

**DUKE POWER COMPANY**  
**GENERAL OFFICES**  
422 SOUTH CHURCH STREET  
**CHARLOTTE, N. C. 28242**



April 13, 1981

Mr. Voss A. Moore  
Division of Human Factors Safety  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: NUREG-0659 "Staff Supplement to the Draft  
Report on Human Engineering Guide to  
Control Room Evaluation

Reference: (1) Federal Register/Vol. 46., No. 58/March 26, 1981

Dear Mr. Moore:

In accordance with the notice appearing in Reference (1), we present herewith our preliminary comments to you for discussion at the upcoming meetings, April 22 and April 24, 1981. The first group of comments are general in nature, requesting certain clarifications:

- (1) NUREG 696 and Reg. Guide 1.97 have a significant impact on the operator interface and the Control Room Review. Yet their implementation and schedule are not accounted for in the Control Room Review. Does the staff perceive these as being a part of the Review, and if so, how do they see these tasks being incorporated into the Review plan?
- (2) To what extent, and how, has the need for NUREG 659 been validated by the NTOL Control Room audits conducted by the Staff and their contractors?
- (3) To what extent has the need for NUREG 659 been validated on the basis of the 600 reactor years of operating experience and 20,000 L.E.R.s resulting from this experience?
- (4) Has there been any rationale established that in fact justifies



8 104170 643

the Systems/operational analysis on the basis of eliminating the fundamental errors of TMI-2?

- (5) What guidelines does the Staff suggest for determining what displays, controls, etc. should not be in the control room? Conversely, what criteria are to be used in determining the man-machine allocations that should apply? Since these decisions have already been made for an existing control room, why isn't observation of performance in the actual control room the ultimate validation - even on the basis of a scenario walk thru for those events that cannot be initiated in actual operation?
- (6) Systems/Operational Analysis may well be a valid and (to the extent that design information and procedures are available) useful methodology in the evolution of a new design. But, it is totally inappropriate for an in-place, existing design of a control room in an operating plant. The emphasis on the analytical approach without any guidelines for performance evaluation indicates a lack of concern for operating experience - Figure 4-1 notwithstanding. Section 2.5.5 "Verification and Validation of Control Room Performance Capabilities" appears to touch on this subject, but how is the validation to determine whether problems are with the procedures used as a basis therefor or with the actual control room design.
- (7) The emphasis seems to be in determining so-called "Human Engineering Discrepancies" and the filing of a report. What is a discrepancy in a control room that has been used effectively and safely over a range of operating events?
- (8) The effort of the guidelines to establish the particular makeup of the "team" performing the review - and "how" to conduct the review implies that a value-impact, safety results-cost tradeoff study has been made. For example, how is the economic impact of an estimated 10 man years for the review per unit justified? What are the ground rules for evaluating the impact or benefit of total implementation cost?
- (9) There are human engineering "discrepancies" that may well be a result of compliance with regulations. (e.g. - redundancy per 6.5.1.1b) If the assessment that discrepancy indicates that it should be corrected, will that be sufficient basis for deviation from the regulation?

The following comments concern specific details of the guidelines and reference is made to specific paragraph number.

- 6.1.1.1 (1) Define "primary operating area".  
(2) Many instruments are used only during accidents and have no business being in the "primary operating area".
- 6.1.1.2 This is O.K. for a new design but for a plant that is completed, manning has to be made to fit the equipment.
- 6.1.1.7 Define obstacles (having to go around the center desk in 6.1.1.3 could be considered an obstacle which needs to be overcome before the operator can reach the control boards.
- 6.3.1.1 (1) Do all annunciators have to be in panels located along the top of the control boards? This implies that they should.  
(2) What are you supposed to do if your panels are greater than 86" from the floor? This is an inappropriate criteria for an operating plant.  
(3) Why 1" high letters? The criteria should be that the annunciator can be read from the appropriate control station.
- 6.3.1.2 The need for alarm reset is questionable. Having to constantly reset alarms during periods of high alarm incidence would be an added burden to the operator.
- 6.4.2.1 This needs clarification since it obviously applies to vertical boards. What about console type control boards.
- 6.8.1.2 How are labels mounted to minimize their obscuration by grease, grime, or dirt?
- 7.1.1.3 What type of desk does the "senior desk operator" operate? Do we perhaps mean the senior control room operator?
- 7.3.1.1 (3) Refer to 6.3.1.1b - If the top of an annunciator panel is only six feet above the floor, should it still be tilted at 15°? This requirement needs to be rephrased to take into account the height of the annunciator panel.

Mr. Voss A. Moore - Page 4  
April 13, 1981

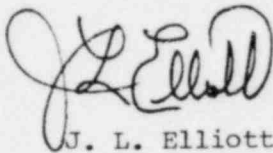
7.4.1.1 (2) What criteria are we going to use to determine if controls minimize operator error? This is a very subjective requirement.

7.4.3.1 (2) Define "adequately minimized". This again is very subjective.

In view of the relatively tight time schedule, the above represent a preliminary set of comments. We are continuing to study the document and expect to present a complete appraisal by April 30, 1981.

Messrs. W. A. Coley, Manager, Engineering Services, Steam Production Department, and R. S. Darke, Supervisor, Control Complex Engineering Group, Design Engineering Department expect to attend the April 24th. meeting in Bethesda.

Very truly yours,



J. L. Elliott, Principal Engineer  
Safety Review, Analysis & Licensing Division

JLE/gf

cc: C. J. Wylie  
B. M. Rice  
T. C. McMeekin  
R. S. Darke  
D. H. Blackmon  
K. S. Canady  
M. J. Gavioli  
R. H. White  
W. A. Coley  
C. A. Little