SAFETY EVALUATION REPORT

Docket No. 71-9239
Model Nos. MMC-3, MCC-4, and MCC-5
Certificate of Compliance No. 9239
Revision No. 16

SUMMARY

By application dated October 28, 2009, as supplemented December 10 and 30, 2009, Westinghouse Electric Company LLC (Westinghouse or the applicant) requested a revision to Certificate of Compliance (CoC) No. 9239 for the Model Nos. MCC-3, MCC-4, and MCC-5 packages. Westinghouse requested the addition of a modified unirradiated 15x15 (Type B) OFA fuel assembly with seven (7) of the fuel rods replaced with solid stainless steel rods to the contents for the CoC, and also requested to remove the restriction on the annular pellet zone length for the 14x14 type fuel assemblies as specified in the CoC.

In addition, the address of the certificate holder, CoC Item No. 3(a), has been changed from Pittsburgh, Pennsylvania, to Columbia, South Carolina. The organization within Westinghouse with responsibility for managing package applications is currently located in South Carolina.

NRC staff evaluated the Model No. MCC-3, MCC-4, and MCC-5 packages and documented the security assessment review separately, as it contains sensitive information that cannot be made publicly available. The security assessment should be reviewed prior to approval of any amendment to this application.

NRC staff reviewed the application using the guidance in NUREG-1609, “Standard Review Plan for Transportation Packages for Radioactive Material.” Based on the statements and representation in the application, as supplemented, and the conditions listed below, the staff agrees that these changes do not affect the ability of the packages to meet the requirements of 10 CFR Part 71.

CRITICALITY EVALUATION

The applicant requested the addition of a modified unirradiated 15x15 (Type B) OFA with seven (7) of the fuel rods replaced with solid stainless steel rods to the contents for the CoC, and also requested to remove the restriction on the annular pellet zone length for the Type A fuel assemblies as specified in the CoC. NRC staff has previously reviewed both a modified 15x15 (Type B) OFA and a modified 17x17 (Type B) OFA, with fuel rods replaced with solid stainless steel rods, and performed a criticality safety review for the Model Nos. MCC-3, MCC-4, and MCC-5 packagings with the modified contents. The replacement stainless steel rods are in a specific configuration for the CoC. There are no design changes to the packaging.

Westinghouse’s original application dated August 29, 2006, as supplemented, demonstrated that the 17x17 OFA is the most reactive contents of the package for Type B assemblies, which include the 15x15 OFA. The analysis for the annular pellet blanket length was preformed using

the 14x14 W-OFA assemblies, which is the most reactive of the Type A assemblies. Calculations to determine the most reactive fuel assembly for Type A and Type B were performed using a 227-group cross-section and evaluated using the AMPX system codes.

The applicant used the SCALE 4.4 system of codes with a 44 group cross section library for the evaluation of the 15x15 OFA assemblies. For the 15x15 (Type B) OFA, the reduction of fissile mass due to replacing the seven (7) fuel rods with solid stainless steel rods in the 15x15 (Type B) OFA caused the calculated k_{eff} for the requested amendment results in a reduction from that of the design basis fuel. This approach of making a comparison with the previously approved design basis bounding case was found to be acceptable. Thus the analysis indicated that this modified assembly is bounded by the allowable contents under the current CoC.

The applicant used SCALE 5.1 with the 44 group cross section library to evaluate the effect of the annular pellet blanket on the reactivity of the 14x14 W-OFA assemblies. They provided a study in Enclosure 3 Table 4 to demonstrate the effect of varying the annular blanket length. The results of this study demonstrated that varying the annular blanket length does not change k_{eff} significantly and the lengths evaluated at were all below the acceptance criteria of 0.95.

NRC staff preformed confirmatory calculations on both the original 14x14 W-OFA assembly and an 14x14 W-OFA assembly with only annular pellets using the SCALE 6 system of codes with 238-group cross sections. The results of these confirmatory calculations were consistent with those performed by the applicant.

Based on the NRC staff verification of adequate system modeling by the licensee, the analyses supporting the content modification were considered acceptable. Thus, the proposed content modification does not affect the ability of the package to meet the requirements of 10 CFR Part 71.

CONDITIONS

The CoC includes the following condition(s) of approval:

Condition No. 5(b)(1) was revised to incorporate the contents revisions detailed in this application. A footnote was added to the Type A fuel assembly parameters to allow the annular pellet length to exceed the 6-inch restriction listed in Table 1-5.1, Rev. 12, for the 14x14 type fuel assemblies. A second footnote was added to the Type B fuel assembly parameters to include the modification of the 15x15 (Type B) OFA fuel assembly by replacing the fuel rods in locations O10 through O15 and N15 with seven solid stainless steel rods.

Condition No. 5(c) was revised to delete the reference to Transport Index for Criticality Control, and instead reference the Criticality Safety Index. This change is a result of the NRC's final rule revising 10 CFR Part 71 to address compatibility with the 1996 Edition of the International Atomic Energy Agency's transportation safety standards, "Regulation of the Safe Transport of Radioactive Material" (TS-R-1) and other transportation safety amendments. The revised 10 CFR Part 71 final rule became effective on October 1, 2004 (69 FR 3698).

New Condition No. 11 was included in the CoC to clarify that the package has not been evaluated under the provisions of 10 CFR 71.55(f) that became effective October 1, 2004.

New condition No. 12 was included in the CoC to clarify that the package is subject to the provisions of 10 CFR 71.19(b), which requires that all fabrication of this packaging must have been completed by April 1, 1999.

Condition No. 14 was revised to authorize use of the previous revision of the CoC until March 31, 2012.

As a consequence of the inclusion of the new Condition Nos. 11 and 12, the previous Condition Nos. 11-13 were renumbered 13-15, respectively.

CONCLUSION

Based on the statements and representations contained in the application, as supplemented, and the conditions listed above, the staff concludes that the design has been adequately described and evaluated, and the Model No. MCC-3, MCC-4, and MCC-5 package meets the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9329, Revision No. 16,
on January 14, 2010.