

Docket No. 50-346

License No. NPF-3

Serial No. 1222

December 2, 1985



JOE WILLIAMS, JR.
Senior Vice President—Nuclear
(419) 249-2300
(419) 249-5223

Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz
Operating Reactor Branch No. 4
Division of Licensing
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Stolz:

This letter is in response to your letter dated November 15, 1985 (Log No. 1862) concerning Toledo Edison's planned actions for the Auxiliary Feed Pump Turbine (AFPT) trip and throttle valves.

Additional Planned Action Item 5 of Preliminary Findings, Corrective Actions, and Generic Implications Report Plan No. 1D, Revision 2 stated Toledo Edison's intention to replace the trip spring on the AFPT trip and throttle valves. As stated in Plan No. 1D, Item 5 was not related to the root causes of the June 9 loss of feedwater event. However, this discrepancy was identified during the investigation and a corrective action was included for completeness.

In a letter dated February 3, 1984 (attached), Terry Turbine detailed a concern that the trip and throttle (T&T) valve would not fully close when pressure below the valve seat exceeded approximately 700 psig. Terry Turbine indicated that this condition could occur only when the governor valve is nearly closed (after an overspeed event) and there is low flow and low pressure drop across the valve seat. Terry Turbine recommended the main closing spring in the T&T valves be changed to increase the closing force.

MPR Associates, Inc., performed a technical review and assessment of the spring replacement recommended by Terry Turbine. MPR letter dated October 18, 1985 (attached) details this review. MPR's review concluded that the existing valve springs have sufficient force to close the T&T valves over the expected range of steam generator pressures. The existing springs have sufficient force available to balance internal pressures of 1050 psig, which is equal to the lowest setpoint of the main steam safety valves.

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Trip spring replacement as recommended by Terry Turbine would increase latching surface loads without a proportional increase in the forces to separate these surfaces. This would decrease the reliability of operation of the overspeed trip mechanism. Toledo Edison has determined that trip spring replacement is not warranted and the existing springs will be retained.

The proper performance of the T&T valves observed on June 9, 1985 further supports this determination. Toledo Edison considers the above information technical justification for withdrawing our previous commitment to replace the T&T valve trip springs.

Very truly yours,

Joe Williams

JW:VJM:lah
attachments

cc: DB-1 NRC Resident Inspector

TERRY

7/17/85

Part of worldwide Ingersoll-Rand

Steam Turbine Division

Terry Corporation
P.O. Box 555 Lamberton Road
Windsor, Ct. 06095
(203) 688-6211 Telex 99-4495
Cable Terrysteam

February 3, 1984

Toledo Edison Co

ATT Rick GRADOMSKI

Telecopy # 419-249-2342

Attention:

Reference: Auxiliary Feedwater Pump Drive Turbine/s

Gimpel NPS-4 T&T Valve Operation

Type:

Serial Number:

Gentlemen:

During testing at a power plant, it was noted that the 4" Gimpel T&T valve did not fully close under certain conditions. The conditions noted were high inlet pressure and low steam flow.

Review of the valve design with Gimpel Corporation revealed that the spring load in the closing direction is not sufficient to overcome the valve stem unbalance when the pressure below the valve seat exceeds approximately 700 psig.

This condition does not occur during normal operation while performing the design function. It can only occur at no load or near no load on the turbine when the governor valve is nearly closed resulting in low flow and low pressure drop across the T&T valve. Any increase in governor valve opening due to load increase or governor malfunction will result in the T&T valve closing fully.

Gimpel Corporation has made available a new spring which has sufficient force to overcome this stem unbalance with full rated pressure at all flow conditions.

Continued.....

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Replacement springs with installation instructions will be made available by Gimpel free of cost through Terry. A \$75.00 charge for documentation will be made per shipment. Installation cost is user's responsibility.

Very truly yours,
TERRY CORPORATION

Robert R. Theroux
Service Manager

RRT/mem

cc: R. Hebert
K. Wheeler
Gimpel Machine Works

MPR ASSOCIATES, INC.

October 18, 1985

Mr. R. A. Gradowski
Toledo Edison Company
300 Madison Avenue
Toledo, Ohio 43652

Subject: Davis-Besse Unit 1 Auxiliary Feed Pump Turbines
Trip Throttle Valve Closing Spring

Dear Mr. Gradowski:

From discussions with you we understand that the Davis-Besse auxiliary feed pump turbine manufacturer (Terry Turbine) has recommended that the main closing spring in the trip throttle valves (manufactured by Gimpel Corporation) be changed to increase the closing force. We understand that the specific concern is that with a line pressure greater than about 700 psig and a low differential pressure across the valve, i.e., with the governor valve almost shut, the spring force may not be sufficient to fully close the trip throttle valve.

From information you provided us (a telephone conversation with Mr. T. Clark on October 17, 1985) we understand the current spring parameters and the revised spring parameters are as follows:

	<u>Current</u>	<u>Revised</u>
Spring Force with Valve Open and Latched	726 lbs	1082 lbs
Spring Rate	247 lb/in	350 lb/in
Spring Force with Valve Closed (based on 1.375 inch travel)	386 lbs	601 lbs

When the valve has no differential pressure across the main disc, the major forces on the valve stem will be the closing spring and the internal pressure acting over the cross sectional area of the valve stem. The valve will close completely only if the spring force is greater than the pressure force. The nominal valve stem diameter, according to Gimpel drawings and confirmed by actual valve inspections, is 0.6845 inch. The spring force available when the valve is closed can balance the following internal pressures (when applied over the valve stem area of 0.368 square inches).

Current Spring (386 lbs), pressure = 1050 psig
Revised Spring (601 lbs), pressure = 1633 psig

Although the valve friction will affect this maximum pressure capability slightly, this friction is only a few pounds based on inspections performed on one of the Davis-Besse valves and will not significantly affect the ability of the valves to close.

Consequently, we conclude that the current valve springs appear to be adequate to move the valves to the closed position over the expected range of steam generator pressures. Note that 1050 psig is above the set pressure of some of the steam system safety valves. Furthermore, in those situations where the trip throttle valve is called upon to shut off the flow, there will necessarily be a pressure difference developed across the valve disc and additional closing force will be available. Consequently, it appears the current spring is adequate and that the situation with a very low pressure difference across the valve and high internal valve pressure is not one which has practical significance at Davis-Besse.

It must also be considered that the increase of the spring force will increase the forces at the latch surfaces and, therefore, the friction force which must be overcome to trip a valve. That is, the modification recommended by Terry Turbine will necessarily reduce the reliability of the operation of the overspeed trip mechanisms. In particular, approximately 50 percent more force will have to be applied by the linkage to trip a valve.

MPR ASSOCIATES, INC.

Mr. R. A. Gradowski

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October 18, 1985

Since we consider that a clear need for the change in spring force has not been established and since the change will adversely affect the reliability of the tripping operation, we recommend that the change not be made and the current springs be retained.

If you have any questions on this letter or if you wish us to review further information on this subject, please do not hesitate to contact us.

Sincerely,


D. H. Harrison

cc: J. K. Wood