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

April 18, 2019

Mr. Wes Stilwell
Global Packaging and Regulatory Compliance Manager
Westinghouse Electric Company LLC
Columbia Fuel Fabrication Facility
5801 Bluff Road
Hopkins, South Carolina 29061

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE MODEL NO. TRAVELLER STD & XL PACKAGE

Dear Mr. Stilwell:

By letter dated December 19, 2018, you submitted an application for Certificate of Compliance No. 9380, Revision No. 0, for the Model No. Traveller STD & XL packages as a B(U)F-96 package for the transport of both Type A and Type B quantities of fissile material in the form of uranium fuel assemblies or fuel rods with enrichments up to 5.0 weight percent (wt.%) U^{235}.

The staff has determined that further information is needed to complete its technical review. The information requested is listed in the enclosure to this letter. We request you provide this information by June 30, 2019.

Please reference Docket No. 71-9380 and EPID - L-2018-NEW-0006 in future correspondence related to this licensing action. If you have any questions regarding this matter, please contact me at 301-415-7505.

Sincerely,

/RA/

Pierre Saverot, Project Manager
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9380
EPID No. L-2018-NEW-0006

Enclosure:
Request for Additional Information

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE MODEL NO. TRAVELLER STD & XL PACKAGE, DOCUMENT DATE: April 18, 2019

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Request for Additional Information
WESTINGHOUSE ELECTRIC COMPANY LLC
Docket No. 71-9380
Model No. Traveller STD & XL Package

By letter dated December 19, 2018, Westinghouse Electric Company LLC (the applicant) submitted an application for Certificate of Compliance No. 9380, Revision No. 0, for the Model No. Traveller STD & XL packages as a B(U)F-96 package. The Traveller shipping package is designed to transport both Type A and Type B quantities of fissile material in the form of uranium fuel assemblies or fuel rods with enrichments up to 5.0 weight percent (wt.%) U-235. The Traveller package includes two packaging variants: Traveller Standard (STD) and Traveller XL (XL).

This request for additional information (RAI) identifies information needed by the staff in connection with its review of the application.

Each individual RAI describes information needed by the staff to complete its review of the application and to determine whether the applicant has demonstrated compliance with the regulatory requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 71.

Chapter 2 STRUCTURAL REVIEW:

2-1 Justify the rod pipe integrity after normal conditions of transport (NCT) tests.

The application does not include any discussion (either by analysis or by testing) that would indicate that the rod pipe's integrity; filled with content, is maintained after the NCT tests to ensure there is no dispersal of contents. Drawing 10006E58 shows a 6" pipe sch 40, with a ¼ inch thick endplate and flange (Section 1.2.1.5.4 of the application mentions 304 stainless steel closures, but there is no material type specified in the drawing), attached with ½-13 stainless steel bolts.

Staff did not find any discussion that concluded the ¼ inch thick plate and 1/2-13 bolts can hold the weight (approximately 1650 lbs) of the loose fuel rods. Staff did not also find any mention of the rod pipe in Section 1.3.3. The application should demonstrate that the rod pipe's ¼ inch thick plate can hold the fuel rods and specify if it is Important to Safety (ITS) or not.

This information is needed to determine compliance with 10 CFR 71.43(f).

2-2 Provide additional justification supporting that the Clamshell drop testing represents an uncoupled system from a load path perspective.

Page 2-96 of Section 2.12.2 of the application states that the "*The majority of the mass of the Outerpack has not been included in this analysis because it does not significantly affect the Clamshell impact. More specifically, the Outerpack impact event is finished within only a few milliseconds, therefore the bottom limiter is simply waiting for the Clamshell impact into it. This assumption has been validated in a separate run which did include the remaining Outerpack mass.*"

During the CTU drop testing discussed in Section 2.7.1.3, local Outerpack and Clamshell damages were found in the region of the lower impact limiter. In order for the staff to ensure that the containment provisions required for a Type B packaging and testing are met, provide additional discussion on how the result of a "separate run" is considered to justify the assumption that both the Clamshell and Outerpack can be conservatively treated as an uncoupled system.

This information is needed to determine compliance with 10 CFR 71.41(a).

2-3 Provide clarification supporting the claim that the Type B Full Scale Drop Testing was performed onto an unyielding surface.
In Section 2.7.1.4, the applicant stated that the Type B full scale drop tests were performed on an asphalt parking lot. Asphalt is a composite material that can shatter and dissipate energy upon impact depending on its properties. The requirements specified in 10 CFR 71 for both hypothetical accident conditions (HAC) and NCT conditions, state that free drops are to occur "onto a flat, essentially unyielding, horizontal surface". Specify how the asphalt top is qualified as an unyielding surface.
This information is needed to determine compliance with 10 CFR 71.71(c)(7) and 10 CFR 71.73(c)(1).

2-4 Provide clarification in the SAR on the helium design pressure and how it is considered in qualifying the fuel rod cladding as the containment boundary.

As noted in RAI 4-4, there exist varied descriptions of the fuel rods' internal pressure. The backfill design pressure and the design basis/rationale, including codes and standards for the design, fabrication, and testing, are needed for the staff to evaluate the fuel rod structural performance. In addition, it should be demonstrated that structural performance of the prototype surrogate cladding/rods used in the 30 ft drop and thermal tests bound the proposed fuel types and content.

This information is needed to determine compliance with 10 CFR 71.31(a) and (c).

Chapter 4 CONTAINMENT REVIEW

4-1 Provide the licensing drawings for the center fuel assembly axial restraint (top) and a bottom nozzle support spacer for those ITS components.

According to page 2-75 of the application, a center fuel assembly axial restraint and a bottom nozzle support spacer were necessary components for the fuel rods to maintain their integrity after the 30 ft drop test. However, detailed drawings of these two components for the fuel assemblies that are listed as content (14x14, 15x15, 16x16, 17x17, 18x18, and inclusion of reactor core components) were not included in the application. Individual drawings for the different fuel assemblies are necessary because, for example and as noted on page 8-11 of the application, there needs to be a conforming fit.

This information is needed to determine compliance with 10 CFR 71.33, 71.51(a)(2).

4-2 Clarify that the "top axial restraint" (item 133) mentioned on page 1-27 is equivalent to the "center fuel assembly axial restraint" mentioned on page 2-75 of the application; likewise, clarify that the "axial bottom spacer" (item 134) is equivalent to the "bottom nozzle support spacer".

Clarification of the terminology related to Type B package components, necessary to ensure the integrity of the containment boundary after hypothetical accident conditions, is needed to review the appropriate ITS designation in Table 1.4 of the application.

This information is needed to determine compliance with 10 CFR 71.33, and 71.51(a)(2).

4-3 Clarify the criteria used to determine if the polyethylene foam sheeting is positioned between the Clamshell and lower Outerpack to augment the shock absorbing characteristics.

Page 1-3 of the application states that polyethylene foam sheeting “may be” positioned between the Clamshell and lower Outerpack, but provides no criteria as to when this is necessary to ensure correct package operations.

This information is needed to determine compliance with 10 CFR 71.33, and 71.51(a)(2).

4-4 Clarify the MNOP and bounding fuel rod pressure during HAC tests (i.e., thermal).

There appears to be inconsistent pressures listed in the application. Section 1.2.2.1.1 states a representative nominal internal pressure of the fuel rod at room temperature of 380 psig, which would indicate that the internal pressure at normal conditions (e.g., MNOP) and at hypothetical accident conditions, which occur at conditions that are higher than room temperature, would be greater. However, page 3-5 states that MNOP is 304.6 psig and pages 2-88 and 4-3 state that HAC pressure is 358 psig. Likewise, according to Section 3.4.3.2, the hypothetical accident thermal condition test considered fuel rods pressurized to 275 psig.

This information is needed to determine compliance with 10 CFR 71.51(a)(1),and (a)(2).

4-5 Confirm that flammable gas concentrations would remain below 5% (volume) during NCT and HAC conditions.

According to page 1-3 and page 1-16 of the application, package components include polyurethane foam, UHMV polyethylene, polyethylene sleeve wrappings, plastic packing materials, and a plastic disc. Recognizing that these materials are hydrocarbon, it is possible that hydrogen off-gassing could occur, including during the thermal fire test.

This information is needed to determine compliance with 10 CFR 71.43(d).

4-6 Confirm that the Type B drop test conditions, including choice of content, bounds the conditions and content requested as part of the certificate of compliance.

The Type B drop test was based on 17x17 fuel assembly content. However, the application is requesting other fuel assembly types (14x14, 15x15, 16x16) and, in addition, page 1-16 states that reactor core components may be shipped with radioactive/fissile contents. Considering the different masses of the content (fuel rods and reactor core components), the bounding nature of the Type B test is uncertain.

This information is needed to determine compliance with 10 CFR 71.51(a)(2).

4-7 Provide the acceptance criteria for the 100% visual and radiographic or ultrasonic inspections of the top and bottom end plug welds in Section 8-1 of the application.

Acceptance criteria that are used to ensure acceptable welds of the containment boundary is needed for review of the Acceptance Tests.

This information is needed to determine compliance with 10 CFR 71.33, 71.51(a)(2).

4-8 Confirm, and update the application if necessary, that all Type A and Type B components needed to ensure fuel rods remain elastic at the end plug welds after 30 ft drop tests, are included in the Operating Procedures. In addition, provide the criteria for including the axial spacer -see page 7-2 which states “axial spacer (as needed)”.

The Operating Instructions should specify the criteria for using particular components. This includes the Type A and Type B package components that were installed to ensure the integrity of the fuel rods during the Type B drop test.

This information is needed to determine compliance with 10 CFR 71.33, 71.51(a)(2).

4-9 Provide the operating instructions to positively secure (per page 1-1 of the application) the Rod Pipe inside the Clamshell.

The operating instructions in Chapter 7 did not appear to include a procedure to secure the Rod Pipe, such that it would not impact safety functions (e.g., criticality) during normal conditions of transport and accident conditions. In addition, it appears the drawing of the conformal shipping spacer that is used to secure the Rod Pipe, as noted on page 1-13 of the application, was not provided.

This information is needed to determine compliance with 10 CFR 71.33, 71.51(a)(1),and (a)(2).

4-10 Update the application to confirm that the Type B bottom nozzle support/fuel assembly interface pre-test (as noted in Figure 2.7-21) will be performed during loading operations.

According to Figure 2.7-21, a pre-test was performed to ensure adequate response during the Type B drop test, but this was not included in the Chapter 7 Package Operations.

This information is needed to determine compliance with 10 CFR 71.33, 71.51(a)(2).

4-11 Confirm the fuel rod integrity after undergoing the series of hypothetical accident condition tests.

Section 2.7.1.4.1 stated that the 264 replica fuel rods met the 10^{-7} ref air cm^3/sec “leaktightness” criteria after the 30 ft drop test. However, there was no similar leakage rate test after the fire test discussed in Section 3.4 or no discussion to indicate that the fuel rod’s plastic deformation of expansion and compression (mentioned on page 2-83 of the application) would not be impacted by the higher pressure due to the higher temperature from the fire’s thermal input.

This information is needed to determine compliance with 10 CFR 71.51(a)(2).