UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION OF THE DETAILED CONTROL ROOM DESIGN REVIEW FOR PILGRIM NUCLEAR POWER STATION DOCKET NO. 50-293

1.0 INTRODUCTION

Item I.D.1 of the Nuclear Regulatory Commission (NRC) Action Plan NUREG-0660 (Ref. 6) states that operating licensees and applicants for operating licenses will be required to perform a Detailed Control Room Design Review (DCRDR) to identify and correct design discrepancies. The objective, as stated in NUREG-0660, is to improve the ability of nuclear power plant control room operators to prevent or cope with accidents, if they occur, by improving the information provided to them. Supplement 1 to NUREG-0737 (Ref. 3) confirmed and clarified the DCRDR requirement in NUREG-0660. Each applicant or licensee is required to conduct its DCRDR on a schedule negotiated with NRC.

NUREG-0700 (Ref. 7) describes four phases of the DCRDR to be performed by the applicant or licensee. The phases are: (1) planning; (2) review; (3) assessment and implementation; and (4) reporting. Criteria for evaluating each phase are contained in Section 18.1, Rev. 0 and Appendix A to Section 18.1, Rev. 0 of the Standard Review Plan.

As stated in Supplement 1 to NUREG-0737, each applicant or licensee is required to submit a program plan that describes how the following elements of the DCRDR will be accomplished:

1. Establishment of a qualified multidisciplinary review team.
2. Function and task analyses to identify control room operator tasks and information and control requirements during emergency operations.
3. A comparison of display and control requirements with a control room inventory.
4. A control room survey to identify deviations from accepted human factors principles.
5. Assessment of human engineering discrepancies (HEDs) to determine which HEDs are significant and should be corrected.
6. Selection of design improvements.
7. Verification that selected design improvements will provide the necessary correction.

8. Verification that improvements will not introduce new HEDs.

9. Coordination of control room improvements with changes from other programs such as SPDS, operator training, Reg. Guide 1.97 instrumentation, and upgraded emergency operating procedures.

In addition, the NRC requires each applicant or licensee to submit a summary report at the end of the DCRDR. The report should describe the proposed control room changes, give implementation schedules, and provide justification for leaving safety significant HEDs uncorrected or partially corrected.

The NRC staff evaluates the organization, process, and results of each DCRDR. These evaluations consist of the following, as described in NUREG-0800 (Ref. 8):

1. An evaluation of the Program Plan report submitted by the licensee/ applicant.

2. A visit to some of the plant sites to audit the progress of the DCRDR programs.

3. An evaluation of the licensee/applicant DCRDR summary report.

4. A possible Pre-Implementation Audit.

5. The preparation of a Safety Evaluation (SE) that will present the results of the NRC evaluation.

The staff position is that significant HEDs should be corrected and that improvements which can be accomplished with an enhancement program should be done promptly.

The Boston Edison Company (BECo) submitted a program plan (Ref. 1) for conducting a DCRDR at the Pilgrim Nuclear Station to the NRC on October 14, 1983. Staff comments on the Pilgrim Plan were issued on March 6, 1984 (Ref. 2). BECo submitted a revised Program Plan on August 14, 1984 (Ref. 4) and a DCRDR Summary Report on September 24, 1984 (Ref. 5). The staff conducted an on-site Pre-Implementation Audit of the BECo DCRDR on November 26-30, 1984 with consultants from Science Applications International Corporation (SAIC).

2.0 EVALUATION

Boston Edison's DCRDR for Pilgrim has been evaluated on the basis of the information provided in the original and revised Program Plans in the Summary Report, and during the Pre-Implementation Audit. The organization, methods and processes, and results of the Pilgrim DCRDR were compared with the requirements of Supplement 1 to NUREG-0737 and guidance contained in

NUREG-0700 and Section 18.1, Rev. 0 and Appendix A to Section 18.1, Rev. 0 of the Standard Review Plan. Consultants from SAIC assisted the staff in the evaluation and prepared the enclosed Technical Evaluation Report (TER). The NRC staff agrees with the technical positions and conclusions as presented in the TER.

BECo has evidenced a genuine dedication to the DCRDR of the Pilgrim Station. The NRC staff noted that the licensee has planned substantial improvements which should make a significant contribution to operational safety. Although numerous and extensive modifications to the control room are envisioned, the details have not as yet been developed. The following is a summary of the staff's comments on BECo's compliance with the DCRDR review requirements:

1. Establishment of a qualified multidisciplinary review team - The licensee has satisfied this NUREG-0737 supplement 1 requirement.

2. System function and task analysis (SFTA) to identify control room operator tasks and information and control requirements during emergency operations - The effort conducted to date, when supplemented by the results of the upgrade described in the enclosed TER, can be expected to satisfy the NUREG-0737 Supplement 1 requirement. The methods developed for the upgrade and associated results should be described in the licensee's Supplemental Summary Report.

3. Comparison of display and control requirements with a control room inventory - The licensee has generated a control room inventory; however, the requirement to compare the display and control requirements developed from the SFTA with the inventory has not been met. When the additional task analysis work has been completed and these results are compared by the licensee to its present control room inventory, the licensee is expected to satisfy the NUREG-0737 Supplement 1 requirement. The methodology and results of this comparison should be included in the licensee's Supplemental Summary Report.

4. Control room survey to identify deviations from accepted human factors principles - The control room survey has been conducted satisfactorily. Additional information is required in the licensee's Supplemental Summary Report to resolve several criteria and the five NRC audit team observations described in the TER.

5. Assessment of HEDs to determine which are significant and should be corrected - While the licensee has developed an acceptable assessment process, actual implementation of the process is not yet complete. BECo should describe the results of the assessment process in greater detail in the Supplemental Summary Report.

6. Selection of design improvements that will correct discrepancies - The licensee has not yet completed this work. In its Supplemental Summary Report, BECo should describe in detail the additional efforts towards completing this requirement, such as the results and solutions from the special studies and how BECo has addressed cumulative and interactive effects of design solutions.

7. Verification that improvements will provide the necessary correction without introducing new HEDs - BECo has not yet started the process of verifying that improvements will provide the necessary correction without introducing new HEDs. The licensee should describe the actual process to be used to complete this activity along with the results in its Supplemental Summary Report.

8. Coordination of control room improvements with changes resulting from other improvement programs - Coordination of the DCRDR with the SPDS and Reg. Guide 1.97 work is satisfactory. Coordination with the upgraded EOP effort should be improved as indicated in the TER. Specific coordination mechanisms and processes should be described in the Supplemental Summary Report.

3.0 CONCLUSION

Our review of the Summary Report submitted by the licensee on September 24, 1984, and the information obtained from the preimplementation audit during November 26-30, 1984, indicates that the DCRDR for Pilgrim Station is incomplete. A supplemental report satisfactorily addressing all of the concerns identified in this SE and the enclosed TER will be necessary to meet the requirements of NUREG-0737 Supplement 1.

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REFERENCES

1. Letter from W.D. Harrington, Boston Edison Company to D.B. Vassallo, NRC, forwarding "Detailed Control Room Design Review Program Plan," October 14, 1983.

2. NUREG-0737, Supplement 1 - DCRDR Program Plan Letter from D.B. Vassallo, NRC to W.D. Harrington, BECO, dated March 6, 1984.

3. NUREG-0737, Supplement 1, "Requirements for Emergency Response Capability," USNRC, Washington, D.C., December 1982, transmitted to reactor licensees via Generic Letter 82-33, December 17, 1982.

4. Letter from W.D. Harrington, Boston Edison Company, to D.B. Vassallo, NRC, dated August 14, 1984, submitting revised "Detailed Control Room Design Review Program Plan for Pilgrim Station

5. Letter from W.D. Harrington, Boston Edison Company, to D.B. Vassallo, NRC, dated September 24, 1984, transmitting "Detailed Control Room Design Review Report" for BECO's Pilgrim Station, Volume 1: "Executive Summary Report," Rev. 1, and Vol. 2: "Appendices A through D," Rev. 1, dated September 1984, and "Attachment A," dated August 1984.

6. NUREG-0660, Vol. 1, "NRC Action Plan Developed as a Result of the TMI-2 Accident," May 1980; Revision 1, August 1980.

7. NUREG-0700, "Guidelines for Control Room Design Reviews," September 1981.

8. NUREG-0800, "Standard Review Plan," Section 18.1, "Control Room," and Appendix A "Evaluation Criteria for Detailed Control Room Design Reviews (DCRDR)," September 1984.