January 24, 2000

Mr. G. Rainey, President
PECO Nuclear
Nuclear Group Headquarters
Correspondence Control Desk
P.O. Box 195
Wayne, Pennsylvania 19087-0195

SUBJECT: NRC INTEGRATED INSPECTION REPORT 05000277/1999009, 05000278/1999009 AND 07201027/1999009

Dear Mr. Rainey:

On December 27, 1999, the NRC completed an inspection at the Peach Bottom Atomic Power Station. The enclosed report presents the results of that inspection. We concluded that your staff continued to operate both units safely.

Based on the results of this inspection, the NRC has determined that two Severity Level IV violations of NRC requirements occurred. These violations are being treated as Non-Cited Violations (NCVs) consistent with Section VII.B.1.a of the NRC Enforcement Policy. The first NCV involved the inoperability of a room cooler fan for the 2B core spray subsystem. The second NCV involved two examples of inadequate testing and calibration procedures.

If you contest either of these violations or the severity level of the NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001 with copies to the Regional Administrator, Region I, the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington DC 20555-0001 and the NRC Resident Inspector at the Peach Bottom Atomic Power Station.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room (PDR).

We appreciate your cooperation.

Sincerely,

ORIGINAL SIGNED BY

Curtis J. Cowgill, Chief
Projects Branch 4
Division of Reactor Projects

Docket Nos.: 05000277, 05000278, 07201027
License Nos.: DPR-44, DPR-56

Enclosure: NRC Inspection Report No. 05000277/1999009, 05000278/1999009

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U. S. NUCLEAR REGULATORY COMMISSION
REGION I

License Nos.	DPR-44 DPR-56
Report Nos.	199909 199909
Docket Nos.	05000277 05000278 07201027
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:	November 9, 1999, through December 27, 1999
Inspectors:	A. McMurtray, Senior Resident Inspector M. Buckley, Resident Inspector B. Welling, Resident Inspector E. Gray, Senior Engineering Inspector C. Sisco, Operations Inspector L. Cheung, Senior Reactor Inspector
Approved by:	Curtis J. Cowgill, Chief Projects Branch 4 Division of Reactor Projects

EXECUTIVE SUMMARY

Peach Bottom Atomic Power Station
NRC Inspection Report 05000277/199909, 05000278/199909

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

Operations:

- The 2B core spray subsystem was inoperable for a time period greater than allowed by Technical Specifications because the associated room cooler fan would not auto-start. This violation is being treated as a Non-Cited Violation (NCV) consistent with Section VII.B.1.a of the NRC Enforcement Policy. (Section O2.1)

- The root cause evaluations for Performance Enhancement Program (PEP) issues performed at Peach Bottom in 1999 were generally good and contained thorough investigations of the issues. The identified corrective actions for resolving these issues were appropriate. The corrective actions were either adequately implemented or being tracked for completion through the PEP tracking system. The root cause evaluation process and corrective action implementation had improved at the station in 1999. (Section O7.1.1)

- PECO's resolutions for identified issues were effective. The recurrence of identified issues was very low. (Section O7.1.2)

- PECO generally prioritized problem resolutions at Peach Bottom based on the safety significance of the issues. PECO did not formally use risk information in the prioritization process. PECO planned to include risk information in their prioritization process early in 2000. (Section O7.1.3)

- The quality of PECO's 1999 self-assessments had improved. These assessments were in-depth and resulted in significant findings. These identified problems were entered into PECO's corrective action program with identified problems scheduled for timely resolution. (Section O7.1.4)

Maintenance:

- A full scram signal and a Group 1 isolation signal occurred while Unit 3 was in the refueling mode due to an inadequate surveillance test procedure. Station personnel performed an investigation into this event and provided comprehensive corrective actions to address identified deficiencies. The investigation identified concerns with the station's change management process for groups assuming new tasks.

  Operations personnel demonstrated a good questioning attitude by identifying a test procedure inadequacy that had rendered all four residual heat removal pumps inoperable for a period of approximately two hours during testing prior to 1998.

  The above two examples of inadequate procedures are being treated as a Non-Cited Violation (NCV) consistent with Section VII.B.1.a of the NRC Enforcement Policy. (Section M3.1)

Engineering:

Executive Summary

- The planning, fabrication and documentation for the TN-68 dry fuel storage casks at Precision Components Corporation met the design configuration. Effective fabrication practices were in use and extensive Quality Assurance coverage by PECO Nuclear was in place at the manufacturing plant. (Section E1.1)

- Although PECO engineering was aware that the Unit 2 high pressure coolant injection (HPCI) steam admission valve could fail to open because of thermal binding when the system was isolated for maintenance, engineering personnel failed to prevent this type of failure during maintenance performed on November 2, 1999. This resulted in a minor increase in system unavailability. (Section E2.2)

Plant Support:

- Higher than expected radiation levels in the reactor cavity were caused by placing newly discharged fuel in close proximity to the spent fuel pool gates. Station personnel performed a thorough investigation into this issue and initiated corrective actions designed to prevent recurrence. (Section R1.1)

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Report Details

Summary of Plant Status

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

Unit 2 operated at 100% power throughout this inspection period.

Unit 3 began this inspection period at 100% power. On November 13, 1999, unit load was reduced to 73% power for primary containment isolation valve testing. The unit was returned to 100% power on November 14, and remained at that level for the rest of the period.

I. Operations

O1 Conduct of Operations[1]

O1.1 General Comments (71707)

The inspectors observed very good operator performance during routine tours of the control room. Shift turnovers and turnover meetings were typically thorough.

The inspectors noted that good questioning attitude by operations personnel resulted in the identification of a residual heat removal (RHR) logic system functional test procedure deficiency prior to performing this test. See Section M3.1 for additional details.

O2 Operational Status of Facilities and Equipment

O2.1 Core Spray Pump Room Cooler Fan Failed to Start and (Closed) Licensee Event Report (LER) 50-277/2-99-007

a. Inspection Scope (71707)

The inspectors reviewed PECO's investigation into an event in which a core spray (CS) pump room cooler fan failed to start during surveillance testing. The inspectors also discussed this issue with operations personnel and performed an onsite review of LER 50-277/2-99-007.

b. Observations and Findings

On November 11, 1999, the 2B CS pump room cooler failed to start during a routine quarterly surveillance test. Operations personnel determined that the room cooler fan switch was not fully turned to the "run" position which prevented the fan from starting automatically when the pump was started. Although the switch position indicated "run," it actually needed to be turned slightly past this position in order for the switch contact to make up. This condition rendered the room cooler and its associated CS subsystem inoperable.

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

Station personnel determined that the room cooler fan switch had last been aligned on September 24, 1999. Thus, the 2B CS subsystem had been inoperable for approximately 48 days. The independent verification and routine check requirements for the switch position by operators did not specify that the switch position needed to slightly past the run position.

Operations personnel concluded that the label plate on the room cooler fan switch and other similar plant switches needed to be modified to more accurately reflect the control switch position. In addition, plant management initiated actions to incorporate the lessons learned for this issue into operator training. The inspectors considered these corrective actions to be adequate.

Peach Bottom Atomic Power Station Unit 2 Technical Specification 3.5.1, requires that each ECCS injection/spray subsystem be operable when in modes 1, 2, and 3. If one low pressure ECCS injection/spray subsystem is inoperable, the subsystem shall be restored to operable status within seven days. Contrary to the above, the 2B core spray subsystem was inoperable while Unit 2 was in mode 1 between October 5, 1999, and November 11, 1999, a period of over 35 days. This Severity Level IV violation is being treated as a Non-Cited Violation (NCV) consistent with Section VII.B.1.a of the NRC Enforcement Policy. This issue was documented in PECO's corrective action program as PEP I0010483. **(NCV 50-277/99-09-01)**

c. Conclusions

The 2B core spray subsystem was inoperable for a time period greater than allowed by Technical Specifications because the associated room cooler fan would not auto-start. This violation is being treated as a Non-Cited Violation (NCV) consistent with Section VII.B.1.a of the NRC Enforcement Policy.

O2.2 EDG Walkdowns

a. Inspection Scope (71707)

The inspectors walked down sections of the E1, E2, E3, and E4 emergency diesel generators (EDGs) and related subsystems.

b. Observations and Findings

The material condition of the E1, E2, E3, and E4 EDGs and related subsystems was acceptable. In addition, equipment alignment of the related subsystems was verified to be correct.

O7 Quality Assurance in Operations

O7.1 Problem Identifications, Resolutions, and Corrective Actions

07.1.1 Root Cause Evaluations

a. Inspection Scope (40500)

The inspectors reviewed five Performance Enhancement Program (PEP) issues at Peach Bottom that required root cause evaluations (Class A PEP issues) to determine the quality of the evaluations and the adequacy of the resolutions for the issues. Class A PEP issues at Peach Bottom were plant issues that had a high potential to affect quality, including repeated equipment failures. All Class A PEP issues required full scale root cause evaluations. The inspectors also reviewed the associated corrective actions to determine whether they were adequately implemented.

b. Observations and Findings

The five PEP issues were: 1) PEP I0009477, "3 B CS Pump Failed to Start as Required During CS Logic System Functional Testing"; 2) PEP I0009846, "Failure of Outboard Main Steam Isolation Valve (MSIV) DC Solenoid"; 3) PEP I0010074, "Valves Failed to Stroke - Apparent Cause Was Auxiliary Contacts"; 4) PEP I0010133, "Unit 3 High Pressure Coolant Injection (HPCI) Inoperable Due to Large Oscillations in Discharge Pressure"; and 5) PEP I0009697, "Ineffective Corrective Actions on Previous PEP Issues." All these issues occurred in 1999.

Peach Bottom procedure exhibit LR-CG-10-1, "Root Cause Flow Chart and User's Information Manual," Revision 1, dated November 22, 1999, provided guidance for performing root cause evaluations associated with the PEP issues. In 1999, PECO developed procedure, AG-CG-050, "Equipment Investigation and Troubleshooting Guideline," Revision 3, dated October 15, 1999, which provided additional guidance for root cause evaluation dealing with equipment failures.

The inspectors reviewed these documents and determined that the root cause evaluations were generally good, with thorough investigations. The resulting corrective actions for resolving the identified issues were appropriate. Most of these corrective actions were completed. Those that had not been implemented were being tracked for completion through the PEP tracking system. PECO noted that many root cause evaluations performed before 1999 were not in-depth and the resulting corrective actions were sometimes ineffective. As a result, PECO made extensive changes in 1999 to improve root cause evaluations and corrective actions. The several PEPs reviewed had improved root cause evaluations and corrective actions.

c. Conclusions

The root cause evaluations for Performance Enhancement Program (PEP) issues performed at Peach Bottom in 1999 were generally good and contained thorough investigations of the issues. The identified corrective actions for resolving these issues were appropriate. The corrective actions were either adequately implemented or being tracked for completion through the PEP tracking system. The root cause evaluation process and corrective action implementation had improved at the station in 1999.

07.1.2 Effectiveness Of Resolutions for Identified Issues

a. Inspection Scope (40500)

The inspectors reviewed PEP issue records and problem identification reports to determine the effectiveness of licensee's resolutions for identified issues.

b. Observations and Findings

The inspectors reviewed three PEP issues: 1) PEPs I0009526, "Mispositioning Incident Trips EDG During Unit 2 Start-Up Restoration"; 2) PEP I0009713, "Control Rod 14-15 Withdrawn to Notch 34 Instead of 30"; and 3) PEP I0010404, "3B Recirculation Pump Trip During Troubleshooting." The inspectors noted that the corrective actions taken to resolve the identified issues were appropriate. Also, the inspectors reviewed a sample of 10 problem identification reports and determined that the corrective actions for the identified issues were also appropriate. A review of the computerized data base of the problem reporting system indicated that the recurrence of identified issues was less than PECO's performance goal of two per month, indicating that the corrective actions taken to resolve issues were effective.

c. Conclusions

PECO's resolutions for identified issues were effective. The recurrence of identified issues was very low.

O7.1.3 Prioritizations of Plant Identified Issues

a. Inspection Scope (40500)

The inspectors reviewed PECO's prioritization process for resolving PEP issues to determine if the prioritization was based on safety significance or risk information of the identified issues.

b. Observations and Findings

The prioritization for resolving PEP issues at Peach Bottom was based on PEP levels as defined in Exhibit LR-C-10-3, “Examples of Issues and Their Significance,” and Exhibit LR-CG-10-4, “Corrective Action Process Hierachy.” These exhibits also defined the criteria for determining various PEP levels. The inspectors noted that problem resolutions were generally prioritized based on the safety significance of the issues and that risk information was not formally used in the prioritization process. PECO stated that risk information would be a part of the prioritization of plant problems and issues early in 2000. The inspectors attended plant staff meetings and observed the staff’s prioritization of daily plant problems. The inspectors noted that the problems were prioritized and classified in accordance with plant procedures.

c. Conclusions

PECO generally prioritized problem resolutions at Peach Bottom based on the safety significance of the issues. PECO did not formally use risk information in the prioritization process. PECO planned to include risk information in their prioritization process early in 2000.

O7.1.4 Organizational Self-Assessments

a. Inspection Scope (40500)

The inspectors reviewed self-assessments performed by operations and by engineering to assess PECO’s effort in problems identification and resolution.

b. Observations and Findings

The inspectors reviewed five organizational self-assessments, two performed by operations in May and June of 1999, one by operations in May 1998, one by components engineering and maintenance in July 1999, and one by components engineering in May 1998. The inspectors noted a significant improvement in the quality of PECO’s 1999 self-assessments. These assessments were in-depth and the auditors identified problems and issues of significance. These identified problems were entered into PECO’s corrective action program with scheduled dates for resolution of the identified problems.

c. Conclusions

The quality of PECO’s 1999 self-assessments had improved. These assessments were in-depth and resulted in significant findings. These identified problems were entered into PECO’s corrective action program with identified problems scheduled for timely resolution.

O7.1.5 Resolution for Motor-Operated Valve Failures due to Auxiliary Contact Problems

a. Inspection Scope (40500)

The inspectors reviewed the licensee's corrective actions for multiple motor-operated valve (MOV) failures that had occurred during the past years because of auxiliary contact problems. Two of the failures that occurred in 1999 (one in June and the other in August) involved two safety-related MOVs and the issues were documented in PEP I0010074.

b. Observations and Findings

The inspectors reviewed PEP I0010074 which noted that failures occurring in 1999 were repeat failures. On June 23, 1999, Valve MO-2-14-012B failed to close during testing. The failure was caused by the sticking of auxiliary contacts mounted on the opening starter coil. The inspectors reviewed the valve failure record and noted that this valve had failed twice before, first on April 1, 1990, and then again on May 20, 1995, due to auxiliary contact problems. On July 21, 1999, Valve MO-2-10-089A, failed to open during testing. This failure was also caused by an auxiliary contact problem. The failure record indicated that this valve had failed earlier on July 1, 1997, also due to auxiliary contact problem. Since 1988, 27 safety and nonsafety-related valves failures had occurred, all due to auxiliary contact problems.

Following the valve failures in 1999, PECO sent the failed auxiliary contacts to the Valley Forge Laboratories for extensive analysis, including cutting open of the contact housing. The analysis results indicated that the failure mechanism was the "bowing" of the contact rods, where the add-on contacts were hooked to the base contacts. This "bowing" caused binding of the contact rods, and prevented the contacts from returning to their normal positions. The tightening of the mounting screws also affected the "bowing." PECO found that the existing installation procedure did not specify a torque value, which should have been approximately 10 - 14 inch-pounds.

PECO's corrective actions included the replacement of all double add-on auxiliary contacts with singles, the removal of the unused contacts, the reduction of the spring burden, and the inclusion of the torque value in the installation procedure. At the time of the inspection, all add-on double auxiliary contacts in the MCCs for the high- and medium-risk MOVs were replaced with singles. PECO found that the MCCs for 13 of their low-risk MOVs contained add-on double auxiliary contacts. PECO stated that the replacement of the double auxiliary contacts with singles would be completed before the end of year 2000.

c. Conclusions

PECO completed an extensive effort in resolving the motor control center (MCC) auxiliary contact problems that had caused motor-operated valve failures.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

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 following maintenance and surveillance test activities:

Maintenance Observations:		Observed On:
M-C-747-017	Hydraulic Control Unit (HCU) Pressure Switch Testing and Calibration	December 13, 1999
C0189842	Repack 2D High Pressure Service Water Pump	December 14, 1999
C0191599	ECR 99-02546 Jordan Positioner	December 16, 1999
CO191658	Replacement of Topaz Inverter on ALT S/D Panel	December 17, 1999

Surveillance Observations:		Observed On:
ST-I-023-100-3	HPCI Logic System Functional Test	December 09, 1999
ST-O-014-301-2	Core Spray Loop A Pump, Valve and	December 13, 1999
ST-O-033-300-2	Emergency Service Water Flow Test	December 17, 1999
ST-I-010-100-3	3A RHR Logic System Functional Test	December 20, 1999
ST-O-052D-204-2	E2 Diesel Generator Slow Start and Full Load test	December 21, 1999
RT-O-052-204-2	E4 Diesel Generator Load Test	December 28, 1999

The work and testing performed during these activities were comprehensive. Technicians were experienced and knowledgeable of their assigned tasks. The work and testing procedures were generally used effectively. Good pre-job briefs were observed prior to the performance of the maintenance and surveillance activities.

M3 Maintenance Procedures and Documentation

M3.1 Deficiencies in Testing and Calibration Procedures that Resulted in Unexpected Plant System Conditions

a. Inspection Scope (37551 & 61726)

On October 13, 1999, while Chemistry technicians were performing a main steam line monitor source calibration on Unit 3, they created conditions that resulted in full scram and Group 1 isolation signals. No rod motion occurred since all rods were already

inserted to support Unit 3 refueling activities. The main steam isolation valves did not reposition as they were also closed to support refueling activities. The inspectors discussed this event with Chemistry personnel and reviewed applicable documentation.

The inspectors also reviewed a licensee-identified deficiency in a residual heat removal (RHR) logic system functional test procedure, which caused all four RHR pumps to be inoperable. The inspectors performed an on-site review of Licensee Event Report (LER) 50-277(278)/2-99-008 which was initiated due to this event.

b. Observations and Findings

Main Steam Line Monitor Source Calibration During the Unit 3 Refueling Outage

During the performance of the main steam line calibration procedure, ST-C-095-808-3, Chemistry technicians raised the downscale setpoint in lieu of the high alarm setpoint due to inadequate procedural guidance. When the 'A' main steam line detector was exposed to increasing calibration source radiation levels, the Group 1 and half scram alarms were received. Because the calibration procedure erroneously noted in the Plant Impact section that a half scram and a half Group 1 isolation would occur during the calibration of each of the four main steam line channels, the reactor operator (RO) and the Chemistry technicians did not question these alarms. The procedure had been previously revised to preclude the half scram/Group 1 isolation alarms but the Plant Impact section was not properly revised. After the calibration on the 'A' channel was complete, no alarms were reset because alarms were not expected and there was no procedural direction to do so. Although a chemistry technician questioned the half scram and Group 1 isolation alarms after the 'A' channel calibration, the technicians discussed this condition, decided that the alarms were not important, and continued with the test.

The Chemistry technicians proceeded to calibrate the 'B' channel without notifying the RO. Again, the chemistry technicians raised the downscale setpoint in lieu of the high alarm setpoint. When the 'B' channel was exposed to increasing radiation level, the logic was made up, and a full scram and Group 1 isolation signals occurred.

The inspectors noted that the station personnel performed an investigation into this event and PEP I0010367 detailed comprehensive corrective actions to address identified deficiencies. The main steam line calibration test procedure was extensively revised. Also, there was a stand down for all chemistry personnel and the lessons learned from this event were used for other chemistry tests performed during the remainder of the 3R12 outage.

The investigation identified that instrument and control technicians had changed the high alarm setpoint during the previous performance of this test and that this was the first time that chemistry technicians changed this setpoint. Because of this, the PEP identified potential problems with the station's change management process for groups assuming new tasks, PECO also noted that this was another example of human performance concerns in the Peach Bottom Chemistry group.

The inspectors reviewed NUREG-1022, Revision 1, “Event Reporting Guidelines 10 CFR 50.72 and 50.73" and PECO’s justification for not reporting this issue. The inspectors had no reporting concerns with this issue.

Peach Bottom Unit 3 Technical Specification 5.4.1 requires that written procedures be established, implemented and maintained for the activities listed in Regulatory Guide 1.33, which includes surveillance activities for process radiation monitoring calibrations. Surveillance test procedure, ST-C-095-808-3, “Main Steam Line Monitor Source Calibration,” Revision 4, was not adequately maintained to ensure that a half scram/Group 1 isolation signals would not be received during testing. These inadequacies in the procedure resulted in the full scram and Group 1 isolation signals when the second channel was tested. This severity level IV violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1.A of the NRC Enforcement Policy. The violation was placed in PECO’s corrective action program as PEP I0010367. **(NCV 50-278/99-09-02, Example 1)**

Residual Heat Removal Logic System Functional Test Procedure and (Closed) LER 50-277(278)/2-99-008

On December 2, 1999, during a review of an RHR logic system functional test procedure prior to a planned test, operations personnel discovered that the test procedure simultaneously caused all four pumps to be incapable of starting automatically for a period of approximately two hours. This test was last performed on both units in 1997 during Mode 1 (power operation) and was performed in this manner between 1992 and 1997. The pumps were tested sequentially during the procedure, but the auto-start capability (and operability) was not reset until all four pumps had been tested.

Engineering personnel concluded that the procedural guidance for the RHR test was inadequate. They revised the affected procedures and planned to review all other emergency core cooling system logic test procedures for similar problems prior to performing the next tests. Engineers concluded that the safety consequence of this condition was minimal because the RHR pumps were capable of being manually started and other emergency core cooling systems were available.

The inspectors determined that operations personnel demonstrated good attention to detail and a questioning attitude through the identification of this test procedure problem. Also, the inspectors considered discovery of this issue, prior to the recent planned test performance, reflected a positive effort.

Peach Bottom Units 2 and 3 Technical Specification 5.4.1 requires that written procedures be established, implemented and maintained for the activities listed in Regulatory Guide 1.33, which includes activities for the residual heat removal system (emergency core cooling system). Surveillance test procedure, ST-I-010-100-3, “RHR Loop A Logic System Functional Test,” Revision 10, was not adequately maintained to ensure that multiple, simultaneous RHR pump inoperability did not occur. This inadequacy in the procedure caused all four pumps to be incapable of starting automatically for a period of approximately two hours during previous testing activities.

This Severity Level IV violation is being treated as a Non-Cited Violation (NCV) consistent with Section VII.B.1.a of the NRC Enforcement Policy. This issue was documented in PECO's corrective action program as PEP I0010537. **(NCV 50-277(278)/99-09-02, Example 2)**

c. Conclusions

A full scram signal and a Group 1 isolation signal occurred while Unit 3 was in the refueling mode due to an inadequate surveillance test procedure. Station personnel performed an investigation into this event and provided comprehensive corrective actions to address identified deficiencies. The investigation identified concerns with the station's change management process for groups assuming new tasks and noted that this was another example of human performance concerns in the Peach Bottom Chemistry group.

Operations personnel demonstrated a good questioning attitude by identifying a test procedure inadequacy that had rendered all four residual heat removal pumps inoperable for a period of approximately two hours during testing prior to 1998.

The above two examples of inadequate procedures are being treated as a Non-Cited Violation (NCV) consistent with Section VII.B.1.a of the NRC Enforcement Policy. The examples were placed in PECO's corrective action program as PEPs I0010367 and I0010537.

III. Engineering

E1 Conduct of Engineering

E1.1 Independent Spent Fuel Storage Installation

a. Inspection Scope (60852)

An inspection was conducted at Precision Components Corporation (PCC) in York, PA in order to observe the fabrication practices and as-built cask configuration for the Peach Bottom TN-68 spent fuel storage casks. Inspection areas included observation of work in progress, design control, welding procedures, nondestructive testing including radiography and ultrasonic testing; cask fabrication instructions and documentation; and determination of the extent of utility and licensee Quality Assurance oversight applied to cask fabrication. This inspection supplements the inspection conducted at PCC February 22-26, 1999, and documented in NRC Report 72-1027/99-201.

b. Observations and Findings

One TN-68 cask was in the final stages of fabrication for shipment in mid-December 1999 and others were in various stages of fabrication. The observed work in progress including nondestructive examinations was done in accordance with the specification and applicable Codes and standards. PECO Nuclear and Transnuclear, Inc. have extensive quality assurance coverage of the work in progress. No items of concern were identified.

c. Conclusions

The planning, fabrication and documentation for the TN-68 dry fuel storage casks at Precision Components Corporation met the design configuration. Effective fabrication practices were in use and extensive Quality Assurance coverage by PECO Nuclear was in place at the manufacturing plant.

E2 Engineering Support of Facilities and Equipment

E2.1 Engineering Support to Operations

The inspectors reviewed engineering actions related to:

- a main steam isolation valve direct current solenoid failure,
- unexpected changes in the 3B recirculation pump speed which caused minor increases in reactor power, and
- a failed limit switch on the Unit 3 high pressure coolant injection system inboard steam isolation valve motor operator.

The inspectors discussed the investigation and planned corrective actions with engineering personnel. Engineering personnel conducted detailed investigations and established effective corrective actions to support continued plant operations.

E2.2 Failure of the Unit 2 HPCI Steam Admission Motor-Operated Valve (MOV) (MO-14)

a. Inspection Scope (37551)

The inspectors reviewed the corrective actions for the failure of the Unit 2 HPCI steam supply, motor-operated valve to open due thermal binding. The cause and corrective actions were discussed with the MOV project manager.

b. Observations and Findings

When operations personnel attempted to place the HPCI system in service for post-maintenance testing on November 2, 1999, the Unit 2 HPCI steam admission valve (MO-2-23-014) failed to open due to thermal binding. The HPCI system had been taken out of service for a planned maintenance outage and was considered inoperable when the steam admission valve failed to open. No maintenance was performed on the steam admission valve during the planned maintenance outage.

PECO engineering was aware that the steam admission valve had the potential for thermal binding during HPCI system isolation for maintenance. PECO engineering made no provision to prevent thermal binding of the steam admission valve during this maintenance outage.

Due to the thermal binding that occurred during post-maintenance testing activities, the HPCI system remained out-of-service an additional four hours. The HPCI system is the most risk significant safety system in the plant. The additional out-of-service time increased the system unavailability by 0.02 per cent, which had no impact on the assumed system unavailability in the plant risk analysis. The HPCI system was returned to service well within the technical specification allowed outage time. Based on discussions with the system manager, the inspectors also noted that the thermal binding failure of the steam admission valve was considered a maintenance preventable functional failure based on the plant Maintenance Rule criteria.

c. Conclusions

Although PECO engineering was aware that the Unit 2 high pressure coolant injection (HPCI) steam admission valve could fail to open because of thermal binding when the system was isolated for maintenance, engineering personnel failed to prevent this type of failure during maintenance performed on November 2, 1999. This resulted in a minor increase in system unavailability.

E2.3 Topaz Inverter Failures

a. Inspection Scope (37551 & 71750)

The inspectors reviewed the station's response to several recent Topaz inverter failures. In addition, the inspectors discussed with plant personnel the risk significance of the November 29, 1999, Topaz inverter failure that caused the loss of the alternate shutdown valve control function at the alternate shutdown panel.

b. Observations and Findings

Several Topaz inverter failures that have recently occurred at the plant including an inverter fault that resulted in a September 30, 1999, Unit 2 scram. Also, a Topaz inverter failure rendered a Unit 3 RCIC flow controller at the remote shutdown panel inoperable during the same time period that the Unit 3 alternate shutdown panel was inoperable. All of these inverters were replaced. Based on these recent failures, engineering personnel were evaluating a more aggressive replacement strategy for the remaining Topaz inverters using an updated inverter design.

When the Topaz inverter failed on the alternate shutdown panel, maintenance personnel replaced the Topaz inverter on an expedited schedule. Although this failure did not affect the operation of the HPCI or RHR systems from the control room it prevented alternate shutdown valve control from the alternate shutdown panels. PECO had not planned to evaluate the risk significance of the failure of this fire safe shutdown equipment but did so after the inspectors questioned engineering personnel. Furthermore, the inspectors learned that the station typically does not evaluate the change in plant risk resulting from failed fire protection equipment. Although the Unit 3 Core Damage Frequency increased slightly due to this failure, the Sentinel on-line risk assessment still remained in the “Green” band.

c. Conclusions

Engineering personnel were taking appropriate measures in response to several recent Topaz inverter failures.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Higher Than Expected Radiation Levels During Reactor Cavity Drain-down

a. Inspection Scope (37551 & 92904)

The inspectors reviewed corrective actions for an event in which health physics (HP) technicians observed higher than expected radiation levels in the reactor cavity during drain-down following refueling. The inspectors discussed the corrective actions with HP and reactor engineering personnel. This issue was discussed in NRC Inspection Report 05000277(278)/99008, Section R1.3.

b. Observations and Findings

On October 21, 1999, HP technicians detected abnormal radiation levels during surveys in the reactor cavity as water was being drained in preparation for reactor vessel re-assembly. The cavity was not accessible at this time, and no abnormal radiation levels were detected on the refuel floor. The HP technicians placed a hold on the evolution until the radiation levels were understood.

A prompt investigation revealed that the condition was caused by the placement of newly discharged fuel in the spent fuel pool in close proximity to the spent fuel gate area and transfer canal. The newly discharged fuel was subsequently relocated in the pool to lower the dose rates.

Reactor engineering personnel performed a thorough follow-up investigation (PEP I0010407) and determined that procedural controls for the location of newly discharged fuel needed to be improved. Specifically, fuel movement procedures were scheduled to be revised to ensure that the area directly adjacent to the fuel pool gate would not be used for newly discharged fuel.

c. Conclusions

Higher than expected radiation levels in the reactor cavity were caused by placing newly discharged fuel in close proximity to the spent fuel pool gates. Station personnel performed a thorough investigation into this issue and initiated corrective actions designed to prevent recurrence.

R1.2 Plant Tour Observations - High Radiation Area Locked Doors

a. Inspection Scope (71750)

The inspectors toured the Unit 2 and 3 turbine and reactor buildings during the inspection period and inspected high radiation doors to ensure that they were properly posted and locked, if required.

b. Observations and Findings

The inspectors tested approximately 20 high radiation doors that were required to be locked. The inspectors also observed numerous radiological postings throughout the Unit 2 and 3 turbine and reactor buildings. All high radiation doors required to be locked were found locked. No deficiencies were noted with the radiological postings. All locked high radiation doors tested and postings observed met the requirements of technical specifications 5.7. No concerns were identified by the inspectors.

c. Conclusions

Locked high radiation doors and postings in the Unit 2 and 3 turbine and reactor building, observed during this inspection period, were adequately maintained per technical specifications and plant administrative requirements.

S2 Status of Security Facilities and Equipment

S2.1 General Integrity of Protected Area (PA)

a. Inspection Scope (71750)

The inspectors toured the site perimeter to observe the condition of the PA barriers and the isolation zones around the PA barriers.

b. Observations and Findings

The inspectors observed that the protected area barrier was appropriately maintained with no openings, damage or degraded sections. The barrier did not show any signs of erosion at the base and there were no substantial rock debris accumulations against any of the fences. The isolation zones were free of objects and permitted observation by the Central Alarm Station (CAS) and Secondary Alarm Station (SAS) operators.

c. Conclusions

PECO had appropriately maintained the barriers and isolation zones around the protected area.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the results of the inspection to members of licensee management on January 6, 2000. PECO acknowledged the findings presented.

INSPECTION PROCEDURES USED

IP 37551	Onsite Engineering
IP 40500	Effectiveness of Licensee Process to Identify, Resolve, and Prevent Problems
IP 60852	ISFSI Component Fabrication by Outside Fabricators
IP 61726	Surveillance Observation
IP 62707	Maintenance Observation
IP 71707	Plant Operations
IP 71750	Plant Support Activities
IP 92904	Followup - Plant Support

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

50-277/99-09-01	NCV	Core Spray Pump Room Cooler Fan Failed to Start
50-277(278)/99-09-02	NCV	Deficiencies in Testing and Calibration Procedures that Resulted in Unexpected Plant System Conditions

Closed

50-277(278)/2-99-007	LER	Inoperability of a Core Spray Pump Room Cooler Fan Due to the Control Switch Not Being in the Run Position
50-277(278)/2-99-008	LER	Inoperability of all RHR Pumps Simultaneously During the RHR Logic System Functional Test

Discussed

None

LIST OF ACRONYMS USED

AC	alternating current
AR	action request
CAS	central alarm system
DC	direct current
ECCS	emergency core cooling system
ECR	engineering change request
EDG	emergency diesel generators
HCU	hydraulic control unit
HP	health physics
HPCI	high pressure coolant injection
HPSW	high pressure service water
LER	Licensee Event Report
LOCA	loss of coolant accident
LOOP	loss of offsite power
MCC	motor control center
MOV	motor-operated valve
MSIV	main steam isolation valve
NC	normally closed
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
PA	protected area
PBAPS	Peach Bottom Atomic Power Station
PCC	Precision Components Corporation
PDR	public document room
PECO	PECO Energy
PEP	performance enhancement program
RCIC	reactor core isolated cooling
RHR	residual heat removal
RO	reactor operator
RP&C	radiological protection and chemistry
SAS	secondary alarm system
the Plan	NRC-approved physical security plan
TS	technical specifications
UT	ultrasonic