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APR 26 1999

U.S. Nuclear Regulatory Commission
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Gentlemen:

In the Matter of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - GENERIC LETTER 96-05 -
PERIODIC VERIFICATION OF DESIGN-BASIS CAPABILITY OF SAFETY-RELATED
MOTOR-OPERATED VALVES - RESPONSE TO REQUEST FOR ADDITIONAL
INFORMATION (TAC NO. M97118)

This letter provides the response to NRC's request for additional information dated January 27, 1999, concerning the subject generic letter. TVA's original response was submitted March 17, 1997, and augmented by a letter dated April 28, 1998. The enclosure provides the response to NRC's request for additional information. This response includes an updated status of the long term open items remaining from the close out of Generic Letter 89-10, "Safety Related Motor-Operated Valve Testing and Surveillance." The status of those long term actions was also discussed in the April 28, 1998, letter identified above.

No new commitments are identified in this generic letter response. If you have any questions concerning this matter, please telephone Paul L. Pace at (423) 365-1824.

Sincerely,


R. T. Purcell

Enclosure
cc See page 2

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U.S. Nuclear Regulatory Commission
Page 2

APR 26 1999

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 1 RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION GENERIC LETTER 96-05

This enclosure responds to NRC's Request For Additional Information (RAI) dated January 27, 1999, concerning Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," for Watts Bar Nuclear Plant.

QUESTION 1

"In U.S. Nuclear Regulatory Commission (NRC) Inspection Report No. 50-390 & 391/95-48, the NRC staff closed its review of the motor-operated valve (MOV) program implemented at Watts Bar Nuclear Plant (Watts Bar) in response to Generic Letter (GL) 89-10, "Safety Related Motor-Operated Valve Testing and Surveillance." In the inspection report, the NRC staff discussed certain aspects of the licensee's MOV program to be addressed over the long term. For example, the inspectors noted that (1) the licensee agreed to review the NRC safety evaluation and confirm the Electric Power Research Institute MOV Performance Prediction Program information that was applied to Watts Bar's Pratt butterfly valves; (2) the power-operated relief valve block valves had low thrust margins; and (3) future in-plant testing would be used to improve the long-term basis for selected valve factors, stem friction coefficients, and load sensitive behavior values. The licensee should describe the actions taken to address the specific long term aspects of the MOV program at Watts Bar noted in the NRC inspection report."

RESPONSE

Long term actions taken in response to the Inspection Report include the following activities:

1. In lieu of using the Electric Power Research Institute (EPRI) Performance Prediction Methodology (PPM) applied to the Pratt butterfly valves, WBN intends to analyze the available data by using the TVA Design Standard, DS-M18.2.21, "Motor Operated Valve Thrust and Torque Calculations," Revision 10, Attachment 3, "Henry Pratt Butterfly Valves Evaluation." This butterfly valve analysis examines in-house and industry data to show that the design values for required torque provided by Henry Pratt are bounding. This analysis is part of the general update of WBN design basis calculations for the Generic Letter 89-10 valve population that incorporates the changes outlined in Limitorque Technical Update 98-01, "Actuator Output Torque Calculation."

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
GENERIC LETTER 96-05

2. The pressurizer power operated relief valves, 1-FCV-68-332 and 1-FCV-68-333 were tested near design basis conditions. These valves had low thrust margins. In conjunction with implementing Limitorque Technical Update 98-01, these two valves have been upgraded by re-gearing the actuator to provide more torque. The modification was implemented during the Unit 1 Cycle 2 refueling outage to ensure adequate margins under design basis conditions.
3. WBN is in the process of a general update of the design basis calculations for the Generic Letter 89-10, "Safety-Related MOV Testing and Surveillance," valve population to comply with the revised TVA Design Standard, DS-M18.2.21, with the Limitorque Technical Update 98-01, and to incorporate the analysis required for Generic Letter 96-05. As part of the process, the full flow test data recorded during the startup of WBN is being analyzed to substantiate the values chosen for the design basis. Included in the revision is an analysis for the long-term basis of valve factor, stem friction coefficient, and load sensitive behavior. Margin for these issues is being documented in the calculations. Additionally, several parameters are being measured periodically and monitored over the long-term as part of the testing performed in conjunction with the Generic Letter 96-05 program.

QUESTION 2

"The licensee indicates that its MOV static diagnostic periodic verification program will include test methods at the valve and the motor control center. Will diagnostic data be obtained for all GL 96-05 MOVs, including gate, globe and butterfly valves? If not, TVA should describe its plans to monitor degradation in capability for those MOVs not diagnostically tested."

RESPONSE 2

Yes, diagnostic data is obtained for the GL 96-05 MOVs including the gate, globe, and butterfly valves. This is required by TVA procedure MMDP-5, "MOV Program."

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
GENERIC LETTER 96-05

QUESTION 3

"The licensee should briefly describe its plans for the use of test data from the motor control center (MCC) including

- (1) correlation of new MCC test data to existing direct force measurements;
- (2) interpretation of changes in MCC test data to changes in MOV thrust and torque performance;
- (3) consideration of system accuracies and sensitivities to MOV degradation for both output and operating performance requirements; and
- (4) validation of MOV operability using MCC testing."

RESPONSE 3

TVA has previously committed to implement Generic Letter 96-05 for periodic verification. One method of implementing the generic letter is to use test data from the MCC. TVA, currently, plans to use the MCC diagnostic test method to monitor degradation for Henry Pratt butterfly valves. TVA, however, continues to monitor the Industry effort relative to MCC testing and may choose to utilize it in the future for gate and globe valves as well.

The Henry Pratt butterfly valves are equipped with Limitorque actuators, including Type HBC gearboxes. The yoke and valve to actuator connections block direct access to the valve stem and prevent installation of strain gages for direct torque measurements. The actuator torque switches are not utilized. The valves are controlled by position limit switch in both the open and close directions. Therefore, full torque capability of the motor and actuator is provided to close or open these valves as required.

Periodic verification tests are designed to detect mechanical degradation that could affect the output torque capability of these actuators or the torque requirements of the valves. These tests employ MCC based motor torque (quantitative data) to assess performance and functional margin.

The following briefly describes TVA's plans for using the MCC diagnostic test method to monitor degradation for Henry Pratt butterfly valves:

- (1) In order to use motor torque measurements to determine functional margin, the actuator throughput efficiency must

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
GENERIC LETTER 96-05

be known. Since these actuators cannot be instrumented for output torque measurements without major modifications, TVA plans to use a laboratory test program to establish the proper relationship (correlation) between input motor torque and output actuator torque for the affected actuators.

This plan includes a statistically valid sample of prototype actuators, that meet the specifications of the plant-installed actuators. These actuators will be assembled and tested in a laboratory environment. Motor torque test results will be compared to ensure that the performance of the laboratory specimens is similar to the plant installed equipment. These actuators will be tested on precision torque stands at loads and load rates expected during plant testing condition.

- (2) The resulting efficiency values will be analyzed and values established for use during future periodic verification data analysis.
- (3) Equipment measurement errors will be combined with uncertainties in efficiency, and allowance for degradation will be included in the assessment.
- (4) Functional margin will be assessed during future periodic verification tests by comparison of running load measurements plus the design basis differential pressure requirement to the torque capability of the motor at reduced voltage.

QUESTION 4

"The Joint Owners Group (JOG) program focuses on the potential age-related increase in the thrust or torque required to operate valves under their design-basis conditions. In the NRC safety evaluation dated October 30, 1997, on the JOG program, the NRC staff specified that licensees are responsible for addressing the thrust or torque delivered by the MOV motor actuator and its potential degradation. In a letter dated April 28, 1998, the licensee stated that potential actuator degradation would be identified through review and trending of actuator performance parameters. The licensee should describe the actions taken at Watts Bar for ensuring adequate ac and dc MOV motor actuator output capability, including consideration of recent guidance in

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 1
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
GENERIC LETTER 96-05

Limitorque Technical Update 98-01 and its Supplement 1 in more detail."

RESPONSE 4

TVA has reviewed the Limitorque Technical Update 98-01 and its Supplement 1. In-plant reviews were performed to ac powered actuators in accordance with Limitorque Technical Update 98-01. A list of MOVs requiring specific configuration review was sent to Limitorque for such review as recommended by Limitorque Technical Update 98-01. The results of these reviews are being incorporated into the actuator sizing portion of the MOV design basis calculations. Additionally, WBN is continuing to monitor and trend actuator performance parameters. These include:

1. thrust/torque at control switch trip,
2. thrust/torque at unseating
3. total thrust/torque
4. average running thrust/torque
5. average running current
6. peak inrush current
7. spring pack displacement at control switch trip
8. stroke time
9. stem factor at control switch trip, and
10. rate of loading when DP data is available.

TVA is an active member of the JOG and as such, any new recommendations from the JOG regarding the dc MOVs are appropriately evaluated for incorporation into the MOV program. Note - there is only one dc actuator at Watts Bar Nuclear Plant.