

ENCLOSURE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2 DELAY OF REACTOR TRIP DUE TO ARCING ACROSS UNDERFREQUENCY RELAY CONTACTS

NCR EEB 79-13
10 CFR 50.55(e)
FINAL REPORT

Description of Condition

During the preoperational testing of the underfrequency inputs into the solid-state protection system, arcing occurred across the underfrequency relay contacts. The problem involves the underfrequency and auxiliary relays on the reactor coolant pump underfrequency and undervoltage protection panels. This arcing caused the auxiliary relay to chatter and delay the reactor trip and the reactor coolant pump breaker trip signals. There are two auxiliary relays associated with each reactor coolant pump.

The SDF-1 relay (see attached figure) senses the frequency by a solid state circuit which energizes a telephone type relay on underfrequency. Arcing occurs when the telephone relay contacts deenergize a large inductive load. The solid state circuits are adversely affected by noise generated by the arcing. This then causes the telephone relay to chatter which delays the trip signal to the SSPS.

Safety Implications

Had this condition gone uncorrected, the trip signal due to an underfrequency to the reactor coolant pumps could have been delayed. Thus, this condition could have adversely affected the functioning of the solid state protection system.

Corrective Action

The relay panel will have the SDF-1 relays modified internally so that there will be two normally closed contacts available for external connections (presently there is available only one normally closed and one normally open contact for external connections). The two normally closed contacts will be used to deenergize a small 120-volt ac general purpose relay located in the SSPS cabinets. Testing has verified that the VF relay will be able to energize and deenergize the small general purpose relay in the SSPS without contact chatter. The auxiliary relay will be used to monitor control voltage and will send a trip signal to the SSPS by opening contacts in series with the VF relay contacts upon loss of control power.

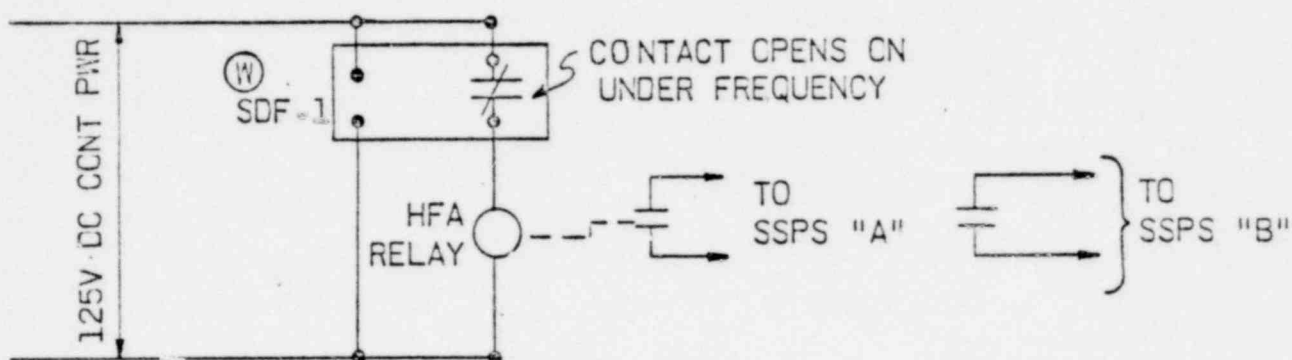
These modifications will be completed on Sequoyah unit 1 before fuel loading. Design changes have also been initiated for Sequoyah unit 2 and for Watts Bar Nuclear Plant units 1 and 2.

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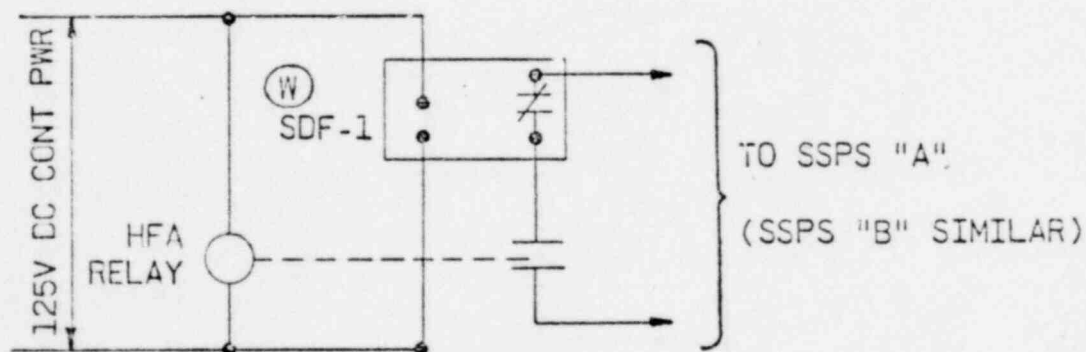
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SEQUOYAH NUCLEAR PLANT
 UNDERFREQUENCY INPUTS TO THE
 SOLID STATE PROTECTION SYSTEM
 (MODIFICATIONS DUE TO NCR EEB 79-13)



ORIGINAL CONFIGURATION



MODIFICATION