



**Pacific Gas and
Electric Company®**

Donna Jacobs
Vice President
Nuclear Services

Diablo Canyon Power Plant
P. O. Box 56
Avila Beach, CA 93424

805.545.4600
Fax: 805.545.4234

May 2, 2007

PG&E Letter DCL-07-053

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
90-day Response to NRC Generic Letter 2007-01, "Inaccessible or Underground
Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant
Transients"

Pursuant to 10 CFR 50.54(f), this letter provides the Pacific Gas and Electric Company (PG&E) 90-day response to NRC Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," dated February 7, 2007. The generic letter requests licensees to provide a history of inaccessible or underground power cable failures, and to describe inspection, testing, and monitoring programs to detect the degradation of inaccessible or underground power cables for cables within the scope of 10 CFR 50.65.

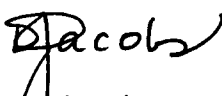
PG&E's response is provided in the enclosure.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter. This letter includes no revisions to existing regulatory commitments.

If you have questions regarding this response, please contact Mr. Stan Ketelsen at (805) 545-4720.

I state under penalty of perjury that the foregoing is true and correct.

Executed on May 2, 2007.


Donna Jacobs



Document Control Desk
May 2, 2007
Page 2

PG&E Letter DCL-07-053

mjrm/4557

cc: Terry W. Jackson, Senior Resident Inspector
Bruce S. Mallett, Region IV
Sandra Shewry, Director, California Department of Health Services
Diablo Distribution
cc/enc: Alan B. Wang, NRR

**Response to Requested Information of NRC Generic Letter 2007-01,
Inaccessible or Underground Power Cable Failures that Disable
Accident Mitigation Systems or Cause Plant Transients**

Below is the Pacific Gas and Electric Company (PG&E) response to the information requested in NRC Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," dated February 7, 2007. The generic letter's requested information is shown in italics, followed by PG&E's response.

NRC Requested Information Item (1):

Provide a history of inaccessible or underground power cable failures for all cables that are within the scope of 10 CFR 50.65 (the Maintenance Rule) and for all voltage levels. Indicate the type, manufacturer, date of failure, type of service, voltage class, years of service, and the root causes for the failure.

PG&E Response (1):

Research into inaccessible or underground power cable failures at Diablo Canyon Power Plant (DCPP) revealed 10 failures in power cables within the scope of 10 CFR 50.65. Table 1 below contains the information requested as well as additional information on the types of failures, components supported, and cable identifiers.

For most of the cable failures listed in Table 1, no definitive evidence was found to determine a root cause for the failure. However, water was found present in most cases. PG&E suspects that water may have been a contributing factor, and limiting or eliminating the wet environment would remove a possible degradation mechanism. After the analysis of the component cooling water motor 2-3 cable failure found the root cause to be a discrete contaminant particle within the cable insulation, PG&E established a cable replacement program as a corrective action to replace all safety-related medium voltage cables and other critical non safety-related medium voltage cables with more modern cables during refueling outages. DCPP has completed more than 50 percent of these replacements.

NRC Requested Information Item (2):

Describe inspection, testing and monitoring programs to detect the degradation of inaccessible or underground power cables that support EDGs, offsite power, [emergency service water] ESW, service water, component cooling water and other systems that are within the scope of 10 CFR 50.65 (the Maintenance Rule).

PG&E Response (2):

Testing:

PG&E periodically performs direct current hi-pot testing on medium voltage cables during the overhaul or maintenance of the equipment they feed.

DCCP uses a high resistance ground system for the 4kV and 12kV systems, and an ungrounded system for the low voltage (480V and under) system. Medium voltage and low voltage degraded cables typically fail to ground rather than phase to phase. In an ungrounded or high resistance ground system, a single ground fault will bring in a ground alarm alerting operators of a problem, providing time for operator actions. Additionally, surveillance test procedures performed periodically on safety-related equipment demonstrate that the cables are functional.

Pull Box Inspections:

PG&E performs inspections on a periodic basis to eliminate or minimize wet conditions known to impact cable degradation rates. DCCP has the following recurring preventive maintenance activities and inspections in place to mitigate the potential for cable degradation:

- Bimonthly inspection and dewatering of outdoor electrical pull boxes located between the turbine building and the intake structure (inspections may be deferred if weather conditions do not warrant inspection, but have to be performed a minimum of four times per year). Pull boxes are checked for standing water and if water is found, it is pumped out, and corrective action is initiated to investigate the cause of the standing water.
- Yearly verification that pull boxes and manholes, sump pumps, alarms, and drains are functional.
- Once per cycle inspection of the pull boxes at the intake structure to verify that they are dry, and the drainage system is functional.

In addition, PG&E inspects and dewateres a limited number of the non-safety related electrical pull boxes that are known to have moisture problems during the rainy season (those without drain pipes or sump pumps). These pull boxes are inspected and pumped out monthly during the rainy season.

Conduit Inspections:

Although the pull box inspection and dewatering program has been effective in keeping the pull boxes dry, PG&E discovered in the process of cable

replacements that water was present in some dips in the conduits subjecting the cables to long term wetting. A new underground conduit inspection program is being implemented for DCPD to inspect the duct bank underground conduits suspected of containing water. This inspection will look for the presence of water, and will remove any water that is found. Any conduits found to contain water will be monitored to verify that the water does not return.

In addition to the current inspection, testing, and maintenance practices, DCPD continues to stay informed of new technologies, and will evaluate the new technologies for implementation as additional information becomes available. These could include such techniques as partial discharge testing, very low frequency, dissipation factor, etc.

Table 1. DCPD Cable Failure Data

Failure #	Failure Type (Inservice/ Testing)	Cable Type (Insulation Type)	Cable Type (Shielded, Yes/No)	Cable Manufacturer	Date of Failure	Type of Service (Energized/ Deenergized)	Component Supported	Cable Identifier	Voltage Class (nominal service voltage)	Voltage Class (cable rating voltage)	Years of Service Prior to Failure	Root Causes for the Failure (apparent cause) (Note 2)
1	Inservice	EPR Black	Yes	Okonite	10/29/1989	Energized	ASW 2-2	G06H00	4kV	5kV	16	Unknown
2	Inservice	EPR Black	Yes	Okonite	5/3/1992	Energized	MCC 14D (Note 4)	D08H00 (Note 1)	4kV	5kV	17	Unknown
3	Hi-pot	EPR Black	Yes	Okonite	10/31/1992	Energized	ASW 1-2	G06H00	4kV	5kV	17	Unknown
4	Inservice	EPR Black	Yes	Okonite	2/5/1993	Energized	CWP 1-1	D05V00	12kV	15kV	21	Chemical Attack
5	Inservice	EPR Black	Yes	Okonite	3/12/1993	Energized	CWP 1-2	E05V00	12kV	15kV	22	Chemical Attack
6	Inservice	EPR Black	Yes	Okonite	10/25/1995	Energized	MCC 15D (Note 4)	D06H00	4kV	5kV	23	Unknown
7	Hi-pot	EPR Black	Yes	Okonite	4/16/1996	Energized	MCC 24E (Note 4)	E06H00 (Note 1)	4kV	5kV	24	Unknown
8	Inservice	EPR Black	Yes	Okonite	6/12/1997	Energized	MCC 14D (Note 4)	D08H00 (Note 1)	4kV	5kV	25	Unknown
9	Inservice	EPR Black	Yes	Okonite	8/18/2002	Energized	CCW 2-3	H12H00	4kV	5kV	29	Insulation Contaminant (Note 3)
10	Hi-pot	EPR Black	Yes	Okonite	2/22/2003	Energized	MCC 24E (Note 4)	E06H00 (Note 1)	4kV	5kV	30	Unknown

Table 1 Notes:

- Note 1: These circuits failed twice as the cables were only partially replaced to remove the failed section the first time. Subsequently the remaining portion of the original cable failed, and the circuits were then replaced entirely.
- Note 2: In all cases, except failure No. 9, water was present in the pull boxes/conduits.
- Note 3: This cable was evaluated by Altran Solutions Inc. for failure analysis and the root cause was found to be due to a discrete contaminant particle within the cable insulation. The underground duct bank conduit was found to be dry. There was no bulk degradation of the dielectric properties of this cable, and no evidence of chemical attack or water damage on this cable.
- Note 4: 480 VAC motor control center (MCC).