

PHILADELPHIA ELECTRIC COMPANY

NUCLEAR GROUP HEADQUARTERS

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March 20, 1992

D. M. SMITH  
SENIOR VICE PRESIDENT - NUCLEAR

Docket Nos. 50-277  
50-278  
License Nos. DPR-44  
DPR-56

Director, Office of Enforcement  
U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

SUBJECT: Peach Bottom Atomic Power Station - Units 2 and 3  
Reply to a Notice of Violation and Proposed  
Imposition of Civil Penalties  
NRC Inspection Report Nos. 50-277/91-33; 50-278/91-33

Attached is Philadelphia Electric Company's (PECo) response to the subject Notice of Violation (NOV). The NOV was identified in the resident's routine inspection 91-33/33 and consisted of two parts. Part A of the violation concerned a Technical Specification Violation due to Automatic Depressurization System (ADS) valves being inoperable on Unit 3 and Part B concerned inadequate corrective action to ensure that a similar condition did not exist on Unit 2.

We feel that our comprehensive corrective actions identified in the attached response will preclude repetition of this violation. Please find enclosed an affidavit and a check in payment of the civil penalty.

If you have any questions or desire further information, please do not hesitate to contact us.

Sincerely,



cc: T. T. Martin, Administrator, Region I, USNRC  
J. J. Lyash, USNRC Senior Resident Inspector

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COMMONWEALTH OF PENNSYLVANIA :

: SS.

COUNTY OF CHESTER :

D. M. Smith, being first duly sworn, deposes and says:

That he is Senior Vice President-Nuclear, Philadelphia Electric Company; that he has read the response to the Peach Bottom Atomic Power Station, Units 2 and 3 Notice of Violation and Proposed Imposition of Civil Penalties, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.



Senior Vice President

Subscribed and sworn to  
before me this *20<sup>th</sup>* day  
of *March* 1992.



Notary Public

Notarial Seal  
Dolores A. Cinnan, Notary Public  
Tredyffrin Twp., Chester County  
My Commission Expires July 24, 1995

## Response to Notice Of Violation 91-33-01

### PART A

#### Restatement of the Violation

Unit 3 Technical Specification Limiting Condition for Operation (LCO) 3.5.E.1 requires that the Automatic Depressurization Subsystem be operable whenever there is irradiated fuel in the reactor vessel and the reactor pressure is greater than 105 psig and prior to a startup from a Cold Condition, except as specified in 3.5.E.2 below.

Unit 3 Technical Specification LCO 3.5.E.2 requires that from and after the date that one valve in the Automatic Depressurization Subsystem is made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding seven days, unless such valve is sooner made operable, provided that during such seven days the HPCI subsystem is operable.

Unit 3 Technical Specification LCO 3.5.E.3 requires that if the requirements of 3.5.E cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to at least 105 psig within 24 hours.

Contrary to the above, between December 7, 1989 (shortly after plant startup from a refueling outage) and September 14, 1991 (when the plant was shutdown for another refueling outage), during which time the reactor was operating and reactor pressure was greater than 105 psig, the Automatic Depressurization Subsystem (ADS) was inoperable. During that time, the HPCI subsystem was also inoperable for a total of 510 hours, and the reactor was not shutdown and reactor pressure was not reduced to at least 105 psig. The ADS was inoperable due to incorrectly installed thermal insulation around the ADS safety relief valves, resulting in significant degradation of the associated solenoid operated valves, cables, and splices, and in the ability of the ADS valves to perform their intended safety function.

#### Admission or Denial of Alleged Violation

PECO acknowledges the violation with the clarification that two of the five ADS valves were determined by an engineering evaluation to be operable for design basis events. The other three valves were outside of the environmental qualification (EQ) envelope and therefore may not have functioned properly during certain design basis events involving a harsh environment in the drywell.

### Background of the Violation

During the pipe replacement outage in November 1987, the mirror insulation was removed from all 11 Unit 3 Main Steam Relief Valve (MSRV's) by the Peach Bottom Maintenance Fitter Group. The MSRV's were then removed and sent offsite for rebuild and testing. After the MSRV's were serviced they were returned and reinstalled on September 5 and 6, 1989, by the Maintenance Fitter Group. Extensive damage to the MSRV mirror insulation was identified by the fitters and they did not feel qualified to perform the necessary repairs. The re-insulation of the MSRV's was then assigned to the contractor hired to reinstall drywell insulation. Extensive repairs and alterations to the mirror insulation were performed by the contractor. Following reinstallation of the insulation, several walkdowns of the mirror insulation in the drywell were conducted, but did not result in identification of the MSRV insulation deficiencies of the type identified during the eighth refueling outage.

The Operations Verification Form (OVF) for Maintenance Request Form (MRF) 8809258 for the pipe replacement modification stated that "all drywell insulation to be inspected on MRF 8809474". However, no work was performed on MRF 8809474 and the OVF was signed off stating that fact. Three other MRPs were referenced for drywell insulation work, but none of their associated OVF's indicated that the inspection of the mirror insulation was conducted.

Special Procedure 1142J was written and approved by the Plant Operations Review Committee (PORC) to ensure that all insulation inside the drywell that was, or may have been, disturbed during the Unit 3 outage was properly repaired or replaced. This procedure was very detailed and referenced the proper prints including the MSRV insulation detail. The special procedure was completed and closed out on November 16, 1989, but did not note any MSRV insulation discrepancies.

A general drywell inspection was conducted on December 1, 1989, but the MSRV insulation discrepancy was not detected. The Unit 3 generator was then synchronized to the grid on December 11, 1989, with the insulation installed in a manner with the body of the MSRV on the air operator end of the valve uninsulated. This resulted in temperatures in excess of 400 degrees F around the solenoid valve and associated cabling.

On October 27, 1990, Unit 3 was shutdown for a midcycle outage. During this time, the main valve seat of the "E" MSRV was suspected to be leaking and was replaced by the Maintenance Fitter Group. A maintenance fitter craftsman questioned the orientation of the mirror insulation on the

MSRV. To reinstall the insulation as he remembered, the insulation would require alteration. The maintenance fitter craftsman also identified that all 11 MSRVS were installed in a similar manner. This concern was expressed to the maintenance unit coordinator. The maintenance unit coordinator knew that the MSRVS insulation was extensively repaired during the pipe replacement outage and, based on the information presented to him, considered the MSRVS to be adequately insulated. No follow-up investigation or evaluation was initiated, and Unit 3 was returned to service on November 21, 1990.

On September 14, 1991, Unit 3 was shutdown for the eighth refueling outage. During the performance of preventive maintenance tasks on September 24, 1991, it was discovered that the associated wiring on three of the MSRVS solenoid valves showed signs of heat damage. This observation could not have been made during any of the previous walkdowns or inspections because the damaged wiring was concealed in conduit. After further examination, it was determined that heat damage on the MSRVS was the result of the improperly installed mirror insulation.

#### Reason for the Violation

A causal factor analysis has been performed concerning this event. The most significant contributing factor of this event was that no one perceived any technical risk with insulation. It was determined that the personnel involved in this event were primarily concerned about insulating piping and components. They believed that the function of insulation was limited to thermal efficiency or personnel protection. It was only after the event that the significance of insulating to protect critical equipment from exposure to high temperature heat sources and thermal degradation was fully realized. Additionally, due to this perception, information was never requested or provided on areas where insulation could be critical to surrounding equipment or components.

Inadequate training and guidance and inattention to detail were other factors in this violation. Maintenance Request Form 8809258 did not contain sufficient MSRVS insulation inspection details. The inspection of drywell insulation after the pipe replacement failed to identify the discrepancies with the installed MSRVS insulation. The performer of Special Procedure SP 1142J had seen the damaged MSRVS insulation prior to its repair and, when performing the final inspection, was so impressed by the improved visual and physical condition of the MSRVS insulation that he did not identify the installation discrepancies.



There was also an occurrence where the lack of a questioning attitude by the technical staff failed to identify the improperly installed insulation. This opportunity occurred October 27, 1990, when a maintenance fitter craftsman questioned the orientation of the MSR/V insulation. This information was given to the maintenance unit coordinator who decided, based on his knowledge of the reinstallation, that the MSR/V's were properly installed. No action was taken to investigate the potential problem.

#### Assessment of Safety Significance

PECo would like to comment on a statement made in the February 21, 1992, letter transmitting the Notice of Violation and Proposed Imposition of Civil Penalties. The statement in the last paragraph of page 2 of the letter reads, "As a result, the ability of the plant to automatically cope with a small to intermediate break LOCA was lost." PECO disagrees with this conclusion.

As presented at the Enforcement Conference on January 17, 1992, the intermediate break Loss of Coolant Accident (LOCA) was determined to be the limiting event for the circumstances associated with this violation. Our analysis of this limiting event concluded that safe shutdown was achievable. This analysis assumed: 1) an intermediate break LOCA, 2) High Pressure Coolant Injection (HPCI) unavailable, 3) loss of offsite power, and 4) only two ADS valves available. The assumption that only two ADS valves were available is considered to be conservative. This assumption takes no credit for the one ADS valve whose solenoid valve was unavailable for testing because it had been discarded. Further, this assumption takes no credit for the two ADS valves whose solenoid valves passed the as-found "click" test, passed the as-found functional test and passed the vibration test, but required multiple attempts to pass either the LOCA or the non-LOCA test.

Additional information which supports the conclusion that safe shutdown was achievable is found in General Electric (GE) Report NEDC 30936P-A, "BWR Owners Group Technical Specification Improvement Methodology (With Demonstration for BWR ECCS Actuation Instrumentation) Part 1" dated December, 1988. This report has been previously docketed with the NRC. Table 3-7 of this report states that two ADS valves are sufficient to depressurize the reactor for all small and intermediate break LOCAs. The sensitivity study associated with this table ensures that that peak clad temperature does not exceed 2200 degrees F. PECO has confirmed the applicability of this GE Report to PBAPS.

### Corrective Actions Taken and Results Achieved

The Unit 3 MSRVS were removed and replaced during the eighth refueling outage. The Unit 3 Technical Specification Limiting Conditions for Operation (LCO) for ADS were exited when the plant was placed in shutdown with reactor pressure less than 105 psig. Replacement of these valves returned operability to ADS which would be required for plant start-up.

Administrative Procedure A-26, "Plant Work Process," was revised to prevent insulation tasks on certain safety-related components from being performed on blanket work orders. A-26 now requires that insulation tasks on components such as MSRVS, Main Steam Isolation Valves (MSIV's), HPCI and Reactor Core Isolation Cooling (RCIC) Turbine must receive Control Room approval for the release and return of equipment to service.

Insulation inspections were performed by the system engineers on high temperature safety-related systems. These inspections did not identify any problems that adversely affected system operability.

This event was reviewed with the plant staff during a January 21, 1992, supervisory meeting. Emphasis was placed on the importance of insulation from an operability standpoint and the various functions that insulation provides to a component, system, and its surroundings. Attention to detail and the pitfalls of poor detection practices when conducting acceptance of close-out inspections were also stressed. A letter from the plant manager concerning the purpose of insulation and the controls to maintain its integrity was distributed to the plant staff on January 24, 1992.

### Corrective Steps that will be Taken to Avoid Further Violations

As a follow-up to discussions with maintenance planners and foremen, the Maintenance Planner Training Course will be revised to include guidance on insulation. Additionally, the course will be enhanced to emphasize the importance of providing appropriate references and specifications to ensure complete work packages. This will be completed by March 31, 1992.

This event will be formally discussed with maintenance planners and foremen. The importance of providing necessary information and references to ensure work is completed properly will be stressed. This will be completed by March 31, 1992. This event will also be included in the next Technical Staff and Manager Continuing Training Course to be completed by April 15, 1992.

Critical areas with insulation design requirements will be identified and inspected. Insulation design requirements for components, systems and environmental effects will be reviewed to ensure proper application. Subtle design concerns involving insulation that could potentially cause operability concerns on safety equipment will also be evaluated.

Information concerning design requirements will also be captured in the Plant Information Management System for use by maintenance planners. This will ensure that insulation tasks are not lost and will enhance the capability to provide complete work package information.

This event will also be reviewed and discussed with personnel who supervise contractors. The importance of fully evaluating work scope and providing adequate information to perform that work will be stressed. Additionally, the role of supervisors to ensure that work is performed correctly will be emphasized. This will be accomplished by March 31, 1992.

Date When Full Compliance Was Achieved

Compliance with Technical Specifications was achieved on September 15, 1991, with the shutdown of Unit 3 and reactor pressure less than 105 psig. Insulation repairs were completed during the refueling outage and Unit 3 was returned to service on January 8, 1992.



## Response to Notice of Violation 91-33-01

### PART B

#### Restatement of the Violation

10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action, requires, in part, that measures shall be established to assure that conditions adverse to quality and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the cause of the condition shall be determined and documented, and corrective action shall be documented and taken to preclude repetition.

Contrary to the above, although a significant condition adverse to quality was identified in September 1991 involving the degradation of all five of the Unit 3 ADS valves because of improper insulation, adequate corrective actions were not taken to assure that a similar significant condition adverse to quality did not also exist on Unit 2 and to correct such condition if it existed. Specifically, although the licensee performed a visual inspection of the Unit 2 SRV's on October 17, 1991 to verify correct insulation, this inspection was inadequate in that it did not identify that insulation for the "C" SRV (an ADS valve) was improperly installed. As a result, the unit was returned to power operations without correcting this condition adverse to quality.

#### Admission or Denial of Alleged Violation

PECo acknowledges the violation.

#### Background of the Violation

On October 18, 1991, a maintenance engineer aware of the Unit 3 MSR/V insulation problem inspected the Unit 2 MSR/V's to collect nameplate data for the solenoid valves. While collecting data on the Unit 2 MSR/V's, the engineer also observed the installed insulation. After the inspection, he reported the results to his supervisor. A pre-planned inspection for the Unit 2 MSR/V insulation was then cancelled based on the results of the inspection of solenoid valves and insulation. The inspection failed to identify the '2C' MSR/V insulation discrepancy.

On October 19, 1991, an outage planning supervisor performed a work status walkdown in the area of the MSR/V's. He noticed the '2C' MSR/V insulation discrepancy, but considered it to be adequately insulated. He mistakenly believed that convective heat transfer caused the damage to the Unit 3 MSR/V's when in fact it was radiant heat transfer. Because of the nature of

the insulation discrepancy on the '2C' MSRV, he felt that the '2C' MSRV would not be subject to convective heat transfer and, therefore, was not affected by the insulation discrepancy. On February 3, 1992, an engineering evaluation confirmed that the '2C' MSRV was operable in this condition.

#### Reason for the Violation

A causal factor analysis has been performed concerning this event. The cause of the failure to identify the '2C' MSRV insulation discrepancy was due to a cancellation of a pre-planned inspection on Unit 2 insulation for potential similar deficiencies as Unit 3. The basis for cancellation was due to a walkdown concerning solenoid valves on October 18, 1991 by a maintenance engineer. His walkdown included the solenoids on the 11 Unit 2 MSRV's. Because he was familiar with the Unit 3 MSRV insulation discrepancy issue, he also observed the insulation condition during the walkdown. The maintenance engineer did not have the MSRV insulation detail print in-hand, but he understood the standard for insulating the MSRV. Because the walkdown was not specifically for insulation, his attention to detail concerning insulation was diminished after finding the first five of 11 MSRV's without discrepancies. Contributing to this was a mindset that the discrepancy on the Unit 3 MSRV's was generic in nature in that insulation for all 11 MSRV's had been improperly installed. The '2C' MSRV insulation discrepancy was unique for Unit 2. The other ten MSRV's on Unit 2 were adequately insulated. After the maintenance engineer reported his inspection results to his supervisor, the supervisor was satisfied that the maintenance engineer understood the standard for MSRV insulation and had performed an adequate inspection. The supervisor then cancelled the pre-planned inspection.

The cause of the failure to identify the impact of the '2C' MSRV insulation discrepancy during the outage planning supervisor walkdown on October 19, 1991, was due to his limited knowledge of the concern surrounding the Unit 3 MSRV insulation installation. Had he known the effect of the insulation discrepancy concerning radiant vice convective heat transfer, he would have properly pursued remedial corrective actions.

#### Corrective Steps Taken and Results Achieved

This event has been reviewed with plant staff personnel at a plant supervisory meeting on January 21, 1992. Attention to detail, importance of pre-job planning, and responsibilities to thoroughly investigate and follow-up on abnormal conditions were specifically addressed. This discussion also

included the need to consider detail, significance, and complexity of each individual task before combining them. This event has also been extensively discussed with personnel involved with this event as well as other appropriate plant groups.

#### Corrective Steps that will be Taken to Avoid Further Violations

Discussions held at the January 21, 1992, plant supervisors' meeting, with individuals involved and appropriate plant groups have been completed. Appropriate plant staff are now aware of the importance of insulation as well as the importance of pre-planning and attention to detail.

PECo is also dedicated to the longer term enhancement of our process for review and disposition of conditions adverse to quality. Since mid-1991 we have assigned a Senior Engineer to our in-house events program as well as providing him with a competent staff. Efforts have also been taken to strengthen applicable procedures and training, strengthen the analysis of outstanding corrective action items, track outstanding event reports and evaluate interim corrective actions for effectiveness. It is felt that those actions are significantly enhancing our abilities to promptly identify and correct conditions adverse to quality. Plant staff has accepted this concept and is providing good overall support for the program. Even though the number of identified events remained high, the number of reportable events and attention to detail events have shown a marked decrease since October, 1991.

#### Date When Full Compliance Was Achieved

Full compliance was achieved on December 15, 1991, with the repair of the '2C' MSR/V insulation discrepancies. On February 3, 1992, an engineering evaluation concluded that insulation discrepancies in the '2C' MSR/V at no time resulted in valve inoperability.