U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket/Report No.	50-277/96-01 50-278/96-01	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:	January 14, 1996 - March 9, 1996	
Inspectors:	W. L. Schmidt, Senior Resident Inspector F. P. Bonnett, Resident Inspector R. K. Lorson, Resident Inspector R. J. Urban, Project Engineer G. C. Smith, Senior Physical Security Specialist A. L. Bryant, Resident Intern	
Approved By:	W. J. Pasciak, Chief Reactor Projects Branch 4 Division of Reactor Projects	3-25-96 Date

EXECUTIVE SUMMARY
Peach Bottom Atomic Power Station
Inspection Report 96-01

Overall Assurance of Quality:

The inspectors identified several issues where the Updated Final Safety Analysis Report (UFSAR) did not reflect current station operating practices. None of the examples identified were safety significant; however, they did indicate a need for management focus in this area. Examples include: no discussion of the alteration of the circulating water discharge flow path in the UFSAR (Section 2.2.3); testing requirements for the alternate shutdown panels not documented in the UFSAR or an associated reference document (Section 3.8); and PECO not performing periodic Boraflex inspections committed to in 1985 (non-cited deviation)(Section 4.2).

Shift management generally made correct determinations of safety system operability and reportability of identified conditions as exemplified throughout the report. An exception was when a control room supervisor did not enter a required technical specification (TS) action statement for the main stack radiation gas recorder (Section 2.6).

PECO implemented well the Improved Technical Specifications (ITS) at both units. PECO identified and aggressively resolved several minor problems (Section 2.8). The inspectors noted a good review of a draft report by the Independent Safety Engineering Group (Section 2.9).

Plant Operations:

Operators conducted activities at both units safely over the period. These included operator response to transients and routine activities. The inspectors noted good operator performance during the loss of 343 startup source (Section 2.1), and during abnormal river level and flow conditions (Section 2.2.1). Unit 2 operators responded well to a lowering condenser vacuum (Section 2.2.2), reactor feed pump trip (Section 2.4), and a reactor water clean-up (RWCU) system relief valve actuation (Section 2.5). Unit 3 operators responded well to a hydrogen cooling leak on the main generator (Section 2.3).

Contrary to otherwise good performance, the inspectors noted minor weaknesses involving a blocking clearance applied to the RWCU system (Section 3.2), and an improper operability determination involving the main stack radiation gas monitor (Section 2.6).

Maintenance and Surveillance:

The inspectors noted good maintenance performance at both units, including: repair of a floating head seal on the 3A residual heat removal heat (RHR) exchanger (Section 3.1), repair of a leak on the Unit 3 RWCU non-regenerative heat exchanger (Section 3.2), replacement of a leaking relief valve on the Unit 2 RWCU regenerative heat exchanger (Section 2.5), and the replacement of a failed Unit 3 reactor high pressure trip unit card (Section 3.7).

Surveillance testing was performed well, including the emergency diesel generator 24-hour endurance tests (Section 3.3), alternate rod insertion logic system functional test (Section 3.4), and drywell to torus vacuum breaker test (Section 3.5).

Engineering and Technical Support:

The inspectors identified through a review of the 4 KV safety-related undervoltage (UV) relay testing procedure, that PECO was not testing to ensure that the degraded grid UV relays functioned within the settings provided in the custom TS and the new ITS. The inspectors found that PECO had not been testing to within the TS allowable values since the relays had been installed in 1989. Further, the inspectors determined that PECO had not been treating as-found calibration data outside the TS allowable values as instrument failures. The inspector found that the overall safety significance of this issue was low since, although not known clearly to PECO at the time, the setpoints used were within the calculated analytical values. However, violations of 10 CFR 50, Appendix B, Criterion XI, Test Controls and Criterion XVI, Corrective Actions, were cited because the testing was inadequate to verify operability and the calibration testing was inadequate to identify an adverse condition dealing with as-found settings. (NOV 96-01-01, NOV 96-01-02) (Section 4.1).

The inspectors identified that a 125 vdc circuit breaker supplying power to portions of the Unit 2 remote shutdown panel was not in its closed position as required by the normal system line-up. PECO determined that the breaker had been open since October 1994, that the surveillance test procedure was inadequate, that the operations and engineering review of an action request was not thorough or timely and did not identify the actual cause of the problem, and that the controls over components left in abnormal positions following removal of tags was less than adequate. The safety significance of this issue was low, however, the length of time that the issue remained undetected and unresolved concerned the inspectors. This was cited as the second example of a violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions, since PECO had the ability to and should have identified and corrected the issue in October 1994 (NOV 96-01-02) (Section 4.3).

PECO identified that a periodic inspection of the Boraflex coupons in the spent fuel pool (SFP) had not been completed for either unit. PECO performed an engineering evaluation of the SFP and determined that the integrity of the Boraflex was good. The inspector concurred that the SFP was in a safe condition due to other existing surveillance methodologies; however, the testing required by the UFSAR was not tracked well in that the inspection was not performed in the last ten years (Non-cited Deviation)(4.2.1).

The inspector reviewed PECO documents pertaining to the spent fuel pool cooling system design capacity and determined that the system design heat load was clearly defined. The inspector noted, however, that it was not clear that the refueling procedure provided adequate controls to ensure that the SFP cooling system design requirements would be maintained during a full core offload. PECO is addressing the issue (Section 4.2.2).

Plant Support:

The inspector observed that health physics technicians provided good job coverage and implemented good radiological controls during the Unit 3 A RHR and RWCU outages (Sections 3.1, 3.2, and 5.1).

The NRC conducted a security core inspection in accordance with MC 81700-Physical Security Program for Power Reactors. The inspector determined that PECO had an effective security program in place that was in compliance with the NRC-approved Security plans and applicable regulatory requirements. A review of the Security Plan identified an inconsistency between the Plan and plant practices relative to de-vitalization of certain areas during outages. PECO took immediate action to revise the Plan in accordance with the provisions of 10 CFR 50.54(p) to correct the inconsistency.

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DETAILS

1.0 PLANT ACTIVITIES REVIEW

1.1 PECO Energy Company Activities

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

Unit 2 began the inspection period operating at 100% power and remained at this power level for essentially the entire inspection period. PECO removed the reactor water cleanup (RWCU) system from service on March 8 following the lifting of a safety relief valve while placing a filter demineralizer unit in service (Section 2.5). PECO reduced unit load for other than rod pattern adjustments and the following:

- January 20 — Began unit shutdown in response to a technical requirements manual shutdown requirement due to a high river level and flowrate condition (Section 2.2.1). Power reached 50% prior to river level flowrate decreasing. The unit was returned to 100% power on January 23.

- February 3 — Power reduced to 85% for repair of a hydraulic control unit and rod pattern adjustment. Operators returned the unit to 100% power the same day.

- February 5 — Power reduced to 78% in response to a loss of condenser vacuum event caused by a clogged circulating water traveling screen during a lower than normal river condition (Section 2.2.2). Operators entered the appropriate procedures and restored the unit to 100% power.

- March 4 — A recirculation pump runback due to the 2B reactor feedwater pump (RFP) trip (Section 2.4). Operators stabilized power at about 65% and returned the unit to 100% power on March 5.

Unit 3 began the inspection period operating at 100% power and remained at this power level for essentially the entire inspection period. PECO removed from service the A residual heat removal (RHR) loop (Section 3.1) and the RWCU system (Section 3.2) to perform scheduled maintenance. PECO reduced unit load for rod pattern adjustments and the following:

- January 20 — Began unit shutdown in response to a technical requirements manual shutdown requirement due to a high river level and flowrate condition (Section 2.2.1). Power was reduced to 50% prior to river level flowrate decreasing. The unit was returned to 100% power on January 23.

- February 1 — Power reduced to 55% for condenser water box cleaning.

- February 2 — PECO identified a hydrogen leak on the Unit 3 generator neutral bushing (Section 2.3). Operators reduced power to 23% to remove the generator from the grid and effect repairs. PECO synchronized the generator back to the grid on February 4.

- February 5 — Power ascension halted at 50% power due to lower than normal river conditions (Section 2.2.2).

On January 18, PECO implemented the Improved Technical Specifications at both units (Section 2.8).

PECO performed functional testing of all degraded bus undervoltage relays at both units on January 26, to ensure that these relays were calibrated within the improved technical specifications allowed limits (Section 4.1).

PECO satisfactorily performed the 24-hour endurance test on the E1 and E3 emergency diesel generators (EDG) during the period (Section 3.3).

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 and maintenance (Section 3.0); engineering and technical support (Section 4.0); and plant support (Section 5.0). The plant support area includes the routine inspection of the security program area. (Section 5.3).

2.0 PLANT OPERATIONS REVIEW (71707, 92901, 93702)

The inspectors observed that operators conducted routine activities well at Unit 2 and Unit 3 including: the loss of the 343 startup source (Section 2.1), the power reduction that resulted from high Susquehanna River level and flow (Section 2.2.1), and lower than normal river conditions that resulted from river icing (Section 2.2.2). Unit 2 operators responded well to a reactor feed pump trip and recirculation pump runback (Section 2.4). Unit 3 operators responded well to remove the main generator from the grid to repair a hydrogen leak (Section 2.3).

The operations crews made correct determinations of safety system operability and reportability of identified conditions, except during an inoperability of a main stack radiation monitor used as an isolation signal for containment purge valves, as discussed in section 2.6. The crews adequately tracked and controlled entry into and exit from technical specification (TS) and technical requirement manual (TRM) 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 Loss of 343 Startup Source

Control room operators exhibited excellent response to a loss of the 343 startup source (343-SU) on February 28, with both units operating at 100% power and the E4 EDG running in parallel with the 2 startup (2-SU) source as part of the 24-hour endurance test. The 2-SU source was in the manual mode of operation and inoperable because of testing requirements (discussed in Section 3.3). At 11:48 a.m., the 343 SU transformer output breaker and the 343-SU breaker tripped open de-energizing the 3 emergency tie bus and 343-SU bus causing the four 4.16 KV vital busses (two at each unit), normally fed from that source, to automatically fast transfer to the alternate source (2-SU).

The bus transfer occurred as designed and the expected Group II/III primary containment isolation initiated at both units, due to the momentary bus deenergization. In addition, both units lost extraction steam to a train of feedwater heaters, resulting in a minor positive reactivity addition, to which the reactor operators (RO) immediately responded by quickly reducing reactor power about 5% with recirculation flow. The control room operators entered the appropriate Operational Transient (OT) and Off-Normal (ON) procedures and quickly stabilized both units. The control room supervisor (CRS) maintained excellent command and control throughout the transient and subsequent recovery.

The inspector noted that the shift management maintained an excellent awareness of TS LCOs. Since the 2-SU source was inoperable for E4 EDG testing, both units were in a TS LCO for the inoperable offsite source. The 343-SU source trip required entry into the LCO for the loss of two offsite sources. Based on the fact that the 343-SU bus was not immediately recoverable, shift management directed that the E4 EDG be secured and the 2-SU restored to an operable condition. This action, required by TS within 12 hours, occurred in a timely fashion; the two offsite sources being inoperable for less than 30 minutes.

PECO's engineering and electrical staff performed troubleshooting into the cause of the offsite source trip focusing in three areas. PECO tested and inspected the cables connecting the 343-SU transformer to the 343 switchgear in the plant for faults; inspected the fiber optic communication link between the bus differential current (LCB) relays for failures; and tested the 13 KV breakers and associated current transformers for abnormal conditions. PECO found no problems or anomalies during their testing.

PECO determined that an electrical instability between the North Substation and the startup switchgear in the plant was most likely to be the cause of the trip. PECO found no evidence of an instrument malfunction, but continues to focus on the LCB relays malfunctioning. The LCB relay is a differential relay designed to protect the electrical line between the North Substation and the startup switchgear in the plant. PECO replaced the LCB relays and sent the original relays to the vendor for testing. The results from the vendor indicated that the LCB relay had operated as designed. PECO, however, is re-assessing the relay's design for this application.

PECO re-energized the 343 switchgear via the 343-SU transformer on March 2 and allowed it to soak for six hours unloaded. PECO's observations during the transformer soak revealed no anomalies and the 343-SU source was fully restored to an operable condition. The inspector determined PECO's actions during the event and during subsequent troubleshooting to be thorough. As a safety precaution, for a short period of time PECO transferred the feed for the "A" reactor protection system bus to the alternate feed at both units to avoid a full scram and Group I isolation in the event the 2-SU source was lost.

2.2 Susquehanna River Level Issues Due to Weather Conditions

2.2.1 High Level and Flow Rate - Unusual Event - Dual Unit Shutdown

Between January 20 and 21, PECO properly responded to a higher than normal Susquehanna River level and flowrate condition caused by melting of upstream ice and snow. Over the period, the inspectors monitored river conditions and the intake structure water level. PECO entered and properly handled an Unusual Event (UE) and a TRM required shutdown action statement for both units due to the high river level and flowrates. The inspector toured the site on the evening of January 20 and found the operators taking the proper actions to conduct the dual unit shutdown and to monitor river conditions.

The river level at the site is dependant on the flowrate of water over the upstream Holtwood Dam, the flowrate to or from the Muddy Run pumped storage station, and the flowrate over the downstream Conowingo Dam. The flowrate from upstream is uncontrollable, the flowrate to or from Muddy Run is controllable by PECO and the flowrate over the Conowingo Dam is controlled by opening or closing spillway gates. TRM Section 3.15, for both units, requires a shutdown of both units be commenced with river level greater than 111.0 feet (ft) but less than 112 ft and with predicted river flows greater than 600,000 cubic feet per second (cfs). Special event procedure, SE-4 "Flood," also requires entry into an UE at this point. Further, TRM Section 3.15, requires a manual scram of both units if level reaches 112 ft.

PECO entered the shutdown TRM requirement at 1710 on January 20, with river level at 111.6 ft and an estimated river flowrate of 535,000 cfs. River level did not reach 112 ft, but did reach a maximum level of 111.6 ft with approximately 625,000 cfs flow recorded at the Conowingo Dam. The inspector observed the shutdown activities at both units and found that operators performed well, using good communications and control skills. PECO exited the TRM shutdown requirement when river level lowered to less than 111 ft. PECO remained in an UE until 1600 on January 21, at which time river flow was less than 520,000 cfs, the crest having past.

2.2.2 Lower Level - Low Condenser Vacuum - Unit 2

On February 5, PECO entered the special event procedure for loss of the river level due to icing at the plant intake structure, following a low condenser vacuum condition at Unit 2. Operators responded by reducing power at Unit 2 to 80% and by halting the power increase on Unit 3 at 50%. One of the three operating Unit 2 circulating water pumps was secured, which allowed the intake

bay levels to return to normal. The lowering of power was effective at restoring condenser vacuum and maintenance personnel broke up ice at the intake structure and cleared debris from the traveling screens, which restored level at the circulating and safety-related pump structure.

2.2.3 Updated Final Safety Analysis Report Discussion

The inspector reviewed the Updated Final Safety Analysis Report (UFSAR), Section 11.6, Circulating Water System and Cooling Towers, which 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. The inspector found that the discharge pond to inlet pond gate valve, which tempers the inlet pond with warm water from the discharge pond, was not discussed. The inspector discussed this with the system manager, who provided a 10 CFR 50.59 evaluation dated May 1985, stating that the modification which installed the gate did not change the UFSAR. However, based on the inspector's question, PECO stated that a UFSAR change would be developed.

2.3 Reactor Power Reduction Due to Generator Hydrogen Cooling Leakage - Unit-3

On February 2 PECO responded well to a hydrogen cooling leak on the Unit 3 main generator. The response included reducing power to within the capacity of the bypass valves (approx 23%), which allowed removal of the generator from the grid and isolation and repairs to the generator B phase neutral bushing. Following the repairs, operators synchronized the generator to the grid and initiated a power increase.

2.4 Reactor Feed Pump Trip - Unit 2

PECO responded well to an unexpected trip of the 2B RFP which caused a recirculation pump runback, as designed, on March 4. Operators performed well stabilizing reactor power at about 65% and stabilizing reactor level in accordance with OT-100, "Reactor Low Water Level,"and OT-110, "Reactor High Water Level." The operators and the control room supervisor demonstrated excellent communication skill during and in response to the transient. PECO operations, maintenance, and engineering personnel promptly assessed the possible causes of the event.

PECO's investigation identified that the 2B RFP tripped on high vibration. An employee cleaning in close proximity to a loose conduit connected to the RFP vibration probe junction box caused the vibration signal. PECO duplicated the high vibration signals during troubleshooting. Following the trip, PECO tightened the conduit, repositioned the vibration probe, restored reactor power, and initiated a performance enhancement program (PEP) to review the event. The inspectors concluded that this event was of minimal safety significance and PECO took good initial actions.

2.5 Reactor Water Cleanup System Relief Valve Actuation - Unit 2

PECO operators responded well on March 8 to a minor, non-safety significant leak (approximately 15 gpm) from the Unit 2 RWCU system regenerative heat

exchanger shell-side relief valve. A RWCU regeneration heat exchanger (RHX) room high temperature alarm (the room temperature reached approximately 150°F) and a plant equipment operator (PEO) report of a loud noise originating from the RWCU heat exchanger room, alerted the RO to this condition. The relief valve lifted and reseated several times. PECO removed and isolated the RWCU system from service to investigate the event and effect repairs.

The inspectors reviewed the event and determined that the leak was not safety significant since it would have been automatically isolated by the RWCU room high temperature condition (the RWCU room high temperature isolation occurs at 200°F as specified in TRM Section 3.5.1). Additionally, the inspectors noted that the small amount of coolant lost was not radiologically or operationally significant. A PECO health physics (HP) technician surveyed the room and found no increase in background radiation or contamination levels.

During the event, the RWCU system was operating in the dump mode of operation with system flow through the 2A and 2B filter-demineralizer (FD) units to the main condenser in accordance with procedure SO 12.1.A-2, "Reactor Water Cleanup System Startup For Normal Operations Or Reactor Vessel Level Control." The relief valve lifted shortly after the RO reduced the system flow by throttling shut the control valve (CV-55) to limit the inlet temperature to the FD units. The inspectors reviewed system operational pressure data collected during system restoration from the event and determined that throttling CV-55 shut could not have resulted in a system pressure increase to the nominal relief valve setpoint.

PECO inspected the relief valve finding two valve deficiencies that could have lowered the relief valve setpoint by up to approximately 400 psig. The inspectors agreed with PECO's findings and concluded that the relief valve deficiencies would have allowed it to actuate at normal system operating pressures. PECO replaced the relief valve and satisfactorily restored the RWCU system to service.

PECO initiated a PEP to review this event and determine the root cause(s) and appropriate corrective actions. The inspectors concluded that PECO responded well to this event, but noted a minor weakness in that the SO 12.1.A-2 procedure did not discuss operation of the CV-55 valve to help control system flowrate. The system manager indicated that the SO 12.1.A-2 procedure was in the process of being revised to enhance guidance. The inspectors had no further questions.

2.6 Main Stack Radiation Monitor

PECO did not respond properly on March 1, after declaring the 'B' main stack radiation gas recorder inoperable after it failed a background check during surveillance test (ST)-C-095-862-2, "Instantaneous Noble Gas Release And Surveillance Log." The monitor provides information for determining the off-site release rate and provides a primary containment isolation system (PCIS) signal to containment vent and purge valves (normally closed). The CRS initiated the compensatory measures required by the Offsite Dose Calculation Manual (ODCM), Section 3.8.C.4, but did not enter the TS 3.3.6.1 action statement as required. The TS required one instrument in each of the two trip

systems to be operable, the LCO should have been entered since one instrument in one trip system had been declared inoperable. Instead the CRS, due to a mis-understanding of the trip system logic, generated a potential TS action statement for TS 3.3.6.1.

PECO identified the TS action statement problem on March 4 and promptly entered TS action statement 3.3.6.1. PECO performed troubleshooting on the 'B' main stack radiation gas monitor and determined that the PCIS function was operable since the monitor would respond to high radiation conditions as required and exited the TS action statement. The inspector considered the safety significance of this item low since the main stack radiation gas monitor was operable throughout the event, but expressed concerned that the CRS performed an improper TS operability assessment. PECO initiated a PEP investigation to identify the root cause(s) of this event and appropriate corrective actions. The inspector will review the results of this investigation when complete.

2.7 1996 Operations Strategic Action Plan

The inspector determined that the 1996 Operations Strategic Action Plan (OSAP) provided a clear statement of PECO management's policies and expectations to maintain high operator performance. The OSAP replaced the 1995 Operations Improvement Plan (OPI) and was intended to further improve plant operations and raise operator standards. The OSAP was designed to heighten PBAPS staff awareness of plant activities and promote a "healthy skepticism" and questioning attitude toward these activities. Operator feedback and department self-assessment also contributed to the plan's development as well as some items carried over from the OPI.

A key feature of the OSAP was the Event Free Operations (EFO) program. This program increases focus on human performance in six key areas: supervisory performance/involvement; self-check; pre-job/post-job briefings; work control process; procedure use/compliance; and proper component manipulation. The program goals were to encourage good operator performance, help reduce events and recognize and capture "near misses." The program did not guarantee error free operations, but increased operator accountability and understanding of the risks associated with the activities performed.

2.8 Improved Technical Specification Implementation

On January 18, PECO implemented well the Improved Technical Specifications (ITS) for both units at PBAPS. The ITS replaced the older customized TS (CTS) and are designed to improve station performance. The NRC has encouraged the adoption of ITS to standardize TS interpretation. During the period following the transition, PECO identified and aggressively corrected numerous minor problems. Several of the more significant problems are discussed throughout this report.

2.9 Independent Safety Engineering Group Review

The inspectors attended an Independent Safety Engineering Group (ISEG) meeting conducted to review a draft ISEG report which evaluated a Unit 3 planned power

reduction. The inspectors noted that the meeting participants critically reviewed the report, enhancing its clarity and content. The inspectors reviewed the report and noted that it identified several good maintenance and operational planning initiatives.

2.10 Closed - Mis-aligned Injection System Flowpath (Violation 95-08-01)

The inspector determined that PECO adequately implemented corrective actions addressing an event in which the Unit 2 high pressure coolant injection (HPCI) system suction path had, unknowingly to the operator, transferred to the torus. Operators performing an abnormal procedure to locate a battery ground, did not understand a note in the procedure that stated that the HPCI suction flow path would automatically transfer from the condensate storage tank to the torus. The abnormal flow path remained undetected by the control room operators for 18 hours. PECO conducted a PEP investigation, revised the procedures, and enhanced operator training to address the event.

The inspector reviewed the procedure revisions and the results of the PEP investigation. The procedure revisions clarified the notes prior to the affected step to be performed and inserted steps to return the HPCI valves to the normal pre-test configuration. PECO also addressed a similar situation in another procedure that would have affected the reactor core isolation cooling (RCIC) system. The PEP determined the causal factors of the event and initiated corrective actions to improve communications between control room and floor operators. The Operations Department initiated an "Event Free Operations" program (see Section 2.7) to improve operator human performance and self-check. This item is closed.

2.11 Closed - Inadvertent CARDOX System Discharge into the Cable Spreading Room (Unresolved Items 95-24-01 and 95-24-02)

Special Event procedure SE-2, Revision 7, "CARDOX Injection into the Cable Spreading Room," stated that various plant systems would respond in an uncontrollable or unreliable manner if the CARDOX system injected into the cable spreading room, and directed operators to immediately scram both units. An NRC inspector questioned the impact on plant operation if the CARDOX system actually injected into the cable spreading room, and if the operator actions in SE-2 were over-reactive, especially if there was only spurious indication that the CARDOX system had injected.

Actions and information in SE-2, Revision 7, were based on a licensee study performed in 1982. As a result of the inspector's questions, the licensee re-evaluated this issue and found that only three systems would be affected by a CARDOX injection into the cable spreading room. These systems included the electro-hydraulic control (EHC) system, the HPCI system, and the RCIC system; EHC system performance would likely be erratic, and the HPCI and RCIC systems would have a 50% chance of losing flow control from the control room.

PECO's current evaluation shows that a simultaneous loss of the EHC, HPCI, and RCIC systems would represent a serious challenge to the plants; therefore, it would be prudent to place both plants in a stable, safe condition by immediately scramming both units. Additionally, the safety analysis for

automatic CARDOX initiation in the cable spreading room assumes that both units are shutdown prior to discharge. Also, the re-evaluation allowed the licensee to revise and simplify operator actions in SE-2. SE-2, Revision 8, no longer requires dispatching operators to the HPCI Alternate Shutdown Panel to shut down the plant; most actions can now be taken from within the control room. Additionally, some contingency actions were added to SE-2, such as several methods to trip, and maintain tripped, the HPCI and RCIC turbines in case system operation becomes erratic. PECO also revised their Design Basis Document P-S-51, and the Fire Protection Program (FPP), Section 3.1.2, Items 5 and 61, to reflect the current evaluation. These unresolved items are closed.

2.12 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
2-96-001	1/18/96	Licensed Thermal Limit Exceeded Due to Unaccounted for CRD Water Flow
2-96-002	2/23/96	Emergency Bus Protection Relays Found Out of Calibration

2.13 10 CFR Part 21 Report Update

The inspectors reviewed the actions taken on several 10 CFR Part 21 reports, and assessed that PECO took proper corrective actions on any reports that applied to PBAPS. The 10 CFR Part 21 reports reviewed are listed in Appendix A.

3.0 MAINTENANCE AND SURVEILLANCE TESTING (61726, 62703, 92902)

The inspectors routinely observed the conduct of maintenance and surveillance tests (STs) on safety-related equipment. This involves the review of ongoing activities to ensure: the proper use of approved procedures and skills of the craft, the calibration of testing instrumentation, the qualification of personnel, and the implemented administrative controls including blocking permits, fire watches, ignition sources, and radiological controls.

In the maintenance area the inspectors reviewed maintenance procedures, action requests (AR), work orders (WO), and radiation work permits (RWP). 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.

In the surveillance area the inspector reviewed test procedures and completed tests to verify the adequate demonstration of safety functions. During surveillance observations, the inspectors verified that tests were properly scheduled and approved by shift supervision prior to performance; control room operators were knowledgeable about testing in progress, and that 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.

3.1 Residual Heat Removal Heat Exchanger Repair - Unit 3

PECO performed well during repairs to a gasket leak on the inner flange of the floating head on the 3A residual heat removal (RHR) heat exchanger. During the week of January 15, PECO removed the A loop of RHR from service for a planned maintenance outage and entered a seven day TS LCO. PECO successfully replaced the split-ring and seal-welded the floating head flange, which PECO determined would prevent future leakage, declared the RHR system operable, and returned the system to service on January 18.

During late Summer 1995, the PECO chemistry department began detecting an increase in radiation levels in the effluent from the 3A high pressure service water (HPSW) system. The inspectors confirmed that the radiation levels did not exceeded any limits or requirements and determined that the levels were of low safety significance. After performing troubleshooting, PECO determined the source of radiation was from a leak on the floating head gasket in the 3A RHR heat exchanger. The leak was minor and intermittent and therefore did not demand immediate attention. PECO's maintenance planning scheduled the repair to occur in January 1996.

The maintenance conducted the repair activities well in accordance with the approved procedures. PECO safely lowered the heat exchanger head to inspect the inner floating head flange and replace the split-ring. Maintenance technicians completed the seal weld without problems. The inspector examined the weld and noted it to be of high quality. The work area was tented from floor to ceiling and housekeeping in the work area was adequate. The heat exchanger was re-assembled, filled and vented, and returned to service in a controlled manner.

During reassembly of the heat exchanger, a service air hose used for pneumatic powered tools ruptured in the heat exchanger work area. The air turbulence lasted about 30 seconds and caused the upper level of the 3A/3C RHR pump rooms to become contaminated. Loose surface contamination became airborne and contaminations levels increased from 1000 to 10,000 disintegrations per minute (dpm) smearable. HP technicians immediately evacuated the 3A/3C RHR pump rooms until airborne radiation levels dropped to an acceptable radiologically safe level. No personnel contaminations occurred, but PECO initiated a PEP evaluation for the incident. The inspector reviewed the PEP and found it to have adequately addressed all of the issues.

The inspector concluded that the RHR maintenance activities were completed in a good, professional manner. HP technicians maintained radiological controls and activities effectively. This is the second RHR heat exchanger to be repaired in this fashion. PECO intends to eventually perform this repair on all RHR heat exchangers to eliminate any future breaches in the barrier between the potentially contaminated liquid and the river.

3.2 Reactor Water Cleanup 3B Non-Regenerative Heat Exchanger Outage - Unit 3

PECO personnel performed well in identifying and repairing a leak on the Unit 3 RWCU 3B non-regenerative heat exchanger (NRHX). PECO scheduled an outage for the RWCU system on January 23 to repair the leak and to replace the FD inlet temperature indicator (TI-3-12-099). The temperature indicator inputs to the RWCU FD inlet high temperature isolation. PECO identified the leak to be reactor water coming from under the insulation on the upper water box head flange. The NRHX head flange is bolted and utilizes a seal welded head gasket. During repair activities, PECO's non-destructive examination (NDE) of the diaphragm gasket's seal weld disclosed two small (Approx 3" and 5") cracks. PECO technicians ground out and welded the cracks to correct the leak, tested the NRHX, and determined that the repair was effective.

The inspectors examined the cracks and the work area in the NRHX room. PECO technicians tented the heat exchanger during welding activities and used good work practices. The inspector observed tnat HP technicians provided good job coverage and implemented good radiological controls.

A minor incident to the otherwise good performance occurred during system restoration on January 24. A capped drain line from the 3B RHX was found not capped and in the open position after the system had been filled and pressurized. Maintenance technicians made an entry into the RHX room to replace the cap with water flow from the pipe. HP technicians noted an increased area radiation level, but no personnel contaminations or uptakes occurred, nor was there any increase in the RHX room contamination level. PECO initiated a PEP.

The inspector reviewed the results of the PEP investigation and concurred with PECO's conclusions. Three opportunities were identified which could have prevented the incident. The clearance writer did not properly identify on the clearance the appropriate position (uncapped) for the normally closed and capped drain valve. The operator applying the clearance did not recognize this error nor did he note on the clearance the as-left condition of the pipe downstream of valve (uncapped). Lastly, the operator preparing the check-off list (COL) for system restoration overlooked the normal component position on the COL even though the system drawing and valve line-up procedure were correct. PECO considered these errors to be less than adequate attention to detail. The inspector determined that the PEP adequately addressed the issue and had no further questions.

3.3 E1/E3 Emergency Diesel Generator Endurance Testing

PECO operators performed well during the 24-hour endurance tests (ST-O-052-70(1)(3)-2) for the E1 and E3 EDGs. The tests are performed once per cycle to satisfy the TS requirements to slow start and fully load the EDG for 24 hours; operate the EDG at rated load for two hours; perform a load reject from full power without tripping the engine; and restart the EDG within five minutes after the engine is shutdown. The inspectors observed portions of the ST; specifically, the full load reject and "hot" restart portion of the E3 EDG test. The operators conducted the tests in a controlled and professional manner using proper communication techniques.

The inspector noted that when the EDG was running in parallel with the 2-SU source, the SU source was declared inoperable because the startup transformer load tap changer (LTC) was required to be "off" for the duration of the test. The ST requires the EDG to carry a constant load, however, with the LTC in automatic the EDG voltage regulator and the LTC constantly compete for the load which creates a varying load situation. The inspector verified that PECO did not and should not have entered more than one TS LCO for the EDG or startup source at a time. PECO coordinated the slow start of the EDGs well (which makes the EDGs inoperable) and placing the LTC in the manual mode (which makes the startup source inoperable). After the engine was started and control returned to the control room, the EDG was considered operable due to the droop mode override and automatic opening of the EDG output breaker in the event of an ECCS initiation signal (this function was tested within the ST). The inspector also noted that PECO performed the required offsite and onsite breaker alignment checks every eight hours.

3.4 Alternate Rod Insertion Surveillance Testing - Unit 2

Shift management made a good operability determination and responded properly to a failed alternate rod insertion (ARI) logic system functional test (LSFT) on February 23. The surveillance, which tests the A channel ARI system logic and the recirculation pump trip, failed when the resistance across a closed contact on relay 4-ARIA in the anticipated transient without scram recirculation pump trip (ATWS-RPT) circuit measured higher than the required value. The LSFT failure caused shift management to enter a one hour TS LCO (ATWS-RPT) and a TRM LCO (ARI) to restore the inoperable condition.

I&C technicians performed a Troubleshooting, Minor Maintenance, and Testing (TMT) procedure to clean oxidation from the affected contact. During the contact cleaning, the one hour LCO action time expired and the shift manager entered a six hour shutdown TS LCO. Within one hour after entering the six hour LCO, the shift exited the LCO having completed satisfactorily the relay contact cleaning and retesting.

The system manager evaluated the high resistance condition of the relay contact and generated a nonconformance report (NCR). The engineering evaluation determined that the ATWS-RPT trip circuit was still capable of performing its intended safety function and specified a range of acceptable resistances over which the relay could be considered operable. As a further protective measure, PECO increased the surveillance frequency from quarterly to bi-weekly.

PECO does not plan to changed the acceptance criteria in the surveillance test at this time. The contact resistance is within the required value at present and the system manager expects the contact to be satisfactory during the next performance on or about March 8. PECO is conducting further review into the basis for the resistance value and to determine if other suitable testing methodologies would suffice.

The inspector determined that PECO's operability determination was appropriate. The shift manager did not enter an eight hour shutdown TRM LCO concurrently with the six hour shutdown TS LCO because the relay failure only

affected the ATWS-RPT function. The LSFT had proven the ARI function operable. The inspector also reviewed the surveillance test procedure and NCR and concurred with PECO's determination.

3.5 Drywell to Torus Vacuum Breaker Surveillance Test - Unit 2

The inspectors observed a Unit 2 drywell to torus (D/T) vacuum breaker surveillance test and noted that PECO performed the test well and all vacuum breakers functioned properly. The "Drywell/Torus Vacuum Breakers Operability Test," (ST-O-007-430-2) satisfies TS 3.6.1.6.2 which requires each D/T vacuum breaker to be functionally tested every 31 days. The inspectors noted that the operator performing the test followed the procedure, and maintained good communications with the RO in the control room.

3.6 3D High Pressure Service Water Pump Trip During Testing - Unit 3

The 3D HPSW pump failed to start during the performance of a routine surveillance test. The CRS declared the 3D HPSW pump inoperable but determined that the associated HPSW subsystem remained operable. PECO performed troubleshooting and determined that the pump breaker cell switch, which functions as an electrical interlock to indicate that the breaker is fully racked-in, had intermittently de-energized which prevented the breaker from closing. PECO replaced the pump breaker, and satisfactorily retested the pump. The inspector plans to review breaker racking procedures and cell switch issues in a future report.

3.7 Reactor Protection System High Pressure Trip Instrument Inoperable - Unit 3

On February 5 operators responded properly to indications of a failed trip unit on one of the four high pressure scram channels. The indications received by the operators included a half scram and a reactor high pressure alarm. The operators properly determined, based on redundant plant parameters, that the signal was false and entered the proper TS action statement for a failed high pressure scram instrument. PECO developed and conducted a test plan and determined that the failure was in the trip unit and that the associated slave trip unit was receiving its proper signal and would properly respond. The inspector observed the testing of the replaced instrument on February 7 and found that the I&C technicians and supervision involved were very knowledgeable and conducted the activities well.

3.8 Alternate Shutdown Panel Testing

An operator conducted routine testing of the HPCI system from the Unit 2 alternate shutdown panel (ASP) well. The RO conducted test RT-O-023-750-2 to verify functionality of the HPCI system from the Appendix R ASP. The procedure stated that the governing requirements were in the PBAPS Fire Protection Program (FPP), which is part of the UFSAR. The inspector reviewed the FPP and found that there was no specific stated requirement to conduct this testing. The inspector was concerned that the testing requirement was not described in the FPP, since it may have been a commitment associated with

10 CFR 50 Appendix R. The inspector planned to review this issue with PECO and NRC staff to determine the basis for the testing requirement and if it should be documented in a current PECO design basis document.

3.9 Minor Material Deficiencies

PECO took good actions in addressing minor material deficiencies identified by the inspector during routine system walkdowns of safety-related equipment.

- HPCI Support Bolts: PECO staff responded appropriately to the inspector's concerns regarding rusted bolts at a structural support beam for the HPCI test line. The HPCI test line directly above the rusted bolts was tagged with an action request to repair a minor flange leak. Operations staff were notified and the structural engineering group determined the beam to be structurally sound. PECO added an activity to the existing action request to re-surface and paint the rusted area.

- Safety-Related Conduit: The inspector identified a missing cover plate and two occurrences of loose ground wires on safety-related conduit in the cable spreading room. PECO initiated action requests to address the discrepancies and corrected the problems in a short time. PECO determined that the deficiencies did not affect operability and were not safety significant.

- The inspector identified a section of safety-related conduit with a missing mounting clamp in the Unit 2 Core Spray A/C room 116' elevation. After showing operations staff the conduit, PECO's Fix-It-Now Team promptly installed a new clamp.

4.0 ENGINEERING AND TECHNICAL SUPPORT ACTIVITIES (92903, 37551)

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

4.1 Emergency Bus Protection Relays Found Out of Calibration

The inspectors identified through a review of the 4 KV safety-related undervoltage (UV) relay testing procedure, that PECO was not testing to ensure that the degraded grid UV relays functioned within the settings provided in the custom TS (CTS) and the new ITSs. The inspectors found that PECO had not been testing to within the TS allowable values since the relays had been installed in 1989. Further, the inspectors determined that PECO had not been treating relays with as-found calibration data outside the TS allowable values as instrument failures.

BACKGROUND:

Each safety-related 4KV bus has one normal and one alternate offsite power supply. Four degraded grid UV relays monitor the voltage on each of these supplies and both the Custom TS and the Improved TS require that all four

relays be operable when their associated busses are required to be operable. These relays include: 60% (127) and 87% (127Z) time inverse voltage relays and a non-loss of coolant accident (LOCA) 98% (127Y) relay with a 60 second time delay (127B) and a LOCA 89% (127E) relay with a 9 second time delay (127D). The time delays associated with the 60% and 87% relays are functions of the relays themselves. The time delays associated with the 98% and 89% relays have separate time delay relays in the circuits. Either of these four relays can cause its associated feeder breaker to trip on a sensed undervoltage condition if its setpoint is reached and sustained for the specified time period.

PECO has completed modifications to four of the eight safety-related busses to limit the possibility of repeated cycling between offsite power sources due to degrading grid conditions. The other four busses will be completed following the 1996 Fall Unit 3 refueling outage.

PROCEDURE REVIEW:

During a review of UV relay functional testing the inspectors found that the procedures tested all the applicable logic and circuitry properly on the modified and unmodified circuits. However, the 98% and 89% degraded grid UV relay actuation values used in the test procedures corresponded to values lower than those specified in the CTS and subsequently the ITS. The inspectors questioned why these values were lower than the allowed CTS and ITS.

PECO responded to the inspector's questions by stating that they interpreted the CTS definition of Functional Testing as not necessarily requiring a precise test to ensure that the relays functioned within the CTS level trip setting, but that the test was required to 'verify the proper instrument channel response, alarm, or initiating action'. PECO claimed the definition was not clear that the exact setpoints for instrument action needed to be verified. PECO engineering further stated that the ITS definition was clear in that "operability" was specifically stated, and therefore, the UV relays needed to be tested to within the allowable trip settings provided.

After these discussions and PECO implementing the ITS, the inspectors identified that PECO conducted undervoltage relay testing using the previous (CTS) acceptance test criteria. Subsequently, the NRC determined that the functional testing of the UV relays should have always been completed to within the setpoint values provided by TS.

CTS/ITS vs ACTUAL FUNCTIONAL TEST BANDS:

NOTE: The 120 V basis and the procedures setpoints are based on the 4200:120 (35:1) turn ratio of the in-line potential transformer.

127Y (89% of 4160):

CTS level trip setting and ITS allowable value	3702 ± 11 V (4160 basis - Primary) 105.4 - 106.0 V (120 basis - Secondary)
Previous PECO Functional Test band	102.9 - 105.5 V

127E (98% of 4160):

CTS level trip setting and ITS allowable value	4077 ± 12 V (4160 basis - Primary) 116.1 - 116.8 V (120 basis - Secondary)
Previous PECO Functional Test Band	112.0 - 116.2 V

SUBSEQUENT FUNCTIONAL TESTING:

PECO management, engineering and I&C personnel performed well in conducting UV testing and responding to relays found out of calibration during testing subsequent to identification by the inspectors. The CTS and ITS require that functional testing be completed every 31 days. After the inspectors identified the relay testing deficiency, PECO developed a plan to retest the relays on the two busses that had been previously tested to the inappropriate acceptance criteria. However, due to circumstances that developed during this re-testing, station management determined that surveillance tests for all 98% and 89% UV relays at both units be completed to ensure that all relays were properly calibrated. As a result, PECO found nine relays out-of-calibration and two relays that had failed. The nine relays were recalibrated and the two failed relays replaced.

On January 26, PECO began performing relay functional testing on the E22 vital electrical bus per partial SI2K-54-E22-XXFM, "Functional Test of E22 4KV Undervoltage Relays." During the test, the technicians found the 98% (127E-1601) and the 89% (127Y-1601) relays for circuit breaker E322, out-of-calibration. The technicians successfully recalibrated the 98% relay, but could not adjust the reset setpoint for the 89% relay. PECO replaced the relay and later determined that the original relay had failed. During the time that both relays were inoperable, the CRS declared the E2 EDG inoperable to comply with TS.

Initially, I&C technicians used a Fluke 45 Dual Display Digital Multimeter which was very sensitive and did not provide the consistent accuracy required for the relay test. I&C supervisors evaluated the tolerance of the Fluke 45 and decided that the Fluke 8600A Digital Multimeter was a better choice to complete the UV testing. In addition, I&C technicians setup relay calibration equipment in the 4KV switchgear rooms to more efficiently perform testing. I&C technicians worked around the clock to test all vital bus UV relays at both units.

PECO I&C supervisors developed a plan to ensure meter reliability during the relay setpoint checks. The plan required the technicians to use one meter per pair of relays (98% and 89%) then have a calibration characterization check performed on the meter. The calibration characterization check compared the meter calibration against a traceable standard. The use of several multimeters would prevent all relays from becoming inoperable if any one meter was found to be out of calibration. The PECO laboratory checked the calibration of the Fluke meters and found that all of the Fluke 8600A meters were calibrated satisfactory but the Fluke 45 was out of calibration.

The inspectors observed I&C technicians performing UV relay testing in the field, attended management meetings, and monitored PECO's activities throughout the weekend. The technicians performed the testing well using proper communication practices and procedures. The inspector determined the calibration characterization data sheets for the Fluke multimeters were prepared correctly. The inspector determined that PECO's actions were conservative and well planned to ensure the accuracy of the relay data collected.

REVIEW OF PREVIOUS CALIBRATION DATA:

The CTS and ITS require relay calibration every 18 months. PECO's practice was to remove a relay, replace it with a calibrated spare, then to calibrate and reinstall the origiral relay. The inspectors reviewed the calibration history of the 98% and 89% relays, finding that several had been found out of the TS allowable range in the as-found condition. The inspectors noted that I&C technicians did not report that the relays were found in an inoperable condition, outside the TS allowable values. The inspectors determined that PECO should have submitted an LER for the setpoint drift the same as they do when a safety relief valve is found out of calibration.

DESIGN BASIS INFORMATION:

The inspectors determined that sufficient design basis information was available for PECO to correctly interpret and perform functional testing for the relays. The UFSAR, Section 8.4 - Auxiliary Power Systems, Sub-section 8.4.7 - Inspection and Testing, states that the relay "will be tested to verify settings, operability, and functional performance. These tests will provide assurance that the UV protection scheme... will operate at the required voltage and time settings, and perform the intended functions when called upon to operate."

The inspectors discussed the design basis of the 98% and 89% relays with the PECO design engineer. The function of the 98% relay is to ensure that sufficient bus power is available pre-conditional to a LOCA. In the event of a LOCA, the 89% relay ensures that the plant safety systems continue to function during the LOCA by monitoring bus voltage. The 89% relay verifies that bus voltage has recovered to greater than 89% after a large motor has started. For example, an RHR pump motor will cause a voltage drop to $\approx$ 73%. Bus voltage must recover to greater than 89% within 9 seconds or the 89% relay senses that insufficient bus voltage exists to start the next motor and trips the bus to the alternate source or EDG.

The initial voltage study done prior to the 1989 restart identified the lowest allowable voltage level at any 480 V bus as 84% (of 480), based on a component level test. This appeared to be a value based on the limiting bus. The engineer stated that PECO had been doing testing on components to verify operability at this voltage, which apparently was less than the manufacture's low voltage specification. The calculations at that time indicated that a minimum 4160 bus recovery voltage would be 3682 V (88.52% of 4160 or 105.21 V based on 120 V downstream of PT). This appears to be the analytical limit, based on the initial calculation.

The PECO engineer clearly indicated that there is some design margin due to recent improvements in the electrical distribution system. However, it is not clear that the station knew about these margins prior to implementing ITS.

Over the last several years, PECO has completed the following modifications to improve the voltage at the 480 V boards including:

- making offsite power tap changes more responsive.
- upgrades to three offsite power sources to limit the amount of non-safety loads that are normally powered from offsite sources supplying the E-busses.
- installation of new 4160/480 V transformers.
- increasing the normal 13.2 KV bus voltage to 13.8 KV.

PECO believes that based on these changes and a preliminary calculation, the minimum recovery voltage on a 4160 bus would now be near 3671 V (88.24% or 104.88 on 120 V).

CONCLUSION:

The inspectors concluded the following:

1) Inadequate Functional Testing - testing did not verify compliance with allowable values. PECO conducted functional testing of the 4 KV feeder degraded grid UV relays to a voltage that was less that the CTS level trip setting and the equivalent ITS allowable values.

2) After identification by the NRC and subsequent testing, PECO found several of these UV relays tripped at voltage values outside the ITS allowable values.

   Ten relays identified during the January 1996 testing would have been outside the required band for varying durations. The longest duration since the last calibration was approximately 9 months.

3) Inadequate Calibration - failure to identify a possible degraded condition following as-found relay calibration checks. Inspector review of previous calibration as-found data indicates that PECO had identified

numerous out-of-calibration conditions on these relays in the past, but had not considered that they may have been operability concerns.

Fourteen relays previously were affected based on review of historical calibration test data. The calibrations could have been out for 18 months from the last calibration date.

4) The setpoints for the UV relays were not appropriately tied to the analytical limits established by design basis calculations. This resulted in tight tolerance bands for setting these instruments combined with some possible calibration instrument errors that allowed the setpoint deviation to develop and continue.

5) UFSAR Section 8.4.7 was clear in the requirements for testing the relays at the required voltage to ensure that the intended function would operate as designed. The testing conducted did not fulfill the UFSAR assumption. PECO's initial position on the differences between the CTS and ITS did not take into account the UFSAR discussion.

6) The ITS development process did not identify that the allowable values did not have a direct tie to analytical values from the design calculations.

Based on initial inspector review the safety significance of these issues appeared low. The affected relays all tripped within approximately 0.2V of the required trip setpoints and the 60% and 87% relays were functional. A preliminary PECO engineering analysis (50.59) determined that the relay setpoint deviations did not involve an unreviewed safety question. However, the inspector identified two violations:

1) PECO did not implement adequate functional or calibration testing in that acceptance criteria did not verify the 98% and 89% 4 KV UV relays would function within the TS allowable limits. This was contrary to 10 CFR 50, Appendix B, Criterion XI, Test Controls (NOV 96-01-01).

2) Through the calibration data PECO had information that indicated that the relay setpoints were found outside the TS allowable values and did not take appropriate actions to correct the issue. This was contrary to 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions (NOV 96-01-02).

4.2 Spent Fuel Pool Issues

4.2.1 Boraflex Inspection

On February 21, PECO's engineering staff identified that the five year periodic surveillance of the Boraflex coupons in the spent fuel pool (SFP) had not been completed for either unit. The surveillance test was a PECO commitment stated in the 1985 SFP re-rack TS change request and in the UFSAR, Section 10.3.6, Inspection and Testing. The test involved periodic visual and weight inspections and testing of jacketed Boraflex specimens contained in the SFP. The inspections are designed to evaluate and provide reasonable assurance that the Boraflex material is continuing to perform its function and

to provide an indication of deterioration. The first test should have occurred in 1991, however, the Boraflex coupons have never been inspected.

PECO's engineering staff performed an evaluation of the SFP and determined that the integrity of the Boraflex was good. Based on this evaluation, PECO decided that performing the surveillance test to bring it back into periodicity would not be beneficial for the following reasons:

- PECO determined that the coupons were located in non-representative areas of the SFP. The two Boraflex coupons (approx. the same size as a normal Boraflex wrapper plate attached to the cell) are located in a low exposure area in the periphery of the SFP.

- PECO performed a qualitative assessment (part of 50.59 being evaluated) that takes credit for 1) the original analysis considered the SFP being filled to capacity; 2) the fuel in the SFP being depleted; 3) industry operational experience; and 4) a high silica level in the SFP water chemistry would be detected if a Boraflex failure occurred.

- PECO's computer model (RACKLIFE) of the SFP is helping to predict the reactivity of the SFP to ensure the reactivity of the fuel is below the design basis.

- An industry study regarding Boraflex performance indicated that washout of the Boraflex material occurred at other facilities. The design of the stainless steel wrapper at those facilities allowed a small flow of cooling water to come in contact with the Boraflex causing the washout. PECO noted that the wrapper design at PBAPS uses a tight stainless steel wrapper that does not allow water flow past the Boraflex material. In addition, silica level in the water chemistry is high if the Boraflex degrades. PECO noted that the silica levels in the SFP chemistry are low.

PECO committed to perform a quantitative assessment of the SFP's condition.

PECO plans to perform an areal density test (Badger Test) in March to determine the effectiveness of the Boron-10 in the Boraflex. The test places a line source in one cell and a line source detector in the adjacent cell which will characterize any Boraflex degradation. Further, PECO is using the RACKLIFE computer model to calculate the actual exposure of the SFP without Boraflex to determine the reactivity of the pool in a worst case scenario. PECO is inputing the records and history of the spent fuel in the pool to accomplish this task. Further, PECO is evaluating, through a 50.59, a change to the surveillance methodology and testing frequency.

The inspector reviewed the UFSAR, PECO's safety evaluation, and interim corrective actions and concurred that the SFP was in a safe condition. The safety significance of this issue is low due to other existing surveillance methodologies. Although PECO identified the issue, the commitment made in 1985 during the SFP re-racking activities was not tracked well, in that the inspection was not performed in the last ten years. The inspector concluded to classify this as a non-cited deviation of the UFSAR.

4.2.2 Spent Fuel Pool Cooling System Capacity

The inspector reviewed PECO documents pertaining to the SFP cooling system design capacity and determined that the system design heat load was clearly defined. The inspector reviewed PECO's refueling controls to prevent exceeding the SFP cooling system design limit and concluded that the current controls are acceptable for a core shuffle, but may be not adequate for a full core offload. PECO established acceptable interim measures to address this issue.

The inspector reviewed the SFP cooling system section of the UFSAR and a July 1985 Safety Evaluation (SE) prepared to support installation of the high density spent fuel storage racks to determine if the system design heat load was adequately defined in these documents. The inspector noted that both the USFAR and the SE clearly stated that the cooling system could maintain the SFP below 150°F up to a maximum heat load of 26 million-BTUs/hour and determined that the system cooling capacity design basis was clearly defined.

The inspector reviewed PECO procedure FH-6C, "Core Component Movement - Core Transfers" to determine if adequate controls had been established to control SFP heat loading during refueling operations. The inspector noted that the FH-6C procedure limited the fuel bundle transfer rate to 150 fuel bundles per 24 hour period. The inspector concluded, based on the expected heat load, that the fuel bundle transfer limit would preclude exceeding the SFP cooling system design capacity during a core shuffle refueling.

The inspector noted, however, that it was not clear that the FH-6C procedure provided adequate controls to ensure that the SFP cooling system design requirements would be maintained during a full core offload. The inspector discussed this concern with the Reactor Engineering Manager who had initiated a PEP to review this issue. In the interim a temporary change was made to FH-6C to preclude fuel movement for 120 hours after shutdown. The inspector concluded, based upon the design assumptions listed in the SE, that this interim action was acceptable and will review PECO's final corrective actions on this issue.

4.3 Remote Shutdown Functions Inoperable - Unit 2

On January 5, 1996, the inspector identified that a 125 vdc circuit breaker on a safety-related distribution panel was not in its closed position as required by the normal system line-up. The breaker supplied instrument and control power to several components on the Unit 2 remote shutdown panel. The remote shutdown panel meets the requirements of 10 CFR 50, Appendix A, Criterion 19, for equipment outside the control room with the capability for prompt shutdown of the reactor, including necessary instruments and controls to maintain the unit in a safe condition during hot shutdown. Upon identification, the operations department closed the circuit breaker and initiated a PEP review of the condition.

The inspector reviewed the PECO assessment of this issue. PECO determined that the breaker had been open since the Fall 1994 Unit 2 refueling outage. It appears that PECO did not properly control the circuit breaker following a

clearance removal and there was no check off list performed on the circuit breaker panel. Further, the steps in the normal refueling test procedure for verifying operation of the remote shutdown panel switches showed that several components did not receive position indication at the remote shutdown panel when their switches were taken to the "pulled" (remote) position. The steps in the procedure were not designated as needing to be satisfactorily completed prior to declaring the ST satisfactory. In an action request written to document the problems, it stated that indications were not received for the following: RCIC air operated steam line drain and barometric condenser drain valves, both control rod drive pumps, the A emergency service water pump, the normal and alternate offsite power circuit breakers for the E22 and E42 safety busses, and the circuit breaker supplying the 480 v transformer on the E22 bus. This AR was initiated and the test signed off as satisfactory on October 19, 1994. The first indication that the AR was reviewed was dated December 5, 1995, and included a recommendation to exercise all the switches and clean the contacts if necessary.

The inspector found that the PEP review of this issue was well prepared and documented. Based on review of the PEP and on independent review of the issue the inspector concluded the following:

1) The surveillance test procedure was inadequate in that it had not completed its required verification. The switch check identified the problem but the procedure did not have the indication as a required step and thus the ST was signed off as acceptable.

2) The operations and engineering review of the AR was not thorough or timely and did not identify the actual cause of the problem.

3) The controls over components left in abnormal positions following removal of tags was less than adequate.

PECO initiated action to address these issues. Further testing of the specific switches and their indications was conducted and documented on the PEP.

Review of UFSAR Section 7.18, Separate Shutdown Control Panel, provided a good discussion of the system. The inspector found that CTS 3/4.11.c and the associated basis implied that the remote shutdown panel be operable as verified by a switch check completed once per outage. The inspector considered that the failure to identify and correct the open circuit breaker following identification of indication problems at the remote shutdown panel was a second example of a violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Actions. Specifically, this failure led to several functions of the remote shutdown panel being inoperable from October 1994 through January 1996 (NOV 96-01-02).

4.4 3D Monicore Computer Failure

The 3D Monicore system failed to update thermal parameters for 27 minutes on February 9. This event was of minor safety significance because TS requires surveillance of thermal parameters every 24 hours. PECO determined that a

hand-shaking software code allowed a failed process computer to send data to the 3D Monicore system. This resulted in the 3D Monicore system receiving data from both the failed computer and the working primary computer. PECO implemented a temporary modification to the software code which prevented the 3D Monicore system from accepting data from the non-primary computer. PECO plans to assign a staff member from the Limerick Generating Station to independently review the software code and help develop appropriate corrective actions.

PECO reviewed the thermal parameters before and after the failure and found them to be within TS limits. The inspector confirmed the thermal parameters were within limits and reviewed applicable software configuration control documents and found them to be acceptable.

4.5 High Pressure Service Water Flow Modification

PECO initiated ECR package 96-00353, "3B/D High Pressure Service Water (HPSW) Flow Indicator Reads 300 GPM High," to eliminate instrumentation loop noise which caused the control room HPSW flow indication to read 300 gpm higher than the local flow indicator. PECO eliminated the noise by installing a 0.68uF capacitor across the input to the square root module driving the control room indicator. The inspector verified that the local and control room flow indications matched during a routine surveillance of the 3D HPSW pump on February 21. The inspector agreed with PECO's determination that this ECR did not require a safety evaluation. However, the inspector identified a weakness in that PECO did not document the technical justification for installing the capacitor.

4.6 Closed - Standby Gas Treatment Fan Trip (Unresolved Item 95-27-03)

The inspector determined that PECO's investigation into the trip of a standby gas treatment (SBGT) fan during a valid on-demand start signal sufficiently addressed the possible causes for the fan trip. PECO was not able to identify the exact cause for the trip, but concluded that two plausible causes for the trip existed, one being electrical and the other mechanical. The inspector reviewed PECO's report of their findings and agreed that due to the circumstances, both electrically and mechanically, that either scenario could have caused the problem.

The summary of PECO's investigation is recorded in PEP I0004921. In brief, the electrical scenario states that the trip could have been a nuisance trip during the motor start. A postulated motor starting transient may have caused the trip considering the lower as-found A phase overload setting and a possible in-rush current peaking higher than the motor locked-rotor current when the motor was started. This transient could have set up a current phase imbalance. The mechanical scenario is based on the abnormal friction found in the A phase contact arm. A high resistance contact would have provided a current for a control and indication circuit, however, would not have sustained an unbalance between phase currents and induced the breaker to trip.

The corporate laboratory was not able to repeat the trip over numerous attempts. The non-repeatable trip indicates a problem with the operating mechanism which was probably cleared when the breaker was cycled. A draw back from the confirmation of the mechanical scenario is that the A phase contacts did not show excessive pitting and that the fan had been run successfully several times since the last time the breaker was opened in September 1995. PECO's review of the component's maintenance history revealed no problems related to premature tripping.

PECO determined that further monitoring of 480 volt breakers is warranted to ensure that, based on qualitative data, there is no abnormal trend in the breaker failures. The inspector agreed with PECO that the exact cause of the trip is indeterminable at this point and that the evaluation performed was of sufficient detail to address the issue. This item is closed.

5.0 PLANT SUPPORT (71750, 92904)

5.1 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. All activities monitored by the inspectors were found to be acceptable.

The inspector observed that HP technicians provided good job coverage and implemented good radiological controls during the Unit 3 A RHR and RWCU outages.

5.2 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.

5.3 SECURITY PROGRAM INSPECTION

The inspector conducted a core security inspection of the Peach Bottom Atomic Power Station on February 26-28, 1996. The purpose of this inspection was to evaluate PECO Energy's compliance with NRC-approved Security Program Plans and applicable regulatory requirements. The areas reviewed included: Audits; Corrective Actions and Management Support, Effectiveness of Management Controls; Security Program Plans; Protected Area Detection Systems; Alarm Stations and Communications, Testing Maintenance and Compensatory Measures and Security Training and Qualifications. The inspector determined that PECO had an effective security program in place that was in compliance with the NRC-approved security plans and applicable regulatory requirements.

5.3.1 Audits, Corrective Actions and Management Support

5.3.1.1 Audits and Corrective Actions

The inspector reviewed the 1995 Fitness-for-Duty audit conducted by Nuclear Quality Assurance (NQA) from August 26-September 29, 1995 (Audit A0951527). The audit was conducted in accordance with regulatory requirements and identified no findings and one deviation. Immediate corrective actions were implemented and the deviation was corrected prior to the completion of the audit. The corrective actions were determined to be adequate and timely. The inspector concluded that the audit was comprehensive in scope, reported to the appropriate level of management and that the program was being properly administered. The most recent annual audit of the security program was reviewed during Inspection 50-277/95-16 conducted June 12-14, 1995, therefore this audit was not reviewed during this inspection.

5.3.1.2 Management Support

Management support for the security program was determined to be excellent. This determination was based on the inspector's review of various program enhancements including renovations to the Security Guard House to expedite personnel processing into and out of the plant, installation of a new digital badging system, conversion to a new non-lethal weapon, and upgrades to the security communications system.

5.3.2 Effectiveness of Management Controls

The inspector determined that PECO had controls for identifying, resolving and preventing security program problems. These controls included the performance of Nuclear Quality Assurance Surveillances in various security areas in addition to the required annual audit by QA. A review of documentation indicated that initiatives to minimize security performance errors and to identify and resolve potential weaknesses were being implemented. The initiatives in this area were considered to be effective.

5.3.3 Security Program Plans

PECO Energy made one revision to the Security Plan and one revision to the Training and Qualification Plan since the last inspection June 12-14, 1995.

The inspector verified that all the changes in the revisions had been reported to the NRC in accordance with regulatory requirements and as implemented did not decrease the effectiveness of the Plans.

5.3.4 Protected Area (PA Detection System)

The inspector physically inspected the PA intrusion detection system (IDS) on February 27 and 28, 1996, and determined by observation that the IDS was installed as committed to in the Plan. Based on observations from alarm stations and review of quarterly test results, the inspector determined that the IDS was functional and met the commitments of the Plan.

5.3.5 Alarm Stations and Communications

The inspector observed Central Alarm Station (CAS) and Secondary Alarm Station (SAS) operations and verified that the alarm stations were equipped with the appropriate alarm, surveillance, and communication capabilities. Inspector interviews of CAS and SAS operators found them knowledgeable of their duties and responsibilities. The inspector also verified that the CAS and SAS operators were not required to engage in activities that would interfere with assessment and response functions and that PECO Energy had communications capabilities with the local law enforcement agencies as committed in the Plan.

5.3.6 Testing, Maintenance and Compensatory Measures

5.3.6.1 Testing and Maintenance

The inspector's review of testing and maintenance records for security-related equipment confirmed that the records committed to in the Plan were on file and that security personnel were testing and maintaining systems and equipment as committed to in the Plan. A review of these records indicated repairs are being completed in a timely manner and that a prioritization schedule is assigned to each work request.

5.3.6.2 Compensatory Measures

The inspector's review of the use of compensatory measures found their use to be minimal due to the efforts and prompt response of the maintenance group. The inspector reviewed the compensatory measures implemented to support the warehouse extension construction project and determined that they were in accordance with the Plan and were effectively implemented.

5.3.7 Security Training and Qualification

The inspector selected at random and reviewed training, physical, and firearms qualification/requalification records for ten Site Protection Officers (SPOs). The inspector determined that the training had been conducted in accordance with the security training and qualification (T&Q) plan and that it was properly documented.

The inspector also observed six SPOs requalifying with handguns and shotguns on the firing range. The range requalification program was conducted safely, professionally and in accordance with the T&Q plan requirements. All SPOs observed on the range demonstrated a high degree of familiarity and proficiency with the weapons and successfully requalified.

5.3.8 Review of UFSAR Commitments

A recent discovery of a licensee operating their facility in a manner contrary to the UFSAR description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR description. While performing inspections discussed in this report, the inspector reviewed applicable portions of the NRC-approved Security Plan that related to the areas inspected. The following inconsistency was noted between the wording in the Security Plan and plant practices. The Security Plan stated in Section 9.2.1.2, that "During certain refueling and major maintenance operations, some areas of a Reactor Building are not considered Vital Areas when the reactor is no longer critical." PECO does not, and has not de-vitalized any portion of the Reactor Building during outages and has no procedures for the de-vitalization or re-vitalization of any areas. When the inspector identified the inconsistency, PECO took immediate action to revise the Security Plan to state "During refueling or major maintenance operations, certain areas may not be considered vital as determined by the Plant Manager and the Manager of Nuclear Security. Appropriate procedures shall be developed prior to initiation of de-vitalization and shall delineate the re-vitalization process."

The Security Plan revision was submitted to the NRC in accordance with the provisions of 10 CFR 50.54(p) on February 28, 1996.

The revision of the Security Plan resolves the inconsistency between the Plan and plant practices.

6.0 MANAGEMENT MEETINGS (71707)

The resident inspectors and the inspector who conducted the radwaste inspection 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 PECO during the inspection. PECO did not express any disagreement with the inspection findings. This report does not contain proprietary information.

APPENDIX A
Part 21 Review Items

Date	Part 21 No.	Title/Resolution
5/12/95	96-001	General Electric Nuclear Energy - Potential unanalyzed water hammer load affecting emergency core cooling systems, reactor core isolation cooling, and suppression pool cooling systems. PECO's review indicated that all items identified in the Part 21 notification have been previously addressed and documented. Corrective actions and procedure enhancements have successfully eliminated the concerns specified in the notification and PECO indicates that no additional action is necessary.
5/17/95	96-002	Static-O-Ring (SOR) - Setpoint shift of pressure and temperature switches due to housing distortions if calibrated prior to being bolted in place. PECO uses the type of switch discussed in the notification. They are calibrated in place and therefore, not effected by the issue. PECO has identified switches stored in the storeroom and labeled them as requiring a calibration check after installation.
7/19/95	96-003	ABB Relays, Type 51 and 87T - Defective Tap Block - ABB relays manufactured between 5/1/94 and 6/15/95 are affected by this notification. PECO identified three relays at PBAPS and performed the tests specified in the notification on the relays. PECO determined that the relays were not affected by the manufacturing defect.
9/12/95	96-004	B&G Manufacturing Co. Insufficient Heat Treatment of Four Lots of Hex Head Bolts - PECO's evaluation indicates that a number of the affected bolts have been utilized in a number of civil/structural applications. PECO engineers have evaluated the mechanical properties supplied by the manufacturer to the application used and determined that the bolt material was acceptable.
9/29/95	96-005	B&G Manufacturing Co. Insufficient Heat Treatment of Hex Head Bolts - PECO's evaluation indicates that a number of the affected bolts have been utilized in a number of civil/structural applications. PECO engineers have evaluated the mechanical properties supplied by the manufacturer to the application used and determined that the bolt material was acceptable.
9/25/95	96-006	Rosemount - Revision to Instruction Manual 4235 for Model 1152 Transmitter- Not applicable to PBAPS.

9/26/95	96-007	ABB - Stationary Secondary Disconnect Conductor Strips for ITE 5HK Circuit Breakers - Not applicable to PBAPS.