

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Peach Bottom Atomic Power Station - Unit 2	DOCKET NUMBER (2) 05000277	PAGE (3) 1 OF 017
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TITLE (4) Failure to Comply with Cable Routing and Separation Criteria as Provided in PBAPS UFSAR Section 7.1.6.1 and 8.4

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)																																		
11	10	87	87	032	000	03	07	87			05000																																		
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">OPERATING MODE (9) N</td> <td colspan="11">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)</td> </tr> <tr> <td rowspan="6">POWER LEVEL (10) 000</td> <td>20.402(b)</td> <td>20.406(e)</td> <td>50.73(a)(2)(iv)</td> <td>73.71(b)</td> </tr> <tr> <td>20.406(a)(1)(i)</td> <td>50.36(e)(1)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(v)</td> <td>73.71(e)</td> </tr> <tr> <td>20.406(a)(1)(ii)</td> <td>50.36(e)(2)</td> <td>50.73(a)(2)(vi)</td> <td rowspan="4">OTHER (Specify in Abstract below and in Text, NRC Form 306A)</td> </tr> <tr> <td>20.406(a)(1)(iii)</td> <td>50.73(a)(2)(i)</td> <td>50.73(a)(2)(viii)(A)</td> </tr> <tr> <td>20.406(a)(1)(iv)</td> <td>50.73(a)(2)(ii)</td> <td>50.73(a)(2)(viii)(B)</td> </tr> <tr> <td>20.406(a)(1)(v)</td> <td>50.73(a)(2)(iii)</td> <td>50.73(a)(2)(ix)</td> </tr> </table>												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) 000	20.402(b)	20.406(e)	50.73(a)(2)(iv)	73.71(b)	20.406(a)(1)(i)	50.36(e)(1)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)	73.71(e)	20.406(a)(1)(ii)	50.36(e)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 306A)	20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)
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LICENSEE CONTACT FOR THIS LER (12)

NAME W. C. Birely, Senior Engineer - Licensing Section	TELEPHONE NUMBER 215 841-5048
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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

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

Abstract:

On November 10, 1987 with Unit 2 in the cold shutdown condition it was determined that electrical cables installed in the Cable Spreading Room as the result of a plant modification did not conform to the separation criteria as identified in the Peach Bottom Atomic Power Station Updated Final Safety Analysis Report (UFSAR) Sections 7.1.6.1 and 8.4. The modification involved the removal of the Yarway temperature-compensated reference column, rerouting of the associated reactor level measurement instrument sensing lines and the addition of reactor pressure compensation to the reactor water level measurement at PBAPS Unit 2. There were three causes of this event: 1) Engineering Design personnel failed to provide an adequate design to construction personnel, 2) design documents were inadequate for field installation personnel and 3) Quality Control failed to identify the nonconforming condition. As corrective actions, the cables have been rerouted or wrapped with a fire retardant barrier. As actions to prevent recurrence, training was held for the PECO Engineering Design group, PECO PBAPS Quality Control group and the PECO PBAPS Construction group which reinforced the routing and separation criteria which must be included in the applicable design and installation. If this deficiency had remained uncorrected, an internally generated electrical fault in the affected cables may have affected operation of several plant systems. Therefore, this deficiency could have adversely affected the safe operation of the plant.

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	LER NUMBER (6)			PAGE (3)	
		YEAR 8 7	SEQUENTIAL NUMBER 0 3 2	REVISION NUMBER 0 0	0 2	OF 0 7

TEXT (if more space is required, use additional NRC Form 365A's) (17)

Unit Conditions Prior to the Event:

Unit 2 in the cold shutdown condition

Description of the Event:

On November 10, 1987 it was determined that electrical cables installed during a plant modification (1457) did not conform to the separation criteria as identified in the Peach Bottom Updated Final Safety Analysis Report (UFSAR) Section 7.1.6.1 and 8.4.

The purpose of Modification 1457 is to remove the Yarway temperature-compensated reference column, reroute the associated reactor level measurement instrument lines and add reactor pressure compensation to the level measurement for Peach Bottom Atomic Power Station Unit 2. As a part of this modification, Panels 20C818 and 20C819 and their associated cables were installed in the Cable Spreading Room.

During a walkdown by PECO Engineering Design personnel, it was discovered that cables from ECCS channels A, B, and D which enter and exit Panels 20C818 and 20C819 do not meet the required separation criteria identified in the Peach Bottom Atomic Power Station UFSAR Sections 7.1.6.1 and 8.4. The separation criteria in the Cable Spreading Room require cables assigned to different channels to be separated by three feet minimum horizontally and five feet minimum vertically. Where cables of different channels approach adjacent panels and the separation cannot be maintained, a flame retardant barrier must be used to provide separation.

Contrary to the above requirements, Channel ZA, ZB, and ZD cables installed in the Cable Spreading Room as part of Modification 1457, did not have the required three foot horizontal separation or a barrier. There were three general areas of improper separation:

1. Vertical tray risers from the tops of Panels 20C818 containing ZA cables, and panel 20C819 which contains ZB cables, are as close as 1.5 inches to each other.
2. Conduits carrying ZA cables to the vertical riser connected to Panel 20C818 end with less than 3 feet of separation to the cables in the ZD cable trays (ZD2VC035 and ZD2VA035).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Peach Bottom Atomic Power Station Unit 2	DOCKET NUMBER (2) 0 5 0 0 9 2 7 7	LER NUMBER (6)			PAGE (3)	
		YEAR 8 7	SEQUENTIAL NUMBER - 0 3 2	REVISION NUMBER - 0 0	0 4	OF 0 7

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

Cause of the Event:

There were three causes of this event: 1) PECO PBAPS Engineering Design personnel failed to provide a design to PECO PBAPS Construction which incorporated the necessary separation of electrical cables, 2) design documents were inadequate for the field installation personnel, and 3) PECO Quality Control failed to identify this nonconforming condition.

Corrective Actions:

1. All Modification 1457 ZA and ZB cables were wrapped between their conduit exits and the entrances to Panels 20C818 and 20C819 with Thermoflex 1200 fiberglass tape to establish separation. The Thermoflex 1200 fiberglass tape acts as a fire barrier for internally-generated electrical faults. This barrier has been approved by Philadelphia Electric Company Engineering and is in accordance with IEEE 384-1974. At the conduit ends, the wrap was extended into the conduit as far as practical. After wrapping, the conduits were sealed to the wrapping. The seal and wrap forms a continuous barrier from cable to conduit. The cables from each conduit were strapped to the vertical riser and a one inch separation between cable bundles of different channels was maintained.
2. Cable trays ZD2VC035 and ZD2VA035 were covered top and bottom with fire retardant barriers. These barriers extend along the trays until a separation of twelve inches between ZA conduit ends and the cables in the trays is established. The twelve inch separation is in accordance with IEEE 384-1974.
3. Signal and equipment ground cables strapped to Conduit ZD2S698 were rerouted to provide adequate separation.

These corrective actions were documented in Nonconformance Report CD-P-946 and Nonconformance Report CD-P-981.

These corrective actions were completed by December 30, 1987.

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	LER NUMBER (6)			PAGE (3)		
		YEAR 8 7	SEQUENTIAL NUMBER 0 3 2	REVISION NUMBER 0 0			

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Actions to Prevent Recurrence

As an action to prevent recurrence, retraining was held for the PECO Engineering Design group, PECO PBAPS Quality Control group and the PECO PBAPS Construction group to reinforce the fact that cable routing and separation criteria must be included in the designing and installation of electrical cables. This action was completed by December 30, 1987.

Additionally, raceway installation notes and details are being rewritten to make the notes and details easier to understand by the installation personnel and more clearly define the design and review responsibilities. This action will be completed by October 7, 1988.

Engineering diagrams for cable and raceway installation are being reviewed to ensure that the reference to the design specifications (E-1315, "Conduits and Cable Tray Symbol Notes and Details", and E-1317, "Wire and Cable, Notes and Details for Power Control and Instrumentation") have been incorporated. This review will be completed by April 8, 1988.

Previous Similar LER Occurrences:

Since 1984, one LER (2-85-23) has been submitted concerning the failure to comply with cable routing and separation criteria.

Cause Code: A3 - Failure to follow rules
 B1 - Code and regulation compliance inadequate
 B11 - Quality control inadequate

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

TEXT (if more space required, use additional NRC Form 365A's) (17)

ATTACHMENT I
LER 2-87-32

Systems and Equipment Affected by Internally Generated
Electrical Faults Due to Lack of Separation Criteria

1. Reactor water level signal that provides auto initiation of the Residual Heat Removal System, Core Spray System, Low Pressure Coolant Injection System, Reactor Core Isolation Cooling System, High Pressure Coolant Injection System and Automatic Depressurization System.
2. Pressure compensated reactor water level indication
3. Reactor Core Isolation Cooling System
 - a. Automatic Isolation
 - b. Turbine Exhaust Condensate Drain Isolation
 - c. Steam Line Leak Detection TE-4939 B, D
4. Reactor Pressure Indication for Post Accident Monitoring
5. Core Spray
 - a. Pump 2DP37 4KV Breaker
 - b. Suction Valves 2-14-07D, 2-14-011B, 2-14-0012B
6. Residual Heat Removal System pump 2DP35 4KV Breaker and associated suction valve
7. Control Room Vent Duct Radiation Monitoring Channel B
8. Control Room Emergency Vent Fan Motor OBV-30
9. Diesel Generator 0DG12
10. Emergency Service Water discharge valve
11. High Pressure Service Water pump 3DP42
12. 4.16KV Emergency Auxiliary Switchgear 20A18
13. Auxiliary Circuit for Emergency Auxiliary Switchgear Circuit Breaker 152-1801, 152-1808
14. 125 VDC power supply to
 - a. Emergency Lighting Transfer Switch
 - b. Emergency Shutdown Panel 2BC43
 - c. Reactor recirculation pump M-G Set B Control
 - d. RPS M-G set output monitor
 - e. Annunciator Termination Cabinet 20C256
15. Uninterruptible AC Power to High Pressure Service Water pump bay level controller LC-3804A & B

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	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 7	- 0 3 2	- 0 0	0 7	OF	0 7

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

16. Turbine Generator & Transformer Relaying Unit Protector Group A & B
17. Reactor Feed Pump A518
18. CAD system solenoid valve SV-4948B, SV-4949B, SV-4950B, SV-4951B, SV-4961B and SV-4961D.
19. Neutron Monitoring System
 - a. Startup range neutron monitoring
 - b. Source Range Monitor and Intermediate Range Monitor Drive Control Relay
20. Primary Containment Isolation System
 - a. Torus vacuum relief valve SV-2502A
 - b. Containment Drywell Exhaust Bypass Valve A-2509
21. Recirculation M-G set A and B Auxiliary AC circuit
22. Hydrogen Water Chemistry System
23. Main Control Room Annunciator
 - a. Reactor Containment Cooling and Primary Containment Isolation
 - b. Reactor Core Isolation Cooling System
 - c. Process radiation monitoring
 - d. Plant services
 - e. Feedwater System
 - f. Audio Tone Transmitter panel 20C509

PHILADELPHIA ELECTRIC COMPANY

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March 7, 1988

Docket No. 50-277

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Washington, DC 20555

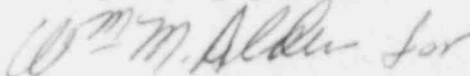
SUBJECT: Licensee Event Report
Peach Bottom Atomic Power Station - Unit 2

This LER concerns the failure to comply with cable routing and separation criteria as provided in the PBAPS UFSAR Section 7.1.6.1 and 8.4.

Reference: Docket No. 50-277
Report Number: 2-87-32
Revision Number: 00
Event Date: November 10, 1987
Report Date: March 7, 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)(v). This submittal was delayed due to a breakdown in communications between the Peach Bottom Compliance Group and Peach Bottom Licensing Section which delayed the processing of this report. Additional time was also needed by PECO Engineering in the identification of the systems affected by this design error, and identifying the root cause.

Very truly yours,



R. H. Logue
Assistant to the Manager
Nuclear Support Division

cc: W. T. Russell, Administrator, Region I, USNRC
T. P. Johnson, NRC Resident Inspector

IE 2/2
1/1