U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket/Report No.	50-277/96-09 50-278/96-09	License Nos. DPR-44 DPR-56
Licensee:	PECO Energy Company P. O. Box 195 Wayne, PA 19087-0195	
Facility Name:	Peach Bottom Atomic Power Station Units 2 and 3	
Dates:	November 10, 1996 - January 11, 1997	
Inspectors:	W. L. Schmidt, Senior Resident Inspector R. K. Lorson, Resident Inspector M. J. Buckley, Resident Inspector	
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EXECUTIVE SUMMARY
Peach Bottom Atomic Power Station
Inspection Report 96-09

This integrated inspection report includes aspects of resident and region based inspection of routine and reactive activities in: operations; surveillance and maintenance; engineering and technical support; and plant support areas.

Overall Assurance of Quality:

PECO Energy (PECO) operated both units safely over the period.

The plant operations review committee (PORC) provided good management focus on safety-related areas through review of technical specification (TS) issues and performance enhancement program (PEP) corrective actions. Independent safety engineering group (ISEG) and quality assurance (QA) provided good assessments of activities, equipment problems and routine plant staff programs and processes, identifying several areas for improvement, before they became areas for greater concern.

Plant Operations:

Overall the inspectors found that PECO maintained the facility and associated equipment in good condition. Further, the plant staff responded well to identified degraded equipment conditions. Operators performed well and were knowledgeable of ongoing activities and equipment status.

Operators properly used the action statement (AS) logs and the equipment status list (ESL) to identify, prioritize, and provide information to track the evaluation and corrective actions to restore degraded equipment.

PECO took appropriate corrective actions in response to Violation 96-01-02 dealing with ineffective corrective action to address past equipment and personnel problems. The inspectors also closed two licensing event reports (LERs) (2-96-011 and 2-95-005).

Maintenance and Surveillance:

PECO personnel conducted maintenance and surveillance activities well, in support of on-line maintenance and in response to equipment problems. Operators used good communications and remained aware of plant condition before, during, and after testing and maintained shift management well aware of conditions and alarm status.

PECO responded well to several equipment conditions, including a failed reactor core isolation cooling (RCIC) check valve, a malfunctioning reactor protection system (RPS) motor generator (MG) set, and a test failure of an emergency diesel generator (EDG) relay.

PECO also took good actions to address the several equipment issues, which occurred following the 1996 Unit 2 refueling outage and following an April 1996 safety-related battery overpressurization.

Maintenance personnel used good quality work packages to conduct the observed work. However, the inspector did note an instance where the seismic qualification of relays had not been accounted during package development and where documentation of completed work was less than adequate following EDG inspections. These cases appeared minor in nature and PECO took appropriate actions, however, they do indicate the need for continued management/supervisory attention.

Maintenance personnel demonstrated good knowledge and performance during the observed on-line maintenance activities. Maintenance personnel also identified and documented adverse conditions including foreign material in an residual heat removal (RHR) heat exchanger and damaged to an EDG cam shaft lobe. The inspectors did note one minor instance where a technician used inappropriate force to close a manual valve.

Engineering:

The inspectors closed Violation 96-01-01, finding that PECO took good corrective actions to address issues dealing with the calibration and monitoring of the 4 KV bus undervoltage (UV) instruments. PECO also took effective actions to address previous issues dealing with the trending of safety relief valve (SRV) tailpipe temperature as a method of identifying leakage to the suppression pool and to ensure that the updated final safety analysis report (UFSAR) reflected the configuration of the discharge canal cross tie gate.

PECO performed a comprehensive safety evaluation and design input document (DID) for modification (MOD) P479 to the average power range monitor (APRM) flow based instrumentation. PECO properly maintained the separation between the safety and non-safety components affected by the modification.

The engineering department continued to provide good support for plant operations; this included involvement in the several equipment related issues discussed in this report.

System engineering performed well in review of EDG issues. Although the cause for EDG power oscillation could not be determined, PECO initially found it not an operability issue because it only affected the EDG power at the lower to moderate loading ranges, not at rated load. The final root cause determination and any subsequent corrective measures for the oscillating power was considered in **Unresolved Item 96-09-01**.

Further, the inspectors believed that engineering could have more quickly documented the operability determination for the high EDG lubricating oil (LO) level.

Plant Support:

The inspectors noted no negative issues during routine tours of the radiologically controlled areas (RCA) of both plants, this included review of general housekeeping and radiological conditions, postings, and barriers.

PECO implemented good radiological control during the RHR heat exchanger repairs.

The inspectors did not identify any major areas of concern during protected area (PA) inspection, during day and night shifts. The security manager quickly addressed one minor concern.

The inspector verified the proper positions for yard fire main valves that supply water to safety-related plant structures from the electric and diesel fire pumps to the reactor and turbine building headers.

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SUMMARY OF PLANT ACTIVITIES

I OPERATIONS

O1 Conduct of Operations[1]

Units 2 and 3 operated at essentially 100% reactor power for the entire inspection period. PECO reduced load for control rod pattern adjustments and condenser waterbox cleaning. On December 25 Unit 2 load was reduced in response to a positive reactivity insertion caused by an unexpected isolation of the 3C feedwater heater.

O2 Operational Status of Facilities and Equipment

a. Scope:

The inspectors routinely assessed the operational status of the facility through tours of the site, including the control room and both plants. These tours included observations of general and specific equipment conditions.

The inspectors also specifically reviewed the use of the TS, technical requirements manual (TRM), and offsite dose calculation manual (ODCM), AS logs, and the status of equipment on each reactor operator's (RO's) ESL and CRDL.

b. Conclusion:

Overall the inspectors found that PECO maintained the facility and associated equipment in good condition. Further, the plant staff responded well to identified degraded equipment conditions as discussed in section M2.1 below.

The inspector found that operators properly used the AS logs and that the ESL appropriately identified, prioritized according to safety impact, and provided information to track the evaluation and corrective actions to restore degraded equipment.

O4 Operator Knowledge and Performance

a. Scope:

The inspectors verified operator knowledge and performance through direct observation and review of logs, plant instrument traces, completed procedures, and PEP documents.

b. Conclusions:

Operators performed well and were knowledgeable of ongoing activities and equipment status.

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[1]Topical headings such as O1, M8, etc., are used in accordance with the NRC standardized reactor inspection report outline. Individual reports are not expected to address all outline topics.

O7 Quality Assurance in Operations

a. Scope:

The inspector attended numerous plant operations review committee (PORC) meeting and reviewed several independent safety engineering group (ISEG) and quality assurance (QA) surveillances and audits to assess the PECO's management and independent review safety focus.

b. Observations and Findings

Plant Operations Review Committee

PORC met UFSAR quorum requirements. Discussions focused on nuclear safety issues, topics included: TS amendment request, TS bases changes, safety evaluation reviews for modifications, and the review of PEP closures. Of particular note were:

- Review of safety evaluation for engineering change request (ECR) 96-01162 - This document supported a TS amendment to modify the setpoints of the 4 KV bus undervoltage instruments, to expand allowable limits using improved setpoint methodologies. These expanded bands could increase the efficiency of the calibration and monitoring surveillance requirements (SRs) of TS.

- Review of PEP 10006093 - This PEP documented a condition identified by PECO QA during the 1996 Unit 2 refueling outage, where nuclear maintenance division (NMD) personnel lifted the reactor shield plugs higher than assumed in the heavy loads analysis. NMD management presented a clear root cause review and comprehensive corrective actions that should prevent recurrence.

- Review of safety evaluation for ECR 96-020701 - This document supports a proposed TS amendment to provide clarification for the requirements on secondary containment access doors.

Independent Safety Engineering Group

The ISEG issued several good reports documenting their review of:

- The October 6 and 15 Unit 2 reactor scrams - The focus was to determine if PECO should have been able to prevent the second scram by identifying the actual root cause following the first scram. ISEG determined that vendor test instruction for the negative phase sequence relay were inadequate and, as such, the cause for the first scram could not have been identified. However, ISEG noted that they believed following the second scram and removal of the relay, the vendor and PECO did identify the root cause for each of the scrams.

- Observation of plant activities - Several recommendations were noted, including one which stated that plant management should evaluate the adequacy of control room log entries with respect to ambiguity and closure of issues.

- Review of events and near misses - In this review ISEG looked at a sample of performance enhancement program reports for a year period - they chose 19 issues, 8 of which resulted during safety-related activities, which affected the operation of the plants. ISEG evaluated how PECO could have prevented the events through increased oversight, increased contractor proficiency, or through correction of minor hardware deficiencies. This appeared to be a good format for such a review.

- Review of Unit 3 high pressure coolant injection (HPCI) steam piping vibration - ISEG completed a very detailed report on the possible causes and the need for action to strengthen the line supports and then to identify the actual causes for correction.

Quality Assurance

The QA division conducted numerous surveillance and audits through the period. The inspector found the following reviews to have been well conducted and documented, with proper focus on positive and weak performance issues:

- Surveillance Report 96-275 - Review of plant equipment operator rounds. QA properly identified several minor weaknesses in the review of rounds data in PEP I0005315;

- Surveillance Report 96-295 - Observation of shift technical advisor (STA) and independent assessor qualification. This review included observation of simulator qualification scenarios and identified several minor weaknesses with the process for testing the knowledge of these individuals;

- Surveillance Report 96-287 - Review of reliability centered maintenance (RCM). QA found the program strong, in part, due to the involvement of the plant staff. QA did identify a weakness that the documentation of the basis for recommendations was weak. Further, QA recommended that self-assessment of the preventive maintenance program include reviews to ensure that ROM recommendations are kept up-to-date.

- Modification Installation Activities Assessment - This audit found adequate modification installation. The audit found that PECO used administrative guideline (AG) 123 as an appropriate tool for maintaining design configuration controls. However, the audit identified several issues dealing with oversight and performance of contractors, and the qualification of materials. In all cases the technical issues were resolved prior to systems being returned to service. The audit noted that the contractor concerns were similar to concerns raised in Inspection Report 96-08, dealing with the documentation of contractor qualifications.

These weaknesses were not significant, but QA had done a good job at identifying them before they could become significant.

c. Conclusions:

The PORC provided good management focus on safety-related areas through review of TS issues and PEP corrective actions. ISEG and QA provided good assessments of activities, equipment problems, and routine plant staff programs and processes, identifying several areas for improvement, before they became areas for greater concern.

08 Miscellaneous Operations and Issues

08.1 (Closed) Licensee Event Report 2-96-011, Main Steam Line Relief Valve Actuation Due to Inadvertent Movement of a Control Switch

This LER discussed the inadvertent actuation of a main steam relief valve at Unit 2. This event was discussed in Inspection Report 96-08. No new issues were identified in the LER.

08.2 (Closed) Licensee Event Report 2-95-005, Improper Drywell Pressure Recorder Monitoring

This LER discussed an error where the operators checked the drywell pressure recorder narrow range pen instead of the wide range pen as required by TSs. PECO attributed this problem to an incorrect surveillance test (ST) procedure. PECO subsequently revised the ST to ensure that the correct pen was monitored. This event is of minimal significance since the two pens are located on the same recorder and any deviations in the wide range reading would have been apparent.

08.3 (Closed), Violation 96-01-02, Inadequate Corrective Actions

The inspectors identified two examples in Inspection Report 96-06 where PECO did not implement prompt corrective actions for:

- Multiple occurrences where the bus undervoltage relays were found to be outside of their allowed calibration band;

- A 125V DC circuit breaker for the Unit 2 remote shutdown panel was found in the open position which caused portions of the remote shutdown panel to not receive alternate control power for over a year.

PECO implemented broad, comprehensive corrective actions for the first issue, including equipment performance monitoring programs and conducting an analysis to justify expansion of the calibration acceptance limits as discussed in Section **E2** of this report.

PECO had an opportunity to self-identify the 125V DC circuit breaker issue during an ST when the control switches were operated for several remote shutdown panel components and no position indication was observed. PECO initiated an action request (AR) for this issue, but the system manager's review failed to identify the mis-positioned breaker as a potential cause for the indication problem.

The inspector noted several problems in Inspection Report 96-01:

- The circuit breaker was not restored to its proper position during a clearance restoration and no formal tracking mechanism was initiated to ensure that it would be returned to its proper position.

- The system manager did not adequately review the AR and incorrectly attributed the component indication problem to dirty switch contacts.

- The ST procedure did not identify the failure to observe the proper component position indication following operation of the control switches was an operability issue.

PECO performed a PEP review of this event and identified similar problems. PECO implemented several corrective actions including:

- The shift managers reviewed the event as a case study;

- System managers' expectations for resolution of system discrepancies were clarified;

- Revision of the ST procedure.

The inspector determined that PECO took adequate corrective actions and this violation is closed.

a. Conclusions:

The inspectors closed Violation 96-01-02 dealing with ineffective corrective action to address past equipment and personnel problems. The inspectors also closed two LERs (2-96-011 and 2-95-005).

II MAINTENANCE AND SURVEILLANCE

M1 Conduct of Maintenance and Surveillance

The inspectors routinely observed operators and maintenance, chemistry, and radiation protection personnel conduct maintenance and surveillance activities.

M1.1 Conduct of Maintenance

The inspector performed in-depth review of several on-line maintenance outages, including the 3B RHR sub-system and the E2 and E4 EDG and several equipment-related issues as discussed in sections M4 and M2, respectively.

M1.2 Surveillance Activities

The inspectors reviewed routine and post-maintenance surveillance testing conducted during the period on the following system areas:

- RCIC (see section M2.1)
- station batteries (see section M2.3)
- RHR
- EDGs
- core spray (CS)
- emergency service water (ESW)
- recirculation system drive flow-core flow correlation check
- primary containment drywell to torus bypass test

M1.3 Conclusions - Conduct of Maintenance and Surveillance

PECO personnel conducted maintenance and surveillance activities well, in support of on-line maintenance and in response to equipment problems. Operators used good communications and remained aware of plant condition before, during, and after testing, and maintained shift management well aware of conditions and alarm status.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Significant Maintenance Related Equipment Challenges

a. Scope:

The inspectors assessed PECO's actions to address equipment problems that occurred during this report period and also reviewed corrective actions for several equipment issues identified in previous reports. The inspectors, through observation and review of activities, verified that PECO took appropriate actions to ensure reliable and safe operation of safety-related structures, systems and components (SSCs).

b. Observations and Findings:

Recent Equipment Problems:

- Reactor Core Isolation Cooling Check Valve Failure - Unit 3

PECO responded well to an apparent malfunction of a RCIC gland seal barometric condenser check valve during testing. On January 3, 1997, while performing RT-O-013-725-3 "RCIC RESPONSE TIME TEST," the RCIC VAC TANK HI PRESS alarm activated unexpectedly. PECO personnel determined that the gland seal barometric condenser check valve 3-13C-38 to the torus had stuck closed. This check valve has two functions: to open to allow flow from the barometric condenser to the torus gas space and to close to act as a primary containment isolation valve (PCIV). Since this valve had not functioned properly, PECO considered it inoperable, and unlocked and closed the upstream stop valve 3-13C-10 per TS, which then acted as the PCIV.

Maintenance disassembled and installed new internals into check valve 3-13C-38 and initiated an analysis to determine the cause of the failure. The local leak rate test (LLRT) performed, using ST/LLRT 30.13.07 Rev 4, "LLRT RCIC VACUUM PUMP DISCHARGE", after the repair activities verified check valve operability. A RCIC system operating test verified check valve operation, allowing flow from the barometric condenser to the suppression pool.

PECO properly conducted the LLRT following the repairs, determining a leakrate of 1700 cc/min of both the check valve and the closed manual valve. This leakrate exceeded PECO's single valve leakage criteria limit of 500 cc/min, but not the penetration operability limit of 9000 cc/min.

After maintenance technicians identified problems with the procedure for determining the leakrate of the check valve by itself the outage manager in consultation with the system manager and LLRT coordinator declared the penetration operable. PECO based this on the 1700 cc/min being less than the 9000cc/min requirement and within the allowable limit when added to the Unit 3 running containment leakage total.

- Reactor Protection Motor Generator Voltage Controller Failure - Unit 3

PECO took very good actions following the failure of the voltage controller on the 3A RPS MG set following an ST. Operators noted that the voltage appeared to be pulsing and placed the reactor protection bus on the alternate feed. Engineering performed a troubleshooting activity determining that the voltage regulator had experienced a rectifier diode failure, which caused the machine to receive half of a sinusoidal wave vice a constant DC signal.

- High Relay Resistance E4 Emergency Diesel Generator

The inspector reviewed PECO's immediate and followup response to an E-4 EDG 59GX relay high contact resistance condition, which had been identified during IC-C-11-04011, "Calibration Testing of Auxiliary Relays," on November 13. The IC-C-11-04011 testing was performed as a preventive maintenance test. The E-4 59GX relay provides a close permissive signal to the E-4 EDG output breakers.

PECO promptly replaced the E-4 59GX relay. Additionally, PECO entered TS AS 3.8.1.B.4 to evaluate the susceptibility of the other EDGs to a 59GX common mode relay problem. PECO sent the original E-4 59GX relay to their corporate laboratory for evaluation, and the relay problem was attributed to an inappropriate test methodology. PECO determined the remaining EDGs were not susceptible to a common mode 59GX relay failure.

PECO identified several problems with the IC-C-11-04011 test procedure including:

- The relay was tested at its minimum relay pickup voltage (approximately 60V) instead of the minimum design relay terminal voltage (103V);

- The test procedure did not provide contact resistance limits nor verify that system design assumptions were satisfied;

- The test configuration (i.e., low voltage, low current) was not representative of the actual relay operating conditions.

A similar model 59GX relay was tested in a configuration representative of the actual relay operating conditions and consistent, low resistance contact values were recorded. PECO is reviewing the auxiliary relay test program. The inspector reviewed the 59GX test data, IC-C-04011 and the testing performed at the corporate laboratory and agreed with PECO's conclusion regarding the high contact resistance readings.

Previous Equipment Issues

- #12 Generator Bearing Failure - Unit 2

PECO NMD and engineering personnel conducted a detailed root cause evaluation for the failure of the #12 bearing which occurred following the start-up from the 1996 Unit 2 refueling outage, as documented in PEP I0006190. PECO concluded that the failure resulted from electrical current flow through the generator shaft to the bearing surface and then to ground. PECO determined that problems with a modification to the generator shaft grounding device and poor review of routine test data led to the potential and to not identifying the bearing damage prior to overheating.

- Battery Cell Overpressurization - Corrective Actions - Unit 3

PECO engineering conducted a detailed root cause analysis, following an April 1996 safety-related battery cell failure. The specific root cause could not be determined, however, PECO believes that an internal battery arc ignited the hydrogen in the upper portion of the cell.

As reported in Inspection Report 96-03:

- On April 14, following the equalizing charge of the Unit 3A 125 V battery cells 45 through 58, the maintenance electrician reported hearing a loud pop and found that cells 49 and 50 (contained in a single jar) had blown a hole on the lid of the jar. The flash arresters were found cracked and the lid had separated from the jar. Further, a significant vertical crack, which extended down the backside of the jar allowed some electrolyte seepage. PECO declared the battery inoperable, attached and verified the spare bank, and declared the battery operable, while maintaining DC bus voltage.

- By applying vendor manual guidance, IEEE practices, and new improved TS notes, PECO could have limited the need for equalizing charges and additional sampling to monitor electrolyte specific gravity (SG). Specifically, the vendor manual stated that to set a representative sample the electrolyte should be sampled at a point 1/3 down from the top of the plate and that a 12" stem on hydrometer would accomplish this. PECO had not been following these recommendations.

- Although the inspector concluded that PECO responded well, the specific root cause for the cell over-pressurization had not been previously determined.

Subsequently, during this report period the inspector found that PECO completed the following:

- The system manager conducted an extensive investigation in conjunction with the battery vendors, consultants, and other utilities, concluding that the most likely cause was a poor weld internal to the cell. During charging this could have caused an increase in electrical resistance or an arc in the cell's combustible airspace. The battery vendor considers their welding practices within acceptable tolerances since only potentially 10 such failures occurred in 20 years or approximately 100,000 cells in service.

- The licensee implemented battery cell thermography inspection to identify and allow for replacement of cells with internal weld cracks that could potentially cause sparking. Since starting this monitoring, PECO has not identified any hot areas in the 125VDC station batteries, but did identify problems on the 2A 24VDC nuclear instrumentation battery.

- Procedures revision to prevent unnecessary moving of cells after installation and the use of newly purchased 'user-friendly' digital hydrometers for SG have been incorporated into ST-0-57B-750-2/3, "125/250 VDC STATION BATTERY WEEKLY INSPECTION" and ST-0-57B-720-2/3, "2BD001 AND 2DD001 STATION BATTERY QUARTERLY INSPECTION." These actions should prevent recurrence of unrepresentative SG readings.

The inspector considers the PECO actions to followup the battery cell overpressurization and to ensure proper use of hydrometers to determine SG well planned, thorough, and effective.

- (Closed) Licensee Event Reports 2-96-009 and 2-96-010

The inspectors reviewed and closed the following LERs which dealt with equipment issues following the 1996 Unit 2 refueling outage:

2-96-009	Two reactor scrams due to generator trip caused by the actuation of the negative phase sequence relay.
2-96-010	HPCI system inoperable due to mis-alignment of outboard booster pump bearing.

b. Conclusion:

PECO responded well to the several equipment conditions that occurred during this period, which included:

- A failure of the Unit 3 RCIC containment isolation check valve during surveillance testing. Maintenance, operations and engineering personnel took appropriate actions to isolate the penetration, perform repairs and conduct the retest.

- A failure of 3A RPS MG set voltage regulator. Operators, the system manager, and the instrument and control (I&C) department performed well to isolate the problem and perform corrective maintenance.

- A test failure during EDG relay resistance verification. I&C and engineering performed well in identifying and correcting several good issues to improve the testing methodology, and in demonstrating that the issue did not affect the other operable EDGs in a generic sense.

The inspector found that PECO took appropriate action to address and report several past equipment issues, including several equipment problems following the Unit 2 refueling outage in October 1996.

In review of a safety-related battery cell failure (no loss of battery operability) in early 1996, the inspector found that PECO could not identify a specific root cause, but did develop several possible causes which dealt with the internal manufacturing methods. The inspector also found that PECO took actions to revise the electrolyte SG sampling methods to ensure that sample result provide accurate and consistent indications of battery health.

M3 Maintenance Procedures and Documentation

a. Scope:

While observing and monitoring of completed activities, the inspectors reviewed work packages and maintenance procedures, to ensure they provided suitable direction to maintenance personnel in the establishment of plant/equipment conditions and in completion of work.

b. Observations and Findings:

PECO provided good quality packages for the RHR and EDG work, which provided necessary information, drawings, and procedures. The inspectors noted several minor concerns dealing with work packages and the documentation of completed work as discussed below.

Relays Seismic Qualification During On-line Maintenance

Following review of a previous maintenance activity, the inspector questioned the seismic qualification of relays on an open 4160 volt safety-related breaker panel door, specifically, if the door housed relays associated with other operable circuit breakers. The inspector observed during a previous maintenance activity on a high pressure service water pump (HPSW) breaker that maintenance personnel had the door open for an extended period of time during breaker lifting mechanism preventive maintenance; on the door were the undervoltage relays for the operable offsite power source, not associated with the breaker being worked on. The inspector discussed this issue with the PECO system manager who responded that he would look into the issue. Subsequently, the system manager issued an AR and a shift update notice (SUN) documenting that the relays were not specifically qualified for a seismic event with the doors open. As such, the engineer directed that

maintenance fabricate and operations use two lateral struts, secured with C clamps between the open door and the panel frame to provide support to the door in the event of a seismic event, during such maintenance activities.

Lack of Documentation During Electrical Maintenance

PECO personnel properly used procedures and documented inspection findings during EDG on-line maintenance. However, in one case the inspector observed that the prerequisite steps necessary for reassembly of the E2 generator following cleaning and inspection had been completed, but had not been signed off in the official copy of the work package. The inspector discussed this with the maintenance department supervision, who stated that this did not meet their expectations. The maintenance department supervision took appropriate actions to reinforce the need to sign off steps in procedures as they are completed.

c. Conclusions

Maintenance personnel used good quality work packages to conduct the observed work. However, the inspector did note an instance where the seismic qualification of relays had not been accounted during package development and where documentation of completed work was less than adequate following EDG inspections. These cases appeared minor in nature and PECO took appropriate actions, however, they do indicate the need for continued management/supervisory attention.

M4 Maintenance Staff Knowledge and Performance

a. Scope:

The inspectors reviewed two on-line maintenance outages and numerous other activities as documented in this section of the report.

b. Observations/Findings:

PECO maintenance personnel were knowledgeable and performed well during the on-line maintenance outage discussed below.

Reactor Core Isolation Cooling Check Valve Leakrate Testing - Unit 3

The technicians maintained a good questioning attitude and stopped the test before any potential equipment damage could take place, i.e., the relief valve lifting or overpressurizing the barometric condenser. The maintenance supervisor effectively identified the troubleshooting section of this procedure for review and revision. PECO outage management provided direction at the maintenance site and did a credible coordination of the engineering/technician interface.

The inspectors did note one poor work practice issue while observing LLRT of the RCIC check valve discussed above. The inspector determined that while use of a pipe wrench to increase the closing force on the manual hand valve was a poor practice, it did not affect

the outcome of the LLRT. The inspector discussed the inappropriateness of applying this added force to the valve with the maintenance supervisor who had also observed the activity.

Residual Heat Removal Sub-System Outage - Unit 3

PECO performed well during the 3B (B and D pumps) residual heat removal sub-system outage during the week of January 6. The work schedule and daily meetings properly controlled and tracked the activities, which included seal welding of the 3D RHR heat exchanger to limit leakage to the high pressure service water (HPSW) system, routine preventive maintenance (PM) activities, and electrical relay and instrument calibrations.

During disassembly of the 3D heat exchanger, prior to seal welding, PECO identified foreign material on the RHR side (shell) in low flow areas. Maintenance personnel properly documented the existence of this material on a non-conformance report (NCR) and removed what could be captured. PECO engineering completed a review of the materials removed and properly documented a use-as-is resolution to the NCR, prior to returning the system to an operable status.

The inspector observed the functional check of the three (one per phase) over-current protection relays for the 3B RHR pump. The technicians performed the work order (WO) activity well, including verification that the relays provided associated alarms and breaker trip functions when the appropriate current settings were input, following calibration. Each of the relays consists of three elements designed to sense current and provide alarms and breaker trips, when necessary, to protect the pump motor and/or the associated bus, as follows: an inverse time delay unit (51TOC) actuates if the current exceeds it variable setpoint for a specific time, two instantaneous units (50) provide protection for a locked pump rotor (i.e., pump motor not turning) and a phase fault to ground.

The inspector verified that the WO calibrated the relays, in accordance with the appropriate overload coordination scheme, to ensure consistent selective tripping of loads. The inspectors reviewed the overcurrent relay coordinations scheme and the control wiring. The coordination diagram established the trip point of the three elements based on a normal running current of 255 amps and a normal starting current in-rush of approximately three times the normal running value; the inverse time 51TOC unit is set at the lowest value of 320 amps at 1000 seconds, as its trip point increases, the time for a trip to occur decreases to 2800 amps at 4 seconds; the locked rotor instantaneous current was set at 480 amps and overlaps the 51TOC curve; and the instantaneous faulted current was set at 2800 amps. The circuit breaker control wiring established: a pump overcurrent alarm in the control room if the 51TOC unit tripped; and a breaker trip and pump tripped alarm if the instantaneous locked rotor current unit tripped followed by the 51TOC trip. This provides motor protection but also allowed for the normal in-rush of current during a normal start; and a breaker trip if the faulted current unit tripped, to protect the associated bus.

During this review the inspector identified a minor problem with a control room alarm response card. The alarm response procedures for pump overcurrent stated that the fault condition combined with the 51TOC caused the breaker trip. This was not correct since

the faulted condition by itself will cause a breaker trip and the time delay plus the locked rotor will cause a breaker trip. The inspector discussed this issue with the operations support staff who agreed and will change the procedures.

Emergency Diesel Generator Outages

During the period PECO conducted the yearly preventive maintenance outages on the E2 and E4 emergency diesel generators. The inspectors found that the maintenance personnel and the vendor support was very good. The activities included normal engine and generator inspections and calibration of relaying and instrumentation. The inspectors found that the work control processes and scheduling functioned well and that work was completed within the scheduled time periods. On the E2 machine, visual inspection identified a cam shaft lobe that showed signs of degradation. Following identification of this, PECO developed a plan to replace the affected section of the cam shaft. The inspector observed portions of the work, finding good practices and foreign material controls in force.

c. Conclusions

Maintenance personnel demonstrated good knowledge and performance during the observed on-line maintenance activities. Maintenance personnel also identified and documented adverse conditions, including a portion of a RCIC LLRT that could not be performed as written, foreign material in an RHR heat exchanger and damaged to an EDG cam shaft lobe. The inspectors did note one minor instance where a technician used inappropriate force to close a manual valve.

III ENGINEERING

E1 General Engineering Comments

E1.1 Average Power Range Monitoring Flow Bias Instrumentation Modification - Unit 2

a. Scope:

The inspector reviewed modification P479 (MOD 479) which replaced the analog APRM flow bias instrumentation with a digital controller. The APRM flow bias instrumentation generates the flow signals for the APRM flow biased scram and rod block functions.

b. Observations and Findings:

The MOD P479 design input document and safety evaluation were prepared well and comprehensive. The safety evaluation reviewed applicable sections of the USFAR, transient response of the digital controller, and potential failure modes. The DID considered several design issues, including separation of the flow signal from the safety related APRMs.

The DID stated that safety grade (Q) fuses would provide the separation between the digital controller flow output signals and the APRMs. The inspector verified, for one of the boundary fuses (FBA-F7), that replacement fuses were designated as Q grade.

c. Conclusions:

The safety evaluation and DID for MOD P479 were comprehensive. PECO properly maintained the separation between the safety and non-safety components affected by the modification.

E2 Engineering Support of Facilities and Equipment

a. Scope:

The inspectors reviewed several recent equipment issues in which the PECO engineering organization played the major role in evaluating. In this case, both dealt with the EDGs as discussed below. In these reviews, the inspectors assessed PECO's ability to respond to these conditions and the effectiveness of their evaluations.

The inspectors also reviewed PECO's actions address to several previous equipment issues dealing with the trending and tracking of SRV tail pipe temperatures and documentation in the UFSAR of previous modifications to the discharge canal. The inspectors also reviewed the corrective actions taken by PECO in response to Violation 96-01-01 dealing with the calibration of the 4 KV UV relays.

b. Observations and Findings:

Recent Equipment Problems

- (OPEN) Unresolved Item 96-09-01: Emergency Diesel Generator Power Fluctuations

While performing ST-O-052-211-2, "E1 Diesel Generator Slow Start Full Load And IST Test," on December 10, 1996, the local and control room operators observed power swings of 250 KW and frequent fluctuations (60.5 to 59.5 Hz) when increasing and decreasing generator load through its mid range (1200-1450 KW). The operators observed no oscillations at rated load test (2600KW). These oscillations reoccurred during E-1 testing on December 27, 1996, but again, not while operating at rated load. PECO initiated AR A10635510 to evaluate and investigate this condition.
The licensee, based on the power oscillations not being observed during full loading of the EDG, considered the EDGs operable and fully capable of performing its intended safety function. The inspector questioned the engineering conclusion that the observed power oscillations wouldn't affect the E-1 capability to perform its safety function. PECO had not specifically determined if the power swings in the droop mode would have any effect on the operation in the isochronous mode of operation. Independently the system manager had started an investigation of the possible causes. The inspector will continue to monitor PECO's action to identify and correct the causes for these power fluctuations.

- Emergency Diesel Generator High Sump Level

On December 18, during routine rounds of the E-3 EDG, the equipment operator found the LO crankcase sump level three inches above the upper scribe mark and documented the condition in action request A1065099. Later, the level had increased to 4.0 inches above the scribe mark and stabilized at that level.

The E-3 had successfully been run on December 10. Oil analysis proved water intrusion had not caused the increase in sump level. Further engineering investigation determined that the engine driven LO pump check valve (CHK-0-52A-10085C) had leaked oil back to the crankcase sump and caused the raised level. Through discussions with the system manager regarding the starting sequence of the EDG during testing and emergency operation and review of the EDG technical manual, the inspector determined that the sump level would not prevent proper emergency starting of the EDG. PECO has determined that this condition would not affect the safety function of the E-3 EDG. The inspector noted that the documentation of the operability assessment took several days, and could have been completed in a more timely manner.

A similar failure occurred on E-3 EDG on January 22, 1993, as documented on AR A0657150. PECO used the previously performed loose parts analysis done following the similar failure on E-3 to verify the downstream filter and strainer would not be damaged. Although the leaking check valve was determined not to affect the operability of the E-3 EDG, the system manager scheduled it for repair during the E-3 EDG maintenance outage in May 1997.

Previous Equipment Issues

- Safety Relief Valve Testing - Unit 3

The inspector reviewed the data gathered on the SRVs during Unit 3 shutdown and restart following the 1995 refueling outage as reported in Inspection Report 95-26. The data indicated possible slight leakage from the 'E' SRV by an elevated tail pipe temperature (less than the 300°F alarm setpoint) and a rapid drop in tail pipe temperature during the shutdown depressurization. A similar review of surveillance test data, the adequacy of the surveillance testing during operation and following restart, and test data received by PECO from their testing vendor was done by the NRC inspector.

The inspector found the normal surveillance test did not provide for trending SRV tail pipe temperatures to identify possible valve leakage. The requirement in the daily log was for the tail pipe temperature to be between 120°F and 300°F only. The inspector discussed this observation with a PECO ISEG engineer who had made a similar assessment. PECO's system manager was pursuing changes to improve the trending of SRV tail pipe temperatures.

The system manager discussed the trending issue with the NRC inspector. The daily surveillance log showed temperatures for a week at a time, the high and low limits, and normal tail pipe temperature enabling immediate and direct assessment of tail pipe status. Section 5.3.1 "System Performance Trending" of Administrative Guidelines (AG-CG-003) "Systems Managers' Responsibilities" requires evaluation of significant changes. The system manager also provided the inspector, and briefly discussed, a graph of the trend for the tail pipe temperature during the period from April 1996 to December 1996. The lack of trending for tail pipe temperatures and the adequacy of criteria in the surveillance for the tail pipe temperatures have been corrected.

- Documentation of Discharge Pond Configuration

UFSAR, Section 11.6, Circulating Water System and Cooling Towers, describes the system as a once through design, water passing from the intake pond through plant loads and back to the river through the discharge pond. As reported in Inspection Report 96-01, the inspector questioned if the discharge pond to inlet gate valve, installed by modification number 1413A, which tempers the inlet pond with warm water from the discharge pond, needed to be included in UFSAR. PECO initiated action request A0987088 to review and update the UFSAR. ECR 96-01168 documented and performed this change and others identified by the licensee's review team during PBAPS UFSAR verification effort.

E2.1 (Closed) Violation 96-01-01, Emergency Bus Protective Relay Testing

The inspectors identified in Inspection Report 96-01 that (since 1989) PECO had not properly tested the 98% and 89% degraded bus UV relays to ensure that the relays would function within the TS allowable limits. Additionally, the inspectors noted multiple examples (since 1989) where PECO did not implement adequate corrective actions for UV relays found outside of the allowed calibration band. PECO performed a comprehensive (PEP) review of this event and identified a number of factors related to the inadequate testing including:

- Poor communications between the different groups involved in the development of the test procedure;
- Ineffective independent review of the test procedure;
- Knowledge weaknesses regarding test equipment and relay operation;
- An overly restrictive relay calibration band;
- Weak monitoring of equipment performance.

PECO implemented a number of broad corrective actions to ensure proper testing of the degraded bus relays and also to address the underlying causal factors which led to the event including:

- Revision of the test procedure;
- Selected review of other test procedures;
- Training of personnel on procedure writing expectations, communications, the independent review process, and test equipment;
- Performed an analysis to justify expanded TS calibration acceptance limits. The expanded limits would provide greater assurance that as found relay calibration data would be acceptable;
- PECO has implemented several programs, since the initial time of the event, to monitor equipment performance. One of the programs involves a periodic review of "as found" surveillance test data. The inspector reviewed the surveillance test

database for one of the degraded bus relays and found it to be complete, readily accessible, and that the "as found" relay performance was clearly identified with respect to the acceptance limits.

The inspector concluded that PECO took comprehensive actions and closed this violation.

c. Conclusions:

Although PECO determined the observed power and frequency oscillations not an operability issue because the power oscillations only affect the EDG power at the lower to moderate loading ranges, the licensee has yet to determine the cause. Pending review of PECOs actions to determine the cause, corrective actions, and the possible affects on the EDGs capability to perform its safety function, this issue remains unresolved. **(URI 96-09-01)**

PECO responded well to the high oil level in the E-3 EDG. The inspectors considers the operators' actions very responsive in getting the issue proper management attention. Oil sampling happened in a reasonable amount of time to rule out water intrusion. The system manager effectively evaluated this issue and came to a timely and proper operability determination.

PECO took effective actions to address previous issues dealing with the trending of SRV tailpipe temperature as a method of identifying leakage to the suppression pool and to ensure that the UFSAR reflected the configuration of the discharge canal cross tie gate. The inspectors closed Violation 96-01-01, finding that PECO took good corrective actions to address issues dealing with the calibration and monitoring of the 4 KV bus undervoltage instruments.

IV PLANT SUPPORT

R1 Radiological Protection and Chemistry (RP&C) Controls

The inspectors noted no negative issues during routine tours of the RCA of both plants. This included review of general housekeeping and radiological conditions, postings, and barriers.

PECO implemented good radiological control during the RHR heat exchanger repairs.

R1.1 Standby Liquid Control Tank Sampling

The inspector noted in Inspection Report 96-08 that the on-shift RO was not informed of a Unit 2 standby liquid control (SLC) tank sampling evolution. PECO's planned and completed corrective actions for this weakness included: placing the SLC tank sample on the station work management schedule, and a procedure revision directing more frequent communications between the RO and the chemistry technician. The inspector determined that PECO's actions were adequate.

S2 Status of Security Facilities and Equipment

Protected Area Walkdown

The inspectors did not identify any major areas of concern during PA inspection, during day and night shifts. The security manager quickly addressed one minor concern.

F2 Status of Fire Protection Facilities and Equipment

Fire System Walkdown

The inspector verified the proper positions for yard fire main valves that supply water to safety-related plant structures from the electric and diesel fire pumps to the reactor and turbine building headers.

V MANAGEMENT MEETINGS

X2 Exit Meeting Summary

The NRC conducted two pre-decisional enforcement conferences with PECO during this period:

- November 15 - dealing with maintenance rule program issues, as discussed in Inspection Report 96-07;
- December 6 - dealing with EDG modification issues, as discussed in Inspection Report 96-06.

The PECO handouts from these meeting are included as attachments to this report. The NRC sent the individual enforcement actions on these issues to PECO in letters dated January 3, 1997 and December 27, 1996, respectively.

LIST OF ACRONYMS USED

action request (AR)
action statement (AS)
administrative guideline (AG)
APRM gain adjust factor (AGAF)
as-low-as-reasonably-achievable (ALARA)
average power range monitors - neutron (APRMs)
control rod drives (CRDs)
control room deficiency list (CRDL)
control room emergency ventilation (CREV)
core power and flow log (CPFL)
core spray (CS)
core thermal power (CTP)
design input document (DID)
diaphragm alternative response test (DART)
electro-hydraulic control (EHC)
eleventh refueling outage (2R11)
emergency core cooling system (ECCS)
emergency diesel generators (EDG)
emergency preparedness (EP)
emergency service water (ESW)
end-of-cycle (EOC)
engineering change request (ECR)
engineered safety feature (ESF)
equipment status list (ESL)
functional testing (FT)
general procedure (GP)
Generic Letter (GL)
health physics (HP)
high pressure coolant injection (HPCI)
high pressure service water (HPSW)
hydraulic control unit (HCU)
improved TS (ITS)
independent safety engineering group (ISEG)
inservice inspection (ISI)
inspector followup items (IFIs)
instrument and control (I&C)
intermediate range monitor - neutron (IRM)
licensee event report (LER)
limited senior reactor operators (LSROs)
limiting conditions for operation (LCO)
load tap changer (LTC)
local leak rate test (LLRT)
loss of coolant accident (LOCA)
loss of off-site power (LOOP)
low pressure coolant injection (LPCI)
lubricating oil (LO)
modification (MOD)
motor generator (MG)
nuclear maintenance division (NMD)

nuclear review board (NRB)
offsite dose calculation manual (ODCM)
offsite power start-up source #2 (2SU)
offsite power start-up source #3 (3SU)
Peco Energy (PECO)
performance enhancement program (PEP)
plant equipment operator (PEO)
plant operations review committee (PORC)
post-maintenance testing (PMT)
primary containment (PC)
primary containment isolation system (PCIS)
primary containment isolation valve (PCIV)
protected area (PA)
quality assurance (QA)
radiologically controlled area (RCA)
rated thermal power (RTP)
reactor core isolation cooling (RCIC)
reactor engineer (RE)
reactor feed pump (RFP)
reactor operator (RO)
reactor protection system (RPS)
reliability centered maintenance (ROM)
residual heat removal (RHR)
residual heat removal (RHR)
safety evaluation report (SER)
safety related structures, system and components (SSC)
safety relief valve (SRV)
scram solenoid pilot valve (SSPV)
secondary containment (SC)
senior reactor operator (SRO)
shift technical advisor (STA)
shift update notice (SUN)
source range monitor (SRM)
specific gravity (SG)
spent fuel pool (SFP)
standby gas treatment (SGTS)
standby liquid control (SLC)
station blackout (SBO)
structure, system and component (SSC)
surveillance requirement (SR)
surveillance test (ST)
systems approach to training (SAT)
technical requirements manual (TRM)
technical specification (TS)
temporary plant alteration (TPA)
turbine bypass valve (BPV)
turbine control valve (TCV)
turbine stop valve (TSV)

undervoltage (UV)
unresolved item (URI)
updated final safety analysis report (UFSAR)

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering Observations
IP 40500: Effectiveness of Licensee Controls in identifying, Resolving,and Preventing Problems
IP 61726: Surveillance Observations
IP 62707: Maintenance Observation
IP 64704: Fire Protection Program
IP 71707: Plant Operations
IP 71750: Plant Support Observations
IP 83750: Occupational Exposure
IP 92700: Onsite Follow of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92901: Operations Followup
IP 92902: Followup - Engineer
IP 92903: Followup - Maintenance
IP 92904: Plant Support Followup
IP 93702: Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened: Unresolved Item 96-09-01

Closed: LER 2-96-011 - Main Steam Line Relief Valve Actuation Due to an Inadvertent Movement of a Control Switch

LER 2-95-005 - Improper Drywell Pressure Recorder Monitoring

Violation 96-01-02 Inadequate Corrective Actions

LER 2-96-009 - Two Reactor Scrams due to Generator Trip Caused by the Actuation of the Negative Phase Sequence Relay

LER 2-96-010 - High Pressure Coolant Injection (HPCI) Inoperable Due to Misalignment of Outboard Booster Pump Bearing.

Violation 96-01-01 Emergency Bus Protective Relay Testing

PEACH BOTTOM ATOMIC POWER STATION
NUCLEAR REGULATORY COMMISSION
PRE-DECISIONAL ENFORCEMENT CONFERENCE

NOVEMBER 15, 1996

PECO NUCLEAR

A Unit Of PECO Energy

AGENDA

Peach Bottom Atomic Power Station
Pre-decisional Enforcement Conference
November 15, 1996

Introductory Remarks	T. N. Mitchell Vice President, Peach Bottom
Apparent Violation	M. E. Warner Director, Site Engineering
Causal Factors	
Completed Corrective Actions	
Additional Actions	
Performance Monitoring	G. D. Edwards Plant Manager
Closing Remarks	D. M. Smith President and Chief Nuclear Officer PECO Nuclear

Apparent Violation

- **10 CFR 50.65 (a)(1) and (a)(2) require monitoring the performance or condition of SSC's against established goals unless the performance or condition is being effectively controlled through appropriate preventive maintenance.**

- **We acknowledge the program deficiencies identified by the NRC.**
  - 93-01 guidance not fully implemented
  - Deviations not appropriately documented

- **We have revised our Maintenance Rule program to be consistent with the NUMARC 93-01 guidance.**

Causal Factors

- Core Team mindset resulted in unrecognized deviations from NUMARC 93-01.
- Core Team underestimated the importance of documenting deviations from NUMARC 93-01.
- Early assessments were narrowly focused or were not sufficiently independent or objective.

Completed Corrective Actions

- **Revised governing document.**
  - Reflects guidance of NUMARC 93-01.
  - Added requirements for documentation.
- **Revised and validated program.**
  - Revised performance criteria.
  - Reviewed and documented bases for risk significance.
  - No systems went from (a)(2) to (a)(1).
- **Completed transfer of program ownership from the Core Team to the system managers.**
  - Reinforced the expectation that system managers own the rule for their system.
  - Core Team acting as a consultant to system managers.

Additional Actions

- Perform independent assessment of the program (4/97).

- Benchmark program against plants recognized by the NRC as having good programs (6/97).

Performance Monitoring

- **The Maintenance Rule is an important part for continued safe operation of Peach Bottom.**
- **There are existing programs for trending declining equipment performance that are focused on improved overall plant performance and safety.**
  - Performance Enhancement Program
  - Equipment Performance and Material Condition Focus List
- **We recognize the opportunity to better integrate these existing programs into the Maintenance Rule.**
- **The Peach Bottom Senior Management Team is committed to a strong Maintenance Rule Program.**

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