

January 27, 1997

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

SUBJECT: COMBINED INSPECTION REPORT NOS. 50-277/96-08; 50-278/96-08

Dear Mr. Smith:

This refers to your January 17, 1997 correspondence, in response to our December 18, 1996 letter.

Thank you for informing us of the corrective and preventive actions documented in your letter. These actions will be examined during a future inspection of your licensed program.

Your cooperation with us is appreciated.

Sincerely,

ORIGINAL SIGNED BY:

Walter J. Pasciak, Chief
Projects Branch 4
Division of Reactor Projects

Docket Nos. 50-277; 50-278

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cc:

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B.W. Gorman, Manager-External Affairs, Public Service Electric & Gas Co.
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Mr. D. Smith

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PECO NUCLEAR

A Unit of PECO Energy

Thomas N. Mitchell
Vice President
Peach Bottom Atomic Power Station

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January 17, 1997

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

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, DC 20555

Subject: Peach Bottom Atomic Power Station Units 2 & 3
Response to Notice of Violation (Combined Inspection Report No.
50-277/96-08 & 50-278/96-08)

Gentlemen:

In response to your letter dated December 16, 1996, which transmitted the Notice of Violations concerning the referenced inspection report, we submit the attached response. The subject report concerned a Routine Resident Integrated Safety Inspection that was conducted September 8 through November 9, 1996.

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

Thomas N. Mitchell
Vice President,
Peach Bottom Atomic Power Station

Attachments

cc: W. T. Henrick, Public Service Electric & Gas
R. R. Janati, Commonwealth of Pennsylvania
H. J. Miller, US NRC, Administrator, Region I
W. L. Schmidt, US NRC, Senior Resident Inspector
H. C. Schwemm, VP - Atlantic Electric
R. I. McLean, State of Maryland
A. F. Kirby III, DelMarVa Power

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Duke
97-277-0004
11/16

RESPONSE TO NOTICE OF VIOLATION 96-08-01

Restatement of Violation

10 CFR 50.120 requires, in part, that PECO establish and maintain a systems approach to training program for plant electrical and mechanical maintenance personnel, which includes evaluation of the mastery of tasks.

Contrary to the above, PECO did not establish and maintain a systems approach to training program for plant contractor electrical and mechanical maintenance personnel, which included evaluation of mastery of tasks. Specifically, in each of the examples below PECO had not evaluated the technician's ability to perform the intended safety-related work activities which included: soldering and crimping of electrical connections, and torquing of mechanical connections.

1. In March 1995, a contract technician incorrectly performed a solder connection during a Unit 3 high pressure coolant injection system modification. The connector subsequently failed resulting in inoperability of the high pressure coolant injection system for about 25 hours.
2. In October 1996, work activities involving crimping and torquing were performed by contract electricians during the installation of Modifications 2-P232 and 2-P262.

This violation represents a Severity Level IV problem (Supplement I).

Preface

PECO Energy has developed, implemented and maintains accredited training programs based on a systems approach to training (SAT) as required by 10 CFR 50.120 "Training and qualifications of nuclear power plant personnel." These programs are periodically evaluated and assessed for accreditation renewal by the Institute of Nuclear Power Operations (INPO).

10 CFR 50.120 states that "the training program must provide for the training and qualifications of (various job classifications) categories of nuclear power plant personnel." During the development of this regulation, public comments and questions concerning the interpretation of the regulation were submitted to the NRC. The NRC responded to the comments and questions and provided guidance on how to interpret the regulations in the statements for consideration for 10 CFR 50.120, dated April 30, 1993. The NRC clarified the application of the rule to the various work classifications stating that "the requirement that each licensee or applicant develop, implement and maintain a SAT based program is applicable only to licensee personnel, not contractors, and establishes a process that provides a high degree of assurance that personnel will be qualified to perform their assigned duties." The statement of considerations also stated that "it is the responsibility of each licensee and applicant to ensure that personnel specified by the rule, regardless of whether they are employees or contractors, are qualified."

To ensure proper qualification of appropriate contractor personnel, PECO Energy developed and implemented the Vendor Craft Training Program Plan (VCT-1). This plan describes three methods for qualification of appropriate vendor personnel which could include a documented review of the individuals previous qualifications and experience, task specific testing or completion of PECO training. Although PECO Energy had developed and implemented a program to ensure the proper evaluation and documentation of task qualifications, the assessment and documentation of vendor training and qualifications were not adequately performed in the two examples cited.

Reason for the Violation (Example 1)

On May 29, 1996 during the performance of a routine test, the High Pressure Coolant Injection (HPCI) turbine control valve failed to open as expected. The HPCI system was declared inoperable and the applicable Technical Specification action statement was entered. Troubleshooting was immediately performed that revealed a broken lead on the HPCI overspeed test potentiometer which is in the circuit for the controlling governor valve. Inspection of the mounting for the test potentiometer indicated an apparent separation of a soldered lead and a "short" of the electronic governor mechanism (EGM). The EGM was replaced and the wire lead was re-landed in accordance with appropriate plant system drawings. The HPCI system was tested and returned to an operable condition on May 30, 1996. An investigation was conducted to determine the cause of the soldered HPCI test potentiometer lead becoming disconnected.

In March, 1995 a scheduled HPCI outage was planned and conducted to complete various corrective maintenance tasks to improve HPCI system reliability. All tasks associated with wiring activities were to be performed in accordance with Electrical Specification, E-1317. A review of E-1317 was performed with appropriate craft personnel that included section 3.3.4 of the specification, which addressed soldered connections and terminations.

The contractor craft individual who performed the task encountered problems during work activities with the solder joint that was eventually found separated. The individual had difficulty inserting a 14 gauge wire through the potentiometer eyelet terminal. The individual contacted his superintendent and was directed to make the best solder joint possible. As a result, instead of inserting the wire through the lug, the contractor craft individual held the wire along side of the lug and soldered the connection. This activity was not performed in accordance with E-1317. In addition, the engineering department was not contacted about the soldering deviation. The contractor craft person and his superintendent also failed to verify that the soldered connection was performed satisfactory to the requirements of E-1317. Further investigation determined that the contractor craft individual that performed the task had not been formally assessed to be task qualified. Contractor craft management failed to provide the appropriate documentation for review and assessment. Contract Services did not provide adequate oversight of the plan to ensure that this documentation was provided and that the worker's task ability and previous experience and training were properly assessed and verified.

Reason for the Violation (Example 2)

On October 21, 1996 the NRC reviewed modification package P232 "Replacement of Class 1E Load Center Transformer 20x31" and P262 "Installation of 4KV Flip Flop Circuitry." During that review, it was identified that two vendor craftsmen that performed Amp crimps for mod P232 on September 14, 1996 and for mod P262 on September 20, 1996 were not listed on the vendor qualification matrix. An investigation was performed where it was identified that the vendor organizations had performed training to qualify their personnel. An attendance sheet was used to document the individuals that participated in the training class. PECO lesson plans and subject matter were utilized for the training class. The appropriate documentation, however was not forwarded to the Contract Services group as required by VCT-1 to evaluate the qualification of the class participants. Qualifications are not considered active until the training and previous experience of vendors are assessed and approval is documented by the Contract Services group manager. The vendor craftsmen were technically competent to perform the required tasks, but their qualifications were not properly assessed or documented per station program requirements. This was a result of documentation not being provided by the contractor management in a timely manner and inadequate Contract Services oversight to ensure that appropriate documentation was provided and assessed. The adequacy of the actual work performed was verified by a PECO quality verification inspector.

Corrective Steps That Have Been Taken and the Results Achieved

The Unit 3 HPCI EGM was replaced and the separated potentiometer lead was properly soldered by a qualified instrument and controls (I&C) technician.

The Contract Services group manager forwarded a letter and initiated action evaluations to each contractor with scheduled electrical work during the eleventh Unit 2 refuel outage that required each contractor work group to identify any present or future electrical soldering per the requirements of E-1317 and to re-assign that work scope to PECO I&C. There was no electrical work identified that had to be re-assigned to PECO I&C. In addition, direction was provided to contractor management that future work be verified by the QV organization, for both safety and non-safety-related work.

Contract personnel were requested to submit any additional training documentation for employees currently on-site. This action was completed December 6, 1996. The training documentation was then reviewed and assessed by the Contract Services group.

Contract personnel were directed to review the qualifications of their employees for augmented and safety-related work activities as well as a 20% sampling of non-quality work activities performed during the period September 1 through October 31, 1996. This period included work activities completed during the eleventh Unit 2 refueling outage. This review was completed December 16, 1996. As a result of the review, similar discrepancies were identified that were corrected by the submittal and assessment of appropriate qualification documentation. Work activities associated with the discrepancies identified were reviewed and were determined to have been verified by the QV organization or performed by appropriate task-qualified individuals.

Corrective Steps That Will Be Taken to Avoid Further Violations

Contract Services management implemented actions on November 15, 1996 to restrict badging of contractor personnel until worker training and qualifications could be properly assessed and verified. Contractors must submit the appropriate training and qualification records for review and approval before site access is granted. This process will continue to be implemented and will be formalized into procedure by June 30, 1997.

The Vendor Craft Training Program Plan (VCT-1) and interfacing procedures will be reviewed and revised to strengthen and clarify the controls and responsibilities of personnel to ensure that work is performed by appropriately qualified and/or supervised individuals. The review and revision of the plan and appropriate procedures will be completed prior to the eleventh Unit 3 refuel outage which is scheduled to begin October 3, 1997.

Date When Full Compliance Was Achieved

Full compliance was achieved for the first example on May 30, 1996 when the HPCI test potentiometer lead was successfully soldered by a task-qualified I&C technician, and on November 25, 1996 for the second example when the adequacy of contractor craft personnel qualifications were properly assessed and verified.

RESPONSE TO NOTICE OF VIOLATION 96-08-02

Restatement of Violation

Technical Specification 3.3.1.1 "Reactor Protection System Instrumentation" requires, in part, that while operating in MODE 1, the absolute difference of at least 2 APRM channels per trip system and calculated thermal power shall be within $\leq 2\%$ of rated thermal power, if not, the APRM scram clamp and flow biased scram functions are to be declared inoperable and within one hour TS action statement 3.3.1.1.F (be in MODE 2 within six hours), shall be entered.

Contrary to the above, on October 7, while operating Unit 2 in MODE 1 at approximately 35% reactor power, the absolute difference of at least 2 APRM channels per trip system and calculated thermal power was not within $\leq 2\%$ of rated thermal power, causing the APRM scram clamp and flow biased functions to be inoperable, and within one hour TS Action Statement 3.3.1.1.F was not entered. Specifically, due to an undetected error in the calculation of core thermal power, the APRMs indicated 3.5% of rated thermal power below actual core thermal power, for approximately six hours.

This violation represents a Severity Level IV problem (Supplement I).

Reason for the Violation

The primary cause of this event was an inaccurate core thermal power (CTP) calculation generated by the Plant Monitoring System (PMS) computer. The inaccurate CTP calculation was a result of the operation of the 2B Reactor Feedwater Pump (RFP) at less than 0.5 million pounds per hour (MLB/HR). This flow rate is below the 0.7 MLB/HR minimum flow value that can be accurately measured by the PMS. With the Feedwater Pump flow less than 0.7 MLB/HR, the PMS does not include the additional feedwater input to the reactor in the calculation of the CTP. Thus, the indicated CTP was lower than actual. Procedure ST-O-60A-210-2, "APRM System Calibration During Two Loop Operation" uses the Core Power And Flow Log to calibrate the APRM output to match calculated CTP. Because the PMS was reporting a lower than actual CTP, the APRM flow bias high Scram and APRM Scram Clamp setpoints were effectively raised by approximately 3.5 percent.

A contributing causal factor was the lack of a questioning attitude by the on-shift Reactor Engineer (RE) performing the APRM calibrations and by the on-shift Operations personnel reviewing the APRM calibrations. Prior to recalibrating the APRMs using the inaccurate PMS power indication, the RE noticed the abrupt change in calculated thermal power and its resultant affect on APRM gain adjustment factors (AGAF) readings. However, the RE, and other on-shift operations personnel, failed to recognize the proper plant response when the 2B RFP was placed in service and the significance of the calculated CTP reduction. The RE did not recognize the failure of the 3D MONICORE P1 and the message printed which stated that Gross Energy Tracking (GET) had been shutdown due to a mismatch between CTP and Megawatt Electrical (MWE) output (i.e. the plant efficiency was outside specified limits within the 3D MONICORE databank). The RE did not discuss and question the abrupt change in calculated power to the level necessary to discover the root cause. In addition, The RE was unsure of the impact that a data change made in accordance to procedure RE-40, "NSSS Software Databank/Database Update", during the previous shift had on the heat balance, but suspected the abrupt change in CTP may have been caused by this change. The data change had been performed approximately 15 minutes prior to the 2B RFP being placed in service.

An additional causal factor was the APRM System Calibration procedure allowed the use of the non-conservative heat balance when the Official 3D MONICORE P1 had failed. Since a calculated heat balance was available through the 3D MONICORE Core Power And Flow Log and was believed to be valid, the APRMs were adjusted accordingly. The procedure did not specify that the adjustment must be made according to the heat balance as displayed on an Official 3D MONICORE P1, but instead stated that a Core Power And Flow Log must be used. The use of a Core Power And Flow Log allowed the Reactor Engineer to adjust the APRMs to a non-conservative value. The specification of an Official 3D

MONICORE P1 may have necessitated better communication and the prevention of this event issue.

In addition, the 3D MONICORE Core Power And Flow Log did not display any failed sensors to indicate that something was unusual with regard to the heat balance. The 2B RFP flow signal coming from PMS was 0.0 Mlbs/hr when in actuality the flow rate was 0.5 Mlbs/hr. Had the 3D MONICORE Core Power And Flow Log displayed the heat balance inputs from PMS that were below a predetermined limit, on-shift personnel may have realized the 2B RFP input was not correct. This was due to the 2B RFP being in service and supplying makeup inventory to the vessel.

Corrective Steps That Have Been Taken and the Results Achieved

- ST-O-60A-210-2(3), "APRM System Calibration During Two Loop Operation" was revised to require that an APRM calibration above 25% power must be based upon an Official 3D MONICORE P1 since P1 will not be available when core thermal power is inconsistent with electrical power.
- ST-O-60A-205-2(3), "APRM Calibration And Thermal Limit Check For Single Loop Operation" and RT-O-60A-210-2(3), "APRM Gain Adjustment" were verified to already require the use of an Official 3D MONICORE P1 to perform an APRM Calibration.
- All Reactor Engineers, Shift Managers, and the Operations Senior Manager were notified of the issue and emphasis was placed on the fact that an APRM calibration must be based upon an Official 3D MONICORE P1.
- The importance of a questioning attitude and effective communication under conditions where equipment operation produces an unexpected or unusual result has been communicated to all members of the Operations staff.
- SO 6C.1.C-2(3) were revised to alert operations to the 0.7 Mlbs/hr lower limit and its effect on calculated thermal power.
- The specifics of this event were communicated to the Limerick Generating Station personnel.
- RE-C-20, "Official 3D P1 Troubleshooting" has been revised to review all non-failed sensors for proper readings when 3D MONICORE P1 is unavailable and also to evaluate performing a manual heat balance calculation in accordance with RE-1, "Core Thermal Power Evaluation (Manual Method)". In addition, RE-C-20 has been revised to address conditions which would allow core thermal power to continue to be calculated, but would not allow a P1 to be requested.

- A review of adjusting the APRMs non-conservatively was performed and the configuration was determined to not exceed the Peach Bottom licensing basis. These results were determined by re-performing transient analysis cases for Unit 2 Cycle 12 fuel loading.
- A review of the impact to thermal limit calculations was made to ensure that no thermal limit violations occurred due to the non-conservative heat balance.
- The importance of a questioning attitude and the importance of effective communication when evaluating an event has been communicated to all members of Reactor Engineering.
- A review was performed of PMS computer points which could impact the heat balance calculations for clamp values, or other constraints which could be affected by abnormal plant operation. No additional problems were identified.

Corrective Steps That Will Be Taken to Avoid Further Violations

- A review will be performed to determine the basis for the 0.7 Mlbs/hr RFP discharge flow clamp and determine whether this clamp should be removed or lowered. This review will be completed by 3/15/97.
- An evaluation will be performed to determine if revisions to the plant procedure(s) for placing an RFP in service are required to indicate that the discharge flow should be increased until a positive instrument indication of at least 1 Mlbs/hr flow rate is observed. This review will be completed by 3/15/97.
- Procedure RE-40 will be revised as appropriate to ensure adequate technical justification is performed and approved by an appropriate level of management prior to implementing any data changes allowed by the procedure during startup evolutions. This action will be completed by 1/31/97.
- An audible alarm will be provided in the main control room to alert personnel when a 3D MONICORE P1 case has failed to properly execute. This action will be completed by 3/31/97.
- A review of Operator training will be performed for potential improvements in the RFP lesson plans with regard to expected plant response when an RFP is placed in service. A review of lesson plans will also be performed to ensure that Operations is aware of which inputs 3D MONICORE uses to perform the heat balance calculation. These reviews will be completed by 2/28/97.

Date When Full Compliance Was Achieved

Full compliance was achieved on 10/7/96 at approximately 2250 hours when all APRM channels were restored within $\leq 2\%$ of rated thermal power in compliance with Technical Specification 3.3.1.1.