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PG&E Letter DCL-01-052

U.S. Nuclear Regulatory Commission
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Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
2R10 Threshold Screening Values for W* Insitu Leak Testing

Dear Commissioners and Staff:

On February 2, 2001, in a telephone discussion with the NRC staff, PG&E discussed the Unit 2 refueling outage ten (2R10) insitu leak testing threshold screening criteria for: (a) deplugged W* indications, and (b) W* indications that have been previously leak tested. The NRC staff requested that these screening criteria be submitted for information. This letter defines these 2R10 insitu leak testing threshold screening criteria.

Background

In PG&E Letter DCL-98-148, "Response To NRC Request For Additional Information, Dated August 6, 1998, Regarding Proposed W* Steam Generator Tube Repair Criteria," dated October 22, 1998, PG&E defined threshold values to screen W* indications for insitu leak testing. The sequential screening parameters include Plus Point maximum voltage, maximum depth, and crack length at maximum depth. Threshold values were defined for each of these parameters as summarized below.

- Indications with maximum Plus Point voltages exceeding the critical voltage (V_{crit}) are leak tested independent of other parameters. V_{crit} = 4.0 volts.

- Indications with maximum Plus Point voltages exceeding the voltage threshold (V_{thr}) are carried to the depth evaluation. A minimum of the five largest voltage indications are carried to the depth evaluation if less than five indications exceed the voltage threshold. V_{thr} = 2.5 volts.

- Depth evaluation. Indications with maximum depths exceeding the maximum depth leakage threshold ($MD_{L\text{-}thr}$) over lengths greater than the deep crack length threshold ($L_{L\text{-}min}$) are leak tested. $MD_{L\text{-}thr}$ = 80 percent. $L_{L\text{-}min}$ = 0.1 inch.

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The above V_{crit} and V_{thr} values were based on experience with axial primary water stress corrosion cracking (PWSCC) indications in non-deplugged tubes.

In the Unit 2 ninth refueling outage (2R9), 54 axial PWSCC W* indications were deplugged, of which 52 were returned to service and 2 were replugged since they failed the W* criteria. As discussed in the 90-day report following 2R9 (DCL-00-008, "Special Report 00-01- 90 Day Report, Steam Generator Alternate Repair Criteria for Diablo Canyon Power Plant Unit 2 Ninth Refueling Outage," dated January 20, 2000), three of these deplugged W* indications had maximum Plus Point voltages that were greater than or equal to V_{crit} (4.0 volts), and therefore, were insitu leak-tested up to normal operating pressure differential. No other W* indications exceeded the threshold screening values. None of the three indications leaked during the test and all were returned to service. The three indications were located near the bottom of WEXTEX transition (BWT), such that the tubesheet provided minimal crevice restriction. The three indications had been plugged in Unit 2 refueling outage seven, and had relatively large voltage increases in the plugged tube condition. The 2R9 nondestructive examination (NDE) results of the three indications are summarized below:

SG	Tube	NDE measured distance of upper crack tip to BWT, not including uncertainty	Peak Voltage
21	R3C59	0.51 inch	5.6 volts
21	R7C62	0.59 inch	4.2 volts
22	R31C25	0.98 inch	4.0 volts

2R10 Insitu Screening Criteria

In 2R10, the existing insitu screening criteria will be retained for non-deplugged W* indications because the existing voltage criteria were based on experience with axial PWSCC indications in non-deplugged tubes. Because the existing criteria do not address experience with deplugged axial PWSCC indications, PG&E is establishing separate insitu screening criteria for deplugged W* indications as described below. PG&E discussed the need for establishing these criteria in the referenced telephone discussions with the NRC, and the NRC indicated that prior approval was not required to implement the criteria in 2R10. PG&E will submit a license amendment request (LAR) after 2R10 to extend the W* ARC license beyond the two cycles originally granted by the NRC. The LAR will also establish insitu screening criteria for deplugged W* indications, non-deplugged W* indications, and W* indications that have been subjected to prior leak-testing.

Deplugged tubes commonly show voltage increases in the plugged tube condition that are due to changes in crack face conditions (for example, oxidation

or minor intergranular attack) rather than crack growth in length and depth. The insitu threshold screen values were developed for active tube conditions.

Because of the higher voltage/depth trends for deplugged tubes, as supported by the fact that three deplugged indications did not leak, PG&E is raising the 2R10 V_{crit} and V_{thr} voltages for deplugged W* indications to 6.0 volts and 4.0 volts, respectively. The significantly higher V_{crit} voltage will permit the depth evaluation, which is less affected by the plugged tube conditions, to have more influence on the insitu selection. The 4.0 volt value for V_{thr} is conservative for deplugged tubes because the maximum Plus Point voltage for active throughwall indications is about 4.5 volts, and crack voltages in deplugged tubes tend to be higher than those in active tubes.

In addition to establishing V_{crit} and V_{thr} for deplugged W* indications, a new screen is being established that is applicable only to the three W* indications that were leak tested in 2R9. This new screen requires testing only if the maximum Plus Point voltage is increased by 25 percent from the 2R9 voltage. The purpose of this additional screen is to limit the number of repeat insitu tests on the same W* indication.

Based on the above discussion, the 2R10 insitu screening plan for deplugged W* indications is summarized below:

- Deplugged indications, which were leak tested in 2R9, with maximum Plus Point voltages greater than or equal to 1.25 times the 2R9 voltage are carried to the V_{crit} screening parameter.
- Deplugged indications with maximum Plus Point voltages exceeding the critical voltage (V_{crit}) are leak tested independent of other parameters. V_{crit} = 6.0 volts.
- Deplugged indications with maximum Plus Point voltages exceeding the voltage threshold (V_{thr}) are carried to the depth evaluation. A minimum of the five largest voltage indications are carried to the depth evaluation if less than five indications exceed the voltage threshold. V_{thr} = 4.0 volts.
- Depth evaluation. Deplugged indications with maximum depths exceeding the maximum depth leakage threshold ($MD_{L\text{-}thr}$) over lengths greater than the deep crack length threshold ($L_{L\text{-}min}$) are leak tested. $MD_{L\text{-}thr}$ = 80 percent. $L_{L\text{-}min}$ = 0.1 inch.

If you have any questions concerning these criteria, please contact Mr. Bob Exner at (805) 545-4302.

Sincerely,

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