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Division of Human Factors Safety
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Attention: R. W. Froelich

Dear Mr. Froelich:

Enclosed herewith are the comments regarding NUREG-0659, Staff Supplement to the Draft Report on Human Engineering Guide to Control Room Evaluation, submitted on behalf of the Pennsylvania Electric Company ("Penelec") and Metropolitan Edison Company ("Met-Ed"), both of Pennsylvania; Jersey Central Power & Light Company ("JCP&L") of New Jersey and GPU Service Corporation. The four companies are subsidiaries of General Public Utilities Corporation ("GPU"), a holding company which is registered under the Public Utilities Holding Company Act of 1935.

The Staff Supplement to the Draft Report on Human Engineering Guide to Control Room Evaluation raises some questions as to the implementation of the final Guide. Therefore, GPU submits general comments and impressions on the Staff supplement to aid in the finalization of the Human Engineering Guide to Control Room Evaluation.

If you have any questions or comments on the issues we have raised, please feel free to contact us.

Very truly yours,

T. E. Tipton
Manager, Licensing and
Regulatory Affairs

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1. Section II of NUREG-0659 responds to the comments that various organizations had with regard to NUREG/CR-1580. Many of the general comments dealt with the flexibility that the individual utilities would have in conducting their control room review. The staff's response seemed to indicate that as long as valid data collection techniques were used and reasonable results were obtained, then the exact procedure used to conduct the review would be left up to the individual utility.

We agree unequivocally that no exact and perfect method of performing a control room review can be established. The nature of human factors engineering in the nuclear industry precludes the establishment of an absolute method of conducting a detailed control room evaluation. Perhaps after a large number of control room reviews have been performed, then a consensus on certain methods can be obtained. Until such time that the nuclear industry has developed detailed quantitative human factors engineering methods, control room reviews will have to rely on the professional judgement and expertise of the human factors experts or the review team for development of the review method.

2. Section III of NUREG-0659 presents the sample checklist and guidelines. The checklists were excluded from NUREG/CR-1580 and the guidelines have been modified to reflect comments on NUREG/CR-1580 guidelines.

A large number of the items in the checklist cannot be answered with a yes, no, or N/A response. Many of the questions in the checklist are so broad as to preclude responding to them. It may be of more benefit to provide examples of a checklist established for a specific plant, perhaps one set for a PWR and one for a BWR, and then allow each utility to modify the checklist to meet the needs of the particular review.

It should be emphasized that the sample guidelines are just that, guidelines and not absolute design standards. Future modifications and lessons learned may invalidate some guidelines and establish others. The conventions already established in a plant must also be taken into account when applying the guidelines. Finally, the limitations of available equipment may place constraints on the extent to which a guideline can be applied.

3. Section IV of NUREG-0659 deals with the System Review Approach. The amount of work that this section implies is overwhelming. Although the section is well written and makes many valid points, it should be modified to prevent misunderstanding of the intent of the section.

The Systems Review section implies that to perform an adequate control room review the utility must follow exactly the methods outlined in the section. While this is not consistent with section II, the impression remains that the only control room review that will be acceptable is the one done according to section IV of NUREG-0659.

The methods used in conducting a control room review depend upon the specifics of the situation. A standard review procedure may be applicable to a control room still in the design process. However, an operating plant precludes the use of one standard review method. Each operating plant has a unique set of characteristics and circumstances that must be accounted for when implementing a control room review. It is necessary, on an operating plant, to rely on the professional judgement and experience of the human factor experts on the review team when designing a review program.

Having already conducted such a review at TMI-1, we feel that there are many viable and acceptable ways to perform a control room review, and some of them may contain only a small part of section IV of NUREG-0659. Our use of a full scale mock-up with operator talk-throughs resulted in the identification of the major human factors deficiencies in the control room along with excellent information on operator characteristics that can be used for future design evaluations. Even though we feel we had an excellent review, we would hesitate to say that it would be the best method for everyone to use.

It must be kept in mind, when reviewing an operating plant, that the purpose of the review is to identify and correct human factors deficiencies. Any review on an operating plant must be designed so that any potential modification to correct an HED will not cause problems of its own and will be acceptable to the operators. We found that the use of a full scale mock-up allowed us to identify the HEDs and then to evaluate the modifications that were to correct the HEDs. Several iterations of a design had to be done in order to obtain a modification that was optimal to the operators. Had we not evaluated the proposed modifications on the mock-up, the resulting changes to the control room may have resulted in as many new HEDs as it corrected.

We do feel that item #3 of section IV, dealing with HED assessment and design implementation, is handled very well. NUREG-0659 takes a realistic approach in the area of correcting HED through backfitting by taking into account the limitations of changing an operating plant. The tone of item #3 should be carried throughout NUREG-0659, that the Human Engineering Guide to Control Room Evaluation is a tool to be used by the utility to aid and direct control room reviews.

4. Section V of NUREG-0659 deals with the NRC's evaluation of the individual control room design reviews. Section V indicates that each control room evaluation will be judged on its own merits as a valid determination of human factors discrepancies in the control room. We agree that only by judging each review separately and the methods that were employed can a just decision be made with regard to the man-machine interface of the particular control room.

It is essential to keep in mind that the criteria developed for judging individual reviews are just criteria. The criteria used should be flexible enough to accommodate a variety of review styles and methods, in the hope that by viewing the results of various methods a consensus on the optimal review method can be obtained. Any criteria used should not be so cast in concrete that it cannot be changed if it is shown that the criteria is in error, or that better criteria can be established.