SAFETY EVALUATION

DAVIS-BESSE UNIT 1 AUXILIARY FEEDWATER

AUTOMATIC INITIATION AND FLOW INDICATION

ACTION PLAN ITEM II.E.1.2

INTRODUCTION AND SUMMARY

To improve the reliability of Auxiliary Feedwater Systems (AFWS)
at pressurized water reactor (PWR) facilities, the staff is
requiring licensees to upgrade the system where necessary to
ensure safety grade automatic initiation and flc indication.
The criteria for this upgrading are contained in NUREG-0737
(Clarifications of TMI Action Plan Requirements), Section II.E.1.2.

The evaluation of the Davis-Besse Unit 1 AFWS design was performed
for the NRC by Franklin Research Center (FRC) as part of a
technical assistance contract program. The results of the FRC
evaluation are reported in the attached Technical Evaluation
Report (TER - C5257 - 302).

Based on our review of the FRC TER, we conclude that the Davis-
Besse Unit 1 AFW automatic initiation and flow indication designs
are acceptable with the exceptions noted below. In addition,
certain Technical Specification changes will be required.

EVALUATION

The attached TER provides a technical evaluation of the electrical,
instrumentation, and control design aspects of the Davis-Besse Unit 1

AFWS with regard to automatic initiation and flow indication. Pages 9 and 15 of the TER indicate non-compliance with the diversity of AFWS pump power supplies requirement since both AFWS pumps are turbine driven. This requirement is not within the scope of the II.E.1.2 review, but is a II.E.1.1 (Auxiliary Feedwater System Evaluation) requirement being reviewed by the Auxiliary Systems Branch (ASB).

The Davis-Besse AFWS was designed with three modes of control available to the operator. These are "manual", "auto-essential", and "ICS (Integrated Control System) control". The operator selects the desired control mode by a control switch on the main control board. TMI Action Plan Item II.K.2.2 requires that auxiliary feedwater system control be independent of the ICS. During a May 1979 shutdown, a mechanical stop was installed to prevent use of the ICS control position. The licensee has verbally stated that ICS control can not be selected from the auxiliary shutdown panel.

Either train of the Davis-Besse AFWS may be taken out of service for maintenance during power operation by manually closing a normally locked open valve (MS729 or MS730) in the steam supply line to the AFWS pump turbine. Taking a pump out of service places the plant in a limiting condition of operation whereby the inoperable train must be restored within 72 hours or the plant must attain a hot shutdown condition within the following 12 hours. Section 4.13 (Indication of Bypasses) of IEEE Standard 279-1971 requires that when some part of the system has been bypassed or deliberately rendered inoperative for any purpose, this fact be continuously indicated in the control room. This

indication should be automatically activated at the system level. Our review of control room status indication at Davis-Besse regarding AFWS operability is incomplete at this time. It appears that the indication provided at present may not be sufficient. We are pursuing this concern with the licensee (Toledo Edison Company - TECo) and will provide the resolution in a supplement to this SER. Further guidance regarding indication of bypasses may be found in Regulatory Guide 1.47 (Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems).

The Davis-Besse Technical Specifications currently do not require periodic (monthly) testing of the AFWS automatic actuation logic. The actuation logic should be tested on a staggered monthly test basis (i.e., test each train every other month) consistent with the Babcock and Wilcox (B&W) Standard Technical Specifications (NUREG-0103). Table 4.3-11 (Steam and Feedwater Rupture Control System Instrumentation Surveillance Requirements) of the Davis-Besse Technical Specifications must be revised to include this testing. In addition, Table 4.3-11 should be modified such that testing of the manual initiation circuits is performed monthly instead of at each refueling. This is also consistent with the Standard Technical Specifications.

The AFWS flow instrumentation provided at Davis-Besse consists of one safety grade flow channel per steam generator. This is not acceptable to the staff. Section II.E.1.2 of NUREG-0737 requires as a minimum for B&W plants, two AFW flowrate indicators per steam generator. This flowrate indication must satisfy Section

4.2 (Single Failure) of IEEE Standard 279-1971. By letter dated September 16, 1981 TECo submitted its justification for providing only one flow channel per steam generator, stating that the insensitivity of overall AFWS reliability to a second flow indicator coupled with the existing steam generator level indication make unnecessary a second flow indicator in each train. The staff does not agree. The operator must know whether AFWS flow is being provided to the steam generators, and therefore adequate decay heat removal capability is being provided when steam generator water inventory has been lost. B&W steam generators are susceptible to rapid dryout during transients requiring AFWS flow.

CONCLUSION

Based on our review of the Franklin Research Center TER and subsequent conversations with the licensee, we conclude that the Davis-Besse AFWS automatic initiation and flow indication systems comply with the staff's long term safety grade requirements with the following exceptions:

1. Only one AFWS flowrate indicator per steam generator is provided in the Davis-Besse design. A second flow channel should be added consistent with the requirements of NUREG-0737 as discussed above.

2. The review of the control room status indication provided when an AFWS train is removed from service is incomplete at this time. We will provide the results of this review, when completed, in a supplement to this SER.

In addition, the Davis-Besse Technical Specifications must be revised to include monthly testing of the AFWS automatic actuation logic and the manual initiation circuitry as discussed above.