

License No. NPF-3

Docket No. 50-346

Serial No. 857

September 14, 1982



RICHARD P. CROUSE
Vice President
Nuclear
14191 259-5221

Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Stolz:

This is in response to your status report (letter dated August 3, 1982; Log No. 1052) on the NRC staff review of the Auxiliary Feedwater System (AFWS) reliability evaluation conducted per NUREG-0737 Item II.E.1.1 for the Davis-Besse Nuclear Power Station Unit 1 (DB-1). Your report addressed short term recommendations (GS-1 through GS-8), additional short term recommendations (1 through 4) and long term recommendations (GL-1 through GL-5 including our letter of May 22, 1981 identifying the design basis for AFWS flow requirements). We note that the NRC has accepted Toledo Edison position on several of the above recommendations. Enclosure 1 provides our comments and/or clarifications of our position on the NRC status of some of the remaining recommendations as requested in your letter.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'R. P. Crouse'.

RPC:SCJ

Enclosure

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cc: DB-1 NRC Resident Inspector

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ENCLOSURE TO TOLEDO EDISON LETTER ON THE NRC
STATUS REPORT ON AUXILIARY FEEDWATER SYSTEM
RELIABILITY EVALUATION

Recommendation GS-2 - "The Licensee should lock open single valves or multiple valves in series in the AFW system pump suction piping and lock open other single valves or multiple valves in series that could interrupt all AFW flow. Monthly inspections should be performed to verify that these valves are locked and in the open position. These inspections should be proposed for incorporation into the surveillance requirements of the plant Technical Specifications. See Recommendation GL-2 for the longer-term resolution of this concern."

By letter dated May 22, 1981, the licensee indicated that all local manual valves in the auxiliary feedwater pumps suction and discharge lines are locked in accordance with the existing administrative procedure. Also, an existing procedure verifies on a monthly basis that these valves are in their correct position. We find the Davis-Besse auxiliary feedwater system acceptable with respect to this recommendation pending confirmation by the licensee that locked means locked open and pending incorporation of the monthly inspections into the plant Technical Specifications.

Response - All local manual valves in the auxiliary feedwater pumps suction and discharge lines are locked in the open position. In accordance with AD1839.02 Operation and Control of Locked Valves and PT5186.01 Locked Valve Periodic Test, the position of these valves is verified to be open on a monthly basis. We reiterate that adequate controls already exist through the institution of the above administrative procedure for the conduct of monthly inspections. This satisfies the actual intent of the NRC concern. In addition, the controls per the above procedures are completely auditable and subject to inspection and enforcement action. Therefore, a Technical Specification imposition for such inspection will prove to be unnecessary and unduly excessive.

Recommendation GS-4 - "Emergency procedures for transferring to alternate sources of AFW supply should be available to the plant operators. These procedures should include criteria to inform the operators when, and in what order, the transfer to alternate water sources should take place. The following cases should be covered by the procedures:

1. The case in which the primary water supply is not initially available. The procedures for this case should include any operator actions required to protect the AFW system pumps against self-damage before water flow is initiated.
2. The case in which the primary water supply is being depleted. The procedure for this case should provide for transfer to the alternate water sources prior to draining of the primary water supply."

In NUREG-0645, the staff acknowledges that Davis-Besse has an automatic system to transfer the suction of the AFW pumps to an alternate water supply. Furthermore, Davis-Besse has an operator procedure to manually transfer to the alternate water source should the automatic system fail to transfer to the alternate water source.

(We are concerned that the AFW pump might incur some degradation in performance as the result of the transfer from the primary to the secondary water source. Other utilities have indicated that their pump vendors will not warranty the pump for such transfer operation. Therefore, we require the licensee to verify that no damage to the AFW pump or degradation of the AFW pump performance will result from the automatic transfer and manual transfer to the alternate water source. We will report resolution of this item in a supplement to this report.)

Response - The automatic transfer of the auxiliary feedwater pump suction from the condensate storage tank to the service water system has been designed to prevent any degradation of the pump performance due to loss of the primary water supply. For this casualty, the primary concern is to maintain adequate pump net positive suction head (NPSH). For this purpose, the pump suction need only be filled with water in order to prevent cavitation since the required NPSH, even at rated conditions is less than atmospheric.

The low suction pressure setpoint for automatic suction transfer has been selected to ensure that minimum required NPSH is always available before, during and after the transfer. If the automatic transfer system fails to transfer to the alternate water source, the transfer can be achieved manually. If, before the transfer is completed, the suction pressure further decreases, there are additional pressure switches (set at 1 psig suction pressure) which will isolate the auxiliary feedpump turbine steam inlet lines, thus stopping the pumps following a 2.5 second delay. This will prevent any pump performance degradation from occurring.

Recommendation GS-6 - "The licensee should confirm flow path availability of an AFW system flow train that has been out of service to perform periodic testing or maintenance as follows:

1. Procedures should be implemented to require an operator to determine that the AFW system valves are properly aligned and a second operator to independently verify that the valves are properly aligned.
2. The licensee should propose Technical Specifications to assure that, prior to plant startup following an extended cold shutdown, a flow test would be performed to verify the normal flow path from the primary AFW system water source to the steam generators. The flow test should be conducted with AFW system valves in their normal alignment.

By letter dated May 22, 1981, the licensee indicated that periodic testing of emergency feedwater systems is conducted monthly, the valves are

returned to their normal operating position and the existing procedures require a second independent verification of proper valve alignment prior to returning the system to operability. We find the response to the first part of this recommendation acceptable.

The existing surveillance Technical Specification for the emergency feedwater system does not require that a flow test to be performed to verify the normal flow path from the primary emergency feedwater source to the steam generators. The licensee stated that operation of the AFWS would have an adverse impact on the water chemistry in the steam generators. We do not concur that the reasons are acceptable for not performing the test. It is our understanding that the condensate storage tank is used for the main feedwater system supply and therefore should be acceptable for the auxiliary feedwater supply.

(We find the licensee's response to this recommendation unacceptable. The licensee must propose a revision to the Technical Specifications to require confirmation of availability of the normal flow path prior to plant startup following an extended cold shutdown. In addition, the licensee must ensure that operation of the AFWS does not degrade the steam generators as the result of poor AFW water chemistry. We will report resolution of this item in a supplement to this report.)

Response: We reiterate that verification of valve positions and pump operability is sufficient to ensure that the auxiliary feedwater pump will be available to perform its intended safety function. On start up, following a cold shutdown condition, first the startup feedwater pump and then the main feedwater pump is used for secondary side heat removal. The primary source of water supply for these pumps is the deaerator storage tank and not the condensate storage tank (CST). The oxygen concentration of the deaerator water is more tightly controlled, whereas no control is exercised for the condensate storage tank oxygen level. The intrusion of the CST water into the steam generator will perturb the oxygen content of water in the steam generator which tends to induce corrosion and has an overall adverse impact on the secondary side equipment. In addition, intrusion of CST water will require further efforts to clean up the steam generator to bring back the chemistry within specification. Further, prior to entry into Mode 3, a valve line up for the AFWS is performed for verification of valve positions. Also, if maintenance is performed on any AFWS train, a functional test is conducted on that train to verify its operability prior to entry into Mode 3. Therefore, the requirement for performing a flow test following an extended cold shutdown is not necessary.

Additional Short Term Recommendations

Recommendation - "The licensee should provide redundant level indication and low level alarms in the control room for the AFW system primary water supply, to allow the operator to anticipate the need to make up water or transfer to an alternate water supply and prevent a low pump suction pressure condition from occurring. The low level alarm setpoint should

allow at least 20 minutes for operator action, assuming that the largest capacity AFW pump is operating."

(The licensee has not provided any information concerning this recommendation. We will report resolution of this item in a supplement to this report.)

Response: The objective of this recommendation appears to be a concern with the performance degradation of the pump due to low pump suction pressure. As explained under the response to recommendation GS-4 above, no damage to the AFW pump or degradation of the AFW pump performance will result from a low level condition in the condensate storage tanks. This is owing to the fact that to maintain adequate NPSH at the pump suction, the suction pipe need only be filled with water to prevent cavitation since the required NPSH, even at rated conditions, is less than atmospheric. Prior to this situation occurring, the suction will either be manually or automatically transferred to the service water system. As explained above, this will not result in degradation of pump performance.

Recommendation - "The licensee should perform a 72 hour endurance test on all AFW system pumps, if such a test or continuous period of operation has not been accomplished to date. Following the 72 hour pump run, the pumps should be shut down and cooled down and then restarted and run for one hour. Test acceptance criteria should include demonstrating that the pumps remain within design limits with respect to bearing/bearing oil temperatures and vibration and that pump room ambient conditions (temperature, humidity) do not exceed environmental qualification limits for safety related equipment in the room."

The licensee informally provided the pump endurance test procedure and the results of the 72-hour tests which were performed on both AFW pumps. The test results indicate that the bearing/bearing oil temperature and vibration design limits were not exceeded. The data was not provided concerning the pump room ambient temperature and humidity during the test. We find the licensee's response to this recommendation satisfactory pending receipt of formal documentation from the licensee which includes the maximum temperature and humidity in the pump room during the test and confirming that the environmental qualification limits were not exceeded.

Response - The 72-hour endurance test on the auxiliary feed pumps was run in June, 1979. A review of test documentation reveals that the ambient temperature and humidity data for the auxiliary feed pump rooms was not collected during this test. However, per FSAR Section 3.11, the AFP room ventilation fans are required to be operable during and subsequent to a design basis accident. The ventilation system is designed to maintain the AFP room ambient conditions (including temperature and relative humidity) within the limits of environmental qualification of the electrical and mechanical equipment in this room.

Recommendation - "Licensees with plants which require local manual realignment of valves to conduct periodic tests on one AFW system train and which have only one remaining AFW train available for operation should

propose Technical Specifications to provide that a dedicated individual who is in communication with the control room be stationed at the manual valves. Upon instruction from the control room, this operator would align the valves in the AFW system from the test mode to its operational alignment."

The licensee stated in his submittal dated May 22, 1981, that the testing of an AFW pump requires manual operation of three valves, all of which are in series, in order to recirculate AFW flow to the condensate storage tank. In lieu of a Technical Specification the licensee proposed that the existing test procedure which requires the operator to be in direct communication with the control room during the test is acceptable. If the AFW train being tested is required to feed water into the steam generator, the operator must close one of the three valves to close the flow path to the condensate storage tank and thereby direct the water to the steam generator.

We find the licensee's response to this recommendation acceptable pending a Technical Specification revision to provide a dedicated individual to be stationed at the manual valves who is in communication with the control room.

Response - A Technical Specification requirement to provide a dedicated individual to be stationed at the manual valves who is in communication with the control room is unduly excessive, since adequate procedural requirements already exist to ensure that the AFW train being tested be immediately put in proper alignment should a steam and Feedwater Rupture Control System demand occur. It is again emphasized that only one train of AFWS is tested at a time. The redundant 100% capacity train is available for feeding AFW to the steam generators if needed during this test. No additional Technical Specifications are therefore needed.

Recommendation GL-2 - "Licensees with plant designs in which all (primary and alternate) water supplies to the AFW system pass through valves in a single flow path should install redundant parallel flow paths (piping and valves).

Licensees with plant designs in which the primary AFW system water supply passes through valves in a single flow path, but the alternate AFW system water supplies connect to the AFW system pump suction piping downstream of the above valve(s), should install redundant valves parallel to the above valve(s), or provide automatic opening of the valve(s) from the alternate water supply upon low pump suction pressure.

The licensee should propose Technical Specifications to incorporate appropriate periodic inspections to verify the valve positions into the surveillance requirements.

In NUREG-0645, the staff acknowledges that Davis-Besse has automatic transfer from the primary to the alternate water source on low AFW pump suction pressure.

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(The licensee has stated in his May 22, 1981 submittal that the administrative procedures are sufficient in lieu of Technical Specifications and the valves are locked open. This is not acceptable. We will report resolution of this item in a supplement to this report.)

Response - See response to Recommendation GS-2 above. We do not feel that any Technical Specification changes are needed.

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