

Cook, John

From: Cook, John
Sent: Thursday, June 03, 2010 8:55 AM
To: Damiano, Debra; Cooper, LaToya
Cc: Glenny, Jessica; Lorson, Raymond; Weaver, Doug; Pstrak, David
Subject: RE: Trans Risk Assessment Comments

Is there a time free for me to meet with Ray and Doug to meet today to discuss this subject?

Background information on comments received on Draft SFTRA NUREG to date:

Bob Einziger provided the following comments on the Draft SFTRA NUREG for items that affect the release rates, i.e. fuel properties, and cladding properties. Our schedule does not call for us to provide comments to SNL until July 9, but have already shared share these comments with SNL for early review and consideration.

- 1- Page 2 - it says the analysis is being done for a 17 x 17 WEC assembly at 45 GWD/MTU, the highest burnup any of the three casks is certified to carry. I agreed to this but we ~~also agreed~~ that the study would be done at the current maximum limit of 62.5 GWD/MTU so we can bound the problem. Using only the lower burnup gives a somewhat hollow result since the properties of the fuel only start changing at this level; there is no rim, hydrogen content in the cladding is rather low etc.
- 2- Page 57 - a report by Kalan et. al. is referenced for the failure behavior of fuel rods. This is a DOE report that I am not familiar with and would like to get a copy. This was a side drop analysis done for 45 GWD/MTU fuel. At this burnup the oxide wastage layer and the hydride wastage layers of the cladding would not be fully formed, and hydride reorientation would not be accounted for. The summary on page 57 says the calculated strains were below the 2% limit stated in the Sanders report. The criteria for failure from Sanders really has no firm support. As a result I am not sure the results of the Kalen report would be applicable to a higher burnup rod.
- 3- Page 102 - the inventory will be much higher for fuel at 62.5 GWD/MTU
- 4- Page 104 release rates were quoted in a table with all the justification left to Appendix V. Sec V.5.4.1 and .2. Table V-17 gives release rates but never discusses how these release rates were obtained. The methodology, input data, and assumptions used to arrive at this table should be presented in the report.
- 5- Page 415 says that if there are no breached rods that no CRUD would be released because "there would be no depressurization even if the cask seals are compromised" This is true if the cask pressure at temperature is only one atmosphere. Many casks are pressurized above one atmosphere at room temperature and even if a cask is pressurized to one atmosphere at room temperature it will be above atmosphere at transportation temperature. The rods do not have to fail in order to release CRUD.
- 6- Page 415 states that the ratio of the atmospheric pressure to the cask internal pressure is .0667. Where does this number come from? It surely doesn't bound the ~~modern casks~~.
- 7- Page 415- There is a statement attributed to Hanson dealing with depressurization and release of material from rods. This statement is irrelevant to the topic being discussed. The topic deals with release from the fuel rods if the fuel oxidizes. A cask will depressurize long before the fuel gets a chance to have any appreciable oxidation. The last line in on the page says that the release fractions from the rods to the cask were developed from data from Hanson but never gave any indication how this was done or the assumption that were made. To be of any value the methodology used to arrive at the release fractions, the input data used and the assumptions made must be clearly described in the report.
- 8- Page 416 - Hanson makes the case, based on German indentation studies, that the rim is tougher than the body of the fuel and as a result should have a smaller fractional release. The validity of these German studies have been questioned by both NRC and PNL staff due to the size of the indenter used. There is equally contrary evidence thus in the past NRC has assumed a large potential uncertainty in the fracture of the rim region. To accept that the fracture of the rim and the body are nearly equal is ignoring the uncertainty in the data. This has been explained to Sandia Staff (RW) in the past.

9- Page 416. The authors use Hanson as a reference for a fission gas release fraction of 0.5 %. This is reasonable for fuel with a burnup of 45 GWd/MTU that has not been subsequently fractured in an impact. Hanson also showed that, the FGR of higher burnup fuel is substantially higher without further fracture in an accident. During fracture in an accident, the fission gas release can increase substantially. This issue was covered in detail in the appendix to the NRC PRA for storage.

Bob also provided some general comments:

- He found the report to be very stagnant. It makes conclusions for older models of casks using a fuel that is just on the brink of being called high burnup. There is not enough information on the methodology used to be able to extrapolate the data to a more realistic and modern case of the very large casks, with high burnup fuel.
- A few months ago we had a discussion of what fuel should be used and we decided that Sandia should model both the cases of fuel burnt to the maximum allowed by the CoC and also model the case where the fuel is at the high burnup limit allowed in-reactor, currently 62.5 GWd/MTU peak rod average. This second case seems to have been forgotten.
- He did not know whether it was NRC's or Sandia's choice not to do the high burnup case, and not to do a more complete treatment of the release terms but I think that for the case where the cask system develops a leak the analysis is unsatisfying.

Bob also indicated that he discussed the release fractions and how to go about addressing the uncertainties in them due to the uncertainties in the input parameters. The results in this report should be consistent with the release fractions in the NRC PRA or an explanation should be presented for the difference. None of these uncertainties was discussed in the report.

Bob is in Vienna this week, and I understand from a call with Doug Ammerman yesterday that Ruth Weiner from SNL spoke with Bob before he left, but I do not yet know the results of that discussion. Bob raised some good points, particularly the question on crud. Some considerations on Bob's points:

- Regarding high burn-up, recall that this was to be a study of certified casks/contents, and these packages are not certified for those burnups.
- The high burn-up fuel mentioned will be transported in canisters; SFTRA shows no release from canisters, so risk results will not be affected.

Bob, SNL and I will discuss his points and SNL's proposed responses after Bob returns. ||

In the meeting yesterday to discuss preliminary findings, Gordon Bjorkman provided an overview of the structural analyses. He noted that the structural analyses did not model gaps in the cask contents, and those gaps can contribute to secondary impacts. I have a call into SNL on this point. This was his significant issue with the analysis at this point. He also found that the overall presentation quality needs to be improved. *gaps were modeled - not explained well*

- ✓ Chris Bajwa indicated that he believed that SNL has looked at the proper fire scenarios, and had no significant issues with the thermal analysis at this point.
- ✓ Anita Grey, who has just joined the review team to replace Liz Thompson, has begun a review of the HP sections of the report.

My own review of the Public Summary, Introduction, Appendix on Analysis of Routine Transportation, Transportation Accidents and Observations and Conclusions has resulted in more than 100 comments, of varying significance. Overall, the report has good information, but it needs to be presented more clearly, with crisper focus on take-aways. There are numerous quality issues with the draft. I intend to relay many of these quality issues to SNL on Friday.

The review team members will provide final written comments to me (in either track-changes or bulleted list form) by June 28, for consolidation as may be needed, discussion and transmittal to SNL by July 9.