

May 13, 2004

Mr. Gregory M. Rueger
Senior Vice President, Generation and
Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P. O. Box 3
Avila Beach, CA 93424

SUBJECT: DIABLO CANYON POWER PLANT, UNIT NO. 1 (TAC NO. MB5796) AND UNIT
NO. 2 (TAC NO. MB5797) - ISSUANCE OF AMENDMENT REVISING
TECHNICAL SPECIFICATION 5.6.6 - REACTOR COOLANT SYSTEM
PRESSURE TEMPERATURE LIMITS REPORT

Dear Mr. Rueger:

The Commission has issued the enclosed Amendment No. 170 to Facility Operating License No. DPR-80 and Amendment No. 171 to Facility Operating License No. DPR-82 for the Diablo Canyon Power Plant, Unit Nos. 1 and 2 (DCPP), respectively. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated November 24, 1999, that was superseded by the application dated July 31, 2002, and its supplements dated August 15 and December 23, 2003.

The amendments revise the TS to allow removal of the pressure-temperature limit curves and the low temperature overpressure protection system setpoints for the DCPP Units 1 and 2 from the limiting conditions of operation for the units and incorporate them into a Pressure Temperature Limits Report that will be administratively controlled by Section 5.6.6 of the TS.

A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's next regular biweekly *Federal Register* notice.

Sincerely,
/RA/

Drew Holland, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures: 1. Amendment No. 170 to DPR-80
2. Amendment No. 171 to DPR-82
3. Safety Evaluation

cc w/encls: See next page

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Diablo Canyon Power Plant, Units 1 and 2

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PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-275

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 170
License No. DPR-80

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Pacific Gas and Electric Company (the licensee) dated July 31, 2002, as supplemented by letters dated August 15 and December 23, 2003, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-80 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 170, are hereby incorporated in the license. Pacific Gas and Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: May 13, 2004

PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-323

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 171
License No. DPR-82

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Pacific Gas and Electric Company (the licensee) dated July 31, 2002, as supplemented by letters dated August 15 and December 23, 2003, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-82 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 171, are hereby incorporated in the license. Pacific Gas and Electric Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: May 13, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 170
TO FACILITY OPERATING LICENSE NO. DPR-80
AND AMENDMENT NO. 171 TO FACILITY OPERATING LICENSE NO. DPR-82
DOCKET NOS. 50-275 AND 50-323

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

1.1-5
5.0-28

INSERT

1.1-5
5.0-28

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 170 TO FACILITY OPERATING LICENSE NO. DPR-80
AND AMENDMENT NO. 171 TO FACILITY OPERATING LICENSE NO. DPR-82
PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON POWER PLANT, UNITS 1 AND 2
DOCKET NOS. 50-275 and 50-323

1.0 INTRODUCTION

By application dated November 24, 1999, that was superseded by the application dated July 31, 2002, and its supplements dated August 15 and December 23, 2003, Pacific Gas and Electric Company (PG&E, the licensee) requested changes to the Technical Specifications (TS) (Appendix A to Facility Operating License Nos. DPR-80 and DPR-82) (TS) for the Diablo Canyon Power Plant (DCPP) Units 1 and 2.

The license amendment request (LAR) proposes to relocate the pressure-temperature (P/T) limits and low temperature overpressure protection system (LTOP) limit setpoints from the TS limiting conditions for operation (LCOs) for the units into a plant-specific pressure temperature limit report (PTLR) that will be administratively controlled by TS Section 5.6.6. The description of the PTLR for the DCPP Units 1 and 2 is documented in DCPP Report No. PTLR-1, Revision 2.

The August 15 and December 23, 2003, supplemental letters provided additional clarifying information, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination published in the *Federal Register* on September 17, 2002 (67 FR 58648).

2.0 REGULATORY EVALUATION

2.1 Title 10, *Code of Federal Regulations* (10 CFR) Part 50, Appendix G – Requirements for Generating P/T Limits for Light-Water Reactors

The staff has established requirements in Appendix G of 10 CFR Part 50, "Fracture Toughness Requirements," in order to protect the integrity of the reactor coolant pressure boundary in nuclear power plants. Appendix G of 10 CFR Part 50 requires that the P/T limits for an operating light-water nuclear reactor be at least as conservative as those that would be generated if the methods of Appendix G to Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code were used to generate the P/T limits. Appendix G of 10 CFR Part 50 also requires that applicable surveillance data from reactor vessel (RV) material surveillance programs be incorporated into the calculations of plant-specific P/T limits, and that the P/T limits for operating reactors be generated using a method that accounts for the effects of neutron irradiation on the P/T limits. The rule also establishes

conservative requirements for determining the temperature and pressure setpoints for LTOP systems.

Table 1 to 10 CFR Part 50, Appendix G, provides the staff's criteria for meeting the P/T limit requirements of Appendix G to Section XI, as well as the minimum temperature requirements of the rule for bolting up the RV during normal and pressure testing operations. In addition, staff regulatory guidance related to P/T limit curves is found in Regulatory Guide (RG) 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," and Standard Review Plan (SRP) Section 5.3.2, "Pressure Temperature Limits."

Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements," provides the staff's criteria for the design and implementation of RV material surveillance programs for operating light-water reactors. The staff's requirements for protecting the RVs of pressurized water reactors (PWRs) against pressurized thermal shock (PTS) events are given in 10 CFR 50.61.

The regulatory requirements for pressure vessel fluence calculations are specified in General Design Criteria (GDC) 30 and 31. In March 2001, the staff issued RG 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence." The staff has approved vessel fluence calculation methodologies which satisfy the requirements of GDC 30 and 31 by adhering to the guidance in RG 1.190. Fluence calculations are acceptable if they are done with approved methodologies or with methods which are shown to conform to the guidance in RG 1.190.

2.2 Technical Specification Requirements for P/T Limits and LTOP Limit Setpoints

Section 182a of the Atomic Energy Act of 1954 requires applicants for nuclear power plant operating licenses to include TS as part of the license. The Commission's regulatory requirements related to the content of TS are set forth in 10 CFR 50.36. That regulation requires that the TS include items in five specific categories: (1) safety limits, limiting safety system settings and limiting control settings; (2) LCOs; (3) surveillance requirements (SRs); (4) design features; and (5) administrative controls.

Section 50.36(c)(2)(ii) requires that LCOs be established for the P/T limits and LTOP limit setpoints because the parameters fall within the scope of the Criterion 2 identified in the rule:

Criterion 2: A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Review requirements for the heat injection and mass injection transients for the determination of the LTOP enable temperature limit are in Section 5.2.2 of the SRP, subject to GDCs 15 and 31.

The P/T limits and LTOP limit setpoints for PWR-designed light-water reactors fall within the scope of Criterion 2 of 10 CFR 50.36(c)(2)(ii) and are therefore ordinarily required to be included within the TS LCOs for a plant-specific facility operating license. On January 31, 1996, the staff issued Generic Letter (GL) 96-03, "Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits," to inform licensees that they may request a license amendment to relocate the actual P/T limit curves and/or LTOP limit setpoint values from the TS LCOs on P/T limits and LTOP limit setpoints and into a PTLR or other licensee-controlled document that would be administratively controlled through the Administrative Controls Section of the TS. In GL 96-03, to permit relocation of the P/T and LTOP limits, the staff stated that the P/T limits and LTOP limits for U.S. licensed light-water reactors would need to be generated in accordance with an NRC-approved methodology and that the methodology to generate the P/T limits and LTOP limits would need to comply with the requirements of 10 CFR Part 50, Appendices G and H; be documented in an NRC-approved topical report (TR) or plant-specific submittal; and be incorporated by reference in the administrative controls section of the TS. The GL also mandated that the TS administrative controls section for the PTLR would need to reference the staff's safety evaluation (SE) issued on the PTLR request and that the PTLR be defined in Section 1.0 of the TS. Attachment 1 to GL 96-03 provided a list of the criteria that the approved methodology and PTLR would be required to meet.

NRC Technical Specification Traveler Form (TSTF) 419 amended the Standard Technical Specifications (STS) (NUREGs-1430, -1431, -1433, and -1434) to: (1) delete references of the TS LCO specifications for the P/T limits and LTOP limits in the TS definition of PTLR, and (2) revise STS 5.6.6 to identify NRC-approved TRs by number and title, or the NRC SE for a plant-specific methodology by NRC letter and date. A requirement is added to the Reviewers Note to specify the complete citation in the PTLR for each TR, including the report number, title, revision, date, and any supplements. Only the figures, values, and parameters associated with the P/T limits and LTOP setpoints are relocated to the PTLR. The methodology for their development must be reviewed and approved by the NRC. The TSTF-419 did not change the requirements associated with the review and approval of the methodology or the requirement to operate within the limits specified in the PTLR. Any changes to a methodology that had not been approved by the staff would continue to require staff review and approval pursuant to the LAR provisions and requirements of 10 CFR 50.90.

3.0 TECHNICAL EVALUATION

As stated in Section 2.0 of this SE, Appendix G of 10 CFR Part 50 requires licensees to establish lower limits on the pressure and temperature of the reactor coolant pressure boundary (RCPB) in order to protect the RCPB against brittle failure (i.e., against brittle "fast-fracture"). These limits are defined by P/T limit curves for normal operations (including heatup and cooldown operations of the reactor coolant system (RCS), normal operation of the RCS with the reactor being in the critical condition, and transient operating conditions) and during pressure testing conditions (i.e., either inservice leak rate testing and/or hydrostatic testing conditions). These limits are also defined by the LTOP limits for the RCPB.

3.1 Evaluation of the Proposed Changes to the DCPD TS

In its LAR, the licensee proposed the following TS requirements for the DCPD PTLR that include the definition of the PTLR as the specific document that identifies pressure and temperature limits, heatup and cooldown rates and power-operated relief valve (PORV) lift settings and arming temperature associated with the LTOP system, for a given reactor fluence period.

The proposed TS explain that limits for RCS pressure and temperature as well as rates for heatup and cooldown are described in the PTLR. Conditions for the LTOP being operable are also provided in the proposed TS.

In addition, the administrative requirements for the PTLR are provided in the proposed TS. These controls apply to RCS pressure and temperature limits and LTOP. WCAP-14040 is specified as the analytic tool to develop cold overpressure setpoints and heatup and cooldown limit curves.

The proposed TS require that the PTLR, as revised, shall be provided to the NRC upon issuance for each reactor vessel fluence period or for any other revision.

In request for additional information (RAI) No. 6, the staff requested that PG&E amend its list of approved WCAPs for proposed TS Section 5.6.6.b to include a reference to Chapter 6.0 of WCAP-15958, Revision 0, "Analysis of Capsule V from Pacific Gas and Electric Company Diablo Canyon Unit 1 Reactor Vessel Radiation Surveillance Program," January 2003. In the PG&E letter of August 15, 2003, the licensee provided its response to RAI No. 6 and amended the referenced methodology for TS 5.6.6.b to include a reference to the neutron fluence and dosimetry methodology specified in WCAP-15958, Revision 0. This resolves the list of approved methodologies that are required by the staff to be referenced in Section 5.6.6 of the DCPD TS for the PTLR.

The licensee's proposed definition of the PTLR identifies the specifications in which the pressure and temperature limits and LTOP limits are addressed. Specification 5.6.6.a requires that the individual specifications that address RCS pressure and temperature limits and LTOP limits be referenced. Therefore, the proposed definition meets the requirements of GL 96-03 and is consistent with NUREG-1431, Revision 2, "Standard Technical Specifications-Westinghouse Plants." The licensee also proposed changes to LCOs 3.4.3 and 3.4.12, and TS 5.6.6 to adopt the PTLR. The proposed changes are consistent with the requirements of GL 96-03 and NUREG-1431, Revision 2. Based on the above, the staff concludes that the proposed definition of the PTLR and the proposed changes to LCOs 3.4.3 and 3.4.12 and TS 5.6.6 are acceptable.

The adoption of TSTF-419 allows the NRC-approved TRs to be identified by number and title in TS 5.6.6. This allows the licensee to use currently approved TRs to support limits in the PTLR without having to submit an amendment to the facility operating license every time the TR is revised. In its submittals, the licensee stated that the PTLR would provide the specific information (i.e., report number, title, revision, date, and any supplements) identifying the particular approved TR(s) used to determine the P/T limits or LTOP limits. This provides assurance that only the approved versions of the referenced TRs will be used for the

determination of the P/T limits or LTOP limits since the complete citation will be provided in the PTLR, and the methodology must be approved by the NRC.

3.2 Evaluation of the Proposed Methodology for the PTLR Against the Criteria for Approved Methodologies in Attachment 1 of GL 96-03

In its LAR, the licensee indicates that the calculation of neutron fluence values for the DCPD Units 1 and 2 RVs and the generation of P/T limits and LTOP limit setpoints for DCPD Units 1 and 2 will be done in accordance with an approved version of the non-proprietary Westinghouse TR WCAP-14040. The current version of the DCPD PTLR (DCPD Report PTLR-1, Revision 2) indicates that the P/T limits and LTOP limit setpoints will be calculated in accordance with WCAP-14040-NP-A, Revision 2, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves."

The staff evaluated the neutron fluence, P/T limit, and LTOP limit setpoint methodologies of WCAP-14040, Revision 1, in the NRC SE of October 16, 1995. To obtain staff approval of the report's methodologies, Westinghouse Electric Company modified the methodologies to incorporate key NRC recommendations identified in the NRC SE of October 16, 1995, and reissued the report as WCAP-14040-NP-A, Revision 2, which included the staff's SE as an attachment in the report. WCAP-14040-NP-A, Revision 2, therefore represents the latest NRC-approved version of WCAP-14040. The methodology in WCAP-14040-NP-A, Revision 2, meets the minimum technical requirements for approved methodologies specified in Attachment 1 to GL 96-03. The licensee's use of WCAP-14040-NP-A, Revision 2, as the proposed methodology for the DCPD PTLR meets the criterion in GL 96-03 that an approved methodology be used for the determination of the neutron fluence values and the calculation of the P/T limits and LTOP limit setpoints. The PTLR is therefore acceptable with respect to this criterion.

3.3 Evaluation of the PTLR Contents Against the Seven Criteria for PTLR Contents in Attachment 1 of GL 96-03

Attachment 1 of GL 96-03 contains seven technical criteria (PTLR Criteria) that the contents of PTLRs should conform to if license amendments requesting PTLRs are to be approved by the staff. The staff's evaluations of the contents of DCPD Report No. PTLR-1, Revision 2, against the seven criteria in Attachment 1 of GL 96-03 are given in the subsections that follow.

PTLR Criterion 1

PTLR Criterion 1 states that the PTLR contents should include the neutron fluence values that are used in the calculations of the adjusted reference temperature values (i.e., RT_{NDT} values) for the P/T limit calculations.

The DCPD fluence methodology and analysis is documented in WCAP-14284, "Pacific Gas and Electric Company Reactor Cavity Neutron Measurement Program for Diablo Canyon Unit 1 – Cycles 1 through 6," and WCAP-14350, "Pacific Gas and Electric Company Reactor Cavity Neutron Measurement Program for Diablo Canyon Unit 2 – Cycles 1 through 6." The neutron fluence calculations were carried out using the DORT Code in forward and adjoint formulations in (r, θ) and (r, z) geometries. The anisotropic scattering was treated with a P_3 approximation

and the angular discretization with an S_8 quadrature. The neutron source distribution, accounted for spectral changes due to the presence of Plutonium. WCAP-14284 and WCAP-14350 adhere to the guidance in RG 1.190 regarding the calculated fluence value, however, they propose a "best estimate" value which deviates from RG 1.190 guidance. The calculated and the best estimate values are within the uncertainty limits allowed in the RG. Nevertheless, the licensee remedied this with the issuance of WCAP-15958 and WCAP-15423, "Analysis of Capsule V from Pacific Gas and Electric Company Diablo Canyon Unit 2 Reactor Vessel Radiation Surveillance Program," which derive a calculated value as recommended in the RG.

WCAP-15958 and WCAP-15423 present an updated analysis which adheres to the guidance of RG 1.190, regarding approximations, neutron sources and cross sections, therefore, the methodology and the proposed peak-vessel fluence values for 32 EFPY and 54 EFPY are acceptable. The licensee stated that the revision of the P/T curves and the LTOP limits which will follow the issuance of the PTLR will be based on fluence values from WCAP-15958 and WCAP-15423. This is acceptable because the references contain the updated neutron fluence values and analyses that demonstrate conformance of the licensee's fluence methodology to the guidelines of RG 1.190. Based on this assessment, the staff concludes that the PTLR conforms to PTLR Criterion 1.

PTLR Criterion 2

Appendix H of 10 CFR Part 50 provides the staff's requirements for designing and implementing RV materials surveillance programs. The regulation requires that RV material surveillance programs for operating reactors must meet the requirements of American Society for Testing and Materials (ASTM) Standard Procedure E-185, "Standard Practice for Conducting Surveillance Tests for Light Water Cooled Nuclear Power Reactor Vessels." The regulation requires that the program design and the surveillance capsule withdrawal schedules for the programs must meet the edition of the standard procedure that is current on the issue date of the ASME Code to which the RV was purchased, although the rule permits more recent versions of the standard procedure to be used, up through the 1982 version of the standard procedure.

PTLR Criterion 2 states that the PTLR should either provide the RV surveillance capsule withdrawal schedule or reference by title and number the documents containing the RV surveillance capsule withdrawal schedule. The criterion also states that the PTLR should reference, by title and number, any applicable surveillance capsule reports that have been placed on the "docket" by the licensee requesting approval of the PTLR for its units. This criterion assures that the PTLR's methods for calculating RT_{NDT} values will be done in accordance with the RV material surveillance program requirements of 10 CFR Part 50, Appendix H.

The licensee states in Section 4 of DCPD Report PTLR-1, Revision 2, that the RV surveillance capsule withdrawal schedules for DCPD Units 1 and 2 are discussed in Section 5.2.4.4 of the DCPD Updated Final Safety Analysis Report (UFSAR) and contained in UFSAR Table 5.2-22. This meets the provision in PTLR Criterion 2 that the PTLR must provide the RV material surveillance capsule withdrawal schedules for their units or else reference by title and number the documents containing the withdrawal schedules. The licensee has based the RV

surveillance withdrawal capsule schedules for DCPD Units 1 and 2 on the applicable withdrawal schedule requirements of ASTM E-185-82. The staff confirmed that the current status of the RV surveillance capsules withdrawals for DCPD Units 1 and 2 are in compliance with the RV materials surveillance capsule withdrawal schedule requirements of ASTM Standard Procedure E-185-82. This meets the first provision of PTLR Criterion 2 and ensures that the RV material withdrawal schedules for DCPD Units 1 and 2 are in compliance with the requirements of 10 CFR Part 50, Appendix H.

The licensee referenced the RV surveillance program and capsule reports that are relevant to the calculation of RT_{NDT} values and RT_{PTS} values for the DCPD RV beltline materials in Section 4 of DCPD Report No. PTLR-1, Revision 2. However, each of the "V" surveillance capsules has been removed from the DCPD RVs since the time the licensee submitted the initial LAR for the PTLR (November 24, 1999). To meet the reporting requirements of 10 CFR Part 50, Appendix H, the licensee submitted the fluence data, chemistry data, tensile test data, and fracture toughness data for the base metal and weld specimens in the DCPD Units 1 and 2 V capsules to the NRC in accordance with the SRP and WCAP-11851, "Analysis of Capsule U from Diablo Canyon Unit 2 Reactor Vessel Radiation Surveillance Program." The TRs for the DCPD Unit 1 and Unit 2 V capsules were not referenced in Section 4 of DCPD Report No. PTLR-1, Revision 2.

PTLR Criterion 2 would normally dictate that WCAP-15958, Revision 0, and WCAP-15423, Revision 0 (the capsule V reports for DCPD Units 1 and 2) be referenced in DCPD Report No. PTLR-1, Revision 2. By letter dated December 23, 2003, the licensee indicated that they had updated DCPD Report PTLR-1, Revision 2, to incorporate references to the Capsule V reports (i.e., to WCAP-15958, Revision 0, and WCAP-15423, Revision 0). The DCPD PTLR therefore includes a reference to all of the docketed RV surveillance capsule reports for DCPD Units 1 and 2. Based on this assessment, the staff concludes that DCPD Report No. PTLR-1, Revision 2, meets the provisions in Attachment 1 of GL 96-03 for RV materials surveillance program withdrawal schedules and RV surveillance capsule reports.

The staff notes that, pursuant to Paragraph III.B.3 of 10 CFR Part 50, Appendix H, the staff continues to require that licensees submit any proposed RV materials surveillance program withdrawal schedules for review and approval. Therefore, the staff's approval of the PTLR for DCPD Units 1 and 2 does not constitute a regulatory basis for exempting compliance with this requirement if PG&E proposes to change either of the DCPD RV surveillance capsule withdrawal schedules in the future.

PTLR Criterion 3

PTLR Criterion 3 states that the PTLR contents should include the LTOP setpoint curves or setpoint values for PWR light-water reactors.

The purpose of the LTOP system is to protect the pressure vessel from overpressure transients that could occur at low temperatures. The LTOP system maintains the vessel pressure below the ASME Section III, Appendix G limits. This is accomplished using the two power operated relief valves (PORVs). The system is manually enabled from the control room prior to decreasing the temperature below a predetermined enable point. When the RCS temperature reaches the enable temperature, the system automatically engages the PORV lift setpoint.

-The lift setpoint and the associated temperature are calculated using the methodology described in WCAP-14040-NP-A which has been reviewed and approved by the staff because it satisfies the requirements of GDC 15 and 31 as invoked by Section 5.2.2 of the SRP. The design basis for the LTOP system includes mass and heat injection transients.

LTOP Analysis: Mass Injection Transients

The design basis for the mass injection transient is defined as the injection of the maximum flow capacity in a water-solid RCS with isolated letdown. Upon initiation of mass injection, the RCS pressure rises to the PORV actuation value and beyond until the PORV relief rate equals the injection rate. The LTOP calculation includes conservative values for PORV delay and opening time and the resulting pressure overshoot. The number and type of pumps is limited by administrative restrictions not to exceed the PORV relief flow capability.

The results of the analyses established the administrative restrictions required to assure that the injection capability remains below the relief capacity of the PORVs. In this case the restrictions are to secure the safety injection pumps and one centrifugal charging pump and isolate the accumulators before enabling the LTOP. The staff finds the proposed analyses and the administrative restrictions to be acceptable because the methodology is described in TR WCAP-14040-NP-A, Revision 2, and meets the requirements of 10 CFR Part 50, Appendix G.

LTOP Analysis: Heat Injection Transients

The design basis for the heat injection is the transient following start-up of the first reactor coolant pump (RCP) during water-solid conditions with a temperature difference, between the RCS and the steam generator (SG), of 50°F with the residual heat removal (RHR) system isolated. The sudden heat injection and the ensuing expansion increase the RCS pressure and, because the RHR is isolated, the RHR relief valves are not available. The objective of the heat injection transient analysis is to estimate the bounding RCS volumetric effects for various RCS temperatures. WCAP-14040-NP-A, Revision 2, specifies a spectrum of heat injection transients that should be analyzed to identify the bounding transient conditions.

The DCPD analysis also establishes that no RCS-SG restrictions apply for starting an RCP provided that the pressurizer level is at 50% or less. DCPD operating procedures require that at least one RCP is operating until the RCS temperature is below 160°F when the RHR provides the required cooling.

The worst case LTOP scenario assumes that the SG temperature remains at 160°F while the RCS cools down to a conservative 50°F. Assuming a temperature measurement uncertainty of 15°F the maximum temperature difference becomes 140°F.

The licensee stated that heat injection transients become more limiting with increasing RCS temperature. Therefore, they chose an RCS temperature of 270°F, the maximum LTOP value, SG temperature greater by 150°F and pressurizer level at 50 percent. Analysis showed that these conditions will not challenge the Appendix G P/T limits. However, the licensee did not present the results of the basic heat injection transient from a water-solid RCS, nor did they justify that the above transient is indeed bounding. The basic difference is the assumed 50

percent pressurizer level. Calculation STA-138 (attached to the July 31, 2002, LAR) includes a variety of heat input transients, but it is not clear that any are from a water solid RCS.

In the December 23, 2003, letter, the licensee clarified that the heat injection transient analyses assumed a water solid RV and demonstrated that the analyses in DCPD Calculation STA-138 are bounding. Therefore, the staff finds that the proposed heat injection transient analyses are acceptable because they satisfy the approved LTOP methodology provisions of WCAP-14040-NP-A, Revision 2.

LTOP Analysis: Use of the RETRAN Code

WCAP-14040-NP-A, Revision 2, lists LOFTRAN as the acceptable Code for the analyses of the mass and heat injection transients. The DCPD PTLR methodology uses the RETRAN Code for the LTOP analysis. The PTLR includes benchmark calculations to demonstrate that the RETRAN results compare very closely with the corresponding LOFTRAN results. However, RETRAN was not listed in the PTLR references, as would be mandated by PTLR Criterion 3 for the contents of PTLRs. In PG&E's letter of December 23, 2003, the licensee addressed this omission and indicated that it had updated Section 2.2.1 of the DCPD Report No. PTLR-1, Revision 2, to include a discussion on how the RETRAN Code was applied to the analysis of the mass injection and heat injection transients assessed in the LTOP analysis. The December 23, 2003, letter also discussed how DCPD Calculation No. STA-138 was applied to the heat injection transient analyses (nine in total). The staff finds the use of the RETRAN Code to be acceptable since it has been acceptably qualified by comparison to use of the LOFTRAN Code and because the RETRAN Code has been incorporated into the references of DCPD Report No. PTLR-1, Revision 2.

PTLR Criterion 4

RG 1.99, Revision 2, provides the staff's basis for calculating adjusted reference temperatures (RT_{NDT} values) used in P/T limit assessments and in safety assessments for ensuring protection of the RV against PTS events.

Section 50.61 provides the staff's requirements for implementing PTS assessments for PWR-designed light-water reactors and for calculating the RT_{PTS} values required for these assessments. The rule requires RT_{PTS} values for base metal materials (i.e., RV plate or forging materials) and axial weld (longitudinal weld) materials to remain below 270°F through the expiration of the operating license for a PWR facility and the RT_{PTS} values for circumferential weld (girth weld) materials to remain below 300°F through the expiration of the operating license for a PWR facility. The methods in 10 CFR 50.61 for calculating the RT_{PTS} values for PWR-designed RVs are consistent with the methods for calculating RT_{NDT} values in RG 1.99, Revision 2.

To ensure conformance with the methodology of RG 1.99, Revision 2, PTLR Criterion 4 states that PTLR contents should identify the limiting adjusted reference temperature values (RT_{NDT} values) at the 1/4T and 3/4T locations of the RV. To ensure compliance with the PTS requirements of 10 CFR 50.61, PTLR Criterion 4 also states that PTLR contents should identify the limiting RT_{PTS} values for the RVs, as required by 10 CFR 50.61.

The licensee included supplemental data tables (Tables 6.0-1 through 6.0-10) in Section 6 of PTLR-1, Revision 2. The applicant provided the bases and calculations of the 1/4T and 3/4T RT_{NDT} values for the DCP Unit 1 RV beltline materials in PTLR Table 6.0-8. The licensee provided the bases and calculations of the 1/4T and 3/4T RT_{NDT} values for the DCP Unit 2 RV beltline materials in PTLR Table 6.0-9. Tables 6.0-1 through 6.0-7 of the PTLR provided the necessary neutron fluence calculations and RV material surveillance data calculations in support of the RT_{NDT} calculations provided in Tables 6.0-8 and 6.0-9 of the PTLR. In the PTLR the licensee applied the most limiting 1/4T and 3/4T RV beltline materials taken from Tables 6.0-8 and 6.0-9 of the PTLR and incorporated RT_{NDT} calculations and values for these materials into Table 6.0-10 of the PTLR.

The limiting 1/4T materials for the DCP RVs is unit 1 axial weld 3-442 (Heat No. 27204) and the limiting 3/4T material for the DCP RVs is unit 2 plate C5454-2 (Heat No. C5168-2). The licensee calculated the limiting RT_{NDT} values for these 1/4T and 3/4T materials to be 184°F and 151°F, respectively. The staff confirmed that these materials are the limiting 1/4T and 3/4T materials for the DCP RVs and independently calculated the RT_{NDT} values for these materials to be 186°F and 152°F, respectively. The values calculated by the staff are in good agreement with those calculated by the licensee in DCP Report No. PTLR-1, Revision 2. The staff also confirmed that all of the calculations in Tables 6.0-1 through 6.0-10 were in conformance with the staff's methods in RG 1.99, Revision 2, for calculating the RT_{NDT} values of RV beltline materials. Based on this assessment, the staff therefore concludes that the DCP Report No. PTLR-1, Revision 2, meets the provision in PTLR Criterion 4 that the PTLR contents identify the limiting RT_{NDT} values for the 1/4T and 3/4T locations of the DCP RVs.

The licensee discusses the PTS assessments for DCP Units 1 and 2 in Section 7 of DCP Report No. PTLR-1, Revision 2. In this section of the PTLR, the licensee summarized the requirements and screening criteria of 10 CFR 50.61 and stated that the limiting RV beltline material for PTS in the DCP RVs is DCP Unit 1 axial weld 3-442C. The licensee also identified that the RT_{PTS} value is 259°F at the expiration of the operating licenses for DCP Units 1 and 2 (i.e., at 32 EFPY). This meets PTLR Criterion 4. The licensee also identified that the PTS evaluations for DCP Units 1 and 2 are given in WCAP-13371, "Evaluation of Pressurized Thermal Shock for Diablo Canyon Unit 1," and WCAP-14364, "Evaluation of Pressurized Thermal Shock for the Diablo Canyon Unit 2 Reactor Vessel." The referencing of the PTS reports for DCP Units 1 and 2 represents supplemental information in the PTLR and is acceptable to the staff.

The staff independently calculated the RT_{PTS} values for the DCP beltline materials. The staff confirmed that the limiting RV beltline material for PTS in the DCP RVs is DCP Unit 1 axial weld 3-442C. The staff independently calculated the RT_{PTS} value for this material to be 258.3°F at 32 EFPY. This is in agreement with the value calculated by the licensee (i.e., 259°F at 32 EFPY). The PTLR also includes a summary of the requirements of 10 CFR 50.61. Based on this assessment, the staff concludes that DCP Report No. PTLR-1, Revision 2, meets the provision in PTLR Criterion 4 for identification of the limiting RT_{PTS} value for the DCP RVs.

PTLR Criterion 5

Section IV.A.2 of 10 CFR Part 50, Appendix G, requires that the P/T limits for operating reactors and the minimum temperature requirements for the stressed regions of RVs (i.e., for the RV flange and stud assemblies) be met for all conditions. The rule also requires that the P/T limits for operating reactors must be at least as conservative as those that would be generated if the methods of analysis in Appendix G to Section XI of the ASME Boiler and Pressure Vessel Code were used to generate the P/T limit curves. Table 1 of 10 CFR Part 50, Appendix G, provides the criteria and additional requirements for generating the P/T limits for operating reactors.

To meet these requirements, PTLR Criterion 5 states that PTLR contents should provide the P/T curves for heatups, cooldowns, critical operations, and pressure tests of operating light-water reactors.

The licensee specified the LCOs for the DCPD P/T limits in Section 2 of DCPD Report No. PTLR-1, Revision 2. The licensee provided the P/T limit data for heatups of the DCPD reactors, for normal operations with the reactors in the critical operating mode (Reactor Operating Mode 1), and for pressure testing conditions in Table 2.1-1 of DCPD Report No. PTLR-1, Revision 2, and the P/T curves for these data points in Figure 2.1-1 of the PTLR. The licensee provided the P/T limit data for cooldowns of the DCPD reactors in Table 2.1-2 of DCPD Report No. PTLR-1, Revision 2, and the P/T curves for these data points in Figure 2.1-2 of the PTLR. This meets the criterion in PTLR Criterion 5 that the PTLR include the P/T curves for heatups, cooldowns, critical operation, and pressure test conditions.

The current P/T curves in DCPD Report No. PTLR-1, Revision 2, for DCPD Units 1 and 2 are effective through 16 EFPY and were previously approved by the staff in the joint SE dated May 3, 1999, for license amendment No. 133 to Facility Operating License No. DPR-80 and license amendment No. 131 to Facility Operating License No. DPR-82 for DCPD Units 1 and 2, respectively. These P/T curves were generated in accordance with the approved methodology cited in WCAP-14040-NP-A, Revision 2.

In RAI 8, the staff asked the licensee for confirmation that the 16 EFPY P/T limit curves incorporated in DCPD Report No. PTLR-1, Revision 2, are identical to those 16 EFPY P/T limit curves that were approved in the staff's joint SE of May 3, 1999. In its response to RAI 8, dated August 15, 2003, the licensee confirmed that the 16 EFPY P/T curves in DCPD Report No. PTLR-1, Revision 2, were identical to those previously approved for license amendments 133 and 131 to Facility Operating License Nos. DPR-80 and DPR-82, respectively. The licensee's response to RAI 8 assures that the P/T limit curves specified in DCPD Report No. PTLR-1, Revision 2, are approved curves that have been generated in accordance with the approved methodology for the P/T limits. RAI 3 is considered to be resolved. Based on this assessment, the staff concludes that DCPD Report No. PTLR-1, Revision 2, meets the criterion that the P/T limits for heatups, cooldowns, critical operations, and pressure tests of the reactors should be included within the scope of the PTLR.

PTLR Criterion 6

Section IV.A.2 of 10 CFR Part 50, Appendix G, requires that the P/T limits for operating reactors and the minimum temperature requirements for the stressed regions of RVs (i.e., for the RV flange and stud assemblies) be met for all conditions. Table 1 of 10 CFR Part 50, Appendix G, provides the criteria for meeting the minimum temperature requirements for the stressed regions of the RV (i.e., for the RV flange and stud assembly).

To assure compliance with these requirements, PTLR Criterion 6 states that the contents of PTLRs should include the minimum temperature requirements for the RV flange and stud assemblies.

The licensee discusses how the P/T limit curves for DCPD Units 1 and 2 incorporate the applicable minimum temperature requirements for the RV flanges in Section 2.1.2 of DCPD Report No. PTLR-1, Revision 2. In this section, in order to demonstrate compliance with the minimum temperature requirements of 10 CFR Part 50, Appendix G, the licensee identified that the limiting RT_{NDT} value for the RV flanges in DCPD Units 1 and 2 is 53°F (i.e., that associated with the RV closure flange for Unit 1) and that therefore the P/T curves conservatively set the minimum temperature requirement specified in WCAP-14040-NP-A to 60°F. This value continues to meet the minimum temperature requirements in Table 1 of 10 CFR Part 50, Appendix G, for non-critical operations and pressure tests at less than 20 percent of the preservice hydrostatic test pressure and the change in this minimum temperature requirement is therefore acceptable.

Appendix G to 10 CFR Part 50 requires licensees to generate their P/T limit curves for pressure test conditions, normal operations of the reactor with the core not critical, and normal operations of the reactors with the reactor core in the critical condition using the more limiting of P/T data points established from either the P/T limit requirements or the respective minimum temperature requirements of Table 1 in the rule. The P/T curves that were approved by the staff in the joint SE of May 3, 1999, and incorporated in DCPD Report No. PTLR-1, Revision 2, are in compliance with all of the P/T limit and minimum temperature requirements of the table. Since the P/T limit curves in the PTLR are in compliance with applicable minimum temperature requirements of Table 1 to 10 CFR Part 50, Appendix G, the staff concludes that the P/T limits in DCPD Report No. PTLR-1, Revision 2, conform to PTLR Criterion 6.

PTLR Criterion 7

RG 1.99, Revision 2, provides the staff's recommended methods for calculating the adjusted reference temperature values (RT_{NDT} values) for RV beltline materials. These RT_{NDT} values are calculated for the 1/4T and 3/4T locations of the vessels and are required by Appendix G to Section XI of the ASME Boiler and Pressure Vessel Code (as invoked by 10 CFR Part 50, Appendix G) to be inputted into the P/T limit calculations for the reactors. RT_{NDT} values for ferritic RV ferritic base metal and weld materials increase as a function of accumulated neutron fluences for the materials and the alloying elements in the materials, copper and nickel in particular. The RG therefore requires that a chemistry factor (CF) be determined that is part of the calculational inputs for RT_{NDT} values. The RG cites one of two methods to determine the CF values for the RV beltline base metal and weld materials: (1) from Position 1.1 in the RG, which allows a licensee to determine the CF values from applicable tables in the RG as a

function of copper and nickel content, and (2) from applicable RV surveillance data if a given RV base metal or weld material is represented in a licensee's RV material surveillance program and if the data are determined to be credible in accordance with the credibility criteria discussed in the RG.

To assure conformance with these methods, PTLR Criterion 7 states that the contents of PTLRs should include the supplemental data and calculations of the CF values for the RV base metal and weld materials, if surveillance data are used in the RT_{NDT} value calculations, and an evaluation of the data against the credibility criteria of RG 1.99, Revision 2.

The DCPD RV material surveillance programs are designed to meet the requirements of 10 CFR Part 50, Appendix H and include the following RV materials for DCPD Units 1 and 2.

- DCPD Unit 1 RV base metal heat No. C2793-1 and RV weld heat No. 27204
- DCPD Unit 2 RV base metal heat No. C5161-1 and RV tandem weld heat No. 12008/21935

The licensee included a summary of surveillance data for the RV materials for DCPD Units 1 and 2 in Tables 5.0-1 and 5.0-2 of DCPD Report No. PTLR-1, Revision 2. The licensee calculated the CFs for these materials in PTLR Tables 6.0-1 and 6.0-2 and assessed the credibility of the surveillance data in Table 6.0-3 of the PTLR. The licensee's tables incorporated surveillance data and CF calculations inclusive of data from Charpy-impact tests of base metal and weld specimens from DCPD Unit 1 surveillance capsules S and Y and DCPD Unit 2 surveillance capsules U, X, and Y.

Each of the V surveillance capsules has been removed from the DCPD RVs since the licensee submitted the initial LAR for the PTLR. To meet the reporting requirements of 10 CFR Part 50, Appendix H, the licensee submitted the fluence data, chemistry data, tensile test data, and fracture toughness data for the base metal and weld specimens in these capsules to the NRC in accordance with the SRP and WCAP-11851.

Tables 5.0-1, 5.0-2, 6.0-1, 6.0-2, and 6.0-3 of DCPD Report No. PTLR-1, Revision 2, did not currently include the respective surveillance data from TRs WCAP-15958, Revision 0 (Capsule V report for Unit 1), and WCAP-15423, Revision 0 (Capsule V report for Unit 2). However, the 16 EFPY P/T limits in PTLR-1, Revision 2, are currently based on the tables and Position 1.1 of RG 1.99, Revision 2, which provides conservative P/T limit results for DCPD. Since the P-T limit curves for DCPD Units 1 and 2 are not based on surveillance data obtained through implementation of the licensee's RV surveillance programs for DCPD Units 1 and 2, the licensee is not mandated by GL 96-03 to update Tables 5.0-1, 5.0-2, 6.0-1, 6.0-2, and 6.0-3 to include the Capsule V data for DCPD Units 1 and 2 as a condition of approval of this PTLR. Based on this assessment, the staff concludes that DCPD Report No. PTLR-1, Revision 2, conforms to the provisions of Criterion 7 of GL 96-03 for incorporation of RV surveillance data assessments into PTLRs and is acceptable.

3.4 Conclusion

The staff has completed its review of PG&E's license amendment request to remove the P/T limit curves and LTOP limits for DCPD Units 1 and 2 from the LCOs in the DCPD TS and to incorporate them into a PTLR that will be controlled through implementation of TS 5.6.6. On the basis of the staff's review, the staff has determined that the 16 EFY P-T limits for DCPD Units 1 and 2 are acceptable and that the contents of the PTLR for DCPD Units 1 and 2 conform to the staff's recommended contents for PTLRs as defined in Attachment 1 of GL 96-03. Based on this evaluation, the staff concludes that the PTLR for DCPD Units 1 and 2 is acceptable. The licensee may relocate the actual P-T limits curves and LTOP setpoint values out of the LCOs for P-T limits and LTOP limits and into a PTLR that will be controlled by TS 5.6.6. Upon issuance of this license amendment, pursuant to TS 5.6.6c, the licensee will be required to provide the PTLR to the NRC upon issuance for each reactor vessel fluence period and for any revision of or supplement to the PTLR thereto.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the California State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments relate to changes in recordkeeping, reporting, or administrative procedures or requirements. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: J. Medoff

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