



U.S. Department
of Transportation

Pipeline and
Hazardous Materials
Safety Administration

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

**COMPETENT AUTHORITY CERTIFICATION FOR A
TYPE FISSILE**

**RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0535/AF-96, REVISION 5**

**REVALIDATION OF JAPANESE COMPETENT AUTHORITY
CERTIFICATE J/105/AF-96**

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 AF package as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America².

1. Package Identification - MFC-1.
2. Package Description and Authorized Radioactive Contents - as described in Japanese Certificate of Competent Authority J/105/AF-96, Revision 3 (attached).
3. Criticality - The minimum criticality safety index is 0.0. The maximum number of packages per conveyance is determined in accordance with Table 11 of the IAEA regulations cited in this certificate.
4. 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.

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.

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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 regulations¹ 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.

5. Special Conditions -

a. Transport by air is prohibited.

6. Marking and Labeling - The package shall bear the marking USA/0535/AF-96 in addition to other required markings and labeling.

7. Expiration Date - This certificate expires on July 7, 2024. Previous editions which have not reached their expiration date may continue to be used.

This certificate is issued in accordance with paragraph(s) 816 of the IAEA Regulations and Section 173.472 and 173.473 of Title 49 of the Code of Federal Regulations, in response to the November 12, 2019 petition by TN Americas LLC, Columbia, MD, and in consideration of other information on file in this Office.

Certified By:



William Schoonover
Associate Administrator for Hazardous
Materials Safety

November 18, 2019
(DATE)

Revision 5 - Issued to endorse the Japanese Certificate of Approval No. J/105/AF-96, Revision 3, dated October 7, 2019.



IDENTIFICATION MARK

J/105/AF-96 (Rev. 3)

COMPETENT AUTHORITY
OF
JAPAN

CERTIFICATE FOR APPROVAL OF
PACKAGE DESIGN
FOR THE TRANSPORT OF
RADIOACTIVE MATERIALS

ISSUED BY

NUCLEAR REGULATION AUTHORITY
1-9-9, ROPPONGI MINATO-KU
TOKYO, JAPAN



**CERTIFICATE FOR APPROVAL OF PACKAGE DESIGN
FOR THE TRANSPORT OF RADIOACTIVE MATERIALS**

This is to certify, in response to the application by Mitsubishi Nuclear Fuel Co., LTD., that the package design described herein complies with the design requirements for a package containing fuel assemblies for pressurized water reactor (hereafter called "PWR"), specified in the 2012 Edition of the Regulations for the Safe Transport of Radioactive Material (International Atomic Energy Agency, Safety Standards Series No.SSR-6) and the Japanese rules based on the Act on Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors.

This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.

COMPETENT AUTHORITY

IDENTIFICATION MARK: J/105/AF-96 (Rev. 3)

Oct. 7 2019

Date

K. Hasegawa

Kiyomitsu Hasegawa

Director, Division of Licensing for
Nuclear Fuel Facilities

Secretariat of Nuclear Regulation Authority
Competent Authority of JAPAN
for Package Design Approval

1. The Competent Authority Identification Mark: J/105/AF-96 (Rev. 3)

2. Name of Package: MFC-1

3. Type of Package: Type A, Fissile Material Package

4. Specification of Package

(1) Material of Packaging: See the attached Table-1

(2) Total Weight of Packaging: Approximately 2,804 kg

(3) Outer Dimensions of Packaging:

(i) Length : Approximately 5,400 mm

(ii) Outer Diameter : Approximately 1,150 mm

(iii) Height : Approximately 1,275 mm

(4) Total Weight of Package: 4,340 kg or less

(5) Illustration of Package: See the attached Figure-1 (Bird's-eye view)

5. Specification of Radioactive Contents: See the attached Table-2

6. Description of Containment System

There are no components as the containment device in this packaging, and the containment boundary consists of cladding tube and end plugs of fuel rod.

7. For Package containing Fissile Materials,

(1) Restrictions on Package

(i) Restriction Number "N": No restriction

(ii) Array of Package: No restriction

(iii) Criticality Safety Index (CSI): 0

(2) Description of Confinement System

The confinement system of the package consists of fuel rods, fuel assemblies, cradle assembly (consists of shock mount frame, cross frame including skin plates (neutron absorber) and clamping frames) and outer shells of both upper cover and lower container.

(3) Assumptions of Leakage of Water into Package

In order to derive higher neutron multiplication, in criticality assessment, it is assumed that water whose density is $1.0 \text{ (g/cm}^3\text{)}$ exists both inside and outside the package and the accommodated fuel assemblies are completely flooded with the water but no water is leaked into the fuel rods.

(4) Special Features in Criticality Assessment

In inspection before each shipment and annual periodical inspection, appearance check of the confinement system is performed to confirm to maintain integrity of the confinement system.

8. For Type B(M) Packages, a statement regarding prescriptions of Type B(U) Package that do not apply to this Package

This is not applicable to this type MFC-1 package.

9. Assumed Ambient Conditions

(i) Ambient Temperature Range: $-20 \text{ }^\circ\text{C} \sim 38 \text{ }^\circ\text{C}$

(ii) Insolation Data: Table 12 of IAEA Regulation

10. Handling, Inspection and Maintenance

Execute handling, the periodic inspection and maintenance of the packaging by the method indicated in the safety analysis report of this package.

11. Issued Date and Expiry Date

(i) Issue Date : July 8, 2019

(ii) Expiry Date : July 7, 2024

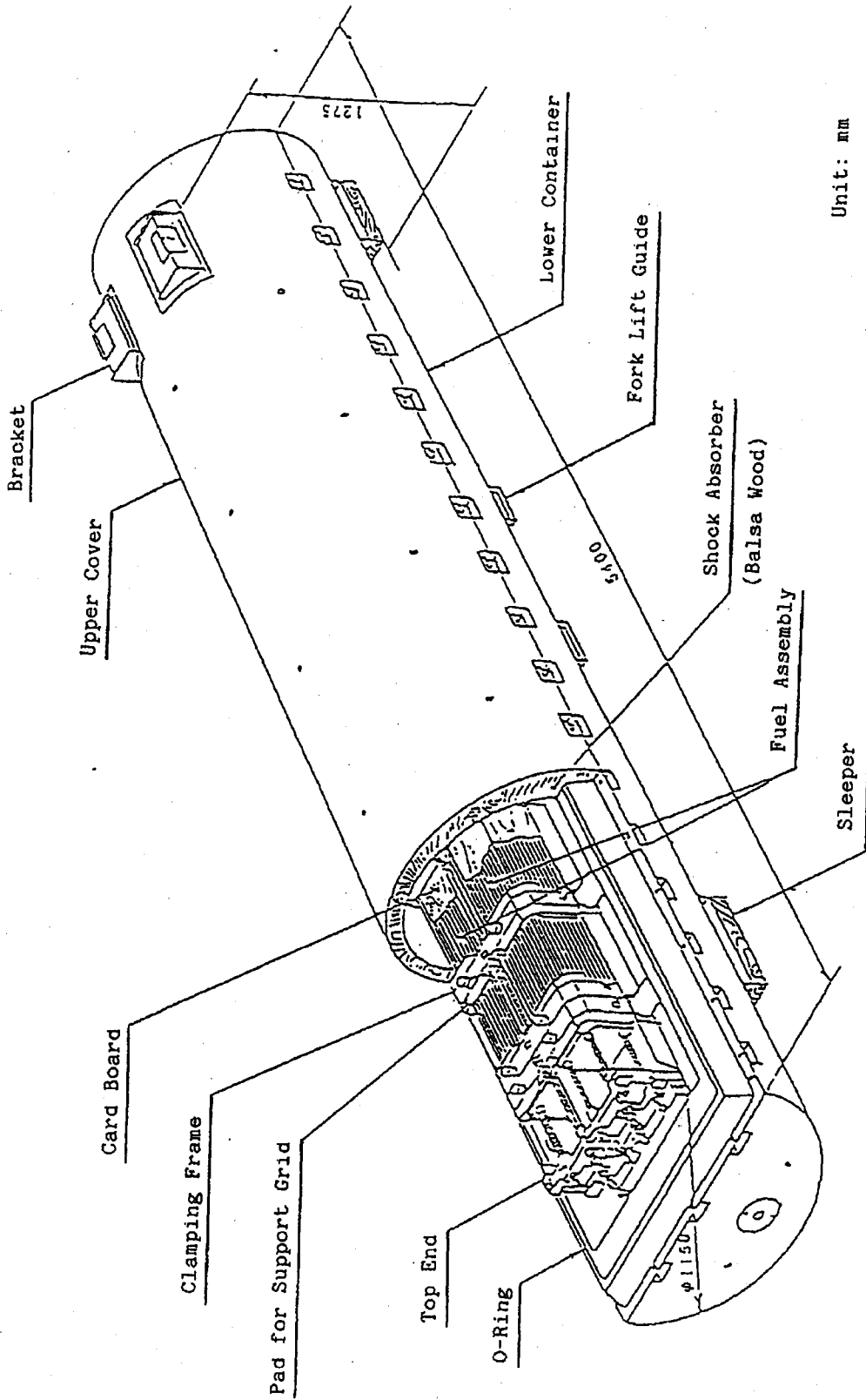


Figure-1 Illustration of Package (Bird's-eye view)

Table-1 Material of Packaging

Construction	Material
a. External Shell	Carbon Steel (SPCC, SS400)
b. Shock Absorber	Wood (Balsa Wood)
c. Cradle Assembly	Carbon Steel (SM490A, SS400), and Boronated Stainless Steel
d. O-Ring	Synthetic Rubber (Neoprene)
e. Shock Mount	Synthetic Rubber (Polybutadiene)

Table-2 Specification of Radioactive Content

Fuel Assembly Type		14×14 (10 ft)	14×14 (12 ft)	15×15 (12 ft)	17×17 (12 ft)	
(Per one package)						
Description		Fuel Assembly for PWR				
Physical State		Solid (UO ₂ Pellet or Gadolinia-UO ₂ Pellet)				
Weight	Number of contents	Two assemblies or less				
	Fuel assembly	1,400 kg or less				
	UO ₂	1,080 kg or less				
Activity	Total	1.65×10 ¹¹ Bq or less				
	Major Nuclide (*1)	²³² U	7.60×10 ⁷ Bq			
		²³⁴ U	1.22×10 ¹¹ Bq			
		²³⁵ U	3.84×10 ⁹ Bq			
		²³⁶ U	5.74×10 ⁸ Bq			
		²³⁸ U	1.13×10 ¹⁰ Bq			
⁹⁹ Tc	6.02×10 ⁶ Bq					
Initial enrichment	UO ₂	5 wt% or less				
	Gadolinia-UO ₂	3.3 wt% or less (Gadolinia concentration: 10.2 wt% or less)				
(Per one fuel assembly)						
Weight	Fuel assembly	490 kg or less	600 kg or less	680 kg or less	700 kg or less	
	UO ₂	390 kg or less	470 kg or less	540 kg or less	540 kg or less	
Radio-nuclides	²³² U	≤0.0001 μg/gU				
	²³⁴ U	≤11,000 μg/g ²³⁵ U				
	²³⁶ U	≤5,000 μg/g ²³⁵ U				
	⁹⁹ Tc	≤0.01 μg/gU				
	If the ²³⁶ U measurement result is less than 125 μg/gU, then measurement of ²³² U and ⁹⁹ Tc is not required.					

(*1) Reference value.



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CERTIFICATE NUMBER: USA/0535/AF-96

ORIGINAL REGISTRANT(S) :

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