hollow cylinder and is fabricated from a high-strength stainless steel casting, 4.95 inches in diameter (0.25 in. nominal wall thickness over most of the containers length increasing to 0.625 in. maximum thickness in the closure region) and 15.893 inches in length. The inner cavity at the bottom of the container is hemispherical with a bottom thickness of 0.285 inches. At the upper end of the container, a stainless steel closure plug is inserted until it seats on a tapered area in the body and is retained by an externally threaded stainless steel retaining ring that threads into the top of the container body. The closure plug is equipped with double ethylene-propylene O-rings which provide the containment boundary for the container assembly when the closure plug is installed in the container body. The closure plug also contains a leak test fitting and leak test plug that seals off a leak test penetration. The HIP-41 inner container is shown on Westinghouse Drawing 5D06622.

The physical characteristics of the cask are as follows:

Model No.	Outer Dimensions		Cavity Dimensions		Approximate Loaded Weight	Radial Lead Shielding Thickness	Reference Drawing (Westinghouse)
	Diameter	Height	Diameter	Height			
NRBK-41	27.16 in.	46.65 in.	5 in.	16 in.	9,000 lb	10 in.	6235E21

b. Authorized Contents

All cargo must be packaged in sealed inner containers. The inner containers designated for used with the NRBK-41 cask are the MIN-41 inner container and the HIP-41 inner container. All shipments are made dry (i.e., shipment of liquids or coolants is not permitted). Shipments of hydrogenous and/or hygroscopic materials susceptible to radiation induced decomposition are not permitted. Shipments of plastics are not permitted. Shipments of test specimens mounted in plastic material for metallographic examination are permitted provided they are removed from the mount and no visible, residual plastic material remains.

The cargo to be shipped in the containers must be limited as indicated in the following table:

The total quantity of radioactive material in the form of loose surface contamination within the cask inner cavity and on the external surfaces of the inner containers (MIN-41 or HIP-41) must not exceed a Type A quantity.

5. (Continued)

Inner Container	Fissile Content ⁽¹⁾	Decay Heat Load	Total Internal Pressure ⁽²⁾	Cargo Weight
MIN-41	350 grams equivalent U ²³⁵	240 BTU/hr	Normal conditions of transport Pressure = 180 psig Hypothetical fire accident condition Pressure = 200 psig	58 pounds
HIP-41	350 grams equivalent U ²³⁵	240 BTU/hr	Normal conditions of transport Pressure = 1,500 psig Hypothetical fire accident condition Pressure = 2,000 psig	53 pounds

⁽¹⁾ The number of grams equivalent U²³⁵ is determined by the equation:
Grams Equivalent ²³⁵U = (1.0 x grams ²³⁵U) + (1.4 x grams ²³³U) + (1.6 x grams ²³⁹Pu)* + (0.07 x grams irradiated ²³²Th)

* If the ²⁴¹Pu content is less than or equal to 2 w/o of the plutonium, or if the ²⁴¹Pu content is greater than 2 w/o of the plutonium but less than the ²⁴⁰Pu content, the ²⁴¹Pu can be treated as if it were ²³⁹Pu. However, contents exceeding these limits must be evaluated on a case basis.

Plutonium in excess of twenty (20) curies per package must be in the form of metal, metal alloy, or reactor fuel elements.

⁽²⁾ For the specified condition, the total internal pressure, including any contribution due to pressure-generating decomposition of the cargo, must not exceed the specified pressure. A method for determining the pressure is provided in Section 3 of the NRBK-41 Safety Analysis Report for Packaging. Prior to shipment, the shipper must demonstrate that the pressure limit would not be exceeded by calculating what the pressure would be if the specified conditions were present.

c. Criticality Safety Index

Criticality safety index to be shown on label for nuclear criticality control: 0.0

d. Other Conditions (Restrictions)

- (1) The cask may be wrapped in polyvinyl chloride (PVC) when shipment is made in a closed vehicle. When the cask is to be wrapped in PVC, dose rate measurements on the surface of the cask must be taken prior to wrapping the cask. The applicable requirements of 10CFR71.87 must be satisfied prior to wrapping the shipping container.
- (2) The package must be operated in accordance with the Operating Procedures in Chapter 7 of the NRBK-41 Cask Safety Analysis Report for Packaging.
- (3) The shipper is responsible for ensuring that there are no adverse chemical reactions between the specimens and any parts of the inner container.
- (4) The package must be maintained in accordance with the Maintenance Procedures in Section 8.2 of the NRBK-41 Cask Safety Analysis Report for Packaging.

5. (Continued)

(5) For shipments in the HIP-41 inner container, the period of time over which the cargo remains in the container (referred to hereafter as the shipping limit) must be limited to 60 days unless the decay heat load of the cargo is less than 240 BTU/hr and the radiation level at one meter from the external surface of the loaded cask (transport index) is less than 10 mrem/hr. If the decay heat and radiation level are below the specified limits, the shipping limit can be increased by the ratio of the limit to the actual value. Both parameters must be considered, and only the smaller ratio can be used to increase the shipping limit.

(6) Transport by air of fissile material is not authorized.

e. References

None.

f. Additional Information

In a letter to Naval Reactors dated April 9, 2009, the Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards concurred that the modified NRBK-41 cask meets the requirements of 10CFR71.