

No: RI-94-13

TECHNICAL ISSUE SUMMARY

Date: 12/8/94

**ATWS MITIGATION ACTUATION CIRCUITRY DESIGN
DEFICIENCY**

PROBLEM: At Beaver Valley Units 1 and 2, the Anticipated Transient Without Scram (ATWS) Mitigation Actuation Circuitry (AMSAC) system was found to contain a design omission which could render the system inoperable under certain conditions. The system is required by 10 CFR 50.62 and is designed to limit reactor coolant system pressure, diverse from the reactor protection system, by automatically initiating the auxiliary feedwater system and a turbine trip under conditions indicative of an ATWS.

EVALUATION: Both Beaver Valley Units are 3-loop Westinghouse PWRs and have an AMSAC system based on the Westinghouse Owners Group WCAP-10858P-A, revision 1, "AMSAC Generic Design Package." The system is designed to initiate auxiliary feedwater flow and trip the main turbine whenever the unit is above 40% power and 2 of 3 normal feedwater loops are below 25% of full flow. The AMSAC system at Beaver Valley is a Foxboro Spec 200 Micro Control System. WCAP-10858 specifies that the frequency of inadvertent AMSAC actuations be minimized. In order to satisfy this aspect of the design, AMSAC logic monitors the feedwater flow signals entering the AMSAC cabinets for levels indicative of an instrument loop failure. If any of the feedwater input channels deviate outside the normal 4 to 20 milli-amp range, then the AMSAC actuation output is automatically blocked. Design requirements include trip switches for the three feedwater flow channels on the AMSAC control panel. Placing a feedwater flow channel in a tripped condition is supposed to: remove the automatic block feature in the logic created when AMSAC sensed the bad feedwater flow input; and create a logic condition where AMSAC would actuate on a 1/2 low feedwater flow condition. During a review of the AMSAC logic, the licensee has found that these trip switches do not remove the automatic blocking feature. Thus AMSAC is rendered inoperable at any time one of the three feedwater flow inputs is outside their normal range.

LICENSEE/VENDOR ACTION: Based on the vendor's recommendations, a minor design change is currently being developed so that placing the bad feedwater flow channel in a tripped condition will remove the AMSAC block as originally designed. The licensee has determined that the failure to incorporate this aspect of the system design was due to an oversight by Foxboro. Beaver Valley also intends on notifying other utilities of this issue via the Nuclear Network. Foxboro has thus far been unable to determine if this same error in design implementation applies to other utilities. Previously identified generic Foxboro design deficiencies involving the actuation timer are discussed in Information Notice 92-06, supplement 1.

NRC CONTACTS: Region I is forwarding this summary to NRR for a review of generic implications and to Region I inspectors for site-specific consideration.

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REFERENCES: 10 CFR 50.62
WCAP-10858-P-A, Revision 1
NRC Region I Inspection Report 50-334/94-25; 50-412/94-26

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