



DEPARTMENT OF NUCLEAR ENGINEERING
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September 30, 1980

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Dr. Stephen Hanauer
Director, Division of Human Factors Safety
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Dr. Hanauer:

I wish to provide some general comments concerning the Draft Human Engineering Guide to Control Room Evaluation (NUREG/CR-1580). Although I am expressing only my own observations, most of these insights were developed during a brief review of the document on behalf of the BWR Owner's Group and represent the consensus of an interdisciplinary group at MIT who were involved in that review. Dr. Sheridan has sent additional remarks with which I also concur.

In general, the direction, organization, scope, and intent of the guide, as well as the treatment of detail, was reasonably clear, thorough and useful. Therefore the guide, when suitably modified, can be a very positive influence, particularly in the approach to new control room designs. In that context the approach described in the guide, if applied during a mock up review, could lead to a design largely free of human engineering deficiencies.

My concern therefore focuses on the applicability of the guide in its present form to existing control rooms. I have several concerns:

(1) The guide correctly addresses the entire central control room, but ignores isolated BOP control boards. These should be included in view of the significant fraction of serious human errors that originate outside the control room. For the same reason the qualifications of unlicensed auxiliary operators should be included both in the interviews and in the training and manning sections of the audit.

(2) The impact of the Technical Support Center interface and other emergency response facilities on the CCR design was also ignored but is thought to be significant. For example, Black & White TV links to the TSC will be oblivious to color code but their usefulness might be strongly affected by contrast, lettering size, lighting etc.

(3) Treatment of discrepancies as described in Par. 4.1 and elsewhere appears to violate a well accepted management principle, i.e., that decisions should be made at the level where both information and knowledgeable

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people are available. The guide violates this precept by leaving the disposition of HEDs to a review committee which itself is removed from the audit procedure. Their link to the audit is via a mass of documentation and video tapes. We believe these will be unwieldy and inherently difficult to interpret in detail by persons who were not at the walk-throughs. Therefore this data should be used for recording and validation and decision review but not as a basis for formulating decisions regarding HEDs. This provision also imposes an onerous obligation on licensees that they may have some difficulty discharging, given the limitations of skilled personnel and resources and schedule demands.

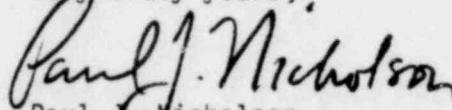
Both of these objections can be overcome by providing for initial disposition of HEDs at the time of the audit, and with a further stipulation that a revisit occur to ensure proper execution of the approved remedies. The HED review committee could then subsequently review the lower level decision of the audit committee and countermand it, but only then under a carefully stated set of guidelines.

The objectivity of the audit which the guide attempts to insure with the proposed approach need not be compromised by this change. Rather the quality of the result will be improved. In my judgment the audit should also involve utility technical management in situ to participate and show their commitment to the review process.

(4) There is a potential danger that the audit team and NRC reviewers will become absorbed in detail and lose track of potentially more serious but less definitive system operational factors. Mental workload, communications and informational overload, for example, can be overlooked in a design oriented audit checklist. The checklist, when completed, should be scrutinized for its treatment of these areas.

I trust that these remarks will be helpful to the staff in prepared a final draft.

Very truly yours,


Paul J. Nicholson
Visiting Scientist

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