

② M. Virgilio  
(PF)

SEP 29 1983

MEMORANDUM FOR: Thomas M. Novak, Assistant Director for Licensing  
Division of Licensing  
FROM: R. Wayne Houston, Assistant Director for Reactor Safety  
Division of Systems Integration  
SUBJECT: RELAY FAILURES AT GRAND GULF - UNIT 1

Plant Name: Grand Gulf-Unit 1  
Docket No.: 50-416  
Licensing Status: OL (Limited to 5 Percent of Rated Thermal Power)  
Project Manager: D. Houston  
Review Branch: ICSB  
Review Status: Open

In July and August 1983 during the performance of 18-month surveillance tests at Grand Gulf twelve inoperable Agastat type relays were identified. These relay failures precluded the automatic operation of three standby service water system valves, one LPCI injection valve, and components in the control room HVAC system, combustible gas control system, RCIC system, RHR system, Containment Drywell instrumentation, HPCS system and fire protection system. On September 23, 1983 the NRC staff met with the representatives from Mississippi Power and Light Company (the licensee) and with representatives from General Electric to discuss the relay failures. At this meeting the General Electric representatives stated that the failures were random end of life failures and that the twelve relay failures were within the bounds of the expected relay failure rates for Grand Gulf. The expected relay failure rate for Grand Gulf is 13 failures per 1000 relays every 18 months. There are approximately 1740 relays at Grand Gulf.

From discussions with the licensee's representatives, a review of the FSAR and a review of the technical specifications for Grand Gulf it appears that a significant percentage of these relays are tested only during the 18 month surveillance. To operate the facility consistent with the single failure assumptions of the FSAR transient and accident analysis more frequent testing may be appropriate.

Contact:  
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T. Novak

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Accordingly, enclosed we are providing a request for additional information to resolve our concerns in this area. We request that you forward the enclosure to the licensee.

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R. Wayne Houston, Assistant Director  
for Reactor Safety  
Division of Systems Integration

Enclosure:  
As stated

cc: R. Mattson  
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| DATE    | 9/28/83   | 9/28/83  | 9/29/83  | 9/29/83   |  |  |

REQUEST FOR ADDITIONAL INFORMATION

During a recent 18-month surveillance test at Grand Gulf 12 inoperable Agastat type relays were identified. These relay failures precluded the automatic operation of components in at least 9 safety-related systems. In a meeting with the NRC staff on September 23, 1983 at the NRC's Region II offices, representatives from Mississippi Power and Light stated that the failures were random, end of life failures and that the relay failures were within the bounds of the expected failure rates for Grand Gulf. The Mississippi Power and Light representatives stated that there are approximately 1740 relays at Grand Gulf and that the expected relay failure rate is 13 failures per 1000 relays every 18 months.

From a review of the FSAR and the Grand Gulf Technical Specification the NRC staff has determined that a significant number of safety-related relays are tested only during the 18-month surveillance tests. It is the staff's concern that 18-month surveillance test intervals may not be justified in view of the relay failure rates. To operate the facility consistent with the single failure assumptions of the FSAR transient and accident analysis more frequent testing may be appropriate.

The design of instrumentation channels, logic and actuation devices of safety-related systems should include provisions for at-power surveillance testing. General Design Criterion 21 states that "the protection system shall be designed to permit periodic testing of its functioning when the reactor is in operation, including a capability to test channels independently to determine failures and losses of redundancy that may have occurred." Additional requirements and guidance for at-power testing and the establishing of test intervals is included in IEEE Standard 279, Reg. Guide 1.118 and IEEE Standard 338.

Based on the above we request that you provide the following information:

1. Of the total population of Agastat relays in the plant's safety-related systems provide a breakdown identifying the systems involved, the number of Agastat relays in each system and the frequency for testing the relays/systems.
2. Provide a detailed discussion, with illustrations from applicable elementary diagrams, on the at-power testing capability provided in the Grand Gulf design for those Agastat relays/systems currently tested only during plant shutdowns.
3. Provide a discussion on the test intervals selected for the systems that include Agastat relays which demonstrates consideration of the following factors:
  - (1) system availability,
  - (2) manufacturers recommendations,
  - (3) historical experience with use of similar equipment,
  - (4) failure rate data,
  - (5) results of preoperational testing,
  - (6) quality information, and
  - (7) regulatory requirements.

This discussion should address the single failure assumptions of the FSAR transient and accident analyses.