



U.S. Department
of Transportation

**Pipeline and
Hazardous Materials
Safety Administration**

**COMPETENT AUTHORITY CERTIFICATION
FOR A FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/4986/AF, REVISION 31**

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

This certifies that the radioactive material package design described has been certified by the Competent Authority of the United States as meeting the regulatory requirements for a Type AF packaging for fissile radioactive material as prescribed in the regulations of the International Atomic Energy Agency¹ and the United States of America².

1. Package Identification - Model RA-3.
2. Package Description and Authorized Radioactive Contents - as described in U.S. Nuclear Regulatory Commission Certificate of Compliance No. 4986, Revision 41 (attached).
3. Criticality - The minimum criticality safety index is as assigned in the NRC Certificate. The maximum number of packages per conveyance is determined in accordance with Table X 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 Hazardous Materials Technology, (PHH-23), Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington D.C. 20590-0001.
 - 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.

1 "Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), No. TS-R-1 (ST-1, Revised)," published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

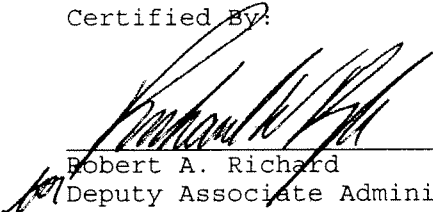
2 Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

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- d. Records of Quality Assurance activities required by Paragraph 310 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 Condition - Transport of fissile material by air is not authorized.
6. Marking and Labeling - The package shall bear the marking USA/4986/AF in addition to other required markings and labeling.
7. Expiration Date - This certificate expires on October 01, 2008. On March 31, 2008, this certificate supersedes all previous revisions of USA/4986/AF.

This certificate is issued in accordance with paragraph 814 of the IAEA Regulations and Section 173.471 and 173.472 of Title 49 of the Code of Federal Regulations, in response to the February 27, 2008 petition by Global Nuclear Fuels - Americas, Wilmington, NC, and in consideration of other information on file in this Office.

Certified By:



Robert A. Richard
Deputy Associate Administrator for Hazardous Materials Safety

MAR 13 2008

(DATE)

Revision 31 - Issued to endorse U.S. Nuclear Regulatory Commission Certificate of Compliance No. 4286, Revision 41.

**CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES**

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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 (<i>Name and Address</i>) | b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION |
| Global Nuclear Fuel - Americas, L.L.C.
P.O. Box 780
Wilmington, NC 28402 | General Electric Company application dated
September 10, 1997, as supplemented. |

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.: RA-3
- (2) Description

A fuel assembly and fuel rod shipping container. Packagings are right rectangular boxes consisting of an outer container of wooden construction and a metal inner container separated by cushioning material.

The metal inner container is approximately 11 inches by 18 inches by 178 inches long and is positioned within a wooden outer container approximately 30 inches by 30 inches by 207 inches long. Cushioning is provided between the inner and outer containers by phenolic impregnated honeycomb and ethafoam. Closure is accomplished by bolts. A pressure relief (breather) valve is provided on the inner container, and is set for 0.5 psi differential. The total weight of the packaging and contents is 2,800 pounds.

(3) Drawings

The packaging is constructed in accordance with General Electric Company Drawing Nos. 769E229, Revision 9; and 769E231, Revision 8.

(4) Product Container

The fuel rod product container is constructed in accordance with General Electric Company Drawing No. 0028B98, Revision 0.

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5.(b) Contents

(1) Type and form of material

- (i) Unirradiated UO_2 fuel assemblies. Each fuel assembly is made up of either 60 or 62 rods in an 8 x 8 square array with maximum fuel cross-sectional area of 25 square inches and a maximum fuel length of 150 inches. The maximum U-235 enrichment is 5.0 percent by weight, and the maximum average enrichment is 5.0 percent by weight. The maximum pellet diameter, minimum clad thickness, water rod specifications, and poison rod specifications are in accordance with Section 6.1, Appendix 8-H, of the supplements dated June 27 and November 1, 1995.
- (ii) Unirradiated UO_2 fuel assemblies. Each fuel assembly is made up of 74 full and partial length rods in a 9 x 9 square array with maximum fuel cross-sectional area of 25 square inches and a maximum fuel length of 150 inches. The maximum U-235 enrichment is 5.0 percent by weight, and the maximum average enrichment is 4.6 percent by weight. The maximum pellet diameter, minimum clad thickness, water rod specifications, and poison rod specifications are in accordance with Section 6.1, Appendix 8-I, of the supplements dated June 27 and November 1, 1995.
- (iii) Unirradiated UO_2 fuel assemblies. Each fuel assembly is made up of 92 full and partial length rods in a 10 x 10 square array with maximum fuel cross-sectional area of 25 square inches and a maximum fuel length of 150 inches. The maximum U-235 enrichment is 5.5 percent by weight, and the maximum average enrichment is 5.0 percent by weight. The maximum pellet diameter, minimum clad thickness, water rod specifications, and poison rod specifications are in accordance with Section 6.1, Appendix 8-J, of the supplements dated June 27 and November 1, 1995.
- (iv) Unirradiated UO_2 fuel assemblies. Each fuel assembly is made up of 92 full and partial length rods in a 10 x 10 square array with maximum fuel cross-sectional area of 25 square inches and a maximum fuel length of 150 inches. The maximum U-235 enrichment is 5.0 percent by weight, and the maximum average enrichment is 4.7 percent by weight. The maximum pellet diameter, minimum clad thickness, water rod specifications, and poison rod specifications are in accordance with Section 5.1 and Table 5.1 contained in Appendix 8-J(a) of the supplement dated May 10, 2005.
- (v) Unirradiated UO_2 fuel rods, which are contained within the product container specified in 5(a)(4). The maximum U-235 enrichment is 5.0 percent by weight. The fuel rods are clad with zircaloy, incaloy, inconel, or stainless steel. The minimum pellet diameter is 0.340 inch, and the maximum pellet diameter is 0.515 inch.
- (vi) Unirradiated UO_2 fuel rods, which may be loose or may be strapped together. The maximum U-235 enrichment is 5.0 percent by weight. The fuel rods are clad with zircaloy, incaloy, inconel, or stainless steel. The minimum pellet diameter is 0.340 inch, and the maximum pellet diameter is 0.515 inch.

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

- (i) For the contents described in 5(b)(1)(i), 5(b)(1)(ii), 5(b)(1)(iii), and 5(b)(1)(iv):

Two (2) fuel assemblies. Total quantity of radioactive material within a package may not exceed a Type A quantity.

- (ii) For the contents described in 5(b)(1)(v):

Two (2) fuel bundles. A fuel bundle is defined as any number of fuel rods contained within the product container specified in 5(a)(4).

- (iii) For the contents described in 5(b)(1)(vi):

Two (2) fuel bundles. A fuel bundle is defined as a maximum of 14 fuel rods positioned within one side (channel) of the inner container.

(c) Criticality Safety Index (CSI)

For the contents described in 5(b)(1)(i), 5(b)(1)(ii) and 5(b)(1)(iii), and limited in 5(b)(2)(i):

0.4

For the contents described in 5(b)(1)(iv), and limited in 5(b)(2)(i):

0.8

For the contents described in 5(b)(1)(v), and limited in 5(b)(2)(ii):

6.3

For the contents described in 5(b)(1)(vi), and limited in 5(b)(2)(iii):

2.9

6. Each fuel assembly must be unsheathed or must be enclosed in an unsealed, polyethylene sheath which may not extend beyond the ends of the fuel assembly. The ends of the sheath may not be folded or taped in any manner that would prevent the flow of liquids into or out of the sheathed fuel assembly.
7. Polyethylene holders with a maximum effective thickness of 0.151 inches (0.3835 cm) may be placed surrounding the fuel assembly up to a maximum of 0.13 grams H₂O hydrogen equivalent per cubic centimeter averaged over the assembly. The effective holder thickness is the linear average of the maximum and minimum thickness.
8. Polyethylene shipping shims may be inserted between rods within the fuel assemblies up to a maximum of 0.10 grams H₂O hydrogen equivalent per cubic centimeter averaged over the assembly. The shipping shims may be used with or without the polyethylene holders.

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9. For shipment of fuel rods described in 5(b)(1)(v) and 5(b)(1)(vi), each fuel rod may be contained within a polyethylene sheath with a maximum thickness of 0.01 inch. Dunnage is permitted within the product container, and within the inner container, provided that the dunnage does not have a hydrogen density greater than that of water.
10. Maximum average enrichment means the highest enrichment averaged over any axial zone of the assembly.
11. In addition to the requirements of Subpart G of 10 CFR Part 71, each packaging must meet the Acceptance Tests and Maintenance Program of Chapter 6 of the application, and the package must be prepared for shipment and operated in accordance with the Operating Procedures of Chapter 6 of the application.
12. Transport of fissile material by air is not authorized.
13. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR 71.17, provided that fabrication of the package was satisfactorily completed by August 31, 1986.
14. Revision No. 40 of this certificate may be used until October 1, 2008.
15. Expiration date: October 1, 2008. This certificate is not renewable.

REFERENCES

General Electric Company application dated September 10, 1997.

Supplements dated: November 20, 1997; June 5 and 25, July 1 and 21, and August 14, 1998; October 14, 1999; December 19, 2002; January 21, and December 3, 2004; April 18 and May 10, 2005; and January 2, 2008.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION



Robert A. Nelson, Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material
Safety and Safeguards

Date: January 31, 2008

SAFETY EVALUATION REPORT
Model No. RA-3 Package
Certificate of Compliance No. 4986
Revision No. 41

SUMMARY

By application dated January 2, 2008, Global Nuclear Fuel – Americas, LLC, requested renewal of Certificate of Compliance No. 4986, for the Model No. RA-3 package. No changes in the package design or contents were requested. Accordingly, the certificate has been renewed for an approximately 8-month period, ending October 1, 2008.

EVALUATION

By application dated January 2, 2008, Global Nuclear Fuel – Americas, LLC, requested that Certificate of Compliance No. 4986, for the Model No. RA-3 package, be extended from March 31, 2008, until October 1, 2008, in order to facilitate shipment of fuel bundles to Taiwan. The extension, or renewal, was requested since the certificate expiration date was shown as March 31, 2008. No changes in the package design or contents were requested.

The following revisions to the certificate have been made:

- Condition No. 12 was added to clarify that fissile material is not authorized for air transport.

New requirements for the shipment of fissile material by air became effective on October 1, 2004. These requirements are codified in 10 CFR 71.55(f). The applicant did not provide an evaluation against the requirements of this new provision. Therefore, the certificate has been revised to clarify that air transport is not authorized.

- Condition No. 13 of the certificate was revised to clarify that use of the package is authorized provided that fabrication of the package was satisfactorily completed by August 1, 1986.

The provisions of 10 CFR 71.19 include restrictions on fabrication of new packagings for previously approved package designs. For Type AF packages approved by NRC prior to September 6, 1983, use is authorized only if fabrication of the packaging was satisfactorily completed by August 1, 1986. Therefore this restriction is included in Condition No. 13.

- Condition No. 14 was added that allows the previous revision of the certificate to be used until October 1, 2008.

This provision is included to allow transition from one certificate revision to the next. Since authority to use the package expires on October 1, 2008, by regulation, the condition allows the previous revision to also be used through that date.

- The certificate was renewed, and the expiration date was changed to October 1, 2008 (Condition No. 15). It is also noted that the certificate is not renewable.

The staff reviewed the documents referenced in the certificate and determined that the documentation was available and complete. The provisions of 10 CFR 71.17(a)(3) specify that Type AF packages approved by NRC prior to September 6, 1983, are not authorized for use after October 1, 2008. Therefore the certificate expiration date was changed to be conterminus with that date. For clarity it is noted that the certificate is not renewable (after October 1, 2008), and is therefore not authorized for use under the timely renewal provisions of 10 CFR 71.38 after October 1, 2008.

CONCLUSIONS

Based on the statements and representations in the application, and the conditions described above, the staff agrees these changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 4986,
Revision No. 13, on January 31, 2008.



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of Transportation

**Pipeline and
Hazardous Materials
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East Building, PHH-23
1200 New Jersey Avenue SE
Washington, D.C. 20590

CERTIFICATE NUMBER: USA/4986/AF-96, Revision 31

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