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PG&E Letter DCL-05-096

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

Docket No. 50-323, OL-DPR-82  
Diablo Canyon Unit 2

Reply to Request for Additional Information for Special Report 05-01 - Results of  
Steam Generator Tube Inspections for Diablo Canyon Power Plant Unit 2 Twelfth  
Refueling Outage

Dear Commissioners and Staff:

By Pacific Gas and Electric (PG&E) Letters DCL 04-165, "Special Report 04-02: Steam Generator Tube Plugging During Unit 2 Twelfth Refueling Outage," dated November 30, 2004 (ML043430465), and DCL-05-024, "Special Report 05-01 - Results of Steam Generator (SG) Tube Inspection for Diablo Canyon Power Plant Unit 2 Twelfth Refueling Outage," dated March 16, 2005 (ML050820052), PG&E submitted reports summarizing the SG tube inspections performed at Diablo Canyon Unit 2 during the twelfth refueling outage (2R12).

On July 5, 2005, the NRC requested additional information needed for the staff to complete its review of these submittals. PG&E's response to the request for additional information is provided in the enclosure. If you have any questions or require additional information, please contact John Arhar at (805) 545-4629.

Sincerely,

  
Donna Jacobs *for,*

ddm1/469  
Enclosure

cc: Terry W. Jackson  
Bruce S. Mallett  
Diablo Distribution  
cc/enc: Girija S. Shukla  
State of California, Pressure Vessel Unit

A001

**Reply to Request for Additional Information for  
Special Report 05-01 - Results of Steam Generator (SG) Tube Inspections for  
Diablo Canyon Power Plant Unit 2 Twelfth Refueling Outage**

NRC Request

*By letters dated November 30, 2004 (ML043430465), and March 16, 2005 (ML050820052), Pacific Gas and Electric Company, the licensee for Diablo Canyon Unit 2, submitted reports summarizing the steam generator (SG) tube inspections performed at Diablo Canyon Unit 2 during their 2004 refueling outage (2R12). Additional information concerning the 2004 SG tube inspections at Diablo Canyon Unit 2 was summarized by the NRC staff in a letter dated January 4, 2005 (ML043570323).*

*In order for the staff to complete its review of the licensee's submittals, responses to the following questions are requested:*

NRC Request 1:

- In Table 3-4 of Enclosure 3 to your March 16, 2005 letter, the voltage change per effective full power year (EFPY) is provided. The largest growth rates were reported as 1.434 and 1.020 volts per EFPY. These values do not match those listed in Table 3-5 where the maximum voltage change per EFPY was listed as 1.35. Please clarify this apparent discrepancy. If any calculations were performed using incorrect growth values, please correct these calculations and provide the results to the NRC.*

PG&E Response 1:

Table 3-5 was prepared using an incorrect cycle length of 1.61 EFPY when calculating the growth rates. The correct cycle length is 1.52 EFPY. Enclosed is a revised Table 3-5 with corrected growth rates. Other than Table 3-5, no calculations were performed using incorrect growth values.

NRC Request 2:

- Figure 3-45 of Enclosure 3 to your March 16, 2005 letter illustrates preventive plugging performed to limit the possibility of extreme voltage changes during a cycle. Six tubes in steam generator 4 were preventively plugged since the +Point™ amplitude exceeded 1.4 volts. Please discuss why one tube in steam generator 4 with a bobbin voltage of approximately 1.9 volts and a +Point™ amplitude of approximately 1.8 volts was not preventively plugged.*

PG&E Response 2:

On Figure 3-45, the tube in steam generator 4 with a bobbin voltage of approximately 1.9 volts and a +Point™ amplitude of approximately 1.8 volts was plugged due to its location in the wedge region exclusion zone, so this tube was not categorized as being preventively plugged. Page 11 of the report states that "a seventh indication in SG 2-4 in this category was already required to be plugged due to its location in the wedge exclusion region."

NRC Request 3:

- *Figure 3-42 of Enclosure 3 to your March 16, 2005 letter indicates that there were 7 indications greater than 2 volts in steam generator 1. However, Table 3-3 indicates that there were only 5 indications that had voltages greater than 2 volts in steam generator 1. Similarly, Figure 3-45 indicates that there were 7 indications greater than 2 volts in steam generator 4 while Table 3-3 indicates that there were only 4 indications that had voltages greater than 2 volts in this steam generator. Please clarify this apparent discrepancy.*

PG&E Response 3:

The data is correct in Table 3-3 and in Figures 3-42 to 3-45. Figures 3-42 to 3-45 plot all +Point™ single axial indication (SAI) voltages against the corresponding bobbin distorted outside diameter signal (DOS) voltage. Outside diameter stress corrosion cracking (ODSCC) indications may have multiple SAIs. In SG 2-1 R25C42 1H bobbin indication of 2.1 volts, there are 3 SAIs. Therefore, Figure 3-42 shows seven SAIs associated with five greater than 2 volt DOS indications. In SG 2-4 R27C43 2H bobbin indication of 2.43 volts, there are 3 SAIs. In SG 2-4 R33C50 2H bobbin indication of 2.62 volts, there are 3 SAIs. Therefore, Figure 3-45 shows eight SAIs associated with four greater than 2 volt DOS indications. Two of the Figure 3-45 SAI voltages are very close together (0.01 volts apart), so the points are indistinguishable in the figure.

Revised Table 3-5  
DOS/AONDB Voltage and Growth Distribution by TSP

Tube Support Plate	SG 2-1					Tube Support Plate	SG 2-2				
	No. of Indications	Max Voltage	Average Voltage	Max Growth/ EFPY	Average Growth/ EFPY		No. of Indications	Max Voltage	Average Voltage	Max Growth/ EFPY	Average Growth/ EFPY
1H	294	2.14	0.59	0.95	0.12	1H	138	1.96	0.59	0.59	0.11
2H	102	2.38	0.53	1.02	0.11	2H	156	2.03	0.57	0.78	0.09
3H	31	1.84	0.53	0.83	0.09	3H	58	1.79	0.50	0.61	0.07
4H	5	0.89	0.50	0.36	0.14	4H	18	1.16	0.50	0.15	0.03
5H	18	0.93	0.51	0.17	0.01	5H	3	0.98	0.57	0.34	0.14
6H	3	0.90	0.65	0.39	0.13	6H	1	0.35	0.35	0.09	0.09
7H						7H	2	0.51	0.51	0.17	0.08
CL	19	0.91	0.47	0.07	0.01	CL	21	0.83	0.40	0.24	0.03
All Inds	472	2.38	0.57	1.02	0.11	All Inds	397	2.03	0.55	0.78	0.09
Tube Support Plate	SG 2-3					Tube Support Plate	SG 2-4				
	No. of Indications	Max Voltage	Average Voltage	Max Growth/ EFPY	Average Growth/ EFPY		No. of Indications	Max Voltage	Average Voltage	Max Growth/ EFPY	Average Growth/ EFPY
1H	148	1.60	0.53	0.36	0.05	1H	371	1.99	0.66	0.63	0.12
2H	83	1.49	0.55	0.57	0.07	2H	436	2.87	0.76	1.43	0.16
3H	23	1.18	0.46	0.16	0.03	3H	148	1.92	0.57	0.70	0.11
4H	1	0.30	0.30	-0.01	-0.01	4H	47	1.19	0.51	0.36	0.11
5H	4	0.86	0.44	0.15	0.03	5H	7	0.71	0.39	0.13	0.05
6H	2	0.32	0.30	0.05	0.03	6H	1	0.20	0.20	-0.03	-0.03
7H	1	0.21	0.21	0.04	0.04	7H					
CL	10	0.42	0.30	0.09	0.00	CL	10	0.75	0.39	0.20	0.04
All Inds	272	1.60	0.52	0.57	0.05	All Inds	1020	2.87	0.68	1.43	0.14
Tube Support Plate	Composite of All Four SGs										
	No. of Indications	Max Voltage	Average Voltage	Max Growth/ EFPY	Average Growth/ EFPY						
1H	951	2.14	0.61	0.95	0.11						
2H	777	2.87	0.67	1.43	0.13						
3H	260	1.92	0.54	0.83	0.09						
4H	71	1.19	0.51	0.36	0.09						
5H	32	0.98	0.48	0.34	0.03						
6H	7	0.90	0.44	0.39	0.07						
7H	3	0.51	0.41	0.17	0.07						
CL	60	0.91	0.40	0.24	0.02						
All Inds	2161	2.87	0.61	1.43	0.11						