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JOSEPH W. GALLAGHER
VICE PRESIDENT
NUCLEAR SERVICES

June 9, 1988

Docket Nos. 50-277
50-278

Mr. William F. Kane, Director
Division of Reactor Projects
Region I
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

SUBJECT: Peach Bottom Atomic Power Station Units 2 and 3
Response to Combined Inspection Reports
50-277/87-22; 50-278/87-22 and
50-277/87-25; 50-278/87-25
Concerning Shutdown Cooling Isolations

Dear Mr. Kane:

In a letter dated February 26, 1988, Philadelphia Electric Company submitted a report entitled, "Root Cause Investigation of Shutdown Cooling Isolations, Peach Bottom Atomic Power Station". This report detailed the investigation of 13 Shutdown Cooling isolations and identified the causal factors associated with them.

Our evaluation of this report has been completed. The attachment lists the significant causal factors associated with the isolations, and the corrective actions which have been taken, or are being taken, with respect to them.

The completion of these corrective actions should significantly reduce the number of inadvertent Shutdown Cooling isolations.

If you require additional information, please do not hesitate to contact us.

Very truly yours,

Joe Gallagher

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PDR ADOCK 05000277
Q DCD
Attachment

cc: Addressee
W. T. Russell, Administrator, Region I, USNRC
T. P. Johnson, Senior Resident Inspector
T. E. Magette, State of Maryland

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The "Root Cause Investigation of Shutdown Cooling Isolations/Peach Bottom Atomic Power Station" which was forwarded to the Commission in a letter dated February 26, 1988, identified 8 significant causal factors associated with the 13 Shutdown Cooling isolations which were reviewed.

The first causal factor is a design susceptible to initiating a Shutdown Cooling isolation upon a single loss of either control or bulk power (off site or on site). The remaining significant causal factors include 5 specific systematic problems (common factors) which were associated with at least 6 of the events, and 2 significant root causes.

The specific causal factors and their associated corrective actions which have been taken, or are being taken, are listed below.

1. Design Concern

The logic circuitry design of the Residual Heat Removal (RHR) and Primary Containment Isolation (PCIS) systems is such that a single loss of either control or bulk power (off site or on site) can result in a Shutdown Cooling isolation. This causal factor was associated with 10 of the 13 isolations investigated.

Corrective Actions

A review of the design of the PCIS power supply and logic system will be completed by July 31, 1989 to determine the feasibility of a modification to reduce the probability that a single loss-of-power will result in an isolation. This review will address reliability, the frequency, causes and consequences of isolations, and the frequency of electrical switching activities.

2. Systematic Problems (common factors)

A. Job site work controls, procedures and supervision, were not sufficient to prevent actions leading to Shutdown Cooling isolations.

- B. Procedures for 'short term' work (e.g. trouble shooting) lacked sufficient guidance to prevent the inadvertent Shutdown Cooling isolations.
- C. The scope of job planning and review for work performed on site often did not identify potential problems which might be encountered in the course of the work.
- D. There was a lack of specific criteria to be used during the independent review of "temporary" changes.
- E. There is a lack of human factors reviews being a part of the job planning or design process.

Corrective Actions

- A. Written guidance to aid in preventing the disturbance of adjacent circuits or the repositioning of cables within electrical panels has been developed and is included in work packages. Electrical and I&C personnel have been trained with respect to this guidance.
- B. A memo has been issued to Electrical supervisors addressing the potential consequences of working in critical panels and the need for supervisory personnel to conduct on-scene reviews with craft personnel relative to the scope of the work to be accomplished and the methods to be employed.
- C. The "Procedure For the Control of Safety Related Equipment" (A-41) and the "Shift Operations" (A-7) procedure have been revised to establish the requirement for a complete review of the acceptability of reapplying a temporarily cleared permit. The revisions require a review which encompasses the same criteria as the original permit application. Also, the "Rules For Permits and Blocking" will be revised to address the responsibility of the issuing authority to verify that plant conditions are correct for both application of the original permit and reapplication of temporarily cleared permits. This revision is expected to be completed by June 30, 1988. A method has been established which ensures that permits including complex logic circuitry are reviewed by the appropriate technical group prior to approval. As a result of the technical review, appropriate warnings and caution statements will be added to the permit to aid the operators during permit application, clearance or reapplication. Additionally,

the review will identify plant or Technical Specifications conditions which must exist prior to application or reapplication of the permit.

- D. Documents and drawings required for control room operators use in writing and reviewing permits involving complex logic circuits will be identified and made available to shift supervision by July 29, 1988.
- E. Procedure A-3, "Procedure for Temporary Changes to Approved Procedures", has been revised to prohibit telephone approvals of complex Temporary Procedure Changes (TPC) and to require PORC review of TPCs affecting safety-related functions prior to their implementation.
- F. The adequacy of instructions and personnel training with respect to wire terminal tightness for modification and electrical field engineering work has been reviewed and appropriate revisions have been made to the instructions and the training program.
- G. A review of critical panels was conducted to identify areas where flexible conduit movement could cause shorting of electrical circuits. No deficiencies were identified.
- H. A Routine Test (RT), RT-9.16, requiring verification of the condition of critical control cabinets late in each major outage will be developed by July 31, 1988. This test will contain a list of applicable panels, attributes to be checked (terminal tightness, condition of fuse clips, etc.), and applicable acceptance criteria.
- I. Procedure A-42, "Procedure for Control of Temporary Plant Alterations (TPAs)" has been revised to specifically include temporary power feeds to installed plant equipment.
- J. Written instructions for painting activities have been implemented which require plant staff review of areas to be painted with the appropriate painting group supervision. The review also includes the identification of masking requirements and the establishment of compensatory measures, if required, until the area is restored to normal. The instructions

also require a plant staff inspection of the area prior to and after completion of the painting.

- K. Warning signs will be placed on control panels which contain shutdown cooling circuits. Shift management permission will be required prior to working in these panels. This action is expected to be completed by July 31, 1988.

3. Root Causes

- A. There was a lack of hands-on training on equipment for personnel who will be responsible for troubleshooting equipment.

Corrective Actions

A video tape training module will be made by July 15, 1988. The tape will emphasize the various panel sensitivities, consequences of improper care, and techniques to be exercised when working near, opening, closing, or working in the panels. Training will be conducted for selected personnel and will be completed by September 2, 1988.

For new plant staff personnel who will be assigned duties which involve work in critical control panels, there will be an established and structured training program. The training will include techniques and requirements for tightening and checking terminations, electrical separation, continuity testing, electrical safety, etc. and panel familiarity. This program will be developed by August 19, 1988, and will become a part of job orientation training.

- B. Clearly defined lines of authority/responsibility either did not exist or were not known, which would enable personnel responsible for the performance of a task to know the proper interface relationships that must be established in order to safely accomplish the task.

Corrective Actions

Supervisory personnel have been directed to conduct on-scene reviews with craft personnel prior to beginning work in critical panels. These reviews will include a review of the scope of the work, methods to be employed, and precautions to be taken.