

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 8
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TITLE (4) Actuation of Primary Containment Isolation System Resulting During an Interruption in Offsite Power

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MCNTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)
1	2	3 0 8	7 8 7	0 3 0	0 1	0 4	2 9	8 8	PBAPS Unit 3		0 5 0 0 0 2 7 8

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	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 80.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 80.73(a)(1)	<input type="checkbox"/> 86.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 80.73(a)(2)	<input type="checkbox"/> 80.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 80.73(a)(2)(i)	<input type="checkbox"/> 80.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 80.73(a)(2)(ii)	<input type="checkbox"/> 80.73(a)(2)(viii)(B)							
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 80.73(a)(2)(iii)	<input type="checkbox"/> 80.73(a)(2)(x)								

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME W. C. Birely, Senior Engineer - Licensing Section		AREA CODE 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 NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	
X	610	IRILY A	11019	Y						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (16)		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)			<input checked="" type="checkbox"/> NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (15)
Abstract: 2-87-30 Revision 1

At 0910 hours on December 30, 1987, a partial loss of offsite power initiated the actuation of the Primary Containment Isolation System (PCIS) of both Units 2 and 3. The unexpected actuation of an engineered safety feature, the PCIS, makes this event reportable. Offsite power was interrupted when a crane made contact with an energized transmission line maintained by another utility. The loss of power from this line resulted in a fast transfer of four of the eight 4kV busses to the alternate source of offsite power. The PCIS and fast transfer functioned as designed and the diesel generators were available, but unchallenged. The "2A" Reactor Protection System Motor Generator (RPS M/G) set tripped, resulting in PCIS Group III and RBVS inboard isolations and a half-scrum signal to Unit 2. No control rod motion occurred, and there were no adverse consequences as a result of this event. PECO's investigation shows that the RPS M/G set trip was caused by the failure of the time delay relay (Agastat Model #7022AD). The relay failure is attributed to age. These relays have been added to the preventive maintenance program.

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

Acronyms Used in this Report:

CRD - Control Rod Drive
 ESF - Engineered Safety Feature
 M/G - Motor Generator
 MSL - Main Steam Line
 PCIS - Primary Containment Isolation System
 RBVS - Reactor Building Ventilation System
 RCS - Reactor Coolant System
 RHR - Residual Heat Removal
 RPS - Reactor Protection System
 RWCU - Reactor Water Cleanup System
 SBGTS - Standby Gas Treatment System

Unit Conditions Prior to the Event:

Unit 2 was in the Cold Shutdown Condition with reactor coolant temperature at 144 degrees F. The "B" RHR pump was in service for shutdown cooling. The "B" RWCU pump was in service, exhausting to the radwaste system. The "A" CRD pump was in service to provide makeup and maintain RCS level.

Unit 3 was in the Refueling mode, with the core off-loaded to the spent fuel pool.

Description of the Event:

At 0910 hours on December 30, 1987, de-energization of the No. 2 Startup Source initiated a PCIS Group II inboard isolation on Unit 2; and PCIS partial Group I, Group II and RBVS outboard isolations on Unit 3. The "2A" RPS M/G Set tripped resulting in PCIS Group III and RBVS inboard isolations and a half-scream signal to Unit 2. PCIS Group I includes the MSL, Group II includes the RHR System and Group III includes the Primary Containment ventilation systems. The unexpected actuation of an ESF, the PCIS, makes this event reportable. The events leading to and following the actuation are described below.

The electrical distribution for Peach Bottom includes four 4 kV emergency busses for each Unit 2 and 3. Each of these eight busses is powered by the two independent offsite power supplies. The No. 2 Startup Source is the normal supply to two busses on each unit. Upon loss of the normal supply, a fast transfer to

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TEXT (if more space is required, use additional NRC Form 386A (1/77))

the alternate supply is made. To prevent overloading during the fast transfer, all loads on the bus are shed. The 480v load centers are re-energized after a three second lockout.

At 0910 hours, the 220-08 transmission line, which fed the No. 2 Startup Source, tripped when a crane made contact with an energized line which is owned and maintained by another utility. The grounding caused the fast transfer of the E12, E32, E23 and E43 4kV emergency busses to the No. 3 Startup Source. The automatic three-second lockout de-energized the load centers, thus initiating these actions:

Unit 2: Inboard PCIS Group II Isolation
RPS Channel "A" M/G Set Trip
"A" Channel Half-Scram
Inboard PCIS Group III Isolation
SBGTS Start
Inboard RBVS Isolation

Unit 3: Partial Outboard PCIS Group I Isolation
Outboard PCIS Group II Isolation
Outboard RBVS Isolation

The Unit 2 RPS "A" M/G set trip de-energized the bus and resulted in the generation of a half scram signal and the inboard PCIS Group III and RBVS isolations, with SBGTS initiation. By design, the inertia of the M/G set flywheel would assure a constant voltage to the RPS logic for up to 10 seconds, thereby preventing a half scram and isolations during a fast transfer. This did not occur for the "2A" M/G set. Table 1 lists the individual components which were affected by the transient.

The 220-08 line was re-energized by 0915 hours from the Nottingham Substation; however, the busses were not returned to this line until after 1045 hours when the load dispatcher verified the reliability of this line. At 0925 hours, resetting the isolations began with restarting the Unit 3 RBVS. At 1025 hours, shutdown cooling was restored to Unit 2; and by 1029 hours, fuel pool cooling was restored to both units. At 1250 hours, the Unit 2 "A" M/G set returned to service, the half-scram signal was cleared, and the final isolations reset. At 2205 hours, the E12, E23, E32 and E43 busses were normalized to the No. 2 Startup Source. The elapsed out-of-service times and the times returned are recorded on the enclosed Table 2 for each system.

The EIIS codes for the systems described in this report are: JM - Containment Isolation System (PCIS); FK - Switchyard System; EK -

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Emergency Onsite Power System (Diesel Generators); AA - Control Rod Drive System (CRD); NH - Reactor Containment; SB - Main/Reheat Steam System (MSL); VA - Reactor Building Environmental Control System (RBVS); CE - Reactor Water Clean-Up System (RWCU); BH - Emergency/Standby Gas Treatment System (SBGTS); DA - Fuel Pool Cooling and Purification System; SD - Condensate System; and TB - Main Generator System.

The EIIS codes for the components described in this report are: CRN - Crane; SSBU - Substation Bus; BU - Bus; DG - Diesel Generator; MG - Motor Generator Set; P - pump; XFMR - Transformer; CHA - Channel; RLY - relay; ROD - rod (control rod); RPV - reactor vessel; and GEN - generator.

Consequences of the Event:

The consequences of this event are considered to be minimal. The fast transfer of the four 4kV busses functioned as designed. The diesel generators were available, but unchallenged. The PCIS functioned properly in response to the fast transfer and the isolations were re-set. No control rod movement is associated with a half scram, and the control rods remained fully inserted in Unit 2. Since both units have been shut down since at least April 1, 1987, the residual heat loads were small. Unit 2 RCS temperature increased one Fahrenheit degree during the transient.

The event could have been more severe if the transient had occurred during a unit startup, when both units are supplied by offsite power, RCS pressure is low and one or two condensate pumps are in service. A partial loss of offsite power could result in one or both condensate pumps tripping, which could cause a reactor scram on reactor vessel low water level.

If the units had been operating at the time of the event, the transient would have been less severe. The PCIS isolations would have occurred; but the plant loads, being supplied by the unit generators, would have been less vulnerable to offsite power reliability. Even with a higher decay heat load, the consequences would be minimal. Station Procedure GP-12, "Core Cooling Procedure" outlines alternative sources of coolant make up and heat removal. During this event, these alternatives were available for both units and spent fuel pools.

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Cause of the Event:

The cause of the event is twofold. The Group III and RBVS inboard isolations resulted from the "2A" RPS M/G Set trip. PECO's investigation shows that the M/G set trip was caused by a failure of the time delay mechanism of the M/G set time delay relay (Agastat Model #7022AD). The cause of the other isolations was the incident outside the Graceton Substation, when a crane contacted an energized line, tripping the 220-08 transmission line that fed the No. 2 Startup Source.

Corrective Actions:

Using General Plant Procedure GP-8, "Primary Containment Isolation", as guidance, the PCIS Group I, II and III isolations and RBVS trip were reset on both units. The No. 2 Startup Source was restored on-line with power from the Nottingham Substation, thereby restoring station reliability. The utility responsible for the Graceton Substation was notified of the event.

Action Taken to Prevent Recurrence:

The original relay, Agastat model #7022AD, was replaced. This relay had a delay range of 5 to 15 seconds. The replacement, Agastat model #7022AC, has a time delay range of 1.5 to 15 seconds. The replacement results in the setpoint, 5 seconds, lying mid-span of the delay range. This enhances the relay's performance. Also, these time delay relays have been included as part of the preventive maintenance program. Annual maintenance and inspection will help ensure that all of the mechanisms are in acceptable condition and function correctly.

Previous Similar Events:

Cause Code: C99 - Other External Cause
B99 - Other Deficiency (relay failure)

Peach Bottom LERs 2-86-10, 2-87-04, 2-87-15 and 2-87-16 involved isolations due to partial losses of offsite power. The cause of LER 2-87-16 was a crane hitting an energized line at a PECO substation.

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Table 1

Unit 2 PCIS Group II Inboard Isolation

- MO-10-17 RHR Shutdown Cooling Suction Valve closed
- MO-10-18 RHR Shutdown Cooling Suction Valve closed
- MO-10-32 RHR Head Spray Valve stayed closed
- MO-12-15 Reactor Water Cleanup Suction Valve closed
- MO-12-68 Reactor Water Cleanup Valve closed
- AO-20-94 Drywell Equipment Drain Valve closed
- AO-20-82 Drywell Floor Drain Valve closed
- AO-2969A Drywell Instrument Nitrogen Valve closed
- "A" Control Rod Drive Pump Trip
- "B" Reactor Water Cleanup Pump Trip
- "A" Station Air Compressor Trip
- Fuel Pool Cooling Trip
- "B" RHR Pump Trip (Shutdown Cooling)

Unit 2 PCIS Group III Inboard Isolation

- AO-2507 Vent to SBGTS stayed closed
- AO-00475-1 SBGTS A Inlet Valve opened
- AO-00475-2 SBGTS A Outlet Valve opened
- AO-20469-1 Equipment Cell Exhaust Valve opened
- AO-20470-1 Refueling Floor Exhaust Valve opened
- PO-20465 Equipment Cell Exhaust to SBGTS opened
- PO-20466 General Area Exhaust to SBGTS opened
- OAV-20 SBGTS fan start

Unit 2 Reactor Building Ventilation System Inboard Isolation

- AO-20453 Refuel Floor Supply Valve closed
- AO-20461 Refuel Floor Exhaust Valve closed
- AO-20458 Reactor Building Supply Valve closed
- AO-20463 Reactor Building Exhaust Valve closed
- AO-20467 Equipment Cell Exhaust Valve closed

- 2AV15 Refueling Floor Supply Fan Trip
- 2BV15 Refueling Floor Supply Fan Trip
- 2CV15 Refueling Floor Supply Fan Trip

- 2AV17 Refueling Floor Exhaust Fan Trip
- 2BV17 Refueling Floor Exhaust Fan Trip
- 2CV17 Refueling Floor Exhaust Fan Trip

- 2AV14 Reactor Building Supply Fan Trip
- 2BV14 Reactor Building Supply Fan Trip
- 2CV14 Reactor Building Supply Fan Trip

- 2AV16 Reactor Building Exhaust Fan Trip
- 2BV16 Reactor Building Exhaust Fan Trip
- 2CV16 Reactor Building Exhaust Fan Trip

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2AV18 Equipment Cell Exhaust Fan Trip
2BV18 Equipment Cell Exhaust Fan Trip

Unit 3 Partial PCIS Group I Outboard Isolation
MO-2-77 Main Steam Line Drain Valve closed

Unit 3 PCIS Group II Outboard Isolation
AO-20-83 Drywell Floor Drain closed
AO-20-95 Drywell Equipment Drain closed
AO-3969B Drywell Instrument Nitrogen closed

"B" Service Water Pump Trip
"B" Circulating Water Pump Trip
"C" Station Air Compressor Trip
Fuel Pool Cooling Trip

Unit 3 Reactor Building Ventilation System Outboard Isolation

AO-30452 Refueling Floor Supply Valve closed for 3 seconds and reopened
AO-30462 Refueling Floor Exhaust Valve closed for 3 seconds and reopened
AO-30457 Reactor Building Supply Valve closed for 3 seconds and reopened
AO-30464 Reactor Building Exhaust Valve closed for 3 seconds and reopened
AO-30468 Equipment Cell Exhaust Valve closed for 3 seconds and reopened

3AV15 Refueling Floor Supply Fan Trip
3BV15 Refueling Floor Supply Fan Trip
3CV15 Refueling Floor Supply Fan Trip

3AV17 Refueling Floor Exhaust Fan Trip
3BV17 Refueling Floor Exhaust Fan Trip
3CV17 Refueling Floor Exhaust Fan Trip

3AV14 Reactor Building Supply Fan Trip
3BV14 Reactor Building Supply Fan Trip
3CV14 Reactor Building Supply Fan Trip

3AV16 Reactor Building Exhaust Fan Trip
3BV16 Reactor Building Exhaust Fan Trip
3CV16 Reactor Building Exhaust Fan Trip

3AV18 Equipment Cell Exhaust Fan Trip
3BV18 Equipment Cell Exhaust Fan Trip

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Table 2

<u>Component/System Returned to Normal Status</u>	<u>Time (24 hrs)</u>	<u>Time Out of Service</u>
Unit 3 Reactor Building Ventilation	0925	15 minutes
Unit 3 Drywell Floor Drain Pump Equipment Drain Pump Instrument Nitrogen	0935	25 minutes
Unit 2 Fuel Pool Cooling Unit 3 Fuel Pool Cooling	1020	1 hr. 10 min.
Unit 2 Shutdown Cooling	1025	1 hr. 15 min.
Unit 2 Drywell Floor Drain Pump Equipment Drain Pump Instrument Nitrogen RWCU Isolation Reset and RWCU Pump Returned to service	1130	2 hrs. 20 min.
Unit 2 "A" M-G Set Half Scram Reset Reactor Building Ventilation	1250	3 hrs. 40 min.
E12, E23, E32, E43 busses normalized to No. 2 Startup Source	2205	12 hrs. 30 min.

PHILADELPHIA ELECTRIC COMPANY

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April 29, 1988

Docket Nos. 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 and 3

This revised LER concerns the unexpected actuation of the Primary Containment Isolation System due to an interruption of off-site power. When the original LER was submitted January 29, 1988, PECO was investigating the root cause of the event. We committed to provide a supplement by May 2, 1988 to provide additional information regarding the results of our investigation.

Reference: Docket Nos. 50-277 and 50-278
Report Number: 2-87-30
Revision Number: 01
Event Date: December 30, 1987
Report Date: April 29, 1988
Facility: Peach Bottom Atomic Power Station
RD 1, Box 208, Delta, PA 17314

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

Very truly yours,



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

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

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