U. S. NUCLEAR REGULATORY COMMISSION
REGION I

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Licensee:	PECO Energy Company Correspondence Control Desk P.O. Box 195 Wayne, PA 19087-0195
Facility:	Peach Bottom Atomic Power Station Units 2 and 3
Inspection Period:	August 11, 1998 through September 21, 1998
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EXECUTIVE SUMMARY

Peach Bottom Atomic Power Station
NRC Inspection Report 50-277/98-08, 50-278/98-08

This inspection report included aspects of licensee operations; surveillances and maintenance; engineering and technical support; and plant support areas.

Operations:

- The operators in the control room demonstrated very good communication practices in their extensive use of three part communications. The operators also demonstrated very good questioning attitudes in their pursuit of the scope of a breaker problem and their review of procedures.

  Peer checking and self checking were usually employed effectively. One error was noted in which the improper unit's procedure was initially used to substitute computer variables for heat balance calculations but later corrected. Logs generally were kept accurately, but an erroneous plant status entry went undetected through a shift turnover, indicating a cursory review of that entry. (Section O1.1)

- Two Unit 3 reactor water cleanup (RWCU) system events occurred during this inspection due to poor system configuration control. These events resulted in an entry into emergency operating procedures due to a steam leak on the non-regenerative heat exchanger and an automatic engineered safety feature (ESF) isolation. The causes were less than adequate turnovers between senior reactor operators and non-licensed operators, incomplete post-maintenance testing instructions, and an inadequate RWCU startup procedure.

  Station personnel failed to properly maintain the RWCU startup procedure, resulting in a violation of Technical Specification 5.4.1, "Procedures." Although station personnel had previously developed some initiatives to reduce plant configuration control problems, they had not made sufficient progress implementing them to preclude these events. (Section O2.1)

- Operators did not verify that a torus-to-drywell vacuum breaker was closed within 10 hours of the discovery of an unreliable indication, as required by technical specifications. This event was caused by the failure to adhere to equipment operator rounds and log review practices by operations personnel. This non-repetitive, licensee-identified, and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy. (Section O2.2)

- On August 22, 1998, during performance of the Unit 3 turbine building rounds an equipment operator inadvertently shutdown the 3C drywell chiller. Since the

chiller was quickly restarted, the temperature and pressure increases in the drywell were small and posed a small safety risk to the plant.

An engineering evaluation for a similar event that occurred on March 25, 1997, was not effective to preclude the August 22, 1998 event. (Section O2.3)

- On August 21, 1998, unit 3 operators commenced a down power maneuver due to loss of cooling to the main transformer. The reduced load prevented a loss of the main transformer and plant transient when the deluge system activated.

  The initial response by the operators for the loss of cooling to the main transformer and subsequent deluge activation was good. Due to the power reduction, the flow in the recirculation system loops became mismatched in excess of the Technical Specification limit. This condition was identified and corrected within the time allowable by Technical Specifications. Failure of operations personnel to fully understand the effect of xenon on recirculation flow and closely monitor recirculation flow contributed to this involuntary entry into a Technical Specification Action and Limiting Condition for Operation. (Section O4.1)

- The Senior Reactor Operator Limited to Fuel Handling (LSRO) program was good overall. The LSRO program guidelines and examinations were comprehensive and well maintained by the program coordinator and LSRO license maintenance was well documented. The areas of exam security, remediation, operator feedback, and medical records were acceptable. (Section O5.1)

Maintenance:

- Control room deficiencies were controlled and adequately prioritized so that critical Main Control room deficiencies were corrected in a timely manner. However, some weaknesses, of minor safety significance, were noted with the clarity and implementation of the requirements in OM-P-10.3, Revision 3, "Equipment Status List/Tagging of Deficiencies." (Section M2.1)

- Weaknesses in maintenance planning and work practices led to a significant water leak on the station fire main on August 23, 1998. Water from the leak entered the safety related emergency service water/high pressure service water pump house via underground electrical conduits and degraded penetration seals. The engineering evaluation, that the penetration seal leakage was within design assumptions for a design basis flooding event, and pump operability was not affected, was adequate. (Section M4.1)

Engineering:

- Construction activities on the east retaining wall of the independent spent fuel storage installation were acceptable. Engineering personnel resolved

construction deficiencies regarding as-built keyways and soil compaction in an effective manner, thus the ana lzed as-found condition of the east wall was acceptable. The concrete mix delivery, testing, and pouring activities for the east retaining wall were acceptable. (Section E1.1)

- Engineering personnel took prompt and effective corrective actions following their identification of the potential to bypass the pressure suppression function of the torus during simultaneous purging of the torus and drywell as a result of postulated failures. In accordance with the NRC Enforcement Policy, Section VII.B.3, Violations Involving Old Design Issues, the NRC is exercising enforcement discretion and not citing this violation. (Section E2.1)

Plant Support:

- PECO implemented, an effective radioactive waste processing, handling, storage, and radioactive material transportation program. Wastes were properly classified and packaged. (Section R1.1)

- Overall, radioactive waste and material processing and storage areas were properly posted and controlled, and exhibited very good material condition. (Section R2)

- Individuals responsible for radioactive waste processing activities exhibited a good knowledge level of regulatory requirements and program procedures. (Section R4)

- PECO provided generally good training of personnel involved in radioactive waste activities. However, one individual had not received the a-priori specified training for mechanics involved with radioactive waste activities and there was no defined training program for new radwaste personnel brought into the radwaste group and involved in radwaste shipping activities. PECO took action on these matters. (Section R5)

- PECO implemented an appropriately staffed and defined organization for radioactive waste processing, handling storage, and shipping. (Section R6)

- PECO performed audits of appropriate depth and scope of radwaste processing, handling, storage, and transportation activities, including training and qualification of personnel. Corrective actions were initiated for identified concerns. (Section R7)

- PECO provided generally good radiological controls oversight of incoming fuel shipments. However, a violation of radiation protection procedures associated with source checking of an alpha contamination counting instrument was identified by the NRC and was promptly corrected by PECO. (Section R8.3)

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ATTACHMENTS

Report Details

Summary of Plant Status

PECO operated both units safely over the period of this report.

Unit 2 began this inspection period at 73% power, in end-of-cycle coastdown. Unit 2 power was at 60% at the end of the inspection period.

Unit 3 began this inspection period at 100% power. On August 14, unit load was reduced to 84% due to a loss of service water to a main generator hydrogen cooler. Unit load was reduced to 67% on August 21 due to degraded cooling of the 3C main transformer. Unit power remained at 100% for the rest of the period.

I. Operations

O1 Conduct of Operations[1]

O1.1 Sustained Control Room Observation

a. Inspection Scope (71715)

The inspectors conducted augmented observations of control room and other in-plant activities from September 7 through September 11, 1998. Some of the activities the inspectors observed included:

- Diesel generator surveillance run for operability determination
- Investigation documentation of a problem associated with racking out a 4 kilovolt diesel output breaker
- Biocide injection in service water systems
- Pre-evolution brief of 3B recirculation pump scoop tube lockup and clamping for motor refurbishment
- Several position turnovers and beginning of shift briefings
- Generation of troubleshooting, repair and test procedures for control room indication circuit
- Performance of special test procedure for hydrogen injection

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[1] Topical headings such as 01, M8, etc., are used in accordance with the NRC standardized reactor inspection report outline. Individual reports are not expected to address all outline topics.

b. Observations and Findings

The operators conducted their activities in accordance with the operations manual procedures. They used three part communications routinely in their exchange of information. Annunciator response was prompt, and alarm response procedures were consulted for any annunciator alarms not anticipated. Anticipated alarms were announced to the crew by the cognizant operator.

Peer checking was used where called for by the operations manual. Peer checking was used for the diesel generator surveillance run and the recirculation pump scoop tube lockup. Operators applying blocking tags on components performed self checking to ensure that the correct components were tagged. The control room supervisors showed appropriate oversight of infrequent tasks and test procedures.

One exception to the otherwise excellent quality verification of control room activities was in the use of the wrong unit's routine test procedure for inserting a substitute value for recirculation loop flow rate in the plant computer heat balance equation. The inspector noted that a Unit 2 procedure initially was used on Unit 3 because it was printed on white paper, the color used for common unit procedures. The operators quickly located the correct procedure prior to the actual performance of the task referenced in the procedure, and the shift manager counseled the control room team on the need to verify procedural accuracy when performing tasks.

Control room logs were kept current. Technical specification action logs were accurate. Entries were made in this log for potential as well as actual technical specification action entries dealing with equipment unavailability. Two minor exceptions were the insertion of erroneous unit status data into the unified computer log at two shift turnovers. The inspectors noted these discrepancies, and also noted that the first log error had not been noted by the control room team in the log review conducted at the most recent shift turnover.

The operations teams, as led by the shift managers and their supervisory staffs, all showed an excellent questioning attitude to abnormal indications and occurrences. When a loose cable cover damaged a terminal strip during a breaker change out, the operations team investigated several similar breakers for the same condition. One control room supervisor noted a step in a surveillance procedure that was not signed off even though there was no requirement that he conduct such a complete review. He initiated action to correct the omission.

c. Conclusions

The operators in the control room demonstrated very good communication practices in their extensive use of three part communications. The operators also demonstrated very good questioning attitudes in their pursuit of the scope of a breaker problem and their review of procedures.

Peer checking and self checking were usually employed effectively. One error was noted in which the improper unit's procedure was initially used to substitute

computer variables for heat balance calculations but later corrected. Logs generally were kept accurately, but an erroneous plant status entry went undetected through a shift turnover, indicating a cursory review of that entry.

O2 Operational Status of Facilities and Equipment

O2.1 Reactor Water Cleanup System Configuration Control Events (Unit 3) and (Closed) LER 50-278/3-98-004

a. Inspection Scope (71707)

The inspectors reviewed two reactor water cleanup (RWCU) system configuration control events that resulted in an unplanned entry into emergency operating procedures and an automatic engineered safety feature (ESF) isolation.

b. Observations and Findings

Non-Regenerative Heat Exchanger Vent Valves Left Open

On August 19, 1998, while restoring the RWCU system to service following maintenance, operators received a reactor building area temperature alarm in the 'B' RWCU non-regenerative heat exchanger room. As required by procedure, operators promptly entered emergency operating procedures for secondary containment control. An equipment operator responding to the alarm heard a steam leak from the 'B' non-regenerative heat exchanger room. The sound diminished when the RWCU inboard and outboard isolation valves were shut.

Operators entered the 'B' non-regenerative heat exchanger room and found the heat exchanger vent valves partially open, instead of closed, as required. Upon further investigation, operations personnel identified that these valves were left out of position due to poor configuration control of the system while preparing for maintenance activities.

Operations personnel investigated this issue and determined that there were two primary causes for these valves left out of position while preparing for maintenance activities:

- Shift turnover information regarding the RWCU system was less than adequate. The turnovers between senior reactor operators and between non-licensed equipment operators did not address the detailed status of the system.

- Shift supervision made incorrect assumptions with regard to the affected trains when continuing with a RWCU system procedure.

The poor turnovers occurred during the performance of a cooldown and depressurization procedure, which prepared the system for maintenance. When preparing the system for maintenance on August 16, 1998, the operations shift

partially opened the vent valves for both the 'A' and 'B' non-regenerative heat exchangers based on the work control supervisor's interpretation of the intent of the depressurization and cooldown procedure. The relieving operations shift crew continued with the procedure to prepare the system for maintenance. The relieving crew believed, based on a precaution step in the depressurization and cooldown procedure, that only the 'A' non-regenerative heat exchanger vent valves had been opened in earlier steps. As a result, when the cooldown and depressurization procedure directed the vent valves to be closed, the operators only closed the 'A' non-regenerative heat exchanger vent valves and did not close the 'B' non-regenerative heat exchanger vent valves. The 'B' non-regenerative heat exchanger vent valves remained partially open, when they should have been closed, until the valves were found leaking steam, while returning the system to service, on August 19, 1998. The system restoration procedure, SO 12.1.A-3, Revision 19, "RWCU System Startup for Normal Operation or Reactor Vessel Level Control," did not contain instructions to verify that the non-regenerative heat exchanger vent valves were closed during system restoration.

The review by the inspectors of this event revealed the following:

- The work control supervisors stated that their turnover was cursory with respect to the RWCU system configuration. They indicated that they relied on the equipment operators using the depressurization and cooldown procedure to conduct a detailed turnover.

- The equipment operators' turnover effectively communicated the steps of the depressurization and cooldown procedure that were completed. However, the turnover did not address the train(s) of the system that were affected by these steps.

- The depressurization and cooldown procedure was infrequently performed. One work control supervisor stated that this was the first time that he had used the procedure.

- The system restoration procedure did not identify the mispositioned valves before the event occurred.

The inspectors determined that this event was an important operations performance issue. This system configuration control event occurred despite ongoing operations focus and initiatives on configuration control and system restoration. This event was similar to others discussed in NRC Inspection Reports 50-277(278)/98-01, 98-02, and 98-06, in which shift supervision made improper assumptions regarding system configuration or operation.

Inadequate RWCU Restoration Following Post-Maintenance Testing

On August 20, 1998, an automatic isolation of the RWCU system occurred due to a high flow condition. Operators were in the process of returning the system to service and were opening the inlet valve to the 'B' RWCU demineralizer when an

inrush of water into the 'B' demineralizer was heard. Following the isolation, operators took appropriate actions to verify the isolation was complete and to check the integrity of the system. Since this was an automatic engineered safety feature (ESF) actuation, operations supervision made a four hour notification to the NRC per 10 CFR 50.72.

The cause of the event was an incorrect system lineup following post-maintenance testing, causing the 'B' demineralizer not to be properly filled and pressurized. After investigation, operations personnel found that the 'B' demineralizer inlet valve had been shut for post-maintenance testing and was not returned to the open position. They noted that a maintenance operator had shut both the demineralizer inlet and outlet valves in order to satisfy an interlock and perform post-maintenance testing (PMT) on solenoid valve SV-3-36B-030B, 'B' demineralizer plenum vent valve. The inlet valve should have been opened following PMT to provide the appropriate configuration for restoration of the system.

The inspectors noted that the PMT instructions in the work order did not address positioning of the demineralizer inlet and outlet valves. Also, the documentation of the completed PMT did not discuss any operation of the inlet and outlet valves.

The inspectors reviewed the procedure used for restoration of the RWCU system, SO 12.1.A-3. The procedure stated that use of the RWCU system check-off list was optional, "as directed by shift management." In this instance, shift management determined that completion or partial completion of a check-off list was not necessary. The inspectors also noted that none of the steps in this procedure verified that the 'B' demineralizer inlet valve was in the proper position for system restoration. The inspectors concluded that SO 12.1.A-3 did not provide adequate instructions for verification of the 'B' demineralizer inlet valve position.

Operations adequately addressed short-term corrective actions for this issue. The inspectors noted that SO 12.1.A-3 was revised following this event, on September 12, 1998, to include verification of the demineralizer inlet valve positions. The inspectors performed an in-plant review of Licensee Event Report (LER) 50-278/3-98-004, and identified no additional concerns.

NRC Inspection Reports 50-277(278)/98-01, 98-02 and 98-06 discussed a number of instances of plant status/configuration control problems, some of which were the result of improper system restoration after maintenance or PMT. Violations for plant status/configuration control problems were cited in NRC Inspection Reports 50-277(278)/98-01 and 98-06. As corrective actions for these issues, operations personnel developed the following initiatives:

- improve configuration control within a clearance boundary
- add system and equipment restoration details in work packages
- implement plant impact plans

Peach Bottom Atomic Power Station Technical Specification (TS) 5.4.1 requires that written procedures be established, implemented, and maintained covering the

activities in Regulatory Guide 1.33, Appendix A, which includes procedures for reactor cleanup system startup. The inspectors determined, based on both of these events, that PECO failed to fully maintain SO 12.1.A-3 with regard to verification of system configuration prior to startup. **(VIO 50-278/98-08-01)**

The inspectors determined that this violation was repetitive since the corrective actions for the previous violation cited in NRC Inspection Report 50-277(278)/98-01 included making enhancements to station procedures. These enhancements were to preclude improper system restoration after maintenance and PMT. Also, the expectation was communicated to all station personnel of the importance of notifying the control room of any system configuration changes made during the performance of maintenance and/or testing. Station personnel had not made sufficient progress implementing these initiatives in order to preclude these events.

c. Conclusions

Two Unit 3 reactor water cleanup (RWCU) system events occurred during this inspection due to poor system configuration control. These events resulted in an entry into emergency operating procedures due to a steam leak on the non-regenerative heat exchanger and an automatic engineered safety feature (ESF) isolation. The causes were less than adequate turnovers between senior reactor operators and non-licensed operators, incomplete post-maintenance testing instructions, and an inadequate RWCU startup procedure.

Station personnel failed to properly maintain the RWCU startup procedure, resulting in a violation of Technical Specification 5.4.1, "Procedures." Although station personnel had previously developed some initiatives to reduce plant configuration control problems, they had not made sufficient progress implementing them to preclude these events.

O2.2 Torus/Drywell Vacuum Breaker Loss of Seated Indication (Unit 2)

a. Inspection Scope (71707)

The inspectors reviewed operator rounds and logkeeping performance issues that led to a technical specification violation associated with a torus/drywell vacuum breaker.

b. Observations and Findings

On August 24, 1998, operators recorded on electronic rounds data that torus/drywell vacuum breaker, AO-2-07B-2504C, had lost its "seated" indication. On August 30, 1998, operations personnel determined that the actions to verify that the vacuum breakers were closed had not been performed, as required by technical specifications.

Peach Bottom Atomic Power Station Technical Specification 3.6.1.6 bases specify that if a torus/drywell vacuum breaker position indication is not reliable, then an

alternate method of verifying that the vacuum breakers are closed shall be performed within 10 hours. This is necessary to ensure that a vacuum breaker is not open, which would create the potential for overpressurization of the torus during a loss of coolant accident. Operators failed to complete the required actions, resulting in a violation of Technical Specification 3.6.1.6. This non-repetitive, licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy. **(NCV 50-277/98-08-02)**

This event resulted, in part, from deficiencies in operations personnel implementation of the rounds and log review processes:

- Operators did not always enter comments on their logs for out-of-specification readings, contrary to operations rounds guidance.
- Operators did not always notify supervision of unsatisfactory readings or conditions.
- Some electronic rounds data was not reviewed by shift management in a timely manner as specified by operations guidance.

Operators also failed to recognize the potential safety impact of the loss of seated indication for the vacuum breaker.

The inspectors reviewed completed corrective actions, which consisted of promptly verifying the vacuum breaker position, revising the daily rounds data procedures, and conducting briefings by operations management. Planned corrective actions included an evaluation of equipment operator training on round sheet parameters, inspection of the torus/drywell vacuum breaker, and revisions to electronic rounds format. The inspectors determined that these completed and planned corrective actions were adequate.

c. Conclusions

Operators did not verify that a torus-to-drywell vacuum breaker was closed within 10 hours of the discovery of an unreliable indication, as required by technical specifications. This event was caused by the failure to adhere to equipment operator rounds and log review practices by operations personnel. This non-repetitive, licensee-identified, and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

O2.3 Inadvertent Shutdown of the 3C Drywell Chiller

a. Inspection Scope (71707 & 37551)

Inspectors reviewed the impact of an inadvertent shutdown of a Unit 3 drywell chiller during reactor plant operation.

b. Observations and Findings

On August 22, 1998, during performance of the Unit 3 turbine building rounds an equipment operator inadvertently shutdown the 3C drywell chiller. The control room operators received the "Drywell Chiller Trouble Alarm" annunciator and took actions in accordance with the alarm response card. The equipment operator informed the control room operators as to the cause of the shutdown. Since the cause was known, no troubleshooting had to be completed before chiller restart. Fourteen minutes after shutdown, the 3C drywell chiller was restarted by the equipment operator. During the drywell chiller shutdown the drywell bulk average temperature increased about 2°F and drywell pressure increase .05 psi.

The inadvertent shutdown of the 3C chiller on August 22 was documented in PEP I0008858. Part of the corrective action for this PEP included an engineering change request (ECR) to evaluate the inadvertent shutdowns. This ECR resulted in an action request to fabricate and install a plastic guard to cover the 'Auto' and 'Stop' buttons on both Unit 2 and 3 chillers.

A similar event on the Unit 2 drywell chiller occurred on March 25, 1997, resulting in a temperature and pressure rise of the Unit 2 drywell. Operations personnel initiated Performance Enhancement Program document (PEP) I0006793 to investigate the apparent cause of this event. According to this PEP, the human factoring of the microprocessor control panel could set-up any individual to inadvertently shutdown a drywell chiller. Although the original corrective action for this issue recommended providing a barrier on the control panel, engineering personnel decided that a physical barrier was not needed. Engineering personnel based this decision on this being an isolated event, and concluded that additional training of equipment operators would prevent this event from recurring.

The inspectors concluded that the engineering evaluation of the March 25, 1997 inadvertent shutdown of a drywell chiller, was not effective since a similar event occurred on August 22, 1998.

c. Conclusions

On August 22, 1998, during performance of the Unit 3 turbine building rounds an equipment operator inadvertently shutdown the 3C drywell chiller. Since the chiller was quickly restarted, the temperature and pressure increases in the drywell were small and posed a small safety risk to the plant.

An engineering evaluation for a similar event that occurred on March 25, 1997, was not effective to preclude the August 22, 1998 event.

O3 Operations Procedures and Documentation

O3.1 Review of Normal Plant Startup Procedure

a. Inspection Scope (71707)

The inspectors reviewed procedure GP-2, "Normal Plant Startup," Revision 88, following a reactor scram event at another nuclear power station during a startup evolution, when operators continuously withdrew a control rod after reaching criticality and before reaching the point of adding heat.

b. Observations and Findings

Peach Bottom procedure GP-2, "Normal Plant Startup," contained written guidance for control rod withdrawal modes following criticality. The inspectors noted that one of the procedural steps specifically allowed single notch or notch override (continuous withdrawal) following criticality and prior to the point of adding heat. However, a caution statement contradicted this step by stating that only notch mode was allowed until "nuclear heat begins to increase reactor water temperature."

The inspectors discussed this discrepancy with operators and learned that, in practice, operators used only single notch mode, consistent with the caution statement. Operations personnel considered the procedural step to be inconsistent with operating practices and promptly revised GP-2.

c. Conclusions

The GP-2, "Normal Plant Startup," procedure and operating practices provided adequate assurance that continuous rod withdrawal following criticality and prior to the point of adding heat would not occur at Peach Bottom. However, inspectors identified inconsistencies in the procedure, and operations personnel determined that a revision was necessary to ensure the procedure reflected operating practices.

O3.2 Unexpected Start of the Motor Driven Fire Pump During Testing

a. Inspection Scope (71707)

The inspectors reviewed documentation for the maintenance on the H-1 fire hydrant and discussed with operations personnel the circumstances that resulted in the unexpected start of the motor driven fire pump.

b. Observations and Findings

On August 23, 1998, the motor driven fire pump unexpectedly started during post-maintenance testing of the H-1 fire hydrant. During this testing, the fire system pressure dropped low enough to cause an automatic start of the pump when the hydrant isolation valve was opened. The inspectors determined that the fire system

had not been fully filled and vented and that the system pressure dropped as the system filled when the hydrant isolation valve was opened. The inspectors noted that there was no Action Request or PEP written for this issue.

The inspectors reviewed the work order activity report and the routine test, (RT)-O-37B-382-2, "Fire Hydrant Inspection and Flush (Miscellaneous)" and discussed this issue with operations personnel. The inspectors noted that neither the work order or the RT had instructions to fill and vent the system before starting the post-maintenance testing or any precautions that the motor driven fire pump could start during the opening of the hydrant isolation valve. In NRC Inspection Report 50-277(278)/97-08, the inspectors noted a similar event when an unexpected automatic start of the motor driven fire pump occurred during clearance restoration of the fire system.

c. Conclusions

On August 23, 1998, the motor driven fire pump unexpectedly started during post-maintenance testing of the H-1 fire hydrant. Neither the work order or the routine test procedure contained any documentation to inform operators that the motor driven fire pump could start during the hydrant post maintenance testing nor did these documents contain instructions to fill and vent the fire system after work was performed.

Several unexpected equipment status changes, some involving safety related components, have been documented in NRC inspection reports during the past year. Even though this issue involved an unexpected change in the status of the motor driven fire pump, it was not documented in any of the licensee's corrective action systems so that it could be tracked and trended.

O4 Operator Knowledge and Performance

O4.1 Operator Performance During Loss of Cooling to the 3C Main Transformer

a. Inspection Scope: (71707)

The inspectors observed and reviewed equipment and control room operators actions for the 3C Main Transformer loss of cooling occurrence.

b. Observations and Findings

On August 21, 1998, with Unit 3 operating at 100%, the control room received the "3 TRANS TROUBLE" Alarm. The #6 oil pump had failed due to a burnt wire and when the operator, following the alarm response card, switched the local control to manual, all of the cooling fans and oil pumps tripped off.

The unit 3 operators commenced a down power maneuver due to loss of cooling to the main transformer to reduce the heat load on and potential loss of the main transformer.

Electricians repaired the burnt wire for the #6 oil pump and checked the other main transformers for similar problems. While bringing the cooling system back into service, the operators started each cooling fan and oil pump at periodic intervals.

Although operations personnel were aware that a high temperature rise could actuate the transformer fire protection deluge system, the operators did not fully account for the temperature rise when the #5 fan and oil pump were started. This resulted in the deluge system immediately detecting a high temperature rise and actuating as designed. The operators quickly isolated the system.

Operations personnel told the inspectors that a plant transient could have occurred, if the deluge system had sprayed on the transformer with the unit at full power, due to transformer oil temperature and pressure changes. With generator output significantly reduced, the deluge activation did not cause a transformer transient and the unit remained on line. The inspectors determined that actuation of the deluge system was not expected. Although the deluge system could have been bypassed to prevent activation, there was no guidance in the procedure for restoring the cooling system for the main transformer, to deactivate or bypass the deluge system while bringing the cooling system back to operation.

During the down power maneuver, the operators created a speed mismatch of 50 RPM between the recirculation pumps which resulted in a loop flow mismatch that was recorded in the reactor operator's log as within the Technical Specification (TS) requirements. During a subsequent panel walkdown by the shift supervisors, the loop flow mismatch had increased to greater than TS limits. A one hour Technical Specification Action (TSA) was entered, the 'B' recirculation pump speed was lowered so that loop flow mismatch was reduced, and the TSA was exited within 27 minutes.

The inspectors independently determined that the operators allowed a loop flow mismatch during the down power maneuver based on reviews of operator logs and recirculation flow data. The inspectors noted that the effect of xenon following the downpower caused recirculation loop flows to change which resulted in the increase in loop flow mismatch. The inspectors determined, based on discussions with shift management that, although the operators thoroughly understood the effects of xenon on power they did exhibit a lack of full understanding of the effects of xenon on recirculation loop flow. Therefore the operators did not control recirculation flow before the effect of xenon increased loop flow mismatch outside the LCO range. By more closely monitoring the recirculation loop flow, the operators could have prevented an involuntary entry into a Technical Specification Action and Limiting Condition for Operation.

c. Conclusion

On August 21, 1998, unit 3 operators commenced a down power maneuver due to loss of cooling to the main transformer. The reduced load prevented a loss of the main transformer and plant transient when the deluge system activated.

The initial response by the operators for the loss of cooling to the main transformer and subsequent deluge activation was good. Due to the power reduction, the flow in the recirculation system loops became mismatched in excess of the Technical Specification limit. This condition was identified and corrected within the time allowable by Technical Specifications. Failure of operations personnel to fully understand the effect of xenon on recirculation flow and closely monitor recirculation flow contributed to this involuntary entry into a Technical Specification Action and Limiting Condition for Operation.

O5 Operator Training and Qualification

O5.1 Limited Senior Reactor Operator (LSRO) Requalification Program

a. Inspection Scope (71001)

The inspectors evaluated the dual site, Limerick/Peach Bottom, PECON LSRO requalification training program to verify its compliance with 10 CFR 55. NRC Inspection Procedure 71001, Licensed Operator Requalification Program Evaluation, and NUREG-1021 Interim Rev.8 - ES-702 were used for the evaluation.

The inspectors evaluated the following program areas:

- Program guidelines
- Operating and written examinations
- Exam security
- Management oversight - license activation and maintenance of records, remediation, training, attendance, feedback system, and medical records

PECON procedures and documents associated with the LSRO training program and its implementation were also reviewed.

The observation of the annual operating exam was not performed during this inspection and will be performed during the LSRO training cycle in 1999.

b. Observations and Findings

Program Guidelines

The inspectors reviewed PECON procedures LSRO-9500, "LSRO Course Plan," and LSRO-0000, "Multi -Site Fuel Handling Director," and determined they acceptably described a program which met 10 CFR 55 requirements and previous written commitments by PECON to the NRC. Additionally, the inspector reviewed the LSRO program subject index and selected LSRO classroom and practical job performance lesson plans and found that their content was comprehensive and well maintained by the program coordinator.

Operating and Written Examinations

The inspectors reviewed three written biennial examinations and two annual operating exams and determined they acceptably sampled the items specified in 10 CFR 55. The inspectors also found that the exams adequately assessed knowledge level in the area of abnormal and emergency procedures. Additionally, it was noted that a large percentage of the questions in the exams were of the more challenging, higher order, analytical type.

The inspectors reviewed job performance measures (JPMs) and found that they met the qualitative guidelines of the inspection procedure and the PECON program. The JPMs reviewed included those for normal, emergency, and abnormal conditions,

Exam Security

The inspectors reviewed the security measures taken by the facility for exam development and administration, and determined that programmatic controls were satisfactory, with no indications of exam compromise.

Activation and Maintenance of Operator Licenses

The inspectors reviewed the programmatic controls that PECON used for maintaining an active license and for reactivating a license while meeting the requirements of 10 CFR 55.53 and found them to be acceptable. The inspectors reviewed various training attendance records, including missed training make-up sessions or exams, and determined that controls for maintenance and reactivation of operator licenses were good.

Remedial Training Program

The inspectors reviewed remediation records for two individuals who had failed the biennial written exams. The inspectors found that the remediation packages developed by the training coordinator were appropriate for the weaknesses demonstrated and were properly documented in accordance with PECON procedures.

Operator Feedback

The inspectors reviewed the feedback records for the past three years and found that management review and disposition was timely.

Medical Records

The inspectors also reviewed all LSRO medical files to ensure that medical exams were being conducted biennially in accordance with 10 CFR 55.21 and determined that requirements were met.

c. Conclusion

The inspectors concluded that the Senior Reactor Operator Limited to Fuel Handling (LSRO) program was good overall. The LSRO program guidelines and examinations were comprehensive and well maintained by the program coordinator and LSRO license maintenance was well documented. The inspectors also determined that the areas of exam security, remediation, operator feedback, and medical records were acceptable.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Observations

NRC Inspection Procedures 62707 and 61726 were used in the inspection of plant maintenance and surveillance activities. The inspectors observed and reviewed selected portions of the maintenance and surveillance test activities listed in Attachment 2.

The work and testing performed during these activities was professional and thorough. Technicians were experienced and knowledgeable of their assigned tasks. The work and testing procedures were present at the job site and actively used by the technicians and operators for activities observed. Good pre-job briefs were observed prior to the performance of the surveillances observed. Applicable procedures were present in the control room and at the job sites during surveillance testing and were appropriately used.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Main Control Room Deficiencies

a. Inspection Scope (61726 & 62707)

The inspectors reviewed the Equipment Status list, action requests designated as Main Control Room (MCR) deficiencies, and the non-outage maintenance backlog to assess the effectiveness of the licensee's corrective maintenance of MCR deficiencies that impact the operators ability to maintain reliable and safe plant operation.

b. Observations and Findings

Main control room deficiencies (MCRDs) were identified and tracked by Action Requests (ARs). The ARs dealing with MCRDs were noted as either control room deficiencies or critical control room deficiencies. The inspectors noted that currently there were 56 control room deficiencies listed on outstanding ARs. Several of these deficiencies were corrected but the ARs remained open to provide

for equipment monitoring. When critical control room deficiencies were identified during this inspection, they were corrected in an expedited manner.

An equipment deficiency log and control rod drive (CRD) deficiency log were kept by control room personnel to identify control room deficiencies. These logs made up the equipment status list. The equipment status list was updated biweekly. The operators reviewed and maintained both logs to track the status of control room significant deficiencies.

The inspectors reviewed the equipment deficiency log. During this review, the inspectors noted that the oldest outstanding significant MCRD was over a year old on unit 2 and over six months old for unit 3 and that five and 13 significant MCRDs were open for units 2 and 3, respectively. However, the inspectors determined that all items on the significant MCRD log had minor safety impact and were scheduled for work.

The inspectors noted that some of the requirements in OM-P-10.3, Revision 3, "Equipment Status List/Tagging of Deficiencies" were vague. During tours of the main control room, the inspectors observed that each MCRD had an equipment deficiency tag, but that some tags were inconsistent with OM-P-10.3 or other work control procedures. The inspectors determined that these inconsistencies were of minor safety significance.

c. Conclusions

Control room deficiencies were controlled and adequately prioritized so that critical Main Control room deficiencies were corrected in a timely manner. However, some weaknesses, of minor safety significance, were noted with the clarity and implementation of the requirements in OM-P-10.3, Revision 3, "Equipment Status List/Tagging of Deficiencies."

M3 Maintenance Procedures and Documentation

M3.1 Fix It Now Team Planning and Documentation

a. Inspection Scope (62707)

The inspectors reviewed approximately 15 completed work orders performed by the Fix It Now (FIN) team.

b. Observations and Findings

The FIN team work order documentation was usually consistent with FIN administrative procedures. The documentation appropriately reflected such items as work scope, parts, procedures/prints, and post-maintenance testing requirements.

In one instance, incomplete corrective maintenance documentation led to repetitive problems on temporary emergency cooling tower replenishment pumps. These

problems reduced the number of pumps available, but did not affect the operability of the replenishment capability.

c. Conclusions

Most Fix-It-Now (FIN) team work order documentation was consistent with FIN administrative procedures, however; incomplete documentation led to repetitive problems on temporary emergency cooling tower replenishment pumps.

M4 Maintenance Staff Knowledge and Performance

M4.1 Fire Main Leak

a. Inspection Scope (37551, 62707 & 71707)

The inspectors reviewed an event in which a pipe coupling separated on the station fire main during maintenance on a fire hydrant. Water from the leaking fire main exceeded the capacity of the storm drains and then entered the Unit 2 safety-related emergency service water/high pressure service water pump house via underground electrical conduits.

b. Observations and Findings

On August 23, 1998, a leak on the station fire main occurred when a 6" pipe separated from a coupling upstream of a block valve. Maintenance workers were working in the vicinity of the coupling. This event was caused by weaknesses in both maintenance planning and work practices.

- Planning Issues: A lack of knowledge or understanding of the design of the pipe coupling upstream of the block valve contributed to this event. This coupling was a slip-fit compression fitting that separated while maintenance technicians were working on the downstream hydrant coupling. Normally, the failed coupling was supported laterally by two tie rods clamped between the hydrant and the piping upstream of the coupling, and by a thrust block at the hydrant. Both the tie rods and the thrust block had been removed to permit replacement of the hydrant, thus allowing the coupling to separate. Planners did not have detailed information on the design of the coupling or the function of the tie rods. Planners did not direct maintenance personnel to uncover the coupling, thus missing an opportunity to visually check the coupling before the work was accomplished. Also, planners did not use two-valve isolation for the work.

- Maintenance Practice Issue: Maintenance personnel left the pipe coupling covered with dirt, thus they were not aware of its configuration and the potential hazard associated with removing the tie rods.

Water accumulated in the outside yard area in the vicinity of the fire hydrant, due to exceeding the capacity of the storm drains in the area. Water seeped into electrical

conduits via manholes that connected to underground cable duct banks. The water then leaked into the emergency service water/high pressure service water pump house structure through these cable duct banks and degraded penetration seals. Sump pumps in the pump house prevented any water accumulation. PECO engineers promptly evaluated the impact of the degraded penetration seals on pump operability and determined that no operability concerns existed. Engineering personnel also extrapolated the pump house in-leakage rate to the design basis flood level and postulated that in-leakage at flood levels would have been within the capacity of the sump pumps. (The design basis flood scenario is a flood of about twelve feet above the ground level outside the pump house. The water level outside the pump house actually reached about three inches). The Peach Bottom flood analysis allowed for cables to exist in a wet environment, and some conduit seepage was acceptable. The inspectors reviewed the engineering analysis and operability determinations from this event and had no concerns.

c. Conclusions

Weaknesses in maintenance planning and work practices led to a significant water leak on the station fire main on August 23, 1998. Water from the leak entered the safety related emergency service water/high pressure service water pump house via underground electrical conduits and degraded penetration seals. The engineering evaluation, that the penetration seal leakage was within design assumptions for a design basis flooding event, and pump operability was not affected, was adequate.

III. Engineering

E1 Conduct of Engineering

E1.1 Installation of the ISFSI East Retaining Wall

a. Inspection Scope (60851 & 60853)

The inspectors reviewed independent spent fuel storage installation (ISFSI) engineering and construction activities affecting the concrete placement of the east retaining wall, including physical inspection of the installation. The inspector also reviewed field activities associated with the soil compaction testing and inspection of the subsurface of soil of the ISFSI east retaining wall. The inspector evaluated the site and reviewed construction records.

b. Observations and Findings

Assessment of Construction Activities

To protect the ISFSI storage pad from an adjacent hill and undermining due to a slope drop, retaining walls were constructed to the east and the west of the storage pad. The design and construction of these retaining walls was performed in accordance with 10 CFR 72 Subpart G "Quality Assurance" requirements. These retaining walls are designated as important to safety (ITS).

The inspectors reviewed the construction of the east retaining wall, in particular, the construction joints. Concrete for the east retaining wall was poured in sections, which interlocked through construction joints called keyways. The inspectors reviewed an evaluation of construction discrepancies made on the dimensioning of two of the keyways. The design specified that each keyway be 8" wide by 3" deep. PECO personnel identified that the keyways on the south construction joint of wall No. 02A and the north construction joint of wall No. 05 used incorrect keyway dimensions (approximately 5.5" wide by 3" deep). Engineering personnel documented this evaluation in Engineering Change Record (ECR) 98-02355. As a part of the corrective actions, PECO personnel stopped additional concrete pours and analyzed the as-found condition.

The inspectors reviewed calculation NCR-98-02355, which assessed the as-found configuration (reduced size of keyway) of the construction joint at the east wall. The inspectors found the calculation and conclusion acceptable. The assumptions in the calculation were conservative, and the approach used to calculate the shear forces acting on the reduced keyway were acceptable. The calculation showed that the as-found configuration for the reduced size of the keyway was within shear allowables established in the main design calculation of the east wall.

Soil Compaction Activities

The inspectors reviewed Field Change Request (FCR) No. 98-00811-10, which was prepared to document and disposition the two field density tests which failed to achieve the required degree of compaction (95 percent). The FCR disposition in both cases accepted the condition "as-is" based on engineering judgement. The inspectors reviewed the engineering judgement determination and determined that this was acceptable because the deviation was not substantial. The inspectors verified that this was an isolated case and PECO personnel have ensured 95% compaction was achieved in all tested locations since this deviation was discovered.

Concrete Mix Delivery, Testing, and Pouring Activities

The inspectors observed the concrete mix delivery, testing, and pouring activities for the east retaining wall. The inspectors noted that the concrete pouring was being conducted in an acceptable manner.

Concrete was being shipped from Havre de Grace, Maryland, which was approximately one hour from ISFSI site. The inspectors noted that the specified maximum time of 90 minutes, from batching the concrete till pouring, was being enforced to maintain quality and achieve the desired compressive strength. This was evident when PECO personnel rejected two truck loads of concrete because the loads were not poured within 90 minutes.

The inspectors noted that the testing of the newly arrived concrete was properly completed. Tests included slump, air entrainment, concrete and ambient air temperatures, and weight. Batch tickets were reviewed by PECO personnel and

contained appropriate information, including data on the concrete mixture, time of batching, and truck number.

c. Conclusion

The inspectors concluded that the construction activities on the east retaining wall of the independent spent fuel storage installation were acceptable. Engineering personnel had resolved construction deficiencies regarding as-built keyways and soil compaction in an effective manner, thus the analyzed as-found condition of the east wall was acceptable. The concrete mix delivery, testing, and pouring activities for the east retaining wall were acceptable.

E2 Engineering Support of Facilities and Equipment

E2.1 (Closed) URI 50-277(278)/97-06-03 and (Closed) LER 2-97-007 Potential for Bypass of Pressure Suppression Pool

a. Inspection Scope (92903)

The inspectors reviewed licensee actions taken in response to the identification of the potential to bypass the pressure suppression function of the torus.

b. Observations and Findings

A potential bypass flow path existed by which the drywell air space could communicate with the torus air space through a six-inch containment purge nitrogen supply piping. On October 21, 1997, station personnel reported this issue pursuant to 10 CFR 50.72 as a condition outside the design basis of the plant. Licensee Event Report (LER) 50-277(278)/2-97-07 reported this issue on November 19, 1997.

Following the identification of this condition, engineering personnel drafted non-conformance reports and a shift update notice for operations to notify all shift personnel. Engineers also changed several procedures to prevent simultaneous purging of the drywell and torus. Further, operations personnel issued a administrative clearance to disable the drywell inboard purge supply valves on both units to prevent simultaneous purging of the drywell and torus.

PECO corporate engineers completed an evaluation of other potential bypass paths in June 1998. They concluded that other potential leakage paths were either not credible, or were significantly smaller than the equivalent of a one-inch hole limited by technical specifications. This evaluation also concluded that the interim disposition of disabling the drywell inboard purge supply valves was acceptable until a final disposition was approved.

Engineering personnel attributed the cause of the event to an original design deficiency in that the design requirements for lines which connect the drywell airspace to the torus airspace were not adequately specified. Single failure and

electrical independence design criteria were not originally applied to the drywell and torus inboard purge supply valves.

The inspectors reviewed engineering activities for this issue, discussed them with selected engineers, and conducted an in-plant review of the LER. The inspectors determined that this issue was an apparent violation of 10 CFR 50 Appendix B, Criterion III, "Design Control." However, the inspectors noted that it was licensee-identified as a result of reviews of industry operating experience and General Electric 10 CFR Part 21 notification No. SC97-4 dated October 15, 1997. In addition, the inspectors concluded that station personnel took prompt and effective interim corrective actions as described above, and this issue was not likely to be identified through routine efforts. In accordance with the NRC Enforcement Policy, Section VII.B.3, Violations Involving Old Design Issues, the NRC is exercising enforcement discretion and not citing this violation as noted in separate correspondence issued on October 28, 1998. **(NCV 50-277(278)/98-08-03)**

c. Conclusions

Engineering personnel took prompt and effective corrective actions following their identification of the potential to bypass the pressure suppression function of the torus during simultaneous purging of the torus and drywell or as a result of postulated failures. In accordance with the NRC Enforcement Policy, Section VII.B.3, Violations Involving Old Design Issues, the NRC is exercising enforcement discretion and not citing this violation.

E2.2 Access and Alarm Failures to Protected Area and Vital Areas Doors Due to Security Multiplexer Failure

a. Inspection Scope (37551 & 71750)

The inspectors observed the response of security personnel to several failures of the protected area and vital area doors due to a security computer multiplexer failure. The inspectors also discussed this issue with security management and the security system manager.

b. Observations and Findings

Twice on August 12, 1998 and then again on August 19 and August 24, the #1 security computer multiplexer failed. This failure caused the protected area and vital area doors to fail closed and rendered the alarm functions on the doors inoperable. Security personnel implemented compensatory actions for this failure per site security plan operating procedures. The inspectors discussed the compensatory actions with security management. The inspectors noted that the response by the security force to this multiplexer failure was adequate and the failure of the doors had no adverse impact on plant operations. Operations personnel were provided keys to allow access through locked doors while the security computer was down. Each of the computer multiplexer failure events were noted in the security log.

The system manager for the security system reviewed these failures and believed that they were due to a power surge in the system. No root cause was determined for these failures by the end of the inspection period.

The inspectors discussed this issue with engineering personnel. The inspectors noted that engineering was initially slow to investigate this issue because the system manager was offsite in training. Full investigation of this issue did not occur until after the fourth failure of the security system when the system manager returned from training.

c. Conclusions

Security personnel responded adequately to four failures of the security computer multiplexer in August 1998. The failures caused vital and protected area doors to fail closed without alarm functions.

Engineering personnel failed to fully investigate and support this issue until after the fourth failure. This contributed to delays in determining the root cause of the multiplexer failures.

E2.3 Core Spray, Residual Heat Removal and High Pressure Service Water Motor Operated Valve Thermal Overload Wire Discrepancies.

a. Inspection Scope (37551)

The inspectors reviewed the findings and actions by engineering personnel for thermal overload wiring discrepancies on motor operated valves (MOVs). Differences were identified between the installed wiring and the drawings for the Core Spray (CS), Residual Heat Removal, and the High Pressure Service Water valves on both units.

b. Observations and Findings

During the review of a multiple high impedance fault calculation, engineering personnel noted that the thermal overloads for the unit 2 CS suction MOVs (MO-2-14-007A,B,C,D) were in the control circuit. However, on the unit 3 CS suction MOVs (MO-3-14-007A,B,C,D), the thermal overloads for the control circuits were permanently bypassed. The unit 3 CS valves were operable since they have no automatic safety function, were key locked open, and would only be closed to act as primary containment isolation valves when the CS system was secured and/or tested.

A walkdown of the system by maintenance planning, on August 6 through August 19, 1998, revealed that the actual wiring did not match the schematic drawings. Although the schematics showed that the wiring for the MOVs on both units were the same, the as-found did not match the schematic drawings for the unit 3 CS suction MOVs. Station personnel found the thermal overloads in series with the control power ground connection on the unit 3 MOVs. This could result in the control power being open circuited on thermal overload operation resulting in a loss of position indication. However, an alarm in the control room would still indicate thermal overload activation. Although this wiring configuration was not in accordance with the schematic drawing, it still resulted in the de-energizing of the MOV on a thermal overload condition.

Station personnel compared the wiring configurations of several other MOVs with the schematics and found that similar discrepancies existed for the residual heat removal (RHR) system suction and cross connect valves and the high pressure service water (HPSW) outlet valves on the RHR heat exchangers. Initial evaluations indicated that these valves functioned the same as the unit 3 CS suction MOVs and were operable based on the same criteria used to evaluate the CS MOVs.

The inspectors noted that engineering's evaluation found the thermal overload protection changed when the alternate power supply from the remote shutdown panel was used due to the as-found wiring for one of the RHR suction and HPSW MOVs on each unit. Further evaluation of these RHR and HPSW valves was on-going and tracked though the licensee's corrective action request system. Engineering personnel noted that the initial operability evaluations did not address the thermal overload protection concern that occurred when the alternate power supply was used.

The inspectors reviewed documentation from the discovery of the wiring discrepancies, the wiring schematics, and the operability evaluations for the core spray suction valves. The inspectors noted during this review that these wiring discrepancies had existed for a long time.

c. Conclusion

Although discrepancies existed between the as-found condition and the schematics for thermal overload wiring on several core spray, residual heat removal, and high pressure service water motor operated valves, none of these discrepancies resulted in the valves being inoperable. Initially, the most significant problem due to this issue was the loss of valve position indication during a thermal overload actuation. However, further evaluations of thermal overload protection for these motor operated valves, during the use of the alternate power supply, was under review by the engineering personnel and was documented in the licensee's corrective action system.

IV. Plant Support

R1 Radiation Protection and Chemistry Controls (RP&C)

R1.1 Radioactive Waste Processing, Handling, Storage, and Shipping

a. Inspection Scope (86750)

The inspectors reviewed and discussed sources of radioactive waste at the station, waste processing and volume reduction efforts, and storage of waste. The inspectors evaluated the methodology for radioactive waste concentration averaging and the development of scaling factors used to estimate hard to detect radionuclides (e.g., Pu-239, Am-241). The inspectors reviewed waste classification practices and selectively reviewed radioactive waste shipping records for shipments of radioactive waste and other radioactive materials made since the previous inspection. The inspectors also performed a test of the emergency response contact listed on the licensee's radioactive material shipping papers. In addition, the inspectors observed various radwaste loading and shipping activities including loading of a cask with a high integrity container of spent resins and loading and shipment of packages of slightly contaminated soil.

The review was against selected criteria contained in 10 CFR 20; 10 CFR 61; 10 CFR 71; 49 CFR 100-179; applicable certificates of compliance for various NRC licensed shipping casks; the Updated Final Safety Analysis Report; and applicable NRC Branch Technical Positions.

b. Observations and Findings

PECO continued to aggressively review and evaluate methods to reduce generated radioactive waste volumes. PECO implemented actions to minimize dry activated waste and process waste and was closely tracking and monitoring numerous performance indicators relative to radioactive waste program performance including plant leaks to reduce waste volumes. Of particular note was PECO's initiatives to request industry audits of its solid and liquid waste programs to identify areas for enhancement and waste volume reductions.

PECO implemented appropriate scaling factors for use in determining curie content of hard to detect radionuclides and was implementing applicable NRC Branch Technical Position (BTPs) guidance regarding waste concentration averaging. Waste was properly classified relative to 10 CFR 61 requirements.

The radioactive waste/material shipping program was generally well implemented. Radioactive material shipping documentation was well maintained and available for review. Individuals responsible for shipping activities were knowledgeable of applicable requirements.

PECO was a registered user of the NRC licensed casks used for shipping purposes and maintained up-to-date cask certificates of compliances associated drawings and

disposal facility licenses. Shipments of radioactive material in NRC licensed casks were performed in accordance with certificate of compliance requirements.

PECO implemented its emergency notification requirements for shipments by use of a vendor service listed on its shipping manifests as a point of contact for in-transit shipping problems. When contacted, the vendor accurately described emergency response actions for the shipment (dewatered resin) in transit.

c. Conclusions

PECO's radioactive waste transportation program, including processing, handling, storage, and transportation was effective. Wastes were properly classified and packaged.

R2 Status of RP&C Facilities and Equipment

a. Inspection Scope (86750)

The inspectors toured various radwaste and radioactive material storage areas including the radwaste building, the south radwaste storage location, and the low level waste storage area.

b. Observations and Findings

Areas were generally well maintained, properly posted, and controlled. No abandoned areas containing unprocessed, stored, or spilled waste was detected. There was a limited amount of waste stored in the radwaste processing and storage areas. Waste storage and processing areas exhibited generally very good material condition. PECO was actively cleaning and painting the facility.

The overhead pipes located in the 91'6" elevation of the floor drain pump room exhibited some surface rusting. PECO had previously evaluated the pipes, concluded the rust to be minor surface rust, and was monitoring the condition of the pipes in the room.

The documented inventory of material contained in the south waste storage area was not fully up-to-date. One package was marked as indicating it contained material but the inventory list for the area indicated the container was empty. PECO updated the list and took action to ensure the list was maintained current by use of formal reporting of material transferred into the area.

c. Conclusions

Overall, radioactive waste and material processing and storage areas were properly posted and controlled, and exhibited very good material condition.

R3 RP&C Procedures and Documentation

a. Inspection Scope (86750)

The inspectors discussed changes in radioactive waste processing, handling, and shipment procedures and programs since the previous inspection with personnel responsible for these areas.

b. Observations and Findings

There were no major changes identified in the radioactive waste processing, handling, storage, and shipment procedures and programs since the previous inspection.

There were very few staff or organization changes in the radwaste management group. New personnel coming into the group were provided training and prohibited from performing tasks for which they were not yet qualified.

PECO was developing a 10 CFR 50.59 safety evaluation to support injection of noble metals into the reactor coolant in late 1998. PECO concluded that no adverse radiological controls impact was associated with the injection including impact on radwaste processing, handling, or transportation programs.

PECO had established and implemented procedures for evaluation and survey of materials not normally considered radioactive (e.g., sewage) to determine if the material should be considered contaminated and disposed of at licensed facilities.

c. Conclusions

There were no major changes identified in the radioactive waste processing, handling, storage, or shipment procedures and programs since the previous inspection. PECO implemented its program for monitoring of normally non-radioactive material (e.g., sewage).

R4 Staff Knowledge and Performance in RP&C

a. Inspection Scope (86750)

The inspectors evaluated general staff knowledge of radioactive waste processing, handling, storage, and shipping requirements during the inspection.

b. Observations and Findings

PECO personnel responsible for radioactive waste processing, handling, storage and radioactive material transportation exhibited a good knowledge level of regulatory requirements and program procedures. The personnel were aware of, and knowledgeable of applicable regulatory requirements, including procedural specifications, DOT rules and regulations, and radiological survey and assessment methodologies.

c. Conclusions

Individuals responsible for radioactive waste processing activities exhibited a good knowledge level of regulatory requirements and program procedures.

R5 Staff Training and Qualification In RP&C

a. Inspection Scope (86750)

The inspectors reviewed the training provided to personnel involved in radioactive waste generating, processing, and handling activities against criteria contained in NRC Bulletin 79-19 and 49 CFR 172, Subpart H. The inspectors reviewed training records and lesson plans and discussed training with cognizant PECO personnel.

b. Observations and Findings

Based on a review of job tasks at the station, PECO had previously established a training matrix to ensure that appropriate training was provided to applicable personnel. PECO met the training requirements for station personnel via general employee training and special training modules developed to address applicable requirements.

One individual (mechanic) involved with transfer of radioactive waste and loading of a cask shipment on August 20, 1998, had not received the training previously prescribed for his position in the a-priori developed employee training matrix described above. The mechanic transferred waste from the station to the low level waste storage facility and routinely loaded waste into shipping casks for transport. The individual was noted to be knowledgeable of his specific task requirements and was provided continuous direct oversight by radioactive material shipping coordinators.

PECO initiated an evaluation of the adequacy of the individual's training for his assigned tasks and believed he may have possessed appropriate training relative to 49 CFR 172, and NRC Bulletin 79-19, acquired in advanced radworker training and waste minimization training. PECO initiated action to place this matter into its corrective action program. PECO also initiated action to determine why the individual had not received the a-priori specified training and if the training was necessary. PECO took action to ensure other mechanics involved in waste handling had received appropriate training.

There was no apparent defined training program for new radwaste personnel involved with radwaste shipping activities. PECO was taking action to review, and adopt, as appropriate, a proposed common program to be implemented at its nuclear stations. One individual had recently been transferred into the radwaste group and a PECO radwaste manager provided job specific procedure training and on-the-job training. The individual possessed previous radwaste oversight experience. The training was considered adequate.

c. Conclusions

PECO provided generally good training of personnel involved in radioactive waste activities. However, one individual had not received the a-priori specified training for mechanics involved with radioactive waste activities and there was no defined training program for new radwaste personnel involved in radwaste shipping activities. PECO took appropriate action on these matters.

R6 RP&C Organization and Administration

a. Inspection Scope (86750)

The inspectors reviewed the current radioactive waste processing organization, including staffing, responsibilities and authorities. The inspectors evaluated PECO's performance in this area by discussion with cognizant personnel and review of applicable administrative and organizational records.

b. Observations and Findings

The review of the current radioactive waste processing organization indicated that there were no significant changes in the organization or its responsibilities and authorities since the previous inspection in this area.

PECO radwaste management indicated that the current radwaste organization would be disbanded, in the near future, with its various subgroups incorporated into the chemistry, radiation protection, and plant engineering groups, as appropriate, for purposes of enhancing efficiency and effectiveness. No immediate safety concerns were identified relative to this proposal. PECO was aware of the need to update organizational administrative documents, as appropriate, to reflect the new organization.

c. Conclusions

PECO continued to implement an appropriately staffed and defined organization for radioactive waste processing, handling storage, and shipping.

R7 Quality Assurance in RP&C Activities

a. Inspection Scope (86750)

The inspectors reviewed PECO's audits, assessments, and surveillances of its radioactive waste handling, processing, and storage programs as well as audits of the Process Control Program, against the criteria contained in its Quality Assurance Program, 10 CFR 20, and 10 CFR 71, Subpart H, Quality Assurance.

b. Observations and Findings

PECO performed various audits and surveillances of its radwaste processing, handling, storage, and transportation programs including its process control program. Training audits for applicable personnel were also conducted. The

station's Nuclear Review Board recommended areas for additional review. Oversight activities were performed using appropriate check lists and qualified personnel were used in lead audit capacities. Appropriate corrective action measures were initiated for areas for enhancement. Audits were of appropriate depth and scope.

c. Conclusions

PECO performed audits of appropriate depth and scope of radwaste processing, handling, storage, and transportation activities, including training and qualification of personnel. Corrective actions were initiated for identified concerns.

R8 Miscellaneous RP&C Activities

R8.1 (Closed) Violation (VIO) 50-277(278)/97-03-02 Failure to Assure that the Turbine Building Atmosphere was Processed Through the Turbine Building Gaseous Waste Treatment System

During a review of the design modification involving the north wall of the Unit 3 turbine building, it was determined that the processing and monitoring of the turbine building atmosphere was not adequately performed. In response to NOV 50-278/97-03-02, dated May 16, 1997, PECO attributed the violation to a lack of detail in the work order and inadequate verbal communication between the work planner and the Health Physics planner. To mitigate future errors the licensee revised four procedures to clarify communication expectations and regulatory guidance. The corrective actions were reviewed and found to be reasonable. The violation is closed.

R8.2 (Closed) VIO 50-277(278)/97-04-03 Violation of Locked High Radiation Area Key Control

The corrective actions taken by PECO for this violation were previously described in NRC Inspection Report No. 50-277(278)/97-04, dated July 24, 1997. PECO implemented the corrective actions described therein. A review of high radiation area access controls during this inspection found that access doors to high radiation areas were properly locked and proper administrative controls were implemented for keys to these areas.

R8.3 Inspection of Incoming Fuel Shipments

a. Inspection Scope (86750)

The inspectors reviewed radiological controls oversight of incoming fuel shipments.

b. Observations and Findings

PECO was receiving new fuel for the Unit 2 outage. Radiation protection (RP) technicians performed radiological surveys of the incoming fuel shipping containers including using an alpha contamination smear counting system to check smears of the incoming packages for alpha contamination.

RP procedure HP-C-403, "Instrument Quality Checks," Revision 0, required in Section 7.4.2, that if 3 or more consecutive values, were in the warning band, notify the Instrument Physicist, who would evaluate the Control Chart and determine the instruments physical condition and determine whether to place the instrument out of service or continue use. If continued use was permitted, the Instrument Physicist was to denote this on the Control Chart and initial and date the entry. The warning level was defined in the procedure as the range on the control chart between + 2 sigma and + 3 sigma and between -2 sigma and - 3 sigma values.

The inspectors reviewed the Control Chart source check data for the instrument on August 18,1998. The inspectors determined that 3 consecutive instrument source check values fell outside of two sigma during the period August 16 - 17, 1998. The radiation protection technician who performed the source check did not act on the matter and a second technician did not recognize the problem. The Control Chart listed only one of several acceptance criteria. The instrument had been used for counting of smears of incoming fuel shipments and the instrument's Control Chart was not initialed to permit its continued use. This was identified by the inspectors as a violation of Technical Specification 5.4.1 for failure to properly implement procedure HP-C-403. **(VIO 50-277(278)/98-08-04)**

PECO placed this matter in the PEP program, initiated an evaluation of the alpha smear counting instrument, and determined that the instrument was functioning properly and exhibited proper efficiency when source checked. PECO reviewed beta-gamma smear survey results and did not identify any removable contamination on incoming fuel shipments. PECO reviewed other in-field counting instruments and did not identify any similar problems. PECO revised its instrument Control Charts to include all procedure specified acceptance criteria for evaluation of source check results. PECO concluded the individual who had performed the check was aware of the procedure requirements but forgot to initiate a call to the Instrument Physicist. PECO coached the involved individual and discussed the event at all hands meetings.

c. Conclusion

PECO provided generally good radiological controls oversight of incoming fuel shipments. However, a violation of radiation protection procedures associated with source checking of an alpha contamination counting instrument was identified by the NRC and was promptly corrected by PECO.

R8.4 Security Oversight of Radwaste Activities

a. Inspection Scope (71750 & 86750)

The inspectors reviewed PECO's loading and transfer of a high integrity container into the process shield at the low level waste storage facility for transfer into the protected area.

b. Observations and Findings

PECO stored its vendor supplied high integrity containers, upon receipt, in a locked building outside of the protected area. The containers were subsequently loaded into a waste processing shield, under observation of security personnel, and transferred into the protected area to the waste fill station by personnel authorized Protected Area access. The large lids of the containers were sealed.

Although security personnel routinely provided oversight of the loading and transfer of the containers, there were no clearly described expectations regarding the degree of security oversight to be provided for the activity (e.g., inspection of the bottom of the transfer shield or opening and inspection of non-sealed small areas).

The acting Security Manager agreed that inspection of the containers could be enhanced and suspended transfer of the high integrity containers into the protected area pending establishment of additional guidance for conducting an inspection of the containers. The acting Security Manager stated that this additional guidance would be added to the security training program to ensure that security personnel met the revised expectations regarding review of the container loading and closure operations.

c. Conclusions

PECO provided security oversight of high integrity containers transferred into the Protected Area. However, clearly described expectations regarding the degree of security oversight of this activity was not fully provided. PECO enhanced inspection guidance and added the revised expectations to the security training program.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the results of the inspection to members of the licensee management on September 23, 1998. The licensee acknowledged the findings presented. No proprietary information was identified by the licensee.

X2 Review of Updated Final Safety Analysis Report (UFSAR) Commitments

A discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR descriptions. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures and /or parameters.

ATTACHMENT 1

LIST OF ACRONYMS USED

AO	abnormal operating
AR	action request
BTP	Branch Technical Position
CM	Corrective Maintenance
CRD	Control Rod Drive
CS	Core Spray
DOT	Department of Transportation
ECR	Engineering Change Request
ESF	Engineered Safety Feature
FCR	Field Change Request
FIN	Fix-It-Now
GP	general procedure
ISFSI	independent spent fuel storage installation
ITS	Improved Technical Specifications
JPM	Job Performance Measure
LCO	limiting condition for operation
LER	licensee event report
LOCA	loss of coolant accident
LSRO	Limited Senior Reactor Operator
MCRD	Main Control Room Deficiency
MOV	motor operated valve
NCV	non-cited violation
NOTICE	notice of violation
PECO	Peco Energy
PECON	Peco Nuclear
PEP	performance enhancement program
PDR	public document room
PMT	Post-Maintenance Testing
RO	Reactor Operator
RP	radiation protection
RPM	radiation protection manager
RWCU	reactor water cleanup
RHR	residual heat removal
RT	Routine Test
ST	surveillance test
TS	technical specification
TSA	technical specification action
UFSAR	updated final safety analysis report

INSPECTION PROCEDURES USED

IP 37551	Onsite Engineering Observations
IP 60851	Design Control of IFSFI Components
IP 60853	On-Site Fabrication of Components and Construction of an IFSFI
IP 61726	Surveillance Observations
IP 62707	Maintenance Observations
IP 71001	Licensed Operator Requalification Program Evaluation
IP 71707	Plant Operations
IP 71715	Sustained Control Room and Plant Observation
IP 71750	Plant Support Observations
IP 84750	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 86750	Solid Radioactive Waste Management and Transportation of Radioactive Materials
IP 92903	Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-278/98-08-01	VIO	RWCU System Startup Procedure

Opened/Closed

50-277/98-08-02	NCV	Torus/Drywell Vacuum Breaker Loss of Seated Indication (Unit 2)
50-277/98-08-03	NCV	Potential for Bypass of Pressure Suppression Pool
50-278/98-08-03	NCV	Potential for Bypass of Pressure Suppression Pool
50-277/98-08-04	VIO	Failure to Adhere to Radiation Protection Procedures for Source Checking Instruments
50-278/98-08-04	VIO	Failure to Adhere to Radiation Protection Procedures for Source Checking Instruments

Closed

50-277/97-03-02	VIO	Failure to Assure that the Turbine Building Atmosphere was Processed Through the Turbine Building Gaseous Waste Treatment System
50-278/97-03-02	VIO	Failure to Assure that the Turbine Building Atmosphere was Processed Through the Turbine Building Gaseous Waste Treatment System
50-277/97-04-03	VIO	Violation of Locked High Radiation Area Key Control
50-278/97-04-03	VIO	Violation of Locked High Radiation Area Key Control
50-277/2-97-007	LER	Potential for Bypass of Pressure Suppression Pool
50-278/2-97-007	LER	Potential for Bypass of Pressure Suppression Pool
50-278/3-98-004	LER	Reactor Water Cleanup System Automatic Isolation
50-277/97-06-03	URI	Potential for Bypass of Pressure Suppression Pool
50-278/97-06-03	URI	Potential for Bypass of Pressure Suppression Pool

ATTACHMENT 2

Maintenance Observations:		Observed On:
M-018-003	New Fuel Receipt and Inspection	August 23
M-053-011	Cleaning and Inspection of Powell Series P-51000 Metal-Clad Switchgear	August 31
C0183052	Refueling Water Pump B - Inspect/Repack Seals	September 10
C0182395	Recirculation Motor Generator Oil Cooler Setpoint Change	September 12
M-056-001	480 Volt Motor Control Center Circuit Breaker Assembly and Cubicle Terminal Maintenance	September 16

Surveillance Observations:		Observed On:
TRT #98-025	Reactor Water Cleanup System 16A Valve Troubleshooting (Unit 2)	August 24
ST-O-052-704-2	E4 Diesel Generator 24 Hour Endurance Test	August 26
SI2K-54-E32-XXFM	Functional Test of E32 4KV Undervoltage Relays	September 3
RT-O-40C-530-2(3)	Drywell Temperature Monitoring	September 16
ST-O-052-413-2	E3 Diesel Generator Fast Start and Full Load Test	September 16
TRT #98-050	2B Loop of HPSW, 2B Loop of RHR in S/D Cooling, Unit 2 ILRT Valve	September 16
RT-O-003-990-2	Control Rod Stroke Speed	September 17
ST-O-10-306-3	B RHR Loop Pump Valve Flow and Unit Cooler Functional and Inservice Test	September 17
SI3N-60B-RBM-AICS	Calibration/Functional check of Rod Block Monitor "A"	September 20