

SAFETY EVALUATION REPORT
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
SEISMIC QUALIFICATION OF THE AUXILIARY FEEDWATER SYSTEM

Introduction

Since the accident at Three Mile Island attention has been focused on the ability of pressurized water reactors to provide reliable decay heat removal. While it is recognized that alternate methods may be available to remove decay heat following transients or accidents, heat removal via the steam generators is the first choice for accomplishing a safe shutdown of the plant. Therefore, there should be reasonable assurance that the auxiliary feedwater (AFW) system can withstand the postulated Safe Shutdown Earthquake (SSE), consistent with other safety-related systems in the plant.

To address this concern, the NRC developed and initiated Multiplant Action C-14, "Seismic Qualification of Auxiliary Feedwater Systems." The objective of this plant is to increase, to the extent practicable, the capability of those plants without seismically qualified AFW to withstand earthquakes up to the SSE level. This program was implemented with the issuance of NRC Generic Letter 81-14, dated February 10, 1981. Our review of the licensee's responses to this letter is the subject of this evaluation.

Evaluation

The attached technical evaluation report (TER) dated October 1, 1982 was prepared by our consultant, Lawrence Livermore National Laboratory. The report provides our consultant's technical evaluation of the licensee's conformance to the criteria of Generic Letter 81-14. We have reviewed our consultant's report and agree with their content.

In the TER, our consultant concludes that the AFW system is seismically qualified for the safe shutdown earthquake, with two exceptions. The two exceptions are, (1) the AFW system boundary does not fully conform to the definition specified in Generic Letter 81-14 regarding double isolation valves on the AFW

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system branch lines, and (2) the seismic qualification of safety-related electrical cables and motor control centers. These concerns have been resolved as discussed below.

Subsequent to issuance of our consultant's TER, we obtained additional information regarding the AFW system boundary. The licensee stated in letters dated February 22, 1984 and August 23, 1984 that those portions of the AFW system pressure boundary that do not include double isolation valves are (1) vent and drain connections of one inch nominal pipe size or smaller, and (2) the AFW pumps recirculation and test loop lines. The licensee further stated that the vents and drains are each isolated by a single, normally closed manual valve designed and constructed in accordance with seismic Category I requirements. The licensee has reviewed these valves as a part of their single failure analysis and has concluded that no single open vent or drain could disable all three AFW trains. Also, each vent and drain valve is verified closed before startup from each refueling outage and the accessible vent and drain valves are verified closed during monthly AFW pump testing. We find this acceptable.

With regard to the AFW pump recirculation lines, the licensee stated that each AFW pump recirculation line is orificed to provide a minimum flow path for pump protection. The orifice and single manual isolation valve in each recirculation line are within the seismic Category I boundary of the AFWS. The licensee has analyzed the effects of failure of the nonseismic recirculation piping downstream of the manual isolation valve and determined that its rupture will not affect the functional capability of the AFW system assuming a single failure in one train. This analysis indicated that the seismic Category I orifice prevents loss of flow to the steam generators sufficient to preclude decay heat removal assuming failure of one AFW pump. Therefore, acceptable pressure boundary protection is provided.

Based on the above, we conclude that adequate protection is provided for the AFW system pressure boundary to assure performance of the AFW safety function following the occurrence of a safe shutdown earthquake. The concern identified in the TER is therefore considered resolved.

Regarding seismic qualification of safety-related electrical cables and motor control centers, the licensee indicated that a walkdown of AFW system cabling and motor control centers had been performed and confirmed that this equipment is properly supported to seismic Category I criteria. We therefore, consider this concern to be resolved.

CONCLUSION

The staff and its consultant, Lawrence Livermore National Laboratory (LLNL) have reviewed the licensee's submittals for H. B. Robinson in response to Generic Letter 81-14. As a result of its review, our consultant has provided a TER. The staff has reviewed the TER and concurs with its findings. The TER is a part of this safety evaluation report. Subsequent to the consultant's technical review, the staff obtained additional information from the licensee regarding the open issues identified in the TER. Based on our review of the consultant's TER and the additional information provided by the licensee, we conclude that there is reasonable assurance that the auxiliary feedwater system at H. B. Robinson has sufficient capability to withstand a safe shutdown earthquake and accomplish its safety function. Accordingly, we are not contemplating requiring any seismic upgrading of the H. B. Robinson AFW system under Multiplant Action C-14.

SALP INPUT

Plant: H. B. Robinson Steam Electric Plant, Unit 2

1. Management Involvement and Control in Assuring Quality: Not Applicable
2. Approach to Resolution of Technical Issues from a Safety Standpoint:
Category 2
3. Responsiveness to NRC Initiatives: Category 2
4. Enforcement History: Not Applicable
5. Reporting and Analysis of Reportable Events: Not Applicable
6. Staff (Including Management): Not Applicable
7. Training and Qualification Effectiveness: Not Applicable

The following is the narrative for Items 2 and 3 above.

The licensee's initial submittal for Generic Letter 81-14, "Seismic Qualification of Auxiliary Feedwater Systems" (MPA C-14) was not complete. It took considerable time to close the open items indicated in the LLNL TER for MPA C-14. When a response was provided, it was generally acceptable without further clarification.