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E. P. FOGARTY
MANAGER
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September 27, 1988
Docket Nos. 50-277
50-278

Mr. Jacque P. Durr, Chief
Engineering Branch
Division of Reactor Safety
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

SUBJECT: Peach Bottom Atomic Power Station Units 2 and 3
Response to Combined Inspection Report
Nos. 50-277/88-30; 50-278/88-30

Dear Mr. Durr:

Your letter dated August 26, 1988 transmitted Combined Inspection Report Nos. 50-277/88-30 and 50-278/88-30 for the routine inspection conducted from August 15, 1988 to August 19, 1988. Appendix A of the letter identified one activity which appeared to have not been conducted in full compliance with NRC requirements. Attachment A of this letter provides a restatement of this item followed by the Philadelphia Electric Company's response.

Further, your letter requested that Philadelphia Electric Company (PECo) provide a schedule for implementing the control program to assure that walls and blockouts remain in the condition/configuration as analyzed and modified. In response to this request, a surveillance test will be developed and issued for implementation by December 1, 1988 which will require periodic inspection to ensure that masonary walls and blockouts remain in the condition/configuration as analyzed.

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

Very truly yours,

E P Fogarty

Attachment

cc: Addressee
475 Allendale Road
King of Prussia, PA 19406
W. T. Russell, Administrator, Region 1, USNRC
T. P. Johnson, USNRC Senior Resident Inspector
T. E. Magette, State of Maryland
J. Urban, Delmarva Power
J. T. Boettger, Public Service Electric & Gas
H. C. Schwemm, Atlantic Electric

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Violation:

10 CFR 50, Appendix B, Criterion X, requires that a program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures and drawing for accomplishing the activity. It also requires that examinations, measurements or tests of material or products processed be performed for each work operation where necessary to assure quality.

Peach Bottom Atomic Power Station, Quality Assurance Manual, Chapter 10, states that inspections shall be performed for each operation (in-process, end-point, etc.) where necessary to assure quality. It further specifies that a sampling plan is used for verification, the plan shall be based on a recognized industry standard, and records shall identify and include justification for the particular sampling plan and sample size used for the inspection.

Contrary to the above, on August 19, 1988 the inspector identified the following:

Item 1 of the Violation:

1. During an independent safety related block wall verification by the NRC, out of a sample of 47 concrete expansion anchors, 22 failed to indicate the specified minimum torque value for the size of anchor bolts tested. The sampling inspection as implemented to verify conformance of concrete expansion anchors with the specified torque requirements was inadequate in identifying the above nonconformance.

Admission or Denial of Item 1 of the Alleged Violation:

Philadelphia Electric Company acknowledges this portion of the violation as stated.

Reason for Violation:

The cause of this violation is a procedural deficiency in Construction Division Procedure CD 5.12 (entitled "Procedure for Installation of Concrete Expansion Bolts"). The degree of relaxation in expansion bolts was not recognized. As a result of this NRC investigation, an engineering investigation was performed which considered the relaxation of the bolts. Specified torque values provided in the procedure are only installation torque values. Concrete expansion anchor bolts would not be expected to retain this value after its application due to load relaxation.

Load relaxation is expected and is not an indication of a failure or impending failure of the bolt to perform its function. The required torque during installation is necessary only to expand the wedges of the anchor bolt, thereby "setting" (properly anchoring) the anchor bolt in the concrete. The concrete expansion anchor bolts holding the structural steel members on walls 76.10 and 16.1 (which were identified in this Inspection Report and are a part

of plant Modification 2235) were torqued and inspected in accordance with the approved Construction Division Procedure CD 5.12. This procedure permits the Quality Control Inspector to inspect bolts after installation by sampling the retained torque of the bolts; however, for the walls identified above, the QC Inspectors witnessed the application of the specified installation torque to all the concrete expansion anchor bolts. The practice of witnessing 100% of this torquing is conservative and acceptable and its use was verified by interviews with the PECo Inspectors. The QC inspection documented only a sample number of this torquing on the Concrete Expansion Bolt (CEB) form as required by Procedure CD 5.12. There is no requirement by PECo or the manufacturer of the bolts to reinspect the anchor bolts after acceptable installation.

The concrete expansion anchor bolts in wall 76.6, which were also inspected by the NRC Inspector and identified in the Inspection Report, were found to be only hand tightened because the installation had not been completed at the time of the NRC's inspection. This was later determined by a review of the QC inspection reports which indicated that only the opposite side of the wall had been torqued and inspected at that time.

Extent of Significance of the Violation:

As stated above, an additional engineering investigation has been performed which considered the relaxation of the bolts and concludes that properly set anchor bolts will perform their safety function. References utilized in this investigation are as follows:

- Meinheit, D. F. and Heidbrink, F. D., "Behavior of Drilled-In Expansion Anchors," Concrete International, American Concrete Institute (ACI), April, 1985, pp. 62-66.

- Lindquist, M. R., "Final Report, USNRC Anchor Bolt Study, Data Survey and Dynamic Testing," NUREG/CR-2999, HEDL-MISC-7246, Hanford Engineering Development Laboratory, pp. 17, 23.

- Burdette, E. G., et al, "Load Relaxation Tests of Anchors in Concrete," Presented at the Symposium on Anchorage to Concrete, Sponsored by ACI Committee 355 - Anchorage to Concrete, ACI Annual Convention, Atlanta, GA, January, 1982.

The initial torquing of the concrete anchor bolts is necessary to set the bolts and ensure that they perform their safety function. The relaxation of the concrete expansion anchor bolts is expected. This relaxation would not affect the structural integrity of the installation during a seismic event. Therefore, plant safety would not be affected.

Immediate Corrective Actions Taken and Results Achieved:

No immediate corrective actions were necessary.

Action Taken to Prevent Recurrence:

As a long-term additional measure to ensure that the concrete anchor bolts are properly set on the initial torquing, Construction Division Procedure CD 5.12 will be revised to require QC Inspectors to witness the application of the specified installation torque for 100% of new concrete anchor bolt installations. In the interim, QC Inspectors have been directed to continue to witness 100% of this torquing, which is in conformance with the procedure change stated above.

Date when Full Compliance Will Be Achieved:

Construction Division Procedure CD 5.12 will be revised by October 17, 1988.

Item 2 of the Violation:

2. No inspection or verification was performed to establish the acceptability of bolt holes in structural steel members for size of hole, shape of hole, method by which holes were made (punching, drilling, burning), and the location of the holes to match the installed anchors.

Admission or Denial of Item 2 of the Violation:

Philadelphia Electric Company acknowledges this portion of the violation as stated.

Reason for the Violation:

The cause for this violation was a procedural deficiency in that the Quality Control Form ("Structural Steel Installation Form", CD-5.6-III) utilized to document the inspection of the structural steel members for Modification 2235, did not require bolt hole inspection of the structural steel. This Form is a part of the Construction Division Procedure CD 5.6, Revision 5 ("Procedure for Installation and Inspection of Pipe Supports and Structural Steel"). This deficiency was identified by PECo prior to this NRC inspection and a request for a revision to the procedure had been initiated. However, the procedure revision requiring the use of this revised form had not been completed and in use at the time of the NRC inspection.

Extent or Significance of the Violation:

Improper bolt hole size could affect the transfer of lateral seismic loads from the block walls to the supporting concrete wall in that the resulting loads on the bolts and structural steel members could be different from design loads. These resulting loads could ultimately result in a failure of the affected block wall. The structural steel members utilized in this modification which act as an interface between the block and structural concrete walls are being reinspected for bolt hole size. The bolt holes which exceed the design

requirements are being documented and dispositioned on nonconformance reports (NCR).

Immediate Corrective Actions Taken and Results Achieved:

The structural steel installation form (CD-5.6-III) used for Modification 2235 has been revised to require the inspection of bolt holes in the structural steel members and has been included in the Construction Job Memorandum. This revision will extend the existing inspection for hanger base plates to all structural steel bolt holes. This inspection will include the size of the hole, the shape of the hole, the method by which the holes were made, and the location of the holes to match the installed anchors. Interim guidance to construction engineers and site lead men has been issued to invoke this inspection criteria prior to procedure CD 5.6 being revised.

Actions Taken to Prevent Recurrence:

Construction Division Procedure CD 5.6 is being revised to incorporate the revised Structural Steel Installation Form CD-5.6-III.

Date When Full Compliance Will Be Achieved:

The bolt holes which exceed the design requirements will be documented and dispositioned on nonconformance reports by November 1, 1988.

Construction Division Procedure CD 5.6 will be revised by October 17, 1988.

Item 3 of the Violation:

3. There was no objective evidence to substantiate any examinations, measurements or tests were performed to verify the acceptability of grout or the grouting operation used in block wall modifications.

Admission or Denial of Item 3 of the Violation:

Philadelphia Electric Company acknowledges this portion of the violation as stated.

Reason for the Violation:

Construction Division Procedure CD 5.13 (entitled "Procedure for Grout Placement at Nuclear Power Plants") is designed to provide the necessary objective evidence of the acceptability of a grouting operation in the form of an inspection of the surface preparation, presoaking, mixing, placing and curing of the grout used in the block wall modification. In the example cited by the NRC Inspector, the Construction Job Memorandum (CJM), which provides the Quality Control procedures to be utilized in performing the identified modifications to the block walls (Modification 2235), did not reference Construction Division Procedure CD 5.13. This deficiency had been identified in a nonconformance

report (NCR CD-P-1469) and a disposition of "use-as-is" was recommended by the engineer performing the grouting operation.

The cause for this violation was that the final "use-as-is" disposition, supplied by the engineer assigned to reviewing and dispositioning the nonconformance report (NCR CD-P-1469), did not provide objective evidence in the form of an independent, direct inspection, examination or test to demonstrate the adequacy of the grouting operation.

Extent or Significance of the Violation:

An inspection of the subject grout for the walls identified in the nonconformance report (CD-P-1469) was performed by removing the structural steel members associated with the grouting. The reinspection determined that the grouting was acceptable. Therefore, this failure to provide a sufficient "use-as-is" justification would not have adversely affected the safe operation of the plant.

Immediate Corrective Actions Taken and Results Achieved:

Two nonconformance reports (NCR CD-P-1559 and NCR CD-P-1564) have been issued to include the necessary objective evidence to demonstrate the grouting operation was acceptable. These NCRs will be completed by October 17, 1988.

Actions Taken to Prevent Recurrence:

The Installation Engineer and construction personnel have been instructed to use Construction Division Procedure CD 5.13 in conjunction with the manufacturer's instructions for all Modification 2235 grouting work unless stated otherwise in an approved Engineering Review Request (ERR). This corrective action to prevent recurrence was stated in the disposition of the original NCR (CD-P-1469).

The responsible Engineer, Independent Reviewer and Section Head responsible for the original disposition of the NCR have been reinstructed in the need to provide objective evidence when performing "use-as-is" disposition of grouting operations.

Date When Full Compliance Will Be Achieved:

All actions have been completed.