

# GENERAL ELECTRIC

NUCLEAR POWER  
SYSTEMS DIVISION

GENERAL ELECTRIC COMPANY, 175 CURTNER AVE., SAN JOSE, CALIFORNIA 95125  
MC 682, (408) 925-5040

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

Attention: Stephen H. Hanauer, Director

Gentlemen:

SUBJECT: COMMENTS ON "HUMAN ENGINEERING GUIDE TO CONTROL ROOM  
EVALUATION," NUREG/CR-1580

The purpose of this letter is to provide General Electric and BWR Owners Group comments on draft NUREG/CR-1580 (Draft). General comments are provided below. Specific comments are provided in the attachment.

NUREG/CR-1580 is intended, as the preface states, to be a suggested set of guidelines and procedures for the control room evaluation. This draft however does not directly address all of the design review factors specified in Task I.D (Control Room Design) of NUREG-0660. The draft is a compilation of assorted human factors engineering standards, criteria, and guidelines from existing references. There is no assurance that all control room concerns are adequately addressed nor are all pertinent to development of a survey method.

In Section 3.4 it is stated that the primary means for comparing panel design to establish human factors engineering practices is the checklists. These checklists, along with the evaluation process, should form the basic document for public review and comment. However, the checklists are missing. Without checklists, this document falls short of the basic objective of providing specific detailed guidelines for control room evaluation.

Precise checklist selection criteria need to be defined. This would ensure that all items addressed by the checklists are within the scope of the required survey and would provide a standard to measure the adequacy of assembled checklists.

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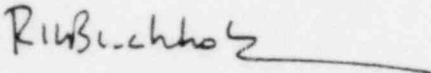
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The preface states that final review guidelines will be issued as NUREG-0700. This implies that the final guidelines will be issued containing material not within NUREG/CR-1580 and therefore, have not been issued for public comment and review. It is suggested that all guideline documentation be open for public comment and review prior to NRC approval.

It is hoped that these comments will aid you in your revision of NUREG/CR-1580. If you have any questions regarding these comments, please contact Mr. R. A. Hill (408) 925-5388 of my staff.

Very truly yours,



R. H. Buchholz, Manager  
BWR Systems Licensing  
Safety and Licensing

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Attachment

## SPECIFIC COMMENTS ON NUREG/CR-1580

### 1.0 Introduction

The statement "results show that 15 to 66 percent of plant safety failures are attributable to human failure" is too general. It implies that a determination of specific cause can be made when operators are involved. This is difficult to accomplish at best.

It is a premature generalization to state "most of the control rooms designed prior to the TMI accident were not in compliance with human engineering standards and principles." First, an acceptable degree of compliance needs to be established. Then a review and evaluation against a minimum established standard

### 2.0 Control Room Evaluation Planning

The recommended size of the survey team is unnecessarily large. A smaller team would be entirely adequate and have less impact on utility operations. The survey team should include both inexperienced and experienced operators to ensure a representative cross-section of personnel.

The preparation of evaluation material is generic and can be standardized beforehand for a particular product line.

A walkthrough of all procedures is unnecessary; a representative sample is sufficient.

Operators should check the task analysis for validity as well as completeness.

The photographic support is excessive. In particular, a mockup and a large detailed photographic library are not necessary. Also both color and black and white photographs are not necessary. A simple photograph of the identified deficiency is sufficient.

### 3.0 Control Room Evaluation

3.1 Use of a separate evaluation for generic problems is redundant. Items of concern should be incorporated into the main checklists.

3.2 The requirement to interview all operators is excessive; a sample is sufficient.

The method used to document operator comments for further consideration is not well defined. Consideration only of items frequently mentioned is not adequate. Every concern of every operator interviewed should be addressed and incorporated into the evaluation.

Anonymous input should not be recommended.

- 3.3 Detailed surveys of lighting, noise, etc. are excessive. A more general review is sufficient with emphasis on effect on operator performance.

A videotaped sequence of donning anti-Cs is not pertinent. An estimate of man-minutes based on Technical Specifications is not meaningful. A better approach would be to first determine habitability requirements based on defined operator functions.

- 3.4 A yes/no evaluation of a checklist leaves no allowance for degree of compliance.

Since the guidelines are derived from several different references much overlap, redundancy, and contradiction exists.

Overemphasis is placed on specific numerical values such as torque, panel radii, and sound absorption coefficients. These are more appropriately considered in the design phase. Emphasis should be placed now on their effect on operations.

The sample given in Section 3.4.3 does not agree with referenced checklist item 9. "System requirements" are not necessarily the same as "information that is as accurate as you need". The latter can be very subjective.

- 3.5 Counting the number of times a component is used may have no bearing on safety. A component used only once may have a greater impact on safety than one used numerous times.

The value of videotaping the walkthrough is questionable. The walkthrough should be evaluated against the Task Analysis at the time the walkthrough is performed.

To have the control room operator describe the event prior to its performance will not result in a natural walkthrough and demonstrates a lack of understanding on the part of the analysts.

#### 4.0 Evaluation of Human Engineering Discrepancies

The method of data reduction suggested is complex. It requires an individual report to be filled out on every discrepancy and delaying judgment of relevance. The effect of each item on operation can easily be determined prior to the survey.

The guidelines recommend backfit of all items which are safety-related. This decrease emphasis on those items which produce greatest reliability increases.

While categorization is necessary for modification requirements, the method of division proposed is overcomplicated. Only those items that are both non-compliant and have a high degree of poten-

tial for contributing to operator error need to be considered for corrective action.

Cost-effectiveness is more a function of design and engineering than the HED Review Committee.

#### 5.0 Reporting

Items identified as deficiencies in the generic problem analysis and operator interviews should be included in the evaluation in the checklists.