

From: Jessica Glenny
Sent: Wednesday, April 09, 2008 9:51 AM
To: Pomares, Raul J. (GE Infra, Energy); Bob Robnett; Troy Hedger
Cc: Robert Nelson; Nader Mamish; Meraj Rahimi
Subject: Telephone Conference Report

Troy and Raul,

As discussed on Monday, below is the telephone conference report for you.

Sincerely,

Jessica Glenny
Project Manager, Licensing Branch
Division of Spent Fuel Storage
and Transportation
301-492-3285

Telephone Conference Report April 7, 2008

Participants

Robert Nelson, SFST/LB, Chief
Jessica Glenny, SFST/LB, Project Manager
Troy Hedger, AOS
Bob Robnett, AOS
Raul Pomares, GE

This email documents our telephone conference held on Tuesday, April 7, 2008, at 1:30 PM. This conference call was held to summarize the significant technical deficiencies identified in the application for the AOS Radioactive Material Transport Packaging System.

Significant deficiencies were identified in the technical areas discussed below. A summary of the key technical issues is provided for your review. The staff will provide you with more detailed information in a deficiency letter. This deficiency letter would be sent in response to a withdrawal request.

Materials

The chemical composition and physical form of the contents are not specified in sufficient detail to determine if interactions with other materials will occur. The chemical form of the liquid contents dictates what interactions will take place. If there is polymer material surrounding the contents, such as metallographic mounts, gases could be generated. If the contents include

bare metal, the size, shape, and chemical form dictates if pyrophoric or other reactions can occur.

The location and properties of the neutron shielding “Boronated WEP/Polyethylene” have not been specified. No methodology has been provided to qualify: (a) the uniformity of the material; (b) the durability of the material for the environmental conditions of service; and (c) to measure its absorption coefficient. Without this information, the staff is unable to assess the expected behavior and interactions of this absorber material.

The Safety Analysis Report (SAR) states that the cask is modeled to include the “fuel rod basket,” and uses the densities and material properties presented in Table 5-26, along with the standard cask assembly. This is the only instance where “fuel rod basket” is described as an integral structural component within the cask. It is not clear to the staff, which among the seven different models contains this fuel rod basket. Details of the structure of the fuel rod basket have not been provided and an explanation of how the fuel rod basket, if used, was modeled, and also how its independence and structural integrity within the cavity was maintained. Additionally, there was insufficient evaluation of the interaction effects during the required drop scenarios for both normal condition of transportation and hypothetical accident condition.

Thermal

The maximum decay heat values used for the thermal analysis were not consistent with the decay heat values provided in other sections of the SAR. A potential unit conversion error with respect to the decay heat values could lead to non-conservative thermal results.

Temperature limits for the cask cavity and seals were exceeded. Seal temperature limits do not agree with the maximum service temperature reported by the seal manufacturer.

LIBRA input and output files as well as a comprehensive discussion of analysis models were not provided per Interim Staff Guidance 21, "Use of Computational Modeling Software." Additional models, including those with liners, were not analyzed. The internal fuel rod basket was not modeled in the LIBRA analysis; therefore the model does not thermally represent the designed packages.

Because of the magnitude of these issues and others, the staff cannot comprehensively apply NUREG-1609, "Standard Review Plan for Transportation Packages of Radioactive Materials," in all thermal review areas until they are resolved. The staff identified many technical discrepancies between information presented in various sections in the SAR, and significant thermal and containment design issues that question the fundamental performance of the proposed packages.

Criticality

AOS did not specify the S (alpha, beta) data for the water. Without the S (alpha, beta) specification, the criticality code (MCNP) used by the applicant will treat a mixture of hydrogen and oxygen as a mixture of free gas rather than a water molecule. Neutrons will interact differently with the gas phases of hydrogen and oxygen than with a water molecule. Preliminary staff calculations show that this will cause the k-effective of the uranium-235 cases to increase. In some cases, this value exceeds the k-effective limit of 0.95. The applicant will have to repeat all of the criticality calculations with this specification. In many cases the k-effective value will increase slightly or not at all and there will be little impact. In some cases, the k-effective may not increase above the limit, but the behavior when applied to the sensitivity studies may be different enough to cause different limiting conditions. In other cases, this change may cause k-effective to increase above the limit and the applicant may have to make design changes by decreasing the allowed amount of fissile material, or taking credit for geometry aspects, presence of neutron poisons, burn-up, etc.

General

Additionally, the license application provided by AOS is not outlined to be consistent with the format and content delineated in NUREG-1609, "Standard Review Plan for Transportation Packages for Radioactive Materials." As a result and due to the complexity and organization of the information as presented in the application, NRC staff has had difficulty in determining if the technical adequacy of the design proposed for acceptance and approval complies with the requirements of 10 CFR 71.33, 71.35, 71.43(d), and 71.47.

Recommendation

NRC staff recommended that AOS withdraw its application and address these technical deficiencies. The staff suggested that AOS consider a simplified application addressing one or two of the desired contents for the transport package system and request additional contents as an amendment after the base design is approved. The staff also recommends that the applicant follow format in NUREG-1609, "Standard Review Plan for Transportation Packages for Radioactive Materials."

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From: Jessica Glenny

Created By: Jessica.Glenny@nrc.gov

Recipients:

Raul.POMARES@ge.com (Pomares, Raul J. (GE Infra, Energy))
Tracking Status: None
bobr@alpha-omegaserv.com (Bob Robnett)
Tracking Status: None
th@alpha-omegaserv.com (Troy Hedger)
Tracking Status: None
Robert.Nelson@nrc.gov (Robert Nelson)
Tracking Status: None
Nader.Mamish@nrc.gov (Nader Mamish)
Tracking Status: None
Meraj.Rahimi@nrc.gov (Meraj Rahimi)
Tracking Status: None

Post Office:

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