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 |
|---|---|---|---|---|---|---|
| 9319 | 1 | 71-9319 | USA/9319/B(U)F-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)*

AREVA NP, Inc.
1724 Mt. Athos Rd
Lynchburg, VA 24504

b TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

AREVA NP, Inc., application dated March 13, 2007, 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.: MAP-12 and MAP-13

(2) Description

The MAP package is designed to transport unirradiated uranium fuel assemblies with enrichment up to 5.00 weight percent. The package is designed to carry two fuel assemblies with core components. The package consists of two components, a base and lid. The containment system of the MAP packaging is the fuel and cladding.

The base consists of a fixed stainless steel strong-back which supports the fuel assemblies. A series of inner stiffeners are secured to the underside of the strong-back to support the fuel assemblies. A neutron moderator and absorber are positioned directly beneath the strong-back between each inner stiffener. The base inner stiffeners are retained by a stainless steel cover. Exterior to the cover is a layer of rigid polyurethane foam and an outer shell of 11 gauge stainless steel. A 12-gauge stainless steel sheet is provided between the two middle stiffeners. Four stainless steel outer stiffeners support the package base. The payload rests on the "W" shaped strong-back (referred to as a W-plate) and is held in place with hinged and latched aluminum doors. The lid is very similar to that of the base – a "W" shaped stainless steel inner shell is fitted with a series of inner stiffeners, neutron moderator and absorbers, and a stainless steel cover is fitted over the stiffeners. The lid is fitted with trapezoidal impact limiters at each end. The impact limiters are constructed from rigid polyurethane foam encased by the package outer stainless shell skin. The base and lid include end plates with interlocking, interfacing angles.

5.(a) (2) Description (continued)

There are two models of the MAP package, the MAP-12 and MAP-13 The weights and dimensions of the package are as follows

MAP-12 (for 144-in Maximum Nominal Active Fuel Length)

| | |
|---|---|
| Maximum Gross Weight | 8,630 lbs |
| Maximum Payload Weight | 3,400 lbs |
| Outer Dimensions | |
| Length | 208 in |
| Width | 45 in |
| Height | 31 in |

MAP-13 (for 150-in Maximum Nominal Active Fuel Length)

| | |
|---|---|
| Maximum Gross Weight | 8,630 lbs |
| Maximum Payload Weight | 3,400 lbs |
| Outer Dimensions | |
| Length | 221 in |
| Width | 45 in |
| Height | 31 in |

(3) Drawings

The MAP-12 and MAP-13 packages are fabricated and assembled in accordance with the following AREVA NP, Inc. Drawing Nos.: 9045393, Rev. 2; 9045397, Rev. 0; 9045399, Rev. 0; 9045401, Rev 0; 9045402, Rev. 0; 9045403, Rev. 0; 9045404, Rev. 0; 9045405, Rev 0

(b) Contents

(1) Type and Form of Material

Enriched commercial grade uranium or enriched reprocessed uranium, as defined in ASTM C996-04, oxide fuel rods enriched to no more than 5.0 weight percent in the U-235 isotope, with limits specified in Table 1 below

5.(b) Contents (continued)

(2) Maximum Quantity of Material per Package

Table 1: Maximum Authorized Concentrations

| Isotope | Maximum Content |
|---|---|
| U-232 | $2.00 \times 10^{-9}$ g/g U |
| U-234 | $2.00 \times 10^{-3}$ g/g U |
| U-235 | $5.00 \times 10^{-2}$ g/g U |
| U-236 | $2.50 \times 10^{-2}$ g/g U |
| U-238 | Balance of Uranium |
| Np-237 | $1.66 \times 10^{-6}$ g/g U |
| Pu-238 | $6.20 \times 10^{-11}$ g/g U |
| Pu-239 | $1.04 \times 10^{-9}$ g/g U |
| Pu-240 | $3.04 \times 10^{-9}$ g/g U |
| Gamma Emitters | $5.18 \times 10^{5}$ MeV/Bq/kg U |

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5.(b) Contents (continued)

(3) Fuel Assembly

(i) The parameters of the fuel assemblies that are permitted are specified in the table below.

| Fuel Rod Array | 14x14 | | 15x15 | | | | | 16x16 | 17x17 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Assembly Type | 1 | 2 | 1 | | | 2 | 3 | 1 | 1 | 2 |
| No. of Fuel Rods | 176 | 179 | 208 | | | 216 | 204 | 236 | 264 | 264 |
| No. of Non-Fuel Cells | 20 | 17 | 17 | | | 9 | 21 | 20 | 25 | 25 |
| Nominal Fuel Rod Pitch (in) | 0.580 | 0.550 | 0.568 | | | 0.550 | 0.563 | 0.506 | 0.502 | 0.496 |
| Maximum Pellet Outer Diameter (in) | 0.3812 | 0.3682 | 0.3622 | 0.3707 | 0.3742 | 0.3617 | 0.3682 | 0.3282 | 0.3252 | 0.3232 |
| Minimum Fuel Rod Outer Diameter (in) | 0.438 | 0.422 | 0.414 | 0.428 | 0.428 | 0.414 | 0.422 | 0.380 | 0.377 | 0.372 |
| Minimum Clad Wall Thickness (in) | 0.0245 | 0.0230 | 0.0220 | 0.0245 | 0.0230 | 0.0220 | 0.0230 | 0.0220 | 0.0220 | 0.0205 |
| Minimum Guide Tube Wall Thickness (in) | N/A | N/A | 0.0220 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Minimum Guide Tube Outer Diameter (in) | N/A | N/A | 0.586 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Number of Guide Tubes | N/A | N/A | 16 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Minimum Instrument Tube Wall Thickness (in) | N/A | N/A | 0.0240 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Minimum Instrument Tube Outer Diameter (in) | N/A | N/A | 0.491 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Number of Instrument Tubes | N/A | N/A | 1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Clad/Tube Material Type | Zr Alloy | Zr Alloy | Zr Alloy | | | Zr Alloy | Zr Alloy | Zr Alloy | Zr Alloy | Zr Alloy |
| Maximum Active Fuel Length (in) | 160 | 160 | 160 | | | 160 | 160 | 160 | 160 | 160 |

5.(b) Contents (continued)

(3) Fuel Assembly (continued)

(ii) Non-fissile base-plate mounted and spider body core components are permitted.

(iii) Fuel rods assembled into the fuel assemblies are those loaded with sintered pellets of uranium oxides and/or with sintered pellets of uranium oxides mixed with various additives (e.g., Chromium, Boron, Gadolinium, and Europium).

(c) Criticality Safety Index: 2.8

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 of the application, as supplemented.

(b) Each package must meet the Acceptance Tests and Maintenance Program of Section 8 of the application, as supplemented.

(c) Each fuel assembly must be unsheathed or must be enclosed in an unsealed, polyethylene or polypropylene 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.

(d) The fuel rods must be leak tested and fabrication to ensure that the leakage rate of the containment boundary is less than [illegible] sec.

7. Transport by air of fissile material is not authorized.

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

9. Expiration date: January 31, 2013.

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## REFERENCES

AREVA NP, Inc., application dated March 13, 2007

Supplements dated October 24, December 6 and 14, 2007, and April 11, October 13 and 31, 2008

FOR THE U.S NUCLEAR REGULATORY COMMISSION

Eric J Benner, Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Date November 6, 2008

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

Safety Evaluation Report
Model Nos. MAP-12 and MAP-13 Packages
Certificate of Compliance No. 9319
Revision No. 1

## SUMMARY

By application dated April 11, 2008, and as supplemented on October 13 and 31, 2008, AREVA requested an amendment to Certificate of Compliance (CoC) No 9319 to clarify "maximum" nominal fuel lengths for the Model Nos MAP-12 and MAP-13 packages, and to change the guide tube and instrument tube basis for the 15 Type 1a assembly The guide tube and instrument tube basis for the 15 Type 1a assembly was changed from their respective maximum inner diameters to corresponding minimum wall thicknesses

## EVALUATION

Based on its review of the amendment request dated April 11, 2008, and as supplemented on October 13 and 31, 2008, the staff determined that AREVA adequately demonstrated that the Model Nos. MAP-12 and MAP-13 packages provide for the secure packaging of fuel assemblies less than the maximum nominal fuel length by using shims The staff also found that the changes requested by AREVA are consistent with the criticality model provided in Section 6 of the application

AREVA updated Drawing No. 9045393, sheets 1 and 2, to Revision No. 2, for Model Nos. MAP-12 and MAP-13 packages. The latest revision of the drawing includes the use of shims, consistent with the application and information requested by the staff. The shims position the fuel during transport, when necessary, for fuel shorter than the maximum length and limit the movement of the fuel assemblies during shipment. The applicant demonstrated that the Model Nos. MAP-12 and MAP-13 designs provide for the secure packaging of fuel assemblies less than the maximum nominal fuel length

The staff also reviewed the design parameters for the 15 Type 1a and Type 1b assemblies, as provided in Tables 6-30 and 6-31, respectively. The staff found that the changes provided in Table 6-30 were adequate. No changes were made to Table 6-31; however, the applicant added a footnote stating the purpose of the inequality symbols, $\leq$ and $\geq$ This footnote does not change the effect of the original cladding thickness specifications Based on the statements and representations contained in the application, the staff finds that Model Nos MAP-12 and MAP-13 packages meet the criticality requirements of 10 CFR Part 71

As a result of the amendment request, the following conditions were revised in CoC No. 9319:

Condition No. 5.(a)(2) was revised to include the word "maximum" in the description of the nominal fuel lengths for the Model Nos. MAP-12 and MAP-13 packages. The use of the word "maximum" was inadvertently omitted in the description of fuel length provided in the application by AREVA.

Condition No. 5.(a)(3) was changed to reflect Revision No. 2 as the latest version of Drawing No. 9045393, which includes the reference to the shims.

Condition No. 5(b)(3)(i) was revised to show the change from "maximum inner diameters" to "minimum wall thickness," as well as the respective dimensions.

CONCLUSION

Based on the statements and representations in the application, the NRC staff has reviewed the proposed changes for the Model Nos. MAP-12 and MAP-13 packages. The staff concludes the changes indicated for the Model Nos. MAP-12 and MAP-13 packages do not affect the ability of the designs to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9319, Revision No. 1 on
November 6, 2008.