

## **NRR-PMDAPEm Resource**

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**From:** Singal, Balwant  
**Sent:** Thursday, November 02, 2017 1:39 PM  
**To:** 'Richardson, Michael'  
**Cc:** Tsao, John  
**Subject:** Request for Additional Information - Request for Approval for Application of Full Weld Overlay REP-RHR-SWOL, Diablo Canyon Power Plant, Units 1 and 2 (EPID No. L-2017-LLR-0092)  
**Attachments:** Diablo-LLR-0092-WeldOverlay-RAIs.docx

By letter dated September 29, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17269A220), Pacific Gas and Electric Company (PG&E) requested approval of alternative for application of full structural weld overlay at Diablo Canyon Power Plant, Units 1 and 2. The NRC has identified the attached request for additional information (RAI) during the review of the application.

Draft RAI were transmitted on October 30, 2017 and a clarification call was held on November 2, 2017. Please note that the attached RAIs incorporate the changes to the Draft RAIs discussed during the call. It was agreed that PG&E will respond to these RAIs within 30 days from the date of this e-mail.

Please treat this e-mail as official transmittal of RAIs.

PG&E has requested for an expedited review and approval by January 12, 2018. Hence, it is important that the request is processed on an expedited basis so that the U.S. Nuclear Regulatory Commission (NRC) staff can support the requested review schedule.

Thanking you.

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**Created By:** Balwant.Singal@nrc.gov

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REQUEST FOR ADDITIONAL INFORMATION  
RELIEF REQUEST REP-RHR-SWOL  
APPLICATION OF FULL STRUCTURAL WELD OVERLAY  
ON RESIDUAL HEAT REMOVAL PIPING  
DIABLO CANYON POWER PLANT UNITS 1 AND 2  
PACIFIC GAS AND ELECTRIC COMPANY  
DOCKET NOS. 50-275 AND 50-323

By letter dated September 26, 2017, (Agencywide Documents and Access Management System (ADAMS) Accession No. ML17269A220), Pacific Gas and Electric Company (PG&E, the licensee) requested relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, IWA-4000, at Diablo Canyon Power Plant (DCPP), Units 1 and 2. The licensee submitted Relief Request REP-RHR-SWOL for U.S. Nuclear Regulatory Commission (NRC) approval to repair degraded residual heat removal (RHR) suction piping using the full structural weld overlay at both units. To complete its review, the NRC staff requests the following additional information.

Request for Additional Information

1. The cover letter states, in part, "Temperature monitoring of the RHR lines for both Units 1 and 2 indicated that thermal stratification and temperature cycling are present at both of these weld locations."

Given the existence of the thermal cycles and thermal stratification, discuss whether the guidance in Electric Power Research Institute (EPRI), topical report MRP-146 "Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines," (Proprietary Document, Non-Publically Available) is applicable to the subject RHR piping. If yes, please describe the actions that will be taken. If no, please provide justification.

2. Page 7, Item (c)(1), states that inside diameter weld repairs shall be assumed in the weld residual analyses to conservatively bound any actual weld repairs that may have occurred during original construction. Item (c)(1) also stated that no repairs were performed on the inside diameter of the subject welds during construction. Please clarify whether the weld residual stress analyses includes an inside diameter repair.
3. In its request the licensee cites DCPP, Units 1 and 2, RHR suction weld joint flaw evaluation reports (References 7<sup>1</sup> and 8<sup>2</sup>) in support of its evaluation. The NRC staff is currently reviewing these reports as separate licensing actions. The NRC staff believes that the referenced reports provide basis for operation for one cycle as opposed to the time period

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<sup>1</sup> PG&E letter DCL-17-049, "Flaw Evaluation of Unit 2 Residual Heat Removal Suction Weld Joint," dated May 18, 2017 (ADAMS Accession No. ML17138B138)

<sup>2</sup> PG&E letter DCL-17-070, "Flaw Evaluation of Unit 1 Residual Heat Removal Suction Weld Joint," dated August 17, 2017 (ADAMS Accession No. ML17229B617)

currently proposed to the end of plant life in the relief request. The referenced flaw evaluations provide an effective period of 35 months (without the weld overlay) whereas the proposed weld overlay is designed to the end of plant life. Please describe how the weld overlay can support the longer period of operation proposed in the submittal as compared to the effective period in the flaw evaluations (e.g., weld overlay will reduce the flaw growth).

4. Page 5, third paragraph, of the relief request states, in part, “The provisions of ASME Code Case N-740-2<sup>3</sup>, Appendix I (Temper Bead) are not required.” Please discuss the welding technique that will be used to install the overlay and cite the relevant ASME Code Sections and articles that the welding will follow.
5. On page 6, last paragraph, of the relief request the licensee provided information concerning postulated and measured flaws. The values provided do not appear to precisely match the requirements of Code Case N-740-2. Please confirm that the requirements for measured and postulated flaws contained in the code case will be met or justify alternate requirement.
6. Page 7, last paragraph, of the relief request states, in part, “The allowable flaw size will be determined in accordance with ASME Section XI, Appendix C for the structural weld overlay geometry. This time period will meet or exceed the design requirement of the weld overlay (i.e., continued operation of both the units until the expiration of the current operating license).” Given the proposed weld overlay, and the assumption that the crack grows by 1) fatigue, 2) stress corrosion cracking, or 3) a combination of both, please provide the maximum allowable flaw depth permissible at the time of the installation of the weld overlay.
7. Page 9 of the relief request contains language concerning the volume to be inspected and actions to be taken if full coverage is not achieved. This language appears to differ from Code Case N-740-2. Please confirm that inspections will be conducted in accordance with N-740-2 or provide the differences proposed and justification for those differences.
8. Page 10 of the relief request states, in part, “Two examinations will be conducted, after installation of the weld overlay: the acceptance examination of the overlay and the preservice inspection. The purpose of the acceptance examination is to assure a quality overlay was installed. The purpose of the preservice inspection is to locate and size any indications and to provide a baseline for future examination.” The NRC staff notes that the volume of the acceptance examination is different from that of the pre-service examination as shown in Code Case N-740-2. The relief request needs to make that distinction. Please confirm that (a) the examination volume for the acceptance examination will follow Figure 1 of Code Case N-740-2, and (b) the examination volume for the preservice and inservice examinations will follow Figure 2 of Code Case N-740-2.
9. Page 9 of the relief request states, in part, “Schematic representation of the required ultrasonic examination volume is shown in Figure 5 [of the Enclosure to letter dated September 26, 2017].” The required volume for the acceptance examination is not identified in Figure 5. Please confirm that the solid red area in Figure 5 is the volume that is required to be ultrasonically examined for the acceptance examination.

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<sup>3</sup> Code Case N-740-2, “Full Structural Metal Dissimilar Weld Overlay for Repair or Mitigation of Class 1, 2, and 3 Items Section XI, Division 1.

10. Code Case N-740-2, Section 3(c), provides provisions for inservice examination requirements. Because flaws exist in both welds, please discuss the ultrasonic examination schedules for each weld from the overlay installation to the end of operating license for both units.

11. Paragraph 3(c)(4) of Code Case N-740-2 requires, in part, that if a planar flaw is detected in the outer 25 percent of the base material, weld overlay thickness shall meet the design analysis requirements of Section 2 of the code case. Any indication characterized as stress corrosion cracking in the weld overlay material is unacceptable. Paragraph 3(c)(6) requires, in part, that if inservice examinations reveal planar flaw growth, or new planar flaws, the weld overlay examination volume shall be reexamined during the first or second refueling outage following discovery of the growth or new flaws. Paragraph 3(c)(7) requires that for weld overlay examination volumes with unacceptable indications in accordance with paragraph 3(c)(4), the weld overlay and original defective weld shall be removed. A repair/replacement activity shall be performed in accordance with IWA-4000.

(a) Please confirm that the licensee will follow the requirements of above three paragraphs of the code case and other provisions of Section 3 of the code case (b) Paragraph 3(c)(4) of the code case requires that any indication characterized as stress corrosion cracking in the weld overlay material is unacceptable. Because the licensee has identified thermal fatigue as a key degradation mechanism, please discuss whether any indication propagated into the weld overlay material by thermal fatigue should also be considerable unacceptable. If not, please provide justification.

12. The NRC staff notes that a pre-overlay examination will be conducted prior to making the overlay. The licensee will be able to use this examination to obtain the current cycle's flaw growth rate. The licensee has assumed that the flaw degradation mechanism is thermal stratification and thermal cycling. If the current cycle's flaw growth rate exceeds the predicted flaw growth by thermal stratification and thermal cycling, discuss actions that the licensee will take to ensure the adequacy of the designed full structural weld overlay that will continue to mitigate this weld. Discuss at what growth rate would there need to be a modification to the weld overlay design and potential change of the re-inspection schedule for the weld repaired.