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PG&E Letter DCL-10-105

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 July 22, 2010, Request for Additional Information (Set 15) 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 July 22, 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.

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.

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

Executed on August 18, 2010.

Sincerely,

James R. Becker

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NRR

pns/50330161
Enclosures
cc: Diablo Distribution
cc/enc: Elmo E. Collins, NRC Region IV Regional Administrator
Nathanial B. Ferrer, NRC Project Manager, License Renewal
Kimberly J. Green, NRC Project Manager, License Renewal
Michael S. Peck, NRC Senior Resident Inspector
Alan B. Wang, NRC Project Manager, Office of Nuclear Reactor Regulation

PG&E Response to NRC Letter dated July 22, 2010
Request for Additional Information (Set 15) for the
Diablo Canyon License Renewal Application

RAI 3.1.2.3.2-1

In license renewal application (LRA) Tables 3.1.2-2, 3.3.2-8, and 3.3.2-17, the applicant stated that carbon steel tanks, heaters, and valve internal surfaces exposed to treated borated water can experience loss of material, and that the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will be used to manage this aging effect. The aging management review (AMR) line items cite generic Note G, indicating that the environment is not in the Generic Aging Lessons Learned (GALL) Report for this component and material combination. The AMR line item in Table 3.1.2-2 also cites a plant specific note indicating that the tank has an internal coating that is not credited for aging management. The AMR line item in LRA Table 3.3.2-8 also cites a plant specific note indicating that the component is a flange separated from the treated borated water by a gasket.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program involves visual inspections of internal surfaces of steel piping, piping elements, ducting, and components in an internal environment (such as indoor uncontrolled air, condensation, and steam). It is unclear to the staff how the Internal Surfaces in Miscellaneous Piping and Ducting Components Program is adequate to manage loss of material for the carbon steel tanks, heaters, and valve internal surfaces exposed to treated borated water discussed above.

Provide justification for why the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is acceptable to manage loss of material in the identified carbon steel tanks, heaters, and valves exposed to treated borated water.

PG&E Response to RAI 3.1.2.3.2-1

The Diablo Canyon Power Plant (DCPP) Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will select an inspection sample as discussed in the response to RAI B2.1.22-3.

Visual inspection of carbon steel tanks, heaters, and valves exposed to treated borated water will identify loss of material. For carbon steel components that are coated, the coating will be visually inspected for degradation. If the coating is not degraded, then there is reasonable assurance that the base metal will not be degraded.

In addition to the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program, carbon steel heaters, tanks, and valves exposed to treated borated water are managed by the DCPP Boric Acid Corrosion Program discussed in License Renewal Application Section B2.1.4.

RAI 3.3.2.2.4-1

LRA Table 3.3.1, item 3.3.1.08 addresses stainless steel regenerative heat exchanger components exposed to treated borated water greater than 60°C (140 OF), which are being managed for cracking due to stress corrosion cracking (SCC) and cyclic loading. The Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (SRP-LR) recommends the use of the Water Chemistry Program to manage the effect of cracking due to SCC. In addition, the SRP-LR recommends a plant-specific aging management program to verify the absence of cracking due to SCC and cyclic loading and ensure that these aging effects are managed adequately. The applicant proposes to manage this aging effect using its Water Chemistry Program (82.1.2) and One-Time Inspection Program (82.1.16).

The applicant states that its One-Time Inspection Program will include selected components at susceptible locations. However, the applicant does not identify the technique to be used to perform the proposed inspections on heat exchanger components.

Describe the details of the inspection technique to be used to perform the one-time inspection of these heat exchanger components and provide relevant plant or industry experience to demonstrate the effectiveness and reliability of the technique.

PG&E Response to RAI 3.3.2.2.4-1

The Diablo Canyon Power Plant (DCPP) Water Chemistry Program manages crack initiation and growth of stress corrosion cracking (SCC) in the nonregenerative heat exchangers and seal water heat exchangers. The DCPP One-Time Inspection (OTI) Program verifies the effectiveness of the Water Chemistry Program in preventing cracking due to SCC for in-scope components. If selected as part of the inspection sample, the OTI program will perform eddy current testing on the heat exchangers.

RAI 3.4.2.1-1

SRP-LR Table 3.4-1, items 2 and 3, state that steel piping, piping components, piping elements, and heat exchanger components exposed to steam or treated water are subject to loss of material due to general, pitting, and crevice corrosion. The GALL Report, under items VIII.A-16 and VIII.E-37. recommends managing the aging effect using the Water Chemistry and OneTime Inspection Programs.

The LRA Table 3.4.2-4 indicates that carbon steel heat exchanger components exposed to secondary water or steam in the condensate system can undergo loss of material, and the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will be used to manage this aging effect. The AMR line items cite generic Note E, indicating that they are consistent with the GALL Report for material, environment and aging effect, but that a different aging management program is credited. The LRA references the GALL Report items VIII.A-16 and VIII.E-37 for this aging issue, and notes that the use of the Water Chemistry and the One-Time Inspection Programs were not considered appropriate to manage wall thickness reductions of the main condenser shell and hotwell internal surfaces exposed to treated water and steam environment due to Diablo Canyon Power Plant (DCPP) operating experience supporting anticipated condenser wall thickness reduction. The LRA states that the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program is consistent with exceptions to the corresponding AMP XI.M38 in the GALL Report. Although the exception pertaining to inspection techniques indicates that volumetric testing may be performed on stainless steel to detect stress corrosion cracking, visual inspections only will be used to detect loss of material in carbon steel. Since visual inspections alone may not be effective in identifying loss of material due to general corrosion, and the DCPP operating experience pertaining to condenser wall thickness reduction is not further described, the staff is unclear on how the use of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will be able to manage this aging effect.

Describe how the credited aging management program (AMP) is adequate to manage the loss of material due to general, pitting, and crevice corrosion of the carbon steel heat exchanger components exposed to secondary water or steam in the condensate system.

PG&E Response to RAI 3.4.2.1-1

Diablo Canyon Power Plant (DCPP) Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will select an inspection sample as discussed in the response to RAI B2.1.22-3.

DCPP has identified anticipated corrosion in the condenser hotwells. Wall thicknesses are designed to account for some amount of wall loss due to corrosion over the life of

the component. Any abnormal corrosion would be evaluated by the DCPP Corrective Action Program (CAP).

As stated in LRA Section B2.1.18, visual inspections of internal surfaces of plant components will be performed by qualified personnel during the conduct of periodic maintenance, predictive maintenance, surveillance testing and corrective maintenance. Visual inspections performed by qualified personnel are capable of identifying corrosion products and dimensional changes caused by corrosion of carbon steel heat exchanger components. DCPP will use visual inspection to identify general, pitting, and crevice corrosion on heat exchanger components exposed to secondary water or steam in the condensate system. If general, pitting, or crevice corrosion is identified during the visual inspection, the DCPP CAP will identify additional inspection methods as appropriate.

RAI 3.4.2.1-2

SRP-LR Table 3.4-1, item 16, states that stainless steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to treated water are subject to loss of material due to pitting and crevice corrosion. The GALL Report, under item VIII.B1-4, recommends managing the aging effect using the Water Chemistry and One-Time Inspection Programs.

The LRA Table 3.4.2-2 indicates that stainless steel piping exposed to secondary water in the auxiliary steam system can undergo loss of material, and the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will be used to manage this aging effect for stainless steel piping in the auxiliary steam system. The AMR line item cites generic Note E, indicating that they are consistent with the GALL Report item for material, environment, and aging effect, but a different aging management program is credited. The LRA references the GALL Report item VIII.B1-4 for this aging issue, and notes that the Water Chemistry Program does not apply because the associated component is abandoned in place. Since the current AMP will use preventive maintenance and surveillance activities to conduct and document inspections, the staff is unclear how the use of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will be able to manage this aging effect.

Describe how the credited AMP, which uses preventive maintenance and surveillance activities to conduct and document inspections, is adequate to manage the loss of material due to pitting and crevice corrosion of the stainless steel piping exposed to secondary water in the auxiliary steam system, which has been abandoned in-place.

PG&E Response to RAI 3.4.2.1-2

The Diablo Canyon Power Plant Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will select an inspection sample as discussed in the response to RAI B2.1.22-3.

Stainless steel piping exposed to secondary water in the auxiliary steam system will be inspected for loss of material due to pitting and crevice corrosion using visual and volumetric examination. Visual inspections performed by qualified personnel are capable of identifying corrosion products and dimensional changes caused by corrosion as a result of pitting and crevice corrosion in stainless steel piping. If the visual inspection identifies pitting and crevice corrosion, the DCPP Corrective Action Program will identify further examination methods such as volumetric examination.

RAI B2.1.22-3

The GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," "detection of aging effects" program element, recommends that locations for inspection should be chosen to include conditions likely to exhibit the aging effects and that the inspection intervals should be established such that they provide for timely detection of degradation. LRA AMP B2.1.22, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program," states that the program " ... will provide for periodic inspection of a representative sample of the internal surfaces material and environment combinations for systems within the scope of the program."

Although LRA AMP B.2.1.22 requires the periodic inspection of a representative sample of the internal surfaces material and environment combinations for systems within the scope of the program, the program does not clearly establish how the sampling would be accomplished.

Describe the sampling methodology, including how the population for each of the material-environment-aging effect combinations is being selected, and what type of engineering, design, or operating experience considerations would be used to select the sample of components for both the scheduled and supplemental inspections.

PG&E Response to RAI B2.1.22-3

The Diablo Canyon Power Plant (DCPP) Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program provides for the inspection of selected systems, structures, and components (SSC) during the conduct of normal plant activities. SSC to be inspected are selected from those exposed or opened for access during normal maintenance activities. These include preventative maintenance, corrective maintenance and surveillance testing. The maintenance activities are controlled via the DCPP work control process.

Nondestructive examination techniques beyond the basis visual examination will be applied as necessary to fully characterize material loss. For example, stainless steel exposed to diesel exhaust will receive a volumetric examination to detect the presence of stress corrosion cracking (SCC), and elastomeric materials will receive physical manipulation to detect the presence of cracking and/or hardening.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will provide a minimum inspection scope prior to the period of extended plant operation. Additional inspections are identified via individual notification should the predetermined inspection scope prove inadequate to satisfy program scope requirements. Within any preidentified inspection scope, materials with corrosion resistance equivalent to that of carbon steel (e.g., cast iron) will be counted toward the

required minimum, while materials of superior corrosion resistance (e.g., stainless steel) will not. The selection of inspection locations will consider DCPP operating experience.

SSC inspections revealing the presence of aging effects will be documented in the Corrective Action Program. Engineering will evaluate aging effects against defined fitness for service criteria. The extent of scope expansion will be determined by the program owner.

Inspection Selection Criteria

SSC to be evaluated under the Internal Surfaces in Miscellaneous Piping and Ducting Components Program will be selected on the basis of environment and aging mechanism. The material least resistant to corrosion in DCPP service environments, carbon steel, is included in the minimum inspection scope. Elastomeric materials will be selected based upon environmental parameters including moisture and temperature.

Stainless steel exposed to diesel exhaust will receive volumetric examination for the detection of SCC. The initiation of notifications will be necessary for these components because they fall outside of the typical DCPP work control process.

Minimum Inspection Scope

The minimum Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program inspection scope will achieve 2 inspections per system of the most susceptible material for each environment, limited to 50 percent of system components for those containing 4 or less components. Opportunistic inspection scope is determined via the work control process.

Scope Expansion

The identification of actual material loss, SCC and/or hardening/loss of strength will result in scope expansion.

The scope expansion for material loss will be twice the original inspection scope for the system/material/environment in which the material degradation was identified. The scope expansion will also include materials of corrosion resistance equal to or inferior to the material identified with the aging mechanism within the system.

Scope expansion for SCC in stainless steel exposed to diesel exhaust will include the welds upstream and downstream of the weld with the SCC. Scope expansion will also include the equivalent weld configuration on other diesel exhaust lines.

Elastomeric materials scope expansion will be twice the original inspection scope for the environment/system for which the degraded condition was identified.

For all material degradation mechanisms the scope expansion will continue to double until the corrosion condition has been bounded. Examinations on similar locations on the opposite unit will be scheduled for the next refueling outage.

Minimum Scope Completion

The minimum inspection scope as described above is intended to identify the presence of material damage. In the absence of indication(s) of damage, opportunistic inspections will continue to be performed as provided by the work control process. The identification of damage will result in scope expansion and engineering evaluation. Additional actions identified during the engineering evaluation will be specified as necessary to ensure the intended function of all components is maintained.

RAI B2.1.22-4

The GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," "detection of aging effects" program element, recommends that the applicant should identify and justify the inspection technique for the aging effect of concern. In LRA AMP B2.1.22, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program," the applicant took an exception to the "scope of program" and "detection of aging effects" program elements and stated that the proposed AMP will also manage aging effects in asbestos cement pipes (ACP) through visual inspections of their internal surfaces. LRA Tables 3.3.2-5 and 3.3.2-12 for this material in a raw water environment describe the aging effects to be loss of material, cracking, and changes in material properties.

In the LRA, the applicant identified visual inspections to be the technique used to manage the aging effects of concern (Le., loss of material, cracking, and changes in material properties) for ACPs. Performing visual inspections of the internal surfaces of ACPs may not be adequate to detect changes in the cementitious material properties.

Provide the basis for concluding that visual inspections can be effectively used to identify changes in ACP material properties. If available, also provide examples of plant-specific operating experience that could be used to demonstrate the effectiveness of visual inspections as a means of identifying changes in ACP material properties.

PG&E Response to RAI B2.1.22-4

The Diablo Canyon Power Plant (DCPP) License Renewal Application identifies asbestos cement piping exposed to a raw water environment with the aging effects of loss of material, cracking, and change in material properties. Asbestos cement pipe in a raw water environment has the same aging effects as structural concrete, which is aging managed primarily by a visual inspection. Access is available to internal surfaces of asbestos cement pipe to effectively visually inspect a representative sample of the internal surfaces periodically. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program will perform these visual inspections to manage the aging effects of loss of material, cracking, and change in material properties for asbestos cement pipe exposed to raw water.

A review of DCPP corrective action documents did not identify any degradation in asbestos cement piping. Asbestos cement piping in a raw water environment can be characterized as inherently resistant to corrosion.