

December 8, 1988

Docket No. 50-346
Serial No. DB-88-064

Mr. Donald C. Shelton
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Dear Mr. Shelton:

SUBJECT: SAFETY EVALUATION RELATING TO TOLEDO EDISON AFWS RELIABILITY
ANALYSIS (TAC 65346)

In response to the June 9, 1985 loss of Main and Auxiliary Feedwater Event at the Davis-Besse Nuclear Power Station, Unit No. 1, Toledo Edison Company has implemented various system modifications to improve the Auxiliary Feedwater System (AFWS) reliability.

On April 3, 1987, you submitted a reliability analysis of the AFWS in accordance with a requirement imposed by the staff in NUREG-1177. This analysis provides estimates of the overall unavailability of the system as it existed up to June 9, 1985, as subsequently modified (modified two-train configuration), and as currently planned (three-train configuration). Additionally, a qualitative assessment of the currently-planned modifications was provided.

The staff has reviewed Toledo Edison Company's submittal, and our evaluation is enclosed. The staff also has assessed some system modifications which have not been modeled by Toledo Edison Company. These modifications were planned for implementation during the fifth refueling outage.

Toledo Edison Company used human error rate data as appropriate with proper emphasis on the stress levels associated with the initiating events. The study also used component failure rate data obtained from the Davis-Besse station experience to the extent possible. This data was generated on the basis of station maintenance, surveillance and testing records.

As part of the AFWS upgrade, Toledo Edison Company planned several modifications to the system to be implemented during the fifth refueling outage. These modifications were not considered in the AFWS reliability analysis. The staff evaluated the potential impact of these modifications. In these modifications, the changes in valve positions and valve operators in the steam admission lines to the AFW turbines (see Section II.E.a, in enclosure) introduce two effects: (a) a potential increase in overspeed trip vulnerability, and (b) an improved Air-Operated Valves performance over that of the Motor Operated Valves. Toledo Edison Company should ensure that these system modifications do not result in

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a net reduction in system reliability. This may be achieved by closely monitoring the operability of the moisture traps, and the capability of the AFW turbine-driven pumps to start and continue to operate.

It should be noted that the three-train unavailability estimates provided by this analysis are higher than what would be expected from a configuration of this type. Since previous Davis-Besse analyses of the AFWS unavailabilities and equipment failure data were done using different system modeling assumptions, human-error modeling, and equipment failure data, it is difficult to make a direct comparison to explain the results. It is possible that the modeling level of detail and, to a lesser extent, the use of plant-specific failure rate data may contribute to the estimated high unavailability. For example, if conservatively high values of failure data were used consistently at the most detailed level of system modeling, then the cumulative effect could produce an unrealistically high unavailability. However, this does not have a significant effect on the validity of the analysis, since it is used primarily to assess the impact of system changes.

We conclude that the analysis methodology, assumptions, and system modeling provide a useful analytical tool to evaluate the AFWS reliability and the impact of various system hardware or operational modifications.

Sincerely,

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Albert W. De Agazio, Sr. Project Manager
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Enclosure:
Safety Evaluation

cc w/enclosure:
See next page

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