

THE CINCINNATI GAS & ELECTRIC COMPANY
ZIMMER NUCLEAR POWER STATION, P.O. BOX 201, MOSCOW, OH. 45153



March 29, 1982
QA-1628

U. S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Attention: Mr. J. G. Keppler

RE: WM. H. ZIMMER NUCLEAR POWER STATION-UNIT I
10CFR50.55(e) ITEM E-10 BROWN-BOVERI POWER
SHIELD RELAY FAILURES - DOCKET NO. 50-358,
CONSTRUCTION PERMIT CPPR-88, W.O. #57300
JOB E-5590 FILE NO. NRC-7 ITEM E-10



Gentlemen:

This letter constitutes a final report concerning the subject deficiency initially reported under the requirements of 10CFR50.55(e).

As stated in our previous report, QA-1308, dated June 11, 1980, the relays were returned to the factory on June 4, 1980. The relays have since been tested and a failure report submitted. The cause of the failure for each unit is discussed below.

1) Type SS3G, 50-225 amps Serial #23977

This relay was found to have a cracked solder joint under the long time pickup tap block. The connection was found to be intermittent. A slight movement at the tap pin or trip unit apparently would cause the circuit to open and the tap block to revert to the lowest setting as designed. Brown-Boveri considers this a random problem since relay tap pins are inserted many times at the factory during tests and problems such as this normally are uncovered at the factory.

2) Type SS4G, 50-225 amps Serial #30017

This relay had a tripping SCR with excessive leakage which caused the false tripping. The vendor stated that this unit may have been damaged during tests or that it might have been a random defective unit. The vendor has recently completed an investigation which indicates that there was no evidence that there was a generic problem with the SCR's. Furthermore, this SCR was manufactured in 1976 and the vendor's records indicate that there have been practically no SCR's

date coded 1976 returned from the field. (10,594 SCR's were shipped in 1976 as output devices in relays and trip units).

3) Type SS4G, 250-600 amps Serial #42883

This unit was never placed in service. During acceptance testing, it was discovered that the relay would not operate on a long time delay trip test. However, during factory tests, the relay operated properly. We requested that the unit be carefully re-examined. The vendor was unable to find any defects.

Since the above relays were returned to the factory, additional Power Shield Relays have failed. The relay types, serial numbers, and circumstance of failure are described in the following items.

4) Type SS3G, 50-225 amp Serial #23938

The instantaneous unit of this relay tripped on normal load current. The relay was returned to the factory in March, 1981. The vendor's investigation revealed that the tripping SCR had excessive voltage during factory testing or possibly a random manufacturing defect.

5) Type SS3G, 50-225 Amp Serial #23958

The relay operated falsely when the protected motor was started. Inspection of the relay by the vendor showed foreign material on an internal connector pin. When the film was cleaned off the unit functioned properly.

6) Type SS3G, 50-225 amp Serial #30059

This relay also operated falsely when the protected motor was started. The reason for the failure was a broken solder joint causing an intermittent connection at the emitter of a transistor. The characteristics of the fracture indicated that the break occurred after wave soldering. The cause of the fracture could not be determined.

To summarize, of the six (6) failed relays, two (2) had SCRs with excessive leakage current, two (2) had broken solder joints, one (1) had a foreign substance on a connector pin, and one (1) had no defects that could be discovered. While the reasons for the failure of these relays were identified in most cases, the specific cause of each failure cannot be determined.

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The reports from the vendor contend that the failures are random and that there is no generic problem. We are unable to either confirm or deny that a particular failure is a generic problem. However, we are concerned about the possibility of additional failures due to SCRs with excessive leakage.

In response to the excessive leakage concern, we asked the vendor to supply an SCR test set. We received the test set and tested all of the 480V circuit-breakers on substations serving safety-related (essential) loads. Out of the 65 breakers that were tested only two (2) had SCRs with excessive leakage. The two (2) defective units will be repaired.


While not a common recurrence, electronic equipment such as Power Shield Relays do fail occasionally. These failures are beyond the control of the manufacturer and are generally random in nature. To account for these failures, the manufacturer recommends periodic testing at regular intervals. Our maintenance procedures will be modified to require a thorough cleaning and testing of safety-related 480V metal-clad circuitbreakers on a periodic basis.

To conclude, we feel that the problems identified have been adequately addressed at this facility to assure the safety of plant operations. We have identified and will repair all Power Shield Relays with leaky SCR's that are serving safety related loads. The other problems identified in this report can be detected by periodic testing of all essential circuitbreakers. The SCR leakage will not become a problem in the future.

We trust that the above will fulfill the requirements of a final report under 10CFR50.55(e).

Very truly yours,

THE CINCINNATI GAS & ELECTRIC COMPANY

By 
E. A. BORGMANN
SENIOR VICE PRESIDENT

WPC:plc

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