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PG&E Letter DCL-10-057

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20852

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Response to NRC Request for Additional Information for the Diablo Canyon License
Renewal Application

Dear Commissioners and Staff:

By letter dated November 23, 2009, Pacific Gas and Electric Company (PG&E) submitted an application to the U. S. Nuclear Regulatory Commission (NRC) for the renewal of Facility Operating Licenses DPR-80 and DPR-82, for Diablo Canyon Power Plant (DCPP) Units 1 and 2, respectively. The application included the license renewal application (LRA), and Applicant's Environmental Report – Operating License Renewal Stage.

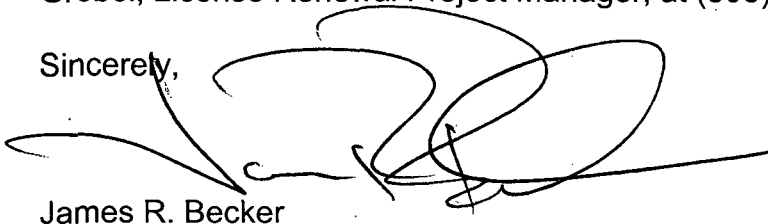
By letter dated May 18, 2010, the NRC staff requested additional information needed to continue their review of the Diablo Canyon License Renewal Application.

PG&E's response to the request for additional information is included in Enclosure 1.

PG&E makes no regulatory commitments (as defined in NEI 99-04) in this letter.

If you have any questions regarding this response, please contact Mr. Terence L. Grebel, License Renewal Project Manager, at (805) 545-4160.

Sincerely,



James R. Becker

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NRR



pns/50317785

Enclosure

cc: Diablo Distribution

cc/enc: Elmo E. Collins, NRC Region IV Regional Administrator

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**PG&E Response to Request for Additional Information For the
Diablo Canyon License Renewal Application**

Question B2.1.12-1

In license renewal application (LRA) Section B2.1.12, the applicant stated an exception to Generic Aging Lessons Learned (GALL) Report aging management program (AMP) XI.M26, "Fire Protection Program" to expand the scope of the AMP to include aging management of lightning rods, mounting structures, and ground connections. The applicant stated that the aging effects of these components are managed in accordance with commitments to 10 CFR 50, Appendix A, APCS 9.5-1 and NFPA 780 "Standard for the Installation of Lightning Protection." Although Appendix D of NFPA-780 is not part of the requirements and was included for informational purposes only, Appendix D is the only section of the standard that discusses inspection and maintenance practices.

The Diablo Canyon Nuclear Power Plant (DCPP) Fire Protection Program (FPP) includes visual inspection of lightning rods, mounting structures, and ground connections at least once every five years to verify that the lightning protection system is present without damage. However, the staff noted that NFPA-780, 2008 Edition, Appendix D, Section D.1.1.2 specifies that lightning protection systems be visually inspected at least once a year, and complete in-depth inspections of all systems be completed every three to five years. Furthermore, NFPA-780, Section D.1.3 states that in addition to visual inspections, complete testing and inspection includes (a) tests to verify continuity of those parts of the system that were concealed and not available for visual inspection, (b) ground resistance tests of the grounding electrode termination system and its individual grounding electrodes, and (c) continuity tests to determine if suitable equipotential bonding has been established for any new services or connections that have been added since the last inspection. In the absence of plant specific operating experience, it is unclear to the staff what the basis is for the scope and frequency of inspections of lightning rods, mounting structures, and ground connections.

Provide justification for the frequency and scope of tests and inspections of lightning rods, mounting structures, and ground connections managed for aging by the FPP, including plant specific operating experience (e.g., inspection results, corrective actions taken to mitigate aging degradation), and describe whether these results were used for trending and adjustment of testing frequency and scope.

PG&E Response to Question B2.1.12-1

PG&E performs an inspection of lightning rods, mounting structures, and ground connections every 5 years in accordance with plant procedures. The inspection is a visual inspection and includes the system checks noted in National Fire Protection Association (NFPA) 780 section D.1.2 "visual inspection", steps 1-6. The inspection includes the following plant areas and components:

- lightning rods and mounting structures on the main warehouse, fuel handling building, auxiliary building, turbine building, and the containments;
- ground connections on the auxiliary boiler enclosure, blast and paint facility, hazardous material building, flammable and combustible liquids building, main warehouse, cold machine shop, and radwaste building.

Plant procedures require that any degradation observed during inspection activities be entered into the corrective action program.

Based on PG&E's inspection findings, no degradation due to aging has been found during surveillances which would prevent this equipment from performing its license renewal intended function. Thus, the five-year frequency is adequate for detecting aging degradation prior to the loss of license renewal intended function. The most recent inspection was performed April 18, 2007, which inspected 370 lightning rods. The test identified degraded lightning rods at eight locations. The degradation was assessed by Engineering to not be related to aging (primarily loose clamps) with no loss of license renewal intended function. Repairs were completed by July 23, 2007.

PG&E does not periodically perform continuity, ground resistance, and equi-potential point testing of the lightning protection system as described in NFPA 780 Appendix D. If degradation is observed during inspections, evaluation of corrective actions may include further testing as described in NFPA 780, Section D.1.3.

As stated in License Renewal Application (LRA) Section B2.1.12, the aging effects of lightning rods, mounting structures, and ground connections are managed in accordance with commitments to NFPA 780. The current licensing basis (CLB) for DCPD does not include a commitment to all provisions of NFPA 780 and NFPA 780 Appendix D. NFPA 780 Appendix D is an informational part of the NFPA standard. Per NFPA 780 Appendix D, "This annex is not a part of the requirements of this NFPA document but is included for informational purposes only" and as such, is not considered to be a part of the CLB.

Question B2.1.12-2

GALL AMP XI.M26, "Fire Protection Program," recommends visual inspection and functional testing of the halon and carbon dioxide (CO₂) fire suppression system every six months to examine for signs of degradation that may affect performance of the system.

In LRA Section B2.1.12, the applicant stated an exception to GALL AMP XI.M26, in that it does not have any halon fire suppression systems within the scope of license renewal. The applicant did not provide details supporting its conclusion that the halon fire suppression systems are not within the scope of the license renewal.

Provide justification for why the halon fire suppression systems are not included in the scope of the license renewal.

PG&E Response to Question B2.1.12-2

As noted in PG&E's comparison of Branch Technical Position Auxiliary Power and Chemical System Branch (BTP APCSB) 9.5-1, (Final Safety Analysis Report (FSAR) Update Section 9.5, Appendix 9.5B), Halon suppression systems are not utilized within the Diablo Canyon power block. However, Halon suppression systems are used in the Learning Center (Building 109 - in the Simulator area), in the Administration Building (Building 104 - on the 1st and 6th floors), and in the I&C/Medical/Telecom building (Building 102 - in the 2nd floor communications room). Except for the Administration Building, these buildings are evaluated as not within scope of license renewal as detailed in DCPD License Renewal Application (LRA) Table 2.2-1. The Administration Building structure is within the scope of license renewal to provide structural support for the elevated walkway to the Turbine Building. None of the mechanical systems within the Administration Building, including the Halon suppression systems, are within the scope of license renewal.

Additionally, although the Fire Protection System is in the scope of license renewal (as detailed in LRA Table 2.2-1), the Halon suppression components at DCPD do not have a license renewal intended function and therefore do not require aging management.

Question B2.1.12-3

GALL AMP XI.M26, "Fire Protection Program," recommends visual inspection and functional testing of the halon and CO₂ fire suppression systems every 6 months to examine for signs of degradation that may affect performance of the system.

In LRA Section B2.1.12, the applicant stated an exception to GALL AMP XI.M26 in that functional testing of the CO₂ fire suppression systems are performed every 18 months, and the turbine generator bearing No. 10 and circulating water pump high pressure CO₂ system detectors are tested every 24 months. The applicant also stated that a review of the past 10 years of operating experience and corrective action documentation has shown no loss of intended function between test intervals. However, the staff noted that in the LRA Section B2.1.12, the applicant stated that leakage and degradation has been found in the CO₂ fire suppression system.

Provide additional information such as inspection results and trending data to justify the inspection interval of once every 18 or 24 months for the CO₂ fire suppression system components.

PG&E Response to Question B2.1.12-3

The surveillance frequencies for CO₂ functional testing are based on original plant technical specification surveillance requirements and operating experience as discussed below.

Equipment Control Guideline (ECG) 18.5, "CO₂ System," Bases states, in part, "Surveillance requirements provide assurance that the minimum operability requirements for DCPD fire suppression systems are met. The NRC, in the original plant fire protection technical specifications, established the frequency of system surveillances when the plant was licensed (Reference: License Amendment Request 90-11). Additionally, National Fire Protection Association (NFPA) guidance is used as a basis for establishing other surveillance requirements. DCPD insurance requirements provide additional input to system testing, maintenance, and compensatory measures."

In addition, this is considered an adequate frequency based on the system being a low duty system and operating in a mild environment. Seal aging issues take several years to reveal themselves. More frequent testing would not improve the performance of the system. The CO₂ system is normally at room temperature and depressurized, and the electrical components are normally de-energized (energize to actuate). The process media is inert CO₂ gas. This results in the aging mechanisms caused by temperatures and internal/external environments being slow acting. Recent DCPD problems with hoses, as discussed below, have been exacerbated by improper testing (extended time at pressure) and are not due to aging issues.

A review of plant CO₂ system maintenance and test history, as documented below, shows that 18 and 24 month test frequencies are adequate to detect aging-related degradation prior to loss of license renewal intended function. This review identified the following items, which involve initiating factors other than aging, that may have adversely affected the ability of the system to perform its license renewal intended function:

1. Two functional failures were discovered during testing at master valves FCV-103 and FCV-104 in 2008 and 2004, respectively. FCV-103 failed due to actuator seal aging and FCV-104 failed due to improper test practices that were not related to aging. Both valves and operators have since been replaced and procedures revised to protect valves during testing. All other system valves are functional with operational tests current. Valve replacement orders are currently in-progress to replace all 18 low pressure CO₂ valves and associated actuator/operators. This new preventive maintenance plan is a corrective action to address the extent of condition for the FCV-103 failure. To date, seven valves have been replaced with only minor elastomeric seal degradations found.

2. The CO₂ refrigeration system was replaced in 2007 to address both obsolescence issues and upgrade the system to employ an environmentally friendly coolant. System performance since replacement has been without problems. Based on a review of system pressure trends and maintenance records, no adverse trends have been identified.
3. There have been eight CO₂ hose station problems. Five of these problems were identified during a single routine surveillance test. The 2008 master valve FCV-103 failure (noted above in item 1) is the reason these problems were identified. FCV-103 failed to close on signal during testing on August 27, 2008. This resulted in the hose station header being pressurized to all 19 hose stations for approximately 30 minutes. Normally, the hose stations are tested for less than one minute, FCV-103 is reclosed, and the system is vented. In this case, the system was pressurized for an extended period of time, which revealed hose reel problems at five locations. The five failures are evaluated as related to the over pressurization event and not related to aging effects. The five hose stations have since been repaired. All 19 hose reel stations are currently being inspected with enhanced maintenance plans, and new hoses are being installed at each reel. The remaining three hose station problems involved minor hose reel leaks in 1998, 1999, and 2000, which would not have prevented the system from performing its license renewal intended function.
4. Only one temperature switch failure has occurred, on March 24, 2010. The temperature switch is an active component, which is not under the scope of license renewal.

Question B2.1.13-1

GALL AMP XI.M27, "Fire Water Program," recommends annual hydrant hose hydrostatic tests and gasket inspections, however, in LRA Section B2.1.13, the applicant stated that it performs hydrostatic testing of its power block fire hoses every three years and gasket inspections at least once every 18 months in most areas and every 24 months in high radiation areas. The applicant further stated that it has been using a three-year frequency for hydrostatic testing of fire hoses and 18 or 24 month frequency for gasket inspection for more than ten years and no degradation leading to a loss of function has been observed.

In LRA Section B2.1.13, the applicant stated an exception to GALL AMP XI.M27 to perform hydrostatic test of power block fire hoses every three years and inspection of gaskets every 18 or 24 months because plant operating experience has demonstrated that the extended testing frequencies have been adequate to prevent system failures. However, the GALL Report program specifically states that fire hydrant hose hydrostatic tests, gasket inspections, and fire hydrant flow tests, should be performed annually to ensure that fire hydrants can perform their intended function and provide detection of degradation before a loss of intended function can occur.

Provide additional justification for performing the hydrant hose hydrostatic tests every 3 years and gasket inspections every 18 or 24 months, including inspection results, corrective actions taken to mitigate aging degradation, and describe whether these results were used for trending and adjustment of testing frequency.

PG&E Response to Question B2.1.13-1

In accordance with plant procedures and National Fire Protection Association (NFPA) Standard 1962, 1998 Edition, PG&E performs hydrostatic tests of its indoor fire hoses at least every 3 years, while outdoor fire hoses are tested at least annually. Fire hoses that are inaccessible during normal plant operations are tested every refueling outage. In addition, fire hoses are removed and visually inspected on an 18-month frequency. This test removes the fire hose from the hose reel to inspect for defects (fraying, puncture, mildew), and to inspect hose gaskets for condition (cracking, elasticity, smoothness of sealing surfaces).

In accordance with plant procedures, PG&E performs a visual inspection of its indoor hose station gaskets once every 18 months, except hose stations in high radiation areas and the containment buildings which are tested during refueling outages. Further, hose station gaskets are inspected during annual surveillance operability testing for outdoor fire hose stations and every 3 years for indoor fire hose stations. These testing frequencies are performed to satisfy DCPD Equipment Control Guideline (ECG) 18.2.6, which was relocated from the DCPD Technical Specifications. Per License Amendments 74 and 75 for Units 1 and 2, respectively, NRC approved DCPD's request to relocate the fire protection Technical Specifications and associated bases to the ECGs. Therefore, DCPD's testing frequencies are in compliance with the licensing basis previously approved by NRC.

NFPA Standard 25, Section 4.6.1.1.1 states, "As an alternative means of compliance, subject to the authority having jurisdiction, components and systems shall be permitted to be inspected, tested and maintained under a performance-based program." As of March 2010, DCPD has six leaky hose reel valves and one cracked hose reel. All ECG hose stations are operable with one non-ECG hose station degraded, but still in-service. No trends have been identified that indicate the current inspection frequencies are not adequate to ensure the equipment meets its license renewal intended function. In summary, PG&E conducts hydrostatic tests in accordance with NFPA Standard 1962, 1998 Edition; is in compliance with the licensing basis previously approved by NRC (Reference: License Amendments 74 and 75); meets the guidance of NFPA 25 for performance-based testing; and, has not identified adverse trends in hydrant hoses and gaskets.

Question B2.1.13-2

GALL AMP XI.M27, "Fire Water Program," recommends periodic flow testing of the fire water system or wall thickness evaluations (e.g., volumetric or visual inspections) be performed to ensure that the system maintains its intended function; and that these inspections be performed before the end of the current operating term and at plant-specific intervals thereafter during the period of extended operation. GALL AMP XI.M27 also states that if an applicant chooses to perform visual inspections, these inspections must be capable of evaluating (1) wall thickness to ensure against catastrophic failure, and (2) the inner diameter of the piping as it applies to the design flow of the fire protection system. The applicant's current visual inspection frequency for firewater piping, valves, and fire hydrants is once every 18 months.

In LRA Section B2.1.13, the applicant discusses an enhancement to GALL AMP XI.M27 to revise procedures to include either periodic, non-intrusive volumetric examinations (e.g., ultrasonic or eddy current) or visual inspections of fire water system piping to ensure these inspections are suitable to identify evidence of loss of material due to corrosion and to ensure that wall thickness is within acceptable limits.

During its review of plant specific operating experience, the staff noted several examples of corrosion damage to above ground firewater piping, valves, and fire hydrants, including through wall leaks that have been identified at the applicant's current visual inspection frequency of 18 months. The staff also noted that the applicant's underground firewater piping does not have cathodic protection and is currently not periodically inspected.

It is not clear to the staff that the enhancement discussed in LRA Section B2.1.13 includes inspections of below ground firewater piping. Also, given the plant-specific operating history (discussed above), the staff questions the suitability of maintaining an 18-month inspection frequency.

Clarify whether the enhancement discussed in LRA Section B2.1.13 includes inspections of below ground firewater piping. Also, provide additional detail as to the basis for maintaining an 18-month inspection frequency, given the above plant-specific operating history.

PG&E Response to Question B2.1.13-2

The enhancement discussed in LRA Section B2.1.13 includes inspections of all fire water piping included within the scope of the Fire Water System Aging Management Program. This scope includes above grade fire water piping and below grade fire water piping.

DCPP fire water piping inspections will be conducted in accordance with the recommendations outlined in NUREG-1801, XI.M27, Element 4. This states, in part:

If the environmental and material conditions that exist on the interior surface of the below grade fire protection piping are similar to the conditions that exist within the above grade fire protection piping, the results of the inspections of the above grade fire protection piping can be extrapolated to evaluate the condition of below grade fire protection piping. If not, additional inspection activities are needed to ensure that the intended function of below grade fire protection piping will be maintained consistent with the current licensing basis for the period of extended operation.

DCPP fire water piping is visually inspected for early indications of aging effects (such as material wastage, pitting, blistering, or porosity) on an 18-month frequency. In addition, the firewater yard loop and underground feeds are flushed semi-annually. The flowing water removes accumulated debris and/or sediment which can be indicative of internal pipe aging. The firewater system is flow tested at least every 3 years in order to verify firewater system design and National Fire Protection Association (NFPA) test requirements.

These testing frequencies are performed to satisfy DCPP Equipment Control Guidelines (ECGs), which were relocated from the DCPP Technical Specifications. Per License Amendments 74 and 75 for Units 1 and 2, respectively, NRC approved DCPP's request to relocate the fire protection Technical Specifications and associated bases to the ECGs. Therefore, DCPP's testing frequencies are in compliance with the licensing basis previously approved by NRC.

NFPA Standard 25, Section 4.6.1.1.1 states, "As an alternative means of compliance, subject to the authority having jurisdiction, components and systems shall be permitted to be inspected, tested and maintained under a performance-based program." Based on quarterly system engineering evaluations of DCPP operating experience and implementation of associated corrective actions, PG&E has determined that the frequency of fire water piping inspections is adequate.

Additionally, PG&E currently performs opportunistic inspections of buried firewater piping when excavation is occurring. The work planning process and fire protection engineering reviews ensure that fire protection equipment, including buried firewater pipe, are properly inspected during repairs. As discussed in License Renewal Application (LRA) Section B2.1.13, for the period of extended operation, PG&E also commits to performing "either periodic, non-intrusive volumetric examinations (e.g., ultrasonic or eddy current) or visual inspections of fire water system piping."

Plant procedures require that any degradation observed during inspection activities be entered into the corrective action program. Corrective actions and preventive measures, such as component replacements, redesign, and material upgrades, have been developed in response to plant-specific operating experience on firewater components to ensure their license renewal intended function is maintained.

In summary, PG&E believes that the current surveillance frequency is adequate to maintain components' license renewal intended functions based on tests and inspections on firewater piping; compliance with the licensing basis previously approved by NRC (Reference: License Amendments 74 and 75); meeting the guidance of NFPA 25 for performance-based testing; a commitment to NUREG-1801, XI.M27, Element 4 for either periodic, non-intrusive volumetric examinations or visual inspections of firewater piping; and, corrective actions for identified degradation.