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SUBJECT: Provides addl comments for consideration by NRC staff re draft NUREG-1560.Comments address discussion on early containment failure for ice condenser containments.

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DUKE POWER

May 8, 1997

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Subject: Duke Power Company Supplemental Comments on Draft NUREG-1560

By the letter of March 3, 1997 Duke Power Company submitted an initial set of comments on the draft NUREG-1560 report. Duke is providing herein a few additional comments for consideration by the NRC staff. These supplemental comments relate to the level 2 analysis.

The following comments address the discussion on early containment failure for the ice condenser containments.

Comment 1

The NUREG points out that the average conditional early containment failure probability for the ice condenser plants from the IPE submittals is lower than the average for the large dry containments. This is identified as an unexpected result. We agree that the early containment failure probability for a large dry containment is likely to be less than that for the ice condenser design. Our analysis for the Oconee plant calculated a conditional early containment failure probability of 0.003. The conditional early containment failure probability for the McGuire and Catawba Nuclear Stations was calculated in the IPE analyses to be between 0.04 and 0.07. These results are consistent with the expectation stated in the NUREG. Our results for McGuire and Catawba are comparable to the value arrived at in the NUREG-1150 analysis for Sequoyah. While some details may differ, the overall results are similar. The language in the sections discussing the ice condenser results gives the impression that the analyses for the ice condenser plants are suspicious. Given that the conditional early containment failure probability

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results from the ice condenser IPEs are numerically similar to the NUREG-1150 results, perhaps it is the results of the large dry containments with substantial variation in the level of detail and analytical approach that contribute to this observation. NUREG-1560 correctly points out that the much larger sample size for the large dry containments contributes to a large spread in the calculated results.

Comment 2
The differences in the conditional probabilities of early containment failure for the ice condenser plants are not solely attributable to the differences in modeling of containment failure modes. The NUREG alludes to this during a discussion of the Sequoyah and Watts Bar results when it states that "Another factor that affects containment failure probabilities is the type of core damage sequences …". This is an important point for the entire discussion of containment performance. This concept needs to be clearly articulated in the report.

The following comments address specific issues or comments made about the McGuire and Catawba IPE studies.

Comment 3
Page 4-40
"These two IPEs assumed that containment failure caused by the DCH load is unlikely …"
Page 4-42
"However, it is assumed in the IPEs that …"

The use of the word "assumed" in these descriptions is inappropriate. The containment failure probability was calculated by adding the DCH pressure rise (from an appropriate case in NUREG/CR-4551) to the base pressure in the containment at vessel breach (from DPC MAAP runs) to obtain the peak pressure in the containment. This pressure was then compared to the plant specific containment ultimate strength curve (Appendix G of the PRA report) to obtain a containment failure probability. We believe this process provides a realistic estimate of the containment failure probability for the DCH events. Appendix C of NUREG-1150, Section C.5.2, also notes the effectiveness of the ice condenser during HPME events when it states "The value of the ice condenser for containment pressure suppression is readily apparent …"

Comment 4
Pages 4-42 and 4-43
There is some discussion on these pages concerning the corium contact with the containment wall failure mode for the containment. Some reference is made to specific quantification values from the McGuire and Catawba IPEs such as "likely" (which numerically is a 0.9). Identifying these PRA quantifications without providing the corresponding similar value from NUREG/CR-4551 is misleading. In some cases our value of 0.9 is not significantly different than a similar quantification from NUREG/CR-4551. We agree that the assignments of some parameters for our evaluation of this particular failure mode are different enough from the NUREG/CR-4551 evaluation to contribute to the observed difference in the results. We are continuing to evalute the appropriateness of our quantification in our current update of the PRAs. This includes some specific items mentioned in the NUREG such as the ability of corium to escape the cavity and the potential for hot leg or surge line failure. However, the ability to depressurize the reactor coolant system for many sequences is also important.

According to the information in NUREG/CR-4551, the Sequoyah emergency procedures directed the operators to open the pressurizer PORVs at a CET temperature of 1200 °F if at least one charging or safety injection pump is operating. The McGuire and Catawba emergency procedures direct the operators to open the PORVs at this condition even if the pumps are not available. It was not apparent from the discussion in NUREG/CR-4551 that any depressurization using the steam generators was considered following core uncovery. With a source of auxilairy feedwater available, the procedures call for a depressurization of the steam generators to reduce RCS pressure. The opportunity for a procedurally directed depressurization of the RCS seems to be greater at McGuire and Catawba than was considered in the NUREG/CR-4551 analysis of Sequoyah. It is inappropriate to characterize the McGuire and Catawba evaluation of operator depressurization using the pressurizer PORVs as "less restrictive". This tends to imply that the differences are a result of the analytical technique. The McGuire/Catawba evaluation that was done was consisitent with the procedural guidance available to the operators.

Comment 5
Page 4-43
"The possibility of providing power to the igniters …"

Duke Power has completed its evaluation of this alternate power supply for the igniters. The alternate power connection was determined to be not practical with the current plant configuration.

Again we appreciate the opportunity to provide these comments.

Very truly yours,

M. S. Tuckman

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Assistant Director for
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