

ENCLOSURE 2

EVALUATION OF THE
DETAILED CONTROL ROOM DESIGN REVIEW
SUMMARY REPORT FOR MCGUIRE NUCLEAR STATION,
UNITS 1 AND 2

Technical Evaluation Report

Final

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Contract NRC-03-82-096

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Technical Evaluation Report
for
McGuire Nuclear Station

Duke Power Company responded to the NRC request for information to address open items resulting from a review of the DCRDR of McGuire Nuclear Station (Reference 1). Duke Power specifically responded with further information requested by the NRC in order to provide a valid assessment of the following items.

1. 36 Human Engineering Discrepancies (HEDs) to be resolved by surface enhancements or physical changes.
2. 10 HEDs that Duke Power proposes to leave uncorrected.
3. The process to verify that selected design improvements will provide the necessary correction.
4. The HED solution implementation schedule.

The following is SAIC's evaluation based on guidance contained in NUREG-0700 and NUREG-0800 and the requirements of Supplement 1 to NUREG-0737.

1. HEDs to be Resolved by Surface Enhancements or Physical Changes

Of the 36 HEDs to be resolved by surface enhancements or by physical changes, Duke Power's clarification leads us to conclude that 34 of the resolutions are adequate and that the two remaining ones are also adequate provided that procedural changes are effected. The following are HEDs for which resolutions are adequate:

Surface Enhancement HEDs

HED No.	M-1-0066	M-1-0198	M-1-0671	
	M-1-0068	M-1-0258	M-1-0683	
	M-1-0070	M-1-0281		
	M-1-0085	M-1-0322		
	M-1-0106	M-1-0333		Reference 2, TER
	M-1-0127	M-10359		p.22,
	M-1-0172	M-1-0374		Section 1 (a,b).

Physical Change HEDs

HED No.	M-1-0108	M-1-0319	M-1-0587	
	M-1-0128	M-1-0513	M-1-0652	
	M-1-0139	M-1-0514	M-1-0679	
	M-1-0141	M-1-0516	M-1-0681	Reference 2, TER
	M-1-0188	M-1-0517	M-1-0691	p.23,
	M-1-0268C	M-1-0520	M-2-0325	Section 2 (a,b).

The remaining two HED corrections are satisfactory provided the operating procedures are changed to reflect the following concerns:

HED NO. M-1-0361: The correction described for this HED appears adequate, however, it is recommended that procedures be instituted for periodic review and replacement of worn switchbutton engravings and lamp lenses.

HED No. M-1-0610C: Correction for the HED appears satisfactory; however, it is recommended that the operating procedures that are used during the calculation of T-Average specify the meaning of the asterisks in the CRT display.

2. HEDs Proposed to be Left Uncorrected

For the 10 HEDs that Duke Power has provided further justification or clarification to leave uncorrected, we conclude that Duke's justifications for the following nine HEDs are satisfactory:

HED No.	M-1-0028	M-1-0269B	
	M-1-0038	M-1-0563	
	M-1-0118	M-1-0654	TER, Pages 24-26,
	M-1-0159	M-1-0669	Section 3
	M-1-0268		

Duke's justification for leaving HED No. M-1-0152 uncorrected is unsatisfactory for the following reasons:

HED No. M-1-0152: The justification for not correcting this HED is discussed in two places in the Duke Power Company response. Contradictory justifications are presented for use of key-operated switches by Duke. The staff does not agree with the justification presented by Duke Power which leaves the Pressurizer PORV as a key-operated switch for the following reasons:

1. The Westinghouse Owners Group generic studies show a time-dependent reliance on the pressurizer PORV to mitigate a SGTR. In addition, the pressurizer PORV which provides low temperature overpressure protection may be required on a timely basis in forced shutdown situations as documented in McGuire's FSAR and its Supplements.
2. No protection is required for security reasons (See NUREG-0700, Guideline 6.4.4.3.a).
3. Key-operated switches should not be used solely as a means of shape coding (See NUREG-0700, Guideline 6.4.4.3.1).

3. VERIFICATION THAT DESIGN IMPROVEMENTS WILL PROVIDE NECESSARY CORRECTION

It appears that Duke has adequately implemented a procedure to ensure that selected design improvements will provide the necessary HED corrections. This was accomplished by portraying changes on a

full-scale, control board mock-up in an integrated manner. The effect of each solution on the operator and its relationship to other solutions was observed. Solutions were further reviewed to ensure that new HEDs were not introduced and that the HED was corrected or improved.

4. Implementation Schedule

Duke's implementation schedule for correcting HEDs involves points 2-4 of the NRC letter of August 15, 1984 from T.M. Novak to H.B. Tucker (Reference 2). In summary, point 2 requests Duke Power to provide an implementation schedule for correcting HEDs that is acceptable to the NRC staff. Point three requests Duke Power to identify specific HEDs assigned to four implementation categories that are linked to refueling outages. Point 4 requests Duke Power to reduce the time projected to complete implementation of all HED corrective actions.

The Duke Power Company discussed all of these points in Attachment 2 of their letter dated September 24, 1984, from T.B. Tucker to H.R. Denton (Reference 1). However, Duke Power has only partially complied with the NRC request with regard to identifying HEDs assigned to implementation categories and then linking them to specific refueling outages.

Duke Power has identified an incomplete Implementation Schedule for McGuire Units 1 and 2 based on refueling outages through 1985. The schedule for Unit 1 which encompasses 2 refueling outages implements only 56% of the HEDs. The schedule for Unit 2 implements 34% of the HEDs in the first refueling outage. Of concern to us are two problems. The first is that solution to the HEDs be implemented as soon as reasonably possible considering all the factors that Duke Power has expressed in their letter of September 24, 1984 (Reference 1). The second problem is that Duke Power does not seem to have used their prioritization methodology in scheduling the implementation of HEDs. One of the primary reasons for prioritizing HEDs is to take into account the safety significance of an HED and the impact that HED could have on plant safety if not implemented quickly.

We do not agree with the implementation schedule proposed by Duke. As a suggestion for reducing the time needed to implement the HED solutions, we suggest that surface enhancements be accomplished as soon as possible. This suggestion is supported by paragraph 5.1.c of Supplement 1 to NUREG-0737 which requires that "Improvements that can be accomplished with an enhancement program (paint-tape-label) should be done promptly." A review of the solutions for the HEDs cited in Table 1 of Reference 1 indicates that changes to labels represents a large fraction of the proposed work. For Unit 1, 23 out of 62 HED solutions are label changes and for Unit 2, 20 out of 54 HED solutions are also label changes.

We suggest that Duke Power implement all HED corrective actions by end of the 3rd refueling outage for Unit 1 and the end of the 2nd refueling outage for Unit 2. Those HEDs that cannot be accommodated under this suggested schedule should be justified in writing on an HED by HED basis to the NRC. This will help the NRC and the licensee negotiate an HED Implementation Schedule that is approved by the NRC as required by paragraph 5.2.g, Supplement 1 to NUREG-0737.

REFERENCES

1. Letter from H.B. Tucker (Duke) to H.R. Denton (NRC) Docket Nos. 50-369 and 50-370, 9/24/84.
2. Letter from T.M. Novak (NRC) to H.B. Tucker (Duke) Docket Nos. 50-369 and 50-370, 8/15/84.
3. NUREG-0800 (Standard Review Plan) REVO, Section 18.1 and Appendix A to Section 18.1, September, 1984.
4. NUREG-0700, "Guidelines for Control Room Design Review", September 1981.
5. NUREG-0737, "Clarification of TMI Action Plan Requirements", November 1980; Supplement 1, December 1982.