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PG&E Letter DCL-03-026

U.S. Nuclear Regulatory Commission
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Docket No. 50-323, OL-DPR-82
Diablo Canyon Unit 2
License Amendment Request 03-04
Emergency Request for Approval to Use an Alternate Method of Determining Probability of Detection for the Diablo Canyon Unit 2 Steam Generator 4 Tube R44C45 Indication

Dear Commissioners and Staff:

In accordance with 10 CFR 50.90 and 10 CFR 50.91(a)(5), enclosed is an emergency application for amendment to Facility Operating License No. DPR-82 for Unit 2 of the Diablo Canyon Power Plant (DCPP). The enclosed proposed license amendment requests NRC approval to apply a probability of detection (POD) of 1.0 to the bobbin indication in the DCPP Unit 2 steam generator (SG) 4 tube at row 44, column 45 at the second tube support plate (TSP) on the hot leg side (R44C45-2H) for the beginning of cycle (BOC) voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment. Technical Specification 5.5.9, "Steam Generator Tube Surveillance Program," and Technical Specification 5.6.10, "Steam Generator Tube Inspection Report," are based on Generic Letter (GL) 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," dated August 3, 1995, which requires the application of a POD of 0.6 to all previous bobbin indications for the determination of the indication voltage distribution for the beginning of cycle. Therefore, the use of a POD of 1.0 for the DCPP Unit 2 R44C45-2H indication for the BOC voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment is an exception to GL 95-05 and requires prior NRC review and approval.

During DCPP Unit 2 refueling outage 11, a 21.5 volts bobbin indication (R44C45-2H) was found in SG 4. The indication was left in service following DCPP Unit 2 refueling outage 10, under the alternate repair criteria (ARC) for outside diameter stress corrosion cracking (ODSCC) indications at SG TSP intersections. During DCPP Unit 2 cycle 11, the indication grew from 2.0 to 21.5 volts. As a result of this indication, the probability of burst performance criterion limit of 1×10^{-2} was exceeded at end of DCPP Unit 2 cycle 11. Projections using the currently approved POD of 0.6, as required by GL 95-05 will not permit startup of DCPP Unit 2 cycle 12. The

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projected probability of burst performance criterion is exceeded for Unit 2 cycle 12 when the remaining fractional proportion of the 21.5 volts indication is included in the DCPP Unit 2 BOC cycle 12 voltage distribution resulting from the application of a constant POD of 0.6 regardless of detected bobbin amplitude. The approval to use a POD of 1.0 for the DCPP Unit 2 R44C45-2H indication for the BOC voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment is required to permit startup and operation of DCCP Unit 2 for the 120 day assessment period.

Enclosure 1 contains a description of the proposed change, justification for the emergency circumstances, the supporting technical analyses, and the no significant hazards consideration determination.

There are no Technical Specification changes required to apply a POD of 1.0 to the R44C45-2H indication for the DCPP Unit 2 BOC cycle 12 operational assessment.

PG&E has determined that this LAR does not involve a significant hazard consideration as determined per 10 CFR 50.92. Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of this amendment.

Pursuant to 10 CFR 50.90 and 50.91(a)(5), PG&E requests that the NRC approve this license amendment requested on an emergency basis to allow startup of DCPP Unit 2 for cycle 12. A similar request was made in PG&E letter DCL-03-023, "Request to Use an Alternate Method of Determining Probability of Detection for the Diablo Canyon Unit 2 Steam Generator 4 Tube R44C45 Indication," dated February 28, 2003. The basis for the emergency circumstances is contained in Enclosure 1. PG&E requests NRC approval to use a POD of 1.0 for the DCPP Unit 2 R44C45-2H indication for the BOC voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment no later than March 7, 2003, to support the current schedule for entry into Mode 4. PG&E requests the license amendment be made immediately effective upon NRC issuance. If you have any questions or require additional information, please contact Stan Ketelsen at (805) 545-4720.

I state under penalty of perjury that the foregoing is true and correct.

Executed on March 3, 2003.

Sincerely,

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

kjs/4328
Enclosures

cc: Edgar Bailey, DHS
Ellis W. Merschoff
David L. Proulx
Diablo Distribution
cc/enc: Girija S. Shukla

EMERGENCY REQUEST FOR APPROVAL TO USE A POD OF 1.0 FOR THE DCPP UNIT 2 R44C45-2H INDICATION FOR THE BEGINNING OF CYCLE VOLTAGE DISTRIBUTION FOR THE DCPP UNIT 2 BEGINNING OF CYCLE 12 OPERATIONAL ASSESSMENT

1.0 DESCRIPTION

This letter is an emergency request to amend the Operating License for DPR-82 for Unit 2 of the Diablo Canyon Power Plant (DCPP). This license amendment request (LAR) requests NRC approval to apply a probability of detection (POD) of 1.0 to the bobbin indication in the DCPP Unit 2 steam generator (SG) 4 tube at row 44, column 45 at the second tube support plate (TSP) on the hot leg side (R44C45-2H) for the beginning of cycle (BOC) voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment. Technical Specification 5.5.9, "Steam Generator Tube Surveillance Program," and Technical Specification 5.6.10, "Steam Generator Tube Inspection Report," are based on Generic Letter (GL) 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," dated August 3, 1995, which requires the application of a POD of 0.6 to all previous bobbin indications for the determination of the indication voltage distribution for the BOC operational assessment. Therefore, the use of a POD of 1.0 for the DCPP Unit 2 R44C45-2H indication for the BOC voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment is an exception to GL 95-05 and requires prior NRC review and approval.

2.0 PROPOSED CHANGE

The requested change is to use a POD of 1.0 for the DCPP Unit 2 R44C45-2H indication for the BOC voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment. This exception to GL-95-05 does not require a change to the Technical Specifications (TS) since Section 5.5.9, "Steam Generator (SG) Tube Surveillance Program," and Section 5.6.10, "Steam Generator Tube Inspection Report," do not contain requirements for the bobbin POD to be used or the bobbin indications which are to be used for determination of the indication voltage distribution for the BOC operational assessment.

3.0 BACKGROUND

3.1 Steam Generators

The SG tubes constitute more than half of the reactor coolant pressure boundary (RCPB). Design of the RCPB for structural and leakage integrity is a requirement under 10 CFR 50, Appendix A. Specific requirements governing the maintenance and inspection of SG tube integrity are in DCPP TS, Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, and

Regulatory Guide (RG) 1.83. These include requirements for periodic inservice inspection of the tubing, flaw acceptance criteria (i e., repair limits for plugging), and primary-to-secondary leakage limits. These requirements, coupled with the broad scope of plant operational and maintenance programs, have formed the basis for assuring adequate SG tube integrity.

SG tube plugging limits are specified in the DCPP TS. The current DCPP TS require that flawed tubes be removed from service by plugging if the depths of the flaws are greater than or equal to 40 percent through-wall, unless the degradation is subject to voltage-based outside diameter stress corrosion cracking (ODSCC) repair criteria, W* repair criteria, or primary water stress corrosion cracking within dented TSP locations repair criteria. The TS 5.5.9 repair limits ensure that tubes accepted for continued service will retain adequate structural and leakage integrity during normal operating, transient, and postulated accident conditions, consistent with General Design Criteria (GDC) 14, 15, 30, 31, and 32 of 10 CFR 50, Appendix A. Structural integrity refers to maintaining adequate margins against gross failure, rupture, and collapse of the steam generator tubing. Leakage integrity refers to limiting primary-to-secondary leakage to within acceptable limits.

The generic criteria for voltage-based limits for ODSCC are contained in GL 95-05. GL 95-05 relies on empirically derived correlations between a nondestructive inspection parameter, the bobbin coil voltage, and tube burst pressure and leak rate. The GL 95-05 guidance ensures structural and leakage integrity continue to be maintained at acceptable levels consistent with the requirements of 10 CFR Part 50 and the guideline values in 10 CFR Part 100 through augmented steam generator tube inspections and more restrictive operational leakage limits.

GL 95-05 focuses on maintaining tube structural integrity during the full range of normal, transient, and postulated accident conditions with adequate allowance for eddy current test uncertainty and flaw growth projected to occur during the next operating cycle. Tube structural limits based on Regulatory Guide 1.121 criteria recommend maintaining a margin of safety of 1.4 against tube failure under postulated accident conditions and maintaining a margin of safety of 3 against burst during normal operation.

In order to ensure the structural and leakage integrity of the tube until the next scheduled inspection, GL 95-05 specifies a methodology to determine the conditional burst probability and the total primary-to-secondary leak rate from an affected steam generator during a postulated main steam line break (MSLB) event. The methodology in

WCAP-14277, Revision 1, "SLB Leak Rate and Tube Burst Probability Analysis Methods for ODSCC at TSP Intersections," dated December 1996, is used to implement the GL 95-05 structural integrity methodology.

A probabilistic analysis to quantify the potential for steam generator tube ruptures given a main steam line break event is performed per WCAP-14277, Revision 1, and compared to a threshold value of $1x10^{-2}$ per cycle as required by GL 95-05. This threshold value provides assurance that the probability of burst is acceptable considering the assumptions of the calculation and the results of the staff's generic risk assessment for steam generators contained in NUREG-0844, "NRC Integrated Program for the Resolution of Unresolved Safety Issues A-3, A-4, and A-5 Regarding Steam Generator Tube Integrity." Failure to meet this threshold value indicates ODSCC confined to within the thickness of the TSP could contribute a significant fraction to the overall conditional probability of tube rupture from all forms of degradation assumed and evaluated as acceptable in NUREG-0844.

The calculation of conditional burst probability is a function of the POD and resulting indication voltage distribution at BOC The indication voltage distribution at BOC is based on consideration of all previous bobbin indications. PG&E currently assumes a POD of 0.6, independent of indication bobbin voltage, as required by GL 95-05.

3.2 Purpose of Proposed Amendment

During DCPP Unit 2 refueling outage 11, a 21.5 volts bobbin indication (R44C45-2H) was found in the SG 4 tube at row 44, column 45 at the second TSP on the hot leg side. The indication was left in service following DCPP Unit 2 refueling outage 10, under the alternate repair criteria (ARC) for ODSCC indications at SG TSP intersections. During DCPP Unit 2 cycle 11, the indication grew from 2.0 to 21.5 volts. As a result of this indication, the probability of burst (POB) performance criterion limit of $1x10^{-2}$ was exceeded at end of DCPP Unit 2 cycle 11. End of cycle 12 projections using the currently approved POD of 0.6, as required by GL 95-05, will not permit startup of DCPP Unit 2 cycle 12

The projected POB performance criterion is exceeded for Unit 2 cycle 12 when the remaining fractional proportion of the 21.5 volts indication is included in the DCPP Unit 2 BOC cycle 12 voltage distribution resulting from the application of a constant POD of 0.6 regardless of detected bobbin amplitude.

The approval to use a POD of 1.0 for the DCPP Unit 2 R44C45-2H indication for the BOC voltage distribution for the DCPP Unit 2 BOC cycle

12 operational assessment is required to permit startup and operation of DCCP Unit 2 for the 120 day assessment period.

3.3. Justification and Basis for the Emergency Circumstances

Based on the fact that the discovery of the 21.5 volt bobbin indication at R44C45-2H during DCPP Unit 2 refueling outage 11 and the consequential failure to meet the POB requirements was not planned and could not have been anticipated, and failure to act in a timely way would prevent resumption of operation of DCPP Unit 2, emergency conditions exist as provided for in 10 CFR 50.91(a)(5). PG&E could not have foreseen the 21.5 volt bobbin indication at R44C45-2H, and has not failed to make timely application for this amendment.

4.0 TECHNICAL ANALYSIS

PG&E believes that an indication of this size can be detected with 100 percent certainty and therefore this indication should not be included in the DCPP Unit 2 BOC cycle 12 voltage distribution for the purpose of operational assessment. An indication between three and four volts can be detected with near 100 percent certainty. Based on data in an industry database contained in EPRI Topical Report NP 7480-L, Addendum 5, "Steam Generator Tubing Outside Diameter Stress Corrosion Cracking at Tube Support Plates Database for Alternate Repair Limits, Update 2002," dated January 2003, for thirty-seven inspections in plants with 7/8" and 3/4" tubing, including four DCPP inspections, no new indications throughout the industry were found by reanalysis to have a prior inspection voltage greater than 3.2 volts. Indications of 3.2 volts are well below the SG tube structural limit of about 9.6 volts. For DCPP, no new indications were found by reanalysis to have a prior inspection voltage greater than 1.6 volts. The industry and Diablo Canyon bobbin detection data are summarized in Tables 1 and 2 respectively of PG&E letter DCL-03-017, "Revised Steam Generator Voltage-based Repair Criteria Probability of Detection Method for Diablo Canyon Unit 2 Cycle 12," dated February 24, 2003. All large voltage indications, i.e., those challenging structural or leakage integrity, found in ARC inspections including the DCPP Unit 2 refueling outage 11 can be traced to large voltage growth rates and not to missed indications.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

Pacific Gas and Electric Company (PG&E) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The use of a probability of detection (POD) of 1.0 for the bobbin indication in the Diablo Canyon Power Plant (DCPP) Unit 2 steam generator (SG) 4 tube at row 44, column 45 at the second tube support plate (TSP) on the hot leg side (R44C45-2H) for the beginning of cycle (BOC) voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment does not increase the probability of an accident. Based on industry and plant specific bobbin detection data for outside diameter stress corrosion cracks (ODSCC) within the SG tube support plate region, large voltage bobbin indications, such as those the size of indication R44C45-2H, can be detected with 100 percent certainty. Since large voltage ODSCC bobbin indications within the SG TSP can be detected, they will not be left in service, and therefore these indications should not be included in the voltage distribution for the purpose of operational assessments Therefore, these large voltage indications will not result in an increase in the probability of a steam generator tube rupture (SGTR) accident or an increase in the consequences of a SGTR or main steam line break (MSLB) accident

Therefore, the proposed changes will not result in a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different accident from any accident previously evaluated?

Response: No.

The use of a POD of 1.0 for the DCPP Unit 2 R44C45-2H bobbin indication for the BOC voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment concerns the SG tubes and can only affect the SGTR accident Since the SGTR accident is already considered in the Final Safety Analysis Report Update, there in no possibility to create a design basis accident which has not been previously evaluated.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No

The use of a POD of 1.0 for the DCPP Unit 2 R44C45-2H bobbin indication for the BOC voltage distribution for the DCPP Unit 2 BOC cycle 12 operational assessment does not involve a significant reduction in a margin of safety. The applicable margin of safety potentially impacted is the Technical Specification 5 6.10, "Steam Generator Tube Inspection Report," projected end-of-cycle leakage for a MSLB accident and the projected end-of-cycle probability of burst. Based on industry and plant specific bobbin detection data for ODSCC within the SG tube support plate region, large voltage bobbin indications, such as those the size of indication R44C45-2H, can be detected with 100 percent certainty and will not be left in service Therefore these indications should not be included in the voltage distribution for the purpose of operational assessments. Therefore, these large voltage indications will not result in a significant increase in the actual end-of-cycle leakage for a MSLB accident or the actual end-of-cycle probability of burst

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

5.2 Applicable Regulatory Requirements/Criteria

GL 95-05 requires the application of a POD of 0.6 to all previous bobbin indications for the determination of the indication voltage distribution for the beginning of cycle.

In conclusion, based on the deterministic considerations discussed in this submittal, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

PG&E has evaluated the proposed amendment and has determined that the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in

10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment

7.0 REFERENCES

7.1 References

1. Generic Letter 95-05, "Voltage-Based Repair Criteria for Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking," dated August 3, 1995.
2. WCAP-14277, Revision 1, "SLB Leak Rate and Tube Burst Probability Analysis Methods for ODSCC at TSP Intersections," dated December 1996.
3. PG&E letter DCL-97-034, "License Amendment Request 97-03, Voltage-Based Alternate Steam Generator Tube Repair Limit for Outside Diameter Stress Corrosion Cracking at Tube Support Plate Intersections," dated February 26, 1997.
4 NRC Letter for Amendment Nos. 124 and 122 for Diablo Canyon Power Plant Units 1 and 2 respectively, "Issuance of Amendments for Diablo Canyon Nuclear Power Plant, Unit No. 1 (TAC No. M97254) and Unit No. 2 (TAC No. M97255)," dated March 12, 1998
5 NUREG-0844, "NRC Integrated Program for the Resolution of Unresolved Safety Issues A-3, A-4, and A-5 Regarding Steam Generator Tube Integrity."
6 PG&E letter DCL-03-017, "Revised Steam Generator Voltage-based Repair Criteria Probability of Detection Method for Diablo Canyon Unit 2 Cycle 12," dated February 24, 2003
7. PG&E letter DCL-03-023, "Request to Use an Alternate Method of Determining Probability of Detection for the Diablo Canyon Unit 2 Steam Generator 4 Tube R44C45 Indication," dated February 28, 2003.