U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket/Report No.	50-277/94-04 50-278/94-04	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:	March 20, 1994, through April 30, 1994	
Inspectors:	W. L. Schmidt, Senior Resident Inspector F. P. Bonnett, Resident Inspector R. K. Lorson, Resident Inspector S. Dembek, Project Manager, NRR	
Approved By:	Clifford J. Anderson C. J. Anderson, Chief Reactor Projects Section 2B Division of Reactor Projects	5/25/94 Date

EXECUTIVE SUMMARY
Peach Bottom Atomic Power Station
Inspection Report 94-04

Plant Operations

The operating staff performed well over the period. This included responding to several transient conditions at Unit 3. In each case the transients were initiated by balance of plant (non-safety related) equipment problems (feed pumps and stator water cooling). The operators took prompt and effective actions to limit the effects on the unit (Sections 2.1 and 2.2). PECO continued to monitor for additional fuel bundle leakage at Unit 2, by core flux tilting (Section 2.0). The inspectors were concerned with the operations department interpretation that operators may take actions, not specified by procedure, in order to meet a condition specified in a non-action verification (i.e., verify pressure is 50-100 psig) procedure step. This type of interpretation led an operator not to identify leakage through a core spray full flow test valve as discussed in section 5.2.

Maintenance and Surveillance

The inspector found that the surveillance activities observed were properly conducted, in accordance with procedures. The inspectors reviewed PECO's implementation of a technical specification requirement for collecting composite water samples entering and leaving the site. These samples are used to monitor the radiological environmental condition of the river water. The inspectors found that PECO was not collecting a composite sample of the water flowing into the site. Specifically, because of equipment problems the system sampling tank was not collecting a composite sample (Section 3.1). This was considered a violation of technical specification 4.8. **(VIO 94-04-01)**. The safety significance of this event was minimal due to the fact that PECO maintains redundant sampling stations external to the station. However, the inspectors were concerned that station personnel were tolerant of a degraded system condition and attempted to work around the problem in lieu of correcting system performance.

The maintenance activities observed were properly conducted. This included observation of high pressure coolant injection valve packing leak repair (Section 4.2), residual heat removal heat exchanger leakage repairs (Section 4.3), and emergency diesel generator outage work (Section 4.4). PECO also began the implementation of a "Fix-It-Now" program, which appeared effective at correcting minor maintenance issues quickly and reducing their backlog (Section 4.5).

Engineering and Technical Support

Engineering and plant management provided good support in reviewing Unit 3 feed pump problems (Section 5.1).

The system manager for the core spray system developed a good quality method for determining that a leaking full flow test valve was allowing pipe draining and subsequent water hammers during surveillance testing. However, this problem should have been identified and corrected as part of operability testing following a valve operator torque switch setting change and when operators had indication that the valve was not fully shutting during routine surveillance testing (Section 5.2). This issue was considered unresolved **(94-04-02)** pending review of an operation department interpretation on verifications steps, discussed above, and on a review of other possible problems due to torque switch setting changes.

PECO took appropriate actions to evaluate the structural condition of a leaking emergency service water weld, once it was identified that a planned ASME Section XI repair would not be possible. During discussions on this issue, the inspector and PECO identified that because a code repair was not conducted shortly after the leak was discovered in November 1993, PECO should have requested relief from the code. However, based on a review of the structural evaluation completed at the time, the NRC staff did not have a safety concern on the integrity of the piping. PECO planned to develop and conduct a code repair to this section of piping during June 1994. PECO also committed in the future to follow the current NRC guidance on leakage of Class III moderate pressure piping (Section 5.3).

The engineering department had reduced the overall backlog of tasks from approximately 1200 to 400 items (Section 5.4).

PECO completed the initial phases of a modification which will, when complete, provide three independent offsite power sources to the site. This will improve reliability and provide flexibility during preventive maintenance and the loss of one line (Section 5.5).

The inspectors reviewed the 10 CFR 50.59 safety evaluation process, procedures, training and implementation. The process was functioning well providing high quality evaluations. While the process appeared to be performing well, several weakness were identified dealing with the review, documentation, and training on the contents of the site's safety analysis report (Section 5.6).

PECO began the installation of a modification to the radiation monitors for the control room ventilation and isolation system. During the installation of the first half of the modification, several difficulties arose that are attributable to the design adequacy (Section 5.7). The inspector considered this an unresolved item pending review of the completed design and of PECO's corrective actions **(UNR 94-04-03)**.

Assurance of Quality

PECO maintained very good overall management control of work and developing issues over the period. Meetings were focused on safety and provided good formats for questioning and discussions. The morning leadership meeting functioned as a very effective management tool. PECO management took effective actions to address the Unit 3 feed pump problems and the ESW through-wall leakage issues (Section 7.0).

The performance enhancement process appeared to be functioning well, allowing for identification and correction of plant problems. The inspector reviewed numerous completed investigation reports for significant issues during 1993 and early 1994, finding that root cause analysis and corrective action determinations were appropriate. The PEP process identified several issues with the modification process, which will be reviewed in a subsequent report (Section 7.1).

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DETAILS

1.0 PLANT OPERATIONS REVIEW (71707)*

1.1 PECO Energy Company Activities

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

Unit 2 began the period operating at 100% power with an asymmetrical rod pattern to suppress four leaking fuel bundles. PECO reduced power to approximately 70% on March 25 to perform a local power range monitor gain calibration. The unit was restored to full power by March 27 and operated at essentially 100% power until April 9 when power was reduced to 72% to remove the fifth stage feedwater heater (FWH) from service and stroke main steam isolation valves (MSIVs). The unit was restored to 100% power by April 10 and operated at essentially 100% power until April 22 when power was reduced to 55% to perform flux tilt testing, to return the fifth stage FWH to service, and install the 3D MONICORE process computer software (Section 2.0). Power was restored to 100% by April 25. The unit essentially operated there for the remainder of the period.

Unit 3 operated at essentially 100% power for the entire inspection period. PECO reduced reactor power to about 45% on April 15 to perform condenser waterbox cleaning and MSIV inspections and surveillance testing. On April 27, power was reduced to 75% due to reactor feedwater pump problems and remained at approximately 90% power for the remainder of the period.

1.2 NRC Activities

The resident and regional based inspectors conducted routine and reactive inspection activities concerning operations (Section 2.0), surveillance (Section 3.0), maintenance (Section 4.0), engineering and technical support (Section 5.0), plant support (Section 6.0), and management systems assessment (Section 7.0). The inspectors conducted these activities during normal and off-normal (backshift) PECO work hours. There was a total of 12 hours of deep-backshift inspection hours.

The following specialist inspections also occurred during the report period:

Date	Subject	Report No.	Inspector
4/4-8/94	Engineering Inspection	94-05	Chaudhary

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

2.0 PLANT OPERATIONS REVIEW (71707, 93702)

The inspectors independently found that control room operators conducted routine activities on both units well including: performance of several power maneuvers to support maintenance and core monitoring activities, successful completion of the E-2 emergency diesel generator (EDG) outage (Section 5.4) and good response to a hydraulic control unit (HCU) accumulator low pressure indication. Prompt response to a Unit 3 stator cooling system high temperature alarm averted a generator runback and scram (Section 2.2). The operators performed well and averted a possible scram when the 3A reactor feedwater pump (RFP) exhibited a sudden drop in flow and the 3B RFP failed to respond (Section 2.1).

PECO suspected that a fifth leaking fuel bundle existed on Unit 2 and dropped load on April 22 to perform flux tilt testing, but did not locate any additional leaking bundles. During the load drop, PECO installed the software for the 3D MONICORE process computer. The 3D MONICORE program provided a better model of reactor core thermal-hydraulic and nuclear conditions, and provided more accurate determinations of core thermal limits. Due to the improved core modeling, PECO could continue to operate Unit 2 with an asymmetrical rod pattern and not approach a calculated core thermal limit.

Control room operators correctly used procedures and alarm response cards to conduct plant operations throughout the period. One minor instance occurred in which the inspector identified to the shift management that a copy of a procedure enclosure used to document control rod movement was not the proper revision. Specifically, Exhibit 9 of Reactor Engineer (RE) procedure RE-31, "Reactor Engineering Core Monitoring Instructions," at the Unit 3 reactor control panel was out of date. The safety significance of the instance was low since the actual control rod manipulations specified were correct. The shift management immediately removed the procedure and initiated a PEP investigation.

The operations crews made correct determinations of safety system operability and reportability of identified conditions. The entry into and exit from technical specification (TS) limiting conditions for operation (LCOs) were adequately tracked and controlled. The inspectors routinely verified the operability of safety systems required to support given plant conditions at both units. Housekeeping at both units was good.

2.1 Operator Response to Reactor Feed Pump Transient - Unit 3

On April 27, the control room operators responded well to a Unit 3 reactor vessel water level transient caused by RFP control system problems. Plant management and engineering (see Section 5.1) also performed well in developing corrective actions in response to the event. Initially, the reactor operator (RO) observed that the 3A RFP flow suddenly dropped causing the 3B and 3C RFPs to respond and increase their flow. As the RO began to evaluate the 3A RFP response, the 3A RFP flow dropped a second time, however, the 3B RFP did not respond. The 3B RFP speed and flowrate remained unchanged as the 3C RFP flowrate increased in response to the lowering reactor water level. The control room supervisor (CRS) entered the

operation transient procedure OT-100, "Reactor Low Level," and directed the RO to decrease reactor power as per general procedure (GP)-5, "Power Operation." The RO also took manual control of the 3A RFP by placing the pump control on the hydraulic jack. After reactor power was stabilized at about 75%, the CRS directed the RO to remove the 3B RFP from service. The RO had to trip the 3B RFP because the pump speed did not change from 4000 rpm after the discharge valve was shut and the motor gear unit and motor speed changer were run down to the low speed stops.

Control of the 3A RFP was stable on the hydraulic jack and the 3C RFP responded properly. Based on this, reactor power was increased to 90%, the limit with two RFPs, while the 3B RFP was being repaired. After the 3B RFP was returned to service, the 3A RFP was removed and repaired. Operators returned the Unit to 100% on May 3. The inspector observed the Unit 3 operations staff during the period the RFPs were out of service, finding the ROs knowledgeable of plant conditions and of actions to mitigate further problems.

2.2 Stator Cooling System High Temperature - Unit 3

Plant operators performed well when the service water (SW) control valve (CV) for the Unit 3 generator stator water cooling system heat exchanger became clogged and caused a stator coolant high temperature condition. The control room staff received the "Stator Cooling In-Out Hi Temperature" alarm (306-L3) on March 25 and entered procedure OT-113, "Loss of Stator Cooling." A plant operator (PO) investigated and found the SW CV throttled open with a coolant temperature of 150°F (normally 135°F). The PO notified the chief operator (CO) who stroked open the valve. Indicated coolant temperature peaked at 184°F and then decreased back to normal. The CRS exited OT-113 and initiated a PEP investigation.

PECO determined through the PEP investigation that, because of the high stator cooling temperature, the unit had approached an automatic generator protection runback setpoint. A generator runback without a decrease in stator water temperature would have resulted in a turbine trip and subsequent reactor scram. PECO determined that the cause of the high temperature was that river silt in the service water system had clogged the SW CV. The inspector reviewed PECO's actions and determined that the operation staff's prompt response to the alarm averted the generator runback and reactor scram.

2.3 Licensee Event Report Update

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

LER No.	LER Date	LER Title
3-94-001	2/3/94	High Pressure Coolant Injection System Inoperable due to a Hydraulic Line Problem.
2-93-004	3/26/93	Reactor Scram due to Reactor Feed Pump Trip
2-93-006	4/7/93	Snow Storm Results in Inaccessibility of Site
3-93-008	11/5/93	Main Steam Relief and Safety Valve Setpoint Drift
3-93-009	12/13/93	HPCI Inoperable When Discharge Valve Failed to Open

3.0 SURVEILLANCE TESTING OBSERVATIONS (61726, 71707)

The inspectors observed conduct of surveillance tests to determine if approved procedures were used, test instrumentation was calibrated, qualified personnel performed the tests, and test acceptance criteria were satisfied. The inspectors verified that the surveillance tests had been properly scheduled and approved by shift supervision prior to performance, control room operators were knowledgeable about testing in progress, and redundant systems or components were available for service, as required. The inspectors routinely verified adequate performance of daily surveillance tests including instrument channel checks, and jet pump and control rod operability tests. The inspectors found the licensee's activities to be generally acceptable.

3.1 Circulating Water Composite Sampling Program

TS 4.8.E.1 requires that PECO monitor the Susquehanna River water by collecting a composite sample from the discharge canal prior to release. For comparison, a composite sample is also collected from the river water intake. The inspector reviewed the operation of the sampling systems and determined that PECO was not collecting the composite samples as required.

The intent was to collect samples from each location (intake and discharge) using an automatic sampling system designed to provide a continuous flowrate to a collecting tank located in each area. Procedure ST-C-095-835-2, "Circulating Water Intake and Discharge Composite Sampling" required the sample flowrate to be consistently maintained in order to obtain a uniform sample. The inspector monitored the sample flowrates at each location over an approximate three week period and noted wide variations in the flowrates, which resulted in the collection of non-uniform samples. PECO attributed the difficulty in maintaining the proper sample flowrate to river silt clogging of the sample lines.

The inspectors concluded that the safety significance of this event was minimal due to the fact that PECO maintains redundant sampling stations external to the station. However, the inspectors were concerned that station personnel were tolerant of a degraded system condition and attempted to work around the problem in lieu of correcting system performance. TS 4.8.E.1, Table 4.8.3.a, requires collection of these radiological environmental monitoring composite waterborne surface samples from the site intake and discharge streams over a one month period. Additionally, Table 4.8.3.a Note b. requires the composite samples to be

collected by collecting an aliquot at intervals not exceeding two hours. Contrary to the above, the inspector noted that the composite samples were not collected during the period. This was a violation of TS 4.8.E.1. **(NOV 94-04-01)**

3.2 (Closed) Procedural Adherence during Preventive Maintenance, Violation 93-15-02

During the performance of preventive maintenance on a Unit 3 HCU on July 9, 1993, the inspector identified that the controlling procedure was not present at the job site or in the control room; and that the work order and the calibration data sheet specified different torque values for the nitrogen charging connection cap. PECO took immediate actions to correct the non-compliance and develop appropriate corrective actions to prevent recurrence.

PECO developed a streamlined procedure for the performance of preventive maintenance on HCU instrumentation. Further, the calibration sheets were revised to reflect the proper nitrogen charging connection cap torque values to require the torque values to be recorded, and double verified. PECO management reinforced their expectations with the technicians that the proper paperwork should be at the job site, and that all discrepancies identified in the procedures and work orders should be corrected prior to work initiation. This item was closed based on the inspector's review of these corrective actions.

4.0 MAINTENANCE ACTIVITY OBSERVATIONS (62703)

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

4.1 Standby Liquid Control Continuity Meter Replacement

The inspector observed the replacement of the standby liquid control (SLC) continuity meter relay unit (the meter). The meter monitors the squib valve supply current and actuates an alarm to alert the op[illegible] to an undercurrent condition. PECO elected to replace the original meter with an upd[illegible]eter because of a poor maintenance history associated with the original meters.

The inspector reviewed the applicable documentation, observed the field activities, and concluded that the meter replacement was performed well. The work order instructions were clear and provided an adequate level of detail for replacing the meter. The technicians were knowledgeable, the work instructions were followed, and the lifted lead form was utilized

correctly. The meter relay unit was properly calibrated prior to installation. Additionally, the LCO log properly reflected the SLC system operability status and the RO was familiar with the SLC system status during the maintenance.

A minor weakness was noted when the scope of the post-maintenance testing (PMT) was expanded without revising the work order instructions. Maintenance guideline MG-8.1-1, "Post-Maintenance Testing" requires the work order to revised if the PMT scope is expanded. The inspector discussed this issue with the instrumentation and controls (I&C) manager who attributed the event to a lack of familiarity with MG-8.1-1. The I&C manager agreed to conduct MG-8.1-1 training with the appropriate personnel. The inspector was satisfied with the response to this issue. Overall, the inspector concluded that this work activity was well conducted.

4.2 High Pressure Coolant Injection System Valve Leak - Unit 3

PECO maintenance technicians performed well on March 31 when a troubleshooting, minor maintenance, and testing (TMT) activity was performed to stop a packing leak on the high pressure coolant injection (HPCI) steam isolation valve (MO-3-23-14). The packing leak was identified during the previous report period as the source of the radiological contamination problem in the Unit 3 HPCI room (see Inspection Report 94-03). The TMT process was used to provide the needed controls for the torquing of the packing gland nuts, and to ensure that the added friction did not make the valve inoperable. This was necessary since the motor operated valve diagnostic (VOTES) strain gage on the valve yoke was not functioning and could not be used to verify that the valve operated properly following the packing adjustment. The system manager (SM) calculated that a 20% increase of the packing gland bolt torque would not cause the stem friction to increase to the point that the valve would be inoperable.

The technicians adjusted the packing gland, which stopped the leak and the MO-3-23-14 was stroke tested satisfactorily. PECO attempted to repair the remaining steam leaks on the turbine stop valve cross around chamber during the monthly ST (ST-O-23-300-3) but was not successful. Maintenance plans to repair the stop valve cross around chamber leaks, repack the MO-3-23-14, and repair the valve's strain gage during the outage window during the week of May 2.

Although PECO corrected the main source of the contamination problem in the Unit 3 HPCI room, the health physics (HP) staff decided not to decontaminate the entire room until after the outage window. The HPs did not want to expend the dose and man-hours to decontaminate the room when there was the possibility of contamination again during the outage. The inspector observed that a general pathway was decontaminated in the HPCI room. The inspector will continue to monitor PECO's corrective activities during the outage window.

4.3 Residual Heat Removal Heat Exchanger Repair - Unit 3

PECO responded well to a suspected leak in the 3C residual heat removal (RHR) heat exchanger. A routine chemistry sample of the 3A/C high pressure service water (HPSW) system effluent showed trace levels of radioactive contamination indicating that the 3A and/or 3C RHR heat exchangers were leaking. The A loop of RHR was declared inoperable on March 5 and an investigation to determine the source of the leak was initiated. Troubleshooting identified that the leak was from the 3C RHR heat exchanger, averaging 1 liter every 7 minutes with the stayfill system in service. PECO isolated the HPSW system to the 3C RHR heat exchanger to prevent further leakage to the discharge canal and returned the A loop of RHR to an operable status.

PECO determined the source of the leak was through the floating head flange joint. Maintenance activities to repair the 3C RHR heat exchanger leak began on April 11 and PECO found that the tension of the floating head bolts had slackened. PECO maintenance technicians repaired the leak by replacing the floating head gasket. The heat exchanger was reassembled, leak tested, and returned to an operable condition on April 12.

PECO was actively reviewing a revision to the RHR system operating procedure to attempt to reduce the differential pressure created across the lower head with the system in a standby status (stay fill pressure) and when the heat exchanger is placed inservice. PECO plans to place the lower pressure RHR system inservice before the higher pressure HPSW system. This system operation would reverse the order in which the two systems are started by the current procedure. The inspector concluded that PECO aggressively pursued this issue and noted good use of chemistry data to evaluate component performance.

4.4 E-2 Emergency Diesel Generator Annual Outages

PECO performed the annual E-2 EDG maintenance outage during this period. The EDG was the fourth and last EDG to undergo the 18 month TS required inspection. Prior to removing the EDG from service on March 20, PECO satisfactorily performed the 24-hour endurance ST (ST-O-052-702-2, "E-2 Diesel Generator 24 Hour Endurance Test"). PECO operators declared the EDG inoperable, entered a seven day TS LCO Action Statement, and performed procedure GP-23, "Diesel Generator Outages," for the establishment of administrative controls for removing the EDG from service. The EDG was returned to an operable status on March 27.

The inspectors reviewed and observed the activities associated with the diesel outage including maintenance planning and operations support prior to the start of the outage and conduct of maintenance and testing activities during the outage. While performing bearing clearance measurements, PECO determined that one of the lower crank shaft thrust bearings had overheated resulting in increased tolerances. PECO mechanics replaced the thrust bearing and no other deficiencies were identified. Due to the new shaft component, the EDG was run for 20 hours per procedure M-052-006, "Diesel Run After Major Overhaul," to properly seat the

new component. Following the overhaul run-in test, the routine post-maintenance functional and surveillance tests were performed. All equipment functioned as expected within the required times and the tests were declared satisfactory.

The inspectors found the maintenance and testing activities to be acceptable. PECO management actively tracked the EDG outage status, anticipated potential problems, and evaluated alternatives in the event of schedule slippage. The inspector found that PECO's personnel did a very good job at planning and conducting the E-2 EDG outage.

4.5 Fix It Now Process Implementation

During this period, PECO implemented the Fix It Now (FIN) team to perform selected minor maintenance tasks and assist in reduction of the maintenance backlog to enable the maintenance department to focus on the more complex jobs. A licensed senior reactor operator supervises this multi-disciplined team, which was designed to streamline the maintenance process by providing its own maintenance planning, health physics, and operations support. The inspectors reviewed the FIN process controls and concluded that appropriate measures were in place to ensure that the streamlining of maintenance activities was safely implemented.

The scope of the activities that can be performed by the team were specified in procedure A-26.1, "Implementation Of Fix It Now (FIN) Process." The inspectors noted that A-26.1 required the FIN team personnel to follow the applicable station procedures when conducting maintenance activities. All maintenance tasks were pre-planned and documented using the AR system. The inspectors interviewed the FIN team supervisor and concluded that he was knowledgeable regarding the FIN team's role and the A-26.1 procedural controls.

The FIN team appeared to have been effective at safely reducing the station maintenance backlog. The inspectors concluded that developing the FIN team was a positive initiative to improve station performance.

5.0 ENGINEERING AND TECHNICAL SUPPORT ACTIVITIES (37700)

The inspectors routinely monitor and assess licensee support staff activities. During this inspection period, the inspectors focused on site engineering's disposition of the large backlog of nonconformances and the 10 CFR 50.59 review process. Further, the inspectors observed the system manger's (SM's) involvement with two plant problems on Unit 3. The results of these reviews are discussed in detail below.

5.1 Troubleshooting and Repair of 3A/3B Reactor Feed Pumps - Unit 3

Site engineering responded well and plant management provided appropriate focus during investigation of the RFP control problem at Unit 3 (see Section 2.1). PECO's engineering staff performed troubleshooting and was directly involved in the repair of the 3A and 3B RFPs. During disassembly of the 3B RFP control valve linkage and lifting beam, damage to the

journal bearing was observed by the Nuclear Maintenance Department (NMD) and the SM. The SM also found that the bearing support housings were misaligned.

Through discussion with the pump manufacturer representative, PECO determined that bronze was not the optimum choice of material for these bearings. PECO engineers performed a design change to use graphite impregnated bearings, fabricated as recommended by the vendor. Further, prior to reassembly NMD performed a laser alignment of the bearing support blocks. After reassembly, the SM conducted hysteresis testing of the control linkage response and made minor adjustments. Operators ran the 3B RFP to develop confidence in its operation before removal of the 3A RFP from service for repair. The condition of the 3A RFP was similar to that of the 3B RFP and similar repairs and testing was conducted.

PECO's preliminarily conclusion of the event was that the scored bearings impaired the smooth operation of the control valve lifting beam for both RFPs. The bearing and alignment problems found on the 3B RFP was the probable cause for the pumps lack of response during the transient. Also, the inability of the 3A RFP's control valve lifting beam to modulate smoothly was the probable cause for the step change in flowrate. As part of the investigation, NMD and the SM reviewed and identified that the 2C RFP had the same type bearing. This review also indicated that the 3C and 2A/2B RFP bearings were made of softer brass and that the control of these pumps was adequate. The inspector discussed and agreed with these preliminary conclusions of PECO's engineering staff. PECO has initiated a priority one PEP investigation to formalize the review of this event and review previous instability events in order to identify any possible connections. PECO plans to address the 2C RFP during the unit's next load drop. The inspector determined that PECO assessment of the event, and actions taken to repair the RFPs were very good.

5.2 3A Core Spray System Troubleshooting - Unit 3

The inspector observed troubleshooting (TMT) developed by the system manager (SM) and reviewed surveillance activities on the 3A core spray loop to identify the cause of piping drain down during the performance of surveillance testing. The inspector found that operators took actions, not specified by the surveillance procedure, such that a condition required by a verification step could be met. This was apparently the result of an operator philosophy that such actions are appropriate to ensure that a condition specified by a verification step is met. The operator actions are discussed further in the following paragraph. Further, this condition was caused by a failure of engineering to verify that a valve would close under system flow and pressure following a torque switch setting change. This piping drain down had caused small water hammers during the start of the 3C CS pump during several previous routine STs. The operators had generated several action requests over the last six months, which stated that the 3A CS pump discharge check valve leakage may have been the cause of the piping drain down.

The TMT activities identified that the 3A CS discharge check valve was operating properly, however, the full flow test valve (MO-3-14-26), common to both the 3A and 3C CS pumps, was leaking. This was determined after the reactor operator (RO) completed the ST in the normal fashion. Specifically, after MO-3-14-26 was closed, both the CS pumps were secured, and the stayfull system realigned to the piping, the desired system pressure (50-100 psig) could not be obtained. At this point, the RO, as was common practice, gave a second close signal to MO-3-14-26, and CS system pressure increased to 50-100 psig. This indicated to the SM that MO-3-14-26 was not fully shutting against system operating flow/pressure.

The inspector reviewed and discussed performance of ST 0-01-301-3 "Core Spray Loop A Pump, Valve, Flow, and Cooler Functional and Inservice Test" with several operators and operations department management. The inspector found that if during testing MO 3-14-26 did not completely shut it would allow water to drain from the piping, before the 3C pump was started, causing the water hammer. Further, if MO-3-14-26 did not go shut during testing of the 3C pump it would prevent the stay fill system from pressurizing the piping when the testing was completed. From discussions with operators, they believed that the intent of procedure step 6.3.30, which states "VERIFY stayfull pressure as read on PI-3758A is between 50 and 100 psig." is to take action to achieve the required pressure if it is not proper. During this ST, operators routinely re-shut MO-3-14-26 to achieve the pressure within the required band. Further, because this was not noted as an abnormal condition by the operator, and because they believed that the 3A CS discharge check valve was leaking, this information was not given to the SM until disclosed by the TMT process. Based on this the inspector was concerned with the operation department's interpretation of the word "verify", when used in a step that does not require completion of a valve/component positioning or an automatic or manual action.

The inspector was concerned that the valve may not fully close if a LOCA occurred during surveillance testing and that flow would be short cycled through the full flow test line during the injection mode following a LOCA. The SM calculated that 135 gpm would leak back to the torus during the injection and that this leak rate was small enough that sufficient flow would be delivered to the reactor. The MO-3-14-26 was considered operable by the operations staff based on this calculation and the valve remaining closed.

The SM determined that MO-3-14-26 had tripped on torque when it was being closed. The valve's torque switch prematurely tripped as the valve disc experienced the higher pressure as it was closing off the flow. Although the valve was almost shut when the torque switch tripped, the momentum of the actuator was not sufficient to fully seat the valve under system flow conditions.

The SM reviewed that valve history and determined that the valve torque switch setting had been changed in May 1993 due to an overthrusting condition found during diagnostic testing (VOTES). The valve was operating at 116% of actuator rating, which was greater than the maximum actuator torque rating assumed, at that time. The torque switch setting (TSS) was 2.5 and reset to 2.0 in order to return the valve's performance to 100% of the actuator rating.

The inspector determined, based on discussions with the SM, that following the torque switch setting change the valve was not tested to ensure that the valve would fully shut under system flow conditions. The inspector was concerned that this practice may have occurred in other valves, potentially effecting other systems. PECO is reviewing this concern.

PECO performed a short outage for the A CS system to perform preventive maintenance on April 25 and 26. PECO performed VOTES testing on MO-3-14-26 and set the TSS back to 2.5 which would allow the valve to operate up to 116% of the actuator's rating. PECO dispositioned an NCR justifying use of the higher torque switch trip setpoint based on the actuator's run efficiency as allowed by PECO specification NE-119, "Motor Operator Valve thrust/Torque Determination Methodology." The inspector reviewed this evaluation, discussed it in detail with the engineer, and found it to be acceptable.

In summary, the inspector found that the SM developed and directed a TMT that identified and allowed for correction of the CS pipe draining issue. However, the operator interpretation of a pressure verification step allowed the actual problem to remain unidentified, unreviewed, and uncorrected until the TMT was performed. Further, following a torque switch setting change a verification of valve operability under flow conditions was not conducted. Following identification of the problem, the disposition of allowing the valve to operate at 116% of the actuator rating was appropriate and performed well. The inspector remained concerned over the interpretation of a non-action verification step as allowing actions to be completed and the failure to verify operability after torque switch resetting. This issue was considered unresolved pending inspector review of the implication of the verification interpretation and the potential that other valve torque switch settings were conducted and not properly retested **(URI 94-04-02).**

5.3 Emergency Service Water Through Weld Leakage

During the week of April 18, PECO prepared to conduct an ASME Section XI code repair to a leaking weld in the emergency service water (ESW) supply to the A ESW booster pump suction. PECO identified the pencil stream leak in November 1993. At that time, PECO engineering determined that the weld was structurally sound and operable, based on calculations using localized weld UT wall thickness measurements, and developed the code repair on a NCR. The planned repair would have removed the flaw, and thus would have been a code repair. It consisted of grinding to clean the area where the flaw was, inspection of the area to ensure that the flaw would be removed, welding of a pipe tee section over the affected area, drilling out of the defect, and welding of a cap on the end of the new tee pipe. When the initial grinding was conducted, PECO identified several other indications of through weld leakage within approximately one-inch of the initial indication. At this point, PECO placed the repair plan on hold until further evaluation could be conducted.

On April 19, PECO completed a 360 degree UT inspection of the weld and determined that there were several other indications of localized pitting. Engineering then completed calculations to determine that the weld was still structurally sound. Further, PECO conducted

UT examinations of other welds in sections of piping similar to the leaking section. These exams identified similar, but less severe weld thinning. PECO was developing a monitoring program to trend the pitting degradation. On April 28 PECO discussed this issue with the NRC on a conference call, presenting the sequence of events, their engineering evaluations, and repair plan. The repair of this section of piping and review of additional corrective actions will be reviewed in a subsequent report.

The inspectors reviewed PECO's actions with respect to this issue and found that from an engineering view point they were adequate. This included the initial and subsequent determination that the weld was structurally sound and therefore operable. The inspectors did find that there were some misunderstandings with respect to the importance for PECO to have requested NRC relief from ASME Section XI, based on the through wall leakage on Class III moderate pressure piping. The NRC staff determined, based on the April 28 conference call and review of PECO calculations, that an immediate safety concern did not exist and that in the short term PECO did not need to submit a relief request for the condition, as it will be corrected within 30 days of the conference call. However, the inspectors concluded that between November 1993 and April 1994, PECO could have been more aggressive at completing the code repair. Based on recent NRC staff guidance, if the repair could not have been completed in 30 days, PECO should have submitted a relief from ASME Section XI requirements for NRC approval. PECO currently understands this NRC position and committed to use it when evaluating any future issues.

5.4 Site Engineering Review

The inspector reviewed the engineering backlog of work items for the design and plant engineering sections of the site engineering organization. The inspector interviewed the managers of both engineering sections and attended an interface meeting between the maintenance department and plant engineering. The inspector concluded that measures have been effectively implemented to reduce the engineering backlog of NCRs, design change documents, and corrective and prevention maintenance tasks.

Following the site engineering reorganization due to the nuclear effectiveness and efficiency study (NEEDS), engineering management implemented a program to reduce the large backlog. Realistic goals were established, performance indicators were closely monitored, and the engineering organization received close management attention. As of the close of this report period, the design section had reduced their backlog from over 1200 items to about 400 items. Plant engineering had exhibited similar performance and was working with the maintenance department to reduce the maintenance backlog. The inspector concluded that adequate management controls have been implemented to ensure continued reduction in this backlog.

5.5 Offsite Power Modification Review

Over the period, PECO completed the first phase of upgrades to the offsite power supplies. This included: separation of the two startup transformers (3 SU & EA Reg (500 KV) and 343 SU (220 KV)) which alternately could have supplied the # 3 startup source, isolation of the old #3 SU line, and installation of a new #3 SU line from the 220 KV 343 SU transformer to the #3 SU bus. The next phase will include the installation of a new house services bus, with switchgear interconnections to the #2 and #3 SU busses, being fed through the old #3 SU line from the 500 KV 3 SU & EA Reg transformer. When completed PBAPS will have three offsite power lines, each from a separate portion of the PECO grid, and associated switchgear that will provide more availability and flexibility during maintenance on or loss of an offsite line(s).

The inspectors found that PECO implemented this initial phase of this modification well. Planning and engineering involvement was good in the establishing of plant conditions, modification acceptance testing, and briefing of operators in the changes made by the modification. Operators were knowledgeable of the modification and its effects on technical specification equipment.

5.6 10 CFR 50.59 Review

The inspector conducted a review of the PECO's 10 CFR 50.59, "Changes, Tests, and Experiments (CTEs)" program. The inspection included a review of the licensee's procedures, training and qualification program, and implementation of the program.

Overall, the inspector concluded that PECO had adequately implemented its 50.59 process. The procedures for determining when a safety evaluation needed to be conducted were appropriate. The training was consistent with PECO's process. The reviewed evaluations showed improvements in quality. Weaknesses were noted in two previously identified areas, specifically, in the review and documentation of the complete site safety analysis report (SAR) and in a lack of training on what is included in the SAR.

5.6.1 Procedures

PECO procedure LR-C-13, Rev. 0., which governs the 50.59 process, was a significant revision since the previous 50.59 inspection (see Inspection Report 92-16). The procedure provides instruction for the performance of both the 50.59 determination and safety evaluation (the process of performing a determination and, if necessary, a safety evaluation, is referred to as the 50.59 review). The determination process screens the CTEs to determine if a safety evaluation is required. A safety evaluation is required if the CTE 1) changes the facility as described in the safety analysis report (SAR), 2) changes procedures as described in the SAR, or 3) conducts tests or experiments not described in the SAR. The safety evaluation analyzes the safety significance of the CTE and determines if the CTE involves an unreviewed safety question (as defined in 10 CFR 50.59). The licensee's procedure incorporates industry guidance on the 50.59 process as described in NSAC-125, "Guidelines for 10 CFR 50.59 Safety

Evaluations." The inspector concluded that LR-C-13 was a very thorough procedure which provides conservative guidance on the implementation of 50.59.

The individual performing a CTE is directed to use LR-C-13 by the applicable procedure governing the CTE. For example, MOD-C-3, Rev. 2 establishes the process for design and design changes of modifications to plant systems, structures and components. This procedure directs the lead representative engineer to process the 50.59 review in accordance with LR-C-13. During the previous inspection, the inspector noted that Administrative Procedure A-20, "Generation, Revision and Implementation of Operating Procedures (System(S), System Operating (SO), Abnormal Operations (AO), General Plant (GP), Alarm Response Card (ARC))," did not direct the performance of a 50.59 review. At that time, the inspector was told that the procedure was under revision and the revised version would correct this deficiency. During this inspection the inspector again reviewed A-20 and found that it had not been revised. However, the licensee stated that A-20 was being superseded by procedure AA-C-5, Rev. 3. This new revision will be issued shortly. The inspector reviewed the latest draft of AA-C-5, Rev. 3 and verified that it superseded A-20 and properly directed the person revising or writing a procedure to perform a 50.59 review using LR-C-13.

5.6.2 Training and Qualification

The inspector found the training plan consistent with the guidance of LR-C-13. The training consists of two parts. First, the trainee must read LR-C-13 and sign a statement to that effect. Second, the trainee must attend a two-hour class on LR-C-13. The class session briefly reviews 10 CFR 50.59 and LR-C-13. The inspector concluded that the training adequately familiarized reviewers with LR-C-13. The inspector performed a spot check to verify that the individuals performing the 50.59 reviews had received the required training, noting no discrepancies.

The inspector found that the training had not been modified to address the weaknesses noted during the NRC's previous 50.59 inspection. Specifically, the lesson plan did not include discussions of what was included in the complete SAR and how to document the review conducted. The training representative stated that the continuing training given to the engineering department discussed these weaknesses. However, the continuing training does not cover everyone performing 50.59 reviews. As discussed below, some of the problems noted in the previous inspection were still evident. While these problems were not safety significant PECO did not appear to have effectively used feedback to improve its training program, and thus the quality of the process.

5.6.3 Implementation

The inspector used the licensee's July 20, 1993 (covering calendar year 1992) and February 10, 1994 (covering calendar year 1993) annual 10 CFR 50.59 summary reports to select approximately 5% of the 1992 and 1993 10 CFR 50.59 safety evaluations for review. Specifically, the inspector reviewed the following 50.59 reviews:

1993

1. MISC. 50.59 Operating with MO-3-10-25A open
2. MOD 5231 (replace instrumentation in condensate loops)
3. MOD 5401 (removal of RCIC turbine missile shield)
4. NCR P910591 (use as is disposition for two electrical panels)
5. Procedure OM-03.2 (allows any STA qualified individual to fill STA position)
6. TPA 3-62-044 (jumper across defective control rod drive magnetic reed switch)

1992

1. MISC. 50.59 Valve Closure Time (justifies increased valve closure times for the torus to reactor building vacuum breaker isolation butterfly valves)
2. MOD 0964 (removed continuous water level monitoring system for the scram discharge headers)
3. MOD 1909 (reconfigured valve stuffing box arrangements)
4. MOD 2075 (added valves to ensure local leak rate test is performed in full compliance with Appendix J)
5. MOD 5249 (installed GEZIP)
6. NCR P900244 (eliminated reactor feedwater pumps "B" and "C" D/P transmitters from service)
7. UFSAR CR-9108594 (addressed 10CFR21 deficiency in primary high range radiation monitoring system coaxial cabling)

The inspector determined that, overall, the quality of the safety evaluations had improved over the safety evaluations reviewed during the previous inspection. The inspector found that PECO had taken adequate actions to ensure that the answers to questions were not just a negative restatement of the question. However, the inspector noted some weaknesses similar to those noted in the previous inspection. Specifically, the licensee's procedure stated that the SAR is a body of documents that includes the UFSAR, TS, NRC safety evaluations and other commitments to the NRC. However, the 10 CFR 50.59 reviews for "UFSAR CR-9108594," "Mod 5249," and "MISC. 50.59 Operating with MO-3-10-25A Open," appear to rely solely on a review of the UFSAR.

Although the inspector found LR-C-13 to be a good procedure, the inspector noted weaknesses in an optional form that is available to the 50.59 reviewers. The format contained in LR-C-13 encourages the reviewer to use a word processor to document the review. However, the optional form contained in administrative guide AG-66 encourages the reviewers to hand-write short answers to the questions asked. As a result of the poor format, some of the words in the copies of the reviews given to the inspector were illegible. Additionally, AG-66 does not ask for information that LR-C-13 instructs the reviewer to document. Specifically, LR-C-13 asks the reviewer to describe the CTE and to state the reason why the review is necessary. The

form in AG-66 does not explicitly request this information. Also, the form in AG-66 does not prompt the reviewer to provide the basis for concluding that a technical specifications change is not required. LR-C-13 states that this basis shall be provided.

Despite these weaknesses, the inspector concluded that there were no safety evaluations that reached an incorrect unreviewed safety question conclusion. PECO was taking actions to improve its 50.59 review process. For example, a computerized list of all the documents comprising the SAR is expected to be available by the end of this year. Use of this new system should correct the weakness previously noted regarding the superficial review of the SAR. Additionally, PECO was developing a performance indicator for the 50.59 program. This program will set performance standards and then sample 50.59 reviews against the standards. Feedback will be provided to encourage the prompt correction of noted weaknesses.

The inspector also attended a plant operations review committee (PORC) meeting during the inspection. The inspector concluded that the PORC displayed an adequate questioning attitude regarding the 50.59 reviews discussed during the meeting.

5.6.4 PECO 50.59 Self-Assessment

TS 6.5.2.7 requires that the nuclear review board (NRB) review the 50.59 process. At PBAPS the independent safety engineering group (ISEG) performs this requirement for the NRB. Review of the April 21 ISEG report on 50.59 determinations showed that ISEG had reviewed the process for determining if a safety evaluation needed to be completed and the documentation necessary for making the determination. The ISEG's overall conclusion was that there were some areas for improvement in the understanding of what made up the SAR and how the completed review was documented. These issues are similar to those identified previously by the NRC. At the close of the reporting period PECO management was determining how to respond to the ISEG recommendations.

5.7 Control Room Radiation Monitor Replacement

The inspector identified a design weakness and modification control deficiency during installation of Modification 5281 designed to replace and upgrade the control room ventilation radiation monitoring (CRM) system. The modification also installed new flow measuring switches in the ventilation ductwork and revised the initiation logic for the control room emergency ventilation (CREV) system. The CRM system contains six radiation detectors (A-E). Four of the detectors (A-D) provide an initiation signal for the CREV system, the remaining two detectors monitor radiation levels following a CREV initiation.

During this period, PECO installed the A, C, and E radiation detectors. Following installation, PECO was initially unable to calibrate the A detector. PECO consulted with the equipment vendor and isolated the problem to an improperly shielded detector output cable. PECO corrected the detector cable problems by replacing the cables for the A, C, and E detectors and was able to calibrate the detector. The inspector discussed this issue with the system manager

who indicated that the original detector cable had performed acceptably in the vendor's test facility and attributed the problem to the increased electrical noise in the operating plant environment. The system manager also indicated that this was the first time that this particular radiation monitoring equipment had been installed in an operating plant. The inspector was satisfied with PECO's actions to resolve the noise problem. However, the inspector noted a weakness in the original system design involving the inadequate protection of the monitoring system from background noise.

After PECO declared the A instrument channel operable the inspector noted that the revised operating procedures had not been implemented. Guideline MOD-CG-14, Revision 1, "Guideline For MOD Acceptance Testing And Closure," required the affected procedures to be issued prior to declaring the system operable. The inspector discussed this modification control issue with the operations manager who agreed to review the event.

At the conclusion of the period, PECO was installing the B instrument channel. The inspector will continue to review this modification and considers the design weakness and the modification control deficiency unresolved pending review of the completed modification package. **(URI 94-04-03)**

5.8 (Closed) Secondary Containment Testing, Unresolved Item 93-24-03

In NRC Inspection Report 93-24 the inspectors reviewed PECO's program for maintaining secondary containment (SC) integrity and identified concerns regarding the containment capability testing, operation of the reactor building airlock, and restoration of barrier breaches that do not render the SC inoperable. The first two concerns were closed in NRC Inspection Report 93-31. During this period, the inspectors reviewed PECO's program for restoring SC penetration barriers and concluded that it was acceptable.

PECO utilizes a controlled reassembly process in lieu of testing to restore SC barriers. The inspectors were concerned that this could result in a nonconservative estimate of in-leakage which would remain undetected until performance of the next SC capability test. The inspectors reviewed the SC test results for the past several years and noted that a large margin for leakage existed compared to the relatively small potential leakage from a restored barrier. The data indicated that PECO has adequately restored the penetration barriers. This unresolved item was closed.

5.9 (Closed) Violation of Pressure/Temperature Curve following Unit 3 Scram, Violation 92-27-01

Following a reactor scram at Unit 3 on October 15, 1992, which included the shutdown of recirculation pumps, there was a significant cooldown in the bottom head as a result of the loss of forced recirculation. During the bottom head cooldown, the pressure/temperature (P/T)

conditions exceeded the allowable limits shown in the P/T curves in the TS. PECO initiated an evaluation and addressed the overall impact of the event, reactor vessel integrity concerns and associated margins to safety, and initiated corrective actions to prevent recurrence.

The inspector reviewed PECO's corrective actions and found them to be fully implemented with the exception of a plant modification that will be installed during the refueling outage in September 1994 for Unit 2 and September 1995 for Unit 3. MOD 5362 will install a motor operated throttle valve on the 6 inch reactor water clean-up pump (RWCU) suction line from the recirculation pump suction and will allow the RWCU pumps to pull increased flow from the bottom head by throttling the flow from the recirculation loop suction, reducing thermal stratification in the core. The inspector determined that this modification should improve the accuracy of the bottom head temperature measurement which will minimize stratification in the lower head. This item was closed.

6.0 PLANT SUPPORT (71707, 90712)

6.1 Radiological Controls

The inspectors examined work in progress in both units to verify proper implementation of 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.

6.2 Physical Security

The inspectors monitored security activities for compliance with the security plan and associated implementing procedures. The inspectors observed security staffing, operation of the central and secondary access stations, 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 observed protected and vital area barriers, compensatory measures, and escort procedures. The inspectors found the licensee's activities to be acceptable.

7.0 MANAGEMENT SYSTEMS ASSESSMENT (71707,30702)

Daily PECO management interactions with the site staff were evaluated on a sampling basis. These included: 8:00 a.m. work planning meetings, 8:30 a.m. leadership meetings, and 3:00 p.m. work scheduling meetings. In all cases, management showed proper attention to technical issues, discussions were well developed, focused on safety, with proper depth and insight provided by specific site personnel.

The leadership meetings included very open and frank discussions of daily problems. On a rotating basis (i.e., once per week) special topics were discussed including status of radiological protection, chemistry, engineering, maintenance, training, emergency planning, quality assurance, experience assessment, and operations programs. Routine issues for discussion included personnel radiological contaminations and injuries and any industry events/issues received by PECO from industry groups. The plant manager effectively used a follow up items list to track the site review of developing issues or problems. For each issue the plant manager assigns a designated individual to report back to the group on the topic on a specific date, based on the safety significance of the issue. The plant manager provided very good focus on what type of issues he desired to follow and the type of followup presentation to be provided to the group. Types of issues on this list included: equipment failures/problems, housekeeping deficiencies, radiological problem trend evaluations, control of work problems, and design problems.

PECO conducted a very good overview PORC meeting discussing the operation of both units during the month of March 1994. The PORC open items discussed were focused on continued safe operation of the plants and on reducing challenges to safe operation. Presentations on the status of the PEP implementation and the temporary plant alterations installed were good.

The inspectors observed that PECO management took aggressive actions to address several technical issues over the period. Information was gathered and assessed based on safety and sound technical judgements made for the ESW through wall pipe leak (see section 3.3) and the feed pump governor control problems (see section 3.1). PECO managers asked key questions of their staff, on each of these topics, demonstrating a desire to improve overall performance.

7.1 Performance Enhancement Program Review

PECO recognized that a strong self-assessment philosophy includes self-identification and correction of problems. The PEP was put into use in October 1993. Prior to the implementation of PEP, PECO used a similar reportable event investigation form (REIF) process to evaluate events and issues. Both processes were designed to allow PECO employees or contractors to identify issues to PECO management, which they believed were adverse to quality, so that corrective actions could be taken.

The PEP process has been administered by the experience assessment group (EAG) and controlled by procedure LR-C-10, Rev 1, dated 9/7/93. The process has three levels of issues, based on the severity of the situation, each of which has a specific graded level of evaluation necessary. A Level 1 PEP includes issues that have or could have resulted in a major adverse effect. It would have a Class 1 evaluation performed on it, which would include a comprehensive structured evaluation to determine causal factors and necessary corrective actions to prevent recurrence. The lower severity level PEPs (Levels 2 and 3) require incrementally less structured analysis of root causes and documentation of corrective actions.

PECO requires that their detailed root cause analysis procedure be used when evaluating Level 1 and 2 problems. This process is well developed and laid out in a tree diagram format using a specific alpha-numeric designator for each cause block. This alpha-numeric designation allows the tracking of each cause down through the tree diagram to the basis cause categories of procedure, training, quality control, communications, management systems, human factors, and immediate supervision. At this point, the root cause determination is very similar to the NRC's Human Performance Investigation Process (HPIP) manual (NUREG/CR-5455), where each of the root cause branches is further broken down into more specific cause (each of which is also given an alpha-numeric designator). The PEP procedure requires the root cause be documented using the series of alpha-numeric paths through the root cause tree and that the cause be documented in writing.

Level 1 and 2 PEP evaluations and corrective actions are presented to the PORC for approval. The nuclear review board (NRB) also reviews and comments on these evaluations. The PEP process is monitored by the EAG as part of the daily leadership meetings. The EAG also issues a quarterly summary, showing a years worth of data, of PEP issues. This summary report contains several performance indicators and conclusions based on trends of the indicators.

Through attendance at daily leadership and PORC meetings and based on a review of the March 1994 EAG quarterly report, the inspectors concluded that PECO was adequately monitoring the performance of the PEP system and developing worthwhile trend data. The report indicated that several areas needed to be watched by management and that several areas were improving. Further, the report summarized the leading causes for problems over the last year, these were: management policies or controls less than adequate or not used, corrective actions less than adequate or not followed, procedures wrong, incomplete or followed incorrectly, self- checking less than adequate, and man-machine interface problems. This report represented good self-assessment data and provided valuable information to PECO management.

The inspectors reviewed a sampling of the 1993 and the first quarter of 1994 completed Level 1 and 2 event investigation reports. This included both REIFs and PEPs and represented approximately 50 % of the total generated. The evaluations reviewed met the criteria described in LR-C-10, for event discussion, and identification of causes, contributing factors, conditions adverse to quality, and associated corrective actions. The specific REIFs and PEPs reviewed are listed in Attachment 1 of this report.

Overall, based on this review of Level 1 and Level 2 PEPs, the inspectors found that the system was functioning properly, allowing for good root cause determination and identification of appropriate corrective actions. Of particular interest to the inspectors were the problems associated with modification design and implementation. This issue was identified by PECO in their EAG quarterly review for March 1994 as a watch area. The implementation of corrective actions specified on REIF 2-93-337, modification problems throughout 1993, and REIF 2-93-360, Rev 1, design deficiencies on control room emergency ventilation radiation monitor modification will be the subject of future NRC inspection as design work is completed and as installations are conducted during the 1994 Unit 2 outage.

ATTACHMENT 1

OPERATIONS:

- REIF 3-93-026 Level 2 March 7, 1993 reactor scram, due to low reactor vessel level. Reactor feed pump trip while lowering reactor power to with in the bypass valve capacity, to allow work on turbine valves.

- REIF 2-93-264/267, Level 2, June 22, 1993, Mispositioned control rod, following power reduction to allow entry into Unit 2 main steam tunnel.

- PEP I0000291, Level 2, October 6, 1993, control switch for control room emergency ventilation left in the off position following restoration.

- PEP I0000605, Level 2, November 15, 1993, 5th point heater valve out-of-position following Unit 3 start-up, leading to a steam leak to the turbine building.

- PEP I0000902, Level 2, December 11, 1993, switchyard alignment and voltage check not completed within one hour.

- PEP I0001161, Level 2, December 18, 1993, missed continuous fire watch

- PEP I0001457, Level 2, February 11, 1994, automatic shutdown of EDG E-4.

MAINTENANCE:

- REIF 3-93-125, July 9, 1993, Non-compliance with HCU maintenance procedure.

- PEP I0001401, February 3, 1994 reactor scram due to identification of generator alterex problems.

PLANT SUPPORT:

- REIF 2-93-264/267, June 22, 1993, Controls over a special high radiation area entry were not fully effective in that a higher than expected dose rate was identified upon the entry.

- REIF 2-93-279, June 25, 1993, unlock high radiation area door.

- PEP I000162/170, September 24, 1993 Workers in Unit 3 were unaware of higher than expected radiation levels.

- PEP I0000582, November 11, 1993, Unlocked high radiation area door