



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

SAFETY EVALUATION REPORT
Docket No. 71-9372
Model No. TN-B1
Certificate of Compliance No. 9372
Revision No. 2

SUMMARY

By letter dated September 6, 2018, Framatome Inc. (the applicant), requested an amendment to Certificate of Compliance (CoC) No. 9372, for the Model No. TN-B1 transportation package to allow transport of ATRIUM 11x11 boiling water reactor (BWR) fuel assemblies containing trace amount of material, as specified in Table 2 of the CoC, as contaminant to the fuel. The applicant stated that, since the contamination is in such a small quantity, its impact to the shielding, containment, and criticality analyses of the package is negligible.

Framatome Inc. requested, by letter dated January 23, 2019, the renewal of the Certificate of Compliance for a 5-year term. The application was also supplemented on February 14, 2019, to request the addition of additives to the uranium dioxide contents (sintered pellets).

NRC staff reviewed the applicant's request and found that the package meets the requirements of 10 CFR Part 71.

EVALUATION

Framatome Inc., requested to amend the CoC for the TN-B1 package to allow transport of commercial ATRIUM UO₂ fresh fuel containing trace amount of material, as specified in Table 2 of the CoC, as contaminant to the fuel. In addition, the applicant requested to allow, as authorized contents, UO₂ fuel that is doped with Chromia, Gadolinia, and Silica.

The staff reviewed the applicant's justifications for allowing a trace amount of material as defined in Table 2 of this CoC in the UO₂ fuel and finds the justifications presented to be acceptable. Although the pregnancy of some of the isotopes, e.g. U-232, in the slightly contaminated uranium will elevate the A₂ value and the radiation sources, such a trace amount of contaminants will still not cause a significant increase in the A₂ value and radiation sources. Based on this reason, the staff determines that the trace amount of material, as defined in Table 2 of the CoC, will not impose significant additional impacts on the safety of the package with respect to the containment and shielding design, and the package will continue to meet the respective parts of the regulatory requirements of 10 CFR Part 71. The trace amount of fissile isotopes, as specified in Table 2, will not also cause significant changes to the neutron multiplication factor, k_{eff} , because their quantities are negligible with respect to the criticality safety of the package.

The staff also reviewed the applicant's safety analysis for the package containing UO₂ fuel that is doped with Chromia, Gadolinia, and Silica. The maximum amount of U-235 remains at 5.0

w.t.% and the minimum Gadolinia loading per fuel assembly remains the same as required by the current CoC. To support this amendment request, the applicant provided a revised safety analysis report, Revision 19, for the new fuel designs. The applicant demonstrated that adding the doping materials results in the reactivity of the fuel to decrease and concluded that there are no negative impacts on the criticality, shielding and containment safety of the package. The staff finds that the addition of the doping materials will not adversely impact the criticality safety of the package because all doping materials are neutron absorbers which will cause the reactivity of the package to decrease. Additionally, the doping materials all are non-radioactive and, therefore, have no impact on the shielding and containment safety of the package.

The staff followed the guidance provided in NUREG-1609, "Standard Review Plan for Transportation Packages for Radioactive Material" and finds that the amended Model No. TN-B1 package design meets the acceptance criteria of NUREG-1609. On these bases, the staff determined that the Model No. TN-B1 package containing UO₂ fuel, contaminated with trace amount of material as defined in CoC Table 2 and/or doped with Chromia, Gadolinia, and Silica, continues to meet the regulatory requirements of 10 CFR 71.41, 71.43, 71.47, and 71.55.

The applicant also requested renewal of Certificate of Compliance No. 9372. The staff reviewed the sections on operating procedures, acceptance tests, and maintenance programs and determined that they are complete, accurate, and found them to be adequate. The staff reviewed the documents referenced in the certificate and determined that the documentation was available and complete. The certificate has been renewed for a five year term. This change does not affect the ability of the package to meet the requirements of 10 CFR Part 71.

CONDITIONS

The following changes have been made to the CoC:

Item No. 3.b. has been updated to reflect the latest revision number and title of the application.

Condition No. 5(a)(2) has been edited to clarify that fuel assemblies or individual rods meet either the ASTM standard of enriched commercial grade uranium or of uranium with a trace amount of materials as defined in the Table 2 of the CoC.

Condition No. 5.(b)(1) has been edited to clarify that slightly contaminated uranium with trace quantities limits as specified in Table 2 of the CoC is authorized. Also, fuel rods assembled into fuel assemblies, can now contain sintered pellets of uranium oxides and/or sintered pellets of uranium oxides mixed with various additives such as chromia, gadolinia, and silica.

Condition No. 7 has been modified to remove the condition pertaining to ATRIUM 11x11 fuel.

Condition No. 8 was edited for clarity.

Condition No. 11 authorizes the use of the previous revision of the certificate for approximately one year.

Condition No. 12 has been updated with the new expiration date of the certificate.

The references section has been updated to include the February 14, 2019 application.

CONCLUSION

Based on the statements contained in the application, and the conditions listed above, the staff concludes that the changes indicated do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9372, Revision No. 2,

on March 6, 2019.