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January 30, 2014

PG&E Letter DCL-14-008

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

10 CFR 50.73

Docket No. 50-275, OL-DPR-80
Diablo Canyon Unit 1
Licensee Event Report 1-2013-006-01, Emergency Diesel Generators Valid Start Signal Due to Loss of Startup Power

Dear Commissioners and Staff;

Pacific Gas and Electric Company (PG&E) submits the enclosed Licensee Event Report (LER) supplement for a valid actuation of the emergency diesel generators when 230 kV offsite power to Diablo Canyon Power Plant (DCPP), Unit 1, was lost. PG&E is submitting this supplement to provide updated cause and corrective action information, following completion of a vendor analysis. This LER supplement is submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

PG&E makes no new or revised regulatory commitments (as defined by NEI 99-04) in this report. All the corrective actions identified in this letter will be implemented in accordance with the DCPP Corrective Action Program.

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

Sincerely,

Barry S. Allen

dho6/6038/50578636
Enclosure
cc: Brian J. Benney, NRR Project Manager
Marc L. Dapas, NRC Region IV Administrator
Thomas R. Hipschman, NRC Senior Resident Inspector
INPO
Diablo Distribution

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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)

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4. TITLE

Emergency Diesel Generators Valid Start Signal Due to Loss of Startup Power

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
08	15	2013	2013	- 006 -	01	01	30	2014	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)*
Dean Overland, Senior Engineer, Regulatory Services	(805) 545-6038

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
B	FK	TTC	483R	Y					

14. SUPPLEMENTAL REPORT EXPECTED

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

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On August 15, 2013, at 18:24 PDT, Pacific Gas and Electric lost the 230 kV offsite power source to its Diablo Canyon Power Plant (DCPP), Unit 1, when the Startup Transformer (SUT) 1-1 load tap changer (LTC) diverter switch failed. This resulted in the valid start of all three Unit 1 emergency diesel generators (EDGs). The EDGs successfully started, but did not load, because the associated buses remained energized by the 500 kV auxiliary offsite power source. On August 16, 2013, at 02:36 EDT, DCPP made an 8-hour report to the NRC (NRC Event Notification Number 49287).

A failed bolted connection between a flex link and a stationary contact caused the SUT LTC diverter switch to fail. It was determined that the bolted connection failed because the vendor did not adequately torque the connection during assembly and installation. Corrective action include the revision of SUT LTC maintenance instructions to include bolted termination torque specifications. Additionally, DCPP will include replacement parts material checks in procurement or work planning documents for future LTC maintenance.

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

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NARRATIVE

I. Plant Conditions

Just prior to, and following, the event, Unit 1 operated in Mode 1 (Power Operation) at approximately 100 percent reactor [RCT] power with normal operating reactor coolant temperature and pressure.

II. Problem Description

A. Background

The Diablo Canyon Power Plant (DCPP) electrical systems are designed to ensure an adequate supply of electrical power to all essential equipment during normal operation and under accident conditions. Nonvital 4 kV alternating current (AC) auxiliary buses [EA] are energized by either offsite power [FK] or power from the main generator [GEN]. Vital AC buses [EB] have an additional available source, which includes onsite power [EK] delivered by emergency diesel generators (EDGs) [DG]. The electrical systems are designed so that failure of any one electrical device will not prevent operation of the minimum required engineered safety feature (ESF) equipment.

DCPP offsite power is supplied by two offsite power circuits that are physically and electrically separated and independent of each other: (1) a 230 kV connection and (2) a 500 kV connection. The 230 kV offsite power circuit provides offsite startup and standby power, and provides an immediately available source of offsite power to the 4 kV system. To make power available to the vital 4 kV buses, the 230 kV offsite power circuit provides power to Startup Transformers (SUT)[XFMR] 1-1 and 2-1 (230 kV to 12 kV), which then feeds Startup Transformer (SUT) 1-2 and 2-2 (12 kV to 4 kV). The 500 kV offsite power circuit provides for transmission of the plant's power output, and is also available as a delayed access source of offsite power after the main generator is disconnected.

To produce onsite power, each unit has three EDGs, which supply power to the 4 kV vital AC buses when power is unavailable or voltage degrades below a point at which required ESF loads would be operable. After the EDGs start they supply power to their respective vital bus if the buses are deenergized. If the vital buses are not deenergized, the EDGs continue to run in standby mode, ready to provide power if required. The EDGs also start in standby mode on low 12 kV startup bus voltage but do not load onto the buses.

B. Event Description

On August 15, 2013, at 18:24 PDT, DCPP Unit 1 lost its 230 kV offsite power source when the SUT 1-1 load tap changer (LTC) diverter switch failed. This caused a valid anticipatory start of all Unit 1 EDGs, and is reportable per 10 CFR 50.73(a)(2)(iv)(A). The Unit 1 EDGs successfully started on loss of Unit 1 12kV Startup voltage, but did not load, because the associated buses [BU] remained energized by the 500 kV auxiliary offsite power source. However, the safety-related onsite EDGs would have provided power to mitigate the consequences of an accident if both sources of offsite power had been lost. On August 16, 2013, at 02:36 EDT, DCPP made an 8-hour report to the NRC (NRC Event Notification Number 49287).

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C. Status of Inoperable Structure, Systems, or Components That Contributed to the Event

The SUT 1-1 LTC diverter switch failure, and subsequent loss of voltage to the Unit 1 12 kV startup bus, initiated the valid start signal to the Unit 1 EDGs.

D. Other Systems or Secondary Functions Affected

All Unit 1 EDGs started and ran in standby.

E. Method of Discovery

Licensed plant operators immediately recognized the event by alarms and indications received in the control room.

F. Operator Actions

After ensuring that all vital buses remained energized, operators manually shut down the Unit 1 EDGs.

G. Safety System Responses

All Unit 1 EDGs started as designed with no problems observed.

III. Cause of the Problem

A. Immediate Cause

DCPP Unit 1 lost its 230 kV offsite power source when the SUT 1-1 LTC diverter switch failed.

B. Cause

An apparent cause evaluation, supported by a vendor analysis, concluded that vendor error during bolt installation and torquing caused a loose, high-resistance bolted connection between a flex link and a stationary contact in the diverter tank. This high resistance caused the SUT LTC diverter switch to fail.

IV. Assessment of Safety Consequences

The 230 kV startup power is a standby system. With the successful start of all EDGs upon the loss of startup power, the vital AC power supply to all emergency core cooling system loads would have been maintained. Probabilistic risk analysis results in an incremental core damage and incremental large early release probabilities that were well below their respective acceptance criteria.

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V. Corrective Actions

A. Immediate Corrective Actions

The SUT LTC diverter was replaced. Post-maintenance testing confirmed that the transformer high voltage windings and bushings were not damaged by the electrical event experienced inside the LTC diverter switch compartment, and that SUT 1-1 was no longer degraded.

B. Other Corrective Actions

DCPP will revise SUT LTC maintenance instructions to include bolted termination torque specifications. This action will also add guidance on which critical steps will be performed by the vendor, add a requirement to record torque values, and add quality verification checks during bolt torquing. Additionally, DCPP will include replacement parts material checks in procurement or work planning documents for future LTC maintenance.

VI. Additional Information

A. Failed Components

SUT 1-1 LTC diverter switch failed.

B. Previous Similar Events

On June 23, 2013, at 21:20 PDT, Pacific Gas and Electric lost its 230 kV offsite power source at DCPP when an offsite transmission system relay actuated. This resulted in the valid start of all Unit 1 and 2 EDGs, three per unit. All EDGs successfully started, but did not load since all associated buses remained energized by auxiliary power. All systems operated as designed with no problems observed. (NRC Event Notification Number 49143, and LER 1-2013-003-00).