

# OAK RIDGE NATIONAL LABORATORY

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NUCLEAR DIVISION



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Mr. Richard Froelich  
Division of Human Factors Safety  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Froelich:

The Preface to NUREG/CR-1580, a draft report, "Human Engineering Guide to Control Room Evaluation" solicits comments so that the final document when issued will be as complete and practical, at that time, and also to have benefited from a peer review. In that context I offer the following comments for consideration.

1. Part 1 Control Room Evaluation. The first sentence of the introduction is too broad of a sweep which other statements in the text bear out. As I interpret the intent of this document, that opening sentence would be better stated as follows: "From the point of view of control room evaluation, human engineering seeks to locate (and evaluate for safety significance) and remove (if criteria is exceeded) causes for operator error." Much time, effort, and dollars can be expended in nit-picking without an equivalent compensatory increase in safety. It would be better to identify the relatively major causes of human error and to correct some of them than to solve a myriad of ideological nonconformist designs for the sake of conformity per se.
2. Page 23, 3.2 Operator input is valuable but do not exalt it. The operator is analyzing himself. He will remember where and when he had concerns in operating the plant. However, the logs will show when and where errors were made which could be unrecognized by those persons interviewed; and the operator will have forgotten those error prone situations/occurrences wherein he became immediately self-correcting. The unrecorded "ops" is the error precursor.
3. Page 31, 3.3.4.2. A taped recording of the operator's conversation and exclamations while dressing-out and wearing the protective garments would be as beneficial, is not more so, than a video recording of him donning the gear and of his subsequent movements. During TMI operator communication was difficult while wearing protective gear.

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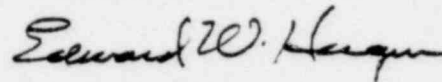
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4. Page 34, 3.5.1. Also record all operator conversations and observer's comments during the walk-through.
5. Page 35, 3.5.2 "voice recording in sync with action." This should be a dual channel; one for operator conversation and the other for the observer's comments.
6. Page 42, f(second dot). In order to add more displays, something else should be eliminated otherwise the large panels will get larger, the room more cluttered and possibly even larger.
7. Page 42, f(fifth dot). Another alarm during normal operation could be tolerated, but during an abnormal situation, one more alarm would not be noticed.
8. Page 43, 4.2.2. Also to be considered in backfitting.
  5. What problems/complications might the backfit itself produce?
  6. In installing/implementing the backfit what are the difficulties that might be encountered?
  7. What is the effect of the backfit on reliability?
9. Appendix I-C. Many statements throughout this section are not sufficiently definitive and interpretations could produce a wide range of responses. Consider the following:
  - 1.1.1.3. There is a room full of *other controls*.
  - 1.1.2.2. How much is "too little force"?
  - 1.1.3.1. From where?
  - 1.2.2.5. If each control were unique and/or its location different from all the others - what a conglomeration.
  - 1.2.3.1 & 1.2.3.2. From where?
  - 1.4.1.2 & 1.4.2.1. How much is "excessive"?
10. Appendix II (same as for appendix I-C).
11. Appendix III When a "yes" or "no" is the requested answer, you should also ask "why" or "explain." Such will make tabulation of responses more difficult but much more insight will be gained. After all what is the subject of the questionnaire, to confirm a prognosis or to compile relevant information?
12. Appendix IX. Too susceptible to guessing and prognosticating. Without qualification of "yes" or "no" the prioritization of errors would be a laborious procedure to obtain a quasi-educated guess. Different evaluators/operators will produce different results and validation of the prioritization of errors will not be attainable.
13. Page CRE 3 B.6a. What is "proper placement"? For example see page CRE-17, B.4 where "adequate" is defined. Guidelines should be specific and not vague or ambiguous.

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The Guidelines will have to be tested by time and applicability and revised or modified as found necessary to provide and produce the desired information transfer. This draft report was apparently produced in parts within a limited time frame by individuals or pairs of individuals and shows a slight disparity in overall coordination. Omissions in the first sentence are picked up on pages 41 and 50. Alarms on page 42 are further clarified in an appendix. NUREG/CR-1580 is a worthy document and represents a commendable price of work. When the above comments and others are factored into it, the product will be a practical, useful, and needed guide for the evaluation of control rooms and control room designs.

Sincerely,



Edward W. Hagen, P.E.

Section Editor: Control & Instrumentation  
*Nuclear Safety*

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