

AUG 23 1984

DISTRIBUTION:
Central Files
HFEB Files
V Moore
HFEB Members

MEMORANDUM FOR: George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing

FROM: Voss A. Moore, Chief
Human Factors Engineering Branch
Division of Human Factors Safety

SUBJECT: IN-PROGRESS AUDIT MEETING OF BEAVER VALLEY POWER STATION,
UNIT 2, DETAILED CONTROL ROOM DESIGN REVIEW

Duquesne Light Company (DLC) is required by Supplement 1 to NUREG-0737 to conduct a Detailed Control Room Design Review (DCRDR) of the Beaver Valley Power Station Unit 2, (BV-2) prior to licensing. The staff has reviewed and commented on the BV-2 Program Plan and has conducted a brief on-site in-progress audit July 26 and 27, 1984. Results of the audit indicate that the BV-2 DCRDR is proceeding in a manner that will satisfy the requirements of Supplement 1 to NUREG-0737.

The staff did identify several concerns that were brought to the attention of the applicant. A major concern is in the differences between the Unit 1 and Unit 2 control rooms since the applicant indicated a desire to apply for dual-unit licensing of its operators. Those differences will require careful evaluation to determine if a potential exists for inducing operator error.

Although the Function and Task Analysis process appears to be satisfactory, the staff is concerned that (1) a human factors specialist is used only as a reviewer and has no direct input to the analysis, and (2) selected event sequences to be evaluated may not cover all emergency operations.

A full evaluation of the BV-2 DCRDR will be accomplished following submittal of the Summary Report, scheduled for June 1, 1985.

Contact:
R. J. Eckenrode
x24882

427

8408340084 XA

OFFICE							
JRNAME							
DATE							

George W. Knighton

- 2 -

AUG 23 1984

The enclosed report presents the results of the in-progress audit meeting of the DCRDR program for BV-2. Please transmit the report to DLC for their use.

Voss A. Moore, Chief
Human Factors Engineering Branch
Division of Human Factors Safety

Enclosure:
As Stated

cc: M. Ley
W. Troskoski, R. I
R. Peterson, LLNL
D. Beckham
R. Starostecki

OFFICE	HFEB	HFEB	HFEB				
RNAME	RJE:renrode:mec	DTondi	VAMoore				
DATE	8/22/84	8/22/84	8/23/84				

Nuclear Regulatory Commission
In-progress Audit Report
Beaver Valley Power Station, Unit 2

BACKGROUND

Duquesne Light Company (DLC) is performing a Detailed Control Room Design Review (DCRDR) of the Beaver Valley Power Station, Unit 2 (BV-2) in accordance with the requirements of Supplement 1 to NUREG-0737. By letter dated August 8, 1983, DLC submitted a DCRDR Program Plan. Staff review comments on the plan were submitted to the Division of Licensing December 12, 1983, along with a request for an in-progress audit meeting when the applicant was beginning the task analysis phase of the DCRDR.

DISCUSSION

An onsite in-progress audit of the DCRDR activities was conducted by the staff on July 26 and 27, 1984. The audit consisted of a visit to the BV-2 control room to review its status and similarity to the Unit 1 control room, and a meeting to discuss the details of the applicant's review processes as requested by the staff in a letter dated January 23, 1984.

Control Room Visit

The control room visit verified that there are many differences between Unit 1 and Unit 2 control rooms. The importance of these differences and their significance with respect to operator performance and dual unit licensing of operators must be carefully investigated. A report is being prepared by DLC which documents the distance deviation in the location of each control and display in one unit with respect to the like control and display in the other unit. This report, however, does not take into account the direction of the relocation and reversals in position can occur. For example, two switches may be shown in the report as having been moved only four inches each. If the four-inch move is in opposite directions the result may be a reversal of switch location with respect to the other unit, or a very large distance between switches in which case it is likely that something else has been installed. This type of difference between units can be expected to lead to operator error. The staff audit verified that this type of difference does exist.

Another significant difference exists between annunciator systems. Unit 2 has approximately one half the number of tiles as Unit 1 and the tile identification scheme is different between units. Several video displays are to be installed in Unit 2 in place of annunciator panels still in Unit 1.

New instrumentation has been developed since BV-1 went into operation and some of this new equipment (e.g., automatic Bypassed and Inoperable Status Indications, ICC instrumentation) is being installed in Unit 2. The Boron Injection System is different and it appeared that some instrumentation related to boron concentration has been deleted from Unit 2.

CRDR Meeting

The agenda and list of attendees for the CRDR meeting are provided in Attachments 1 and 2. The purpose of the meeting was for DLC to present responses to the NRC review comments to the Program Plan for BV-2, and to review, in detail, the DLC System Review and Task Analysis (SRTA) methodology.

The staff's Program Plan comments, addressed by DLC at the meeting, were in the following areas:

1. Qualifications of review team members and level of involvement in review tasks
2. Human factors specialists' involvement in detailed planning
3. Need for more than one human factors specialist in the many review tasks
4. Description of the data base and data base management system
5. Description of the standardized forms/checklists to be used
6. DLC reference material should include conventions and standard abbreviations
7. Independence of function and task analysis (F&TA) from other review tasks
8. Events to be considered in the F&TA
9. Event-based vs function-based emergency operating procedures (EOPs)
10. Specific EOPs to be considered in the F&TA
11. Information and control requirements and characteristics to be determined from F&TA
12. Function and task analysis methodology
13. Control room inventory of instrumentation
14. Control room inventory forms
15. Verification methodology and tools
16. Human factors guidelines and criteria to be used in the control room survey

17. Process for identifying and recording human engineering discrepancies (HEDs)
18. State of control room in which survey will be conducted
19. Implementation schedule for correction of HEDs
20. HED assessment methodology
21. Selection of design improvements traceability
22. Criteria for selection of design improvements
23. Methodology to ensure that improvements correct the HED without introducing new HEDs
24. Approach to coordinating the DCRDR with other post-TMI activities
25. Control room modifications resulting from post-TMI actions.

With the exception of item No. 11, all responses were satisfactory to the staff. The details of the definition of information, display, and control requirements (Item No. 11) have not yet been finalized by DLC.

CONCLUSION

Based on the presentations made at the DCRDR meeting and the documentation reviewed, it is the staff's opinion that DLC is proceeding on a program of control room review and improvement that will enhance the safety of operations in BV-2.

The major concern resulting from this meeting was that, because of the desire to dual-license operators on both BV-1 and BV-2, a concerted effort be made to coordinate design improvements between control rooms. Differences already exist between the control rooms and their significance, with respect to operator performance, needs to be determined. Related to this concern is the fact that the plant specific simulator will be of the Unit 1 design. Since Unit 1 already has experienced operators, it appears that more benefit would be gained by having a Unit 2 simulator since all operators will need training on Unit 2.

The Function and Task Analysis process appears to be satisfactory. Two concerns still exist: 1) that a human factors specialist is used only as a reviewer and does not have direct input into the analysis, and 2) that sequences not on the current list (e.g., Station Blackout) will be identified and evaluated.

TENTATIVE AGENDA

Beaver Valley Unit 2 Detailed Control Room Design Review In-Progress Audit

DATE: July 27, 1984
TIME: 8:00 a.m. - 1:30 p.m.
LOCATION: Robinson Plaza II Large Conference Room

- I. Introduction to BVPS-2 Control Room Design Review
 - A. Presentation of the following:
 1. CRDR organization (Core and Support Team)
 2. Detailed implementation flow diagram
 3. Overall schedule
- II. NRC Comments to Program Plan
 - A. Discuss DLC responses (except for SRTA related)
 - B. Present and discuss the following:
 1. Data collection forms
 2. HED evaluation criteria
- III. SRTA Presentation
 - A. SRTA schedule
 - B. SRTA methodology
 - C. Discuss NRC comments/DLC responses (SRTA related)
- IV. Conclusion
 - A. Summary remarks
 - B. Address any additional NRC comments

PERSONNEL - IN - ATTENDANCE

NAME OF PROJECT BEAVER VALLEY POWER STATION UNIT 2

PURPOSE OF MEETING CONTROL ROOM DESIGN REVIEW - NRC MEETING

LOCATION ROBINSON PLAZA DATE JULY 27, 1984

[illegible]