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10CFR 50.73

September 16, 2003

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Peach Bottom Atomic Power Station (PBAPS) Unit 2
Facility Operating License Nos. DPR-44
NRC Docket Nos. 50-277

Subject: Licensee Event Report (LER) 2-03-03

This LER reports an automatic scram and other plant operational events that resulted from a Main Generator Lockout due to a ground on the main generator bus. In accordance with NEI 99-04, the regulatory commitment contained in this correspondence is to restore compliance with the regulations. The specific methods that are planned to restore and maintain compliance are discussed in the LER. If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

John A. Stone
Plant Manager
Peach Bottom Atomic Power Station

JAS/djf/CR 168589/168689/168859/168816

Attachment

cc: PSE&G, Financial Controls and Co-owner Affairs
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INPO Records Center
H. J. Miller, US NRC, Administrator, Region I
R. I. McLean, State of Maryland
M. J. Buckley, US NRC, Senior Resident Inspector (Acting)

CCN 03-14074

IE22

bcc:

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SUMMARY OF EXELON NUCLEAR COMMITMENTS

The following table identifies commitments made in this document by Exelon Nuclear. (Any other actions discussed in the submittal represent intended or planned actions by Exelon Nuclear. They are described to the NRC for the NRC's information and are not regulatory commitments.)

Commitment	Committed Date or "Outage"
In accordance with NEI 99-04, the regulatory commitment contained in this correspondence is to restore compliance with the regulations. The specific methods that are planned to restore and maintain compliance are discussed in the LER.	In accordance with the Corrective Action Program

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Peach Bottom Atomic Power Station, Unit 2	05000 277	1 OF 7

4. TITLE

Generator Bus Ground Caused by Foreign Material Results in Automatic Scram

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
07	22	03	03	– 03 –	00	09	16	03	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1
10. POWER LEVEL	100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)		50.36(c)(1)(i)(A)	X	50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)	OTHER
20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	X	50.73(a)(2)(i)(B)		50.73(a)(2)(vii)	
20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)	

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Ellen P. Anderson - Regulatory Assurance Manager	(717) 456-3588

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

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

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

At approximately 1345 on 7/22/03, Unit 2 automatically scrammed as a result of a fast closure of the Main Turbine Control Valves. This was a result of a Main Generator lockout due to a generator neutral high voltage ground fault. Control rods fully inserted and Primary Containment Isolation System (PCIS) Group II / III isolations were received, as expected. At approximately 1358 hours, a Main Steam Line Isolation Valve closure occurred due to a Group I PCIS actuation. The actuation was a result of high area temperatures in the vicinity of the main steam lines caused by a loss of normal ventilation due to the Group II / III isolations. A reactor scram signal was also received as a result of the Group I isolation. The Reactor Core Isolation Cooling (RCIC) system controller was observed to have an inappropriate response while controlling reactor water level in that the RCIC system flow was oscillating (a condition that was subsequently determined to be a Technical Specification inoperable condition). A reactor scram occurred at approximately 1615 hours during transition to reactor level control using the feedwater / condensate system. The generator bus fault occurred when foreign material in the isophase bus duct came in contact with a bus conductor. This foreign material was identified as remnants of failed isophase bus cooling fan belts that had previously failed. The foreign material was removed, thereby resolving the bus ground. Design changes are in progress to add isophase bus fan belt debris guards.

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

Unit Conditions Prior to the Event

Unit 2 was in Mode 1 and operating at approximately 100% rated thermal power when the event occurred. At the time of the event, the 'A' Standby Gas Treatment (SBGT) (EIIS: BH) Fan (EIIS: FAN) was out of service for planned preventative maintenance. There were no other structures, systems or components out of service that contributed to this event.

Description of the Event

At approximately 1345 on 7/22/03, Unit 2 automatically scrammed as a result of a fast closure of the Main Turbine Control Valves (EIIS: FCV). The Control Valve fast closure was a result of a generator (EIIS: GEN) lockout due to a momentary generator neutral high voltage ground fault. Control rods fully inserted and Primary Containment Isolation System (PCIS) (EIIS: JM) Group II / III isolations and a Standby Gas Treatment (SBGT) System initiation were received, as expected, as a result of reaching the Level 3 Reactor water level set point. Additionally, both Recirculation Pumps (EIIS: P) tripped as expected as a result of the End-of-Cycle Recirculation Pump trip logic inputs from the Turbine Control Valve closure. Reactor level control was maintained by the 'C' Reactor Feed Pump and the scram was reset by 1355 hours.

At approximately 1358 hours, a Main Steam Line Isolation Valve (MSIV) (EIIS: ISV) closure occurred due to a Group I Primary Containment Isolation System (PCIS) actuation. The Group I PCIS actuation was a result of high area temperatures in the vicinity of the main steam lines caused by a loss of normal Reactor Building ventilation due to the Group II / III isolation that occurred at approximately 1345 hours. As a result of the MSIV closure, reactor water level decreased and a reactor scram occurred as a result of reaching the Level 3 reactor water level signal. Main Steam Relief Valves (MSRVs) C, D, E, F, and L opened on high reactor pressure and subsequently closed. MSRVs were initially used for pressure control. Reactor Core Isolation Cooling (RCIC) (EIIS: BN) and High Pressure Coolant Injection (HPCI) (EIIS: BJ) were subsequently placed in service by Operations personnel to control reactor pressure and water level. The RCIC controller (EIIS: TC) was observed to have an inappropriate response while controlling level in that the RCIC system flow was oscillating (a condition that was subsequently determined to be a Technical Specification inoperable condition). The RCIC controller was placed in the manual mode for level control and the RCIC system was subsequently secured. The reactor water level was then controlled with HPCI. The reactor scram signal and PCIS Group II / III isolations were reset by approximately 1408 hours. The Group I PCIS isolation was reset by approximately 1525 hours and the MSIVs were re-opened.

At approximately 1615 hours, a scram signal was received when the Level 3 reactor water level was reached. This low level was reached during the transition of reactor level control from HPCI back to the normal feedwater / condensate system. The operating direction at this time was to reduce plant pressure to below 600 psig which would result in cooler condensate being used for level control through the feedwater system. HPCI was removed from service to prevent a high reactor water level trip of HPCI since the reactor depressurization would cause reactor water level to swell.

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

Description of the Event, cont.

During the transition performed by operations personnel (licensed, utility), reactor level initially rose due to the condensate injection, however reactor level was in the lower end of the procedurally controlled band. As cooler condensate water entered the reactor, level began to shrink and reached the Level 3 reactor level setpoint resulting in the scram. PCIS Group II / III isolations and a SBGT initiation were also received as a result of reaching the Level 3 reactor water level set point.

The PCIS Group II / III isolations and scram were reset by approximately 1623 hours.

Prompt NRC notifications were completed by approximately 1735 hours on 7/22/03. These notifications include the Reactor Protection System (RPS) (EIIS: JC) scram actuations, the Group I / II / III PCIS isolations and the discharge of water from an Emergency Core Cooling System (i.e. HPCI) into the reactor vessel.

This report is being submitted pursuant to 10CFR50.73 (a)(2)(iv)(A) due to valid actuations of the Reactor Protection System, the Primary Containment Isolation System, the HPCI System, and the RCIC System.

This report is also submitted pursuant to 10CFR50.73 (a)(2)(i)(B) to report a condition prohibited by Technical Specifications due to RCIC being inoperable in excess of 14 days. The RCIC flow control system had been improperly adjusted in 1994 and was originally reported in LER 2-02-01.

Analysis of the Event

There were no actual safety consequences as a result of this event.

All control rods inserted on the reactor scram signal. The Group I / II / III PCIS isolations resulted in the primary containment isolation safety function being met. All isolation valves closed as required.

HPCI, MSRV, RPS and Recirculation Pump Trip safety functions operated as designed.

The initial scram is bounded by the design basis event entitled, 'Electrical Load Rejection (or Turbine Trip) with Bypass'. During this event, the plant safety systems responded as necessary. This event did not involve operations that exceeded the design basis.

The scram associated with the PCIS Group I isolation is bounded by the design event entitled 'Isolation of All Main Steam Lines'. However, since the isolation occurred at 0% reactor power, the event was significantly bounded by the analyses for the design event. All control rods were already inserted into the reactor prior to the scram. The normal heat sink was subsequently restored for plant cooldown.

Although RCIC was operated and initially performed its overall intended function of controlling reactor water level for this event, subsequent analysis of the oscillations of the RCIC flow resulted in RCIC being considered inoperable.

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Analysis of the Event, cont.

Technical Specification Surveillance Requirement (SR) 3.5.3.3 requires that RCIC be capable of developing a flow rate greater than or equal to 600 gpm. The oscillations in flow cycled above and below this flow value. Therefore, the SR requirement was considered to not be met, resulting in an inoperable condition. However, since RCIC was still able to be used manually to fulfill the function of controlling reactor water level, RCIC was considered available. Had the reactor water Level 2 setpoint been initially reached, RCIC would have automatically started as designed and injected water into the reactor vessel at an average rate greater than the design reactor boil off rate for vessel isolation.

The Group I isolation on high steam line area temperature was not indicative of any actual steam line breaches. The isolation occurred due to the loss of normal reactor building ventilation as a result of the GP II / III isolation which caused the temperature to increase in the vicinity of the main steam lines. The Group I isolation occurred as designed. The Group I isolation occurred approximately 13 minutes after the initial scram and therefore, significant residual reactor heat had already been removed through the normal heat sink.

The scram associated with the low reactor water level when transitioning from HPCI to normal feedwater did not significantly impact plant safety. All control rods were already inserted into the reactor prior to the scram. Reactor level was subsequently controlled using feedwater / condensate with no further significant issues.

A Conditional Core Damage Probability (CCDP) study was performed. The results of this analysis determined that this event was not risk significant.

Cause of the Event

The cause of the scram is due to a generator lockout resulting from a generator neutral high voltage ground fault. This fault occurred when foreign material in the isophase bus duct (EIIS: DUCT) came in contact with a bus conductor. The foreign material was tested and found to be conductive. The ground that led to the scram occurred following the swapping of isophase bus fans (A to B) at approximately 1255 hours on 7/22/03. This fan swap caused flow perturbations that resulted in the foreign material moving within the duct work and coming in contact with the generator bus conductor (EIIS: BU).

This foreign material was identified as remnants of failed isophase 'B' fan belts (EIIS: DRIV) that were discovered to be failed during routine operator rounds on 1/21/03. The B isophase fan belts were promptly replaced on 1/21/03. The root cause investigation performed following the 7/22/03 scram determined that not all of the remnants of the failed fan belts from the 1/21/03 fan belt repair activity were retrieved by the involved maintenance technicians (utility, non-licensed). The fan is motor driven using 6 fan belts. On 1/21/03, 2 of the 6 fan belts were discovered to have failed while the fan was running. The design of the isophase bus fan is such that some remnants of the failed fan belts were drawn into the suction of the operating fan and therefore, were introduced into the isophase bus work.

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Cause of the Event, cont.

It was determined that a design weakness existed in that there were no debris guards to prevent intrusion of fan belt foreign material into the fan suction. The isophase bus fan (including belts) is not classified as safety related equipment.

The cause of the Group I PCIS isolation on high area temperature near the main steam lines was due to an overly sensitive design of the main steam line tunnel temperature sensing instruments (EIIS: TE) on Unit 2. The temperature sensing instruments are located in ductwork in close proximity to the area around the main steam lines. This results in a very sensitive condition when normal reactor building ventilation is lost to the main steam line tunnel area on a Group II / III PCIS isolation. Normal heat from the main steam lines and other piping in the tunnel can directly cause a sudden rise in temperature sensed by the temperature elements due to their close proximity to the main steam line tunnel area. This temperature rise was exacerbated by high summer ambient temperatures.

The cause of the RCIC inoperability was due to an improperly adjusted needle valve in the turbine governor system. This improper adjustment was most likely made during testing activities in October 1994. Additional investigation concluded that there existed insufficient procedural guidance concerning the adjustment of the governor needle valve (EIIS: SCO) in 1994. For condensate storage tank (CST) to CST operations of RCIC during normal test conditions, the flow is routed through a throttled valve. In the reactor injection mode, flow is routed through check valves. Injection through check valves result in quicker flow rate changes as the check valves open. For the normal test line-up in CST to CST mode, the needle valve setting is not as crucial than it is for the Reactor injection mode.

The scram at approximately 1615 hours occurred when transitioning from HPCI to feedwater / condensate for level control. Just prior to the scram, the Control Room Supervisor (utility, licensed) directed the Reactor Operator (utility, licensed) to not continue lowering reactor pressure due to concerns with potentially exceeding the cool down rate. By continuing to reduce pressure, a higher condensate flow rate could have been injected into the reactor vessel due to the lower reactor pressure. Also, at the time that pressure reduction was halted, reactor level was in the lower portion of the level control band. Additionally, the investigation determined that the operating procedure specified a reactor water level control band that was close to the reactor water level scram setpoint when considering instrument inaccuracies and their associated setpoints.

Corrective Actions

The isophase bus duct work was inspected and foreign material was removed, thereby resolving the bus ground. Design changes are in progress to add isophase bus fan debris guards to both Units 2 and 3 isophase bus fan systems. This design change will ensure that failed fan belt debris would not be able to enter the isophase bus system through the fan inlets. Isophase fan belt inspection and maintenance is being evaluated as part of the corrective action program. Personnel involved with the January 2003 isophase bus belt replacement were informed of the need to ensure all foreign material is accounted for when performing maintenance activities. Similar information will be shared with other maintenance personnel.

The design / location of the Group I PCIS temperature sensing instruments on Unit 2 is being reviewed for improvements. Additionally, a Technical Specification change concerning the temperature setpoints will be evaluated. Similar Unit 3 instruments were evaluated and were determined to be less sensitive to ambient heat due to their location in the ventilation ductwork.

The RCIC governor needle valve was readjusted to the proper setting based on industry and vendor information. An actual RCIC flow injection test to the reactor was performed to assist in confirming proper RCIC operation. The Unit 3 RCIC system was evaluated for its needle valve setting and was found to be within the proper range and therefore, Unit 3 RCIC was operable. Appropriate engineering and maintenance procedures will be enhanced to ensure that the proper RCIC governor needle valve setting is properly controlled.

The operations procedure concerning control of reactor water level for post-transient operating conditions will be evaluated to provide more margin between the lower point in the control band and the Level 3 Reactor water level scram setpoint.

Operations personnel involved with the control of reactor water level during the transition from HPCI to feedwater / condensate have been informed of this event and the importance of balancing the priorities of reactor level control with control of cool down rates. This event was shared with other operating personnel as appropriate.

The events discussed in the LER have been entered into the corrective action program. Other corrective actions are being considered as part of the corrective action program and will be implemented as appropriate.

Previous Similar Occurrences

There were no previous events identified involving scrams similar to those discussed in this LER. LER 02-01-004 reported a generator bus fault caused by a failed isophase ventilation damper. Corrective actions from that event included upgrading the damper fasteners and the preventive maintenance of the dampers. These actions would not be expected to prevent the 7/22/03 event since the 7/22/03 event involved intrusion of foreign material into the isophase bus cooling system during operations.

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Previous Similar Occurrences, cont.

Concerning the RCIC inoperability, RCIC had been identified to be inoperable in LER 2-02-01 since 1994 as a result of improper adjustment performed during a modification acceptance test subsequent to a modification of the system flow controller in 1994. The characteristics observed in LER 2-02-01 were similar to those seen in the 7/22/03 event. Corrective actions identified in LER 2-02-01 included the adjustment of the RCIC flow controller and are judged to have provided some improvement in RCIC performance. However, the needle valve mis-adjustment which occurred in October 1994 was not detected during troubleshooting in December 2002.