January 28, 2011

Mr. Peter J. Vescovi
Westinghouse Electric Company, LLC
Nuclear Fuel Supply Chain Management
5801 Bluff Road
Columbia, SC 29209

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

Dear Mr. Vescovi:

By letter dated November 19, 2010, Westinghouse Electric Company, LLC (Westinghouse) submitted an amendment request for the Model No. TRAVELLER package, including design changes such as a modified clamshell top end plate, change of authorized contents, and revised licensing drawings.

In connection with the staff's review of Revision No. 9 of the application, we need the information identified in the enclosure to this letter. We request that you provide this information by March 15, 2011. If you are unable to meet this deadline, you must notify us in writing no later than March 1, 2011, of your submittal date and the reasons for the delay. The staff will then assess the impact of the new submittal date and notify you of a revised schedule.

Please reference Docket No. 71-9297 and TAC No. L24488 in future correspondence related to this request. The staff is available to meet with you to discuss your proposed responses. If you have any questions regarding this matter, I may be contacted at (301) 492-3408.

Sincerely,

/RA/

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

Docket No. 71-9297
TAC No. L24488

Enclosure: Request for Additional Information

Mr. Peter J. Vescovi
Westinghouse Electric Company, LLC
Nuclear Fuel Supply Chain Management
5801 Bluff Road
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Docket No. 71-9297
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Enclosure: Request for Additional Information
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NAME:	PSaverot		NDay		PRaynaud		JSolis		DJackson		MSampson	
DATE:	01/26/2011		01/25/2011		01/25/2011		01/25/2011		01/25/2011		01/25/2011	
OFC:	SFST	E	SFST	C	SFST	C	SFST	C	SFST	E	SFST	C
NAME:	MDeBose		RJohnson									
DATE:	1/27/2011		1/28/2011									

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Request for Additional Information
for the
Model No. TRAVELLER Package
Docket No. 71-9297

By application dated November 19, 2010, Westinghouse Electric Company, LLC, submitted an amendment request for the Model No. TRAVELLER package.

This Request for Additional Information (RAI) identifies 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.

1. Clarify the proposed contents for this package:

   In Section Nos. 1.2.3.1 and 1.2.3.2 of the application, for both the pipe and box containers, specify the maximum number of fuel rods that may be transported for each different fuel rod design allowed.

   In Section No. 1.2.3.2, clarify the statement: "The maximum quantity of fissile material is contained in approximately 32 kg of uranium." The staff believes that the sentence should read: 'The maximum quantity of fissile material allowed in one package is contained in approximately 32 kg of uranium 235.' Provide confirmation or clarification and correct the application accordingly.

   In Section No. 1.2.3.2, provide a brief description of the materials to be used as packaging materials for the fuel assembly or rods.

   This information is required to determine compliance with 10 CFR 71.33(b) and 10 CFR 71.55.

2. In Table No. 2-2 of the application, make the following corrections:

   Change 6005-T6 to 6005-T5: 6005-T6 is not a correct material designation.

   Correct the UTS and YLD for 6061-T6 Aluminum: ASME Code Section II, Part D, specifies UTS = 38 ksi and YLD = 35 ksi for 6061-T6 Aluminum SA-221.

   Correct the τ_{allow} for 6005-T5 and 6061-T6 Aluminum alloys: ASME Code Section II, Part D, specifies a maximum allowable stress for 6061-T6 Aluminum SA-221 of 10.9 ksi. The same mechanical properties should be assumed for 6005-T5 as for 6061-T6.

   Evaluate the impact of the above corrections on the structural analyses performed using the erroneous properties.

This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

3. In Section 2.12.4.6.2: clarify which foam densities will be used in the Traveller package.

   Based on the licensing drawings and the package descriptions provided in other sections of the application, foams with densities of 7 pcf and 14 pcf are not used in components of the Model No. Traveller package. If the staff is correct, remove all references to the 7 pcf and 14 pcf foams, and correct Figure No. 2-105 to reflect the properties of the 6 pcf, 10 pcf, and 20 pcf foams that are used in the Model No. Traveller package.

   This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

4. Clarify and justify the material properties used for the foam in the overpack end impact limiter.

   Section Nos. 2.12.6.1 and 2.12.7.1 of the application, Rev. 9, state: “The stiffer foam in the Overpack end impact limiter, 20 pcf. (0.32 g/cc) density, is located below and around the soft pillow.” However, the material properties depicted in Table No. 2-54 in Section No. 2.12.6, of the application, Rev. 9, represent 14 pcf (0.224 g/cc) foam material properties instead of 20 pcf foam properties.

   In addition, the foam moduli and Poisson’s ratios provided in Table No. 2-54 of the application, Rev. 9, are not in agreement with the publicly available data for similar foams (General Plastics Last-a-Foam FR3700 series). Justify the use of the foam properties provided in Table No. 2-54.

   Also note that the erroneous foam properties appear to be used as input into the LS-DYNA finite element model described in the proprietary Westinghouse report SFAD-10-72, Rev. 2, and may also be erroneously included in additional analyses.

   This information is required to determine compliance with 10 CFR 71.73.

5. Explain the discrepancy between the foam crush properties presented in Figure No. 2-158 and those presented in Figure Nos. 2-13, 2-14, and 2-15.

   The foam crush properties presented in Figure No. 2-158 are lower than the properties presented in Figure Nos. 2-13, 2-14, and 2-15 by a factor of about 100.

   This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

6. Revise Section No. 2.12.6 of the application to clarify which aluminum axial spacer will be used.

   The clamshell axial spacer is analyzed in Section No. 2.12.6 of the application, Rev. 9. By adding a 28.94 inch aluminum spacer, the Model No. Traveller XL package is capable of transporting 17X17 STD type fuel. However, it is not entirely clear if the ENUSA or Westinghouse type spacer will be used in the Model No. Traveller XL package.

It appears that both the ENUSA and Westinghouse spacers are adequate during a 9 m bottom end drop event, based on the evaluation in the proprietary Westinghouse report SFAD-10-72, Rev. 2. Based on the material of construction of item 153 in DWG 10004E58, Rev. 5 (6061-T6) it is assumed that only the Westinghouse spacer is currently used. However, Section No. 2.12.6 of the application incorrectly incorporates the results of the ENUSA spacer and figures (Note LS-DYNA figures titled "EN") and not the Westinghouse spacer.

Revise Section No. 2.12.6, and if needed DWG 10004E58, to clarify which aluminum axial spacer will be used. Provide national consensus standards (for example ASTM or ASME material specifications) for the aluminum alloys to be used for the axial spacer and ensure that the corresponding mechanical properties are used in the model.

This information is required to determine compliance with 10 CFR 71.73.

7. In Table No. 3-2, correct the conductivity values provided for 304 Stainless Steel and 6005 Aluminum, as well as the specific heat provided for 6005 Aluminum.

   The values shown in Table No. 3-2 are roughly 10% too high when compared to the values found in ASME Code Section II, Part D, Table TCD for 6061 Aluminum (which is comparable to 6005 Aluminum for its thermal and mechanical properties).

   This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

8. In Table Nos. 3-2 and 3-4, provide density dependent thermal properties for the polyurethane foams used in the Model No. Traveller package, and justify or correct the values used in Table Nos. 3-2 and 3-4.

   The thermal conductivity and specific heat values provided for the foam in Table Nos. 3-2 and 3-4 are respectively higher and lower than the publicly available data for similar foams (General Plastics Last-a-Foam FR3710). This could result in higher than expected thermal diffusivity.

   This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

9. Revise the following sections of the application to clarify/amend the typographical errors.

   - Section No. 1.2.1 states, "Polyethylene foam sheeting may … to augment the *shack* absorbing characteristics …"

   - Section 1.2.1.4 states, "Axial restraint is provided … shown on sheet *7 of 8* of drawing 10004E58"

   - Section 1.2.3.1.3 states, "The top nozzle functions *ass* the fuel assembly upper…"

   - Section 2.12.6 contains references to the Traveller *TX*. All references to the Traveler TX must be deleted or explained.

- Section 2.12.6.1 states, "The clamshell may be … as shown in *Figure 2-158.*"
- Section 2.12.6.3 states, "The foam crush characteristics shown in *Figure 16* include … stability purposes."
- Section 2.12.6.3 states, "The material properties … are summarized in *Tables 1 through 5."*
- Section 2.12.6.3 states, "With the simulation with axial spacer … (3.62 inches), see *Figure 11."*
- Section 2.12.7.1 states, "*Figure 2-165* shows the potential interference."

This information is required to determine compliance with 10 CFR 71.73.

10. Provide Westinghouse report SFAD-09-182, "NovaTech Technical Data Record, TDR-07-133, Rev. 0, Simplified Traveller XL LS-Dyna Analysis," November 2009.

    The proprietary Westinghouse report SFAD-09-184, Rev. 1, provides an analysis of the new removable top plate, by using an optimized FEA model that was developed and benchmarked in reference 6 (NovaTech Technical Data Record, TDR-07-133) of SFAD-09-184, Rev. 1.

    This information is required to determine compliance with 10 CFR 71.73.

11. Provide details regarding the changes to the outerpack that are listed in LCPT-10-33 dated November 19, 2010.

    LCPT-10-33 states, "the engineering drawings for packaging were revised to show modifications to the clamshell top end plate and *changes to the outer pack such as silicone rubber weather gasket, tie down chain tray gussets, new swing bolts, and clamshell cam lock wave washer."*

    When reviewing licensing drawings 10004E58, Rev. 5, 10006E58 Rev. 5, and 10006E59 Rev. 1, it is not entirely clear which items correspond to those that have been changed. For example, "swing bolts" and "tray gusset" are not included in the bill of materials, and cannot be definitely determined.

    It would be advisable to clearly delineate the items that were listed in LCPT-10-33 with an item number from the licensing drawings, as well as a reference to the application.

    This information is required to determine compliance with 10 CFR 71.73.

12. Clarify why the maximum temperature of the accessible package surface is not provided in the application, as required by 10 CFR 71.43(g).

    Page No. 3-10 of the application states that no thermal evaluation is needed for normal conditions of transport but an explanation of how 10 CFR 71.43(g) requirements are met should be included in the application.

    This information is required to determine compliance with 10 CFR 71.43(g).

13. Verify the specific heat units on page No. 8-4 of the application. Verify that all material properties used to perform the thermal evaluation of the Model No. Traveller package are provided with the correct units.

    Page No. 8-4 of the application includes foam thermal properties such as specific heat. The specific heat units are given in BTU/hr-°F and they should be corrected to BTU/lb-°F.

    This information is required to determine compliance with 10 CFR 71.7.