

Materials RAI (Round 2) for NC-45 DOT Revalidation Review

RAI-M1: Clarify the type of spruce wood used in the shock absorbers.

Section 3.6 of the Safety Analysis Report states that the shock absorber is made of balsa and spruce wood, but according to the United States Department of Agriculture (USDA) Wood Handbook, there are multiple varieties of spruce, with varying mechanical properties.

In the response to a previous RAI, the applicant clarified the apparent discrepancy between the use of pine and spruce for the impact absorber, but the type of spruce used in the package will affect the mechanical properties of the wood. The staff is under the impression that the spruce chosen will have properties similar to those listed in NCS 0017, Rev.4. This clarification is requested in combination with RAI-M2, as the mechanical properties of the woods used in the package, and used to demonstrate compliance with the regulations is unclear.

The Staff notes that the USDA Wood Handbook is freely available for download at: http://www.fpl.fs.fed.us/products/publications/several_pubs.php?grouping_id=100&header_id=p

This information is required to meet TS-R-1 Regulation 656.

RAI-M2: Justify the unusually high compressive strengths for the wood shock absorbers used in the structural analysis of the package (Table 2 of B-TA-3991-Rev.2). If necessary, make corrections to the structural analysis of the package. Correct the apparent discrepancy between the compressive strengths for the wood shock absorbers in Table 2 of B-TA-3991-Rev.2 and Table 4-30 of NCS 0017, Rev.4.

According to the USDA Wood Handbook, the compressive strength of balsa and all types of spruce wood are significantly lower the strengths quoted for these woods in Table 2 of B-TA-3991-Rev.2. The Staff agrees that the absorbed energy densities of the woods quoted in the application are appropriate, however.

This information is required to meet TS-R-1 Regulation 656.

RAI-M3 – Provide support for the “time yield limit” given for lead in Table 4-9 of SAR NCS 0017 Rev 4. The response should include an estimate for the stress on the lead shielding during normal conditions of transport.

The tables in the Guruswamy reference do not support the values given in Table 4-9. These values are used in Sec 4.2.4.3.1 to calculate heat effects. In response to a prior RAI, the applicant stated that the plot in Guruswamy was off by a factor of 100. The

Staff considers that the plot in Guruswamy is most likely off by a factor of at least 10,000 and requests clarification, and additional support for the time yield limit given for lead in Table 4-9 of SAR NCS 0017 Rev 4.

This information is required to meet TS-R-1 Regulation 651(b).

Comment – The Staff has determined that the applicant did not present sufficient technical justification for the transportation of high-burnup spent nuclear fuel (greater than 45 GWd/MTU), without requiring canning of such fuel. Therefore, the Staff believes the conservative approach would be to can all fuel with burnups greater than 45 GWd/MTU. The Staff also considers that due to the temperatures that such cans may observe during accident conditions, brazing should not be permitted to seal the cans.