HLWYM HEmails

From: Tae Ahn
Sent: Thursday, February 02, 2006 6:57 AM
To: Andy Campbell; Albert Wong
Cc: Biswajit Dasgupta; Michael Waters; Robert Johnson (NMSS); Christopher Ryder
Subject: Re: Proposed Thermal Calculations Work in a Hypothetical FHF

Hydride embrittlement of cladding could be an issue if there is a thermal pulse under normal or accident conditions. This would happen inside an intact TAD canister. Tae

>>> Albert Wong 02/01/06 8:35 PM >>>
Andy -

This e-mail summarizes recent conversations I had with Bis & Co. re: the proposed thermal calculations work in a hypothetical Fuel Handling Facility.

As you know, the work started last year under the leadership of Chris and Bis. The original scope of work was as follows: Center was to use a computational fluid dynamics (CFD) code to analyze the temperature profiles of a cask (as a function of time under different operating conditions) when the lid was removed. Fuel temp is expected to rise when the lid is removed and the helium inside the cask is displaced by air. The temp of the fuel was to be estimated for the following conditions: HVAC on and off for a cask is located in an (1) operating room, (2) hot cell.

Initially the Center used Flow 3D as the CFD software and completed runs for the case where the cask was located in an operating room. The results were reviewed by SFPO and RES. RES/SFPO suggested the Center to re-analyze the results using FLUENT and compare the results. FLUENT is a commercial CFD code that's widely used in many fields (e.g., aerospace, mechanical, chemical, etc.) for the following reason: FLUENT contains a radiation module that allows the user to bring the effects of radiation into the simulation; whereas Flow 3D does not have this capability. The Center accepted the suggestion and began to purchase the FLUENT software. Shortly after that DOE made a decision to pursue the TAD option, thereby greatly reducing the need to handle bare fuel in open air environment.

Currently, due to the program change, we decided to scrap the second half of the simulation (i.e., an open cask in a hot cell). However, the Center proposed to carry out the runs using FLUENT and complete the first half of the simulation (i.e., an open cask in a room). The estimated completion time is 3 months from the time the FLUENT software is purchased with 0.3 FTE usage. No adverse impact on other Center's work (either in preclosrue or postclosure) is expected because the thermal calculation PI and other supporting staffers are from the SWRI. Currently they do not support other Center activities.

I support the Center's proposal for the following reasons: (1) Re-analyzing the problem using FLUENT gives the Center staff an opportunity to become familiar with FLUENT code. The knowledge can then be used to analyze other temperature/flow related problems associated with TAD design and other surface/subsurface facilities. The code can also be used to provide confirmatory calculations in other suitable preclosure areas if necessary. (2) It can provide us an opportunity to compare the results from FLUENT and Flow 3D to ascertain the effects of radiation on the temp profiles in the room.

At this time, we would like to have RES/SFPO review the FLUENT results again when they become available. The time frame is estimated to be around the end of Feb or beginning of March. It should not take more than one RES/SFPO staffer more than 2 weeks to review the results and provide feedback. Please let me know ASAP if you believe the work should be discontinued.

Everyone, please weigh in and express your views on the merit of this work. If necessary, I can schedule a meeting to further discuss this issue. Thanks,

Albert

Hearing Identifier: HLW_YuccaMountain_Hold_EX
Email Number: 15

Mail Envelope Properties (Tae.Ahn@nrc.gov20060202065647)

Subject: Re: Proposed Thermal Calculations Work in a Hypothetical FHF
Sent Date: 2/2/2006 6:56:47 AM
Received Date: 2/2/2006 6:56:47 AM
From: Tae Ahn

Created By: Tae.Ahn@nrc.gov

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