East Building, PHH-23
1200 New Jersey Ave, SE
Washington, D.C. 20590

U.S. Department of Transportation

Pipeline and Hazardous Materials Safety Administration

COMPETENT AUTHORITY CERTIFICATION FOR A TYPE B(U) RADIOACTIVE MATERIALS PACKAGE DESIGN CERTIFICATE USA/9320/B(U)-96, REVISION 5

The Competent Authority of the United States certifies that the radioactive material package design described in this certificate satisfies the regulatory requirements for a Type B(U) package as prescribed in the regulations of the International Atomic Energy Agency[1] and the United States of America[2] The package design is approved for use within the United States for import and export shipments made in accordance with applicable international and domestic transport regulations.

1. Package Identification - MIDUS.

2. Package Description and Authorized Radioactive Contents - as described in U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9320, Revision 6 (attached).

3. General Conditions -

   a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.

   b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Engineering and Research, (PHH-23), Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.

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[1] "Regulations for the Safe Transport of Radioactive Material, 2012 Edition, No. SSR-6" published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

[2] Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.

d. Records of Management System activities required by Paragraph 306 of the IAEA regulations[1] shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors in the United States exporting shipments under this certificate shall satisfy the applicable requirements of Subpart H of 10 CFR 71.

4. Marking and Labeling - The package shall bear the marking USA/9320/B(U)-96 in addition to other required markings and labeling.

5. Expiration Date - This certificate expires on November 30, 2026. Previous editions which have not reached their expiration date may continue to be used.

This certificate is issued in accordance with paragraph(s) 810 of the IAEA Regulations and Section 173.471 of Title 49 of the Code of Federal Regulations, in response to the April 25, 2022 petition by EnergySolutions, Columbia, SC, and in consideration of other information on file in this Office.

Certified By:

May 03, 2022

William Schoonover
Associate Administrator for Hazardous Materials Safety

(DATE)

Revision 5 - Issued to endorse U.S. Nuclear Regulatory Commission Certificate of Compliance 9320, Revision 6.

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
9320	6	71-9320	USA/9320/B(U)-96	1	OF	3

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)*

Energy*Solutions*
740 Osborn Road
Barnwell, SC 29812

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

MIDUS Transportation Package Safety Analysis Report, Revision 7, dated March 2022.

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.: MIDUS

(2) Description

A depleted-uranium shielded package for the transport of medical isotopes. The package has two primary components: (1) an inner cask assembly that provides containment of the radioactive material and radiation shielding, and (2) an overpack that provides impact and thermal protection.

The cask assembly consists of the cask body, closure lid, shield plug, and shield lid. The cask body is a monolithic, machined 2.5-millimiter (mm) thick stainless steel containment vessel, surrounded by approximately 62 mm of depleted uranium gamma shielding, and a 4-mm thick stainless steel outer shell. The containment system closure lid is a 19-mm thick stainless steel plate which is attached to the cask body by 8, M10 × 1.5 × 30 socket head cap screws. The containment system is sealed by two concentric ethylene propylene O-rings, and the lid is equipped with a leak test port. A stainless steel clad depleted uranium shield plug in the cask cavity and a shield lid that is installed over the closure lid provide shielding at the top end of the package. The overpack base and lid are constructed of thin stainless steel shells filled with rigid polyurethane foam. The overpack lid is attached to the base by eight recessed alloy steel bolts. The overpack lid is equipped with four stainless steel lugs for lifting and tie-down, and the overpack base has a bottom flange with four lugs that may also be used for tie-down.

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

The approximate dimensions and weight of the package are:

Overall package outer diameter	520 mm
Overall package height	551 mm
Cask assembly diameter	225 mm
Cask assembly height	347 mm
Cask cavity inner diameter	85 mm
Cask cavity inner height	134 mm
Maximum package weight	330 kg

(3) Drawings

The packaging is constructed and assembled in accordance with EnergySolutions Drawing Nos.:

TYC01-1601, Sheets 1 and 2, Rev. 2	"General Arrangement of Packaging and Contents"
TYC01-1602, Sheets 1 through 4, Rev. 2	"General Arrangement of Cask Assembly"
TYC01-1603, Sheets 1 through 3, Rev. 1	"General Arrangement of Overpack Assembly"
TYC01-1604, Sheets 1 through 3, Rev. 3	"Containment System"
TYC01-1605, Sheets 1 and 2, Rev. 2	"Closure Devices"
TYC01-1606, Sheets 1 through 3, Rev. 2	"Gamma Shielding"
TYC01-1607, Sheets 1 and 2, Rev. 0	"Heat Transfer Features"
TYC01-1608, Sheet 1, Rev. 0	"Energy Absorbing Features"
TYC01-1609, Sheets 1 and 2, Rev. 0	"Lifting and Tie-Down Devices"

(b) Contents

(1) Type and form of material

(i) Molybdenum-99 (^{99}Mo) with its daughter products as natrium molybdate ($NaNO_3$ 1M / NaOH 0.2M) in liquid form.

The liquid may be contained within product bottles, consisting of stainless steel flasks with stainless steel caps, with or without elastomeric seals. Various stainless steel components may be used as dunnage. The total volume of the payload hardware may not exceed 125 ml (as indicated by a maximum mass of 1.0 kg).

(ii) Molybdenum-99 with its daughter products as solid, metallic molybdenum.

The metal will be contained within a sealed aluminum target can and placed in an aluminum carrier. The total mass of the payload shall not exceed 1.0 kg, including the target cans and carrier.

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

Maximum activity	4,400 Ci ^{99}Mo
Maximum specific activity	60 Ci/ml ^{99}Mo
Liquid product volume	0 to 150 ml
Maximum mass of material	1.0 kg

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 the Package Operations in Section 7.0 of the application. Optional polymeric dunnage may be placed in the space between the cask assembly and the overpack.

(b) The package must meet the Acceptance Tests and Maintenance Program in Section 8.0 of the application.

7. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17.

8. Revision No. 5 of the certificate may be used until April 30, 2023.

9. Expiration date: November 30, 2026.

REFERENCES

MIDUS Transportation Package Safety Analysis Report (Document No: TYC01-1600), Revision 7, dated March 23, 2022.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Yoira Diaz-Sanabria, Chief
Storage and Transportation Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

Date: April 21, 2022

East Building, PHH-23
1200 New Jersey Ave, SE
Washington, D.C. 20590

U.S. Department of
Transportation

**Pipeline and
Hazardous Materials
Safety Administration**

CERTIFICATE NUMBER: USA/9320/B(U)-96

ORIGINAL REGISTRANT(S):

Mallinckrodt Nuclear Medicine, LLC
Mallinckrodt Nuclear Medicine, LLC
2703 Wagner Place
Maryland Heights, MO, 63043
USA

EnergySolutions
151 Lafayette Drive, Suite 201
Oak Ridge, TN, 37830
USA

University of Missouri-Columbia
1513 Research Park
Columbia, MO, 65211
USA

POLATOM
National Centre for Nuclear Research
Radioisotope Centre
Andrzej Solatn 7
Otwock, Poland, 05-400
Poland

Curium
2703 Wagner Place
Maryland Heights, MO, 63043
USA