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November 24, 2010

PG&E Letter DCL-10-148

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 Letter dated November 03, 2010, Request for Additional Information (Set 29) 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 November 03, 2010, the NRC staff requested additional information needed to continue their review of the DCPP LRA.

PG&E's response to the request for additional information is included in Enclosure 1. LRA Amendment 25 resulting from the responses is included in Enclosure 2 showing the changed pages with line-in/line-out annotations.

PG&E makes new commitments in revised LRA Table A4-1, License Renewal Commitments, shown in Enclosure 2.

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

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

Executed on November 24, 2010.

Sincerely,

James R. Becker

tlg/50358666
Enclosure
cc: Diablo Distribution
cc/enc: Elmo E. Collins, NRC Region IV Regional Administrator
Nathanial Ferrer, NRC Project Manager, License Renewal
Kimberly J. Green, NRC Project Manager, License Renewal
Michael S. Peck, NRC Senior Resident Inspector
Fred Lyon, NRC Project Manager, Office of Nuclear Reactor Regulation
Alan B. Wang, NRC Project Manager, License Renewal

PG&E Response to NRC Letter dated November 03, 2010
Request for Additional Information (Set 29) for the
Diablo Canyon License Renewal Application

RAI B2.1.18-2 (Follow-up)

Background:
Given that there have been a number of recent industry events involving leakage from buried or underground piping, the staff requested further information to evaluate the impact that these recent industry events might have on the applicant's Buried Piping and Tanks Inspection Program. By letter dated August 3, 2010, the staff issued RAI B.2.1.18-2 requesting that the applicant provide information regarding how Diablo Canyon will incorporate the recent industry operating experience into its aging management reviews and programs. The applicant responded on August 30, 2010. In reviewing the response, the staff noted the following.

Issue:

1) *The applicant's response stated that, "Evaluation and appropriate changes to applicable programs as a result of recent operating experience are still ongoing both within PG&E and the industry. PG&E is committed to follow the EPRI 1016456, Recommendations for an Effective Program to Control the Degradation of Buried Pipe. The EPRI initiative addresses recent industry operating experience. PG&E programs, which will be modeled after the EPRI initiative, will also consider plant-specific operating experience. The EPRI initiative will set an inspection schedule for buried piping segments based on, among other things, pipe materials and locations. PG&E will develop an inspection plan for buried piping in accordance with NRC staff accepted industry guidelines that will provide the number of excavations, the minimum length of piping that will be exposed, and the percentage of the total length of piping that will be inspected."*

   The staff believes that in order to provide a reasonable assurance that in-scope buried piping will be capable of performing its intended function(s) and not release hazardous materials (i.e., material which, if released, could be detrimental to the environment such as diesel fuel and radioisotopes that exceed EPA drinking water standards) to the environment, each material, safety/Code class, and potential to contain hazardous material during normal operation category of in-scope buried pipe should be inspected. The staff also believes that there is a minimum set of excavated and visual inspections of buried piping segments that should be conducted. The LRA and supplemental material did not contain enough specifics on the planned inspections for the staff to determine if the inspections would be adequate to manage the aging effect for all material, safety/Code class, and potential to contain hazardous material categories of in-scope buried pipes.

2) *The applicant's response stated that, "At this time, PG&E does not plan to use any examination method other than excavation or visual inspection of buried piping. If PG&E decides to use methods of examination other than excavation and direct visual inspection, these methods will be submitted for NRC staff approval in accordance with NRC staff accepted buried piping and underground piping guidelines."*

   The staff acknowledges that examining buried pipe from the exterior surface may sometimes not be possible due to plant configuration (e.g., the piping is located underneath foundations); nevertheless, it is important to expose a large enough length of the piping in order to establish reasonable assurance of the condition of the piping system. The staff believes that in instances where it is not possible to expose the program designated length of piping during each inspection, an alternative examination should be proposed. The staff notes that it is reasonable to substitute an ultrasonic volumetric examination from the interior of the pipe provided the surface is properly prepared. Although the applicant stated that they will submit alternative examination methodologies for NRC staff approval, there is no specific requirement for a licensee to submit such changes for approval in the license renewal guidelines. Therefore the RAI response lacks sufficient specificity for the staff to find the applicant's proposal acceptable.

3) *The applicant stated that, "The remaining DFO system piping runs in air either in a conduit between the DFO tank and DFO transfer pump or in a concrete lined trench from the DFO transfer pumps to each diesel generator with no CP since the piping is not buried." The staff believes that this statement is in conflict with LRA Table 3.3.2-13 which indicates that there is buried piping in the diesel generator fuel oil system. The staff also believes that there is a minimum set of excavated and visual inspections of buried piping segments that contain hazardous materials that should be conducted to establish a reasonable basis of assurance that aging effects are not adversely impacting buried pipe and resulting in the system or component not meeting its intended function. Additionally, the staff does not have enough information to determine what percent of total linear feet of the Diesel Generator Fuel Oil System piping will be inspected by the External Surfaces Monitoring Program during each ten year period starting ten years prior to the period of extended operation.*

4) *The applicant stated that,*

   > *CP is used in portions of the auxiliary saltwater (ASW) piping and for the intake structure traveling screens, gates and guides, ASW pumps and screen wash pumps. PG&E procedures perform monthly monitoring of the rectifier output voltage and current for the CP system. An annual survey of the ASW pipe CP system includes monitoring rectifier output voltage and current, "ON/OFF" pipe to soil potentials, and individual anode currents. The recent annual*

survey results show that the ASW piping meet at least one of the specified CP criteria for CP, as established by the National Association of Corrosion Engineers International in their Standard SP0169-07, "Control of External Corrosion on Underground or Submerged Metallic Piping Systems.

The staff believes that cathodic protection is an important preventive measure for steel piping. The LRA and supplemental documents lack sufficient detail for the staff to understand (a) which portions of the ASW piping systems that contain steel piping are not cathodically protected, (b) the availability of the cathodic protection system, and (c) given that NACE SP0169-07, paragraph 6.2.2, allows "other criteria" than demonstrating a negative potential of at least 850mv or a minimum of 100 mv of cathodic polarization between the piping and a stable reference electrode contacting the electrolyte, what CP criteria is being used for buried in-scope steel piping.

5) *The LRA does not describe the quality of the backfill in the vicinity of buried in-scope piping. The staff understands that the presence of rocks and sharp objects in the backfill around buried pipes is a leading precursor of degradation of buried piping when over time ground movement causes these materials to come in contact with the buried pipe resulting in damage to the pipe's coating or external surfaces.*

6) *Based on a review of LRA Section 2.3.3.5 and the License Renewal Boundary Drawings, it is not clear to the staff if the in-scope buried make-up water system piping has a safety related function.*

<u>Request:</u>

1) *For buried piping within the scope of license renewal, respond to the following:*

    a) *Understanding that the total number of inspections performed will be dictated by plant-specific and industry operating experience, clarify the minimum number of inspections of buried in-scope piping are planned during the 30 – 40, 40 – 50, and 50 – 60 year operating period. When describing the minimum number of planned inspections, differentiate between material, code/safety-related piping, and potential to contain hazardous material category piping inspection quantities of buried in-scope piping.*
    b) *For the minimum number of planned inspections, indicate what length of piping will be excavated and have a direct visual inspection conducted.*

2) *For buried piping within the scope of license renewal, respond to the following:*

a) *Describe what alternative inspection methods will be utilized when excavated direct visual examinations are not possible due to plant.*
b) *If alternative volumetric examination methods, beyond ultrasonic examinations, will be utilized for conducting an interior wall thickness measurement when not excavating and visually inspecting a buried piping segment, justify why they will be effective at providing a reasonable assurance that the buried in-scope piping systems will meet their current licensing basis function.*
c) *If a volumetric examination method is used in lieu of direct visual examination, indicate what percentage of interior axial length of the pipe will be inspected.*

3) *For buried steel piping within the scope of license renewal, respond to the following:*

a) *LRA Table 3.3.2-13, page 3.3-200, Diesel Generator Fuel Oil System, lists an AMR line item, piping constructed of buried carbon steel and being managed for loss of material by the Buried Piping and Tanks Inspection Program. Reconcile this line item with the statement in Issue 3 above, that there is no in-scope buried carbon steel piping in the Diesel Generator Fuel Oil System.*
b) *If portions of the piping are buried, state what percent of total linear feet of the Diesel Generator Fuel Oil System piping will be inspected by the Buried Piping and Tanks Inspection Program during each ten year period starting ten years prior to the period of extended operation.*
c) *If the piping is not buried, state what percent of total linear feet of the Diesel Generator Fuel Oil System piping will be inspected by the External Surfaces Monitoring Program during each ten year period starting ten years prior to the period of extended operation.*
d) *If there are no planned inspections for this piping, justify why it is acceptable to not inspect in-scope pipe containing hazardous materials.*

4) *For buried steel piping within the scope of license renewal, respond to the following:*

a) *State which portions of the ASW system that contain steel piping are not cathodically protected.*
b) *If portions of the in-scope ASW system piping are not cathodically protected:*
    i. *Justify how the piping will meet or exceed the minimum design wall thickness throughout the period of extended operation.*
    ii. *State what augmented inspections of these portions of the ASW system will be conducted, and if no augmented inspections are planned, justify how a reasonable assurance will be established*

that the piping will meet its Current Licensing Basis intended functions throughout the period of extended operation.

c) *State the availability of the cathodic protection system, and if portions of the system are not available 90% of the time or will be allowed to be out of service for greater than 90 days in any given year, justify how the piping will meet or exceed the minimum design wall thickness throughout the period of extended operation.*
d) *State whether the acceptance criteria for the annual survey of the CP system is either a negative potential of at least 850mv or a minimum of 100 mv of cathodic polarization between the piping and a stable reference electrode contacting the electrolyte, or if alternative criteria are utilized justify how it achieves corrosion control comparable to the above criteria.*

5) *For buried piping within the scope of license renewal, respond to the following:*

   a) *Provide details on the quality of the backfill in the vicinity of in-scope buried pipes.*
   b) *If there is no information on the condition of the quality of backfill beyond initial installation specifications (i.e., no documented observations of the quality of the backfill), justify why the planned inspections are adequate to detect potential degradation as a result of coating damage or holidays, or damage to the exterior surface of non-coated piping.*

6) *Clarify whether any of the buried make-up water system piping within the scope of license renewal has a safety related function.*

PG&E Response to RAI 2.1.18-2

1) The Buried Piping and Tanks Inspection Program will include a risk assessment of in-scope buried piping and tanks that includes consideration of the consequences of buried piping or tank leakage and of conditions affecting the risk for corrosion. The piping segments and tanks will be classified as having a high, medium or low impact of leakage based on items such as the safety class, the hazard posed by fluid contained in the piping, and the impact of leakage on plant operation. The corrosion risk will be determined through consideration of items such as piping or tank material, soil resistivity, drainage, the presence of cathodic protection, and the type of coating.

   Pacific Gas and Electric (PG&E) backfill requirements include placement of all yard piping and electrical conduit runs, not encased in concrete, in an envelope. This envelope shall extend 6 inches below and above pipe or conduit and for the entire width of the trench. Care is taken to prevent damage to exterior coatings of pipe. Backfill material consists of clean sand, slurry, or selected stone sieved to exclude all particles larger than ¼ inch. Backfill shall be clean and free of expansive material.

Inspections will be conducted during each 10-year period beginning 10 years prior to the entry in the period of extended operation. Examinations of buried piping and tanks will consist of visual inspections as well as non-destructive examination (e.g. ultrasonic) to perform an overall assessment of the condition of buried piping and tanks.

The Buried Piping and Tanks Inspection Program manages the following safety related systems: auxiliary saltwater (ASW), make-up water, and diesel fuel oil (DFO). The firewater system is included for fire protection per 10CFR54.4(a)(3).

The following is a summary of materials associated with the in scope systems:

Auxiliary Saltwater

The in-scope ASW system piping includes the original and the bypass piping. The original piping is 24-inch ASTM A53, Type S seamless carbon steel. The original piping is externally coated with two coats of coal tar epoxy with an embedded layer of 6 ounce treated square woven fiberglass cloth. The interior liner is an abrasion resistant Paraline AR brand seamless polyvinyl chloride (PVC). The ASW piping bypass is 24-inch ASME SA-106, Grade B carbon steel. The piping is externally coated with two coats of Devoe Coatings' Devguard 238 and a fiberglass lining. The interior liner is Paraliner.

As indicated in PG&E letter DCL-97-010 dated January 27, 1997, a portion of the ASW piping was bypassed due to a concern that localized corrosion was occurring in the portion of the piping buried below sea level in the tidal zone outside the intake structure.

The piping buried in soil from the intake structure to the turbine building wall has cathodic protection (CP) designed and installed at the whole length.

The ASW discharge piping is carbon steel and mostly encased in concrete, except near the turbine building. The piping exiting the turbine building is epoxy coated and buried in soil for less than 40 feet with approximately 5 feet of cover. There is currently no CP on this segment of pipe.

Make-up Water

The in scope buried piping of the make-up water system consists of Asbestos Cement Pipe (ACP). There is also a short segment of in scope, non-cathodically protected carbon steel piping contained inside a valve pit in contact with soil.

Diesel Fuel Oil

The DFO piping is not in direct contact with soil or concrete and therefore not buried. The DFO piping is contained within a trench, vault, or pipeway such that it is in contact with air and is located where access for inspection is restricted. The DFO piping is carbon steel. The branch lines are 2 inch and the main header piping is

2 ½ inch. The DFO piping is externally coated with a Rayclad 120 (thickness type B) heat-shrinkable pipeline coating system. No DFO piping is buried, therefore, license renewal application (LRA) Table 3.3.2-13 has been corrected.

The DFO storage tanks are buried in soil. The tanks are designed with three layers, two steel shells and an outer fiberglass shell. The primary corrosion protection for the DFO tanks is the 300 mil. fiberglass reinforced plastic outer shell. A zinc coating on the outer surface of the secondary steel shell provides backup corrosion protection in the event of the failure of the outer shell.

Firewater
The Plant Yard Loop is 12-inch ACP, with cast iron fittings. Carbon steel piping runs are also present in the Plant Yard Loop in branch lines to the turbine and auxiliary buildings (Units 1 & 2). After the start of plant operation, PVC pipe with ductile iron fittings was used to extend the firewater system to new non-power block buildings.

a) Inspections of Buried Piping Based on Material and Environment Combinations

Fire mains are installed in accordance with NFPA 24. Preventive actions for fire mains beyond those in NFPA 24 need not be provided if the system undergoes a periodic flow test in accordance with NFPA 25 section 7.3 at a frequency of at least one test in each 1-year period. Fire mains will be subject to a periodic flow test in accordance with NFPA 25 section 7.3 at a frequency of at least one test in each one year period. These flow tests will be performed in lieu of excavating buried portions of firewater pipe for visual inspections.

For cathodically-protected metallic piping, at least one excavation and visual inspection of steel piping will be conducted each 10-year period beginning 10 years prior to the entry in the period of extended operation. Cathodically-protected steel piping within the scope of license renewal exists in the ASW system intake lines.

For non cathodically-protected buried metallic piping, at least four excavations and visual inspections of steel piping will be conducted each 10-year period beginning 10 years prior to the entry in the period of extended operation. Non Cathodically-protected steel piping within the scope of license renewal exists in the ASW system discharge lines, makeup water system and firewater system. PG&E will install CP for the ASW discharge piping in contact with soil during the first 10 year interval period excavation and inspection prior to the period of extended operation. Following the installation of the CP on ASW discharge piping, one excavation and visual inspection will be conducted per 10 year interval. The makeup water system piping in the valve pit and in contact with soil will be visually inspected four times per 10-year period. If the configuration of the piping in the valve pit is altered so that the piping is no longer in contact with soil the inspection frequency will be revised to two visual inspections per 10-year period.

For non metallic piping, at least one excavation and visual inspection each of PVC and ACP will be conducted each 10-year period beginning 10 years prior to the entry in the period of extended operation. PVC piping within the scope of license renewal exists in the firewater system. Asbestos cement piping within the scope of license renewal exists in the firewater system and make-up water system.

b) Each inspection will examine either the entire length of a run of pipe or a minimum of 10 feet. If the number of inspections times the minimum inspection length (10 feet) exceeds 10 percent of the length of the piping under consideration, only 10 percent will need to be inspected. If the total length of the in-scope pipe constructed of a given material times the percentage to be inspected is less than 10 feet, either 10 feet or the total length of pipe present, whichever is less will be inspected.

2) At this time, PG&E does not plan to use any examination method other than excavation or visual inspection of buried piping. If the instance were to arise where it is not possible to expose the program designated length of piping during each inspection, prior NRC approval would be obtained for use of alternative ultrasonic volumetric examination techniques from the interior of the pipe.

3)

a) All fuel oil piping is contained in either a pipe trench with a leak chase or vault. The trenches are equipped with leak detection. Therefore, the LRA has been revised to show no buried DFO pipe. See revised LRA Section 2.4.7 and Tables 2.4-7, 3.3.2-13, and 3.5.2-7 in Enclosure 2.

b) As discussed above there are no buried portions of piping containing hazardous materials.

c) One hundred percent of the below grade diesel generator fuel oil system piping is visually inspected by an existing plant procedure on a 10 year interval. The External Surfaces Monitoring Program will be revised to describe this inspection and the associated 10 year frequency. See revised LRA Appendix B2.1.20 in Enclosure 2.

d) As discussed above, inspections of below grade piping containing hazardous materials will be conducted.

4)

a) The ASW intake piping has no CP system between the turbine building wall and the ASW heat exchangers. The piping in this section is encased in the concrete floor of the turbine building. The ASW intake piping buried in soil from the intake structure to the turbine building has CP installed for the whole length. The ASW discharge piping is in contact with soil when it leaves the turbine building for approximately 40 feet at which point the pipe is encased in concrete for the

remainder of the run to the discharge structure. This portion of the ASW discharge piping is not cathodically protected. As discussed above, CP will be installed on this portion of the discharge piping.

b) The ASW system piping that is not cathodically protected is encased in concrete. The concrete provides a non corrosive environment for the steel piping such that CP is not necessary and there are no aging effects. Diablo Canyon Power Plant (DCPP) operating experience confirms effectiveness of this design.

c) CP systems of the ASW piping have been and will be available more than 90 percent of the time.

d) The NACE SP0169-07, paragraph 6.2.2, “negative potential of at least 850mV or a minimum of 100 mV of cathodic polarization” is the only criteria used at DCPP. At the ASW pipe test locations where static (native) pipe-to-soil potential data is not available, the 850mV criteria are used. At ASW pipe test locations where static (native) pipe-to-soil potential data is available, the 100mV criteria are used. There have been no corrosion leaks on the ASW piping since the CP systems have been installed.

5)

a) PG&E backfill requirements include placement of all yard piping and electrical conduit runs, not encased in concrete, in an envelope. This envelope shall extend 6 inches below and above pipe or conduit and for the entire width of the trench. Care is taken to prevent damage to exterior coatings of pipe. Backfill material consists of clean sand, slurry, or selected stone sieved to exclude all particles larger than ¼". Backfill shall be clean and free of expansive material.

b) A comprehensive search of DCPP records provided a single event of foreign objects found in backfill during an excavation. In 1992, an excavation of the ASW carbon steel annubar line found wood blocks and debris around the buried pipe. This finding was entered in the corrective action program. An investigative action was also taken to further excavate around all four of the main 24" diameter ASW pipes to inspect the flanges and bottom side of the pipe.

6) None of the buried make-up water system piping has a safety related function. The reservoir gravity feed asbestos cement piping supplying water to the fire system yard loop is buried piping and is in-scope for fire protection (10 CFR 54.4(a)(3)) and long term cooling(10 CFR 54.4(a)(2)). The piping is shown on boundary drawing LR-DCPP-16-106716-11.

D-RAI B2.1.26-3

Background:
NUREG-1801, Rev. 1, "Generic Aging Lessons Learned," (the GALL Report) addresses inaccessible medium voltage cables in Aging Management Program (AMP) XI.E3, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." The purpose of this program is to provide reasonable assurance that the intended functions of inaccessible medium voltage cables (2 kV to 35 kV), that are not subject to environmental qualification requirements of 10 CFR 50.49 and are exposed to adverse localized environments caused by moisture while energized, will be maintained consistent with the current licensing basis. The scope of the program applies to inaccessible (in conduits, cable trenches, cable troughs, duct banks, underground vaults or direct buried installations) medium-voltage cables within the scope of license renewal that are subject to significant moisture simultaneously with significant voltage.

The application of AMP XI.E3 to medium voltage cables was based on the operating experience available at the time Revision 1 of the GALL Report was developed. However, recently identified industry operating experience indicates that the presence of water or moisture can be a contributing factor in inaccessible power cables failures at lower service voltages (480V to 2kV). Applicable operating experience (OE) was identified in licensee responses to Generic Letter (GL) 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," which included failures of power cable operating at service voltages of less than 2kV where water was considered a contributing factor.

Recently identified industry operating, provided by the NRC licensees in response to GL 2007-01, has shown that there is an increasing trend of cable failures with length in service beginning in the 6th through 10th years of operation and also that moisture intrusion is the predominant factor contributing to cable failure. The staff has determined, based on the review of the cable failure distribution, that annual inspection of manholes and cable testing frequency of at least every 6 years is a conservative approach to ensuring the operability of power cables and, therefore, should be considered.

In addition, recently identified industry operating experience has shown that some NRC licensees may experience events, such as flooding or heavy rain, that subjects cables within the scope of program for GALL Report XI.E3 to significant moisture. The staff has determined that event driven inspections, in addition to a 1 year periodic inspection frequency, is a conservative approach and, therefore, should be considered.

Issue:
The staff has concluded, based on recently identified industry operating experience concerning the failure of inaccessible low voltage power cables (480v to 2kV) in the presence of significant moisture, that these cables can potentially experience age

related degradation. The staff noted that the applicant's Inaccessible Medium-Voltage Cables Program does not address inaccessible low voltage power cables (400V (Nominally 480V) to 2kV inclusive). In addition, increased cable test and inspection frequencies (6 and 1 years respectively) should be evaluated to ensure that the Inaccessible Medium Voltage Program test and inspection frequencies reflect industry and plant-specific operating experience and that test and inspection frequencies may be increased based on future industry and plant-specific operating experience.

Request:

1. *Provide a summary of your evaluation of recently identified industry operating experience and any plant-specific operating experience concerning inaccessible low voltage power cable failures within the scope of license renewal (not subject to 10 CFR 50.49 environmental qualification requirements), and how this operating experience applies to the need for additional aging management activities at your plant for such cables.*

2. *Provide a discussion of how Diablo Canyon Nuclear Power Plant, Units 1 and 2, will manage the effects of aging on inaccessible low voltage power cables within the scope of license renewal and subject to aging management review; with consideration of recently identified industry operating experience and any plant-specific operating experience. The discussion should include assessment of your aging management program description, program elements (i.e., Scope of Program, Parameters Monitored/Inspected, Detection of Aging Effects, and Corrective Actions), and FSAR summary description to demonstrate reasonable assurance that the intended functions of inaccessible low voltage power cables subject to adverse localized environments will be maintained consistent with the current licensing basis through the period of extended operation.*

3. *Provide an evaluation showing that the Inaccessible Medium Voltage Program test and inspection frequencies, including event driven inspections, incorporate recent industry and plant-specific operating experience for both inaccessible low and medium voltage cable. Discuss how the Inaccessible Medium Voltage Program will ensure that future industry and plant-specific operating experience will be incorporated into the program such that inspection and test frequencies may be increased based on test and inspection results.*

PG&E Response to D-RAI B2.1.26-3

1) In response to Diablo Canyon Power Plant (DCPP) operation experience associated with underground cable degradation, all of the in-scope inaccessible underground medium voltage cables at DCPP have been replaced. As discussed, in the License Renewal Application section B2.1.26, DCPP has experienced water accumulation in the pull boxes and underground conduits. Actions taken to address

this water accumulation include implementation of an inspection program of pull boxes for water accumulation, removal of water from pull boxes as required, maintenance of sump pumps and removal of conduit seals.

DCPP operation experience has shown there have been no in scope 480 V power circuit cable failures at DCPP.

2) DCPP's medium voltage cable aging management program is consistent with the guidance in NUREG 1801 section XI.E3. The program will be revised to include in scope inaccessible underground 480 V power cables. The program will be revised such that all underground in scope 480 V or higher power cables is being included in the program, regardless of the percentage of time the loads are energized.

   As previously noted, all in scope medium voltage cable at DCPP has been recently replaced. DCPP 480 V buses are equipped with continuous ground detection. DCPP ground detection operating experience has not identified 480 V grounds that were a result of power conductor insulation failures.

   The DCPP pull box inspection program has been effective in preventing pull box flooding and cable submergence in all in scope medium and low voltage pull boxes. Bi-monthly pull box inspections are currently being performed. The inspections monitor water accumulation during rainy periods. The inspections can be deferred if no rain has fallen since the last inspection. These inspections have demonstrated that event driven water accumulation from natural sources is not occurring. Event driven inspections are thus not required. Recent structural pull box inspections have not produced any visible indication of significant cable or cable support degradation. The pull box inspection frequency is subject to change based on inspection results. However the program will require that in scope cable pull boxes will be inspected for water accumulation at least once every year.

   Based on current DCPP operating experience insulation testing of in scope 480 V and higher power cables at least once every 10 years is sufficient. This includes medium voltage power cables. The first tests will be completed prior to entering the period of extended operation. The test will be a proven test with acceptance criteria determined prior to conducting the tests.

   Detailed internal pull box inspections of cables and cable supports will be included in the structural monitoring program. Inspection criteria will be included in plant procedures. These are opportunistic inspections conducted when the pull boxes are opened for maintenance or other reasons. More frequent tests and inspections will be required when the current program identifies adverse trends indicating that in scope power cables insulation resistance is being reduced or the cables are being subjected to submergence or visible indications of cable aging or cable support degradation are observed. A corrective action document is required to be written

when test or inspection requirements do not meet acceptance requirements or when adverse trends are noted when evaluating results over time.

3) The DCPP site is not prone to flooding events from natural sources. The design and layout of the in scope cable pull boxes limit the likelihood that any significant water will accumulate in the pull boxes. The boxes are designed to drain down-hill toward plant structures/sumps, to automatic pump equipped sumps which pump to structure sumps, or they are designed or located such that significant water ingress or retention is not likely. Since completion of corrective action which include implementation of a pull box inspection program to inspect and remove water accumulation. A review of the past five years of operation experience demonstrates that this program has been effective in preventing pull box flooding and cable submergence in pull boxes. As stated above, water accumulation is not occurring and recent structural pull box inspections have not identified any visible indication of significant cable or cable support degradation. Based on DCPP operating experience, event driven pull box inspections are not required.

   As previously noted, all in scope medium voltage cable at DCPP has been recently replaced. DCPP operating experience has not identified any indication that failures of inaccessible 480 V or higher power conductors located underground are a concern. Based on this and reviews of industry operating experience reported as a result of responses to NRC Generic letter 2007-01 and recent cable replacements at DCPP compliance with NUREG 1801 section XI.E3 inspection and testing guidance, with previously noted program enhancements, ensures that in scope underground low and medium voltage power cables will continue to perform their intended functions through the period of extended operation.

   Any necessary changes to inspection or test frequencies will be evaluated as part of the DCPP corrective action program. Industry operating experience is evaluated by the plant staff through the corrective action program. A corrective action document is required to be written when test or inspection requirements do not meet acceptance requirements or when adverse trends are noted when evaluating test or inspection results over time.

   In summary based on the above, the DCPP Inaccessible Medium Voltage Program incorporates recent industry and plant-specific operating experience for both inaccessible low and medium voltage cable and adjusts testing and inspection frequency based on test and inspection results. DCPP operation experience shows that in scope pull boxes are not accumulating water and pull box cable and support degradation is not occurring.

   See revised license renewal application (LRA) Table A4-1 for medium and low voltage commitments.

LRA Amendment 25

LRA Section	RAI
Section 2.4.7	B2.1.18-2
Table 2.4-7	B2.1.18-2
Table 3.3.2-13	B2.1.18-2
Table 3.5.2-7	B2.1.18-2
Table A4-1	B2.1.18-2 B2.1.26-3
Appendix B2.1.20	B2.1.18-2

2.4.7 Diesel Fuel Oil Pump Vaults and Structures

Structure Description

The diesel fuel oil pump vaults and structures include the pump vaults, pipe trenches (also referred to as the DFO pipeway structure), and the diesel fuel oil *storage* tank foundations. Also included are the vaults at the suction and discharge lines, manway and level monitors, fill line, and vent line, and the traffic box at the vacuum gage. These reinforced concrete structures are below grade west of the turbine building. The vaults and trenches have reinforced concrete covers and steel hatches flush at ground level. Concrete curbing prevents water intrusion into the vaults. *A 30 inch diameter steel pipeway provides a conduit for the diesel fuel oil piping between the fuel oil storage tank and the transfer pump vault. A reinforced concrete slab above the pipeway protects it from heavy equipment loads and any potential missiles.* The tanks are supported on granular bedding over a reinforced concrete foundation. The vaults and trenches are supported either on compacted backfill or by reinforced concrete grade beams and drilled concrete piles, which extend down to bedrock. These structures support the underground fuel oil storage tanks, transfer pumps, piping, valves, and instrumentation for the emergency diesel generators. To provide for seismic separation between the underground tanks and diesel fuel pump vaults, there are ~~conduits with~~ flex*ible* piping connections *inside the 30 inch pipeway* between the two structures. The pump vaults are Design Class I. The Design Class II trench bottom slab and walls are qualified for the Hosgri earthquake to protect the Design Class I piping

Table 2.4-7 Diesel Fuel Oil Pump Vaults and Structures

Component Type	Intended Function
Structural Steel	*Shelter, Protection* Structural Support

Table 3.3.2-13 Auxiliary Systems – Summary of Aging Management Evaluation – Diesel Generator Fuel Oil System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
~~Closure Bolting~~	~~PB~~	~~Carbon Steel~~	~~Buried (Ext)~~	~~Loss of material~~	~~Buried Piping and Tanks Inspection (B2.1.18)~~	~~VII.H1-9~~	~~3.3.1.19~~	~~D~~
~~Piping~~	~~PB~~	~~Carbon Steel~~	~~Buried (Ext)~~	~~Loss of material~~	~~Buried Piping and Tanks Inspection (B2.1.18)~~	~~VII.H1-9~~	~~3.3.1.19~~	~~B~~

Table 3.5.2-7 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation – Diesel Fuel Oil Pump Vaults and Structures

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Structural Steel	*SH, SS*	*Carbon Steel*	*Plant Indoor Air (Structural) (Ext)*	*Loss of material*	*Structures Monitoring Program (B2.1.32)*	*III.A3-12*	*3.5.1.25*	*A, 1*

Plant Specific Notes:

1 The 30 inch diameter steel pipeway provides a conduit for the diesel fuel oil piping between the fuel oil storage tank and the transfer pump vault. A reinforced concrete slab above the pipeway protects it from heavy equipment loads and any potential missiles. The outside surface of the pipeway is inaccessible due to the protective slab, but the structures monitoring inspections examine the inside surfaces of the pipeway to ensure that any degradation will be identified and managed prior to a loss of intended function.

Table A4-1 License Renewal Commitments

Item #	Commitment	LRA Section	Implementation Schedule
52	*The Buried Piping and Tanks Inspection Program will be revised to include the following inspections that will be conducted during each 10-year period beginning 10 years prior to the entry in the period of extended operation. Examinations of buried piping and tanks will consist of visual inspections as well as non-destructive examination (e.g. ultrasonic) to perform an overall assessment of the condition of buried piping and tanks.* *Each inspection will examine either the entire length of a run of pipe or a minimum of 10 feet. If the number of inspections times the minimum inspection length (10 feet) exceeds 10 percent of the length of the piping under consideration, only 10 percent will need to be inspected. If the total length of the in-scope pipe constructed of a given material times the percentage to be inspected is less than 10 feet, either 10 feet or the total length of pipe present, whichever is less will be inspected.* *<u>Inspections of Buried Piping Based on Material and Environment Combinations</u>* *Fire mains will be subject to a periodic flow test in accordance with NFPA 25 section 7.3 at a frequency of at least one test in each one year period. These flow tests will be performed in lieu of excavating buried portions of Fire Water pipe for visual inspections.* *For cathodically-protected metallic piping, at least one excavation and visual inspection of steel piping will be conducted. Cathodically-protected steel piping within the scope of license renewal exists in the Auxiliary Salt Water (ASW) system intake lines.* *For non cathodically-protected buried metallic piping, at least four*	*B2.1.18*	*Prior to the period of extended operation*

Table A4-1 License Renewal Commitments

Item #	Commitment	LRA Section	Implementation Schedule
	excavations and visual inspections of steel piping will be conducted. Non Cathodically-protected steel piping within the scope of license renewal exists in the ASW system discharge lines and Makeup Water system. *For non metallic piping, at least one excavation and visual inspection each of polyvinyl chloride (PVC) and Asbestos Cement Pipe (ACP) will be conducted. PVC piping within the scope of license renewal exists in the Fire Water system. Asbestos cement piping within the scope of license renewal exists in the Fire Water system and Make-up Water system.*		
53	*PG&E will install cathodic protection for the ASW discharge piping in contact with soil during the first 10 year interval period excavation and inspection prior to the period of extended operation.*	*B2.1.18*	*Prior to the period of extended operation*
54	*The DCPP XI.E3 program will be revised to include in scope inaccessible underground 480 V power cables or higher power cables, regardless of the percentage of time the loads are energized. The program will require that in scope cable pull boxes will be inspected for water accumulation at least once every year. Detailed internal pull box inspections of cables and cable supports will be included in the structural monitoring program. Inspection criteria will be included in plant procedures. These are opportunistic inspections conducted when the pull boxes are opened for maintenance or other reasons. More frequent tests and inspections will be required when the current program identifies adverse trends indicating that in scope power cables insulation resistance is being reduced or the cables are being subjected to submergence or visible indications of cable aging or cable support degradation are observed. The DCPP corrective action program will drive any necessary changes. A corrective action document is required to be written when test or inspection requirements do not meet acceptance requirements or when adverse trends are noted when evaluating results over time.*	*B2.1.26*	*Prior to the period of extended operation*

B2.1.20 External Surfaces Monitoring Program

Program Description

The External Surfaces Monitoring Program manages loss of material for external surfaces of steel, stainless steel, aluminum, copper alloy components and elastomers, and hardening and loss of strength for elastomers. The program is a visual monitoring program that includes those systems and components within the scope of license renewal. *The below grade Diesel Generator Fuel Oil System piping is visually inspected by an existing plant procedure on a ten year interval.*

Surfaces that are inaccessible or not readily visible during plant operations are inspected during refueling outages. Surfaces that are inaccessible or not readily visible during both plant operations and refueling will be evaluated by the DCPP Corrective Action Program to evaluate applicable industry and plant-specific aging operating experience for the material and environmental combination. The evaluation will determine if there is a representative location, based on the material, environment, and applicable aging effect that has been or can be inspected in place of the inaccessible components. When appropriate for the component configuration and material, physical manipulation of elastomers is used to augment visual inspections to confirm the absence of hardening or loss of strength.

The External Surfaces Monitoring program may be credited with managing loss of material from internal surfaces for situations in which material and environment combinations are the same for internal and external surfaces such that external surface condition is representative of internal surface condition.

The External Surfaces Monitoring program is a monitoring program that provides measures for detecting the aging effects prior to loss of intended function, but does not prevent degradation due to aging effects.

The External Surfaces Monitoring Program manages aging for external surfaces that are not within the scope of the following programs:

1.) Boric Acid Corrosion program (B2.1.4) for components in a system with treated borated water or reactor coolant environment in which boric acid corrosion may occur

2.) Buried Piping and Tanks Inspection program (B2.1.18) for buried components

3.) Structures Monitoring Program (B2.1.32) for civil structures, and other structural items which support and contain mechanical and electrical components

4.) Fire Protection program (B2.1.12) for the CO_2 fire suppression system components.

Personnel performing external surfaces monitoring inspection will be qualified in accordance with DCPP-controlled procedures and processes.

The External Surfaces Monitoring Program will be implemented within the context of the System Engineering Program. Routine system walkdowns are required by the System Engineering Program to perform inspection on components. External surface inspections will be performed on passive components in scope for license renewal at intervals no longer than once per refueling cycle except for those inspections pertaining to the fire protection CO_2 system. The inspection interval for the passive fire protection CO_2 system components in scope for license renewal will be no longer than once every six months as discussed in the Fire Protection program (B2.1.12) for the CO_2 fire suppression system components. The program will include periodic visual inspections for loss of material, leakage, and conditions indicating elastomer hardening and loss of strength. Visual inspection parameters for metals and non-metals will be specified in walkdown procedures.

The External Surfaces Monitoring program will require that completed inspection documentation be reviewed by an engineer and retained for historical information and trending. Trending of inspection results will be performed to the extent reasonably practicable.

The External Surfaces Monitoring program will include inspection criteria for metals and non-metals that list general conditions that should be identified as discrepancies in the DCPP corrective action program. This listing will serve as acceptance criteria.