

June 7, 2016

Paul Blanton, Program Manager
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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
MODEL NO. 9979 PACKAGE

Dear Mr. Blanton:

By letter dated May 3, 2016, Savannah River National Laboratory (SRNL) submitted an application for Certificate of Compliance No. 9979 for the Model No. 9979 package.

In connection with the staff's review of the application "Safety Analysis Report Model 9979 Type AF Shipping Package, S-SAR-G-0002, Revision No. 0", dated May 2016, we need the information identified in the enclosure to this letter. We request that you provide this information by July 11, 2016. If you are unable to meet this deadline, you must notify us in writing no later than July 1, 2016, 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. 71-9979 and CAC No. L25101 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) 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. 71-9979
CAC No. L25101

Enclosure: Request for Additional Information

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Request for Additional Information
for the
Model No. 9979 PACKAGE
Docket No. 71-9979

By application dated May 3, 2016, Savannah River National Laboratory (SRNL) submitted an application for the Model No. 9979 package.

This Request for Additional Information (RAI) identifies information needed by the staff in connection with its review of the "Safety Analysis Report Model 9979 Type AF Shipping Package – S-SAR-G 00002, Revision No.0", dated May 2016. The requested information is listed by chapter number and title in the applicant's Safety Analysis Report. The staff reviewed the application using the guidance in NUREG-1617, "Standard Review Plan for Transportation Packages for Spent Nuclear Fuel."

Each individual RAI section 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.

Chapter 2 – Structural Evaluation

- 2-1 Specify on the licensing drawings the UN stamps for which the 30-gallon and 55-gallon drum are designed for.

Reference 2-8 indicates that both drums of the package are built to withstand 36 psig of internal pressure. The reference states that this information would be conveyed in the form of UN stamps. However, this information could not be found on the licensing drawings.

This information is needed to determine compliance with *Title 10 of the Code of Federal Regulations* (10 CFR) 71.33(a)(5).

- 2-2 Clarify the yield strength of material used to construct the individual drums and split closure rings of the prototypes used during drop testing.

The package specifies the use of ASTM A1008 CRCQ carbon steel for the 55-gallon drum, 30-gallon drum and split-ring closure device. The applicant states that the yield strength of the steel varies from 20 ksi to 40 ksi. However, it is unclear what the yield strength of the material used for prototype drop testing was. Without a minimum yield strength, it is unclear how drums built using A1008 steel will perform as compared to prototypes used for hypothetical accident conditions (HAC) test conditions due to the variation of yield strength. Drums built with this material would then also have to meet or exceed the yield strength of the prototypes.

This information is needed to determine compliance with 10 CFR 71.33(a)(5), 10 CFR 71.71 and 10 CFR 71.73.

- 2-3 Clarify the performance of the package during normal conditions of transport (NCT).

Several prototypes were dropped under ambient temperatures (South Carolina winter). It is unclear how these prototypes would perform at -20°F and 100°F. The applicant stated through electronic communication that not all packages were dropped at these temperatures due to the performance of similar packages like the 9977 and BTSP. However, this information has not been provided.

This information is needed to determine compliance with 10 CFR 71.71.

- 2-4 Clarify the effect of fatigue on the package during normal conditions of transportation.

Section 2.6.5 of the SAR indicates that “Fatigue and bolt evaluations are shown to be acceptable” with regards to vibration. Information regarding fatigue appears to be contained within references cited in this section, however, information regarding fatigue could not be found in these two references.

This information is needed to determine compliance with 10 CFR 71.71

- 2-5 Provide weld size, weld filler and welding process information on the drawings.

Provide weld size, weld filler and welding process information on the drawings as reference to AWS D1.3 is not enough.

This information is needed to determine compliance with 10 CFR 71.33(a)(5).

- 2-6 Clarify the foam material properties specified on Drawing R-R4-G-00163 and Drawing R-R4-G-00164.

Note 3 of Drawing R-R4-G-00163 indicates that foam material properties can be found in document M-DS-G-00057. Likewise, note 3 of Drawing R-R4-G-00164 indicates that disk material properties can be found in document M-DS-G-00084. These documents could not be located, and material information should be indicated on the licensing drawings.

This information is needed to determine compliance with 10 CFR 71.33(a)(5).

Chapter 3 – Thermal Evaluation

- 3-1 Clarify the material of the package/dunnage foam in the 30-gallon drum.

Figure 3.3 and 3.4 of the application seem to identify the package/dunnage foam of the 30-gallon drum as polyethylene but Table 3.1 identifies the packing/dunnage materials as polyurethane foam. Table 3.1 note (h) also leads to Reference 3-10 which provides documentation for testing of polyurethane foam. Additionally, several sections of the application, such as Section 3.1.1.4, identify the packing foam material as polyurethane which seems to contradict Figures 3.3 and 3.4. In contradiction to Table 3.1 of the application, page 9 of Appendix 3.1 calls out the

packing material for the foam in the 30-gallon drum as polyethylene foam. The staff needs clarification on the material of the packaging/dunnage foam.

This information is needed to determine compliance with 10 CFR 71.33.

- 3-2 Provide further information on the charring temperature of Dow BETAFOAM.

Table 3.1, note (c), leads to Reference 3-9 which is used to identify 640°F as the temperature at which Dow BETAFOAM degrades to char. Reference 3-9 seems to do this analysis for the FR-3710 foam with a handwritten note stating this is similar for BETAFOAM. The applicant should provide more information and demonstrate the equivalency of these two foams in order to use 640°F as the “charring” temperature for the BETAFOAM.

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

- 3-3 Clarify the term “black body” and the associated properties.

Page 3-23 of the application states, “For the HAC thermal analysis, 1475°F air with forced convection and black body properties simulates the engulfing fire.” The applicant should clarify the term “black body” and define the associated properties.

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

- 3-4 Clarify the data in Table 5 and Figure 3 of Appendix 3.1.

Table 5 of Appendix 3.1 shows the maximum component temperatures for NCT/shade conditions. This table shows that the maximum temperature for each component is 100°F. Figure 3 of Appendix 3.1 shows the temperature profile for the 9979 package for NCT/shade conditions. The temperature profile of Figure 3 and the data in Table 5 do not seem to correspond. The applicant should clarify the maximum component temperatures for NCT/shade.

This information is needed to determine compliance with 10 CFR 71.71.

- 3-5 Provide Reference 3-31 as identified in Section 3.3.1.1.3 of the application.

Section 3.3.1.1.3 points to reference 3-31 in a discussion regarding a previously DOE certified Bulk Tritium Shipping Package and COMSOL benchmarking. Reference 3-31 does not seem to include this information. The applicant should provide the correct reference with the applicable COMSOL benchmarking information related to the Bulk Tritium Shipping Package.

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

- 3-6 Clarify the maximum pressure under NCT for the 30-gallon drum.

Section 3.3.2.1 calculates the maximum pressure in the 30-gallon containment drum based on a content heat load of 1-milliwatt for the AGN fuel content. A total pressure

of 20 psia is calculated. Table 2.9 of the application shows the 30-gallon drum maximum pressure to be 21.16 psia but the note states that the pressure is based on a 3.5 watt heat source which bounds the AGN fuel source of 1-milliwatt. The applicant should clarify the maximum NCT pressure for the 30-gallon drum and the heat load value used to calculate the maximum pressure.

This information is needed to determine compliance with 10 CFR 71.71.

- 3-7 Provide additional information on the minimum allowable service temperatures of the packaging components.

Table 3.1 shows that the minimum design limit temperature for all of the packaging components is -40°F. The applicant does state in note (j) that this is the regulatory limit. Section 3.2.1 of the application states that all of the materials are thermally stable from -20°F. The applicant should provide additional information (e.g.; manufacturers data sheets) that show the minimum allowable service temperature of all components is less than or equal to -40°F.

This information is needed to determine compliance with 10 CFR 71.71.

- 3-8 Provide additional information on the heat transfer capabilities of the COMSOL Multiphysics software to model the package.

Section 3.3.1.1.1 describes the COMSOL Multiphysics software as a general purpose conduction-radiation computer code. Reference 3.2 adds that it is subdivided into submodules that can be employed base on the type of problem being solved and that the heat transfer module is utilized for this package. The applicant should provide additional detail on the heat transfer capabilities of the software to model this particular package.

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

Chapter 5 – Shielding Evaluation

- 5-1 Demonstrate that the authorized contents are limited to one A_2 .

The package, designed for transport of Type A quantities of fissile material, does not necessitate a shielding evaluation. The applicant needs to determine the A_2 value for all isotopes of the authorized contents using the equation provided in Appendix A of 10 CFR Part 71.

This information is needed to determine compliance with 10 CFR 71.22.