



U.S. Department  
of Transportation

400 Seventh Street, S.W.  
Washington, D.C. 20590

Pipeline and  
Hazardous Materials  
Safety Administration

COMPETENT AUTHORITY CERTIFICATION  
FOR A FISSILE  
RADIOACTIVE MATERIALS PACKAGE DESIGN  
CERTIFICATE USA/9297/AF-96, REVISION 1

This certifies that the radioactive materials package design described below has been certified by the Competent Authority of the United States as meeting the regulatory requirements for a packaging for fissile radioactive materials as prescribed in the regulations for the International Atomic Energy Agency<sup>1</sup> and United States of America<sup>2</sup>.

1. Package Identification - Traveller STD and Traveller XL.
2. Packaging Description and Authorized Contents - as described in U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9297, Revision 1 (attached).
3. Criticality -
  - a. Criticality Safety Index when transporting fuel assemblies: 0.7  
Criticality Safety Index when transporting loose rods in rod containers: 0.0
  - b. The maximum number of packages shall be determined in accordance with Table X of the IAEA's "Regulations for the Safe Transport of Radioactive Materials, 1996 Edition (Revised), No. TS-R-1 (ST-1 Revised).
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 in accordance with the endorsed certificate.
  - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Hazardous Materials Technology (DHM-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.
  - d. Records of Quality Assurance activities required by Paragraph 209 of the IAEA regulations<sup>1</sup> shall be maintained and made available to the authorized officials for at least three years after the last shipment authorized by this certificate. Consignors and consignees in the United States exporting or importing shipments under this certificate shall satisfy the requirements of Subpart H of 10 CFR 71.

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

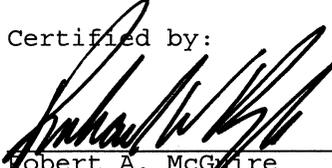
<sup>2</sup> Title 49, Code of Federal Regulations, Parts 100 - 199, United States of America.

CERTIFICATE USA/9297/AF-96, REVISION 1

5. Marking and Labeling - The package shall bear the marking USA/9297/AF-96 in addition to other required markings and labeling.
6. Expiration Date - This certificate expires on March 31, 2010. On April 30, 2007, this certificate supercedes all previous revisions of USA/9297/AF-96.

This certificate is issued in accordance with paragraph 814 of the IAEA Regulations and Section 173.473 of Title 49 of the Code of Federal Regulations, in response to the April 27, 2006 petition by Westinghouse Electric Company, Columbia, SC and in consideration of other information on file in this Office.

Certified by:

  
Robert A. McGuire

Acting Associate Administrator for Hazardous Materials Safety

APR 28 2006

(DATE)

Revision 1 - issued to endorse U.S. Nuclear Regulatory Commission Certificate of Compliance No. 9297, Revision 1, which revised the weight limits and drawings related to the transport of loose fuel rods.

|  |                    |                                    |                                  |      |       |
|--|--------------------|------------------------------------|----------------------------------|------|-------|
| NRC FORM 618<br>(8-2000)<br>10 CFR 71                                  |                    | U.S. NUCLEAR REGULATORY COMMISSION |                                  |      |       |
| <b>CERTIFICATE OF COMPLIANCE<br/>FOR RADIOACTIVE MATERIAL PACKAGES</b> |                    |                                    |                                  |      |       |
| 1. a. CERTIFICATE NUMBER   | b. REVISION NUMBER | c. DOCKET NUMBER                   | d. PACKAGE IDENTIFICATION NUMBER | PAGE | PAGES |
| 9297   | 1                  | 71-9297                            | USA9297/AF-96                    | 1    | OF 6  |

## 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)

Westinghouse Electric Company  
P.O. Drawer R  
Columbia, SC 29250

## b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

Westinghouse Electric Company application  
dated April 1, 2004, 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 Nos.: Traveller STD and Traveller XL
- (2) Description:

The Traveller package is designed to transport non-irradiated uranium fuel assemblies or rods with enrichment up to 5.0 weight percent. The package is designed to carry one fuel assembly or one container for loose rods. The package consists of three components: 1) an outerpack, 2) a clamshell, and 3) a fuel assembly or rod container.

The outerpack is a structural component that serves as the primary impact and thermal protection for the fuel assembly or rod container. The outerpack has a long horizontal tubular design consisting of a top and bottom half. At each end of the package are thick limiters consisting of two sections of foam of different densities sandwiched between three layers of sheet metal. The impact limiters are integral parts of the outerpack and reduce damage to the contents during an end, or high-angle drop. The outerpack also provides for lifting, stacking, and tie down during transportation.

The clamshell is a horizontal structural component that serves to protect the contents during routine handling and in the event of an accident. The clamshell consists of an aluminum "V" extrusion, two aluminum door extrusions, and a small access door. Each extruded aluminum door is connected to the "V" extrusion with piano-type hinges (continuous hinges). These doors are held closed with a latching mechanism and quarter-turn bolts. Neutron absorber plates are installed in each leg of the "V" extrusion and in each of the doors. The "V" extrusion and the bottom plate are lined with a cork rubber pad to cushion and protect the contents during normal handling and transport conditions.

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 |
|--------------------------|--------------------|------------------|----------------------------------|------|-------|
| 9297                     | 1                  | 71-9297          | USA/9297/AF-96                   | 2    | OF 6  |

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

The Traveller package is designed to carry loose rods using either of two types of rod containers: a rod box or rod pipe. The rod box is an ASTM, Type 304 stainless steel container of rectangular cross section with stiffening ribs located approximately every 60 centimeters (cm) (23.6 inches (in.)) along its length. It is secured by fastening a removable top cover to the container body using socket head cap screws. The rod pipe consists of a 15.2 cm (6 in.) standard 304 stainless steel, Schedule 40 pipe, and standard 304 stainless steel closures at each end. The closure is a 0.635 cm (0.25 in.) thick cover secured with Type 304 stainless steel hardware to a flange fabricated from 0.635 cm (0.25 in.) thick plate.

There are two models of the Traveller packaging, the Traveller STD and the Traveller XL.

Traveller STD:

|                        |   |
|------------------------|---|
| Package gross weight   | 2,041 kilograms (kg) (4,500 pounds (lbs)) |
| Packaging gross weight | 1,293 kg (2,850 lbs)                      |
| Contents gross weight  | 748 kg (1,650 lbs)                        |
| Outer dimensions       |   |
| Length                 | 500 cm (197 in.)                          |
| Width                  | 68.6 cm (27.1 in.)                        |
| Height                 | 100 cm (39.3 in.)                         |

Traveller XL:

|                        |                      |
|------------------------|----------------------|
| Package gross weight   | 2,313 kg (5,100 lbs) |
| Packaging gross weight | 1,519 kg (3,329 lbs) |
| Contents gross weight  | 894 kg (1,971 lbs)   |
| Outer dimensions       |                      |
| Length                 | 574 cm (226 in.)     |
| Width                  | 68.6 cm (27.1 in.)   |
| Height                 | 100 cm (39.3 in.)    |

(3) Drawings

The packagings are fabricated and assembled in accordance with the following Westinghouse Electric Company's Drawing Nos.:

10004E58, Rev. 3 (Sheets 1-8)  
10006E58, Rev. 5  
10006E59, Rev. 1 (Sheets 1-2)

(b) Contents (Type and Form of Material)

(1) Fuel Assembly

- (i) Unirradiated PWR uranium dioxide fuel assemblies with a maximum uranium-235 enrichment of 5.0 weight percent. The parameters of the fuel assemblies that are permitted are as follows:

|   |                                    |                  |                                  |      |       |
|---|------------------------------------|------------------|----------------------------------|------|-------|
| NRC FORM 618<br>(8-2000)<br>10 CFR 71   | U.S. NUCLEAR REGULATORY COMMISSION |                  |                                  |      |       |
| <b>CERTIFICATE OF COMPLIANCE<br/>                 FOR RADIOACTIVE MATERIAL PACKAGES</b> |                                    |                  |                                  |      |       |
| 1. a. CERTIFICATE NUMBER  | b. REVISION NUMBER                 | c. DOCKET NUMBER | d. PACKAGE IDENTIFICATION NUMBER | PAGE | PAGES |
| 9297  | 1                                  | 71-9297          | USA/9297/AF-96                   | 3    | OF 6  |

5.(b)(1)(i) Fuel Assembly (Continued)

**Parameters for 14 x 14 Fuel Assemblies**

| Fuel Assembly Description         | 14 x 14              | 14 x 14              | 14 x 14                          |
|-----------------------------------|----------------------|----------------------|----------------------------------|
| Fuel Assembly Type                | W-STD                | W-OFA                | CE-1/CE-2                        |
| No. of Fuel Rods per Assembly     | 179                  | 179                  | 176                              |
| No. of Non-Fuel Rods              | 17                   | 17                   | 20                               |
| Nominal Guide Tube Wall Thickness | 0.043 cm (0.017 in.) | 0.043 cm (0.017 in.) | 0.097 cm (0.038 in.)             |
| Nominal Guide Tube Outer Diameter | 1.369 cm (0.539 in.) | 1.336 cm (0.528 in.) | 2.822 cm (1.111 in.)             |
| Nominal Pellet Diameter           | 0.929 cm (0.366 in.) | 0.875 cm (0.344 in.) | 0.956/0.966 cm (0.376/0.381 in.) |
| Nominal Clad Outer Diameter       | 1.072 cm (0.422 in.) | 1.076 cm (0.400 in.) | 1.118 cm (0.440 in.)             |
| Nominal Clad Thickness            | 0.062 cm (0.024 in.) | 0.062 cm (0.024 in.) | 0.071/0.066 cm (0.028/0.026 in.) |
| Clad Material                     | Zirconium alloy      | Zirconium alloy      | Zirconium alloy                  |
| Nominal Assembly Envelope         | 19.7 cm (7.76 in.)   | 19.7 cm (7.76 in.)   | 20.60 cm (8.11 in.)              |
| Nominal Lattice Pitch             | 1.432 cm (0.563 in.) | 1.432 cm (0.563 in.) | 1.473 cm (0.580 in.)             |

**Parameters for 15 x 15 Fuel Assemblies**

| Fuel Assembly Description         | 15 x 15                          | 15 x 15              |
|-----------------------------------|----------------------------------|----------------------|
| Fuel Assembly Type                | STD/OFA                          | B&W                  |
| No. of Fuel Rods per Assembly     | 205                              | 208                  |
| No. of Non-Fuel Rods              | 20                               | 17                   |
| Nominal Guide Tube Wall Thickness | 0.043/0.043 cm (0.017/0.017 in.) | 0.043 cm (0.017 in.) |
| Nominal Guide Tube Outer Diameter | 1.387/1.354 cm (0.546/0.533 in.) | 1.354 cm (0.533 in.) |
| Nominal Pellet Diameter           | 0.929 cm (0.366 in.)             | 0.929 cm (0.366 in.) |
| Nominal Clad Outer Diameter       | 1.072 cm (0.422 in.)             | 1.072 cm (0.422 in.) |
| Nominal Clad Thickness            | 0.062 cm (0.024 in.)             | 0.062 cm (0.024 in.) |
| Clad Material                     | Zirconium alloy                  | Zirconium alloy      |
| Nominal Assembly Envelope         | 21.39 cm (8.42 in.)              | 21.66 cm (8.53 in.)  |
| Nominal Lattice Pitch             | 1.430 cm (0.563 in.)             | 1.443 cm (0.568 in.) |

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 |
|--------------------------|--------------------|------------------|----------------------------------|------|-------|
| 9297                     | 1                  | 71-9297          | USA/9297/AF-96                   | 4    | OF 6  |

5.(b)(1)(i) Fuel Assembly (Continued)

**Parameters for 16 x 16 Fuel Assemblies**

| Fuel Assembly Description         | 16 x 16                 | 16 x 16                 | 16 x 16                 | 16 x 16                 |
|-----------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Fuel Assembly Type                | W-STD                   | CE                      | NGF                     | ATOM                    |
| No. of Fuel Rods per Assembly     | 235                     | 236                     | 235                     | 236                     |
| No. of Non-Fuel Rods              | 21                      | 20                      | 21                      | 20                      |
| Nominal Guide Tube Wall Thickness | 0.046 cm<br>(0.018 in.) | 0.102 cm<br>(0.040 in.) | 0.041 cm<br>(0.016 in.) | 0.057 cm<br>(0.023 in.) |
| Nominal Guide Tube Outer Diameter | 1.196 cm<br>(0.471 in.) | 2.489 cm<br>(0.980 in.) | 1.204 cm<br>(0.474 in.) | 1.354 cm<br>(0.533 in.) |
| Nominal Pellet Diameter           | 0.819 cm<br>(0.323 in.) | 0.826 cm<br>(0.325 in.) | 0.784 cm<br>(0.309 in.) | 0.914 cm<br>(0.360 in.) |
| Nominal Clad Outer Diameter       | 0.950 cm<br>(0.374 in.) | 0.970 cm<br>(0.392 in.) | 0.914 cm<br>(0.360 in.) | 1.075 cm<br>(0.423 in.) |
| Nominal Clad Thickness            | 0.057 cm<br>(0.023 in.) | 0.064 cm<br>(0.025 in.) | 0.057 cm<br>(0.023 in.) | 0.072 cm<br>(0.029 in.) |
| Clad Material                     | Zirconium alloy         | Zirconium alloy         | Zirconium alloy         | Zirconium alloy         |
| Nominal Assembly Envelope         | 19.72 cm<br>(7.76 in.)  | 20.33 cm<br>(8.00 in.)  | 19.72 cm<br>(7.76 in.)  | 22.95 cm<br>(9.03 in.)  |
| Nominal Lattice Pitch             | 1.232 cm<br>(0.485 in.) | 1.285 cm<br>(0.506 in.) | 1.232 cm<br>(0.485 in.) | 1.430 cm<br>(0.563 in.) |

**Parameters for 17 x 17 and 18 x 18 Fuel Assemblies**

| Fuel Assembly Description         | 17 x 17  | 17 x 17              | 18 x 18              |
|-----------------------------------|--|----------------------|----------------------|
| Fuel Assembly Type                | W-STD/XL                                       | W-OFA                | ATOM                 |
| No. of Fuel Rods per Assembly     | 264  | 264                  | 300                  |
| No. of Non-Fuel Rods              | 25   | 25                   | 24                   |
| Nominal Guide Tube Wall Thickness | 0.041/0.051 cm<br>(0.016 /0.020 in.)           | 0.041 cm (0.016 in.) | 0.065 cm (0.026 in.) |
| Nominal Guide Tube Outer Diameter | 1.204/1.224/1.24 cm<br>(0.474/0.482/0.488 in.) | 1.204 cm (0.474 in.) | 1.240 cm (0.488 in.) |
| Nominal Pellet Diameter           | 0.819 cm (0.323 in.)                           | 0.784 cm (0.309 in.) | 0.805 cm (0.317 in.) |
| Nominal Clad Outer Diameter       | 0.950 cm (0.374 in.)                           | 0.914 cm (0.360 in.) | 0.950 cm (0.374 in.) |
| Nominal Clad Thickness            | 0.057 cm (0.023 in.)                           | 0.057 cm (0.023 in.) | 0.064 cm (0.025 in.) |
| Clad Material                     | Zirconium alloy                                | Zirconium alloy      | Zirconium alloy      |
| Nominal Assembly Envelope         | 21.39 cm (8.42 in.)                            | 21.39 cm (8.42 in.)  | 22.94 cm (9.03 in.)  |
| Nominal Lattice Pitch             | 1.260 cm (0.496 in.)                           | 1.260 cm (0.496 in.) | 1.270 cm (0.500 in.) |

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 |
|----|-----------------------|--------------------|------------------|----------------------------------|------|-------|
|    | 9297                  | 1                  | 71-9297          | USA/9297/AF-96                   | 5    | OF 6  |

5.(b)(1) Fuel Assembly (Continued)

- (ii) Non-fissile base-plate mounted core components and spider-body core components are permitted.
- (iii) Neutron sources or other radioactive material are not permitted.
- (iv) Materials with moderating effectiveness greater than full density water are not permitted.
- (v) There is no restriction on the length of top and bottom annular blankets.

(2) Loose Fuel Rods

Unirradiated uranium dioxide fuel rods with a maximum uranium-235 enrichment of 5.0 weight percent. Fuel rods shall be transported in the Traveller package inside either a rod pipe or rod box as specified in License Drawings 10006E58 or 10006E59, specified in Section 5(a)(3). The fuel rods shall meet the parametric requirements given below:

| Parameter                            | Limit  |
|--------------------------------------|--|
| Maximum Enrichment                   | 5.0 weight percent uranium-235   |
| Pellet diameter                      | 0.508 - 1.27 cm (0.20 - 0.60 in.)  |
| Maximum stack length                 | Up to rod container length   |
| Cladding                             | Zirconium alloy  |
| Integral absorber                    | Gadolinia, erbium, and boron   |
| Wrapping or sleeving                 | Plastic or other material with moderating effectiveness no greater than full density water |
| Maximum number of rods per container | Up to rod container capacity   |

5.(c) Criticality Safety Index

- (1) When transporting fuel assemblies: 0.7
- (2) When transporting loose rods in a rod container: 0.0

|   |                       |                                    |                  |                                  |      |       |
|---|-----------------------|------------------------------------|------------------|----------------------------------|------|-------|
| NRC FORM 618<br>(8-2000)<br>10 CFR 71   |                       | U.S. NUCLEAR REGULATORY COMMISSION |                  |                                  |      |       |
| <b>CERTIFICATE OF COMPLIANCE<br/>                 FOR RADIOACTIVE MATERIAL PACKAGES</b> |                       |                                    |                  |                                  |      |       |
| 1.  | a. CERTIFICATE NUMBER | b. REVISION NUMBER                 | c. DOCKET NUMBER | d. PACKAGE IDENTIFICATION NUMBER | PAGE | PAGES |
|   | 9297                  | 1                                  | 71-9297          | USA/9297/AF-96                   | 6    | OF 6  |

6. In addition to the requirements of Subpart G of 10 CFR Part 71:
  - (a) The package must be prepared for shipment and operated in accordance with the Operating Procedures in Chapter 7 of the Traveller License Application, Revision 4.
  - (b) Each packaging must be acceptance tested and maintained in accordance with the Acceptance Tests and Maintenance Program in Chapter 8 of the Traveller License Application, Revision 4.
7. The package authorized by this certificate is hereby authorized for use under the general license provisions of 10 CFR §71.17.
8. The package is not authorized by this certificate for air transport.
9. Revision No. 0 of this certificate may be used until April 30, 2007.
10. Expiration date: March 15, 2010.

**REFERENCES**

Westinghouse Electric Company application dated April 1, 2004.

Supplements dated: October 15 and November 16, 2004, and February 16, March 4, and March 10, 2005, and March 17 and April 22, 2006.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

  
 Robert A. Nelson, Chief  
 Licensing Section  
 Spent Fuel Project Office  
 Office of Nuclear Material Safety  
 and Safeguards

Date: April 25 2006