

PHILADELPHIA ELECTRIC COMPANY

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SHIELDS L. DALTROFF  
VICE PRESIDENT  
ELECTRIC PRODUCTION

March 16, 1983

Docket Nos. 50-277  
50-278

Mr. J. F. Stolz, Chief  
Operator Reactors Branch #4  
Division of Licensing  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Mr. Stolz:

During a meeting held in Bethesda on March 3, 1983, concerning the failure, during environmental qualification testing, of electrical control stations of the type used for the Emergency Core Cooling System (ECCS) room coolers at Peach Bottom, you requested that we provide information and justification for continued operation.

Nature of the Failure:

Two switch assemblies, GE Model NO. CR 2940-UB 203W, were subjected to radiation of  $27 \times 10^6$  RAD and  $37 \times 10^6$  RAD respectively. The switch assembly which received the higher dose was found to lack continuity. Investigation determined that although the switch itself was electrically and mechanically functional, the nylon operating cam had disintegrated and caused the switch plungers to be in an intermediate "all contacts open" position. The switch assembly which received  $27 \times 10^6$  RAD showed evidence of cracking of the cams but otherwise functioned normally.

A001

Description of Test Basis:

The radiation level for the test was chosen to represent the worst case Total Integrated Dose including forty years service plus 180 day post DBA LOCA exposures. In addition, a 10 percent margin was included as required by IEEE-323 1974. A tabulation of the calculated Total Integrated Doses for the various ECCS rooms is as follows:

RHR	33.5 x 10 <sup>6</sup>	RAD
Core Spray	2.99 x 10 <sup>6</sup>	RAD
HPCI	12.8 x 10 <sup>6</sup>	RAD
RCIC	6.72 x 10 <sup>6</sup>	RAD

Note: RCIC is not considered a safeguards system and HPCI is not utilized for long term post LOCA cooling. In addition, recent information indicates that the calculated values for RHR are very conservative in that no credit was taken in the analysis for torus volume dilution effect.

Postulated Effects of the Failure:

Two failure modes have been postulated for the switch assemblies; however, it is necessary to review the ECCS room cooler arrangement in order to more easily address these scenerios. A simplified schematic of a typical switch installation is included as a reference.

There are two room coolers per ECCS room for a total of twenty coolers per unit. The ECCS rooms are as follows: RHR (4); Core Spray (4); HPCI (1); and RCIC (1). The normal mode of operation is for one cooler to be in the "run" mode with the second cooler serving as back-up in the "auto" mode. The coolers have a permissive to operate in these modes only when the associated ECCS pump is operating (see schematic). The back-up cooler is activated by a differential pressure switch across the opposite cooler which monitors cooler operation. A manual contact is also provided to allow local operation of the cooler without ECCS pump operation being required. The selection of primary and back-up

coolers is alternated to provide uniform operating time on both coolers.

The ECCS room coolers utilize Emergency Service Water (ESW) as a heat transport media. The ESW system also provides cooling water to the emergency diesels as well as assorted other coolers.

Postulated Failure #1 - In this failure scenerio the cams would disintegrate such that neither cooler would operate. Without room cooling the associated ECCS pump motor is assumed to fail and therefore there would be a loss of long term cooling capability.

Postulated Failure #2 - This scenerio sees the cams failing such that the "manual" contact closes thus resulting in operation of all of the coolers. This poses difficulties in that operation of all coolers exceeds the capacity of the ESW system such that there may be insufficient heat removal capability for the coolers and other equipment (Diesels) using ESW supply.

Immediate Corrective Actions:

As an immediate corrective measure, jumpers were installed on the auto or run contacts and leads were lifted on the normal contacts as follows:

A,C,D RHR - one cooler auto contact jumpered  
one cooler run contact jumpered

B RHR - one cooler manual coolant jumpered  
one cooler auto contact jumpered

A,C,D Core Spray - lifted manual connections  
all coolers

B Core Spray - lifted manual connection  
on one cooler

HPCI - lifted manual connection  
on one cooler

RCIC - lifted manual connections  
on both coolers

Please note that the B RHR, B Core Spray and HPCI rooms have a cooler operating in the manual mode due to a previously reported electrical separation problem. The effect of these modifications is to counteract the two postulated failure modes as follows:

Jumpers installed across the run or auto contacts effectively bypass the switches thus failure of the cam will not preclude cooler operation. Lifting of manual leads on the limited number of coolers precludes inadvertent operation of these coolers and maintains the ESW flow below the maximum system capacity. The changes do constitute a minor inconvenience to plant operations; however, there is no deleterious effect to plant safety since the coolers will be available as designed for ECCS room heat removal.

Long Term Corrective Actions:

Sample cams manufactured from metal are being machined and will be undergoing testing to assure switch operability. Upon the successful completion of these tests, a full complement of cams will be manufactured and installed. It is anticipated that this will be completed within six months.

Safety Significance:

The immediate corrective actions compensate for the postulated failure modes corresponding to the test failure whereas the proposed long term corrective action obviates the need for the interim measure. For these reasons, it is our belief that continued operations of Peach Bottom Atomic Power Station does not constitute an undue hazard to the public due to the test failure or the interim or proposed long term corrective actions.

Mr. J. F. Stolz

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Should you require further information, please do not hesitate to contact us.

Sincerely,

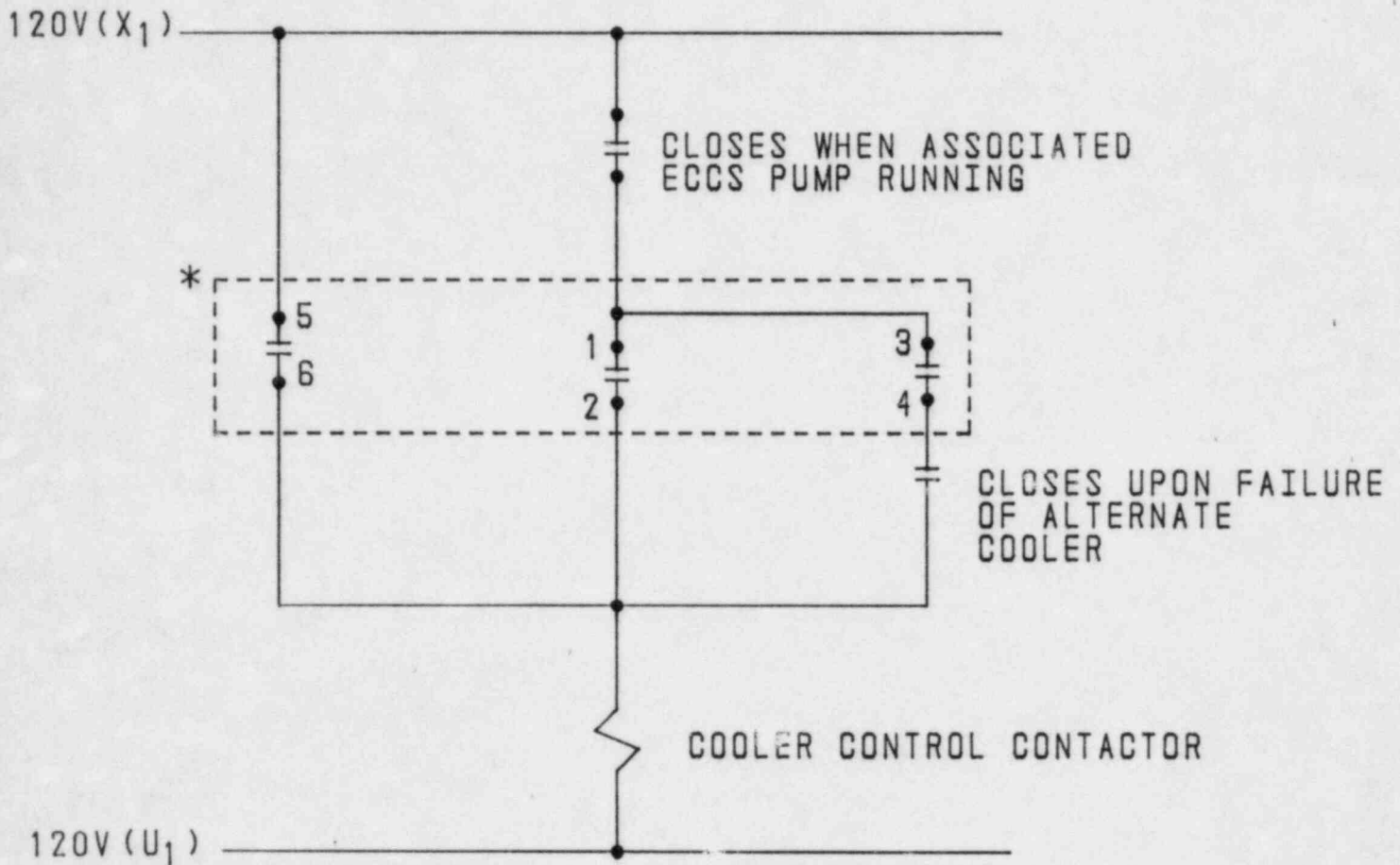
A handwritten signature in cursive script, appearing to read "A. R. Blough".

Attachment

cc: R. C. Haynes, Administrator  
Region I  
U.S. Nuclear Regulatory Commission

A. R. Blough, Site Inspector  
Peach Bottom

SIMPLIFIED SCHEMATIC  
TYPICAL APPLICATION-ECCS ROOM COOLER SWITCH  
(ONE SWITCH PER COOLER)



\* COOLER CONTROL SWITCH  
CONTACT ARRANGEMENT

1-2	CLOSED IN RUN	OPEN ALL OTHERS
3-4	CLOSED IN AUTO	OPEN ALL OTHERS
5-6	CLOSED IN MANUAL	OPEN ALL OTHERS