NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Calvert Cliffs Unit 1	0 5 0 0 0 3 1 7	1 OF 0 5

TITLE (4)
Failure of #12 MSIV to fully close during surveillance testing

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
1 2	1 2	8 4	8 4	0 1 9	0 0	0 1	0 9	8 5		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	3
POWER LEVEL (10)	0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)	X	50.73(a)(2)(v)		73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		
	20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
	20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER	
	AREA CODE	
Robert M. Somers, Senior Engineer	3 0 1	2 6 0 - 4 4 0 3

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
X	S B	8 4	G 2 5 0	Y					
X	S B	H S	H 2 6 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO		0 1	1 1	8 5

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 2100 on December 12, 1984, during the performance of surveillance testing as required by TS 4.7.1.5, #12 MSIV failed to reach the fully closed position. Hydraulic fluid pressure on both the high pressure (cap) and low pressure (rod) ends of the actuator were abnormal. Number 12 MSIV was declared inoperable and was shut locally to satisfy the requirements of TS Action Statement 3.7.1.5.

The ensuing investigation revealed faulty contacts in the Control Room handswitch for #12 MSIV. These contacts were replaced; however, post maintenance testing indicated the problem was not resolved. Subsequent corrective actions taken were as follows: (1) Both restrictor valves, which control the closing speed of the MSIV by restricting the hydraulic fluid flow from the rod end of the actuator, were replaced. (2) The hydraulic fluid pilot lines which operate the restrictor valves were verified clean. (3) The integrity of the actuator piston hydraulic seals was verified by both a pressure drop test and visual inspection. (4) Both solenoid pilot valves, which control the admission of high pressure hydraulic fluid to the cap end of the actuator were replaced. (5) Two check valves in the hydraulic lines between the high pressure pumps and the high pressure hydraulic header were replaced.

After the above corrective actions were completed, #12 MSIV was fast stroked satisfactorily thirteen times. Inspection and testing of the removed hydraulic components have revealed no identifiable deficiencies to date.

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With the plant in **MODE** 3 at 2100 on December 12, 1984, #12 MSIV (SB-ISV) failed to fully close within 3.6 seconds as required by the MSIV quarterly surveillance test and was declared inoperable. Three attempts were made by the Control Room Operator to perform the required timed stroke test of #12 MSIV. In each case, the Operator initiated the attempt by taking #12 MSIV's handswitch (SB-HS) to the CLOSE position. This action should have resulted in the following:

1. The opening of one of the two in parallel solenoid operated pilot check valves (1-MSH-4047) (SB-FSV).

2. Discharge of high pressure hydraulic fluid from an accumulator bank (SB-ACC) which is maintained at a pressure of 4700-5000 psig to the high pressure header and the cap end of the actuator.

3. One of the two in series cap end vent solenoids (1-SV-4052) (SB-FSV) energizing to close, to isolate the cap end of the actuator (SB-84) from the hydraulic reservoir (SB-RVR).

4. The restrictor valves (SB-FSV) opening to a preset position, after sensing the increased high pressure header pressure to control the flow of hydraulic fluid from the rod end of the actuator, thereby controlling the MSIV closing speed. At the completion of the valve stroke rod end fluid pressure should be 0 psig.

Details of each test are outlined below.

TEST 1

Local observation of #12 MSIV indicated no valve movement. Hydraulic fluid pressures indicated that accumulator pressure had not been applied to the cap end of the actuator.

TEST 2

Local observation of #12 MSIV indicated that the valve fast stroked, but remained approximately 3" open. Rod end pressure increased to 3100 psig at the end of the MSIV movement.

TEST 3

Same results as TEST 2.

Operations personnel then shut #12 MSIV by locally running a high pressure pump to increase pressure on the cap end of the actuator.

At 0340 on December 13, 1984, a plant cooldown was commenced. The unit entered **MODE** 5 at 1500 on December 13, 1984. At that time Electrical Maintenance

personnel inspected the Control Room handswitch for #12 MSIV. The upper contact blocks (Honeywell Model: CMC911AGA031BB, Part: Microswitch Contact: PTCC) were found to cause erratic contact closure across the contacts which open the solenoid operated pilot check valve and shut the cap end vent solenoid. Failure of these components to operate resulted in the failure of the MSIV to close during the first attempt. The failure of the handswitch would not, however, have interfered with the valve closure from a Steam Generator Isolation Signal (SGIS). The bad contact blocks were replaced and at 1930 on December 13, 1984, a fourth timed stroke of #12 MSIV was attempted. The MSIV went full shut in the required time, however, rod end pressure increased to approximately 3000 psig after the stroke and cap end pressure was below the normally expected value of greater than 2400 psig. It was postulated that bad piston seals (SB-SEAL) in the actuator or a malfunction of the restrictor valves could be causing the low cap end pressure and abnormally high rod end pressure.

At 1230 on December 14, 1984, the integrity of the seals was verified by a pressure drop test. At 1230 on December 16, 1984, the cap end of the MSIV was pumped down and the upper piston seals were visually inspected and verified intact. The hydraulic fluid pilot lines which transmit cap end pressure to the restrictor valves were disconnected, flushed, and verified clean and two new restrictor valves were installed on the actuator. At 0325 on December 18, 1984, two fast timed strokes of #12 MSIV were performed satisfactorily. Both rod and cap end pressures were normal. Disassembly and inspection of the previously installed restrictor valves was conducted on December 18, 1984, at 1330 with no deficiencies noted. Since a definitive cause for the rod and cap pressure anomaly could not be determined, four additional timed fast strokes were performed to verify valve operability. In all cases the valve shut within the required time and both rod and cap end pressures were normal.

On December 20, 1984, the Plant Operations and Safety Review Committee reviewed the results of the current testing and directed that two additional fast timed strokes be performed satisfactorily with the plant in **MODE** 3 to provide additional assurance that the problem was corrected. A plant heat-up was conducted on December 22, 1984, with entry into **MODE** 3 occurring at 1357. On December 23, 1984, at 0254 a fast timed stroke of #12 MSIV was conducted satisfactorily. Both rod and cap end pressures responded normally. At 0500 a second fast timed stroke was conducted, however, in this instance rod and cap pressures were again abnormal. Three additional fast strokes were then performed. The first two were completed satisfactorily, however, on the third the abnormal rod and cap end pressures reappeared. Number 12 MSIV was verified shut and declared inoperable. A cooldown was conducted in accordance with the Technical Specifications with entry into **MODE** 4 occurring at 2145 on December 24, 1984. Since the replacement of the restrictor valves which control rod end pressure had not solved the problem, further corrective action was directed toward determining the cause for the reduced pressure on the high pressure side of the actuator. This reduced pressure could have resulted in the failure to open or the premature closing of the restrictor valves, both of which would result in a hydraulic lock on the actuator piston. This would explain the abnormally high rod end pressures as well as the failure of the valve to reach the fully closed position.

The following corrective actions were taken late on December 23, 1984 and early on December 24, 1984.

1. A pressure drop test of the high pressure header and all accumulators was performed satisfactorily.

2. The nitrogen precharge pressure of all accumulators was verified to be 2900 psig.

3. An inventory check of each accumulator was performed and the resultant volumes were consistent with previous checks.

Two test gauges were installed to monitor the pressure in the hydraulic fluid pilot lines which operate the restrictor valves and the high pressure hydraulic header.

At 0343 on December 24, 1984, a fast stroke of #12 MSIV was performed satisfactorily. Rod end, cap end, and flow restrictor actuation pressures were normal. At 0452, a second fast stroke was attempted, however, in this instance rod end pressure was high, cap end pressure was low, and flow restrictor actuation pressure indicated zero. An absence of sufficient flow restrictor actuation pressure could be indicative of a diversion of some high pressure accumulator fluid back to the hydraulic reservior. Subsequent corrective action was directed toward replacing hydraulic components which may have contributed to this diversion. Specifically, the following action was taken.

1. The solenoid valves associated with the solenoid operated pilot actuation check valves were replaced (1-SV-4047 and 1-SV-4048).

2. Two check valves (SB-V) (1-MSH-209 and 1-MSH-250) between the high pressure header and high pressure pump discharge were replaced.

Starting at 2030 on December 24, 1984, eleven fast timed strokes of #12 MSIV were performed satisfactorily. In all cases the valve shut in the required time both cap end, rod end, and flow restrictor actuation pressures were normal. At 0540 on December 25, 1984, #12 MSIV was declared operable and a heat-up was conducted with entry into **MODE** 3 at 0500. With the Reactor Coolant System temperature at 532°F, two additional fast strokes were performed satisfactorily and at 1252 the reactor was returned to power operation. Subsequent testing and inspection of the removed check valves and solenoid valves have revealed no deficiencies to date.

The following corrective actions will be taken to ascertain the cause and/or prevent recurrence.

1. Since the problem was only observed intermittently, more extensive testing will be performed on the removed solenoid valves to insure no deficiencies exist which went undetected during the initial inspection and testing.

2. An accurate volumetric check of several high pressure accumulators will be

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

conducted to insure the capacity is as specified in the manufacturer's technical manual. In addition, a calibration check will be performed on each accumulator's pressure gauge.

3. A review of the MSIV hydraulic system design has been initiated to identify any additional causes for the low cap end pressure which were not uncovered during the original failure evaluation.

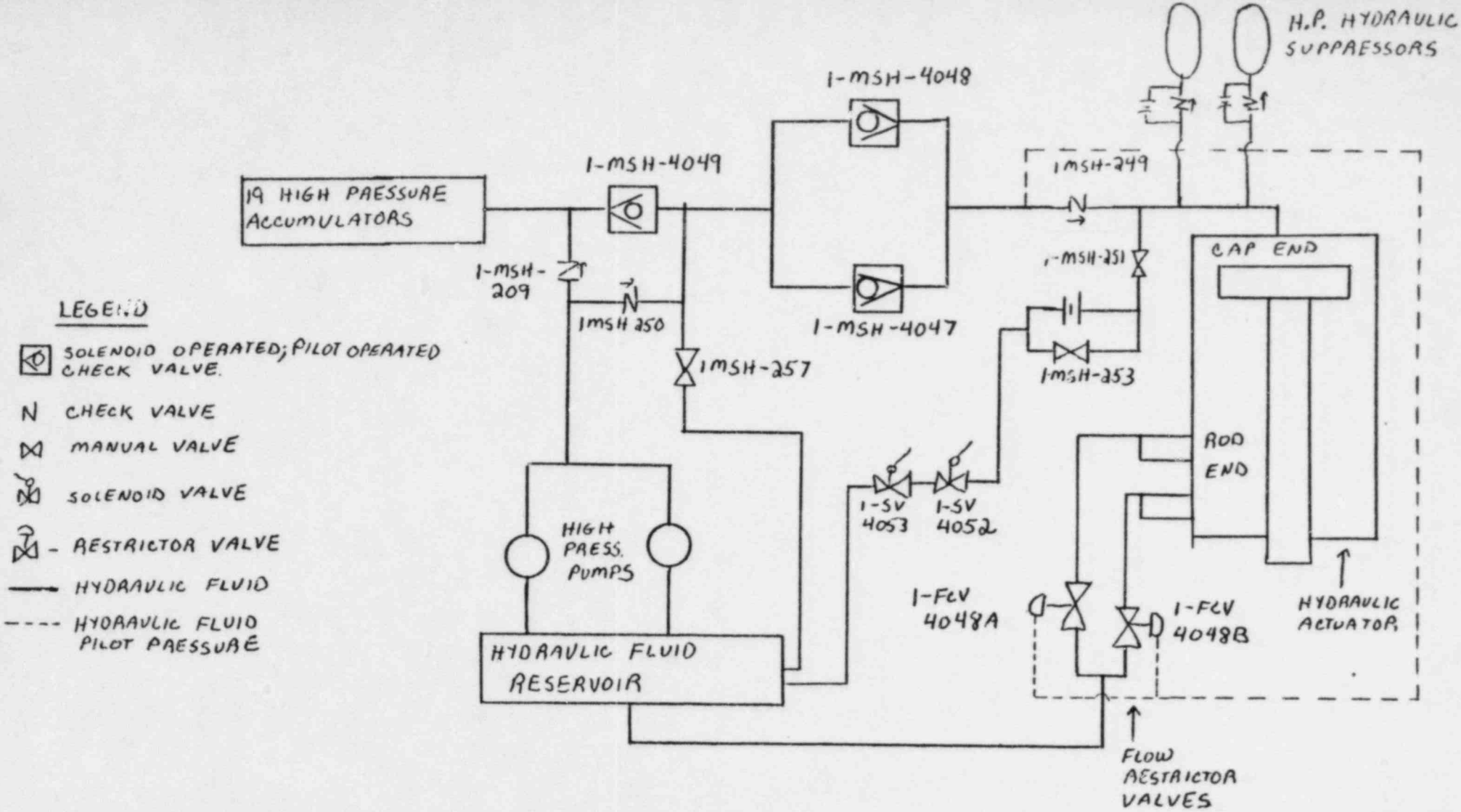
4. If no definitive cause for the event has been identified by the next shutdown, additional fast stroke tests will be performed at that time to provide assurance that the problem is not one of a recurring nature.

5. An evaluation will be conducted to determine if other installed Honeywell handswitches have experienced similar contact block failures.

When this event occurred, the unit had been shutdown because of the inoperability of #11 MSIV (reference LER 84-18). Number 11 MSIV was shut, but was considered inoperable due to excessive piston rod seal leakage on the rod end of the actuator. During a Main Steam Line Break, this excessive leakage could have caused #11 MSIV to close at an increased rate which could have damaged the valve seat and prevented the valve from performing its safety function of isolating the intact steam generator. The failure of #12 MSIV to fully close under these conditions would place the unit outside the assumptions of the safety analysis for **MODE** 1-3 operation. However, #11 MSIV was fast stroked with its rod end seal in a degraded condition during a unit trip on November 20, 1984 and a subsequent safety analysis concluded that the resultant seat leakage and valve deformation would not impair the capability of the valve to perform its safety function. Although it is possible that another fast stroke of #11 MSIV between November 20, 1984 and December 12, 1984, could have resulted in an unacceptable value of seat leakage and deformation, it would have most certainly helped to prevent the rapid depressurization of the intact steam generator during a Main Steam Line Break. In addition, during each of the timed stroke tests where #12 MSIV did not reach the fully closed position, the high pressure hydraulic pumps were secured and one high pressure accumulator was isolated. During normal operation if a main steam line break occurred without a loss of offsite power, the high pressure pumps would operate to increase high pressure hydraulic header pressure after the valve stroke. This increased pressure would reopen the restrictor valves, bleed-off the rod end pressure, and result in full closure of the MSIV. The nineteenth accumulator would have been unisolated and would have provided an additional inventory of high pressure hydraulic fluid to shut the valve. Upon discovery that both MSIVs were inoperable, the valves were maintained shut until entry into **MODE** 4. Return to **MODE** 3 operations was not made until both MSIVs were returned to operable status.

A review of reportable events at Calvert Cliffs revealed no similar events.

The contact for further information of this event is R. M. Somers, (301) 260-4403.



CALVERT CLIFFS

BALTIMORE GAS AND ELECTRIC COMPANY

P.O. BOX 1475

BALTIMORE, MARYLAND 21203

NUCLEAR POWER DEPARTMENT
CALVERT CLIFFS NUCLEAR POWER PLANT
LUSBY, MARYLAND 20657

January 11, 1985

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Docket No. 50-317 (Unit 1)

License No.DPR 53 (Unit 1)

Dear Sirs:

The attached LER 84 - 19 is being sent to you as required by 10 CFR 50.73.

Should you have any questions regarding this report, we would be pleased to discuss them with you.

Very truly yours,

L B Russell

L. B. Russell
Plant Superintendent

RMS

LBR:RMS:ajm

cc: Dr. Thomas E. Murley
Director, Office of Management Information and Program Control
Messrs: A. E. Lundvall, Jr.
J. A. Tiernan

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