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October 22, 1990

PG&E Letter No. DCL-90-254

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Re: Docket No. 50-275, OL-DPR-80
Diablo Canyon Unit 1
Special Report 90-05, Diesel Generator 1-3 Failure to Maintain Electrical Load Due to Failure of the Fuel Oil Booster Pump Drive Belt

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 the failure of Diesel Generator (DG) 1-3 to maintain electrical load.

On September 20, 1990, at 1644 PDT, with Units 1 and 2 in Mode 1 (Power Operation), DG 1-3 was started in accordance with Surveillance Test Procedure (STP) M-9A3, "Diesel Engine Generator 1-3 Routine Surveillance Test." DG 1-3 started, accelerated, loaded, and ran for the length of time required by the TS and RG 1.108. After successful completion of the surveillance test, DG 1-3 began to unload. Operators separated DG 1-3 from the bus and tripped the diesel. Investigation identified that DG 1-3 had begun to unload due to failure of the fuel oil booster pump drive belt. The fuel oil booster pump drive belt was replaced, and STP M-9A3 performed to verify operability of the DG.

Using the guidance of RG 1.108, Sections B and C.2.e, this event could be considered to be a non-valid failure since the unloading occurred after successful surveillance testing. However, PG&E is reporting the event as a valid failure due to the unavailability of the fuel oil booster pump. During this event, all other electrical power sources were available if called upon in the unlikely event of an actual emergency; therefore, the Limiting Conditions for Operation required by TS 3.8.1.1 were satisfied.

The failed belt, a Browning Premium Grip Link belt, size A, was discarded before it could be examined by maintenance engineers. Through interviews with the mechanics who replaced the belt, the failure mode of the belt was attributed to failure of the belt rivets. The mechanics stated that two adjacent rivets that held the belt together had fractured, causing the belt to fail. While the belt rivets had failed, the belt material itself was intact.

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Investigative actions were performed to determine the root cause for the belt rivet failure. Three potential root causes for the belt rivet failure were identified:

1. Excessive belt tension during DG operation.
2. A manufacturing defect.
3. Excessive DG run time.

Results of the investigation discounted the probability of these potential root causes. The failure of the belt rivets due to excessive belt tension during DG operation was discounted because:

1. The DG 1-3 belt had been in service approximately nine months. A rotational stress test closely duplicating operating conditions of the event was performed on another belt that had been in use for 15 months. Several times normal operating tension was placed on this belt before it failed. However, failure of this belt was due to tearing of the belt fabric rather than failure of the rivets.

2. Inspection of the other DG fuel oil booster pump drive belts identified that they were not excessively tensioned.

The failure of the belt rivets due to a generic manufacturing defect was discounted because:

1. The failure of the rivets could not be duplicated using the rotational stress test on a used or new belt.

2. Failed rivets were not found on any other fuel oil booster pump drive belt during an inspection to determine the possibility of a common mode failure. If there was a generic manufacturing defect, other failed rivets would be expected.

3. Conversations with the vendor and other nuclear plants identified no similar problems with the DG belts.

4. A search of past operating experience with the belts at DCPP identified no problems with the belts.

The failure of the rivets due to excessive DG run time was discounted because an operating history search identified that DG 1-3 had not run significantly longer than the other DGs following belt replacement during the last refueling outage.

Based on the results of the investigation, the past experience with the belts at DCPP, and the isolated nature of this failure, no further actions were determined to be necessary to prevent recurrence.

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

(1) Diesel Generator involved: DG 1-3

(2) Number of valid failures in last 100 DG 1-3 valid tests: 1

(3) Cause of failure: Failure of the fuel oil booster pump drive belt. Based on discussions with the mechanics, the belt failure was attributed to failure of two adjacent rivets; however, investigative actions performed could not identify the exact root cause of rivet failure.

(4) Corrective measures taken:
a) Immediate Corrective Action: DG 1-3 fuel oil booster pump drive belt was replaced. All other DG fuel oil pump drive belts were inspected.
b) To Prevent Recurrence: As a result of investigative actions and previous successful experience with the DG fuel oil booster pump drive belts, no further corrective action was identified.

(5) Time diesel was unavailable: The DG 1-3 fuel oil booster pump drive belt failed on September 20, 1990, at 1827 PDT. The control switch for DG 1-3 was returned to AUTO, after successful performance of post maintenance testing, on September 21, 1990, at 0310 PDT for a total of 8 hours and 43 minutes of unavailability.

(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 1-3 is 1, and the total number of valid failures in the last 20 valid tests for DG 1-3 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 have in no way affected the public's health and safety.

Sincerely,

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