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ADVISORY COMMITTEE
REACTOR SAFEGUARDS
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January 31, 1980

Mr. Paul Boehnert
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

In response to Dr. Kerr's request of January 25, I have attempted to summarize in the following discussion my evaluation of the relative merits of alternatives "3a" and "4a" as suggested by Dr. Hanauer as well as my attitude regarding the arguments related to use of "90%, 95% or 99%" value of MTC in calculating PWR pressures following ATWS.

Although alternates "3a" and "4a" are not yet clearly defined we understand that they will be very nearly 3 and 4 as described in NUREG 0460, Vol 3. For the B&W and CE PWR's the major difference between alternates 3 and 4 are the trade-offs between a scram back-up, using same rods but different electrical portions than primary scram, (called BUSS and SPS) and added safety valves to limit pressure rise. Because no ATWS scenario appears to involve gross core distortion or identified mechanical factors likely to impact on operability of a substantial fraction of the rods, I believe the BUSS and SPS concepts can, if properly implemented, significantly improve the likelihood of being able to insert rods. The same holds for ARI of GE, although with some degradation in time response. I am not sure that the added relief capacity would be as effective overall because of my own uneasiness in accepting the dynamic calculations by which mitigation capabilities are estimated. Well defined ATWS initiators do not necessarily imply well defined scenarios - our crystal ball isn't that good. Thus I prefer alternative 3 to alternative 4, but if added relief is considered necessary I would prefer not to give up BUSS and SPS.

With regard to AMSAC, I am less than enthused in any case. There is an implication that one has good information that ATWS has occurred. In my opinion failure to scram is most likely to occur because of failure of the "system", including the operator, to recognize the need in a timely fashion. Meeting the criteria of Appendix C of NUREG 0460, Vol 3, is

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easier said than done, since that appendix paraphrases many requirements of IEEE-279 and implies a design against rather specific conditions and scenarios. Many of the criteria are more cosmetic than substantive.

The BWR problem is a little different. It does appear that RPT will buy time in event of scram if sensing and logic are sufficiently independent (and reliable in themselves) from normal scram and the initiating event. It is quite likely that, given such time, ARI would be more likely to produce satisfactory mitigation than SLCS (although one wonders if the purists might then argue that it is not ATWS if the rods go in). If RPT works it implies that some instruments know of the problem, therefore dumping the air header pressure would most likely insert the rods long before SLCS could be actuated. I believe that the automatic SLCS will have enough constraints that its reliability will be suspect. If it is decided that such automatic action is required, the capacity and response should be improved so that it is sufficient for the task.

The issue of which MTC to use is apparently one of probability. If we assume that ATWS events are equally likely at any time in a cycle then the probability of a coefficient being less negative than that of the assumed case during an ATWS varies from 0.01 to 0.1 between the "99%" and "90%" values. This variation is not large when one considers all the uncertainties we are considering. I have no strong feelings either way. The calculation will not fix the problem, it will only change our perception which is cloudy at best.

Sincerely,

Stephen J. Ditto
Consultant

SJD:alm

cc: W. Kerr
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