

Enclosure 1

SAFETY EVALUATION REPORT RELATED TO THE DETAILED CONTROL ROOM  
DESIGN REVIEW FOR PEACH BOTTOM NUCLEAR POWER PLANT UNITS 2 AND 3

BACKGROUND

By letter dated October 31, 1983, the Philadelphia Electric Company (PECO) submitted to the U. S. Nuclear Regulatory Commission (NRC) its Program Plan (Reference 1) for a Detailed Control Room Design Review (DCRDR) of the Peach Bottom Nuclear Power Plant, Units 2 and 3. The results of the NRC's review of the Program Plan were forwarded to the licensee on December 13, 1983 (Reference 2), indicating that an in-progress audit may be scheduled later to observe the licensee's DCRDR progress. The staff conducted this audit between February 19 and 22, 1985, and the audit report was forwarded to the licensee on April 19, 1985 (Reference 3).

EVALUATION

The staff evaluation of the Peach Bottom DCRDR is consistent with "Standard Review Plan," Section 18.1, "Control Room" (NUREG-0800, Revision 0, Reference 4). This evaluation addresses DCRDR requirements in the same order as they are identified in Supplement 1 to NUREG-0737 (Reference 5). This evaluation is based on the following:

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- ° The licensee's Summary Report dated February 6, 1986 (Reference 6).
- ° The pre-implementation audit and on-site meeting conducted by the staff and its consultant, Science Application International Corporation (SAIC), on July 14 and 15, 1986 and September 28, 1988, respectively.

The technical evaluation reports (TERs) for the DCRDR were prepared by NRC consultants, SAIC, and are attached to this SER. The NRC agrees with technical positions and conclusions presented in the TERs.

1. Establishment of a Qualified Multidisciplinary Review Team

Based on findings during the pre-implementation audit, the staff concludes that the licensee has a qualified multidisciplinary review team and has satisfied this requirement of Supplement 1 to NUREG-0737.

2. Function and Task Analyses to Identify Control Room Operator Tasks and Information and Control Requirements During Emergency Operations

The pre-implementation audit found that this requirement had not been met because the licensee had failed to complete the function and task analysis for the secondary containment control and radioactivity control procedures based on the Boiling Water Reactor Owners Group (BWROG) Revision 3 to the emergency procedures guidelines (EPGs). After the pre-implementation audit, the licensee hired General Physics Corporation to complete a function and task analysis that addressed this concern.

Based on findings during the pre-implementation audit and an audit of a sample of task analysis worksheets during the on-site meeting, the staff concludes that the function and task analysis is acceptable and the licensee has satisfied this requirement of Supplement 1 to NUREG-0737.

3. Comparison of Display and Control Requirements With a Control Room Inventory

The pre-implementation audit also found that this requirement had not been met because the information and control requirements for the radioactivity release control and secondary containment control procedures were not compared to the control room inventory to identify discrepancies. During the on-site meeting, the licensee provided documentation showing how this concern was addressed: (1) After identifying the information and control requirements for the two procedures, the licensee conducted a verification of availability of the displays and controls in the control room and an evaluation of their suitability. (2) After implementing the two procedures, the licensee completed validation walk throughs in the control room and documented discrepancies. (3) Validation discrepancies in the control room were evaluated and corrected.

Based on review of the licensee's Summary Report, findings during the pre-implementation audit, and discussions and documents reviewed during the on-site meeting, the staff finds that the information, control, and display requirements have compared satisfactorily with the controls and displays available.



The staff concludes that the licensee has satisfied this requirement of Supplement 1 to NUREG-0737.

4. Control Room Survey to Identify Deviations from Accepted Human Factors Principles

Based on review of the licensee's Summary Report and findings during the pre-implementation audit, the staff finds that the licensee has conducted an acceptable control room survey that identifies deviations from accepted human factors principles. The staff concludes that the control room survey is acceptable and the licensee has satisfied this requirement.

5. Assessment of Human Engineering Discrepancies (HEDs) to Determine Which are Significant and Should be Corrected

As a result of information presented in the licensee's Summary Report and findings during the pre-implementation audit, the staff finds that the licensee has assessed the deviations from accepted human factors principles existing in the control room. The staff concludes that the licensee has satisfied this requirement of Supplement 1 to NUREG-0737.

6. Selection of Design Improvements

Through evaluation of information presented in the licensee's Summary Report and findings during the pre-implementation audit, the staff concludes that the licensee has met this requirement.

7. Verification that Selected Improvements will Provide the Necessary Correction

Based on findings during the pre-implementation audit, the staff concludes that the licensee has met this requirement.

8. Verification that Selected Design Improvements Will not Introduce New HEDs

Based on findings during the pre-implementation audit, the staff concludes that the licensee has met this requirement.

9. Coordination of Control Room Improvements With Changes From Other Programs Such as the Safety Parameter Display System (SPDS), Operator Training, Regulatory Guide 1.97 Instrumentation, and Upgraded Emergency Operating Procedures

The pre-implementation audit concluded that the licensee had not met this requirement because no formal procedure was in place to coordinate control room modifications resulting from the DCRDR with other Supplement 1 to NUREG-0737 programs. During the on-site meeting, the licensee indicated how the DCRDR modifications were coordinated with the subject programs. The SPDS was coordinated with the DCRDR through (1) the nomenclature standard E-540-4 (Revision 3), (2) a human factors plan that includes

NUREG-0700 guidelines, and (3) the mockup of the new SPDS was developed using the DCRDR human factors experts and team manager. Regulatory Guide 1.97 instrumentation (i.e., Categories 1 and 2) in the control room were enhanced for identification by attaching a vertical yellow strip to the right of each display and recorder. The upgraded emergency operating procedures, including radioactivity release control and secondary containment control, were the bases for the function and task analysis. Finally, the operations staff and training staff received training on the DCRDR enhancements.

The staff finds that the licensee has coordinated the DCRDR with other improvement programs and has, therefore, satisfied this requirement of Supplement 1 to NUREG-0737.

#### CONCLUSIONS

The staff concludes, on the basis of its review of the licensee's DCRDR program descriptions and the audits discussed herein, that the licensee meets all nine of the DCRDR requirements of Supplement 1 to NUREG-0737.



#### REFERENCES

1. Letter from S. L. Daltroff (PECO) to D. G. Eisenhut (NRC), "Peach Bottom Atomic Power Station Program Plan for Control Room Design Review (NUREG-0737, Supplement 1)," October 31, 1983.
2. Letter from G. Gears (NRC) to E. G. Bauer (PECO), "Review of the Program Plan for Conducting a Detailed Control Room Design Review - Supplement 1 to NUREG-0737," December 13, 1983.
3. Letter from J. F. Stolz (NRC) to E. G. Bauer (PECO), "Results of NRC's In-Progress Audit of Peach Bottom Atomic Power Station, Units 2 & 3 - Detailed Control Room Design Review (NUREG-0737, Supplement 1)," April 19, 1985.
4. NUREG-0800, Revision 0, "Standard Review Plan," Section 18.1 "Control Room," and Appendix A, "Evaluation Criteria for Detailed Control Room Design Reviews (DCRDR)," NRC, September 1984.
5. NUREG-0737, Supplement 1, "Clarification of TMI Action Plan Requirements," NRC, December 1982.
6. Letter from S. L. Deltroff (PECO) to D. R. Muller (NRC), "Peach Bottom Atomic Power Station, NUREG-0737, Supplement 1, Section 5, Control Room Design Review," February 26, 1986.