

October 25, 2000

Mr. G. Rainey, President  
PECO Nuclear  
Nuclear Group Headquarters  
Correspondence Control Desk  
P.O. Box 160  
Kennett Square, Pennsylvania 19348

SUBJECT: NRC'S PEACH BOTTOM REPORT 05000277/2000-010, 05000278/2000-010

Dear Mr. Rainey:

On September 30, 2000, the NRC completed an inspection at the Peach Bottom Atomic Power Station. The enclosed report presents the results of that inspection. The inspection results were discussed on October 6, 2000, with Mr. Jay Doering and other members of your staff.

This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, the NRC identified two violations that were evaluated under the significance determination process as having very low safety significance (Green). In addition, the NRC has determined that one Severity Level IV violation occurred. The violations were entered into your corrective action program, and are discussed in the summary of findings and in the body of the report. These issues were determined to involve violations of NRC requirements, but because of their very low safety significance, the violations are not cited. If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis of 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 facility.

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G. Rainey

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If you have any questions, please contact me at 610-337-5233.

Sincerely,

**/RA/**

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

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

Enclosure: Inspection Report No. 05000277/2000-010, 05000278/2000-010

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U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Docket Nos. 05000277  
05000278

License Nos. DPR-44  
DPR-56

Report Nos. 05000277/2000-010  
05000278/2000-010

Licensee: PECO Energy Company  
Correspondence Control Desk  
P.O. Box 160  
Kennett Square, PA 19348

Facility: Peach Bottom Atomic Power Station Units 2 and 3

Inspection Period: August 20, 2000 through September 30, 2000

Inspectors: A. McMurtray, Senior Resident Inspector  
M. Buckley, Resident Inspector  
B. Welling, Acting Senior Resident Inspector  
R. Nimitz, Senior Radiation Specialist  
M. Modes, Senior Reactor Inspector  
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D. Cullison, Project Engineer

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

## SUMMARY OF FINDINGS

IR 05000277/2000-010, 05000278/2000-010, on 08/20-09/30/2000; PECO Energy Company; Peach Bottom Atomic Power Station; Units 2 & 3. Occupational Radiation Safety, Miscellaneous.

The report covers a six-week period of resident inspection and announced inspections by regional radiation specialists and a reactor inspector. The inspection identified three findings which resulted in non-cited violations, one finding had no color and two were Green. The significance of issues is indicated by their color (Green, White, Yellow, or Red) and was determined by the Significance Determination Process (SDP) in Inspection Manual Chapter 0609 (See Attachment 1). Findings for which the SDP does not apply are indicated by "no color" or by the severity level of the applicable violation.

### **Cornerstone: Occupational Radiation Safety**

Green. On September 16, 2000, three workers did not follow oral and written radiation protection instructions, as required by radiation protection procedures and Technical Specifications, to avoid areas of elevated radiation dose rates in the Unit 2 drywell. Specifically, contrary to the instructions given to them, three workers either worked in proximity of, passed through, or transported radiation shielding materials through elevated radiation fields (up to 13.9 R/hr) in the drywell. As a result, one of the workers exceeded the dose limit specified in the radiation work permit. Further, one of the workers did not contact radiation protection personnel upon alarm of their dosimeter, also as specified in written and oral radiation protection instructions. This PECO-identified issue was determined to be a Non-cited Violation of Technical Specification 5.4.1. This issue was considered to be of very low safety significance because it did not result in an over exposure, did not create a substantial potential for such an exposure, and did not compromise the ability of PECO to assess dose to its workers. This issue was placed in PECO's corrective action system. (Section 2OS1)

Green. On September 16, 2000, PECO did not post and barricade a High Radiation Area in the Unit 2 drywell. The failure to properly post and barricade the area contributed to three workers entering the area and one of the workers exceeding the dose limit specified in the radiation work permit. This NRC identified issue was determined to be a Non-cited Violation of Technical Specification 5.7.2.f. This issue was considered to be of very low safety significance because it did not result in an over exposure, did not create a substantial potential for such an exposure, and did not compromise the ability of PECO to assess dose to its workers. This issue was placed in PECO's corrective action system. (Section 2OS1)

### **Miscellaneous**

No color. As identified in LER 2-00-001, the 2B Drywell Wide Range Pressure recorder was inoperable for greater than 30 days. The NRC determined this to be a Non-cited violation of Technical Specification 3.3.3.1. (Section 4OA5.1)

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## Report Details

### SUMMARY OF PLANT STATUS

#### UNIT 2

Unit 2 began this inspection period at 86% power in end-of-cycle coastdown.

August 23 Operators reduced power to 68% to remove the 'B' feedwater heater string from service due to suspected leaks and on August 24 returned the unit to 83% power.

September 7 Operators reduced power to approximately 16% in response to pressure perturbations in the 'B' feedwater heater string and on September 8 returned the unit to 75% power.

September 13 Following an unexpected trip of the 2A recirculation pump due to a maintenance error, operators further reduced reactor power to 36% power and on September 14 returned the Unit to 75% power.

September 15 While operators were performing activities to shutdown Unit 2 to begin refueling outage 2R13, the 2B recirculation pump unexpectedly tripped. In response, the operators initiated a manual reactor shutdown. The unit remained shutdown for the rest of the inspection period.

#### UNIT 3

Unit 3 began this inspection period at 100% power.

September 30 Operators reduced power to approximately 18% in response to a low oil level in the 3B recirculation pump motor. Unit 3 was at approximately 35% power at the end of the period.

### **1. REACTOR SAFETY Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R04 Equipment Alignment

##### a. Inspection Scope

The inspectors performed a complete system walkdown of the Unit 3 high pressure service water system. The inspectors reviewed valve positions, electrical power availability, and the general condition of major system components. The inspectors used the following drawing to verify required alignments during this walkdown:

<u>Plant Drawing No.</u>	<u>Title</u>
6280-M-315	Emergency Service Water and High Pressure Service Water System

b. Issues and Findings

There were no findings identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors performed walkdowns of the following plant areas to assess control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures:

- Unit 2 Reactor Building 135' Elevation (Fire areas 6N and 6S)
- Unit 3 High pressure and emergency service water pump structure

The inspectors also observed plant personnel performance during a fire brigade drill on August 31, 2000, to evaluate the readiness of PECO's personnel to prevent and fight fires.

b. Issues and Findings

There were no findings identified.

1R07 In-Service Inspection

a. Inspection Scope

The inspector reviewed three radiographs each on stainless steel weld W1001, mild steel weld 802, 803, and 804 of the modification to the abandoned Residual Heat Removal Spray Head Loop Piping; Package ECR 9803204. This piping modification replaced two leaking containment isolation valves on the spray system with new pipe containing opposing welded pipe caps. These pipe caps isolated the 1965 ASME Code Class 2 pipe from the 1992 ASME Code Class 3 pipe. The NRC inspector interviewed the lead radiographer and his assistant. For radiograph 804 0-1 at the 0 location, the inspector verified that PECO appropriately dispositioned a sharp inner root geometry indication that could be interpreted as lack-of-penetration or unacceptably deep root undercut.

The inspector reviewed the ultrasonic examination associated with RWCU 12-14-5 Pipe-to-elbow, using a 60 degree refracted longitudinal in conformance with 1989 ASME Section XI. The inspector verified that the PECO review was in conformance with PECO Energy oversight procedure MAG-CG-418, Rev 1.



The inspector reviewed the ultrasonic examination associated with reactor water clean up weld 12-13-9C and weld 12-13-9B, Pipe-to-elbow, using a 45 degree shear wave in conformance with 1989 ASME Section XI.

The inspector reviewed the reactor head-to-flange weld CH-C-2 Magnetic Particle inspection performed using a magnetic yoke. The inspector verified that the six recorded indications by the 45 degree shear wave and 70 degree refracted longitudinal wave were properly dispositioned.

The inspector verified that PECO Energy is identifying in-service inspection (ISI) problems at an appropriate threshold and entering them in the corrective action program. The inspector reviewed the following PEP (Performance Enhancement Process) documents:

- PEP I0010423 "Incorrect ISI Relief Request Information Submitted to the NRC," dated August 7, 2000
- PEP I0007583, "ASME Examination Performed by Examiner Without Current Eye Examination," dated August 5, 1998
- PEP I0010349 "Procedure Adherence Deficiency by GE NDE Techs Performance of ISI," dated February 14, 2000
- PEP I0010374 "Penetrations Omitted from Containment Inspection Procedure," dated November 15, 1999

The inspector discussed examples of corrective actions ancillary to the ISI process with an ISI Engineer from PECO Energy.

b. Issues and Findings

There were no findings identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed PECO's risk evaluation and contingency plans for selected planned and emergent work activities to verify that appropriate risk evaluations were performed and to assess PECO's management of overall plant risk. The inspectors attended selected planning meetings and discussed the risk management aspect of the activities with operators, maintenance personnel, system engineers, and work coordinators, as appropriate, for the following issues:

- E1 emergency diesel generator jacket water circulating pump failure
- 2D residual heat removal system instrument line leak

b. Issues and Findings

There were no findings identified.

1R14 Personnel Performance During Non-Routine Evolutions

a. Inspection Scope

The inspectors reviewed the performance of operations personnel in response to the following non-routine evolutions:

- Unit 2 power reduction for perturbations in the 'B' feedwater heater string (September 7)
- 2A recirculation pump trip due to maintenance personnel error (September 13)
- 2B recirculation pump trip due to a clearance problem and Unit 2 shutdown for refueling outage (September 15)
- Unit 3 load reduction for low oil level in the 3B recirculation pump (September 29)

b. Issues and Findings

There were no findings identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed three operability evaluations to ensure that the required Technical Specification actions were satisfied and the component or system remained available so that no unrecognized increase in risk occurred. The inspectors discussed the evaluations with cognizant engineering personnel and control room supervisors. The following evaluations were reviewed:

- E1 emergency diesel generator (EDG) jacket water circulating pump failure
- Shutdown cooling system isolation on September 25
- Emergency service water (ESW) check valve failure on September 28

b. Issues and Findings

On September 28, 2000, operations personnel determined, during in-service testing, that ESW check valve 2-33-514 had failed open. This check valve is designed to prevent reverse flow from the safety-related ESW system into the Unit 2 non-safety related service water system under accident conditions. Operators declared both ESW subsystems inoperable, because ESW flow to the EDGs and emergency core cooling system room coolers and motor oil coolers could be inadequate.

Approximately one and a half hours after the condition was discovered, operators shut a block valve adjacent to the check valve to eliminate the flow diversion path created by the open check valve and restored the ESW system to an operable status. Later, operators re-performed the in-service test and confirmed the results. Operations personnel also reported this event per 10 CFR 50.72 as a condition that alone could have prevented the ESW system safety function. In addition, operators performed a troubleshooting procedure on September 29, to measure the ESW flow rates with the as-found condition of the check valve.

The inspectors observed maintenance technicians remove the valve internals. The inspectors noted that a nut, which holds the valve disk onto the check valve swing-arm, had backed off and caused the valve to remain wedged open. The nut was also missing a locking pin that was intended to prevent the nut from backing off. The last successful test of the valve was in 1998.

The inspectors identified two issues for further evaluation.

- The inspectors and operations personnel noted that, during two periods in which the ESW system was declared inoperable, operators did not address the operability status of the EDGs or associated Technical Specifications action statements and/or applicable limiting conditions for operation for Unit 2, which was in Mode 5 (refueling) at the time. Technical Specification 3.8.2, “AC Sources - Shutdown,” requires two operable EDGs during fuel movement. PECO personnel were reviewing this issue at the conclusion of the inspection period.
- The inspectors determined that this event required further evaluation in the significance determination process. At the end of the inspection period, PECO personnel were collecting information to support an assessment of the risk impact of the failed check valve. In addition, they were investigating the causes and possible performance issues related to the event.

This item is unresolved pending the completion of the PECO activities described above.  
**(URI 05000277/2000-010-01)**

#### 1R19 Post-Maintenance Testing

##### a. Inspection Scope

The inspectors reviewed test data and observed portions of the following post-maintenance testing:

- E42 electrical bus post-maintenance testing
- High pressure coolant injection (HPCI) system steam admission valve (MO-14) testing
- HPCI auxiliary oil pump post-maintenance testing per M-C-756-001
- HPCI overspeed trip test using auxiliary steam per RT-N-023-240-2
- Reactor core isolation cooling overspeed trip test using auxiliary steam per RT-N-013-240-2

##### b. Issues and Findings

There were no findings identified.

#### 1R20 Refueling and Outage Activities

##### a. Inspection Scope

The inspectors observed and/or reviewed numerous refueling outage activities and controls, including:

- outage configuration management and system restoration
- outage risk assessment
- clearance and tagging
- electrical power alignment
- residual heat removal and alternate decay heat removal system operation
- availability of emergency core cooling systems and makeup water sources
- containment controls and integrity
- fuel handling practices and fuel movement between the spent fuel pool and the reactor core
- reactor startup, including preparations, control rod withdrawal, and reactor coolant system heatup

b. Issues and Findings

There were no findings identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors reviewed and observed portions of the following surveillance tests, and compared test data with established acceptance criteria to verify the system demonstrated the capability of performing its intended safety functions and its operational readiness.

- S13L-2-72-D1FQ, Revision 4, "Functional Test of 'D' Emergency Core Cooling System Compensated Level"
- ST-I-016-220-2, Revision 0, "Main Steam Relief Valve Actuator and Backup N2 Supply Valve Logic Test"
- ST-O-010-306-2, Revision 17, "Unit 2 Residual Heat Removal B Pump, Valve, Flow, and Unit Cooler Functional and In-service Test"

b. Issues and Findings

There were no findings identified.

## 1R23 Temporary Modifications

### a. Inspection Scope

The inspectors reviewed the following temporary modification:

- Temporary Replacement of the Unit 3 Reactor Feed Pump Turbine Woodward Governor Linkage Pins

### b. Issues and Findings

There were no findings identified.

## 2. **RADIATION SAFETY** **Cornerstone: Occupational Radiation Safety**

## 2OS1 Access Control to Radiologically Significant Areas

### a. Inspection Scope

The inspector conducted the following activities and reviewed the following documents to determine the effectiveness of access controls to radiologically significant areas:

- Conducted an inventory of keys to access points to High and Very High Radiation Areas to determine if: 1) the keys were controlled in accordance with administrative controls, 2) the controls were adequate to prevent unauthorized access, and 3) the keys were present, or signed out, as appropriate.
- Reviewed and challenged 12 locked High Radiation Area access points and two access points to areas posted and controlled as Very High Radiation Areas to determine if access controls were sufficient to preclude unauthorized entry.
- Reviewed procedure changes for administrative procedures providing requirements for access to High and Very High Radiation Areas to ensure no degradation in access controls had occurred.
- Made independent radiation measurements of radiation levels within accessible radiologically controlled areas at the station to: 1) verify that areas expected to exhibit radiation levels in excess of 100 mR/hr were properly posted and controlled as High Radiation Areas, in accordance with applicable requirements and 2) to confirm that radiation dose rates were consistent with survey data.
- Evaluated the ambient radiological source term to ensure radiological dose assessments were properly performed including dose assessment for potential transuranic radionuclides.
- Evaluated administrative and physical controls against the following documents to ensure established controls were implemented as outlined.

- Procedure HP-C-202, "Locked High Radiation Area Controls, Rev. 7"
  - Health physics Job Standard HPJS-9.3, "Health Physics Controlled Keys," Rev. 1
  - Procedure HP-C-310, Radiation Work Permit Program, Rev.3
  - Procedure HP-C-106, Dosimetry Program, Rev.7
  - Procedure HP-C-610, Issuance and Control of Dosimetry, Rev.3
  - Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants," June 1993
- Reviewed the adequacy and effectiveness of radiological controls, including implementation of procedure requirements, for the following radiological work activities:
    - entry by personnel into the Unit 2, Traversing In-core Probe Room ( a locked Very High Radiation Area), on September 13, 2000, to repair a limit switch for an in-core probe
    - conduct of turbine component sand blasting activities in a sand blast structure on September 18-19, 2000
    - entry by personnel into the Unit 2 drywell with the reactor at power on May 11, 2000
    - removal of low power range monitors in Unit 2 reactor vessel
  - Directly observed the following work activities to verify implementation and adequacy of prescribed radiological controls:
    - reach and removal of the internals of the 86 B Unit 2 outboard main steam isolation valve on September 20, 2000
    - removal of fuel pins from irradiated fuel and conduct of Unit 2 spent fuel testing activities on September 20, 2000
    - installation of low power range monitors in Unit 2 reactor vessel
    - initial removal of Unit 2 control rod drives on September 22, 2000
  - Reviewed radiation worker and radiation protection personnel performance during activities to ascertain worker knowledge and implementation of prescribed radiological controls.

b. Issues and Findings

On September 16, 2000, PECO identified that two workers, conducting radiation shielding activities on the 157' elevation of the Unit 2 drywell at about 8:00 p.m., exceeded their electronic dosimetry administrative alarm set point (200 millirem) specified on their assigned radiation work permit (RWP No. 84, Drywell Shielding). PECO's subsequent review identified that one of the workers (Worker 1) sustained a total effective dose equivalent (TEDE) during the work of 357 millirem, which exceeded the RWP administrative dose limit (250 millirem). The RWP dose rate alarm limit was 984 millirem/hr. PECO tested the dosimeter by irradiating it to a known field and concluded the dosimeter was operating properly. PECO concluded that this matter was an occurrence of an unintended occupational exposure in excess of 100 millirem TEDE

and constituted a Performance Indicator Instance as described in NEI 99-02, Revision 0. Upon identification, PECO entered this finding into its corrective action system as PEP 10011721. The second worker (Worker 2), although exceeding his dosimeter alarm dose set point (200 millirem), sustained a dose of 246 millirem. Both workers exited the area and informed radiation protection personnel of the alarms. A third worker (Worker 3), also performing radiation shielding activities with Workers 1 and 2, experienced a high dose rate alarm. Worker 3's alarm cleared after exiting the area of higher dose rates.

PECO's review of electronic dosimetry information identified that these three individuals had worked in close proximity to a re-circulation riser pipe, located at 0 degrees azimuth on the 157' elevation of the drywell, that exhibited contact radiation exposure dose rates of up to 24 R/hr. The workers had worked in exposure dose rates ranging from approximately 4.7 R/hr to approximately 13.9 R/hr. The dose rates extended over an approximately 8 foot length of piping from the bio-shield wall outward. A flashing light (beacon) had been placed on the outer portion of the area near the primary containment inner wall. The area was not barricaded or posted as a High Radiation Area.

The three workers had been instructed, in pre-job radiation protection briefings, to avoid the area at 0 degrees azimuth that exhibited the elevated radiation dose rates identified by the flashing light. The workers had also, as part of the briefings, been instructed to go counterclockwise around the dry well to avoid entering the elevated dose rate areas at 0 degrees azimuth marked by the flashing beacon. The 0 degrees azimuth was marked on the primary containment inner wall. PECO's subsequent review determined that one of the workers (Worker 1), who sustained the unintended TEDE dose in excess of 100 millirem, had: 1) entered into the area at 0 degrees azimuth via a clockwise traverse around the dry well contrary to the pre-job briefings; 2) worked in close proximity to the area of highest dose rates (near the bio-shield) contrary to the pre-job briefing and had passed lead shielding directly through the area to another worker (Worker 2) on the other side of the area ; 3) crawled over the piping at 0 degrees azimuth with elevated dose rates, and worked in the area also contrary to the pre-job briefings; and 4) had passed through the area at 0 degrees azimuth to retrieve his working tools. The second worker (Worker 2) was determined by PECO to have worked in close proximity to 0 degrees, also contrary to pre-job briefings while receiving shielding from Worker 1. The third worker (Worker 3) was also determined to have worked in close proximity to the 0 degree azimuth, contrary to pre-job instructions. Workers 1 and 2 exited the area and reported to radiation protection personnel upon alarm of their electronic dosimeters as required by the radiation work permit. Worker 3 however, did not exit the area and report to radiation protection personnel as required by the RWP. Although the alarm cleared after the Worker 3 left the area, this worker incorrectly assumed the alarm was attributable to a presumed increase in the rate of accumulation of radiation dose, signified by an increase in dosimeter "chirping" rate, rather than a high dose rate alarm or an accumulated dose exceeded alarm.

PECO's investigation of this matter concluded that the apparent cause of this event was the failure of the workers to follow specific oral and written instructions by radiation protection personnel to avoid the area of 0 degrees azimuth and the elevated radiation dose rates located therein and exit the area and contact radiation protection when a dosimeter alarms.

This issue is more than minor in that, if left uncorrected, the same issue could become a more significant safety concern. Specifically, failure of these workers to follow pre-job radiation protection instructions could result in more severe adverse radiological consequences to the workers. In addition, the issue was determined to affect the Occupational Radiation Safety Cornerstone because the issue involved a failure of radiation barriers that could result in a significant or unplanned dose. In this case, neither the pre-job instructions to workers or the positive radiation protection coverage specified on the radiation work permit failed to prevent this event. Further, posting and barricading of this area, as discussed below, was not consistent with requirements. Consequently, this issue was screened via the Occupational Radiation Safety Significance Determination Process and determined to be of very low safety significance (Green) because: 1) there was no overexposure of workers; 2) there was no substantial potential for an such an exposure; and 3) PECO's ability to assess dose to the workers was not compromised. The position of the workers dosimetry provided for measurement of maximum expected dose.

The failure of the three workers to follow radiation protection instructions is a violation of radiation protection procedure HP-C-310, Radiation Work Permit Program, Rev 3, which requires (Section 5.6.4) that all plant personnel comply with written and oral instructions given by radiation protection. The requirement to establish and implement such radiation protection procedure is specified in Technical Specification 5.4.1. and described in Appendix A of Regulatory Guide 1.33, November 1972. Upon identification, PECO took immediate and interim corrective actions for this issue. Among other actions, PECO prevented personnel access to the area, initiated investigations, determined potential doses to the workers, and installed additional warning devices including implementing additional personnel monitoring requirements for entry to the area. This violation of TS 5.4.1 is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 05000277/2000-010-02)**

The inspector identified that Technical Specification (TS) 5.7.2.f requires that individual High Radiation Areas (with dose rates greater than 1.0 rem/hr at 30 centimeters), but less than 500 rads/hr at 1 meter, that are located within a larger area, that is controlled as a High Radiation Area and where no enclosure exists for purpose of locking and where no enclosure can reasonably be constructed around the individual area, need not be controlled by a locked door or gate. However, the TS requires that the area shall be barricaded and conspicuously posted as a High Radiation Area, and a conspicuous, clearly visible flashing light shall be activated at the area as a warning device.

As discussed above, a conspicuous flashing light was activated at the area. However, although the area exhibited radiation dose rates at 30 cm of 1.2 rem/hr to 3.5 rem/hr, no posting or barricading was provided for the area as required by the TS. In addition, in this particular case, PECO personnel encountered unexpected elevated radiation fields upon initial entry into the drywell which presented a challenge. The positioning of the installed flashing red light (near the outer wall of the drywell at 0 degrees azimuth, 157' elevation) was not effective in alerting personnel of the much high radiation dose rates near the inner wall of the drywell at that location.



This issue is more than minor in that, if left uncorrected, the same issue could become a more significant safety concern. Specifically, failure to properly post and barricade this area could result in more severe adverse radiological consequences to workers. The issue was determined to affect the Occupational Radiation Safety Cornerstone because the issue involved a failure of radiation barriers that could result in a significant or unplanned dose. In this case, neither the pre-job instructions to workers, positive radiation protection coverage specified on the radiation work permit, or the posting, barricading and lighting of the area were effective in preventing the event. Consequently, this issue was screened via the Occupational Radiation Safety Significance Determination Process and determined to be of very low safety significance (Green) because: 1) there was no overexposure of workers; 2) there was no substantial potential for an such an exposure; 3) PECO's ability to assess dose to the workers was not compromised; and 4) PECO prohibited access to the area and shielded, posted, and barricaded the area.

The failure to post and barricade the area at 0 degrees azimuth, an individual area exceeding 1 rem/hr at 30 cm, but less than 500 rads/hr at 1 meter, within a larger area controlled as a High Radiation Area, as required by TS 5.7.2.f is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 05000277/2000-010-03)** Upon identification to PECO, PECO entered this finding into its corrective action system as PEP I0011721.

## 2OS2 ALARA Planning and Controls

### a. Inspection Scope

The inspector selectively reviewed the adequacy and effectiveness of PECO's program to reduce occupational radiation exposure to as low as is reasonably achievable (ALARA). The inspector conducted the following activities and reviewed the following documents to determine the effectiveness of the PECO's ALARA planning and controls:

- The inspector reviewed the circumstances and PECO's mitigation efforts following identification of unexpected elevated ambient radiation levels encountered in the Unit 2 reactor drywell during initial entry on September 15, 2000.
- The inspector reviewed the implementation and adequacy of ALARA planning and controls for control rod drive work, scaffolding installation, drywell shielding activities, valve work, refueling, and fuel inspection scraping to verify that planned ALARA controls and measures were implemented.
- The inspector reviewed plant collective exposure history, reviewed current exposure trends, and reviewed ongoing and planned activities to assess current performance and exposure challenges.
- The inspector reviewed the station's two year and three year rolling average collective dose data and compared this to similar facilities to evaluate significance of collective exposure at the facility.

- The inspector reviewed the site specific historical trends and current status of tracked source terms to determine if the overall plant source term was increasing, stable or declining, and to identify PECO source term priorities and reduction strategies.
- The inspector reviewed ALARA goals, dose reduction initiatives and the current initiatives to reduce occupational exposure, including source term control strategy.
- The inspector reviewed the following meeting minutes to ascertain management involvement in the ALARA program:
  - ECO Nuclear Executive ALARA Council meeting minutes (00-01 and 00-02)
  - Station ALARA Council Meeting Minutes (99-04, 00-03)
- The inspector reviewed monitoring reports for declared pregnant workers.

b. Issues and Findings

There were no findings identified.

2OS3 Radiation Monitoring Instrumentation

a. Inspection Scope

The inspector selectively reviewed elements of the radiation monitoring instrumentation program to determine the accuracy and operability of radiation monitoring instruments that are used for the protection of occupational workers. The following activities and associated documentation was reviewed.

- The inspector selectively reviewed the calibration of radiation survey and monitoring instruments (one ion chamber (No. 3522), one high range GM detector (#6698020), one contamination monitor (No. 7319), and one portable area monitor used to provide surveys for and monitoring of personnel entering into the Unit 2 Traversing In-core Probe Room (a posted Very High Radiation Area) on September 13, 2000.
- The inspector selectively reviewed the calibration of radiation survey and monitoring instruments (one ion chamber (# 332755), one neutron survey meter(#2436), and two personnel electronic dosimeters) used to provide surveys for and monitoring of personnel entering into the Unit 2 Reactor Containment (a posted Very High Radiation Area), with the reactor at low power (<20%) on May 11, 2000.

The inspector reviewed the following documents to evaluate the adequacy of calibrations:

- Procedure No. IC-C-12-00108, Calibration of Eberline Model RO-2 and RO-2A Ion Chambers

- Procedure HP-C-402, Rev. 0, Calibration of the MGP Instrument Telepole
- Procedure IC-C-00104, Rev. 2, Calibration of the Eberline Model RM-14 Radiation Monitor
- Procedure HP-C-421, Rados 51 Electronic Dosimeter Calibration Verification and Recalibration, Rev.0
- Source Response Check Criteria Sheets (Procedure (HP-CG-401))
- ANSI N323A, 1997, "American National Standard Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments"

The inspector also reviewed the status and surveillance testing of self-contained breathing apparatus (SCBAs) positioned in the Control Room on September 22, 2000, to ascertain the availability and readiness of the equipment. The inspector reviewed Procedure RT-H-099-990-2, Scott Air-Pak and Bottle Inspection, Rev.3.

Also reviewed was the status of control room personnel SCBA training including training on changing of cylinders.

b. Issues and Findings

There were no findings identified.

**Cornerstone: Public Radiation Safety**

2PS1 Radiological Environmental Monitoring Program (REMP)

a. Inspection Scope

The inspector reviewed the following documents and conducted the following activities to evaluate the effectiveness of the PECO's REMP. The requirements of the REMP were specified in the Improved Technical Specifications/Offsite Dose Calculation Manual (ITS/ODCM):

- the 1999 Annual RAMP Report, including 40CFR190 requirements;
- the most recent ODCM (Revision 12, May 17, 2000) and technical justifications for ODCM changes, including sampling locations;
- the most recent calibration results of the meteorological monitoring instruments for wind direction, wind speed, and temperature;
- operability of the meteorological monitoring instruments;
- the most recent calibration results for all TS air samplers (minimum 5 samplers);
- PECO's QC evaluation of the interlaboratory comparison program and the corrective actions for any deficiencies;
- implementation of the environmental thermoluminescent dosimeters (TLDs) program;
- condition report and resolution;
- self-assessments;
- the 1999 QA audit for the REMP/ODCM implementations;
- the Land Use Census procedure and the 1999 results;

- walk-down for determining whether all air samplers, milk farms, composite water sampler, and 25%TLDs were located as described in the ODCM and for determining the equipment material condition; and
- associated REMP procedures, including vendor's analytical procedures.

b. Issues and Findings

There were no findings identified.

2PS2 Public Radiation Dose due to Independent Spent Fuel Storage Installation

a. Inspection Scope

PECO installed an independent spent fuel storage installation at the Peach Bottom Atomic Power Station in 1999. PECO complied with 10 CFR Part 72 requirements. To satisfy requirements listed in 10 CFR 72.104, 10 CFR 70.126, and 40 CFR 190, PECO updated their ODCM, Revision 12, May 17, 2000.

The inspector reviewed the following documents and PECO activities to ensure that PECO's surveys and controls were adequate to prevent inadvertent exposure to the members of the public. The inspector also toured the independent spent fuel storage installation.

- implementation of Section 3.8.D of the ODCM Specifications;
- implementation of Section V of the ODCM;
- updating the ODCM;
- associated procedures; and
- surveillance data.

b. Issues and Findings

There were no findings identified.

## 2PS3 Radioactive Material Control Program

### a. Inspection Scope

The inspector reviewed the following documents and PECO activities to ensure that PECO's surveys and controls were adequate to prevent the inadvertent release of licensed material to the public domain:

- the methods used for control, survey, and release from the Radiologically Controlled Area;
- the most recent calibration results for the radiation monitoring instrumentation (small articles monitor), including the (a) alarm setting, (b) response to the alarm, and (c) the sensitivity;
- PECO's criteria for the survey and release of potentially contaminated material using a gamma spectroscopy; and
- associated procedures and records to verify for the lower limits of detection.

The review was against criteria contained in 10CFR20, NRC Circular 81-07, NRC Information Notice 85-92, NUREG/CR-5569, Health Position Data Base (Positions 221 and 250), and the PECO's procedures.

### b. Issues and Findings

There were no findings identified.

## 4. **OTHER ACTIVITIES**

### 4OA1 Performance Indicator Verification

#### a. Inspection Scope

The inspectors reviewed the accuracy and completeness of the supporting data for the following Peach Bottom Performance Indicators:

- Emergency AC Power Availability
- Occupational Exposure Control Effectiveness
- Public Exposure (RETS/ODCM Radiological Effluent Occurrence)

The inspector reviewed the process for collecting data and reporting Performance Indicators to ensure that PECO had a clear understanding of the indicator definitions, data reporting elements, calculation methods, and definitions of terms, as specified in NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 0. The inspectors reviewed operating logs, surveillance test logs, and action requests, as applicable. The inspectors also reviewed corrective action program records for occurrences involving high radiation areas, very high radiation areas, and unplanned personnel exposures for the past four quarters against the applicable criteria specified in NEI 99-02. The following documents were reviewed to ensure that PECO met all

requirements of the public exposure Performance Indicator from the third quarter 1999 to the second quarter 2000 (four quarters):

- monthly projected dose assessment results due to radioactive liquid and gaseous effluent releases;
- quarterly projected dose assessment results due to radioactive liquid and gaseous effluent releases; and
- associated procedures.

b. Issues and Findings

There were no findings identified.

4OA5 Other

.1 (Closed) LER 2-00-001: "B" Drywell Wide Range Pressure Instrument Inoperable for Greater than Technical Specification Allowable Outage Time - Unit 2

On July 26, 2000, during surveillance testing, maintenance personnel discovered the Unit 2B Drywell (D/W) Wide Range Pressure recorder pen servo had been incorrectly reconnected during a maintenance activity performed in September 1999. The post maintenance testing method failed to adequately identify this condition, which allowed the recorder to remain inoperable for an extended period of time. The 2A Drywell Wide Range Pressure recorder was not affected.

The 2B Drywell Wide Range Pressure Instrument was inoperable for greater than 30 days, which is a violation of Technical Specification 3.3.3.1. This Severity IV violation is being treated as a Non-Cited Violation, consistent with Section VI.A of the NRC Enforcement Policy. This violation is in the Peach Bottom corrective action program as PEP I0011516. This issue was reviewed using the guidance in NRC Manual Chapter 0609, Significance Determination Process, and determined to have no color. **(NCV 05000277/2000-010-04)**

.2 (Closed) LER 3-00-001: Engineered Safety Feature actuations: Reactor Protection System actuation and Primary Containment Isolation System actuation.

This event was discussed in NRC Inspection Report 05000277;05000278/ 2000-008, Section 4OA3. No new issues were revealed during the on-site review of this LER.

4OA6 Management Meetings

.1 Exit Meeting Summary

The inspectors presented the results of the inspection to Mr. Jay Doering and members of PECO management on October 6, 2000. PECO management acknowledged the findings presented.

**LIST OF ACRONYMS USED**

ASME	American Society of Mechanical Engineers
ALARA	As Low As is Reasonably Achievable
CFR	Code of Federal Regulations
EDG	emergency diesel generator
ESF	engineered safety feature
ESW	emergency service water
HPCI	high pressure coolant injection
HP	Health Physics
HRA	High Radiation Area
ISI	Inservice Inspection
ITS	Improved Technical Specifications
LER	licensee event report
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PCIS	Primary Containment Isolation System
PECO	PECO Nuclear
PEP	Performance Enhancement Program
QA	Quality Assurance
QC	Quality Control
RCA	Radiologically Controlled Area
REMP	Radiological Environmental Monitoring Program
RP&C	Radiological Protection and Chemistry
RWP	Radiation Work Permit
TLDs	thermoluminescent dosimeters
TS	Technical Specifications

**ITEMS OPENED, CLOSED, AND DISCUSSED**Opened

05000277/2000-010-01      URI      Emergency Service Water System Check Valve Failure

Opened/Closed

05000277/2000-010-02      NCV      Failure to comply with written and oral instructions given by radiation protection personnel

05000277/2000-010-03      NCV      Failure to post and barricade an area within a larger area controlled as a High Radiation Area

05000277/2000-010-04      NCV      "B" Drywell Wide Range Pressure Instrument Inoperable for Greater than Technical Specification Allowable Outage Time - Unit 2

2-00-001                      LER      "B" Drywell Wide Range Pressure Instrument Inoperable for Greater than Technical Specification Allowable Outage Time - Unit 2

3-00-001                      LER      Engineered Safety Feature (ESF) actuations: Reactor Protection System (RPS) actuation and Primary Containment Isolation System (PCIS) actuation - Unit 3

Discussed

None

**PARTIAL LIST OF PERSONS CONTACTED**PECO Energy Company

J. Doering, Site Vice President  
 G. Johnston, Plant Manager  
 P. Davison, Engineering Director  
 J. Anthony, Maintenance Director  
 J. Bouck, Senior Manager, Operations  
 C. Mudrick, Senior Manager, Plant Engineering  
 A. Winter, Manager, Experience Assessment  
 C. Baker, Manager, Chemistry and Radwaste  
 H. Trimble, Radiation Protection Manager  
 J. Smith, Manager, Instrumentation and Controls



## ATTACHMENT 1

# NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

### Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

### Radiation Safety

- Occupational
- Public

### Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.