



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA STREET, N.W.  
 ATLANTA, GEORGIA 30323

Report No.: 50-261/89-31

Licensee: Carolina Power and Light Company  
 P. O. Box 1551  
 Raleigh, NC 27602

Docket No.: 50-261

License No.: DPR-23

Facility Name: H. B. Robinson

Inspection Conducted: December 12-13, 1989

Inspector:

*A. E. Conlon*  
 M. D. Hunt

1-29-90  
 Date Signed

Accompanying Personnel: T. E. Conlon

Approved by:

*A. E. Conlon*  
 T. E. Conlon, Chief  
 Plant Systems Section  
 Engineering Branch  
 Division of Reactor Safety

1-29-90  
 Date Signed

SUMMARY

Scope:

This special, announced inspection was conducted in the areas of sequencing and loading electrical safe guards equipment onto the safety busses as related to URI 89-25-02, Sequencers Load Overlap Problem-Agastat relays.

Results:

In the areas inspected, violations or deviations were not identified. The licensee has conducted a thorough evaluation of the degraded grid voltages with respect to sequencing the ESF loads.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

C. R. Dietz, Site Manager  
\*W. Flanagan, Outage Manager  
R. E. Morgan, Plant General Manager

Other licensee employees contacted during this inspection included engineers, operators, and technicians,

#### NRC Resident Inspector

\*L. W. Garner

\*Attended exit interview

### 2. Action on Previous Inspection Findings

(Closed) Unresolved Item; 50-261/89-25-02, Sequencer Load Overlap Problem-Agastat Relays. This unresolved item (URI) is discussed in detail in NRC report 50-261/89-25, however, a brief summary of the issue is presented in order to close the URI.

The licensee shut H. B. Robinson, Unit 2 down in August 1989 to correct the Auxiliary Feedwater (AFW) net positive suction head problem. During this outage the licensee extended the corrective action to include the repair of the motor driven AFW pumps due to rotor bar cracking and out-of-roundness. The vendor did the motor repair and in post testing noted longer acceleration times for the A and B motors and informed the licensee.

As a result of other design basis reconstitution efforts, the licensee was aware that a computer simulation of sequential loading of ESF equipment on to the Emergency Diesel Generator (EDG) under LOCA conditions did not exist. Therefore, a quick comparison of the effects of longer motor acceleration times could not be done. The licensee did the next best thing in conducting an iterative analysis sufficient to convince them that a potential problem existed.

The licensee used the following postulated scenario:

- The CP&L grid heavily loaded.
- H. B. Robinson, Unit 2, on line and experiences a LOCA.
- H. B. Robinson, Unit 1, and the ten Darlington County IC turbines not in service.

The above scenario causes the local grid voltage to become degraded when the nuclear unit trips. This event coupled with the longer motor acceleration times plus the  $\pm 5$  percent accuracy of the time delay setting on the Agastat relays rather than the previously assumed  $\pm 2$  seconds accuracy of the relays would result in actuation of undervoltage protective relays and loss of offsite power to the emergency busses. This would cause the loads to shed, auto start of the EDG's and resequencing of the ESF loads. The scenario described above is beyond the analyzed events as described in Chapter 15 of the UFSAR.

Upon discovery of this issue, the licensee extended the outage until the problem was corrected by removing the electro - pneumatic Agastat relays and installing solid state digital relays with a much greater timing accuracy. The modification was completed by MOD-1035, "Emergency Load Sequencer Relay Replacement." This modification was successfully tested before unit restart.

During the interim, the licensee has contracted for a dynamic analysis of sequential loading of EDG's by the engine manufacturer (COLT).

The CP&L grid loading and stability will be controlled by administrative procedures.

This issue was an indirect result of corrective actions by the licensee for the AFW net positive suction head problem, and identified by the licensee as a result of the comprehensive corrective action and promptly reported.

Based upon the above, the NRC has determined that no violation occurred and the URI is considered closed.

### 3. Exit Interview

The inspection scope and results were summarized on December 6, 1989, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. No dissenting comments were received from the licensee.