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PLANT NAME: H B Robinson #2

ENCLOSURES:

Abnormal Occurrence #74-22 on 10-3-74..... concerning failure of Reactor Protection Overtemperature Channel Set #1 to generate rod stop and reactor trip signals for a simulated overtemperature condition.....

(40 cy encl rec'd)

FOR ACTION/INFORMATION 10-22-74 ehf

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CP&L
Carolina Power & Light Company

October 14, 1974

50-261

File: NG-3513 and NG-3514 (R)

Serial: NG-74-1249

Mr. Norman C. Moseley, Director
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Mr. Edson G. Case, Acting Director
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U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Sirs:

H. B. ROBINSON UNIT NO. 2
LICENSE NO. DPR-23
FAILURE OF REACTOR PROTECTION OVERTEMPERATURE CHANNEL

In accordance with Section 6.6.2 of Technical Specifications for H. B. Robinson Unit No. 2, the attached Abnormal Occurrence Report is submitted for your information. This report fulfills the requirements for a written report within ten days of an abnormal occurrence and is in accordance with the format set forth in Regulatory Guide 1.16, Revision 1.

Yours very truly,

E. E. Utley
Vice-President
Bulk Power Supply

KPY:DBW:mvp
Attachment

cc: Messrs. N. B. Bessac
W. B. Howell
J. B. McGirt
D. V. Meuscer
D. B. Waters

10843

336 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602

ABNORMAL OCCURRENCE REPORT

1. Report No. 50-261/74-22

2a. Date October 10, 1974

2b. Occurrence Date October 3, 1974

3. Facility H. B. Robinson Unit No. 2
Hartsville, South Carolina

4. Identification of Occurrence

Failure of Reactor Protection Overtemperature Channel Set No. 1 to generate rod stop and reactor trip signals for a simulated overtemperature condition.

5. Conditions Prior to Occurrence

The reactor was at 100% power with all parameters normal. PT 5.1, "Overtemperature and Overpower Channel Set 1" was being conducted.

6. Description of Occurrence

At approximately 0900 on October 3, 1974, Instrument and Control Technicians began conducting PT 5.1 on Overtemperature and Overpower Channel Set 1. (PT 5.1 is a bi-weekly test which includes testing the overtemperature circuitry to check if it will detect an overtemperature condition and send the appropriate rod stop or reactor trip signal to the reactor protection logic. This is accomplished by removing only one channel at a time from service and simulating T_{hot}, T_{cold}, $flux_{upper}$, $flux_{lower}$, and Pressurizer pressure signals to the overtemperature circuitry. By varying these signals overtemperature conditions can be simulated and the appropriate rod stop or reactor trip signal checked.) At 1000 it was determined that no value or

combination of values of delta T, delta flux, or Pressurizer pressure would result in rod stop or reactor trip signals from Channel 1. The technicians immediately reported the trouble and affected repairs to the overtemperature circuitry. Repairs were completed at 1040.

7. Designation of Apparent Cause of Occurrence

A signal comparator, box number TC-412C, had failed in the unsafe direction. This box takes a signal computed from $flux_{upper}$, $flux_{lower}$, T_{avg}, and Pressurizer pressure; compares it with a signal derived in the overpower circuitry, and then determines if an overtemperature condition exists. If a rod stop or reactor trip is required, a signal is sent to the reactor protection logic from this box.

Investigation revealed that a 50 μf filter capacitor located in the internal power supply for TC-412C, had failed. This affected the negative (-15 volt) supply to the comparator and subsequently disabled the comparator.

8. Analysis of Occurrence

To obtain a rod stop or reactor trip from the overtemperature protection circuitry, two of the three overtemperature channels must detect an overtemperature condition. For this occurrence, Channel No. 1 failed in the unsafe direction. Regardless of the input to this channel, no overtemperature condition signals would be sent to the reactor protection logic. Therefore, overtemperature protection was reduced to a two out of two matrix from the remaining channels. Even though this is not a desirable situation, it is not unsafe from a reactor operation standpoint. The minimum, necessary circuitry for overtemperature protection (i.e. the remaining two overtemperature channels) was still in operation. Had a second overtemperature channel failed as the first did, no overtemperature

trips would come from the overtemperature logic. However, annunciators for high $flux_{upper}$, high $flux_{lower}$, and low Pressurizer pressure plus indicators for T_{avg} and delta T would alert the control operator of an impending overtemperature situation before it became serious. He could then evaluate the situation and take appropriate action. Since PT 5.1 is a bi-weekly test, and the previous test detected no trouble with Channel Set 1, this channel could have been out of service for a maximum of two weeks.

9. Corrective Action

Repairs were made on TC-412C, the box recalibrated and returned to service. PT 5.1 was again run on Overpower and Overtemperature Protection Channel 1 with satisfactory results. The test was completed at 1040 on October 3, 1974, approximately forty minutes after the trouble was detected. In accordance with PT 5.1 the remaining two Overpower and Overtemperature Channels were tested and found to be functioning normally.

The failure of TC-412C was due to the breakdown of an electrical component. It is not possible to design a test to detect the failure of an electrical component before it fails. Also there are no indications that the failure is the result of operating conditions or a generic problem with the capacitor. Therefore, no further corrective action is deemed necessary at this time.

10. Failure Data

No previous failures of this type have occurred.