

HUMAN FACTORS ENGINEERING BRANCH  
DETAILED CONTROL ROOM DESIGN REVIEW  
SUPPLEMENTAL SAFETY EVALUATION REPORT  
FOR  
WATERFORD-3

DISCUSSION

As required by Supplement 1 to NUREG-0737, the Louisiana Power and Light Company (LP&L) is conducting a Detailed Control Room Design Review (DCRDR) of Waterford-3. By letter dated September 28, 1984, LP&L submitted its DCRDR Program Plan. The staff provided its comments on the Waterford-3 DCRDR Program Plan in January 1985. The DCRDR Summary Report was submitted by letter dated April 30, 1985.

A human factors engineering preimplementation audit of the Waterford-3 DCRDR was performed at the Waterford-3 site on June 3 through 6, 1985. The audit was performed by staff from the Human Factors Engineering Branch, Division of Human Factors Safety, assisted by consultants from the Lawrence Livermore National Laboratory (LLNL). Following the on-site audit LP&L submitted a letter dated July 17, 1985, that provided additional information concerning the relationship between control room instrumentation characteristics and the plant safety analysis.

Consultants from LLNL have prepared a Technical Evaluation Report which is enclosed with this SSER. The NRC staff concurs with the technical evaluations, conclusions, and recommendations contained in the LLNL report.

### CONCLUSIONS

The staff's conclusions with regard to each of the elements of the DCRDR required by Supplement 1 to NUREG-0737 are summarized below.

### MULTIDISCIPLINARY REVIEW TEAM

Based on an evaluation of the Summary Report and discussions during the preimplementation audit, we conclude that the review team members have the necessary expertise to perform an adequate DCRDR, which meets the requirement of Supplement 1 to NUREG-0737 for establishment of a qualified multidisciplinary review team.

### SYSTEM, FUNCTION AND TASK ANALYSIS

The use of EOPs developed from generic Combustion Engineering Emergency Procedure Guidelines as the basis of the Waterford-3 system, function and task analysis is acceptable as discussed in NUREG-0800, Section 18.1, Appendix A. However, there are some questions regarding the conduct of the task analysis for which further information is required. The specific issues are discussed under "Control Room Inventory" below. Until additional information is provided in a Supplemental Summary Report, the staff cannot complete its review of this element of the DCRDR.

### Control Room Inventory

During the conduct of the staff's preimplementation audit, the following potential discrepancies were noted that apparently were not identified by the LP&L comparison of operator needs to control room inventory:

- An indicator giving only valve position demand indication was identified for use in verifying secondary steam dump valve position;
- Indication of emergency power sequencer relay status was identified as the means of verifying start of emergency loads instead of a direct indication of the load status (e.g., breaker position, motor current, or related process variable reading); and,
- A meter with a 0-100% scale that is readable to no more than +/- 0.5 percent discrimination was referenced to determine Condensate Storage level within +/- 0.1 percent accuracy.

LP&L must address each of the potential HEDs identified by the NRC audit team to determine whether they are HEDs and, if so, whether they are symptomatic of a generic deficiency with the process used for the identification of required display and control characteristics and/or the comparison to the control room inventory. A written response on this issue in a supplement to the DCRDR Summary Report should be provided to the NRC for its review. The NRC staff can then decide whether LP&L has fulfilled the requirements of Supplement 1 to NUREG-0737 to conduct a task analysis to determine required display and control characteristics and to compare these results with the control room inventory.

#### CONTROL ROOM SURVEY

LP&L has performed an acceptable systematic comparison of the control room against accepted human engineering guidelines. The staff concludes that LP&L has met the requirement of Supplement 1 to NUREG-0737 for conduct of a control room survey.

#### ASSESSMENT OF HUMAN ENGINEERING DISCREPANCIES (HEDs)

LP&L's assessment method, as described and reported, meets the requirement of Supplement 1 to NUREG-0737 to assess HEDs to determine which HEDs are significant and should be corrected.

#### SELECTION OF DESIGN IMPROVEMENTS

Supplement 1 to NUREG-0737 requires the selection of control room design improvements that will correct the significant HEDs. It also states that improvements that can be accomplished with an enhancement program should be done promptly. The methodology described in the Summary Report and discussed during the audit is acceptable. However, at the time of the preimplementation audit, the selection of design improvements was not yet complete. In addition, the audit team had some concerns about a few of the suggested modifications and implementation schedules. Consequently, the supplemental Summary Report should contain the following information so the NRC staff can complete its evaluation of this element:

- Complete the process for selection of design improvements and provide proposed modifications for those HED's for which a correction has not yet been selected (see Table A of attached Technical Evaluation Report);
- Provide an evaluation of whether the present labeling scheme in the control room can be effectively maintained;
- Provide justification for delaying implementation of corrective actions involving color shading enhancements until the second refueling outage (see Table B of attached Technical Evaluation Report); and,
- Provide the determination of whether the annunciator system has reflash capability.

VERIFICATION THAT DESIGN IMPROVEMENTS PROVIDE NECESSARY CORRECTION AND DO NOT  
INTRODUCE NEW HEDs

Supplement 1 to NUREG-0737 requires verification that selected design improvements will provide the necessary corrections of HEDs and will not introduce new HEDs into the control room. LP&L's process meets the requirement of Supplement 1 to NUREG-0737 to verify that selected design improvements will provide the necessary corrections and do not introduce new HEDs.

COORDINATION OF THE DCRDR WITH OTHER PROGRAMS

Supplement 1 to NUREG-0737 requires that control room improvements be coordinated with changes from other initiatives such as SPDS, operator training, RG 1.97 instrumentation, and upgraded EOPs. Based on the Waterford 3 Summary Report and preimplementation audit discussions, LP&L meets the requirements of Supplement 1 to NUREG-0737 for coordination of the DCRDR with other relevant initiatives.

The staff concludes that LP&L will satisfy the requirements of Supplement 1 to NUREG-0737 for a DCRDR of the Waterford-3 plant with the satisfactory completion and appropriate documentation of the issues discussed above including task analysis, control room inventory, and selection of design improvements. LP&L should provide a supplemental Summary Report which addresses these open issues for NRC review and approval no later than April 1, 1986.

HFEB  
SALP EVALUATION  
FOR  
WATERFORD-3

Functional Areas

1. Management involvement

Evidence exists that management has given the detailed control room design review (DCRDR) effort an appropriate priority and is committed to improving the Waterford-3 control room design.

Rating: Category 2

2. Approach to resolution of technical issues

The licensee has conducted the DCRDR using sound and thorough approaches. Proposed corrective actions are generally scheduled for implementation without delay.

Rating: Category 2

3. Responsiveness to NRC initiatives

The licensee has met deadlines for DCRDR submittals and has proposed corrective actions that are technically sound and thorough in almost all cases.

Rating: Category 1