



**Pacific Gas and  
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September 30, 2003

PG&E Letter DCL-03-123

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

Docket No. 50-323, OL-DPR-82  
Diablo Canyon Unit 2  
Response to NRC Request for Additional Information Regarding License  
Amendment Request 03-10, "Revised Steam Generator Voltage-based Repair  
Criteria Probability of Detection Method for Diablo Canyon Unit 2 Cycle 12"

Dear Commissioners and Staff:

On September 10, 2003, the NRC staff identified additional information required to complete the evaluation associated with PG&E License Amendment Request (LAR) 03-10 for Diablo Canyon Power Plant Unit 2.

LAR 03-10 proposes a steam generator voltage-based probability of detection method referred to as the Probability of Prior Cycle Detection method. LAR 03-10 was submitted in PG&E Letter DCL-03-078, "License Amendment Request 03-10, Revised Steam Generator Voltage-based Repair Criteria Probability of Detection Method for Diablo Canyon Unit 2 Cycle 12," dated June 26, 2003. Supplemental information supporting LAR 03-10 was provided in PG&E Letter DCL-03-109, "Supplemental Information to Support License Amendment Request 03-10, 'Revised Steam Generator Voltage-based Repair Criteria Probability of Detection Method for Diablo Canyon Unit 2 Cycle 12,'" dated September 3, 2003.

PG&E's response to the September 10, 2003, request for additional information is included in Enclosure 1.

The additional information does not affect the results of the safety evaluation or no significant hazards consideration determination previously transmitted in PG&E Letter DCL-03-078.

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PG&E Letter DCL-03-123

If you have any questions regarding this response, please contact Stan Ketelsen at 805-545-4720.

Sincerely,

A handwritten signature in black ink, appearing to read 'David H. Oatley'.

David H. Oatley  
*Vice President and General Manager - Diablo Canyon*

kjs/4328  
Enclosures


cc: Edgar Bailey, DHS  
Bruce S. Mallett  
David L. Proulx  
Diablo Distribution  
cc/enc: Girija S. Shukla

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

_____	)	Docket No. 50-323
In the Matter of	)	Facility Operating License
PACIFIC GAS AND ELECTRIC COMPANY	)	No. DPR-82
	)	
Diablo Canyon Power Plant	)	
Unit 2	)	
_____	)	


AFFIDAVIT

David H. Oatley, of lawful age, first being duly sworn upon oath states that he is Vice President and General Manager - Diablo Canyon of Pacific Gas and Electric Company; that he has executed this additional information on License Amendment Request 03-10 on behalf of said company with full power and authority to do so; that he is familiar with the content thereof; and that the facts stated therein are true and correct to the best of his knowledge, information, and belief.

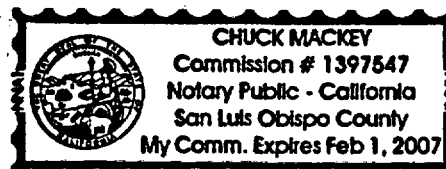


David H. Oatley  
*Vice President and General Manager - Diablo Canyon*

Subscribed and sworn to before me this 30<sup>th</sup> day of September 2003.



Notary Public  
County of San Luis Obispo  
State of California



**PG&E Response to NRC Request for Additional Information Regarding License  
Amendment Request 03-10, "Revised Steam Generator Voltage-based Repair  
Criteria Probability of Detection Method for  
Diablo Canyon Unit 2 Cycle 12"**

Response to NRC Questions Received on September 10, 2003

NRC Question 1:

*"In the September 3, 2003, Supplement, PG&E recommends that bobbin indications, not detected by RPC (RPC NDD), should be treated as detected, and that the Unit 2 Cycle 12 Monte Carlo analysis should be based on the revised LAR POPCD (not the "NRC POPCD" which requires that bobbin indications, not detected by RPC, should be treated as non-detected). PG&E further states that this is consistent with how RPC NDD indications are treated in the GL 95-05 condition monitoring and operational assessments.*

*At RPC NDD locations a flaw may or may not exist (i.e., RPC is not always "truth"). This is the reason RPC NDD indications are treated (by GL 95-05) as flaws for the purposes of condition monitoring and beginning-of-cycle flaw distributions. Treating these indications as flaws, in this context, is conservative. For the same reason, for the purposes of POPCD, the staff believes RPC NDD indications should be treated as non-detected.*

*Given your proposal and the above observations, discuss how you will conclusively determine whether RPC NDD indications are flaws or non-relevant indications."*

PG&E Response:

For the purpose of establishing the Probability of Prior Cycle Detection (POPCD) data for Diablo Canyon Power Plant (DCPP) Unit 2 Cycle 12, PG&E agrees to apply end of cycle n (EOC<sub>n</sub>) bobbin indications not confirmed by rotating pancake coil (RPC) as undetected for POPCD. As such, PG&E will apply the "New NRC POPCD" curve shown in Figure 3 of Enclosure 1 to PG&E Letter DCL-03-109, "Supplemental Information to Support License Amendment Request 03-10, 'Revised Steam Generator Voltage-based Repair Criteria Probability of Detection Method for Diablo Canyon Unit 2 Cycle 12,'" dated September 3, 2003, for the DCPP Unit 2 Cycle 12 steam generator (SG) operational assessment.

NRC Question 2:

*"Please provide a table, similar to Table 5 in the September 3, 2003 supplement, which contains column labels (i.e., Column B through L from Tables 1 and 2) in lieu of numbers indicating how data will be transposed from Table 5 into Tables 1 or 2. In addition, categories which require additional assessment (due to "disappearing flaws")*

*or further eddy current inspections (i.e., rotating probe inspections) should be clearly identified and described. Factor in plans/actions previously described as well as those planned based on response to the remainder of these questions."*

PG&E Response:

Table 2-1 of this enclosure provides a table format similar to Table 5 of Enclosure 1 to PG&E Letter DCL-03-109 and contains column labels that indicate how data will be transposed to the POPCD data table. In addition, notes have been added to clarify when RPC inspection is required at end of cycle  $n + 1$  ( $EOC_{n+1}$ ), and when an assessment is required in the SG 90-day report for RPC no detectable degradation (NDD) indications that were RPC confirmed at  $EOC_n$  ("disappearing flaws"), with the clarification that the assessment is only required if the Plus Point voltage is greater than 0.5 volts. However, if there are a significant number of occurrences of this category, irrespective of the Plus Point voltage, PG&E will evaluate the cause in the 90-day report.

NRC Question 3a:

*"On page 2 of Enclosure 1 to the September 3, 2003 Supplement, NRC Question 4 was misstated (the question, as written by PG&E, was broader than intended by the NRC staff). Below are several follow-up questions which clarify the staff's original intent of Question 4.*

*In response to NRC Question 4, it is stated that indications that "are AONDB at  $EOC_n$  and bobbin NDD at  $EOC_{n+1}$ , PG&E will perform RPC inspection of these indications at  $EOC_{n+1}$ , to ensure that all known ODSCC indications are included in the Monte Carlo calculations.*

*Based on the above statement, the staff assumes that indications categorized as (using terminology from Table 5), BND w/RDD at  $EOC_n$  and BND w/o RPC at  $EOC_{n+1}$  would be RPC inspected. In addition, the staff assumes this row/column in Table 5 states "No Count" because indications will not fall into this category, because subsequent RPC inspection will always be performed.*

*Please verify whether the staff's assumptions are accurate or further clarify the intent of the response to Question 4 in the September 3, 2003 Supplement."*

PG&E Response:

The staff is correct in assuming that indications, categorized as bobbin NDD with RPC detected indication (BND w/ RDD) at  $EOC_n$  that continue to be bobbin NDD (BND) at  $EOC_{n+1}$ , will be RPC inspected at  $EOC_{n+1}$ , as PG&E has previously committed in PG&E Letter DCL-03-109. Table 5 of Enclosure 1 to Letter DCL-03-109 had stated "No Count" because indications in this category had not been included in POPCD tables (as discussed below, there were 12 occurrences of this category in prior inspections). In

the future, there will be no occurrences of this category based on PG&E's commitment to perform RPC inspection at  $EOC_{n+1}$ .

There have been 12 occurrences of  $EOC_n$  axial outside diameter stress corrosion cracking not detected by bobbin (AONDB) indications that were bobbin NDD and not RPC inspected at  $EOC_{n+1}$ . The details of these indications are contained in Table 3-1 of this enclosure. The current POPCD tables have not accounted for these indications. The largest Plus Point voltage of this population is 0.36 volts, consistent with other small AONDB Plus Point voltages. Treating these indications as nondetected at  $EOC_n$ , and obtaining a bobbin voltage using the inferred voltage from Plus Point, would result in negligible changes to POPCD and thus negligible changes to the Cycle 12 leak and burst results.

**NRC Question 3b:**

*"BDD w/RDD at  $EOC_n$  and BND w/o RPC at  $EOC_{n+1}$ : Indications in this category represent a flaw that was detected with bobbin and confirmed with RPC in  $EOC_n$ . Subsequently, the flaw is not detected with bobbin and RPC is not used in  $EOC_{n+1}$ . According to the September 3, 2003 Supplement, these indications are excluded from the POPCD calculations.*

*The staff believes that PG&E should perform RPC inspection of indications in this category at  $EOC_{n+1}$ , to ensure that all known ODSCC indications are included in the Monte Carlo calculations. Therefore this category would state "No Count" because all indications initially identified to fall in this category should require additional RPC inspection and the final results would be included in a different category. Please clarify whether this is your intent."*

**PG&E Response:**

For indications categorized as bobbin detected indication with RPC detected indication (BDD w/ RDD) at  $EOC_n$  that are BND at  $EOC_{n+1}$ , PG&E agrees to perform  $EOC_{n+1}$  RPC inspection of the intersection. There have been no occurrences of this category in the past and, based on PG&E's commitment, there will be no occurrences in the future.

**NRC Question 3c:**

*"BND w/RDD at  $EOC_n$  and BND w/RND at  $EOC_{n+1}$ : This category represents a flaw that was not detected with bobbin, but was confirmed with RPC in  $EOC_n$ . Subsequently, the flaw is not detected with bobbin and not detected with RPC in  $EOC_{n+1}$ . The September 3, 2003, submittal indicates that indications in this category will not be counted.*

*Because indications in this category appear to be disappearing flaws, NRC staff believes these inspection results should be counted, and the causative factors for the change in RPC detection should be discussed in the 90-day report. In addition, these*

*results should be placed into the appropriate column in Tables 1 and 2. Please clarify whether this is your intent."*

**PG&E Response:**

There have been two occurrences of this category (BND w/ RDD at EOC<sub>n</sub> that are BND with RPC NDD (BND w/ RND) at EOC<sub>n+1</sub>). Table 5 of Enclosure 1 to PG&E Letter DCL-03-109 had stated "No Count" because indications in this category had not been included in POPCD tables. There is no impact on POPCD because indications in this category are excluded from POPCD; nonetheless, future DCPD POPCD data table updates will include a count of these indications. The following discussion provides the causative factors for this change in RPC detection, which can be summarized as analyst judgment as a result of extremely low amplitude signals (less than 0.5 Plus Point volts).

The first occurrence of this category was an indication in DCPD Unit 1 SG 2 in row 12 and column 21 at the fourth tube support plate (R12C21 at 4H), which was bobbin NDD and Plus Point single axial indication outside diameter (NDD/SAI-OD) in DCPD Unit 1 refueling outage 10 (1R10), but bobbin distorted inside diameter (DIS) signal and Plus Point NDD (DIS/NDD) in DCPD Unit 1 refueling outage 11 (1R11). A review of the 1R10 data by the PG&E Level III eddy current analyst determined that the Plus Point SAI-OD call in 1R10 was very conservative (0.21 volts), and could have been called NDD, and that the Plus Point NDD call in 1R11 was correct.

The second occurrence of this category was in DCPD Unit 2 SG 4 in row 18 and column 72 at the third tube support plate (R18C72 at 3H), which was a bobbin DIS and Plus Point SAI-OD (DIS/SAI-OD) in DCPD Unit 2 refueling outage 9 (2R9), bobbin DIS and Plus Point NDD (DIS/NDD) in DCPD Unit 2 refueling outage 10 (2R10), and bobbin distorted outside diameter (DOS) signal and Plus Point SAI-OD (DOS/SAI-OD) in DCPD Unit 2 refueling outage 11 (2R11). A review of the data was performed by the PG&E Level III analyst, with the following results. The Plus Point SAI-OD signal was very small in 2R9 (0.11 volt) and could have been conservatively called as SAI-OD again in 2R10. The bobbin signal in 2R11 should have been called as DIS again (21 degrees phase angle and 3.62 volt dent influence) and not a 1.21 volt DOS. The 0.22 volt SAI-OD call in 2R11 is accurate and the 2R11 DOS call is conservative, since the 1.21 volts applied in the tube integrity calculations is larger than the assigned voltage would have been (0.54 volt) by applying the DCPD bobbin to Plus Point voltage correlation.

**NRC Question 4:**

*"The statistical "GLM" regression analyses which is discussed in both the June 26 and September 3, 2003, submittals is identified as the general linear model algorithm. The staff previously understood that PG&E planned to use the "generalized" linear model. Please clarify which model is utilized."*

PG&E Response:

PG&E is applying the generalized linear model. The use of the word "general" in Letter DCL-03-078 and Letter DCL-03-109 should be interpreted as "generalized."

NRC Question 5:

*"In Section 4.6 of the June 26, 2003, LAR, titled "Continuing Assessment and Reporting for POPCD," it is stated that, "If the total number of indications less than 1 volt is underestimated by greater than 15 percent and the number of indications greater than 1 volt is not overestimated by about one third or more of the low voltage percentage underestimate to compensate for the low voltage underestimate, a methods assessment will be made to assess the significance of underestimating the number of low voltage indications."*

*The staff believes this criteria is unnecessarily complicated and should only be based on underestimation of lower voltage indications. In addition, the staff believes the corresponding actions should relate to corrective actions (such as increasing the number of predicted low voltage indications in subsequent operational assessments), rather than an assessment of the significance of the underestimation. Based on the above observations, describe your plans."*

PG&E Response:

PG&E will revise and simplify the commitment in Section 4.6 of Enclosure 1 to PG&E Letter DCL-03-078, "License Amendment Request 03-10, Revised Steam Generator Voltage-based Repair Criteria Probability of Detection Method for Diablo Canyon Unit 2 Cycle 12," dated June 26, 2003, as follows: At the EOC of the twelfth operating cycle for DCP Unit 2, if the total number of as found indications is underestimated by greater than 15 percent, a methods assessment will be performed to determine the cause, and corrective actions will be proposed in the 90-day report, including an assessment of the need to increase the number of predicted low voltage indications at beginning of cycle (BOC) to determine the effect on EOC projections.

A detailed assessment has been performed for the SG 2-4 projected indication population versus the as-found population of indications at the EOC of the eleventh operating cycle for DCP Unit 2, using techniques to increase the number of low voltage indications at BOC. The detailed results of this study will be included as part of PG&E's response to NRC request for additional information (RAI) question #6 dated August 8, 2003, on the DCP Unit 2 eleventh refueling outage 90-day report provided in PG&E Letter DCL-03-076, "Special Report - 03-02 - Results of Steam Generator Inspections for Diablo Canyon Unit 2 Eleventh Refueling Outage," dated June 23, 2003.



NRC Question 6:

*"PG&E previously provided draft RAI responses to NRC POPCD questions of April 9, 2003. The information provided in these draft RAI responses as well as modifications made to the POPCD methodology as a result of the April 9, 2003 questions were to be incorporated into the June 26, 2003 LAR. It appears the responses to RAIs D2 and D3 were not included in the June 26, 2003, submittal. Please provide the information discussed in response to these two questions."*

PG&E Response:

The responses to NRC RAIs D2 and D3 of April 9, 2003, were not docketed in either PG&E Letter DCL-03-078 or PG&E Letter DCL-03-109. Rather, the requested information was docketed in PG&E's 90-day report submittal DCL-03-076 dated June 23, 2003, as discussed below.

NRC RAI D2: *"Provide the leak rate versus time results for the pulled tube tests of R44C45 and R35C57."*

Response:

Section 2.3 and Figures 4 and 5 of Enclosure 5 of DCL-03-076 (Destructive Examination report) provide the leak rate versus time results for the pulled tubes of R44C45 and R35C57, along with a discussion of the test results.

NRC RAI D3: *"Compare predicted profiles with the destructive exam results for the DCP-2 pulled tubes and assess the applicability of the root cause presented at the March 4 meeting (i.e., modest growth in depth for an incipient or throughwall indication leading to a high voltage growth)."*

Response:

Section 4 of Enclosure 4 of DCL-03-076 (ODSCC Alternate Repair Criteria report) compares the predicted profiles with the destructive exam results for the DCP Unit 2 pulled tubes and provides a cause assessment of the growth rate experienced by the R44C45 2H indication.

Table 2-1. Generic Data Table for Tracking Indications Between EOC<sub>n</sub> and EOC<sub>n+1</sub>

EOC <sub>n</sub>				BDD at EOC <sub>n+1</sub>						BND at EOC <sub>n+1</sub>					
				BDD w/o RPC		BDD w/RDD		BDD w/RND		BND w/o RPC		BND w/RDD		BND w/RND	
				Plugged	Not Plugged	Plugged	Not Plugged	Plugged	Not Plugged	Plugged	Not Plugged	Plugged	Not Plugged	Plugged	Not Plugged
BDD at EOC <sub>n</sub>	BDD w/o RPC	Plugged	D												
		Not Plugged		C	C	B	B	E	E	F	F	B	B	E	E
	BDD w/ RDD	Plugged	D												
		Not Plugged		C	C	B	B	E (3)	E (3)	F (1)	F (1)	B	B	E (3)	E (3)
	BDD w/ RND	Plugged	E												
		Not Plugged		J	J	J	J	E	E	F	F	J	J	E	E
BND at EOC <sub>n</sub>	BND w/o RPC	Plugged	No Count												
		Not Plugged		H	H	G	G	L	L	No Count	No Count	I	I	No Count	No Count
	BND w/ RDD	Plugged	K												
		Not Plugged		H	H	G	G	L (3)	L (3)	(2)	(2)	I	I	(3)	(3,4)
	BND w/ RND	Plugged	No Count												
		Not Plugged		H	H	G	G	L	L	No Count	No Count	I	I	No Count	No Count

**General Notes:**

- Three data tables with numbers of indications for voltage bins of 0.0 to 1.0, >1.0 to 2.0 and >2.0 will be included in the alternate repair criteria 90-day report.
- The column letters correspond to the column letters in Table 2 of Enclosure 1 of PG&E letter DCL-03-109 dated September 3, 2003.
- No Count means no tracking is performed because these categories have no influence on POPCD since there was no bobbin or Plus Point indication in either inspection.
- BDD = Bobbin detected indication
- BND = Bobbin NDD intersection
- RDD = RPC detected indication
- RND = RPC NDD intersection

**Specific Notes:**

- 1) In the future, for EOC<sub>n</sub> bobbin indications that are confirmed by RPC, EOC<sub>n+1</sub> RPC will be performed if bobbin is NDD. In previous outages, there have been no occurrences of this category, and there will be none in the future, so the number in this column will be "0".
- 2) In the future, for EOC<sub>n</sub> indications that are not detected by bobbin (AONDB), EOC<sub>n+1</sub> RPC will be performed if bobbin is NDD. Therefore, the number in this column will be "0". In previous outages, EOC<sub>n+1</sub> RPC inspections of 12 EOC<sub>n</sub> BND/RDD locations was not performed (see Response to NRC question #3a).
- 3) In the future, if indications are RPC confirmed at EOC<sub>n</sub> but RPC NDD at EOC<sub>n+1</sub>, the causative factors for this change in RPC detection will be discussed in the alternate repair criteria 90-day report for confirmed indications having +Point voltages > 0.5 volt. If there are a significant number of occurrences of this category, irrespective of the Plus Point voltage, PG&E will evaluate the cause in the 90-day report.
- 4) There were 2 occurrences of this category in the past that were not counted in Table 5 of Enclosure 1 of PG&E letter DCL-03-109 dated September 3, 2003, but will be included in future inspection updates, see response to NRC question 3c.

**Table 3-1. Summary of Indications that are  
AONDB Not Inspected with RPC at Next Inspection**

SG	Row	Col	TSP	1R9			1R10			1R11				
				+Pt Ind	Bobbin Ind	Calc Bobbin Volts	+Pt Ind	Bobbin Ind	Calc Bobbin Volts	Calc Bobbin Volts	+Pt Ind	Bobbin Ind	Bobbin Volts	Repaired R11
11	4	20	1H	NDD	NDD	-	AONDB	NDD	0.47	NA	NI	NDD	-	
11	4	32	3H	NDD	NDD	-	AONDB	NDD	0.54	NA	NI	NDD	-	
11	16	68	3H	NDD	NDD	-	AONDB	NDD	0.46	NA	NI	NDD	-	
11	21	49	1H	NDD	NDD	-	AONDB	NDD	0.49	NA	NI	NDD	-	
11	26	46	1H	NDD	NDD	-	AONDB	NDD	0.67	NA	NI	NDD	-	
12	10	58	1H	NDD	NDD	-	AONDB	NDD	0.43	NA	NI	NDD	-	
12	31	26	3H	NDD	NDD	-	AONDB	NDD	0.45	NA	NI	NDD	-	
12	32	25	2H	NDD	NDD	-	AONDB	NDD	0.53	NA	NI	NDD	-	
14	9	55	1H	NDD	NDD	-	AONDB	NDD	0.54	NA	NI	NDD	-	
				2R9			2R10			2R11				
21	6	24	1H	AONDB	NDD	0.46	NI	NDD	NA	1.13*	3 SAI-OD	DOS	0.42	
22	18	30	1H	AONDB	NDD	0.55	NI	NDD	NA	NA	NI	NDD	NA	
24	10	49	1H	AONDB	INR	0.55	NI	NDD	NA	1.17*	SAI-OD	DOS	0.74	

\* - Calculated for information/comparison.

NDD = no detectable degradation

AONDB = axial outside diameter stress corrosion cracking not detected by bobbin

SAI-OD = single axial indication outside diameter

DOS = distorted outside diameter signal

INR = indication not reportable

NA = not applicable

NI = not inspected