

October 11, 1984

Docket No. 50-271

Mr. R. W. Capstick  
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Dear Mr. Capstick:

SUBJECT: PROGRAM PLAN FOR CONDUCTING A DETAILED CONTROL ROOM DESIGN REVIEW

Re: Vermont Yankee Nuclear Power Station

By letter dated June 29, 1984, you submitted the Program Plan for conducting a Detailed Control Room Design Review (DCRDR) at the Vermont Yankee Nuclear Power Station in accordance with the requirements of Supplement 1 to NUREG-0737. NRC approval of Program Plans is not required; however, we have reviewed the Program Plan with reference to the requirements of Supplement 1 to NUREG-0737 and the guidance contained in NUREGs 0700 and 0801, and have enclosed our comments for your information. A Summary Report for the DCRDR is required to be submitted by July 1, 1985 in accordance with our Order dated June 12, 1984.

The Program Plan addressed all of the DCRDR requirements stated in Supplement 1 to NUREG-0737. Information in the Program Plan indicated general understanding and intent to satisfy the requirements. The review did, however, identify several concerns. Those concerns are summarized in the conclusion section of the enclosed comments. In the staff's judgment, resolution of the concerns would increase the benefits of the DCRDR.

Based on the review of the Program Plan, the staff plans an in-progress audit of the Vermont Yankee Nuclear Power Station DCRDR. We understand that a date of March 12, 1985 will be acceptable to you for the in-progress audit. A proposed agenda will be provided approximately two weeks prior to the audit.

Sincerely,

Original signed by/

Domenic B. Vassallo, Chief  
Operating Reactors Branch #2  
Division of Licensing

Enclosure:  
As stated

cc w/enclosure:  
See next page

DL:ORB#2  
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NUCLEAR REGULATORY COMMISSION  
STAFF COMMENTS  
ON THE  
VERMONT YANKEE NUCLEAR POWER PLANT  
DETAILED CONTROL ROOM DESIGN REVIEW  
PROGRAM PLAN

BACKGROUND

Licensees and applicants for operating licenses shall conduct a Detailed Control Room Design Review (DCRDR). The objective is to "improve the ability of nuclear power plant control room operators to prevent accidents or cope with accidents if they occur by improving the information provided to them" (NUREG-0660, Item I.D). The need to conduct a DCRDR was confirmed in NUREG-0737 and Supplement 1 to NUREG-0737. DCRDR requirements in Supplement 1 to NUREG-0737 replaced those in earlier documents. Supplement 1 to NUREG-0737 requires each applicant or licensee to conduct a DCRDR on a schedule negotiated with the Nuclear Regulatory Commission (NRC).

NUREG-0700 describes four phases of the DCRDR and provides applicants and licensees with guidelines for its conduct. The phases are:

1. Planning
2. Review
3. Assessment and implementation
4. Reporting

Criteria for evaluating each phase are contained in draft NUREG-0801.

A Program Plan is to be submitted within two months of the start of the DCRDR. Consistent with the requirements of Supplement 1 to NUREG-0737, the Program Plan shall describe 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

Licensees and applicants are expected to schedule element 1 for accomplishment during the planning phase, elements 2 through 4 for accomplishment during the review phase, and elements 5 through 8 for accomplishment during the assessment and implementation phase. Scheduling of element 9 is expected to cut across the planning, review, and assessment and implementation phases.

Program Plans are not approved by the NRC, but staff comments will be provided per the requirements of Supplement 1 to NUREG-0737. Those comments will, among other things, provide the staff's judgement as to whether the Program Plan will lead to a successful DCRDR. Staff comments on the Program Plan do not require response and may be used as the licensee or applicant chooses.

A Summary Report is to be submitted at the end of the DCRDR. As a minimum it shall:

1. Outline proposed control room changes
2. Outline proposed schedules for implementation
3. Provide summary justification for HEDs with safety significance to be left uncorrected or partially corrected

The NRC will evaluate the organization, process, and results of the DCRDR. Evaluation will include review of required documentation (Program Plan and Summary Report) and may also include reviews of additional documentation, briefings, discussions, and on-site audits. In-progress audits may be conducted after submission of the Program Plan but prior to submission of the Summary Report. The staff will prepare a report following an in-progress audit. That report will be transmitted to applicants and licensees for their use. Pre-implementation audits may be conducted after submission of the Summary Report. Results of a pre-implementation audit will be included in the NRC evaluation of the DCRDR which follows receipt of the Summary Report. NRC evaluation will be in accordance with the requirements of Supplement 1 to NUREG-0737. Additional guidance for the evaluation is provided by NUREG-0700 and draft NUREG-0801.

Supplement 1 to NUREG-0737 requires that significant HEDs be corrected. Improvements which can be accomplished with an enhancement program may be done promptly. Other control room upgrades may begin following publication of the SER (or SER Supplement), resolution of any open issues, and approval of a schedule for upgrade.

A human factors evaluation of the design of the remote shutdown capability provided to meet 10 CFR Part 50, Appendix A, GDC-19 and 10 CFR Part 50, Appendix R is not specifically identified as a requirement in Supplement 1 to NUREG-0737. NRC staff review of this issue is not completed. In the interim, the NRC staff recommends that the scope of the DCRDR include a human factors evaluation of the design of the remote shutdown capability. To the extent practicable, without delaying completion of the DCRDR, the NRC staff also recommends that the DCRDR address any control room modifications and additions (such as controls and displays for inadequate core cooling and reactor system vents) made or planned as a result of other post-TMI actions, as well as the lessons learned from operating reactor events such as the Salem ATWS events. Implications of the Salem ATWS events are discussed in NUREG-1000 and required actions are described in Section 1.2, Post Trip Review - Data and Information Capability, of the enclosure to Generic Letter 83-28.

#### DISCUSSION

Vermont Yankee Nuclear Power Corporation (VYNPC) submitted a DCRDR Program Plan for Vermont Yankee Nuclear Power Plant (VYNPP) by letter dated June 19, 1984. The Program Plan indicated that both the control room and equipment for remote shutdown would be evaluated during the DCRDR.

The Boiling Water Reactor Owners' Group (BWROG) Control Room Survey Program was referenced in the Program Plan, but the extent to which VYNPC would adhere to that program was not clear. Previous review of the BWROG Control Room Survey Program found that it was not fully responsive to NUREG-0737 Task Action Plan I.D.1. The BWROG program addresses only the planning and review phases of the DCRDR. If VYNPC intends to adhere to the BWROG program, it is required by Generic Letter 83-18 to complete the following tasks:

1. Submit an individual Program Plan to the NRC referencing the BWROG Generic Program Plan. The plant-specific submittal should:
  - a. Document the qualifications of survey team members, and number and extent of plant personnel participation
  - b. Identify portions of the plant's DCRDR not performed in accordance with the methodology specified in the BWROG Program Plan
  - c. Discuss their program for prioritization of HEDs, reporting of DCRDR results, and implementation of control room enhancements

2. Complete the BWROG Control Room Survey Checklist Supplement
3. Prioritize HEDs, determine corrective actions, develop an implementation schedule, and report the results of the DCRDR to the NRC
4. Repeat portions of the task analysis using updated plant specific emergency operating procedures (EOPs) to account for differences in the new procedures
5. Update operating experience review

The DCRDR Program Plan for VYNPP was reviewed against the requirements of Supplement 1 to NUREG-0737. It was also reviewed against the requirements of Generic Letter 83-18 because the BWROG Control Room Survey Program was referenced. However, as noted above, the extent to which VYNPP plans to adhere to the BWROG Program is unclear. Consultants from Science Applications, Inc., assisted the staff in the review. Results of the review are attached.

#### CONCLUSION

The Program Plan addressed all of the DCRDR requirements stated in Supplement 1 to NUREG-0737. Information in the Program Plan indicated general understanding and intent to satisfy the requirements. The review did, however, identify several concerns. Those concerns were:

1. Amount of human factors expertise available for accomplishment of technical tasks is limited
2. Lack of specific personnel assignments
3. Apparent lack of an orientation program for those involved in the DCRDR
4. The possibility that EOPs used in the task analysis will subsequently require revision based on IIRC review of VYNPP's procedures generation package
5. The possibility that identification of operator information and control requirements will not be independent of the existing control room
6. The possibility that all tasks in the EOPs will not be subjected to task analysis
7. Appropriate equipment characteristics may not be included in the control room inventory



8. The indication that modifications to the control room and control boards will be compared only with the BWROG Control Room Survey Program checklist and not the supplement to that checklist
9. The possibility that HED-by-HED solution of design improvements will result in piecemeal correction
10. Gaps in the efforts to coordinate control room improvements with changes from other programs

Resolution of the above concerns would increase the benefits of the DCRDR.

Several recommendations also resulted from the program plan review. The recommendations are not intended as additional requirements. They are intended to encourage the fullest possible benefit from the DCRDR. They do not appear to require major changes to the current organization and process of the DCRDR. These recommendations are:

1. Development of a plan to keep the operating experience review current after completion of the DCRDR
2. Use of a control room mock-up to assess the integrated effect of the fullest possible range of proposed design improvements and enhancements
3. Coordinate simulator development with control room upgrade to assure maximum training benefit, and, if the schedule allows, to permit evaluation of corrections prior to control room improvement.
4. Development of control room design conventions

Based on the review of the Program Plan the staff plans an in-progress audit of the VYNPP DCRDR. The NRC Project Manager for VYNPP has been asked to negotiate a date for the audit in the March 1985 time-frame.

## REFERENCES

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

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

NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980; Supplement 1, December 1982.

NUREG-0801, "Evaluation Criteria for Detailed Control Room Design Reviews," October 1981, draft report.

NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant," April 1983.

Generic Letter 83-18, "NRC Staff Review of the BWR Owners' Group (BWROG) Control Room Survey Program," April 19, 1983.

Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events," July 8, 1983.

Letter from W. P. Murphy (VYNPC) to D. B. Vassallo. Subject "Vermont Yankee Detailed Control Room Design Review Program Plan," June 19, 1984.



ATTACHMENT