DiabloCanyonNPEm Resource

From: Ferrer, Nathaniel
Sent: Friday, July 23, 2010 3:20 PM
To: Grebel, Terence; Soenen, Philippe R
Cc: DiabloHearingFile Resource
Subject: RAI Letters dated July 22, 2010
Attachments: RAI Related to the Review of the DCPP LRA - (Set 14) Aging Management Review and TLAA.pdf; RAI Related to the Review of the DCPP LRA - (Set 15) Aging Management Review and Aging Management Programs.pdf

Terry and Philippe,

Attached are an electronic copies of RAI Letters dated, July 22, 2010. Formal copies are being sent via mail.

Nathaniel Ferrer
Project Manager
Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
(301)415-1045

Hearing Identifier: DiabloCanyon_LicenseRenewal_NonPublic
Email Number: 1939

Mail Envelope Properties (26E42474DB238C408C94990815A02F090A76EBD4C1)

Subject: RAI Letters dated July 22, 2010
Sent Date: 7/23/2010 3:19:50 PM
Received Date: 7/23/2010 3:19:53 PM
From: Ferrer, Nathaniel

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Files	**Size**	**Date & Time**
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RAI Related to the Review of the DCPP LRA - (Set 15) Aging Management Review and Aging Management Programs.pdf	353297	

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Priority: Standard
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WASHINGTON, D.C. 20555-0001

July 22, 2010

John Conway
Senior Vice President
Generation and Chief Nuclear Officer
Pacific Gas and Electric Company
77 Beale Street, MC B32
San Francisco, CA 94105

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE REVIEW OF THE DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. ME2896 AND ME2897) – AGING MANAGEMENT REVIEW AND TIME LIMITED AGING ANALYSES

Dear Mr. Conway:

By letter dated November 23, 2009, Pacific Gas & Electric Company submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating licenses for Diablo Canyon Nuclear Power Plant, Units 1 and 2, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

The request for additional information was discussed with Mr. Terry Grebel, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-1045 or e-mail nathaniel.ferrer@nrc.gov.

Sincerely,

Nathaniel Ferrer, Safety Project Manager
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
As stated

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Diablo Canyon Nuclear Power Plant, Units 1 and 2
License Renewal Application
Request for Additional Information Set 14
Aging Management Review/Time Limited Aging Analyses

RAI 3.1.2.2.7.2-1

Diablo Canyon Power Plant (DCPP) license renewal application (LRA) Section 3.1.2.2.7.2 with LRA Table 3.3.1, item 3.1.1.24 addresses stainless steel Class 1 pressurized water reactor (PWR) cast austenitic stainless steel (CASS) piping and components exposed to reactor coolant. The LRA section states that for managing the aging of cracking due to stress corrosion cracking for the CASS components, the Water Chemistry Program will be augmented by the American Society of Mechanical Engineers (ASME) Section XI Inservice Inspection, Subsections IWB, IWC and IWD Program. LRA Section 3.1.2.2.7.2 also states that the susceptibility to thermal aging embrittlement will be evaluated in the Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Program (B2.1.39). LRA Section B2.1.39 indicates that the applicant's Thermal Aging Embrittlement of CASS Program is a new program that will be consistent with Generic Aging Lessons Learned (GALL) aging management program (AMP) XI.M12, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)," with no exception or enhancement.

The staff noted that although LRA Section 3.1.2.2.7.2 addresses the material evaluation criteria used to manage the thermal embrittlement of CASS, the LRA section does not address the material screening criteria used to further evaluate and manage stress corrosion cracking of the CASS components.

In order to manage the stress corrosion cracking of the CASS components, the GALL Report, under item IV.C2-3, recommends further evaluation for CASS that has carbon content greater than 0.035% or ferrite content less than 7.5%.

1. Clarify the material screening criteria used to further evaluate and manage the stress corrosion cracking of CASS are consistent with GALL Report item IV.C2-3 which recommends that stress corrosion cracking of CASS with carbon content greater than 0.035% or ferrite content less than 7.5% be further evaluated and adequately managed.

2. Clarify whether stress corrosion cracking in the CASS components under GALL Report item IV.C2-3 is managed by inspections, flaw evaluations, and repairs and replacements in accordance with the ASME Section XI Inservice Inspection, Subsections IWB, IWC and IWD Program and the material screening criteria that the GALL Report recommends for the further evaluation. If the ASME Section XI Inservice Inspection, Subsections IWB, IWC and IWD Program or the material screening criteria recommend for the further evaluation is not used to manage the stress corrosion cracking, justify why the applicant's aging management approach is adequate to manage the aging effect.

ENCLOSURE

RAI 3.5.2.3.10-1

LRA Table 3.5.2-10 indicates that for aluminum components encased in concrete (external), there are no aging effects requiring management. The aging management review (AMR) line item cites generic Note J, indicating that neither the component nor the material and environment combination is evaluated in the GALL Report.

Corrosion of aluminum due to alkaline reaction could occur when it is used in contact with concrete. No justification for why there are no aging effects requiring management for the line item referenced above is provided.

Provide justification for why there are no aging effects requiring management for the identified aluminum components exposed to a concrete environment.

RAI 4.6.2-1

In LRA Section 4.6.2, "Design Cycles for Containment Penetrations," the applicant states:

1. The 14,000 additional thermal cycles used in the original analysis for the steam generator blowdown lines is greater than the maximum of 7000 cycles which are expected in 60 years. Therefore, the fatigue analysis for the main steam generator blowdown line flued heads is valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

2. The original number of transients used in the containment airlocks, hatches, penetration sleeves, end plates, and flued head analyses (not including the steam generator blowdown lines flued heads) will be monitored by the DCPP Metal Fatigue of the Reactor Coolant Pressure Boundary Program, described in LRA Sections 4.3.1 and B3.1, to ensure that fatigue will be adequately managed for the period of extended operation in accordance with 10 CFR 54.21(c)(1)(iii). Action limits will permit completion of corrective actions before the design basis number of events is exceeded.

The staff reviewed LRA Sections 4.6.2, 4.3.1, and B3.1 and was unable to find the following information:

1. The total number of transients (thermal cycles, OBE events) used in the original analysis for the steam generator blowdown line flued heads.

2. Total number of transients used to determine that requirements of a fatigue waiver per Subparagraph N-415.1, *Vessels Not Requiring for Cyclic Operation,* and Figure N-415(A) were met for airlocks, equipment hatches, containment penetration sleeves, and end plates.

3. Total number of transients assumed in the current design basis for airlocks, equipment hatches, containment penetration sleeves, and end plates.

The staff needs the below information to confirm that an evaluation the fatigue analysis for the steam generator blowdown line flued heads is valid for the period of extended operation in accordance with 10 CFR 54.21(c)(1):

1. The total number of cycles used for the original analysis for the main steam generator blowdown lines flued heads for 40 years of operation.

2. The projected number of cycles for the main steam generator blowdown line flued heads during 60 years of operation.

3. Total number of transients used to determine that requirements of a fatigue waiver per Subparagraph N-415.1, *Vessels Not Requiring for Cyclic Operation,* and Figure N-415(A) were met for airlocks, equipment hatches, containment penetration sleeves, and end plates.

4. Total number of transients assumed in the current design basis for airlocks, equipment hatches, containment penetration sleeves, and end plates.

July 22, 2010

John Conway
Senior Vice President
Generation and Chief Nuclear Officer
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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE REVIEW OF THE DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. ME2896 AND ME2897) – AGING MANAGEMENT REVIEW AND TIME LIMITED AGING ANALYSES

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/RA/
Nathaniel Ferrer, Safety Project Manager
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
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NAME	NFerrer	SFigueroa	DWrona	NFerrer
DATE	07/12/10	07/12/10	07/22/10	07/22/10

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Letter to J. Conway from N. Ferrer dated July 22, 2010

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE REVIEW OF THE DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. ME2896 AND ME2897) – AGING MANAGEMENT REVIEW AND TIME LIMITED AGING ANALYSES

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WASHINGTON, D.C. 20555-0001

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Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure:
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Diablo Canyon Nuclear Power Plant, Units1 and 2
License Renewal Application
Request for Additional Information Set 15
Aging Management Review/Aging Management Programs

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.

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°F), 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 (B2.1.2) and One-Time Inspection Program (B2.1.16).

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.

ENCLOSURE

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.

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 One-Time 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.

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.

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.

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 (i.e., 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.

July 22, 2010

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Generation and Chief Nuclear Officer
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77 Beale Street, MC B32
San Francisco, CA 94105

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Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

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