



PECO ENERGY

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U. S. Nuclear Regulatory Commission  
Washington, DC 20555

Docket Nos. 50-277 & 278

SUBJECT: Licensee Event Report, Peach Bottom Atomic Power Station  
Unit 2 & 3

This LER concerns a non-compliance with Technical Specifications when certain emergency bus protection relays were found to be out of calibration due to inadequate testing methodology.

Reference:	Docket No. 50-277 & 278
Report Number:	2-96-002
Revision Number:	00
Discovery Date:	1/26/96
Report Date:	2/23/96
Facility:	Peach Bottom Atomic Power Station 1848 Lay Road, Delta, PA 17314

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

Sincerely,

GDEJHG:jhg

enclosure

cc: B. Gorman, Public Service Electric & Gas  
R. R. Janati, Commonwealth of Pennsylvania  
INPO Records Center  
T. T. Martin, US NRC, Administrator, Region I  
R. I. McLean, State of Maryland  
W. L. Schmidt, US NRC, Senior Resident Inspector  
A. F. Kirby III, DelMarVa Power  
H. C. Schwemm, VP - Atlantic Electric

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NRC FORM 366 (5-92)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95						
<b>LICENSEE EVENT REPORT (LER)</b>											
(See reverse for required number of digits/characters for each block)											
FACILITY NAME (1) Peach Bottom Atomic Power Station Unit 2					DOCKET NUMBER (2) 05000277		PAGE (3) 1 OF 4				
TITLE (4) Technical Specification Violation when certain emergency bus protection relays were found out of calibration due to inadequate testing methodology.											
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 NAME	DOCKET NUMBER	
01	26	96	96	-- 002 --	00	02	23	96	Peach Bottom Unit 3	05000278	
OPERATING MODE (9) 1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10) 100			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
			20.405(a)(1)(iii)			X 50.73(a)(2)(i)			50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
			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 Tony Wasong							TELEPHONE NUMBER (Include Area Code) 717-456-4744				
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)											
YES (If yes, complete EXPECTED SUBMISSION DATE)					X NO		EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)											
<p>Between 1/26/96 and 1/28/96, during performance of enhanced functional testing of the 4KV undervoltage relays, station personnel determined that certain 4KV emergency bus undervoltage protection relay trip settings were slightly outside of their Tech Spec allowable values. Specifically, it was determined that trip settings for nine relays in four emergency busses were below their Tech Spec allowable minimum voltages by at most 0.3%. Because these relays are calibrated on an 18 month frequency, this condition may have existed since 1994 for three relays and 1995 for the remaining six relays. These relays were determined to still be able to perform their safety function. The affected relays were recalibrated and returned to service by 1/29/96. The cause of the event has been attributed to a weakness in testing methodology used during the calibration of these relays. No actual safety consequences occurred as a result of this event. One previous similar event was identified.</p>											

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Peach Bottom Unit 2	05000 277	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		96	-- 002 --	00	

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

Requirements of the Report

This report is submitted pursuant to 10 CFR 50.73 (a)(2)(i)(B) as a result of a Technical Specification (Tech Spec) noncompliance due to certain 4KV emergency bus protection relay trip settings being slightly outside of their allowable values.

Unit Conditions at Time of Discovery

Units 2 and 3 were in Mode 1 (RUN) at approximately 100% of thermal reactor power. There were no systems, structures, or components that were inoperable that contributed to the event.

Description of the Event

Between 1/26/96 and 1/28/96, during performance of enhanced functional testing of the 4KV undervoltage relays, station personnel determined that certain 4KV emergency bus undervoltage protection relay trip settings were slightly outside of their Tech Spec allowable values. Specifically, it was determined that trip settings for nine relays in four emergency busses were below their Tech Spec allowable minimum voltages by at most 0.3%. Because these relays are calibrated on an 18 month frequency, this condition may have existed since 1994 for three relays and 1995 for the remaining six relays. These relays were determined to still be able to perform their safety function. The affected relays were recalibrated and returned to service by 1/29/96.

Cause of the Event

The cause of the event has been attributed to a weakness in testing methodology used during the calibration of these relays. A review of the testing procedures identified that they did not specify the range and accuracy of test equipment required to calibrate these relays. This is contrary to the procedural requirements for other I&C procedures. As a result of this, during the last scheduled relay calibration in 1994 and 1995, a Fluke model 45 digital voltage meter (DVM) was selected for the test. The investigation subsequent to the discovery of this event determined that the Fluke model 45 DVM has an accuracy of +/- .33 volts when measuring AC voltage. Since the undervoltage relays monitor the 4KV bus voltage via a potential transformer which steps the voltage down to 120 VAC, the acceptable ranges are 116.1 - 116.8 (98% undervoltage) and 105.5 - 106.1 (89% undervoltage). The comparatively wide DVM accuracy band combined with possible

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Peach Bottom Unit 2	05000 277	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		96	-- 002 --	00	

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instrument drifting is postulated to have resulted in the actual trip setpoint for 9 relays becoming slightly lower than the Tech Spec allowable band since their last calibration. Prior to 1994, a more accurate DVM was used during the calibration of these relays.

A contributing cause for the selection of the inappropriate DVM was a misunderstanding of the accuracy of the Fluke model 45 DVM when used to measure AC voltage by the Instrument and Controls (I&C) technicians. These DVMs, which were procured by the station in 1994, are highly accurate. However, the method of calculating the DVM's accuracy as described in the user's manual was not well understood by some I&C personnel.

An additional contributing factor identified during the investigation of this event was a failure to verify the setpoints of these relays during the monthly functional test as committed to in the safety evaluation report for Tech Spec amendment number 97/99 dated 4/11/84. In addition, it was determined during the investigation of this event that there is no formal program to identify trends associated with frequent recalibration of instrumentation. Such a program in conjunction with monthly verification of 4KV undervoltage relays setpoints could have been an effective barrier to this event.

Analysis of the Event

No actual safety consequences occurred as a result of this event.

Four Functions are provided to monitor degraded 4KV bus voltage at four different levels. These Functions are: Degraded Voltage during Normal Operations, Degraded Voltage during Loss of Coolant Accident (LOCA) conditions, Degraded Voltage High Setting, and Degraded Voltage Low Setting. These relays monitor the following voltage levels with the following time delays: 98% in approximately 60 seconds, 89% in approximately 10 seconds, 87% in approximately 10 seconds when source voltage is reduced abruptly to zero volts (inverse time delay), and 60% in approximately 2 seconds with source voltage reduced abruptly to zero volts (inverse time delay), respectively. The Degraded Voltage LOCA Function preserves the assumptions of the LOCA analysis and the Degraded Voltage Low Setting Function preserves the assumptions of the accident sequence analysis in the UFSAR. The Degraded Voltage during Normal Operations and Degraded Voltage High Setting Function provide an additional increase in the voltage monitoring scheme.



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FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Peach Bottom Unit 2		05000 277	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
			96	-- 002 --	00	

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The slightly lower than acceptable trip settings described above would not impact the ability of the relays to perform their safety function in the event of an actual LOCA or non-LOCA bus undervoltage event. An evaluation confirmed that all as-found relay settings were well within safety analysis limits. In addition, recent modifications have been performed that provide additional margin in the design analysis.

Corrective Actions

The affected relays were recalibrated to within the appropriate Tech Spec limits using more accurate test equipment.

The test procedures used to functionally test the 4KV undervoltage relays were revised to ensure test equipment with adequate accuracy is used and setpoints are verified to be within their allowable values on a monthly basis.

A program will be established to trend instrument recalibrations.

A review of other appropriate procedures will be performed to ensure that the selection of test equipment is adequate.

A review of other AC voltage testing performed with Fluke model 45 DVM's will be conducted to ensure that the DVM was appropriate for the application.

Refresher training will be given to I&C personnel on measurement and test equipment (M&TE) control, selection, and accuracy including new M&TE not previously addressed.

Previous Similar Events

One previous similar event was identified. LER 2-90-35 reported an event in which the 4KV undervoltage relays were found to be operating outside their Tech Spec limits due to harmonic distortion induced by operating equipment on the bus. Since the corrective actions associated with LER 2-90-35 involved the installation of harmonic filters on the 4KV bus relays, it could not have been expected to have prevented this event.