

November 15, 1985

Docket No. 50-346

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Docket File

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Dear Mr. Williams:

SUBJECT: EVALUATION OF TOLEDO EDISON COMPANY PLANS NO. 1A/1B AND 1C -
CORRECTION

By letter dated October 30, 1985, we provided you with evaluations of a number of Toledo Edison Company root cause findings and corrective action reports. The evaluation for plans 1A/1B and 1C contain an incorrect reference to the operator's inability to reset the AFPTs. Enclosed is a corrected version of the evaluation.

Sincerely,

"ORIGINAL SIGNED BY
JOHN F. STOLZ"

John F. Stolz, Chief
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Division of Licensing

Enclosure:
As Stated

cc w/enclosure:
See next page

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Davis-Besse Nuclear Power Station
Unit No. 1

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DAVIS-BESSE

EVALUATION OF LICENSEE'S REPORT REGARDING
OVERSPEED TRIPS OF THE AUXILIARY FEED PUMP TURBINES
TOLEDO EDISON PLANS NO. 1A/1B and 1C

We have reviewed the findings, corrective actions, and generic implications report entitled, "Overspeed Trips Of The Auxiliary Feed Pump Turbines on June 9, 1985 at Toledo Edison's Davis-Besse Nuclear Power Station" concerning the problems associated with an overspeed trip of the auxiliary feed pump turbines (AFPT). The AFPT is a steam driven turbine which drives the auxiliary feedwater pump. Both of the auxiliary feedwater pumps (AFP), including the turbine and overspeed trip mechanism (OTM), at Davis-Besse are identical except for the model of the governors.

Each AFPT is fed from its respective steam generator (SG), that is SG1 feeds AFPT 1 and SG2 feeds AFPT 2. In addition, there is a cross connection such that each SG can feed the redundant AFPT, i.e., SG1 can feed AFPT 2 and SG2 can feed AFPT 1. These cross connected lines are normally closed. During the June 9th event, a low SG1 level signal opened the steam line to AFPT 1. When the operator (five seconds later) tripped both channels on low SG pressure, the normal steam lines were isolated and the cross connected steam lines were opened. The licensee, by analysis, has determined that a large quantity of condensate could have been formed when the steam was admitted to the cold cross connect lines. The condensation in the steam lines formed a water slug at the AFPTs and could have caused the overspeed of the AFPTs. The licensee has proposed three different scenarios where this water slug could cause the AFPT to trip on overspeed. The first scenario is where the water slug in the governor valve causes the valve to open too far in an attempt to maintain turbine speed. When the water clears the valve, the valve admits too much steam and the AFPT trips on overspeed. The second scenario is where the water flashes as it enters the turbine and thereby accelerates the turbine due to the sudden expansion until it trips. The third scenario is similar to the second scenario except the water slows down the turbine and the governor valve tries to maintain speed. When the water clears the turbine, the governor

valve is open too far and the turbine trips on overspeed. In order to support this hypothesis, the licensee also calculated the quantity of condensate which could be formed in the normal lines used to power the AFPTs. A comparison of the quantity of condensate formed in the line from SG1 to AFPT 1 is almost as much as from SG2 to AFPT 1. The licensee could not explain why the AFPT 1 had never tripped on overspeed when fed from SG 1. In addition, the licensee has not determined how or why the condensate resulted in the overspeed tripping of the AFPTs. The identification of the root cause was done hypothetically and the licensee has not proposed to perform any verification tests.

The licensee has proposed maintaining all steam lines from the SGs to the AFPTs at full pressure and temperature up to the turbine inlet isolation valves, which are approximately 10 feet from the turbines. These turbine inlet isolation valves are to be replaced with pneumatically operated control valves. Thus, on an initiation signal, only the new valves will be required to change position. This valve lineup has been tested by the licensee, as indicated in a meeting on September 25, 1985. Each start of the AFPTs resulted in acceptable performance, i.e., no overspeed trips occurred.

Based on our review of the licensee's findings, corrective actions, and generic implications report and the successful initiations of the AFPTs with hot steam lines, we believe that the licensee has identified the root cause of the overspeed trips of the AFPTs and that the licensee has taken the appropriate corrective action.

Dated: October 30, 1985

Revised November 15, 1985

The following NRR personnel contributed to this evaluation: John Ridgely