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PG&E Letter DCL-08-049

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Docket No. 50-275, OL-DPR-80
Diablo Canyon Unit 1
Reply to Request for Information Regarding: Steam Generator Tube Inspections for Diablo Canyon Power Plant Unit 1 Fourteenth Refueling Outage

Dear Commissioners and Staff:

Pacific Gas and Electric Company (PG&E) Letter DCL-07-085 dated August 27, 2007, submitted the "Results of Steam Generator (SG) Tube Alternate Repair Criteria (ARC) Inspections for Diablo Canyon Power Plant Unit 1 Fourteenth Refueling Outage." The NRC requested additional information regarding the inspection results by letter dated April 4, 2008.

Enclosed are the NRC questions and PG&E's response to each question.

There are no new or revised regulatory commitments as defined by the Nuclear Energy Institute 99-04, "Guidelines for Managing NRC Commitment changes," dated July 1999, in this report.

If you have any questions, please contact John Arhar at (805) 545-4629.

Sincerely,

John T. Conway

ddm1/469/A0725886
Enclosure
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A001
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**PG&E Reply to Request for Additional Information (RAI)
Regarding 1R14 Steam Generator Tube Inspections**

Pacific Gas and Electric Company (PG&E) Letters DCL-07-084 (ML072420339), and DCL-07-085 (ML072470561), dated August 27, 2007, and DCL-07-106 (ML073390290), dated November 26, 2007, submitted information summarizing the results of the steam generator (SG) tube inspections at Diablo Canyon Power Plant (DCPP), Unit 1 (Docket No. 50-275). The inspections were performed during the fourteenth refueling outage (1R14). In addition to these reports, the U.S. Nuclear Regulatory Commission (NRC) staff summarized additional information concerning the 1R14 SG tube inspections at DCPP Unit 1 in a letter dated August 8, 2007 (ML072140015).

The NRC requested additional information regarding the 1R14 inspection results by letter dated April 4, 2008 (TAC No. MD6690), for the following questions:

Question 1:

> *On page 2-4 of Enclosure 2 {of DCL-07-085}, you indicated that preliminary disposition of a Plus Point signal at the seventh support plate on the cold-leg side was initially attributed to axial primary water stress corrosion cracking. This indication was then dispositioned based on tracing the bobbin signal to the baseline inspection. Please discuss the nature of the Plus Point signal. Discuss whether the bobbin indication could be a result of some other artifact at this location (which isn't changing) and, therefore, the Plus Point indication is a result of the development of a new crack-like indication.*

PG&E Response:

SG 1-3 R3C86 at 7C was inspected twice by Plus Point probes in 1R14. The first Plus Point examination was with 0.680 inch single coil probe as part of the U-Bend examination program, which showed an inside diameter (ID) indication at the center of support plate 7C (0.64 volts, 8 degrees, and no lobe opening). A second Plus Point examination was performed with 0.720 inch three coil probe at 7C, which also showed an ID indication (0.63 volts, 8 degrees), consistent with the 0.680 inch probe data. The 1R14 bobbin data showed an ID signal at the center of support plate 7C (0.85 volts, 14 degrees), and a small dent of 0.51 volts.

The baseline preservice inspection bobbin data showed a similar ID signal at the center of support plate 7C (0.58 volts, 10 degrees). All data are in good agreement as to the location of the signal, the signal amplitude, and the phase angle. Because the ID signal was traceable back to the baseline data and has not changed in 25 years, it was concluded that the indication detected by Plus

Point at 7C was an ID anomaly (e.g., a scratch or lap) rather than service-induced primary water stress corrosion cracking (PWSCC).

This intersection was also inspected in the Unit 1 twelfth refueling outage (1R12) and the Unit 1 thirteenth refueling outage (1R13) by 0.680 inch single coil probe as part of the U-Bend examination program. Lookup of the 1R12 data showed a similar signal to the 1R14 signal. This further supports the conclusion that the indication is not service induced PWSCC.

Question 2:

On page 2-9 of Enclosure 2 {of DCL-07-085}, you discussed two indications which merged. You appear to have concluded that the depth of the "combined" indication did not undergo significant growth in depth since the maximum voltage of the combined indication was comparable to the maximum voltage of the indications during the prior inspection. Please discuss whether these indications were depth sized using phase analysis (since phase analysis is used in depth sizing these types of indications).

PG&E Response:

The SG 2-2 R8C61 2H two axial PWSCC indications in 1R13 and the single merged axial PWSCC indication in 1R14 were depth sized using phase analysis. The 1R14 depth sizing results are shown on page 2-21 (Table 5) of DCL-07-085, and the adjusted maximum depth is 48 percent. The 1R13 depth sizing results are shown on page 2-23 (Table 5) of DCL-06-029, and the adjusted maximum depth is 50 percent for crack 1 and 36 percent for crack 2. These similar depths support the conclusion of no significant growth in depth.

Question 3:

On page 9 of 113 of Enclosure 3 {of DCL-07-085}, you indicated that you re-performed the operational assessment using the 2R13 probability of prior cycle data. Please discuss why this assessment was re-performed.

PG&E Response:

To clarify, the benchmarking was done with the updated composite DCPP probability of prior cycle detection (POPCD) through the most recent Unit 2 thirteenth refueling outage (2R13), thus consisting of 9 inspections. PG&E's standard benchmarking practice is to use the actual cycle length, the most recent EPRI leak and burst correlations, and the most recent pre-outage composite DCPP POPCD. This practice ensures proper assessment of the POPCD and growth methodologies.

Question 4:

On page 13 of 113 of Enclosure 3 {of DCL-07-085}, you indicated that there were some tubes where an outside diameter initiated indication could not always be found in the bobbin lookup results from 1R13. Presumably these were for indications called "distorted inside diameter support" (DIS) indications. Please discuss under which alternate repair criteria these indications were assessed. If an indication was a DIS in 1R13, the NRC staff would have expected that it would have been inspected with a rotating probe and either dispositioned as non-flawlike, as a primary water stress corrosion cracking indication, or as some other type of flaw. If the 1R14 bobbin indication was now classified as a distorted outside diameter {DOS} initiated indication, the NRC staff would have expected that it would have also been inspected with a rotating probe (since previous DIS's would have been inspected). Please clarify. Please also refer to the discussion on page 20 of 113 in which it appears that a DIS indication in 1R13 was also classified as an axial outside diameter stress corrosion crack not detectable with the bobbin.

PG&E Response:

There are two categories of 1R14 DOS indications for which no 1R13 bobbin outside diameter (OD) component could be detected, all of which are at dented tube support plate (TSP) intersections, thus requiring rotating probe inspections in both 1R13 and 1R14:

Category a): 1R13 axial outside diameter stress corrosion cracking (ODSCC) not detected by bobbin (AONDB), which became a 1R14 DOS. These indications are dispositioned under voltage based alternate repair criteria (ARC) in 1R13 and 1R14.

Category b): 1R13 DIS which became a 1R14 DOS. These 1R13 DIS indications are not subject to ARC because the ID signals were not confirmed as flaw-like by rotating probe. The 1R14 DOS indications are dispositioned under voltage-based ARC.

There are cases where DIS indications may be confirmed as axial outside diameter stress corrosion cracking by rotating probes (termed AONDB indications), such as SG 1-3 R23C31 at 2H in 1R13 as described on page 20 of 113. In some cases, prior cycle AONDB indications are called as DOS in a subsequent outage, such as listed on Table 3-25. Both the prior cycle AONDB and the current cycle DOS indications are dispositioned under voltage based ARC.

Question 5:

On page 1-22 {of DCL-07-106}, you discuss ligament cracking of the tube support plates. Since none of the new indications were traceable to the preservice inspection, please discuss any insights on the cause of these indications.

PG&E Response:

None of the 21 new indications in 1R14 were traceable to preservice inspection (PSI) data. The observation of small numbers of new indications being traceable to PSI has been previously noted in other recent outages. As such, PG&E has recently required prior cycle lookups of new indications, which have concluded that most of the new indications are detectable in the prior cycle data. For example, 17 of the 21 new indications in 1R14 were traceable to 1R13. Most of the new indications could be attributed to increased analyst sensitivity.

PG&E concludes that the majority of new TSP indications are due to service-induced TSP degradation such as erosion and cracking. However, because the monitoring of indications with ligament gaps has shown insignificant change in gap sizes, there is no threat to tube integrity from this changing condition. Tubes with crack-like indications coincident with TSP ligament indications are plugged consistent with prior commitments to the NRC.