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From: Conrad W. Smith <csmith@csg.org>
To: <nrcrep@nrc.gov>
Date: Fri, Dec 30, 2005 3:48 PM
Subject: Response from "Comment on NRC Documents"

Below is the result of your feedback form. It was submitted by

Conrad W. Smith (csmith@csg.org) on Friday, December 30, 2005 at 15:47:47

Document_Title: Spent Fuel Transportation Package Response to the Baltimore Tunnel Fire Scenario (NUREG/CR-6886) - Draft Report for Comment

Comments: In a number of places the study emphasizes that worst-case "conservative" assumptions were made and, overall, the modeling and analysis seems impressive and, clearly, a number of conservative assumptions were made. However, some assumptions made do not appear to be worst-case assumptions -- or at least the fact that their adoption was warranted was not adequately explained. In addition, the use of a 7-hour fire presents a couple of problems.

First, there are various assumptions and statements in section five of the study regarding the location of the package that should be addressed.

On page 5.1 the statement is made that 66 ft. downstream from the fire source is the shortest possible distance between the fire center and an SNF package because of the existence of a buffer car. This assumption seems problematic: even in the Baltimore Tunnel and certainly in wider tunnels with more than one track – it seems possible that the cask car and a buffer car could come become uncoupled and slide past each other, that the buffer car could override or be overridden by the package car or that the derailment could realign the cars in such a way that the minimum distance between the fire Center and the package could be only a few feet. (Many people in the general public who have seen pictures of derailments with cars jumbled or piled on top of each other, would find this assumption doubtful.)

Similarly the study assumes that the package remains horizontal with a one and facing the fire source. It states that this orientation results in the maximum possible exposure and in the least post-fire free convection cooling. While I do not doubt that that is true, it would seem that there should be some discussion or study of an inclined or vertical package particularly, as I believe is pointed out later, because of the vertical temperature distributions both in the air and on the tunnel walls. (Would the seals in a vertical task where the end is near the heated ceiling of the Tunnel -- or sitting just above a pool of flammable liquid – exceed rated service temperatures sooner than in the assumed position?)

Relatedly, on page 5.7, the analysis assumed that the center axis of the package would be 8.2 ft. above the Tunnel floor. Given the thermal interactions revealed by the study of the package with the gases and the walls and ceiling, it is not obvious that it is a worst-case position – and, it does not seem inconceivable that the cask car might override one of the buffer cars and thus be higher in the Tunnel or that the cask cradle could become detached from the railcar or that the railcar could be overturned in such a way that the center axis of the package would be at some other elevation. (While I understand from the comment in the first numbered paragraph of section 6.1 that the peak gas temperature at the top of the Tunnel was used as the ambient temperature for active heat transfer to the upper surfaces of the packages, it is not clear to me that this is equivalent to assuming that the package itself were higher in the Tunnel.)

Second, regarding the use in the study of a seven-hour fire. While I understand that the study states that the bee Fire Dynamics Simulator code predicted a seven-hour fire for the conditions known about the fire that occurred. And, I understand that the actual fire may well have been shorter than seven hours. However, the use of the seven-hour fire certainly raises questions when many of the grafts in section seven of the study are examined. A look at rate of increase of the any of the grafts regarding peak temperatures of the cladding, seals or other interior components at the seven-hour mark indicates all to

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clearly the probable consequences of a fire lasting 10 or 12 hours. I do not know the likelihood of any fire lasting that long -- though it does not seem inconceivable to this lay person that a fire lasting considerably longer that seven hours could occur from tunnel derailments involving several cars of flammable liquids on the same train as an SNF package or on !
a passing train in a dual track tunnel. There should be some discussion of both the confidence of the 7-hour FDS prediction and of the rather higher seal and internal cask temperatures that seem to be likely from a fire lasting 10 or more hours.

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