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Vice President
Operations
Specialized Support Section

December 27, 1990

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Special Report 90-003-00 Emergency Diesel Generator 11
Failure

GNRO-90/00012

Gentlemen:

On November 27, 1990 at approximately 1226 hours, plant operators started Diesel Generator 11 (Division 1) for performance of the monthly functional surveillance in accordance with Technical Specification 4.8.1.1.2.

The diesel was successfully started and loaded to approximately 350 kilowatts (KW) at 1233 hours. While at the 350 KW load, operators at the local diesel generator panel observed oscillations of about 5 volts (10 volts peak to peak) on the generator field voltage instrument. A similar variation occurred at approximately 1000 KW. Incremental loading of the generator was continued without significant abnormal variations.

At approximately 1255 hours with the generator loaded at 5000 KW and stable, large oscillations of generator field voltage, field current and output current were displayed on the local control panel. Indications on these instruments then pegged upscale and returned to near normal range, and then pegged upscale about twenty seconds later at which time the generator output breaker tripped. The diesel continued to run until it was manually shut down by operators. The diesel generator was then secured for corrective maintenance.

Immediate investigation into this failure revealed that the generator field voltage slip rings displayed more than expected amounts of carbon deposits. The voltage regulator circuit in service at the time of the failure (i.e., Bridge 1) was initially suspected to have caused the failed run. Visual inspection of that circuit was performed. No failed component was observed during the search for the cause of the malfunction.

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Upon cleaning the generator slip rings and setting the generator voltage regulator system to the redundant circuit (i.e., Bridge 2), a test run of the diesel generator commenced at 1642 hours and was performed successfully. The failure symptoms did not recur with the voltage regulator system in the Bridge 2 circuit. The diesel generator operability surveillance commenced at 1836 hours. The diesel generator was declared operable at 2158 hours on November 27, 1990.

Subsequent troubleshooting investigations were performed on December 11, 1990. Components and assemblies inspected were the carbon brushes; carbon brush springs force; electrical resistance of relay contacts for generator field voltage feedback circuit to the voltage regulator; and electrical resistance of contacts for the governor droop relay.

Strip chart recordings were made of generator field voltage and current and generator output voltage and current during troubleshooting runs of the diesel generator with the voltage regulator system in the Bridge 1 circuit. Troubleshooting runs subjected the diesel generator to various operating conditions utilizing the same controls in service when the valid failure occurred. Attempts to repeat the failure were unsuccessful. Loads varied from zero to fully loaded and synchronized on the grid. Again, no abnormal parameters were indicated on instrumentation or recordings.

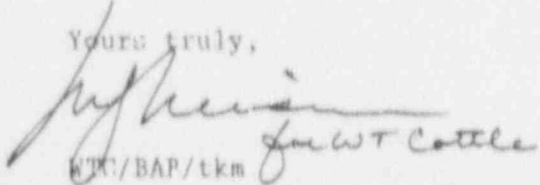
Due to the absence of a repeated failure while troubleshooting, it is suspected that the carbon deposits on the generator slip rings may have been the cause. The frequency of the generator carbon brush and slip ring inspection will be increased from an annual to a quarterly inspection. In addition, periodic cycling of the voltage regulator bridge relay will be performed. Monitoring of the diesel generator will be performed to provide additional assurance that corrective actions taken are effective.

Entergy Operations, Inc. considered the test to be a valid failure pursuant to Position G.2.e(5) of the Regulatory Guide 1.108 since the ability of the diesel generator in this condition to power ESF loads in response to a bonafide signal was indeterminate. This was the first valid failure in the last 20 tests and the fifth in the last 100 valid tests. Therefore, the testing frequency was increased to once per 7 days in accordance with the test schedule of Technical Specification Table 4.8.1.1.2-1.

December 27, 1990
GNRU-90/00012
Page 3 of 4

This Special Report is submitted pursuant to Technical Specification
4.8.1.1.3.

Yours truly,


WTC/BAP/tkm

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December 27, 1990
GNRO-90/00012
Page 4 of 4

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