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Licensee: PECO Energy Company
P. O. Box 195
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Facility Name: Peach Bottom Atomic Power Station Units 2 and 3

Dates: October 9 - November 12, 1994

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EXECUTIVE SUMMARY
Peach Bottom Atomic Power Station
Inspection Report 94-25

Plant Operations

Plant operators performed Unit 2 pre-start-up, start-up, and power ascension activities well (Section 2.0).

At Unit 3, operators displayed good teamwork during the performance of several activities including: scram time testing (Section 2.0); response to a reactor scram (Section 2.1); and a load drop for main condenser waterbox cleaning (Section 2.0).

In response to a feedwater transient caused by the loss of a non-safety related static inverter, operators incorrectly interpreted parameters prior to the automatic reactor scram. While the mis-interpretation did not affect post-scram recovery actions, the operators' immediate response in classifying the event appears inconsistent with the philosophy and intent of symptom-based recovery procedures (Section 2.1).

The inspector noted two minor operational challenges during the Unit 3 start-up which were promptly corrected.

Maintenance and Surveillance

Observed surveillance test activities were performed well (Section 3.0).

PECO responded well to a 2D residual heat removal pump motor failure (Section 4.1). The motor replacement activities were well organized and minimized the amount of time that the secondary containment was breached.

The foreign material exclusion (FME) program was assessed to be effective (Section 4.2). Supervisory involvement with the FME program and FME work practices was good.

Engineering and Technical Support

The inspectors concluded that PECO's actions to two recent emergency diesel generator failures were appropriate (Section 5.0). Good engineering support to resolve recent solenoid valve and electrical breaker problems was noted (Section 5.0).

Plant Support

Two separate events occurred, involving a total of five radiation workers, where personnel entered a high radiation area without having the required dose rate monitoring equipment. Individually, these events were of low radiological consequence; however, they reflect a continuing station weakness in personnel adherence to posted boundary requirements (Section 6.0). These events are considered an Unresolved Item (URI 94-25-01).

The plant security activities were performed well (Section 6.0).

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DETAILS

1.0 PLANT ACTIVITIES REVIEW (71707)*

1.1 PECO Energy Company Activities

The PECO Energy Company (PECO) conducted normal operating and shutdown activities at Peach Bottom Atomic Power Station (PBAPS) Unit 2 and Unit 3 safely over the period.

PECO completed Unit 2's tenth refueling outage during this inspection period. The reactor was made critical on October 20, 1994, and operators performed power re-rate and power ascension testing. The unit reached 100% power on November 2, 1994, and operated at essentially 100% power for the remainder of the period.

Unit 3 began the inspection period operating at 100%. An automatic reactor scram occurred on October 11, 1994, when a static inverter fault caused a momentary loss of power to the 30Y050 panel (Section 2.1). The unit was re-started on October 14, 1994, after repairing the static inverter, and reached 100% power on October 18, 1994 (Section 2.2). A load drop to about 55% power occurred on November 10, 1994, to support cleaning of the main condenser waterboxes. Unit 3 operated at essentially 100% power for the remainder of the period.

1.2 NRC Activities

The resident and region based inspectors conducted routine and reactive inspection activities in several areas including: operations (Section 2.0); surveillance (Section 3.0); maintenance (Section 4.0); engineering and technical support (Section 5.0); and plant support (Section 6.0). The inspectors conducted these activities during normal and off-normal (backshift) PECO work hours. 21 hours of backshift and 21 hours of deep-backshift inspection occurred.

Based on a review of an event that occurred on October 16 and 17, 1994, where operators allowed the Unit 2 reactor pressure vessel (RPV) skin temperature to exceed 212 °F during restoration from the RPV pressure test, the inspectors identified an apparent uncontrolled mode change from cold shutdown to hot shutdown. As a result of this event, the inspectors provided enhanced 24-hour coverage of the Unit 2 start-up and re-rate testing from October 20 through 22, 1994. In-depth review of this event and the unit's return to power is documented in Special Inspection Report 94-26.

On October 18, 1994, the NRC held an enforcement conference, at the Region I office, to discuss an emergency service water event wherein plant operators unknowingly placed the system in an unanalyzed configuration. NRC Special Inspection Report 94-24 contains the details of this event. At the

* The inspection procedure from NRC Manual Chapter 2515 that the inspectors used as guidance is parenthetically listed for each report section.

conference, senior PECO management summarized the event, characterized its safety significance, and outlined completed and planned corrective actions. Enforcement action for this event was issued on November 21, 1994.

2.0 PLANT OPERATIONS REVIEW (71707, 70710, 60710, 93702)

The inspectors observed that operators conducted routine Unit 2 activities well, including the pre-start-up, start-up, and power ascension activities. Operators responded well to a 2D residual heat removal (RHR) pump failure (Section 4.1).

The Unit 3 control room operators were also observed to conduct routine operations well. Operators responded well, and displayed good teamwork, during the performance of scram time testing on October 8, 1994, to a reactor scram on October 11, 1994 (Section 2.1), and in performing a load drop for main condenser waterbox cleaning on November 10, 1994.

The operations crews made correct determinations of safety system operability and reportability of identified conditions. The crews adequately tracked and controlled entry into and exit from technical specification (TS) limiting conditions for operation (LCOs). The inspectors routinely verified the operability of safety systems required to support plant conditions at both units and did not identify any concerns. Housekeeping at both units was good.

2.1 Unit 3 Scram

Control room operators responded well to an automatic turbine trip and reactor scram that occurred at 11:21 a.m. on October 11, 1994. The scram, from about 80% power, occurred during a transient that resulted from an internal fault in a 120 vac uninterruptable power supply (UPS). The operators entered the appropriate transient response implementing plan (TRIP) procedures, stabilized the reactor, and completed a normal reactor cooldown. All systems responded as expected to the scram and no automatic actuation of emergency core cooling systems occurred. The NRC was notified of the event via the Emergency Notification System (ENS).

The inspectors observed the control room staff's initial and follow-up response to the scram. The crew displayed good teamwork throughout the event; however, the inspectors identified a concern in that the staff did not initially interpret plant parameters correctly. During their response to the feedwater transient, the staff incorrectly determined that a recirculation runback due to low reactor level was in progress when, in fact, reactor level was actually increasing. While this event-based interpretation of the transient did not affect post-scram recovery actions, the operators' immediate response in classifying the event did not appear consistent with the philosophy and intent of symptom-based recovery procedures. Further, the initial event classification can predispose operators to expect certain trends, which if they do not occur due to the mis-interpretation, could unnecessarily complicate recovery actions.

The plant transient occurred because the electrical output from the UPS static inverter that feeds the 30Y50 panel was momentarily interrupted due to an internal transformer malfunction. The loss of power caused a recirculation pump runback and two reactor feed pumps (RFPs) to lock up at 100% flow. As power decreased due to the runback, reactor level increased due to swell from the runback and the feedwater flow mismatch. The high reactor level initiated an automatic turbine trip, a generator lock-out, and a reactor scram from the turbine control valve fast-closure signal. Reactor water level decreased to -10 inches with a group II and a group III primary containment isolation valve actuation occurring at 0 inches.

PECO determined that the secondary winding of the UPS transformer failed. An evaluation performed at PECO's test laboratory identified that a short circuit caused by inadequate damping of transformer core vibration resulted in a break down of the insulating material between the shunt core and its coil. The capacitance bank, used for maintaining voltage high and to flatten the voltage on the output of the transformer, caused the inverter's automatic transfer to its alternate ac power supply to respond slowly, and resulted in a momentary loss of voltage to panel 30Y50. This caused the recirculation runback circuitry to activate and the 'A' and 'C' RFPs to lock-up. PECO replaced the transformer and an electrical component that displayed degraded breakdown voltage. PECO also determined that the inverter's fast transfer to the alternate ac power supply was not designed to respond to an internal fault.

During the forced outage, PECO also repaired a packing leak on the high pressure coolant injection (HPCI) system inboard isolation valve (MO-15), located and repaired an instrumentation nitrogen supply line leak, and replaced an indexer unit for the traversing in-core probe system in the drywell.

2.2 Unit 3 Startup

PECO restarted the unit on October 14, 1994, and reached full power on October 18, 1994. The inspectors observed the start-up and noted that the evolution was well controlled, that the operators acted professionally, and that procedures were followed. The inspector noted two minor operational challenges during the start-up. These involved a high ambient noise level condition in the control room and a procedural deficiency. PECO promptly addressed both issues.

The procedural deficiency involved a temporary change (TC) to general procedure GP-2, "Normal Plant Start-Up," which had not been retained during a revision to GP-2. The TC revised the temperature at which the feedwater system recirculation isolation valve (MO-38A) was to be shut during plant start-up; from approximately 440 °F to prior to exceeding 212 °F. The MO-38A valve is normally shut at power for containment isolation, and the TC had been developed as a conservative measure in response to an overtorque condition on the MO-38A valve. PECO identified the procedural deficiency and shut MO-38A prior to exceeding 212 °F. PECO also initiated a performance enhancement program (PEP) review to investigate the procedural deficiency. The inspector assessed that PECO's response to this issue was adequate.

2.3 Licensee Event Report Update

The inspectors reviewed the following Licensee Event Reports (LERs), finding them factual, and that PECO had identified the root causes, implemented appropriate corrective actions, and made the required notifications.

LER No.	LER Date	LER Title
2-94-009	9/21/94	Shutdown Cooling Isolation During Relay Replacement
3-94-005	10/11/94	Unit 3 Scram Due to a Static Inverter Failure

3.0 SURVEILLANCE TESTING OBSERVATIONS (61726, 71707)

The inspectors observed the conduct of surveillance tests (STs) to verify the use of approved procedures, the calibration of testing instrumentation, if qualified personnel performed the tests, and that test acceptance criteria were met. The inspectors verified that: STs were properly scheduled and approved by shift supervision prior to performance; control room operators were knowledgeable about testing in progress; and redundant systems or components were available for service, as required. The inspectors routinely verified adequate performance of daily STs including instrument channel checks and the jet pump and control rod operability tests. The inspectors also observed core spray system (ST-O-014-300-3), reactor core isolation cooling system (ST-O-013-300-2), and steam relief valve testing (ST-O-01A-440-2) and found PECO's performance of these tests to be acceptable.

4.0 MAINTENANCE ACTIVITY OBSERVATIONS (62703, TI-2515/125)

The inspectors observed portions of ongoing maintenance work to verify proper implementation of maintenance procedures and controls. The inspectors verified that PECO properly implemented administrative controls including blocking permits, fire watches, ignition sources, and radiological controls. The inspectors reviewed maintenance procedures, action requests (AR), work orders (WO), item handling reports, radiation work permits (RWP), material certifications, and receipt inspections. During observation of maintenance work, the inspectors verified appropriate Quality Verification (QV) involvement, plant conditions, TS LCOs, equipment alignment and turnover, post-maintenance testing and reportability review. The inspectors found PECO's activities to be acceptable.

4.1 Residual Heat Removal Pump Replacement

PECO responded well to a failure of the 2D RHR pump motor. The motor problem was discovered on October 22, 1994, when the motor breaker tripped following a pump start attempt. PECO promptly declared the 2D RHR pump inoperable and entered a seven day shutdown LCO per TS 3.5.A.4. PECO replaced the motor and exited the TS shutdown action statement on October 28, 1994.

PECO had determined that it was necessary to replace the motor after an inspection indicated that the motor windings were damaged. The motor replacement activity required that secondary containment be breached and the inspectors noted that the motor replacement activities were well organized and minimized the amount of time that the secondary containment was breached. PECO plans to perform a failure analysis on the motor to determine the cause for the winding damage. The inspector will review the results of this analysis when completed.

4.2 Foreign Material Controls

The inspector concluded that PECO's foreign material exclusion (FME) program was effective. This program is important to safety because foreign material introduction can adversely impact the operability of safety-related systems. The inspector observed that supervisory involvement with the FME program and FME work practices was good.

PECO has developed procedures for FME control during maintenance and refueling floor activities. These procedures provide good guidance on FME control and require that FME control measures be specified during the maintenance planning process. The inspector noted that the procedural section which discusses recovery from a loss of FME control could be enhanced to clarify the entry conditions for the use of this section of the procedure. The maintenance director agreed to review this issue and enhance the procedure if necessary.

The inspector reviewed the PEP database and did not identify any events where a recent maintenance activity had introduced foreign material into a system. The inspector concluded that PECO has implemented their FME program well.

5.0 ENGINEERING AND TECHNICAL SUPPORT ACTIVITIES (37551)

The inspectors routinely monitor and assess licensee support staff activities. During this inspection period, the inspectors focused on the activities discussed below.

PECO submitted a special report for the emergency diesel generator (EDG) test failures in accordance with TS 4.9.A.1.2.M. The two separate test failures involved the failure of a solenoid valve, and of an EDG outlet breaker to operate. PECO classified these events as valid failures and consequently reduced the EDG surveillance test interval to once per seven days as required by TS 4.9.A.1.2.L.

PECO's initial corrective actions (i.e. to fail the valve open) for the solenoid valve failure were considered adequate, as discussed in NRC Inspection Report 94-10. The inspector noted that these solenoid valves had a historically high rate of failure and had opened an unresolved item (Unresolved Item 94-10-01) pending their review of PECO's final disposition and review of solenoid valve failure data. During this period, PECO replaced the solenoid valves with valves manufactured by a different vendor. The

inspectors will monitor the performance of the replacement valves, and PECO's actions for other similarly affected safety-related solenoid valves. This item remains unresolved.

The EDG outlet breaker's failure to reshut following an opening operation was attributed to hardened grease which caused binding of the trip mechanism as discussed in NRC Inspection Report 94-21. PECO developed an action plan to regrease other potentially affected breakers. PECO will also review the required frequency of the preventive maintenance activities for these breakers. The inspectors concluded that PECO's actions to the EDG failures were appropriate, and will continue to review actions to the specific equipment problems discussed above.

6.0 PLANT SUPPORT (71707, 90712)

6.1 Radiological Controls

The inspectors examined work in progress in both units to verify proper implementation of health physics (HP) procedures and controls. The inspectors monitored the ALARA (As Low As Reasonably Achievable) program implementation, dosimetry and badging, protective clothing use, radiation surveys, radiation protection instrument use, handling of potentially contaminated equipment and materials, and compliance with RWP requirements. The inspectors observed that personnel working in the radiologically controlled areas met applicable requirements and were frisking in accordance with HP procedures. During routine tours of the units, the inspectors verified that a sampling of high radiation area doors were locked, as required.

The inspectors concluded that two events where radiation workers improperly entered posted high radiation areas had minimal radiological consequence; however, these events reflected a continuing station weakness in personnel adherence to posted boundary requirements. The first event occurred when two individuals from three different firewatches (4 individuals) received inadequate radiological briefings and crossed a posted high radiation area without the proper dosimetry. The second event occurred when an operations supervisor failed to notice that a normally accessible area had been posted as a high radiation area and entered the area without a briefing or the required dosimetry.

In both of these examples, the individuals were inside the posted areas for a short period of time (less than 1 minute) and received no measurable dose. The inspector determined that the first event was due to inadequate attention to detail by the health physics technician who conducted the briefing combined with the radiation workers mistaken understanding that the briefing permitted them access through the posted area without further controls. The second event was primarily attributed to less than adequate attention to detail by the operations supervisor who failed to observe the posted boundary sign. PECO initiated a PEP review to investigate these events and determine the necessary corrective actions.

Individually, these events were of low radiological consequence; however, they reflect a continuing station weakness in personnel adherence to posted boundary requirements. Technical specification 6.13.1.a requires personnel to be provided with dose rate monitoring equipment prior to entry into a high radiation area. The inspectors noted that in the two instances discussed above personnel entered the high radiation areas without having the proper radiation monitoring equipment. The licensee is evaluating further corrective actions to address this matter further. This issue is considered an Unresolved Item (URI 94-25-01). Additional inspection is planned by the NRC to establish the circumstances surrounding this issue.

6.2 Physical Security

The inspectors monitored security activities for compliance with the accepted Security Plan and associated implementing procedures. The inspectors observed security staffing, operation of the Central and Secondary Access Systems, and licensee checks of vehicles, detection and assessment aids, and vital area access to verify proper control. On each shift, the inspectors observed protected area access control and badging procedures. In addition, the inspectors routinely inspected protected and vital area barriers, compensatory measures, and escort procedures. The inspectors found PECO's activities to be acceptable.

7.0 MANAGEMENT MEETINGS (71707,30702)

The resident inspectors provided a verbal summary of preliminary findings to the station management at the conclusion of the inspection. During the inspection, the inspectors verbally notified PECO management concerning preliminary findings. The inspectors did not provide any written inspection material to the licensee during the inspection. The licensee did not express any disagreement with the inspection findings. This report does not contain proprietary information.