

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

1 a. CERTIFICATE NUMBER 9321	b. REVISION NUMBER 0	c. DOCKET NUMBER 71-9321	d. PACKAGE IDENTIFICATION NUMBER USA/9321/B(U)-96	PAGE 1	PAGES OF 4
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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*)
EnergySolutions
140 Stoneridge Drive
Columbia, SC 29210
- b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION
EnergySolutions application, Revision No. 3, dated July 27, 2010.

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.: 3-60B
- (2) Description

A cylindrical austenitic stainless steel and lead shielded packaging for shipment of Type B quantities of radioactive waste materials. The packaging is transported in the horizontal position in a shipping cradle where it is supported and tied down by its four trunnions. Trunnions are structural parts of the packaging.

Approximate dimensions and weights are as follows:

Packaging Height	125-5/8 inches
Packaging Outer Diameter	51-1/2 inches
Packaging Cavity Height / Diameter	109-3/8 inches / 35 inches
Overall Package Height, with impact limiters	165 inches
Overall Package Diameter, with impact limiters	82 inches
Package Total Gross Weight	80,000 lbs
Maximum Total Weight of Contents, Secondary Containers and Cavity Spacers	9,500 lbs

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5.(a)(2) Description (Continued)

The packaging body consists of a 1 ¼-inch thick external stainless steel shell (ASTM A-240, Type 304L) and a 3/4-inch thick internal stainless steel shell. The annular space between the inner and outer shells is filled with a 6-inch thick layer of lead (ASTM B-29 commercial grade). A 12-gauge stainless steel (Type 304 L) thermal shield is welded to the exterior of the external shell to provide protection during hypothetical accident fire condition events.

A bolting ring provides sealing and bolting surfaces for the lid at the top end of the packaging. The lid, constructed of several circular stainless steel plates with a total thickness of 10 ½ inches, is sealed with a pair of elastomer O-rings and sixteen equally spaced 1 ½-inch diameter bolts. A test port hole is provided through the seal ring plate between the O-rings for periodic and pre-shipment leak-testing to verify proper seal closure.

The bottom end of the packaging consists of an external circular 3-inch thick stainless steel plate, a 5-inch thick lead shield, and a ¾-inch inner containment baseplate. The containment boundary is defined as the inner shell of the packaging body, the inner baseplate, the lid, the primary lid bolts, the inner O-rings, and the vent and drain port plugs.

The toroidal-shaped impact limiters extend approximately 15 inches beyond the outside wall of the packaging, and are constructed of fully welded stainless steel shells filled with a crushable foamed-in-place closed-cell rigid polyurethane foam with specifications described in the application.

(3) Drawings

The packaging is constructed and assembled in accordance with EnergySolutions Drawing No. C-002-165024-001, sheets 1- 5, Rev. 0.

5.(b) Contents

(1) Type and form of material

- (a) Byproduct, source, and special nuclear material in the form of inorganic solids, inorganic solidified material, and inorganic resins.
- (b) Radioactive material in the form of activated and/or contaminated non-fuel bearing reactor or accelerator components or segments of components.

(2) Maximum quantity of material per package

- (a) 1110 TBq (30,000 Ci) of Co-60 or equivalent. Equivalency to other radionuclides is determined by the total energy and its spectrum.

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- (b) Decay heat of contents must not exceed 500 watts. For contents with residual water, the total decay heat must not exceed 4.46 times the volume fraction divided by the mass fraction of water in the contents.
 - (c) Contents may include fissile material in compliance with the mass limits of 10 CFR 71.15. Any contents that contain more than 0.74 TBq (20 Ci) of plutonium must be in solid form.
 - (d) The specific activity of radioactive powdered or dispersible solids shall not exceed 330 Ci/gram of Co-60 or equivalent.
 - (e) Materials that auto-ignite or change phase below 350°F, not including water, shall not be included into the contents.
 - (f) Total weight of contents, including shoring and secondary containers, must not exceed 9,500 pounds.
6. In addition to the requirements of Subpart G of 10 CFR Part 71:
- (a) The package shall be prepared for shipment and operated in accordance with Chapter 7 of the application.
 - (b) The package shall meet the acceptance tests and be maintained in accordance with Chapter 8 of the application.
7. Contents shall be packaged in secondary containers.
8. Contents shall be placed such that the center of gravity of the package is at approximately the same location as the geometric center of the package – “approximately the same location” being defined as having a $\pm 10\%$ difference in distance of the cavity inside dimensions from the geometric center of the package in any direction.
9. Shoring must be placed between the secondary container and the packaging cavity to prevent movement during accident conditions of transport.
10. Flammable gas (hydrogen) concentration is limited to less than 5 % in volume. Inerting is not allowed to limit the concentration of flammable gases.
11. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.
12. Expiration date: August 31, 2015.

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REFERENCES

EnergySolutions application "Safety Analysis Report for the Model No. 3-60B Type B Shipping Cask,"
Revision No. 3, dated July 27, 2010.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

/RA/
Eric J. Benner, Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Date: August 26, 2010.

