

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Peach Bottom Atomic Power Station - Unit 3 DOCKET NUMBER (2) 0500002781 OF 05 PAGE 3

TITLE (4) Two PCIS Actuations Caused by an Overvoltage Relay Being Out-of-Calibration Which Allowed the RPS Breakers to Trip Due to Voltage Fluctuations

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:
05	20	88	88	003	01	09	27	88			050000

OPERATING MODE (9) N THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

20.402(a)	<input type="checkbox"/>	20.408(a)	<input checked="" type="checkbox"/>	20.72(a)(1)(iv)	<input type="checkbox"/>	72.71(b)	<input type="checkbox"/>
20.408(a)(1)(ii)	<input type="checkbox"/>	20.36(a)(1)	<input type="checkbox"/>	20.72(a)(2)(iv)	<input type="checkbox"/>	72.71(c)	<input type="checkbox"/>
20.408(a)(1)(iii)	<input type="checkbox"/>	20.36(a)(2)	<input type="checkbox"/>	20.72(a)(2)(v)	<input type="checkbox"/>	OTHER (Specify in Abstract below and in Text, NRC Form 305A)	<input type="checkbox"/>
20.408(a)(1)(iv)	<input type="checkbox"/>	20.72(a)(1)(i)	<input type="checkbox"/>	20.72(a)(2)(vi)	<input type="checkbox"/>		
20.408(a)(1)(v)	<input type="checkbox"/>	20.72(a)(1)(ii)	<input type="checkbox"/>	20.72(a)(2)(vii)	<input type="checkbox"/>		
20.408(a)(1)(vi)	<input type="checkbox"/>	20.72(a)(2)(i)	<input type="checkbox"/>	20.72(a)(2)(viii)	<input type="checkbox"/>		

LICENSEE CONTACT FOR THIS LER (12) NAME: U. C. Birely, Senior Engineer - Licensing Section TELEPHONE NUMBER: 215 841-5048 AREA CODE: 215

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 you 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 May 20, 1988 and on May 22, 1988, a Unit 3 Primary Containment Isolation System Group III inboard isolation and a half reactor scram occurred on the Unit 3 Startup feed, which was caused by the trip of the Reactor Protection System (RPS) alternate feed breakers. The RPS alternate feed was in service at the time of both events because the 'A' RPS motor-generator (M-G) set was blocked out-of-service. There were no adverse consequences as a result of this event. All equipment operated as designed. Therefore, in the event of an accident, any radioactive release would have been precluded. The cause of the event was an RPS overvoltage relay which drifted out of calibration. An investigation indicated that the RPS, load center, and emergency auxiliary transformers were lightly loaded, thereby increasing the RPS sensitivity to fluctuations in the 13 kV voltages which allowed the out-of-calibration relay to trip. To prevent recurrence of this event modifications will be performed to replace the static inverter and RPS overvoltage and undervoltage relays.

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		YEAR 88	SEQUENTIAL NUMBER 003	REVISION NUMBER 01	OF	05

TEXT (If more space is required, use additional NRC Form 365A 1/17)

Unit Conditions Prior to the Event:

Unit 3 was in the Cold Condition with the reactor mode switch in the 'REFUEL' position, and the fuel offloaded to the fuel pool.

The 'A' Reactor Protection System bus was being supplied by its alternate feed because the 'A' RPS motor-generator (M-G) set was blocked out-of-service.

Description of the Event:

On May 20, 1988 at 2316 hours, and again on May 22, 1988 at 0933 hours, a Unit 3 Primary Containment Isolation System (PCIS) Group III inboard isolation and a half reactor scram occurred on the Unit 3 startup bus which was caused by the Reactor Protection System (RPS) alternate feed breakers. The unplanned actuation of an engineered safety feature (ESF) is reportable under 10 CFR 50.73 (a)(2)(iv). The RPS alternate feed was being used at the time of the event because the 'A' motor-generator (M-G) set was blocked out-of-service. The Group III isolation normally would have initiated the 'C' Standby Gas Treatment System (SBGTS) fan and the 'B' SBGTS filter. However, the 'C' SBGTS fan was blocked out-of-service. A complete list of equipment affected during these events is listed in Attachment A.

Consequences of the Event:

There were no adverse consequences of this event. All operable equipment actuated as designed (See Attachment A). The 'C' SBGTS fan normally initiates on a Unit 3 Group III inboard isolation signal. However, the fan was blocked, thus preventing it from starting on the receipt of the isolation signal. However, the 'B' fan was available and would have automatically started, if an outboard isolation had occurred. Therefore, in the event of an accident, any potential release of radioactivity would have been precluded. If this had occurred during fuel movement or during power operation, the ESF actuations would have occurred in the same manner to divert the ventilation flow of effluents through the SBGTS.

The RPS scram logic operates on a "one-out-of-two, twice" principle which requires a scram signal to occur on two channels of the logic for a full scram to occur. Because only one channel tripped no rod motion would have occurred.

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

Cause of the Event:

The cause of the event was initially attributed to the RPS, load center, and emergency auxiliary transformers being lightly loaded at the time of the event, thus making the RPS sensitive to voltage fluctuations on the 13 kV bus. The normal RPS transformer load is 65 amps; however, the load was 20 amps at the time of the event. The corresponding RPS overvoltage trip for 20 amps was calculated at 492 V instead of the normal 500 V overvoltage trip. The load center transformer had no measurable load, while the emergency auxiliary transformer was approximately 15% loaded.

Subsequent to the second event (May 22), the load dispatcher was contacted and indicated that the 230 kV system voltage were normal (approximately 238kV at 0400 hours and 233 kV at 0930 hours, just prior to the event). The No. 343 Startup Transformer load tap changer maintained its set voltage range of 13.7 to 13.9 kV. With the emergency auxiliary transformer being lightly loaded, the 4 kV bus range was being maintained between 4.2 and 4.3 kV. With 13.8 kV on the No. 343 Startup Transformer, the RPS voltage was determined to be approximately 487 V. Therefore, minor system voltage changes could have resulted in the 492 V RPS overvoltage trip point being exceeded, initiating the isolation and half scram.

Although problems were initially suspected with the RPS, load center, and emergency auxiliary transformer load tap changer settings, further investigation revealed that an RPS overvoltage protective relay had drifted out of calibration. Thus, the voltage fluctuations on the RPS bus in combination with the lightly loaded transformers caused the relay to trip resulting in the Group III inboard isolation and half scram.

Corrective Actions:

The RPS alternate feed breakers were reclosed and the feed was returned to service within approximately 15 minutes. The isolations and the half scram were reset within an hour. Ventilation was returned to its normal configuration within 1 1/2 hours.

On May 22, the No. 343 Startup load tap changer was placed in manual operation to accommodate lowering the 13.8 bus voltage to

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

13.6. This allowed the 4 kV bus voltage to be maintained at 4160 V, thus, making the RPS less sensitive to voltage changes.

Actions Taken to Prevent Recurrence:

Modification 1359 has been initiated to replace the static inverter and selected 120 VAC cables, relocate the RPS alternate feed to the distribution panel supplied by the new inverter, and add an adjustable voltage transformer between the inverter and RPS protection panel. This modification will minimize voltage fluctuations, hence reducing the probability of RPS and PCIS actuations due to voltage fluctuations. In addition, the RPS overvoltage and undervoltage relays will be replaced with upgraded relays, which have a "trip condition present" light and a harmonic filter module, as part of Modification 1916 (which provides for extra protection to breaker shunt trip coils in the RPS protection panels). The new relays will also provide additional protection from RPS actuations by screening voltage harmonic frequencies produced by the static inverter which could reach the sensing circuitry. These modifications will be completed by April, 1989.

The transformer load tap changer settings are being evaluated as part of the station voltage study. The settings will be adjusted as necessary throughout the duration of the study. Although the load tap changer settings are no longer considered to be a contributing factor in the cause of this event, the setting adjustments will further enhance the protection of RPS and PCIS from overvoltage and undervoltage transients.

EIIS Codes for Systems and Components:

The EIIS codes for the systems and components are as follows: Plant (reactor) Protection System (RPS) - JC; Containment Isolation Control System (PCIS) - JM; Emergency/Standby Gas Treatment System (SBGTS) - BH; isolation valves - ISV; fan - FAN; transformer - XFMR; rod (control) - ROD.

Previous Similar Occurrences:

LERs 3-87-06 and 3-88-01 addressed PCIS actuations as a result of overvoltage conditions resulting in RPS bus breaker trips.

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		88	003	01	05	OF 05

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

ATTACHMENT A

<u>Valve Number</u>	<u>Description</u>	<u>Valve Positions</u>	
		<u>Before Isolation</u>	<u>After Isolation</u>
SV-9100	N2 Compressor Suction	Closed	Closed
AO-3520	Air Purge Supply Inlet	Closed	Closed
AO-3521B	Torus Air Purge	Closed	Closed
SV-3671A- SV3671G	O2 Analyzer Samples	Closed	Closed
AO-3506	Drywell Vent Valve	Closed*	Closed
AO-3511	Torus Vent Valve	Open	Closed
AC 3509	Drywell 2"Vent Relief	Closed	Closed
AO-3513	Torus 2" Vent Relief	Closed	Closed
SV-5966A SV-5966F	CAD Gas Sample	Closed	Closed
AO-30641	Refuel Floor Exhaust	Open	Closed
AO-30453	Refuel Floor Supply	Open	Closed
AO-30463	Reactor Building Exhaust	Open	Closed
AO-30458	Reactor Building Supply	Open	Closed
AO-30467	Equipment Cell Exhaust	Open	Closed

\* Valve blocked out-of-service at the time of the event.

## PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET  
 P.O. BOX 8699  
 PHILADELPHIA, PA. 19101  
 (215) 841-4000

September 27, 1988

Docket No. 50-278

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 Washington, DC 20555

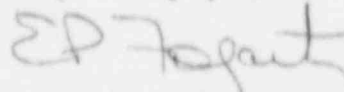
SUBJECT: Licensee Event Report  
Peach Bottom Atomic Power Station - Unit 3

This revised LER concerns two events where Primary Containment Isolation System Group III inboard isolations occurred due to Reactor Protection System alternate feed trips.

Reference:	Docket No. 50-278
Report Number:	3-88-03
Revision Number:	01
Event Dates:	May 20 and May 22, 1988
Report Date:	September 27, 1988
Facility:	Peach Bottom Atomic Power Station RD 1, Box 208, Del. a, PA 17314

This revised LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv). This LER is being revised to forward the results of the investigation to determine the cause of the event. The changes are indicated by a bar in the margin adjacent to the revised text.

Very truly yours,



E. P. Fogarty  
 Manager  
 Nuclear Support Division

cc: W. T. Russell, Administrator, Region 1, USNRC  
 T. P. Johnson, NRC Senior Resident Inspector  
 T. E. Magette, State of Maryland  
 INPO Records Center

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