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PG&E Letter DCL-10-052

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyons Unit 1 & Unit 2
Licensee Event Report 1-2010-002-00
Potential Loss of Safety-Related Pumps due to Degraded Voltage During Postulated Accidents

Dear Commissioners and Staff:

Pacific Gas and Electric Company submits the enclosed Licensee Event Report (LER) regarding a vulnerability identified during postulated degraded grid voltage conditions concurrent with accidents. This LER is submitted in accordance with 10 CFR 50.73(a)(2)(ii) (B) as an unanalyzed condition.

PG&E will submit a supplemental LER following completion of the cause analysis.

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

Sincerely,

James R. Becker

lmp/2246/50302031
Enclosure
cc/enc: Elmo E. Collins, NRC Region IV
Michael S. Peck, NRC Senior Resident Inspector
Alan B. Wang, NRR Project Manager
INPO
Diablo Distribution

IE22
NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Diablo Canyon Unit 1	05000275	1 OF 5

4. TITLE

Potential Loss of Safety-related Pumps due to Degraded Voltage During Postulated Accidents

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Diablo Canyon Unit 2	05000323
03	09	2010	2010	- 002 -	00	05	10	2010	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☒ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Larry M. Parker – Regulatory Services Supervisor	(805) 545-3386

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☒ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☐ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
08	07	2010

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On March 9, 2010, while analyzing the consequences of accidents concurrent with postulated degraded grid voltage, PG&E concluded both Units 1 and 2 were in an unanalyzed condition. On March 9, 2010, at 23:39 (EST), PG&E reported this unanalyzed condition to the NRC in accordance with 50.72(b)(3)(ii)(B) (reference EN45754).

The postulated sustained degraded voltage condition could have resulted in normally operating safety-related pump motors tripping overcurrent relays. As a result, these pumps would not be immediately available to mitigate a postulated accident.

Previously, PG&E had not considered this postulated worst case degraded voltage condition credible, and had therefore not analyzed for it. As a result, technical specification surveillance requirement (SR) 3.3.5.3 values are nonconservative.

The immediate compensatory measure was to raise the first level undervoltage relay setpoints on the vital buses of both units, thus transferring loads to diesels prior to tripping operating motors on overcurrent. PG&E continues to assess this condition, and will submit a supplemental LER following completion of the cause analysis and identification of corrective actions.

TEXT

I. Plant Conditions

At the time of discovery, both units were in Mode 1 (Power Operation) at approximately 100 percent reactor power with normal grid voltage.

II. Description of Problem

A. Background

Each Diablo Canyon Power Plant (DCPP) unit has three 4 kV vital buses [EA]. The 4 kV vital buses are normally powered from auxiliary power transformers from the main generator. Normally operating safety-related loads powered by the 4 kV vital buses include two component cooling water (CCW)[BI] pumps and one auxiliary saltwater (ASW)[BS] pump.

To protect the safety-related loads, the 4 kV vital buses are provided with loss of voltage and undervoltage [27] protection that transfers loads to the immediately available offsite power standby source (startup) and starts emergency onsite diesel generators (EDG)[EK] during a loss of voltage or degraded voltage condition. The EDGs provide emergency power to mitigate an accident and safely shutdown the unit when offsite power is unavailable.

The loss of voltage relays protect each 4 kV vital bus while connected to an offsite power source. These relays have inverse time characteristics that actuate more quickly in response to more severe undervoltage conditions, with only a slight delay upon complete voltage failure. These relays are referred to as the first level undervoltage relays (FLURs).

The second level undervoltage relays (SLURs) provide undervoltage protection for degraded bus voltage conditions. The SLURs actuate at greater than or equal to 3785 volts. Both of the SLURs on a bus must actuate to initiate EDG start and load shed timers for the associated bus. If voltage remains below the reset voltage for 10 seconds, the associated EDG will receive a start signal. If voltage remains below the reset voltage for 20 seconds, loads are shed from the bus in preparation for load sequencing onto the EDG. If voltage recovers prior to these time limits, the SLURs reset. The reset voltage is set to avoid unnecessary EDG starts and load shedding of a vital bus. The FLURs and SLURs are designed to protect safety-related loads from damage on loss or degradation of 4 kV vital bus voltage.

Technical Specification (TS) 3.3.5 "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation" Surveillance Requirement (SR) 3.3.5.3 specifies the FLUR and SLUR setpoints and time delays.

Surveillance Test Procedure (STP) M-75 "4 kV Vital Bus Undervoltage Relay Calibration" ensures the relays meet the values specified in TS SR 3.3.5.3.

B. Event Description

On March 9, 2010, PG&E analyzed the consequences of accidents concurrent with postulated degraded grid voltage for a non-conforming condition, second level undervoltage time delay relay not reflected in accident analyses. As a result, PG&E discovered both units were in an unanalyzed condition. The postulated sustained degraded grid voltage condition was that the 4kV voltage remained below the SLUR setpoint and slightly above the FLUR setpoint, resulting in the vital buses experiencing the degraded voltage condition until the SLUR time delays were completed. This condition could have resulted in normally operating safety-related pump motors tripping their overcurrent relays [51]. As a result, these pumps may not have been immediately available to mitigate a postulated accident as credited in accident analyses.

On March 9, 2010, at 20:39 (PST), PG&E reported this as an unanalyzed condition (8-hour report) to the NRC in accordance with 50.72(b)(3)(ii)(B) (reference EN45754).

PG&E implemented interim compensatory measures via Shift Orders to prevent auto transfer to startup of one vital 4 kV bus per unit. As a result, offsite startup power was considered inoperable in both Units 1 and 2.

On March 9, 2010, at 21:58 (PST for Unit 1, 21:57 for Unit 2), in response to the above interim compensatory measures, operators declared startup power inoperable and entered 72-hour TS 3.8.1 Action A.2 for one inoperable offsite power source.

In order to exit the TS Action, PG&E implemented a temporary modification (compensatory measure) that raised the first level undervoltage relay setpoints on the vital buses of both Units 1 and 2, (from approximately 70 percent to approximately 80 percent) thus allowing transfer of loads to EDGs prior to tripping on overcurrent.

On March 12, 2010, at 13:17 (PST for Unit 1, 13:18 for Unit 2), following adjustment of FLUR setpoints, completion of STP M-75, and elimination of the previously established compensatory measures, operators exited the 72-hour TS action.

C. Status of Inoperable Structures, Systems, or Components that Contributed

to the Event

None

D. Other Systems or Secondary Functions Affected

No additional safety systems were adversely affected by this event.

E. Method of Discovery

During the Component Design Basis Inspection, NRC inspectors asked PG&E to evaluate various postulated sustained degraded 4kV voltage scenarios. As a result of the evaluation, this issue was identified.

F. Operator Actions

Interim compensatory measures were implemented to protect normally operating safety-related pumps from postulated degraded voltage. Operators declared Startup power inoperable and complied with 72-hour TS 3.8.1 Action A.2 until the FLUR setpoints could be raised on the vital buses to higher values.

G. Safety System Responses

None

III. Cause of the Problem

A. Immediate Cause

The immediate cause of the unanalyzed condition was that PG&E had not considered this postulated worst case degraded voltage condition credible, and had therefore not analyzed for it. As a result, technical specification (TS) surveillance requirement (SR) 3.3.5.3 values are non conservative.

B. Cause

A cause analysis has not been completed. Once the analysis is completed, a supplemental LER will be submitted.

TEXT

IV. Assessment of Safety Consequences

The postulated degraded voltage of approximately 70 percent for over ten seconds could cause normally operating safety-related motors (two CCW pump motors and one ASW pump motor) to trip on overcurrent. The condition was considered reportable because accident analyses assumed normally running safety-related loads would automatically transfer to an EDG. Therefore this event is considered unanalyzed.

The assessment of safety consequences will be included in the supplemental LER.

V. Corrective Actions

A. Immediate Corrective Actions

PG&E implemented compensatory measures by raising the FLUR setpoints on the vital buses of both units, thus protecting operating safety-related motors from tripping on overcurrent during postulated sustained degraded voltage conditions.

B. Corrective Actions to Prevent Recurrence (CAPR)

Additional actions will be specified in the supplemental LER.

VI. Additional Information

A. Failed Components

None

B. Previous Similar Events

None.

C. Industry Reports

NRC Event Notification EN45754