NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO 3150-0104
EXPIRES 8/31/88

LICENSEE EVENT REPORT (LER)

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

TITLE (4) Degraded Voltage Protection Outside Design Basis of Plant due to Design Deficiencies

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 7	0 1	8 8	8 8	— 0 1 6	— 0 0	0 8	0 1	8 8	PBAPS - Unit 3	0 5 0 0 0 2 7 8
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	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)	X 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
W. C. Birely, Senior Engineer - Licensing Section	2 1 5 8 4 1 - 5 0 4 8

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	

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

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

Abstract:

On July 1, 1988 with Unit 2 in Cold Shutdown and Unit 3 in the Refuel Mode with the core offloaded, two related conditions which are outside the design basis of the plant were identified. Condition 1 concerns the inadequacy of time delay relay setpoints for degraded grid protection under the conditions of a safety injection signal on one unit while operating with only one of two offsite sources. This is a nonconformance to General Design Criterion 17. Condition 2 concerns the initiation setpoint of the undervoltage relay protection to the 4.16kV bus feed breakers to ensure adequate voltage levels to the 480V motor control centers (MCC's) so that equipment damage due to low voltage would not occur. There were no actual adverse consequences as a result of either condition, and all potential consequences are considered minimal. The cause of both conditions is a design error. For Conditions 1 and 2, plant modifications will be performed to change the voltage initiation setpoint and time delay setpoint associated with the degraded grid voltage protection. These modifications will be completed prior to restart of either unit. These conditions are reportable pursuant to 10 CFR 50.73(a)(2)(ii)(B).

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NRC Form 366
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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Peach Bottom Atomic Power Station Unit 2	0 5 0 0 0 2 7 7	8 8	— 0 1 6	— 0 0	0 2 OF 0 4

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

Unit Conditions Prior to the Event:

Unit 2: Cold Shutdown

Unit 3: Refuel Mode with the Core Offloaded

Description of the Event:

On July 1, 1988 two related conditions which are outside the design basis of the plant were identified. Condition 1 concerns the inadequacy of time delay relay setpoints for degraded grid protection, under the conditions of a safety injection signal on one unit while operating with only one of two offsite power sources available. This is a nonconformance to General Design Criterion 17. Condition 2 concerns the initiation setpoint of the undervoltage relay protection to the 4.16kV bus feed breakers to ensure 90% of nominal voltage to the 480V motor control centers (MCC). Some control components powered from the 480V MCC's are specified to operate within +/-10% of nominal voltage rating to preclude equipment damage from low voltage. Both conditions have existed since installation of the relays in 1984. The relays were installed for the purpose of equipment protection. The conditions were discovered while conducting a revised plant voltage regulation study.

Consequences of the Event:

There were no actual adverse consequences as a result of either condition. The potential consequences of Condition 1 are considered minimal because of the low probability of the postulated scenario which requires the following sequence of events: 1) one offsite power source unavailable (continued operation permitted for 7 days by Limiting Condition for Operation 3.9.B.1) and 2) a loss of coolant accident (LOCA). If this scenario had occurred, the emergency loads would have automatically transferred to the diesel generators. For Condition 2, if the voltage to the 4.16kV buses had been just above the existing relay setting of 90%, the voltage at the 480V MCC may have been below 90% and may have resulted in equipment damage.

Cause of the Event:

The cause of both conditions is a design error in the modification which installed the degraded grid relay protection. The cause is not attributed to a failure to properly implement procedures to identify an unreviewed safety question, but rather the application of an assumption that the core spray motors would accelerate within 6 seconds for the range of expected motor terminal voltage.

For Condition 1, the time delay relay setpoint for degraded grid voltage protection did not accommodate the start time of the core spray pump motors under the conditions of only one offsite power source available and a LOCA. For Condition 2, the design of the degraded voltage protection scheme did not adequately consider the voltage drop between the 4.16kV bus and the 480V MCC which results from transformer and line losses.

Corrective Actions:

Upon discovery of the conditions, an investigation was initiated to identify all possible solutions. The revised plant voltage regulation study which lead to the discovery of the conditions was completed. This study was based on more sophisticated calculation techniques and considered voltage transients down to the 480V level. Since Unit 2 is in Cold Shutdown and Unit 3 is in the Refuel Mode with the core offloaded, the electrical loading is much lower as compared to the loading assumed for operation. In addition, the Core Spray System is not required to mitigate the consequences of a LOCA while in Cold Shutdown. Therefore, immediate corrective actions are not required.

Actions to Prevent Recurrence:

For Condition 1, a plant modification will be performed to change the time delay setting from 6 seconds to 9 seconds on the 4.16kV bus. In addition, the load shedding and re-sequencing of the Residual Heat Removal, Core Spray, Emergency Service Water and Emergency Cooling Water pumps will be revised to improve voltage regulation and motor acceleration time. Upon completion of these modifications, the time delay settings will override the voltage transient caused by the acceleration of motors, thereby

precluding a spurious transfer to an alternate power supply. These modifications will be completed prior to startup of either unit.

For Condition 2, the setting of the undervoltage relay on the 4.16kV bus will be increased from 90% to 92.17%. This will ensure a minimum of 90% nominal voltage to the 480V MCCs. This modification will be completed prior to startup of either unit.

The above modifications involve changes to the Technical Specifications and will be submitted to the NRC as an application to amend the operating licenses.

EIIS Codes:

The EIIS Codes for the affected systems are: BI - Essential Service Water System, BM - Low Pressure Core Spray System, BO - Residual Heat Removal/Low Pressure Coolant Injection System, EB - Medium Voltage Power System - Class 1E, ED - Low Voltage Power System - Class 1E and EK - Emergency Onsite Power Supply System. The EIIS Codes for the affected components are: BU - bus, DG - diesel generator, MO - motor, P - pump, RG - regulator, RLY - relay, TTC - tap changer, transformer, TMR - timer and XFMR - transformer.

Previous Similar Events:

LER 2-87-31 involved a condition outside the design basis of the plant.

Tracking Code: B1 - Code and Regulation Compliance Inadequate

PHILADELPHIA ELECTRIC COMPANY
2301 MARKET STREET
P.O. BOX 8699
PHILADELPHIA, PA 19101
(215) 841-5120

E. P. FOGARTY
MANAGER
NUCLEAR SUPPORT DIVISION

10 CFR 50.73

August 1, 1988

Docket No. 50-277
50-278

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

SUBJECT: Licensee Event Report
Peach Bottom Atomic Power Station - Units 2 & 3

This LER concerns conditions in the electrical distribution system which are outside the design basis of the plant.

Reference:	Docket No. 50-277, 50-278
Report Number:	2-88-16
Revision Number:	00
Event Date:	July 1, 1988
Report Date:	August 1, 1988
Facility:	Peach Bottom Atomic Power Station RD 1, Box 208, Delta, PA 17314

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

Very truly yours,

E. P. Fogarty
Manager
Nuclear Support Division

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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