

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Peach Bottom Atomic Power Station - Unit 2	DOCKET NUMBER (2): 0 5 0 0 0 2 7 7	PAGE (3): 1 OF 0 4
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TITLE (4):
Potential Seismic Failure Of Emergency 4.16KV Breakers Due To Inadequate Cell Switch Engagement.

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)										
0	9	1	9	8	8	8	8	8	0	2	2	0	0	1	0	1	9	8	8	Peach Bottom - Unit 3	0 5 0 0 0 2 7 8
											0 5 0 0 9										

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (1)

OPERATING MODE (9): N	20.422(a)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10): 0 0 0	27.405(a)(1)(ii)	50.36(a)(1)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	73.71(c)
	20.405(a)(1)(iii)	50.36(a)(2)	50.73(a)(2)(iv)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(v)(A)	
	20.405(a)(1)(v)	50.73(a)(2)(v)	50.73(a)(2)(v)(B)	
	20.405(a)(1)(vi)	50.73(a)(2)(iii)	50.73(a)(2)(v)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
T. E. Cribbe, Regulatory Engineer	7 1 7 4 5 6 - 1 7 0 1 4

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	E K S W C R G	0 8 0	Yes						

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input checked="" type="checkbox"/>	<input type="checkbox"/>				

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

On 9/14/88, an operator racked up the E-33 Emergency 4.16KV bus feeder breaker from the E-3 Emergency Diesel Generator and found that there was no indication of breaker position on the control panel. It was discovered that the breaker elevator mechanism linkage was distorted and had allowed the cell switch actuator arm to fall into an intermediate position (neither racked up nor racked down) disabling the automatic and manual closure circuitry. Other breaker compartments contained distorted linkage and, on 9/19/88 it was concluded that any of 4.16KV breakers may fail during a seismic event. The linkage distortion is caused by an interference with the breaker assembly as it is rolled out of the compartment. Since Unit 2 was in cold shutdown and the Unit 3 core is offloaded, there were no actual safety consequences resulting from this event. Had a seismic event occurred while this condition existed and the emergency power system was needed, it is possible that one or more of the Emergency Diesel Generators would be unavailable, resulting in a partial or total station blackout. Existing Emergency procedures address this situation and would be used to implement recovery.

The breakers will be inspected and repaired prior to restart of the corresponding units. Reinspection of the linkage following breaker removal along with installation of the GE upgrade kits will prevent recurrence.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Peach Bottom Atomic Power Station - Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 2 7 7 8 8	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8	0 2 2	0 0	0 2	OF 0 4

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

Requirement for the Report

This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(v) to report a generic defect that may have prevented the proper operation of 4160VAC Emergency Bus breakers during a seismic event.

Status of Units at Time of Event

Unit 2 was in cold shutdown and Unit 3 was in the refuel mode with the core offloaded.

Description of Event

On September 14, 1988, utility non-licensed operators racked up the E-3 Emergency Diesel Generator (EDG) Feeder Breaker to the E-33 (Unit 3) Emergency bus (EIS:EK) following a bus outage and found that there was no indication of breaker position on the control panel. Operations engineers (utility, non-licensed), inspected the breaker compartment and found that the elevator mechanism position linkage was bent. This condition allowed the cell switch actuator arm to fall off of the operator pad to an intermediate position (neither "racked-up" nor "racked-down") rendering the breaker automatic and manual closure circuit electrically inoperable. It was determined that when the breakers are rolled out of the cubicle, the breaker may interfere with the position linkage resulting in varying degrees of distortion. Three other cubicles were inspected and it was found that one of the cell switch actuator arms was held in place at the edge of the operator pad. In this condition, it was determined that there was inadequate engagement to ensure that the linkages would not disengage during a seismic event, electrically disabling the closure circuit of the breaker.

On September 19, 1988, it was concluded that adequate cell switch linkage engagement has not been verified in the past and, the possibility exists that during a seismic event, additional breakers may have failed. The cell switch interlocks with the closure circuitry of all Emergency Bus breakers. On the normal feeder breakers to these buses, a mispositioned cell switch may also disable the undervoltage trip circuitry. The manual trip circuitry for all breakers is not interlocked with the cell switch and remains operative from the control room.

Cause of the Event

The cause of this event is an inadequate design of the cell switch control linkage which occasionally interferes with the breaker assembly when it is removed from its cubicle. Because this deficiency has not been highlighted by known industry operating experience, and previous failures were infrequent, this was not recognized as a generic problem, therefore, procedural controls were not in place to prevent linkage distortion. This investigation also revealed that GE Service Advisory Letter (SAL) 073B - 302.0 addresses this issue and provides information for obtaining and installing upgraded linkage that corrects this deficiency. PECO has no record of receiving and evaluating this SAL.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	0 2 2	0 0	0 3	OF 0 4

TEXT (if more space is required, use additional NRC Form 388A's) (17)

Analysis of Event

There were no adverse safety consequences resulting from this event. All failures identified on either Unit 2 or 3 occurred while the breaker was removed from service.

An NPRDS printout of GE Model AM 4.16 breaker failures was reviewed. Two other cases of breaker failures caused by cell switch disengagement were identified. Neither of these failures were due to vibration or seismic activity, but did occur following maintenance.

Operability of the 4KV Emergency bus breakers at the time of the event is indeterminate because the breaker must be removed to measure the engagement and it is the removal process that causes the degradation. For the purposes of the following analysis, it is conservatively assumed that the breakers found to be degraded, were degraded prior to the inspection. Also, it will be assumed that those breakers that had a total disengagement, would not have met the minimum engagement before the inspection. To date, the following breakers have been identified as degraded.

<u>Unit</u>	<u>Breaker #/Function</u>	<u>Degree of Failure</u>
2	1605/C-22 Feed to E-224 Load Center	Total disengagement
2	1609/E-22 Feed to Emergency Service Water Booster Pump	Less than minimum required engagement
3	1502/E13A4 Emergency Cooling Tower Load Center Feeder	Total disengagement
3	1503/E13 Feed from E-1 Diesel Generator	Less than minimum required engagement
3	1704/E33 Feed from E-3 Diesel Generator	Total disengagement

Had this condition existed during a seismic event with both units at power, there are numerous combinations of possible equipment failures. The worst case scenario from the above breaker failures is the loss of one or more Emergency Diesel Generators (EDG). This could be caused by a normal feeder breaker failing to open in an undervoltage condition or an EDG output breaker failing to close. Although multiple EDG failures are outside the design basis of the plant, the Station Blackout Procedure, SE-11, addresses this situation and prescribes steps to be taken by the operators for recovery. The operators have been trained on this procedure as well as how to mechanically operate various breakers when control power is unavailable. Further more, steps to restore the failed breakers to functional status are simple in nature and personnel are on site around the clock to perform these repairs, if necessary.

Corrective Actions

Criteria for determining acceptable linkage engagement was established. To date, 50 out of the 68 4KV breaker compartments have been inspected against this criteria. Those found with linkage engagement less than the minimum specified have been adjusted or repaired. This inspection and repair process will be completed on all 4kv breakers prior to restart of the affected unit. Procedural controls have established to ensure that the cell switch operating linkage is inspected for minimum engagement prior to installing a breaker.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	- 0 2 2	- 0 0	0 4	OF 0 4

TEXT (if more space is required, use additional NRC Form 368A's) (17)

As a long term corrective action, GE upgrade kits have been ordered and will be installed over the next 3 refueling outages as part of the preventive maintenance program. PECO has informed GE to add the Operating Experience Assessment Program Coordinator to their SAL distribution list.

Additional Information

The switchgear and breakers were manufactured by General Electric, Models M26, 36 and breaker models AM 4.16-250.

There have been no previous LER's on potential breaker malfunctions due to inadequate cell switch engagement.



PEACH BOTTOM—THE POWER OF EXCELLENCE

PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

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D. M. Smith
Vice President

October 19, 1988

Docket No. 50-277

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

SUBJECT: Licensee Event Report
Peach Bottom Atomic Power Station - Unit 2

This LER concerns a generic defect that may have prevented the proper operation of 4.16KV Emergency Bus breakers during a seismic event.

Reference: Docket No. 50-277
Report Number: 2-88-22
Revision Number: 00
Event Date: 09-19-88
Report Date: 10-19-88
Facility: Peach Bottom Atomic Power Station
RD 1, Box 208A, Delta, PA 17314

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(v).

Very truly yours,

cc: W. T. Russell, Administrator, Region I, USNRC
T. P. Johnson, NRC Senior Resident Inspector
T. E. Magette, State of Maryland
INPO Records Center

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11