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SUBJECT: Responds to NRC 940329 ltr re violations noted in insp rept
 50-275/94-02. Corrective actions: electrical governor was
 correctly adjusted.

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April 27, 1994

PG&E Letter DCL-94-087

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Docket No. 50-275, OL-DPR-80
Diablo Canyon Unit 1

Special Report 94-02, Diesel Generator 1-1 Failure to Achieve Rated Output
Frequency within TS Time Limits Due to Electronic Governor Performance

Gentlemen:

In accordance with the requirements of Diablo Canyon Technical Specifications (TS) 6.9.2 and 4.8.1.1.4 and Revision 1 to NRC Regulatory Guide (RG) 1.108, this Special Report is submitted concerning two events regarding failures of Diesel Generator (DG) 1-1. The first event was a failure to achieve rated output frequency within TS time limits due to electronic governor performance. The second event, which occurred during maintenance verification testing for the first event, was a failure to attain rated speed due to improper adjustment of the electronic governor setpoint.

On March 29, 1994, at 2144 PDT, with Unit 1 defueled, performance of Surveillance Test Procedure (STP) M-9A, "Diesel Engine Generator Routine Surveillance Test," commenced for DG 1-1. DG 1-1 failed to meet acceptance criteria for achieving the required frequency within the STP time limits during a simulated undervoltage start. The frequency stabilized at a value of 60.3 hertz (Hz) in 15.74 seconds. The STP requirement, based on gauge readability and instrument accuracy, is to have the frequency to a value between 59 and 61 Hz in 13 seconds. The TS requirement is that the frequency shall be 60 plus/minus 1.2 Hz within 13 seconds after the start signal. DG 1-1 was declared inoperable. The STP was continued and DG 1-1 was paralleled to 4160-volt vital Bus H at 2159 PDT.

On March 30, 1994, at 0218 PDT, DG 1-1 was separated from Bus H to allow electrical maintenance to adjust the voltage regulator/electronic governor. At 0302 PDT, DG 1-1 was paralleled back to 4160-volt vital Bus H. At 0309 PDT, DG 1-1 was separated from Bus H, and at 0326 PST the DG was shutdown. At 0417 PDT, another STP M-9A test was commenced to verify that corrective work on the governor had been completed satisfactorily. The diesel attempted to start (cranking) five times, but never achieved greater than 200 rpm at any time.

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On March 30, 1994, at 0930, DG 1-1 was declared operable after the governor was readjusted and successful completion of STP M-9A.

Using the guidance of RG 1.108, Sections B and C.2.e, the first event of failing to achieve rated frequency within the prescribed time requirement is considered to be a valid failure. The second event, which was part of maintenance verification testing, is considered to be a non-valid failure. During both events, there were no core alterations, positive reactivity changes, nor movement of irradiated fuel or crane operations with loads over the fuel storage pool; therefore, the limiting conditions for operation required by TS 3.8.1.2 were satisfied.

DISCUSSION

Investigative actions were performed to determine the cause(s) for the failure to achieve rated frequency within the prescribed TS time requirement. Based on a review of industry and Diablo Canyon experience, the specific root cause of this event could not be identified. Two potential causes were identified:

- (1) Electrical governor performance.
- (2) Instrumentation malfunction (i.e., not in proper calibration).

The results of the investigation are as follows. Both the frequency meter and frequency recorder were found to be in proper calibration for the frequency range in question. Therefore, instrumentation malfunction was not the cause of this event. The most probable cause for the failure to achieve rated frequency within TS time requirements is due to electrical governor performance. The electrical response of the generator is affected by mechanical variables (i.e., lube oil temperature, etc.) and electrical variables (i.e., voltage regulator adjustments, etc.). The governor is designed to compensate for these variables and provide a response within user defined parameters. The governor adjustment is determined based on the specific operating characteristics of each diesel generator. The exact cause for the need to adjust the governor for DG 1-1 is not known. The regularly scheduled DG surveillance testing verifies that the DG starts and obtains required voltage and frequency, which verifies that the electrical governor is operating properly.

The second event (DG never achieved greater than 200 rpm at any time) was determined to be the result of over-adjustment of the null voltage screw on the electrical governor while attempting to adjust the frequency stabilization setpoint, as part of an approved maintenance work package.

Based on the results of the investigation and past experience with the electrical governor at Diablo Canyon, no further actions were determined to be necessary. No corrective actions to prevent recurrence were identified.

In accordance with RG 1.108, Section C.3.b, the following information is included:

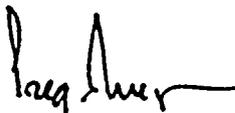
1. Diesel generator involved: DG 1-1



2. Number of valid failures in last 100 DG 1-1 valid tests: 4
3. Cause of failure: The most probable cause for the failure to achieve rated frequency within TS time requirements has been determined to be due to electrical governor performance.
4. Corrective measures taken:
 - a. Immediate Corrective Action: The electrical governor was correctly adjusted, and DG 1-1 was successfully tested in accordance with STP M-9A.
 - b. To Prevent Recurrence: The existing surveillance testing process, in conjunction with RG 1.108 requirements, provides appropriate identification of electrical governor performance problems with respect to other DG electrical and mechanical parameters.
5. Time diesel was unavailable: DG 1-1 failed to achieve rated frequency within the prescribed TS time requirement on March 29, 1994, at 2144 PDT. DG 1-1 was declared fully "operable" on March 30, 1994, at 0930 PDT. Therefore, even though DG 1-1 was available on the vital bus for part of this time period, DG 1-1 was conservatively determined to be not available for a total of 11 hours and 46 minutes.
6. Current surveillance test interval: 31 days
7. Confirmation of proper test interval: The total number of valid failures in the last 100 valid tests for DG 1-1 is 4, and the total number of valid failures in the last 20 valid tests for DG 1-1 is 1; therefore, the 31-day test interval is in compliance with the schedule of TS Table 4.8-1, and an accelerated testing schedule is not required.

These conditions did not adversely affect the health and safety of the public.

Sincerely,



Gregory M. Rueger

cc: Leonard J. Callan
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Diablo Distribution
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DC1-94-TS-N020

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