



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
REQUEST FOR RELIEF FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

CODE REQUIREMENTS

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET      50-317

1.0 BACKGROUND

The Calvert Cliffs, Unit 1, Technical Specifications (TS) Section 3.7.1.5, requires that each of the main steam isolation valves (MSIV) be operable in Operational Modes 1, 2 and 3. The surveillance requirements, TS Section 4.7.1.5, specifies that the MSIV be demonstrated operable by verifying full-stroke closure time of less than 5.2 sec. when tested in accordance with TS, Section 4.0.5. Section 4.0.5 of the TS requires that the testing be performed in accordance with Section XI of the ASME Code and applicable addenda as required by 10 CFR Part 50, Section 50.55a(g). During an unplanned outage on December 23, 1991, BG&E performed Surveillance Test Procedure (STP) 0-1-1, "MSIV Full-Stroke Test," when Unit 1 was in Hot Shutdown (Mode 4). The No. 12 MSIV full stroke was timed at 4.05 sec., less than the TS acceptance value of 5.2 sec. The test procedure did not identify the ASME alert level value. The alert value is based on the previous full-stroke test and for valves, such as MSIV with closure times of less than 10 sec., the alert value is an increase in stroke time of 50%.

MSIV No. 12 was previously full-stroke tested on July 4, 1991, and an alert value of 3.15 sec. was established. Thus, the December 23, 1991, test of 4.05 sec. exceeded the alert value. The ASME Code, Section XI, Article IWB-3417(a), indicates that, if the alert value is exceeded, the test frequency shall be increased to once per month until corrective action is taken. BG&E would be required to reduce the Unit 1 power and enter a mode where the full-stroke test can be performed on January 30, 1992, unless relief is granted. The unit is currently operating in Mode 1 at 100% power.

By letter dated January 27, 1992, BG&E requested relief from the ASME Code, Section XI, requirements to perform the monthly full-stroke test on the Unit 1 MSIV No. 12. This relief is requested until the March 6, 1992, scheduled refueling outage or when the unit is placed in an operational mode which will allow the full-stroke test to be performed.

## 2.0 EVALUATION OF RELIEF REQUEST

### 2.1 Code Requirement for Which Relief is Requested:

ASME Code, Section XI, Article IWV-3417(a), "Corrective Action." This Article states, in part, "(i)f, for power operated valves, an increase in stroke time of 25% or more from the previous test for valves with full-stroke times greater than 10 sec. or 50% or more for valves with full-stroke times less than or equal to 10 sec. is observed, test frequency shall be increased to once each month until corrective action is taken." These increases in valve stroke times (25% or 50%) are the established alert levels for the valves tested. The BG&E request is for relief from this monthly test requirement for MSIV No. 12 which, as stated above, exceeded the previously full-stroke test by greater than 50% and its design full-stroke time is less than 10 sec.

### 2.2 Basis for Relief Request:

The request is based on 10 CFR 50.55a(a)(3)(ii). BG&E indicates compliance with the requirement specified in Article IWV-3417(a) detailed above would result in hardship or unusual difficulties without a compensating increase in the level quality and safety.

### 2.3 Alternative Testing Proposed:

BG&E proposes to do a modified partial-stroke test. The partial-stroke test, STP G-47-1, is presently performed monthly on alternate hydraulic dump valves. The STP will be modified to require monthly partial-stroke testing of all of Units 1 and 2 MSIVs, including Number 12, using each of the dump valve circuits.

## 3.0 EVALUATION

BG&E has analyzed the potential causes for the slower stroke time of MSIV No. 12. The analysis included: 1) the control circuit for the valve, 2) comparison of previous full and partial stroke testing of the valve, 3) consultation and input from the valve vendor, and 4) the maintenance history of the valve.

The MSIV electric/hydraulic control circuit has two channels which operate the two dump valves for the MSIV. Operation of either of the two dump valves vents the hydraulic pressure holding the MSIV open and the MSIV valve strokes to the closed position. Previous bench tests indicate an MSIV will close in 3 sec. with both dump valves and 5 sec. with one dump valve. A post-installed test in Mode 5 condition resulted in a 4.5 sec. closure with one dump valve.

BG&E determined, as the result of its analysis, that there were two potential causes for the increased stroke time of MSIV No. 12. The first is dump valve solenoid-poppet-seal mechanical friction. The MSIV full-stroke testing history for dual dump valve operation indicates a time of about 2.1 sec. for

full closure. Both BG&E and vendor experience for single dump valve operation is about 4.5 sec. As previously noted, the measured stroke time of the MSIV No. 12 test was 4.05 sec. which is indicative of single dump valve operation. The second potential cause for increased stroke time would be intermittent handswitch connections or loose electrical contacts in the control circuit. The partial-stroke STP tests portions of the control circuit and no apparent discontinuity has been identified. The safety-related function of the MSIV is not affected by the handswitch because the handswitch is not in the circuit which provides the automatic closure signal in response to a design basis accident.

BG&E has determined that solenoid-poppet-seal friction is the most likely cause of the decreased MSIV No. 12 closure time. The valve vendor has indicated that poppet seals can become tacky resulting in slow dump valve operation. The vendor further indicated that periodic operation of dump valves will result in the lubrication of the poppets and normal dump valve operation can be expected. BG&E has modified the partial-stroke STP to be performed monthly on each of the dump valves to provide additional assurance that the poppet seal remains lubricated which will enhance the dump valve operation.

BG&E determined, based on its analysis summarized above, that the closure time of MSIV No. 12 is expected to improve based on the increased partial-stroke testing to provide reasonable assurance that the poppet-seal interface will remain lubricated. BG&E further indicates the slow operation of MSIV No. 12 measured during the test is still within the TS required time of 5.2 sec. and the closure time assumed in the design basis of 6.0 sec. The updated Final Safety Analysis Report (UFSAR) assumed the failure of a MSIV dump valve coincident with a single active failure, thus failure of an MSIV to close was assumed in the UFSAR.

#### 4.0 CONCLUSION

BG&E concluded, and the NRC staff agrees, that the analysis performed indicate that one of the MSIV No. 12 dump valves failed to operate at its expected speed, the increased partial-stroke tests should improve the MSIV closure time which provides reasonable assurance that the MSIV will close within its required TS time of 5.2 sec. A MSIV No. 12 full-stroke test would require that the Unit 1 reactor power be decreased and the steam line containing the MSIV would have to be isolated. Compliance with the Code would expose the unit to an additional cycle and potential vulnerability to unexpected transients. There would be no compensating increase in the level of quality and safety given that the licensee's analysis, as well as vendor history, indicates that the increased partial-stroke testing provides, reasonable assurance that the valve can perform its safety-related function and that the closure time will not decrease. Therefore in accordance with the requirements of 10 CFR 50.55a(a)(3)(ii), we have determined that the proposed alternative is acceptable. Compliance with the requirement of the ASME Code, Section XI, Article IWV-3417(a), to perform monthly full-stroke tests on MSIV No. 12 would result in hardship and unusual difficulties without a compensating increase in

the level of quality and safety. This determination was based on: 1) the evaluation performed by BG&E as detailed above, 2) the short time until the Unit 1 shutdown currently scheduled for March 6, 1992, 3) a full-stroke test performed if the unit is placed in an operating mode which would allow the test to be performed prior to the scheduled outage, and 4) required maintenance will be performed on the valve and associated components during the upcoming outage.

Accordingly, we have determined that the relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest. This relief has been granted giving due consideration to the burden upon the licensee that could result if the requirement were imposed upon the facility.

Principal Contributors:

Daniel G. McDonald

Kenreth C. Dempsey

Date: January 30, 1992

Accordingly, we have determined that the relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest. This relief has been granted giving due consideration to the burden upon the licensee that could result if the requirements were imposed upon the facility.

This completes our action related to the above reference TAC number.

Sincerely,

Original Signed By:

Robert A. Capra, Director  
Project Directorate I-1  
Division of Reactor Projects - 1/11  
Office of Nuclear Reactor Regulation

Enclosure:  
Safety Evaluation

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