



OLIVER D. KINGSLEY, JR.  
Vice President  
Nuclear Operations

January 15, 1988

U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: Document Control Desk

Gentlemen:

SUBJECT: Grand Gulf Nuclear Station  
Unit 1  
Docket No. 50-416  
License No. NPF-29  
Special Report 87-007/0  
Emergency Diesel Generator 11  
Trip During Surveillance  
AECM-88/0014

On December 18, 1987 during a functional surveillance, Emergency Diesel Generator (EDG) 11 started and reached normal operating speed of 450 rpm in response to the simulated Loss of Offsite Power/Loss of Coolant Accident (LOP/LOCA) signal. The signal was initiated for Technical Specification required surveillance testing. The diesel generator speed and output voltage began decreasing immediately after reaching 450 rpm and loading. After the engine coasted down to approximately 120 rpm, it began increasing speed and voltage until it reached normal operating parameters. The diesel generator operated at a steady state load of 2200 KW for approximately 40 minutes with no indicated problems before being shutdown for further investigation into the abnormal behavior. The diesel generator had successfully operated at full load for 24.6 hours just prior to the LOP/LOCA test. The 24 hour load test and the LOP/LOCA test are both part of the 18 month functional surveillance.

EDG 11 was placed in the maintenance mode and operated for troubleshooting following the December 18 incident. During the subsequent maintenance runs the diesel generator experienced trips and a similar event where the speed and output voltage dropped to zero but did not recover. The trips and shutdowns were caused by component malfunctions which could have contributed to the initial December 18 incident. Another trip experienced during a maintenance run was caused by a malfunctioning vibration switch. This failure was eliminated as a potential cause of the initial incident since the vibration switch is bypassed in the LOP/LOCA mode.

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The first component malfunction identified was a pneumatic solenoid (P5) and shuttle valve assembly in the pneumatic control logic. The assembly failed to shift to the proper position causing the pneumatic control system to shutdown the engine. An intermittent malfunction of the assembly could have contributed to the initial incident. The pneumatic solenoid and shuttle valve assembly were replaced. The P5 pneumatic solenoid is manufactured by Calcon, model number B843. The shuttle valve is manufactured by Humphrey Products, model number S125.

Another malfunctioning component in the pneumatic control logic was the P4 pneumatic solenoid. The P4 solenoid was leaking air past its seat which reduced the air pressure in the pneumatic trip header. The low air pressure caused false trips during the maintenance runs. This malfunction could also have contributed to the initial incident. The P4 solenoid is manufactured by Humphrey Products, Model Number 250A. The solenoid was replaced.

After correction of the above pneumatic problems, the diesel generator experienced shutdowns with no indication of a pneumatic trip device activation. After an evaluation and a consultation with the diesel generator governor vendor, the mechanical governor was replaced. The problem did not recur. The replaced governor was returned to the vendor, Woodward Governor Co., for a failure evaluation. A malfunctioning governor could also have contributed to the initial incident.

EDG 11 had been removed from service since December 2, 1987 for the scheduled outage inspections and maintenance work. EDG 11 was not required to be operable during this period since EDG 12 was available. By December 27, 1987 EDG 11 had successfully passed both the LOP/LOCA portion of the 18 month functional test and the monthly functional surveillance.

The initial incident on December 18 is considered a valid failure. The test frequency has been increased to once per 7 days in accordance with the test schedule of Technical Specification 4.8.1.1.2-1. This is the third valid failure in the last 100 valid tests. The trips during the maintenance runs are not considered valid tests as allowed by Regulatory Guide 1.108, Section C.2.3.(7).

This report is submitted as an interim report. A supplement to this report providing an update of the governor failure evaluation is expected to be submitted by July 29, 1988.

Yours truly,



ODK:bms

cc: (See Next Page)

cc: Mr. T. H. Cloninger  
Mr. R. B. McGehee  
Mr. N. S. Reynolds  
Mr. H. L. Thomas  
Mr. R. C. Butcher

Dr. J. Nelson Grace, Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region II  
101 Marietta St., N. W., Suite 2900  
Atlanta, Georgia 30323

Mr. L. L. Kintner, Project Manager  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
7920 Norfolk Avenue  
Bethesda, Maryland 20814