

**CERTIFICATE OF COMPLIANCE  
FOR RADIOACTIVE MATERIAL PACKAGES**

1. a. CERTIFICATE NUMBER <b>9168</b>	b. REVISION NUMBER <b>23</b>	c. DOCKET NUMBER <b>71-9168</b>	d. PACKAGE IDENTIFICATION NUMBER <b>USA/9168/B(U)-96</b>	PAGE <b>1</b>	PAGE <b>OF 4</b>
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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  
Suite 100, Center Point II  
100 Center Point Circle  
Columbia, SC 29210**
- b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION  
**EnergySolutions application, Revision No. 11, dated  
May 2016.**

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.: 8-120B
- (2) Description

A cylindrical carbon steel, lead shielded, packaging designed for the transport of radioactive waste materials. The packaging has four tie-down and two removable lifting devices and is transported in the upright position with cylindrical foam-filled impact limiters, 102 inches outside diameter (OD), installed at each end of the packaging. The overall height of the package with the impact limiters attached is 132 ¼ inches. The maximum gross weight of the package is approximately 74,000 pounds (lbs), as follows:

Packaging Body	42,220 lbs
Lid	7,080 lbs
Payload	14,150 lbs
Impact Limiters	4,860 lbs (each)
Miscellaneous	830 lbs
Package	74,000 lbs

The cavity of the packaging is a right circular cylinder with an internal diameter of 61 13/16 inches and a height of 74 7/8 inches. The package body consists of two shells, both fabricated of ASTM A516, Grade 70 steel. The annular space between the 1½ inch thick external shell and the ¾ inch thick internal shell is filled with 3.35 inch thick lead. The primary lid is attached to the packaging body with twenty equally spaced 2-inch diameter bolts. A supplemental 14 gauge stainless steel sheet is welded to the inside surface of the primary lid.

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5(a)(2) Packaging Description (Continued)

The centered secondary lid is attached to the primary lid with twelve equally spaced 2-inch diameter bolts. A thermal shield, consisting of two polished stainless-steel plates separated by a thin air gap, is attached to the secondary lid lifting lugs with hitch-pins. A ½ inch thick steel plate covers the central hollow region of the lower impact limiter. A 12 gauge stainless steel liner is welded to the cavity of the package and the lid surface to protect all accessible areas from contamination.

The containment boundary consists of the inner shell, the upper baseplate, the bolting ring, the inner O-rings of the lids, and the lids. Test ports for leak testing of the package are located between the twin O-ring seals for both the primary and secondary lids.

There are three configurations of the packaging: Configuration 1 includes a drain port, sealed with the insertion and welding of a rod in the drain port; Configuration 2 does not have a drain port; Configuration 3 does not have a drain port and the packaging's base plate is fabricated differently than for Configurations 1 and 2. Fabrication of Configurations 1 and 2 is not authorized.

(3) Drawings

The packaging is constructed and assembled in accordance with EnergySolutions Drawing No. C-110-E-0007, 8-120B Shipping Cask, sheets 1-6, Revision No. 22.

The secondary lid thermal shield is constructed in accordance with EnergySolutions Drawing No. DWG-CSK-12CV01-EG-0001-01, 8-120B Cask Secondary Lid Thermal Shield Details, Rev. 3.

(b) Contents

(1) Type and form of material

- (i) Byproduct, source, or special nuclear material in the form of dewatered or grossly dewatered resins, solids, including powdered or dispersible solids, or solidified material, contained within secondary containers; or
- (ii) Radioactive material in the form of activated metals, or metal oxides in solid form, contained within secondary containers.

(2) Maximum quantity of material per package

- (i) Activity not to exceed 3,000 times a Type A quantity along with the following limits:

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- (1) The limit determined per the procedure in Attachment 1 to Chapter No. 7 of the application for beta and gamma emitting radionuclides.
- (2) The mass limits for fissile materials as prescribed by 10 CFR 71.15 for exempting materials from classification as fissile material.
- (3) A maximum total package neutron source of  $1 \times 10^5$  neutrons/second for materials that produce neutrons (other than fissile materials) through any means, including spontaneous fission, alpha-neutron reactions, and gamma-neutron reactions.
  - (ii) Maximum decay heat: 200 Watts.
  - (iii) Maximum weight of contents: 14,150 lbs including shoring and secondary containers.
  - (iv) Powdered or dispersible solid materials must have a mass of at least 60 grams or a specific activity of 50  $A_2/g$  or less.
  - (v) Explosives, corrosives, and non-radioactive pyrophorics are prohibited. Pyrophoric radionuclides may be present only in residual amounts below 1 weight per cent.
  - (vi) Materials that may auto-ignite or change phase at temperatures below 350°F, not including water, shall not be included in the contents. Also, contents shall not include any materials that may cause any significant chemical, galvanic, or any other reaction.
  - (vii) Powdered radioactive materials shall not include radioactive forms of combustible metal hydrides or combustible element metals, i.e., magnesium, titanium, sodium, potassium, lithium, zirconium, hafnium, calcium, zinc, plutonium, uranium, and thorium, or combustible non-metals, e.g., phosphorus.
  - (viii) Contents may only include quantities of boron, lithium, or beryllium such that these materials do not constitute quantities sufficient to be considered as a bulk material for a payload item or a portion of that payload item.

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

- (i) The package must be prepared for shipment and operated in accordance with the Operating Procedures of Chapter 7 of the application,
- (ii) The packaging must be tested and maintained in accordance with the acceptance tests and maintenance program described in Chapter 8 of the application.

7. Except for close fitting contents, shoring must be placed between the secondary containers, or activated components, and the package cavity's walls to prevent both radial and axial movements during transport.

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8. Flammable gas (hydrogen) concentration is limited to less than 5% in volume. Compliance with this concentration limit is determined by the methodology used in NUREG/CR-6673.
9. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.
10. Expiration date: August 31, 2017.

REFERENCES

EnergySolutions application, Revision No. 11, May 2016.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

**/RA/**

John McKirgan, Chief  
Spent Fuel Licensing Branch  
Division of Spent Fuel Management  
Office of Nuclear Material Safety  
and Safeguards

Date: July 5, 2016

