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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 94-009-00:on 941020,DG 2-2 started automatically during scheduled surveillance test.Caused by plant design w/lightly loaded bus.STP M-16Q3 revised.W/941118 ltr.

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PRIORITY 1 DOCUMENT

Pacific Gas and Electric Company

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Gregory M. Rueger
Senior Vice President and
General Manager
Nuclear Power Generation

November 18, 1994

PG&E Letter DCL-94-257

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

Docket No. 50-323, OL-DPR-82
Diablo Canyon Unit 2
Licensee Event Report 2-94-009-00
Unplanned Diesel Generator Start (ESF Actuation) During a Transfer from Auxiliary Power to Standby Power Due to Slow Bus Voltage Decay During a Scheduled Surveillance Test

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PG&E is submitting the enclosed Licensee Event Report regarding an unplanned diesel generator start (engineered safety feature actuation) during a scheduled surveillance test when, due to a lightly loaded bus, the bus voltage decayed slowly during a transfer from auxiliary power to startup power. This resulted in a loss of potential sensing voltage and actuation of the first level undervoltage relay. A four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72.

This event did not affect the health and safety of the public.

Sincerely,

Gregory M. Rueger

cc: L. J. Callan
Mary H. Miller
Kenneth E. Perkins
Sheri R. Peterson
Diablo Distribution
INPO

Enclosure

DC2-94-TS-NO5O

6699S/KWR/2246

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Diablo Canyon Unit 2

DOCKET NUMBER (2): 0 5 0 0 0 3 2 3

PAGE (3): 1 OF 5

TITLE (4): Unplanned Diesel Generator Start (ESF Actuation) During a Transfer from Auxiliary Power to Standby Power Due to Slow Bus Voltage Decay During a Scheduled Surveillance Test

EVENT DATE (5)			LER NUMBER (6)							REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MON	DAY	YR	YR	SEQUENTIAL NUMBER				REVISION NUMBER		MON	DAY	YR	FACILITY NAMES	DOCKET NUMBER (S)
10	20	94	94	-	0	0	9	-	0	11	18	94		0 5 0 0 0
														0 5 0 0 0

OPERATING MODE (9): 5

POWER LEVEL (10): 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (11)

X 10 CFR 50.73(a)(2)(iv)

OTHER -

(Specify in Abstract below and in text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER AREA CODE	TELEPHONE NUMBER
David P. Sisk - Senior Regulatory Compliance Engineer	805	545-4420

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

[ ] YES (If yes, complete EXPECTED SUBMISSION DATE) [X] NO

EXPECTED SUBMISSION DATE (15): MONTH | DAY | YEAR

ABSTRACT (16)

On October 20, 1994, at 0903 PDT, with Unit 2 in Mode 5 (Cold Shutdown), Diesel Generator (DG) 2-2 started automatically during a scheduled surveillance test due to the first level undervoltage (UV) relay sensing loss of voltage and timing out prior to the successful completion of the transfer from auxiliary power to startup power. The 4160-volt bus was lightly loaded resulting in a slow voltage decay rate that permitted the DG start signal to occur prior to completing the bus transfer and electrically resetting the UV relay. The DG is not expected to start on a successful transfer to startup power. This event constitutes an engineered safety feature actuation.

On October 20, 1994, at 1000 PDT, a four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(ii).

The root cause of this event is plant design; with a lightly loaded bus, there is the potential for the bus voltage to decay at a slow enough rate such that the first level UV relay will sense a degraded bus voltage, time out, and actuate prior to the successful bus transfer electrically resetting the UV relay.

Surveillance test procedures (STPs) will be revised to include sufficient information to alert operators that an automatic DG start may occur during successful transfers to startup power under lightly loaded bus conditions, or the STP alignment will be modified to prevent an inadvertent DG start.

I. Plant Conditions

Unit 2 was in Mode 5 (Cold Shutdown) with an average reactor coolant system temperature less than 200 degrees Fahrenheit.

II. Description of Problem

A. Summary

On October 20, 1994, at 0903 PDT, while performing Surveillance Test Procedure (STP) M-16Q3, "Functional Testing of Busses H, F and G Auto-Transfer to Startup Power," Diesel Generator (DG) 2-2 [EB][DG] started automatically due to the first level undervoltage (UV) [EA][27] relay sensing a loss of bus voltage and timing out prior to the successful completion of the transfer from auxiliary power to startup power. The DG was not expected to start on a successful transfer to startup power. This event constitutes an engineered safety feature (ESF) actuation.

B. Background

STP M-16Q3 tests the transfer from auxiliary power to startup power by initiating a signal from the solid state protection system (SSPS). The STP states that the DG is not expected to start on a successful transfer to startup power. The STP provides precautions that a DG start could occur if the transfer to startup power is not successful.

C. Event Description

On October 20, 1994, during the performance of STP M-16Q3, DG 2-2 started during the transfer from auxiliary power to startup power (SSPS signal initiation). The STP specifically stated that the DG is not expected to start on a successful transfer to startup power.

The bus loading after the transfer was 250 kW and 380 kVAR. There were no 4160-volt motors nor any 480-volt containment fan cooler units (CFCU) loaded on the bus before the test, and only CFCU 2-4 received a start signal, as expected.

Subsequent review of the annunciator printouts determined that the DG started on first level UV relay actuation. The first level UV relay timed out prior to completing the bus transfer and electrically resetting the UV relay.

On October 20, 1994, at 1000 PDT, a four-hour, non-emergency report was made pursuant to 10 CFR 50.72(b)(2)(ii).

D. Inoperable Structures, Components, or Systems that Contributed to the Event

None.

E. Dates and Approximate Times for Major Occurrences

1. October 20, 1994, at 0903 PDT: Event Date/Discovery Date: Inadvertent start of DG 2-2 during STP M-16Q3 auto-transfer test.

2. October 20, 1994, at 1000 PDT: A four-hour, non-emergency report was made to NRC in accordance with 10 CFR 50.72 (b)(2)(ii).

F. Other Systems or Secondary Functions Affected

None.

G. Method of Discovery

The event was immediately apparent to plant operators due to alarms [NA][ALM] and indications received in the control room.

H. Operator Actions

DG 2-2 was run for approximately fifteen minutes and then shutdown and returned to the automatic mode of operation.

I. Safety System Responses

DG 2-2 started but did not load onto its associated 4160-volt bus since the transfer to startup power was successful.

III. Cause of the Problem

A. Immediate Cause

The DG started when the first level UV relay actuated when the bus voltage decayed to below the relay setpoint.

B. Root Cause

The root cause of this event is plant design; with a lightly loaded bus, there is the potential for the bus voltage to decay at a slow enough rate such that the first level UV relay will sense a degraded bus voltage, time out and actuate (DG start signal) prior to the successful bus transfer electrically resetting the UV relay.

C. Contributing Cause

None.

IV. Analysis of the Event

Since all equipment performed as designed during this event, the inadvertent actuation of the DG ESF component did not adversely affect the health and safety of the public.

V. Corrective Actions

A. Immediate Corrective Actions

STP M-16Q3 was revised to provide a precaution that the DG may start during this test if the first level undervoltage relay times out before the 4160-volt bus voltage is restored.

The test was reperformed with a component cooling water pump (4160-volt) connected to the bus and the DG did not start on the transfer from auxiliary power to startup power.

B. Corrective Actions to Prevent Recurrence:

Other STPs that initiate a transfer from auxiliary power to startup power from the SSPS will be reviewed and revised as necessary to provide precautions that a DG automatic start is an expected response for lightly loaded bus conditions, or the STP alignment will be modified to prevent an inadvertent DG start.

No additional corrective actions are necessary. Refer to the discussion below of previous LERs on similar problems.

VI. Additional Information

A. Failed Components

None.

B. Previous LERs on Similar Problems

LER 2-88-010-00 documents the automatic start of DG 2-2 after a reactor trip and subsequent transfer of the 4160-volt buses from auxiliary power to startup power. This DG start was the fourth instance between 1986 and 1988 of such a start during bus transfer. It was determined that the DG starts were due to slow voltage decay due to lightly loaded bus conditions. A design change was implemented for both Unit 1 and 2 to reduce the probability of a DG start on bus transfer. This corrective action appears to have been effective since the event documented in this LER is the only such instance since the design change was implemented.