S. Levine, Chief
Test and Power Reactor Safety Branch, DRL

November 6, 1964

R. H. Baker
Technical Assistance Branch, SS

FISSION PRODUCT RELEASE & TRANSPORT MODEL-PEACH BOTTOM REACTOR (DOCKET-50-171)

At your request, I have reviewed reference information available to me concerning the release and transport of fission products which may be released from the Peach Bottom reactor core in the event of a maximum credible accident.

From discussions with your staff and the summary hazard reports, I understand that the contractor assumed a gross release of 75% of the inventoried fission products from the fuel matrix and that the so-called "solids" including the bone seeking nuclides, such as strontium, are essentially retained within the core by condensation in the cooler regions of the core in an oxide form being released only by transpiration of the oxide form. The concern of the staff based upon their observation that if the reduction factor of 100 which the condensation transpiration model suggests, is not realized, the potential offsite bone doses due to leakage of bone-seeking nuclides may be excessive and constitute the controlling consideration rather than potential thyroid doses.

I have reviewed the current unclassified literature concerning fission product release and transport in an attempt to verify the rationality of the contractor in using the assumed model. I could find no reference to any experimental program which would provide useful data. I am familiar with the several overall experimental programs to ascertain such information and I confirmed this observation by consulting with Dr. W. E. Browning of ORNL who is actively engaged in the studies and who is also familiar with the overall program. There is a possibility that LASL may have obtained some useful data on this subject from an experimental program involving one of their classified projects and I have requested the information through the appropriate channels.

OFFICE ▶						
SURNAME ▶						
DATE ▶						

A-368

In my opinion your staff is justified in questioning the assumed fission product release - transport model because

1. The assumed 75% gross fission product release from the fuel matrix appears to be reasonable.

2. The anticipated temperatures of the core may liberate a great deal of material which will form particles (i.e. carbides of various types) in the Angstrom to sub-micron size range upon which the nuclides may be expected to ad/absorb.

3. The mobility of these particles would be considerably greater than that of the proposed condensed oxided nuclides in that they would be airborne and could be expected to remain airborne until they agglomerate and deposit by gravitational forces.

I suggest that the contractor be asked to provide any reference or cite any experimental program from which we can make judgement concerning the adequacy of his assumed fission product transport model. Meanwhile, I will continue to look for applicable data but I do not believe that necessary definitive experiments have been performed.

cc: A. B. Holt, SS
J. J. DiNunno, SS
R. E. Baker, SS

OFFICE ▶	TAB:SS					
SURNAME ▶	R.E.Baker/amp					
DATE ▶	11/6/64					