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SUBJECT: Discusses turbine driven auxiliary feedwater sys steam admission check valves,per 900129 teleconference.

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February 15, 1990

U.S. Nuclear Regulatory Commission
Document Control Desk
Att: Allen R. Johnson
Project Directorate I-3
Washington, D.C. 20555

Subject: Turbine Driven Auxiliary Feedwater System Steam Admission Check Valves (V-3504B and V-3505B)

Dear Mr. Johnson:

The purpose of this letter is to respond to questions from the NRC originating from a teleconference conducted on 1/29/90. A detailed discussion of previous, current and future efforts as pertaining to the subject valves is attached.

INTRODUCTION

Check valves 3504B and 3505B are located in 6" lines that tap off the main steam lines of each steam generator and direct steam to the Turbine Driven Auxiliary Feedwater (TDAFW) pump turbine. These valves remain closed during normal plant operation and are required to open during certain plant conditions that require the TDAFW pump to provide auxiliary feedwater to the steam generators. Due to system piping configuration, (both lines connect to a common header prior to reaching the turbine), certain post-accident shutdown situations may warrant that either check valve close or remain closed to prevent steam diversion away from the TDAFW pump turbine and therefore prevent the system from performing its required safety function. Inspection report 88-10 identified these valves as missing from the IST program and questioned the valves reverse flow seating capabilities.

DISCUSSION

During NRC Inspection 88-10, an external inspection of the check valves was conducted to determine if required test criteria could be satisfied using the visual indicator located on the valves counter weight swing arm. While V-3505B's swing arm moved freely to the open and closed position, the swing arm on V-3504B met with a notable resistance. Maintenance was performed on this valve throughout and after the inspection until the swing arm was able to move freely to the open and closed positions. The problem appeared to be a high spot on the hinge which was binding against the internal valve body.

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To assure continued operability of these valves, the monthly surveillance test was changed to incorporate a visual position verification, following the opening and closing of their respective upstream MOVs. Steam flow testing through these valves was conducted individually, such that the forward flow of one and back flow seating of the opposite line check valve, was visually verified utilizing its respective counter weight swing arm. This operability verification was satisfactorily performed monthly until the January 1990 test procedure re-write, at which time separate monthly and quarterly test procedures were generated, with the quarterly test procedure now accomplishing the IST check valve testing requirements.

During the 1989 annual refueling outage, a complete disassembly and visual inspection was performed on both check valves. No evidence of abnormal wear or binding was found during these maintenance inspections. The valves were reassembled in accordance with vendor specifications and post-maintenance testing was satisfactorily conducted on 5/29/89 utilizing the monthly surveillance test procedure.

During the scheduled quarterly surveillance test conducted on 1/25/90, both valves met the test procedure acceptance criteria. Following the test, the NRC Resident Inspector voiced a concern regarding the validity of the test methodology being used to assess check valve opening and closure. Manual exercising of both check valves was conducted on 1/26/90 to provide further assurance of full opening and closure and freedom of travel. During the manual exercising, it was noted that the counter weight swing arm loosened as V-3504B reached the closed position. The Turbine Driven Auxiliary Feed Pump steam supply flow path associated with V-3504B was immediately declared inoperable, based on a concern that the counter weight may not be fulfilling its function in this loosened condition. The counter weight on V-3505B was found securely fastened and remained so throughout the manual exercising.

The valve manufacturer was contacted on 1/26/90 for the purpose of obtaining further information regarding proper orientation of the counter weight. Verbal guidance was received from the vendor on 1/26/90, which specified that the counter weight should be installed in a horizontal position ($\pm$ 20^{o}), when the valve disc is in the closed position. The vendor stated that valve operability based on the degree of counter weight mispositioning observed was not an issue in this instance. Corrective maintenance was performed on 1/27/90 which resulted in both valve counter weight arms being aligned to the specified horizontal position (V-3505B was found ~10^{o} from horizontal). A post-maintenance manual position verification test was performed on 1/27/90. Following successful completion of the test, valves 3504B and 3505B were restored to operable status on 1/27/90.

CONCLUSION

Following NRC Inspection 88-10, check valves 3504B and 3505B have been satisfactorily disassembled and inspected twice. The valves have been satisfactorily tested during the performance of each normally scheduled monthly or quarterly surveillance test. Despite identifying an anomaly in the test methodology during the performance of the quarterly test conducted on 1/26/90 (counter weight loosening), both valves were in fact subsequently proven to be fully functional. The test method has since been modified to allow manual exercising of the valves without disturbing the counter weight orientation on the valve shaft. Based on the maintenance and surveillance test results, valves 3504B and 3505B have been fulfilling their design requirements.

Pending installation of a proposed system modification (scheduled for completion by 9/1/90) which will provide additional valve position indication, valves 3504B and 3505B will continue to be manually exercised following each quarterly Auxiliary Feedwater surveillance test. This exercise requirement has been incorporated into the test procedure and will provide maximum assurance of valve position and freedom of travel for valves 3504B and 3505B.

A comprehensive review of the valve program was conducted to ensure that no other similar valve configuration related test deficiencies exist. This review revealed two valves that resemble the configuration of valves 3504B and 3505B. Valves 3519 and 3518 (A&B S/G Main Steam Check Valves), are located in the 30" main steam lines from each steam generator, immediately downstream of their respective MSIV. As is the case with the TDAFW pump check valves, full valve closure is verified by visual indication of the counter weight arm. Each valve has tandem counter weights, which are rigidly attached to the valve shaft via dual set screws. Loosening of the counter weights is not an item of concern for these valves. The valves are tested for check valve closure capability during normal plant shutdown to cold shutdown, following closure of the MSIVs. The valves are readily accessible and are positively assessed for valve closure utilizing the present test method. Based on these significant differences, valves 3519 and 3518 do not constitute a similar configuration. However, since these valves are tested utilizing a similar test method (visual verification) to that used for valves 3504B and 3505B, they too will be reviewed for possible upgrade of local position indication. This review will be completed by 3/1/90. Should a modification be deemed necessary, it will also be installed by 9/1/90.

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