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LOS ANGELES, CALIFORNIA 90024

October 24, 1983

Mel Silberberg
Accident Source Term Program Office
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mel:

I have reviewed the material handed out at the Peer Review Meeting of October 12-13, 1983 as well as my notes and would like to transmit the following comments to you for consideration.

1. During the period beginning with core melt and ending with containment failure, the various isotopes of Iodine decay with the following half lives: I^{131} : 8.04 days, I^{132} : 2.28 hours, I^{133} : 20.8 hours, I^{134} : 52.3 minutes, and I^{135} : 6.7 hours. All have comparable fission yields and activity.

Two questions come to mind: a) What happens to the cesium tied up as cesium-iodide, and is it important (as the iodide decays)? b) How significant (radiologically) are the daughter products and if they are, is their physical chemistry important? For example I^{135} decays to Xe^{135} which decays to Cesium-135 with a 9.2 hour half-life.

2. What can be said of the other important isotopes. For example, ruthenium is currently being lumped into the "other" category; i.e. in the molten core. What can be said about its release. There are a number of other isotopes which would be important (e.g. Sr, Ja, Rb, etc.), and contribute to risk and hence the "risk perspective".

3. Most of the previous work concerning the Zion plant assumed a flooded cavity for the TMLB' sequence. The Battelle work seems to imply a dry cavity. The difference (wet vs. dry) affects the time, mode and location of containment failure, and hence the "source term". Why is there a difference?

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4. In all of the cases shown for the Zion calculations, a point value is given for containment failure pressure. This value is treated as a "threshold" with respect to the "source term". This viewpoint (as well as for other containments) leads to base mat penetration as the failure mode in the sequences shown for Zion.

If containment failure pressure is more accurately portrayed by a distribution, there will be some probability (albeit small), that the containment would fail by slow-overpressure, followed by an airborne release. This viewpoint is missing in the work presented during the meeting and should be assessed.

5. Adequate attention to external events should be given where possible. For example, we now have consideration of external events for Zion, Indian Point and Limerick. I believe we will see more for other PRAs such as GESSAR, Shoreham, etc. Seismic events may be initiators for suppression pool by-pass in some BWF suppression pool containments. At Zion they contributed to early containment failure. Such considerations should be factored into the Source Term Program. At present they don't appear to be.

6. I support your view that there is need for another meeting. I would recommend that the following be included.

a) A clear statement of the changes made (in data as well as models), during the course of the study is needed. Various changes were made (e.g. failure location for Peachbottom, concrete composition for Surry, etc.) which makes evaluation of the new codes and models difficult. These latter changes are often masked by the data changes.

b) The Peer Reviewers need a clear statement of the various phenomena modelled (and not modelled) beginning with WASH-1400, and carried out thru this study.

c) A clear understanding of the differences in the results obtained between the early Surry and Peachbottom (WASH-1400) analyses, the first Surry analysis using March 1.1 and the latest (March 2.0) Surry results, should be achieved. Battelle should have ample time to digest their results, and describe and assess any changes in results.

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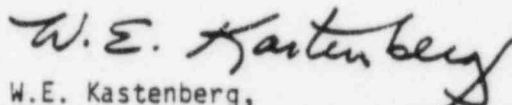
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7. The job of putting the results of this study into perspective will be difficult. As I mentioned at the meeting, the source term takes on different significance when considered on different sites. Population density, meteorology, geology, etc. all play a role. It would be helpful to the Peer Review Group if some specifics were discussed at the next meeting.

Lastly, I again congratulate your staff, and that of Battelle Laboratory for the effort they have expended. I look forward to the next Peer Review.

Sincerely,



W.E. Kastenber,
Professor Engineering and Applied Science

WEK/shm

cc: M. Jankowski
C. Ryden
R. Benero