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 From: Hill Richard A.
 To: Dave Meyer - Fax
 Subject: COMMENTS ON DRAFT REGULATORY GUIDE 1052
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My comments forwarded by fax at Joel Kramer's request.

Rick Hill

From: Hill Richard A.
 To: Joel Kramer - Internet; Marilyn Weber - Fax
 Subject: COMMENTS ON DRAFT REGULATORY GUIDE 1052
 Date: Tuesday, January 21, 1997 2:23PM

As the Chairman of the ANS Working group that developed both ANSI/ANS-58.8-1984 and 1994, I want to offer some comments on the draft Regulatory Guide 1052. It is my opinion that Draft Regulatory Guide 1052 be endorsed by the NRC for implementation in the design process. Thus my comments are directed toward the ACRS concerns.

Before addressing the specific comments of the ACRS, it is necessary to set the boundaries for which the standard is applicable. These boundaries are that the standard is applicable for evaluation of design basis events only, it sets time tests after which a system designer can use operator response, versus automatic response, to a design basis event, and it is not a basis for operator training. In addition, the consensus of the Working Group was that error on both ends of the time test spectrum was equally bad. Time tests that are too short may give rise to designs that require an operator to perform too many actions too early in the event where stress may be a major factor. Time tests that are too long may give rise to designs that are too automated in which the operator becomes unable, or is insufficiently challenged, to keep track of the plant state. Thus when operator intervention is required, the operator is not prepared to do so satisfactorily. The Working Group wanted to set a challenging yet reasonable design time test. The 95th percentile was deemed sufficiently conservative.

1. There is no technical basis for the estimates of minimum times for operator actions in ANSI/ANS-58.8-1994. The basis for the operator action times is described. In summary, it is:

- In the past the industry has used a 10 minute rule, i.e., the operator can not be counted on acting for 10 minutes. Later, adjustments to this rule were made which included 30 minutes for some operator actions.

None of these point estimates of operator response were based on any technical or defensible basis. The philosophy behind this standard is that the basis for time tests needs to have some basis in reality. It is obvious that plants are not going to undergo accident and design basis conditions in an effort to collect data, and there is no first principles calculation that can determine human behavior to complex and stressful events. Therefore, the use of a simulator was deemed to be a realistic alternative. Since the military (Navy, e.g., submarine service, and the airline industry) use simulators extensively for training and determining the capability of their trained personnel to respond to life and death events, the use of simulator data seemed appropriate for a technical basis.

- 1984 version of the standard used data from simulator experiments design specifically for this standard, data from other simulator experiments, and data from plant computer print-outs following unusual plant

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events. These data were analyzed statistically to determine response times at the 95 percentile. These percentile times were set as the time tests.

- The 1994 version of the standard reviewed the only additional data available, to our knowledge, in the world which had any hope of being adapted to the boundaries of the standard. An independent company was utilized to analyze the data. This analysis was complex because the data contained a mixture of severe accident events and design basis events. The conclusion of that study and the subsequent Working Group evaluation of the study was that there was sufficient confidence in the existing time tests to validate their use in the 1994 version of the standard.

- The ACRS may believe that such simulator data and statistical analysis provides no technical basis. If this is the case, there is less technical basis for Individual Plant Examinations (IPEs) (required by Generic Letter 88-20) human reliability analysis. I submit that the basis is not without subjectivity. My challenge to the ACRS is to define a test or develop an algorithm that would be a satisfactory technical basis that is within the constraint of cost and timeliness to both the industry and the nation. Perhaps they would feel more comfortable with arbitrarily determined times.

2. Comparison of the recommended times with results from exercises on plant simulators does not demonstrate that these times are appropriately conservative. The statement by the ACRS is confusing. The recommended times were the result of exercises (really training and examination sessions were used) on plant simulators. The conjecture that these times (or the plant exercises) would not lead to "appropriately conservatively" time tests is just as arbitrary as the 10 minute rule. Where is the ACRS's analysis that says the 95 percentile is not appropriate. It does not exist. They didn't do any analysis and neither did the founders of the 10 or 30 minute rules. This is the only such analysis in existence to my knowledge. The attack on simulator experience by the ACRS implies that they prefer to do testing on real plants. Is that true?

3. Endorsement of the standard is not the appropriate way to resolve Generic Safety Issue B-17. My question back to the ACRS is, what is an appropriate way? Maintaining arbitrary 10 and 30 minute rules? There is no method today to ensure all safety related operator actions are accurately modeled and designs are absolutely free of operator interaction issues. I suggest the industry and regulators use the best information available and not hide our heads in the sand.

4. The standard does not address operator response times for advanced nuclear power plants. I have a few comments to relative to this statement.

- Participants on the Working Group included representatives of GE Nuclear Energy and ABB Combustion Engineering. In each case, this standard was compared to their new designs.

- The new designs are using probabilistic safety analysis techniques to determine the risk effects of operator actions. That is certainly an acceptable alternative. The standard mentions that alternative analysis is allowed.

- In general, there are no dramatic differences in the reliance on operator actions in the advanced designs, thus there is no reason to suggest that the application of this standard would be less applicable to advanced designs.

These comments are submitted by Rick Hill, Chairman of the ANS-58.8 Working Group

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