



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO GENERIC LETTER 83-28, ITEMS 3.1.1, 3.1.2, 3.2.1, 3.2.2 AND 4.5.1  
PHILADELPHIA ELECTRIC COMPANY  
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3  
DOCKET NOS. 50-277 AND 50-278

1.0 Introduction

On February 25, 1983, both of the scram circuit breakers at Unit 1 of the Salem Nuclear Power Plant failed to open upon an automatic reactor trip signal from the reactor protection system. This incident occurred during the plant startup, and the reactor was tripped manually by the operator about 30 seconds after the initiation of the automatic trip signal. The failure of the circuit breakers has been determined to be related to the sticking of the undervoltage trip attachment. Prior to this incident, on February 22, 1983, at Unit 1 of the Salem Nuclear Power Plant, an automatic trip signal was generated based on steam generator low-low level during plant startup. In this case, the reactor was tripped manually by the operator almost coincidentally with the automatic trip.

Following these incidents, on February 28, 1983, the NRC Executive Director for Operations (EDO), directed the staff to investigate and report on the generic implications of these occurrences at Unit 1 of the Salem Nuclear Power Plant. The results of the staff's inquiry into the generic implications of the Salem unit incidents are reported in NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant." As a result of this investigation, the Director, Division of Licensing, Office of Nuclear Reactor Regulation requested (by Generic Letter 83-28 dated July 8, 1983) all licensees of operating reactors, applicants for an operating license, and holders of construction permits to respond to certain generic concerns. These concerns are categorized into four areas: (1) Post-Trip Review, (2) Equipment Classification and Vendor Interface, (3) Post-Maintenance Testing, and (4) Reactor Trip System (RTS) Reliability Improvements. Within each of these areas, various specific actions were delineated.

This safety evaluation (SE) addresses the following actions of Generic Letter 83-28:

- 3.1.1 and 3.1.2, Post Maintenance Testing (Reactor Trip System Components)

- 3.2.1 and 3.2.2, Post Maintenance Testing (All Other Safety-Related Components)
- 4.5.1, Reactor Trip System Reliability (System Functional Testing)

By letters dated November 4, 1983, April 23, 1984, June 29, 1984, August 31, 1984 and February 1, 1985, Philadelphia Electric Company (PECo - Licensee) described their planned and completed actions regarding the above items for Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3. Certain of these actions were reviewed during a Region I inspection conducted on September 13-19, 1984, as described in the Inspection Reports 50-277/84-32 and 50-278/84-26.

## 2.0 Evaluation

### 2.1 General

Generic Letter 83-28 included various NRC staff positions regarding the specific actions to be taken by operating reactor licensees. The Generic Letter 83-28 positions and discussions of licensee compliance regarding Actions 3.1.1, 3.1.2, 3.2.1, 3.2.2 and 4.5.1 for PBAPS Units 2 and 3 are presented in the sections that follow.

### 2.2 Actions 3.1.1 and 3.1.2, Post-Maintenance Testing (Reactor Trip System Components)

#### Position

Licensees and applicants shall submit the results of their review of test and maintenance procedures and Technical Specifications to assure that post-maintenance operability testing of safety-related components in the reactor trip system (RTS) is required to be conducted and that the testing demonstrates that the equipment is capable of performing its safety functions before being returned to service.

Licensees and applicants shall submit the results of their check of vendor and engineering recommendations (regarding safety-related components in the RTS) to ensure that any appropriate test guidance is included in the test and maintenance procedures or the Technical Specifications, where required.

Discussion

Under the definition of "Surveillance Frequency", the Technical Specifications for PBAPS Units 2 and 3 require surveillance testing prior to returning systems or parts of systems to an operable status from a tripped or inoperable status. In a letter dated November 4, 1983, and subsequent additional correspondence dated February 20, 1986 and March 14, 1986, the licensee stated that the post-maintenance operability testing for the reactor trip breaker components is conducted in accordance with the plant administrative procedures A-26, "Procedure for Corrective Maintenance" and A-26A, "Procedure for Corrective and Preventive Maintenance Using Computerized History and Maintenance Planning System (CHAMPS)". All equipment maintenance activities are initiated through the plant maintenance request form (MRF). The MRF is completed prior to performance of work by the appropriate engineering staff supervisor. Cognizant sections of the MRF delineate post-maintenance operability requirements, post-maintenance testing, operation verification method, responsibilities of the individuals performing the tests, and acceptance criteria to insure that the equipment will perform its intended safety function prior to its returning to service. Any deviation from the original work scope is evaluated by the cognizant engineering staff and shift supervisor and documented, including changes to post-maintenance testing requirements.

In a letter dated April 23, 1984, the licensee stated that at PBAPS, surveillance and routine tests are performed to verify acceptable system performance based on its original design. Satisfactory completion of these tests determines the adequacy of the test procedures. Any procedural discrepancy or inadequacy is reviewed by the cognizant engineering and operation staff, revised as required, and approved by the plant operation review committee. The licensee also committed to review and update all plant maintenance procedures. In order to accomplish this task, vendor supplied information is being reviewed and incorporated in the plant procedures, as applicable.

The licensee is a co-sponsor of the BWR Owners' Group Subcommittee's activities to address the updating of the Reactor Protection System Maintenance Manual; and an active participant to the INPO Nuclear Utility Task Action Committee (NUTAC) Vendor Equipment Technical Information Program (VETIP). In a letter dated March 14, 1986, the licensee stated that two concurrent programs, namely; one-time vendor manual update, and maintenance procedure update, have been activated to insure that these procedures contain the latest vendor information. The licensee plans to complete the one-time vendor manual update program by July 1986 with the exception of the diesel generators' manuals. The cognizant vendors have been contacted and, as a result, 88% of the

vendor manuals have been updated and issued. The majority of the remaining manuals are in the NSSS vendor scope of supply, and their update is on-going. Update of the diesel generators' manuals will take at least another eighteen months due to extensive revisions. The licensee, with the help of an outside consultant, is in the process of establishing a program to maintain the vendor information current, accurate and up-to-date.

With regard to the 168 routinely-used station maintenance procedures, the licensee has updated 117 of these procedures and is scheduled to update the remaining 51 procedures within six months. Initially the station had 336 maintenance procedures, but during the review and update of these procedures the licensee determined that 168 procedures are not required for routine maintenance activities at PBAPS.

Based on the above, the staff has determined that the licensee has complied with NRC staff position for Action 3.1.1 of Generic Letter 83-28. Action Item 3.1.2 of Generic Letter 83-28 is subject to further evaluation when the licensee's action is complete. The staff will continue its review upon receipt of the licensee's completed report.

### 2.3 Actions 3.2.1 and 3.2.2, Post-Maintenance Testing (All Other Safety Related Components)

#### Position

Licensees and applicants shall submit a report documenting the extending of test and maintenance procedures and Technical Specifications review to assure that post-maintenance operability testing of all safety-related equipment is required to be conducted and that the testing demonstrates that the equipment is capable of performing its safety functions before being returned to service.

Licensees and applicants shall submit the results of their check of vendor and engineering recommendations (all other safety-related components) to assure that any appropriate test guidance is included in the test and maintenance procedures or the Technical Specifications, where required.

#### Discussion

Paragraph 2.2 describes the licensee's actions relating to post-maintenance testing of the reactor trip system components, and includes post-maintenance testing of all other plant safety-related systems and components. In the letters dated April 23, 1984, August 31, 1984, February 1, 1985 and March 14, 1986, the licensee stated that PECO is in the process of updating all safety-related

procedures based on the latest vendor information. Concurrently, a consultant has been assigned to review the vendor recommendations in order to facilitate changes to the plant maintenance procedures, as applicable. Through participation in the INPO NUTAC VETIP program, the licensee is committed to update and maintain vendor manuals and plant maintenance procedures current and accurate for all PBAPS safety-related components and equipment.

Based on the above, the staff found that the licensee has complied with the NRC staff position for Action 3.2.1 of Generic Letter 83-28. Action Item 3.2.2 of Generic Letter 83-28 is subject to further evaluation when the licensee's action is complete. The staff will continue its review upon receipt of the licensee's completed report.

#### 2.4 Action 4.5.1. Reactor Trip System Reliability (System Functional Testing)

##### Position

On-line functional testing of the reactor trip system, including independent testing of the diverse trip features, shall be performed on all plants. The diverse trip features to be tested include the breaker undervoltage and shunt trip features on Westinghouse, B&W and CE plants; the circuitry used for power interruption with the silicon controlled rectifiers on B&W plants; and the scram pilot valve and backup scram valves (including all initiating circuitry) on GE plants.

##### Discussion

In the letter dated November 4, 1983, the licensee stated that PBAPS performs on-line functional testing of the reactor protection system instrument and control circuitry at the frequencies indicated in the plant Technical Specifications. The reactor protection system (RPS) is arranged in a one-out-of-two taken twice logic. With a dual trip system arrangement it can be tested during reactor operation without causing a scram. This is accomplished either by a manual or automatic trip test. An additional test includes the calibration of the neutron monitoring system by means of simulated inputs from calibration signal units. Also, by applying a test signal to each RPS channel, the electrical independence of the channel circuitry is verified.

The licensee stated that the reactor trip system scram pilot valves are tested during each refueling outage, operational hydro or startup with the system pressure greater than 800 psig. This test is required for all fully withdrawn operable control rods prior to synchronizing the turbine generator. After exceeding 30% power and prior to exceeding 40% power, the remaining operable control rods are tested. This surveillance requirement is performed by manually scrambling the individual rod by operating its toggle test switch in the

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control room. Deenergization of the scram pilot valve solenoid provides the basis for rod scram insertion time calculations. Failure of a scram pilot valve constitutes an unacceptable scram insertion time for the particular control rod and is remedied prior to full power operation.

The licensee also stated that the reactor trip system backup scram valves are tested during each refueling outage. The licensee has explained, and the staff agrees, that the PBAPS reactor trip system currently is not designed to permit periodic on-line functional testing of the backup scram valves. Justification for not making modifications to permit on-line testing has been reviewed separately by the staff under Action 4.5.2 of Generic Letter 83-28. As stated in an NRC letter to the licensee dated March 14, 1985, the staff found that such modifications are not required.

Based on the above, the staff found that the licensee has complied with the NRC staff position for Action 4.5.1 of Generic Letter 83-28.

### 3.0 Conclusion

Based upon the foregoing discussions, the staff concludes that the licensee has complied with Actions 3.1.1, 3.2.1, and 4.5.1 of Generic Letter 83-28. The Action Items 3.1.2 and 3.2.2 of Generic Letter 83-28 will be verified and evaluated when the licensee action is complete.

Dated:

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