NRC FORM 699 (9-2003) U.S. NUCLEAR REGULATORY COMMISSION

CONVERSATION RECORD

DATE: 12/14/2010

TIME: 5:45pm

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	TELEPHONE NO.
See Summary Section below	888-989-4718

ORGANIZATION: NRC, Transnuclear (TN), Department of Transportation (DOT), Mitsubishi Nuclear Fuels (MNF)

SUBJECT: Second MFC-1 RAI Conference Call

TYPE OF CONVERSATION: ☐ VISIT ☐ CONFERENCE ☑ TELEPHONE (☐ INCOMING ☑ OUTGOING)

SUMMARY *(Continue on Page 2)*

Participants:
NRC: William C. "Chris" Allen, Deborah Jackson, Jessica Colon, Jimmy Chang
TN: Jayant Bandre, Don Shaw, Nicolas Guibert
MNF: Alex Corsten, Hode Suguru, J. Kishimoto

RAIs were distributed to the participants prior to the start of the 5 P.M. conference call. Three RAIs generated by the thermal reviewer had been discussed in the previous conference call. Two of these RAIs requested explanatory information on the Hypothetical Accident Condition (HAC) thermal analysis. The technical reviewer reviewed the information provided and detemined that the HAC thermal analysis needed to be reperformed. The two RAIs from the previous conference call were combined and revised to reflect the need to re-perform the HAC thermal analysis. This revised RAI was the only one RAI discussed during the conference call.

Although MNF agreed at the start of the conference call to re-perform the thermal analysis, TN inquired if the conservatism of the existing thermal analysis compared to the actual test results would be sufficient. The following was provided to explain why the existing thermal analysis would not be sufficient. First, since MNF used a natural convection heat transfer coefficient in lieu of a forced convection heat transfer coefficient, they were not in compliance with the TS-R-1 regulations. Therefore, even though using a forced convection coefficient would only result in a more conservative analysis, it must be used. Second, the configuration factor employed by MNF was based on an invalid assumption, and since radiation transfer dominates in this situation (a fact pointed out by Chang in discussion among NRC personnel), it was therefore unclear exactly how much conservatism was actually in the calculation. Considerable discussion followed regarding choosing a forced convection coefficient. Finally, the NRC emphasized that it was not responsible to advise MNF on how to perform the analysis, but that it was responsible to insure the regultions, which require the use of a forced convection coefficient and a flame emissivity coefficient of 0.9, were followed. Therefore, MNF indicated they would likely use a forced convection coefficient listed in an IAEA technical guidance document. MNF also indicated they would provide an updated temperature vs. time plot for the HAC thermal analysis.

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ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Chris Allen	William C. Allen	January 20, 2011

ACTION TAKEN

TITLE OF PERSON TAKING ACTION	SIGNATURE OF PERSON TAKING ACTION	DATE

CONVERSATION RECORD (Continued)

SUMMARY *(Continue on Page 3)*

Because MNF would have to re-perform the HAC thermal analysis, the original RA I response time of thirty days would have to be extended. RAI responses and revised SAR pages would be provided by the end of January. The RAI conference call ended at approximately 5:45 P.M.

Note: RAIs discussed during this conference call were subsequently issued by formal letter (ML10354007).

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T1 – Perform HAC thermal analysis using appropriate coefficients or prove that the analytical approach employed in the application submittal is at least as conservative as that required by the regulations.

The applicant performed a HAC thermal analysis of the package exposed to a fire, and indicated in the SAR that a value of 0.9 was used as the flame emissivity and 0.8 was used as the surface absorptivity coefficient. During a conference call, the applicant stated that a configuration factor was calculated using the values of 0.9 for the flame emissivity and 0.8 for the surface absorptivity coefficient. The configuration factor calculated, and subsequently used in the TRUMP code to determine the maximum package temperatures, was 0.735. This value of 0.735 is non-conservative irregardless if it is used as either an emissivity or an absorptivity coefficient. In addition, the SAR does not show that using this configuration factor provides analytical results which are at least as conservative as those which would be obtained if either a flame emissivity coefficient of 0.9 or a surface absorptivity coefficient of 0.8 were employed.

Also, the applicant specified in the SAR that natural convection heat transfer from the surface of the package was employed instead of forced convection during the 30-minute HAC fire. The applicant also specified that natural convection and radiation heat transfer were used in the HAC analysis during the cooldown period. Although the staff finds the use of natural convection and radiation heat transfer appropriate during the cooldown period, the staff considers using a natural convection heat transfer coefficient during the HAC 30-minute fire a non-conservative boundary condition because the differences in the convective coefficient between natural convection and forced convection are not negligible.

This information is needed to for the staff to determine if the thermal design of the MFC-1 meets the requirements of paragraph 728(a) TS-R-1.