May 15, 2007

MEMORANDUM TO: William H. Ruland, Deputy Director
Licensing and Inspection Directorate
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

FROM: Meraj Rahimi, Senior Project Manager **/RA/**
Licensing Branch
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Office of Nuclear Material Safety
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SUBJECT: SUMMARY OF MAY 8 AND 9, 2007, MEETING WITH DEPARTMENT OF ENERGY - IDAHO NATIONAL LABORATORY ON DESIGN OF STANDARDIZED CANISTERS FOR TRANSPORT

On May 8 and 9, 2007, staff of the Nuclear Regulatory Commission (NRC), and the Department of Energy (DOE) - Idaho National Laboratory (INL) and its contractors, held the fourth pre-application meeting to discuss the Standardized Canister designed for transporting DOE-owned spent nuclear fuel to Yucca Mountain. The meeting was focused on the materials and structural testing and analyses performed by DOE for the Standardized Canister to date. The meeting was held in Idaho Falls, Idaho, in order to provide an opportunity for the staff to observe the tested canisters and the facility used by DOE-INL to perform the material testing. The list of attendees and the meeting handouts are in Enclosures 1 and 2.

In the morning of the first day, DOE-INL presented the results of structural drop tests performed in 1999 and 2004. The 1999 tests were performed on 18-inch diameter and 15-foot and 10-foot long canisters at Sandia National Laboratories (SNL). The 2004 tests were performed on 24-inch diameter and 15-foot long canisters at SNL. The NRC staff indicated that if the canisters passed the leak-tight test, DOE may choose not to use a lesser leakage rate criteria that requires knowledge of fuel debris and fragments under normal and accident conditions for the containment purposes. The DOE-INL also presented the amount of material strain calculated by the ABAQUS computer code simulating the 1999 and 2004 canister drops along with the structural analysis of the canisters subjected to 100-g deceleration load simulating the drop of Standardized Canister within a transportation overpack. The NRC staff reminded DOE-INL that gaps between the canisters and the overpack cavity should be included in calculating the amount of deceleration loads to be applied to the canisters. At the end of the morning session, DOE-INL presented the material testing program and the tests resulting in development of strain-rate based true stress-strain curves for 304L and 316L stainless steel.

In the afternoon of the first day, the NRC staff went on a tour of the facility where the material testing are being conducted. The staff also observed the segments of the canisters which had been dropped in 1999 and 2004 at SNL.

In the morning of the second day, DOE-INL presented an overview of the DOE-owned spent nuclear fuel characteristics and quantities, followed by evaluation of possible degradation mechanisms of canisters during subsequent long storage. As part of this evaluation, DOE-INL discussed generation of 10% by volume of hydrogen gas inside the canisters due to radiolysis of residual water. The staff reminded DOE-INL that NUREG-1617 states that “combustible gases should not exceed 5% of the free gas volume in any confined region of the package ...” Then, DOE-INL presented the results of their flaw propagation tests conducted in 2004 to demonstrate that flaws in excess of detectable limits would not propagate through the canister wall under strains beyond those encountered under 10 CFR 71.73 accident conditions. At the end of the meeting, the path-forward for the Standardized Canister topical report was discussed. It is the NRC staff’s understanding that DOE-INL will demonstrate in the topical report that the Standardized Canister design would be subcritical with full moderation inside the canisters for all DOE-owned spent nuclear fuel types in the as-loaded configurations. Under the 10 CFR 71 Hypothetical Accident Conditions, the DOE-INL will demonstrate subcriticality for bounding fuel re-configurations with some degree of reliance on canisters to keep the moderator outside of the canisters.

No regulatory decisions were made at the meeting.

An attendance list and meeting materials are included.

TAC No. L24045

Enclosures:
1. Attendance List
2. Meeting Materials

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NRC - DOE-INL Meeting
May 8 and 9, 2007

ATTENDANCE LIST

Name	Affiliation
Meraj Rahimi	NRC/NMSS/SFST
Ed Hackett	NRC/NMSS/SFST
Gordon Bjorkman	NRC/NMSS/SFST
Bob Nelson	NRC/NMSS/SFST
Mark Arenez	DOE-Idaho
Brett Carlsen	INL/NSNFP
Phillip Wheatley	INL/SNSFP
Thomas Hill	INL/NSNFP
Bill Hurt	INL/NSNFP
Al Luptak	INL/NSNFP
D. K. Moton	INL/NSNFP
Spencer Snow	INL/NSNFP
W.R. Lloyd	INL/NSNFP
Alan Wertsching	INL
Matt Ebner	INL
Robert Sewell	BSC/YMP

Enclosure 1

Enclosure 2

Presentation Materials