

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)										DOCKET NUMBER (2)										PAGE (3)	
CALVERT CLIFFS UNIT 2										0 5 0 0 0 3 1 1 8										1 OF 0 3	
TITLE (4)																					
REACTOR TRIP CAUSED BY SURGE CAPACITOR FAILURE																					
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)									
									N/A			0 5 0 0 0									
0 4	1 5	8 4	8 4	0 0 3	0 0 0	5 1	4	8 4				0 5 0 0 0									
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)																			
POWER LEVEL (10)		20.402(w)		20.406(a)		X		80.73(a)(2)(iv)		73.71(c)											
1 1 0 1 0		20.406(a)(1)(i)		80.36(a)(1)				80.73(a)(2)(v)		73.71(e)											
		20.406(a)(1)(ii)		80.36(a)(2)				80.73(a)(2)(vi)		OTHER (Specify in Abstract below and in Text, NRC Form 308A)											
		20.406(a)(1)(iii)		80.73(a)(2)(i)				80.73(a)(2)(viii)(A)													
		20.406(a)(1)(iv)		80.73(a)(2)(ii)				80.73(a)(2)(viii)(B)													
		20.406(a)(1)(v)		80.73(a)(2)(iii)				80.73(a)(2)(ix)													
LICENSEE CONTACT FOR THIS LER (12)																					
NAME										TELEPHONE NUMBER											
M. G. POLAK, OPERATIONAL SAFETY ANALYST										3 0 1 2 6 1 0 1 - 4 4 0 2											
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC												
B	MB	1CLAPW	111210	N																	
X	JL1	1CLNIV	111210	N																	
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR							
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)										<input checked="" type="checkbox"/> NO											

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

At 1020 on April 15, 1984, while operating in **MODE 1** at 100% power, an automatic trip of Calvert Cliffs Unit 2 reactor occurred due to a low reactor coolant flow condition resulting from the loss of Reactor Coolant Pump (RCP) 22B. The breaker feeding RCP 22B had opened. The root cause was an overcurrent condition caused by an internal short to ground in a surge capacitor for RCP 22B. The failed capacitor was disconnected and the pump returned to service. One of four Turbine Bypass Valves (TBV) failed to fully reseal causing additional primary cooldown. The TBV was manually isolated. The current to pneumatic (L/P) signal converter was slightly out of adjustment. At 1025 an Auxiliary Feedwater Actuation Signal (AFAS) was generated due to a temporary low level in Steam Generator 22. The low level occurred while manually controlling steam generator levels. Post trip reviews verified all safety systems functioned as expected.

Corrective actions planned include replacing older capacitors, replacing all capacitors periodically, conducting periodic capacitor degradation checks, and revising existing TBV preventive maintenance procedure.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

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CALVERT CLIFFS UNIT 2	0 5 0 0 0 3 1 8 8 4 - 0 0 3 - 0 0				0 2	OF	0 3

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

At 1020 on April 15, 1984, while operating in MODE 1 at 100% power, an automatic trip of Calvert Cliffs Unit 2 reactor occurred due to a Reactor Protective System (JC) "Lo-Flow" signal. The turbine tripped on "Reactor Trip Bus Low Voltage" as expected. The "Lo-Flow" signal was generated from the loss of Reactor Coolant Pump (RCP) 22B (AB). The power supply breaker for RCP 22B had opened. Opening of the breaker could be the result of either the differential or overcurrent relays tripping. In this instance, both relays were found tripped. Investigation determined that the root cause of this event was an overcurrent condition resulting from an internal short to ground in one of three surge capacitors installed for RCP 22B. The failed surge capacitor was disconnected and the pump returned to service.

Following the trip, the Control Room Operators properly evaluated the event and carried out the procedures for reactor trip, Emergency Operating Procedures (EOP) Number 1. At 1025, an Auxiliary Feedwater Actuation Signal (AFAS) (BA) was generated due to a low level in Steam Generator 22. The motor driven and one steam driven auxiliary feedwater pumps started automatically as expected. The low level occurred while a licensed operator was manually controlling steam generator levels. Proper steam generator level was restored. Post trip reviews verified that all safety systems functioned as expected and no technical specification limits were exceeded.

A surge capacitor is installed in each of the three phases to each RCP. These capacitors are installed to protect the reactor coolant pump motors from high voltage surges which could be present on the electric supply buses during certain switching operations. The failed surge capacitor was a Westinghouse style "C". Investigation following disassembly discovered an internal electrical short to ground had occurred resulting in an overcurrent condition. Calvert Cliffs Unit 1 experienced a similar event in June 1983 when a surge capacitor failure on RCP 11A resulted in a reactor trip. Westinghouse representatives assisted in the inspection of the three surge capacitors on RCP 11A. That inspection revealed an internal short to ground in the failed surge capacitor and capacitance degradation in the other two surge capacitors. According to Westinghouse, the visual examination and subsequent capacitance measurements could not determine why the capacitor had failed.

Based on Westinghouse's recommendations the following corrective actions were planned for both Unit 1 and 2:

- Replace older surge capacitors with new surge capacitors, when possible. (Unit 1 - completed, Unit 2 scheduled for spring 1984 outage)
- Conduct capacitor degradation checks each refueling outage (Unit 1 - completed, Unit 2 scheduled for spring 1984 outage)
- Replace all surge capacitors every 4.5 years.

These recommendations were planned to be completed on Unit 2 reactor coolant pumps during the spring 1984 outage which was scheduled to start one week after this event occurred.

During the initial eight to ten minutes of the event a problem with one turbine bypass valve was experienced. There are two (2) dump valves to atmosphere and four (4) turbine bypass valves (JI) to the condenser which regulate the steam generator pressure

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and reduce the number of times the main steam safety valves are actuated. The turbine bypass valves are air operated and respond to a pneumatic signal generated by a current to pneumatic signal converter. Their controls provide automatic or manual control during normal and emergency plant operations. These valves responded as expected following the trip except one of the four turbine bypass valves remained partially open after reaching the reseal setpoint. The valve was manually isolated. Investigation discovered the current to pneumatic signal converter slightly out of adjustment resulting in an air signal strong enough to hold the valve partially open after it actuated. Following recalibration the signal converter exhibited the desired performance characteristics.

As previously mentioned a low level in Steam Generator 22 actuated AFAS starting the motor driven and one steam driven feedwater pumps. This was a result of the operator's inexperience in maintaining the proper feed rate after a reactor trip with a turbine bypass valve stuck partially open coupled with his concern for minimizing the primary cooldown rate.

The circumstances of this event fall well within the bounds of the Loss of Coolant Flow Analysis; FSAR Section 14.9.

The following corrective actions are planned:

- 1) Replace older surge capacitors with new surge capacitors at the first available cold shutdown.
- 2) Conduct capacitor degradation checks each refueling outage.
- 3) Replace all surge capacitors every 4.5 years.
- 4) Revise existing turbine bypass valve preventive maintenance procedure to include a calibration check of the current to pneumatic signal converter.
- 5) Investigate the potential for removal of surge capacitors.

BALTIMORE GAS AND ELECTRIC COMPANY

P.O. BOX 1475

BALTIMORE, MARYLAND 21203

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

May 14, 1984

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

Docket No. 50-318
License No. DPR 69

Dear Sir:

The attached LER 84-003 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,

LBR Russell

L. B. Russell
Plant Superintendent

mo
LBR:MGP:srm

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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