BALTIMORE
GAS AND
ELECTRIC

1650 CALVERT CLIFFS PARKWAY • LUSBY, MARYLAND 20657-4702

GEORGE C. CREEL
VICE PRESIDENT
NUCLEAR ENERGY
(410) 260-4451

January 27, 1992

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317
Request Relief from ASME Boiler & Pressure Vessel Code Section XI Requirement IWV-3417(a)

Gentlemen:

Baltimore Gas and Electric Company requests relief from ASME Boiler & Pressure Vessel Sect. XI requirement IWV-3417(a) as allowed under 10 CFR 50.55 a(a)(3). We specifically request relief from monthly full-stroke testing of Unit 1 No. 12 Main Steam Isolation Valve (MSIV) for the remainder of Unit 1's operating cycle. Compliance with this requirement would result in hardship without compensatory quality or safety improvement.

I. **Component for Which Relief is Requested:**

A. Main Steam Isolation Valve 1-MS-4048-CV (No. 12 MSIV) is a 34-inch, hydraulically-operated, "Y"-pattern globe valve, made by Rockwell-Edward Valve.

B. The No. 12 MSIV design function is to close within six seconds from receipt of an isolation signal, thereby preventing rapid blowdown of Steam Generator (SG) shell-side water and uncontrolled cooldown of the Reactor Coolant System. The valve also closes to prevent containment release of SG shell-side contents (both generators) into containment during Main Steam Line Break (MSLB).

C. The applicable ASME Sect. III Code Classification for this valve is Class 2.

D. The applicable ASME Sect. XI Valve Category is B (IWV-2200: seat leakage inconsequential to fulfillment of valve's function).

E. Full-stroke test frequency is every 92 days in Cold Shutdown (Mode 5) conditions.

A001 Cert No 807926293

II. **Code Requirements for Which Relief is Requested:**

IWV-3417(A) states:

"[i]f, for power-operated valves, an increase in stroke time of . . . 50 percent or more for valves with full-stroke times less than or equal to 10 seconds is observed, test frequency shall be increased to once per month until corrective action is taken . . . ."

III. **Proposed Alternative:**

We propose performing a monthly partial-stroke test of No. 12 MSIV using each of its two hydraulic dump-valve circuits. This provides appropriate safety assurance until Unit 1's next scheduled outage (currently planned for March 6, 1992).

IV. **Supporting Information:**

A. Sequence of Events:

During an unplanned outage on December 23, 1991, our staff performed Surveillance Test Procedure (STP) O-1-1, "MSIV Full-Stroke Test," when Unit 1 was in Hot Shutdown (Mode 4) even though the test was not required. The No. 12 MSIV full stroke was timed at 4.05 sec., less than the Technical Specification acceptance value (5.2 sec.). The test procedure did not identify the ASME alert value for the valve (greater than 3.1 sec.), and therefore the operators evaluated the test as satisfactory. Test-result review relative to alert value criteria is normally done by the Functional Surveillance Test Coordinator (FSTC) prior to restarting the unit. Because of the unplanned nature of the test, it was not reviewed by the FSTC prior to startup and the slower than normal stroke time was not recognized until later.

On December 30, 1991, the FSTC reviewed the test and determined that No. 12 MSIV had tested in the Alert Range. Unit 1 was operating at 30 percent power. An Issue Report was written and plant staff notified. STP O-47-1, "MSIV Partial-Stroke Test," was performed shortly after. Test results were compared with six previous tests dating back to August 29, 1991. No abnormal trends were noted.

B. MSIV Control-Circuit Description:

Attachment (1) is a simplified MSIV electric/hydraulic control-circuit diagram. The valve closes when either solenoid valve opens, releasing pilot pressure from under the hydraulic dump valves. When either dump valve opens, hydraulic pressure under the MSIV piston is vented, stroking the valve. The bench-tested maximum closing time is five seconds for one open dump valve. The bench-tested maximum closing time with both dump valves open is three seconds. Normally, both dump valves function to quickly stroke the valve. During a post-installation test under Mode 5 conditions, the valve closed in 4.5 seconds with only one open dump valve.

C. Analysis:

Site engineering staff analyzed the potential causes of the slower stroke time. This analysis included: i) a review of the valve control circuit, ii) a comparison of STPs O-1-1 and O-47-1 (Attachment 2) and their results, iii) consultation with the vendor, and iv) a review of No. 12 MSIV maintenance history (Attachment 3). This analysis included the MSIV and its actuator and is summarized on Attachment (4). Two potential causes for increased MSIV stroke time were identified. These are:

1. Dump-valve solenoid-poppet-seal mechanical friction.
Valve history indicates a 2.1 +/- 0.1 sec. MSIV stroke time (closing). Actual stroke time was 4.05 sec.. Plant and vendor experience is that a stroke-time of this length is indicative of single dump-valve operation. The vendor has experienced cases where poppet seals became "tacky," resulting in slow poppet shifting. After shifting, the poppets become lubricated and continue to shift normally. This is deemed the most likely cause.

   Solenoid dump valves are normaliy overhauled at each refueling outage. These valves were last overhauled in spring of 1989. They will be overhauled again during the spring 1992 refueling outage.

   Currently, STP O-47-1 is performed monthly on alternate dump valves. The STP will now be performed on both dump valves monthly. This will ensure the poppet seal remains lubricated. This test will be performed on all four MSIVs for both units.

2. Intermittent handswitch contacts or loose dump-valve-circuit electrical contacts.

   STP O-47-1 tests portions of the control circuit. No apparent circuit discontinuity problems were evident when tested.

   UFSAR accident analysis allows a single dump-valve failure coincident with an additional single-active failure. A loose electrical connection affecting a single dump-valve solenoid is not, therefore, safety significant. Additionally, intermittent handswitch contacts do not affect MSIV automatic safety functions. Because the handswitch is not part of the automatic safety-signal path, a problem with this component would not affect valve's accident response.

D. Safety Significance

Recurrence of slow MSIV operation is not expected. The proposed compensatory action should prevent poppet-seal adherence.

Nevertheless, if slow valve operation like that of December 23 reoccurs, the condition is bounded by the UFSAR safety analysis. This analysis assumes a 6 sec. closing time: we would expect to see less than 4.5 sec. for a slow poppet. The MSLB analysis assumes one MSIV fails open.

E. Code-Requirement Performance Impact

Valve full-stroke testing will result in a hardship (plant shutdown to Hot Standby [Mode 3]) without compensating increase in the level of quality and safety.

F. Conclusion:

Both possible causes identified in Section C, above, would result in only one hydraulic dump valve to fail to shut quickly. Monthly full-stroke testing offers no advantages over modified partial-stroke testing in assuring continued Operability. Additionally, failure of both dump valves is bounded by the UFSAR MSI B analysis.

Our analysis demonstrates that the valve remains Operable.

IV. **Compensatory Actions:**

A. Perform modified partial-stroke test to increase poppet-cycling frequency.

B. Perform full stroke testing (plant conditions permitting).

C. Overhaul valve actuator next refueling outage.

VI. **Implementation Schedule:**

A. Modified partial-stroke test -- Monthly, begun December 30, 1991.

B. Full-stroke testing -- when conditions permit.

C. Valve overhaul -- Unit 1 Spring-1992 outage.

Safety Committee Review

The proposed relief request has been reviewed by our Plant Operations and Safety Review Committee and they concluded compliance with IWV-3417(a) would result in hardship without compensatory quality or safety improvement.

Relief is requested through April 1, 1992. Your reply is needed by January 30, 1992 to avert operational impact. Should you have any questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

for
Vice President - Nuclear Energy

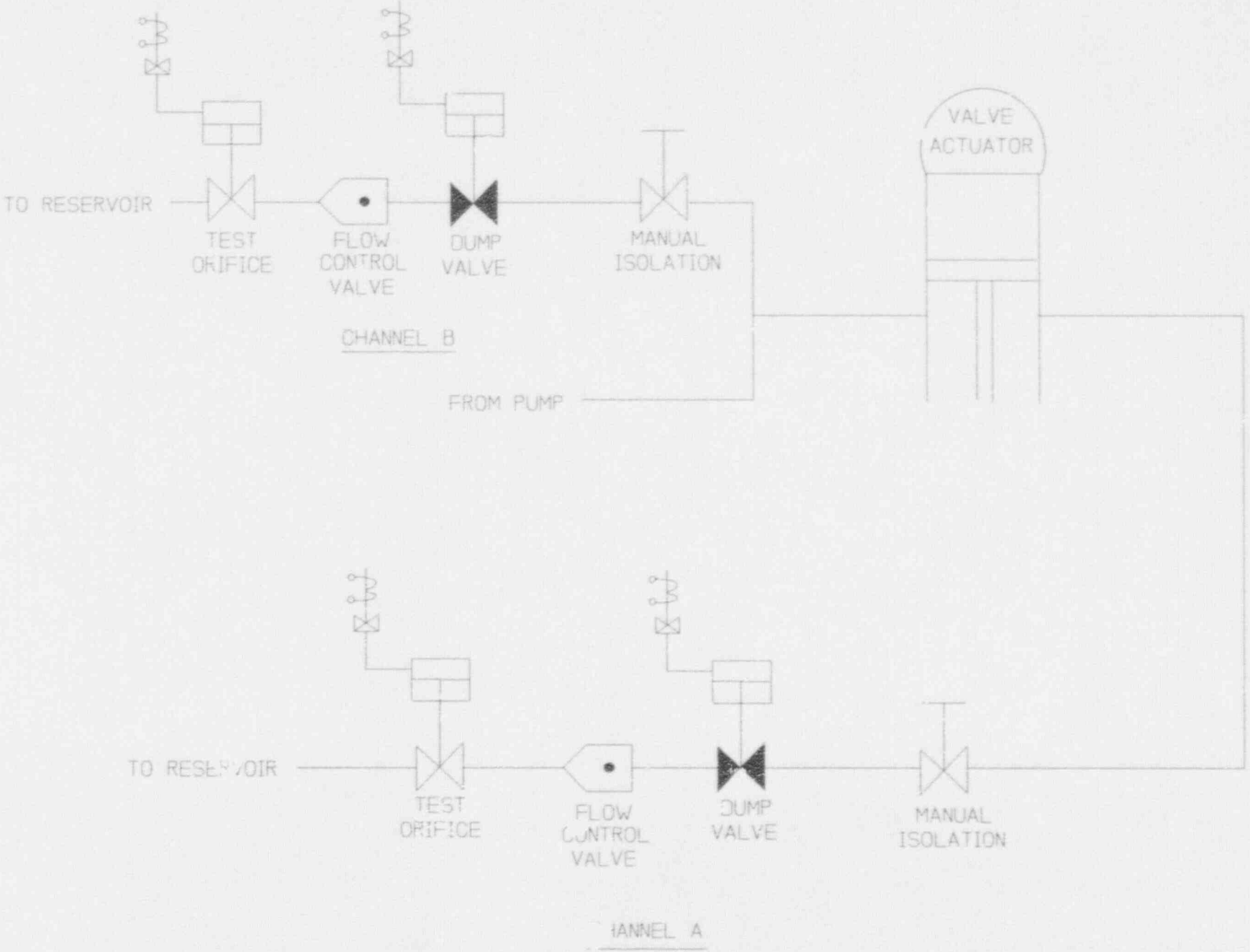
GCC/JMO/REF/dlm

Attachments: (1) Simplified MSIV Hydraulic Diagram
(2) Description of Tests
(3) Valve History
(4) Root Cause Analysis

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
R. A. Capra, NRC
D. G. McDonald, Jr., NRC
T. T. Martin, NRC
P. R. Wilson, NRC
R. I. McLean, DNR
J. H. Walter, PSC

ATTACHMENT (1)

SIMPLIFIED MSIV HYDRAULIC DIAGRAM



ATTACHMENT (2)

DESCRIPTION OF TESTS

Full-Stroke Test (STP O-1)

- Both channels actuate simultaneously,
- Dump-valve solenoid energizes to reposition dump valve,
- Hydraulic fluid vents to reservoir,
- Valve rapidly strokes shut.

Partial Stroke Test (STP O-47)

- Each channel tested independently,
- Test-orifice solenoid energizes to insert test orifice in dump path,
- Dump-valve solenoid energizes to reposition dump valve,
- Hydraulic fluid vents to reservoir,
- Valve slowly strokes to 90% open,
- Dump-valve solenoid de-energizes and dump valve repositions to isolate dump path,
- Test-orifice solenoid de-energizes to remove test orifice from dump path,
- Hydraulic pump operates to return valve to 100% open.

ATTACHMENT (3)

VALVE HISTORY

SPRING 1990:

Valve failed to full open due to oversized rider ring in conjunction with foreign material in valve. Replaced upper rider ring. Also replaced actuator with actuator from No. 22 MSIV. Replacement actuator last overhauled spring 1989. Valve stroke time did not exceed the Technical Specification value during as-found testing.

SPRING 1990:

With valve stuck in intermediate position, valve would not close using control-room handswitch. Neither dump solenoid energized when handswitch was placed in SHUT. Replaced handswitch.

FALL 1990:

With unit at power and valve full open, received intermittent test-valve closure alarms. Replaced timer module in test-valve closure circuit.

DECEMBER 1991:

Routine oil analysis indicated higher than normal acid content. Foam visible on oil surface in reservoir. Replaced hydraulic fluid with unit at power, valve in full open position.

12 MSIV Full-Stroke Test Results (seconds)

04/02/90	2.18
09/15/90	2.16
12/16/90	2.20
05/20/90	2.09
07/04/90	2.10

12 MSIV Partial-Stroke Test Dates

Dump Circuit A	Dump Circuit B
09/10/91	08/29/91
11/05/91	10/24/91
12/31/91	12/01/91
--	12/31/91

ATTACHMENT (4)

ROOT CAUSE ANALYSIS

	POSSIBLE CAUSES	OBSERVATIONS
1.	MSIV stroke problem.	
a.	Packing/stem friction.	Discounted - nothing noted during STP O-47-1.
b.	Piston ring friction.	Discounted - nothing noted during STP O-47-1.
c.	Check valve assembly friction.	Discounted - nothing noted during STP O-47-1. NOTE: STP O-47-1 only moves valve stem approximately 2-1/2 inches. An Operations Shift Supervisor locally witnessed the full-stroke test of Nos. 11 & 12 MSIV on 12/23/91. Both valves were observed to operate as expected.
2.	Dump valve did not shift.	
a.	Problem with dump solenoid coil.	Discounted - functioned correctly during STP O-47-1.
b.	Handswitch contact problem.	
c.	Dump valve solenoid circuit loose connection.	Portions tested during STP O-47-1 functioned correctly.
d.	Dump valve and seat adherence.	Discounted - functioned correctly during STP O-47-1. Vendor assessment not a likely occurrence.
e.	Solenoid poppet and seat adherence.	Functioned correctly during STP O-47-1. Vendor assessment - possible cause based experience with similar actuators.
3.	Hydraulic-fluid-flow-path obstruction.	
a.	Fluid quality problem.	Discounted - ruled out by oil analysis. Higher acidity was noted but it would not cause response time to slow.
b.	Flow-path test orifice.	Discounted - verified correct position.
c.	Valve misalignment	Discounted - valve line-up verified correct. Flow control valve assumed correct. No evidence to suggest flow control valve misaligned.

ATTACHMENT (4)

ROOT CAUSE ANALYSIS

	POSSIBLE CAUSES	OBSERVATIONS
4.	Actuator stroke problem.	
	a. Piston ring friction.	Discounted - no leakage observed. STP O-47-1 was normal.
	b. Seal friction.	No leakage observed. STP O-47-1 was normal.
5.	Valve limit-switch problem.	Discounted - functioned during STP O-1-1 on 12/24/91. Operated satisfactorily using manual actuation on 1/9/92.
6.	Timer problem.	Discounted - timer was within calibration dates. Same timer operated properly on No. 11 MSIV. Timer calibration verified on 1/8/92. Timer and limit switch circuit tested in place on 1/9/92.