

August 27, 1987

Docket Nos.: 50-275  
and 50-323

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Mr. J. D. Shiffer, Vice President  
Nuclear Power Generation  
c/o Nuclear Power Generation, Licensing  
Pacific Gas and Electric Company  
77 Beale Street, Room 1451  
San Francisco, California 94106

Dear Mr. Shiffer:

SUBJECT: ISSUANCE OF AMENDMENTS (TAC NOS. 64905 AND 64906)

The Commission has issued the enclosed Amendment No. 17 to Facility Operating License No. DPR-80 and Amendment No. 16 to Facility Operating License No. DPR-82 for the Diablo Canyon Nuclear Power Plant, Unit Nos. 1 and 2, respectively. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated March 13, 1987, as supplemented July 9, 1987.

These amendments revise the steam generator water level low reactor trip setpoint from 25 to 15 percent of the narrow range instrument span.

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

Sincerely,

Charles M. Trammell, Project Manager  
Project Directorate V  
Division of Reactor Projects - III,  
IV, V and Special Projects

Enclosures:

1. Amendment No. 17 to DPR-80
2. Amendment No. 16 to DPR-82
3. Safety Evaluation

cc w/enclosures:  
See next page

DRSP/PD5  
JLee  
8/20/87

DRSP/PD5  
CTrammell:cd  
8/30/87

NRR/SRXB  
WHodges  
8/17/87

NRR/SICB  
JMauck  
8/10/87

MEB *asm*  
AMasciantonio  
8/12/87  
(II.D.1 ONLY)

OGC  
8/15/87  
DPR/D:PDV  
GKnighton  
8/10/87

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Diablo Canyon

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

PACIFIC GAS AND ELECTRIC COMPANY  
DIABLO CANYON NUCLEAR POWER PLANT, UNIT 1  
DOCKET NO. 50-275  
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 17  
License No. DPR-80

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Pacific Gas & Electric Company (the licensee) dated March 13, 1987 as supplemented July 9, 1987, 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 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.

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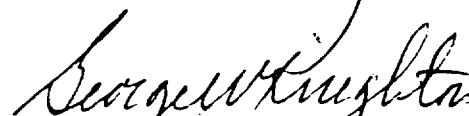
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-80 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 17, are hereby incorporated in the license. Pacific Gas & 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 becomes effective at the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



George W. Knighton, Director  
Project Directorate V  
Division of Reactor Projects - III,  
IV, V and Special Projects

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: August 27, 1987



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

PACIFIC GAS AND ELECTRIC COMPANY  
DIABLO CANYON NUCLEAR POWER PLANT, UNIT 2  
DOCKET NO. 50-323  
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 16  
License No. DPR-82

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Pacific Gas & Electric Company (the licensee) dated March 13, 1987, as supplemented July 9, 1987, 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 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.

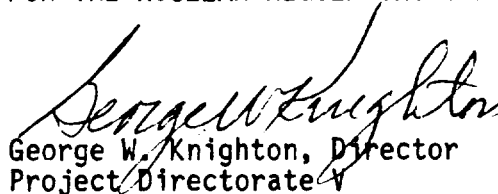
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-82 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 16, are hereby incorporated in the license. Pacific Gas & 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 becomes effective at the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



George W. Knighton, Director  
Project Directorate V  
Division of Reactor Projects - III,  
IV, V and Special Projects

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: August 27, 1987

ATTACHMENT TO LICENSE AMENDMENT NOS. 17 AND 16  
FACILITY OPERATING LICENSE NOS. DPR-80 AND DPR-82  
DOCKET NOS. 50-275 AND 50-323

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Remove

2-5

B 2-7

Insert

2-5

B 2-7



TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>
13. Steam Generator Water Level-Low-Low	$\geq$ 15% of narrow range instrument span-each steam generator	$\geq$ 14% of narrow range instrument span-each steam generator
14. Steam Generator Water Level-Low Coincident with Steam/Feedwater Flow Mismatch	$\geq$ 15% of narrow range instrument span-each steam generator $<$ 40% of full steam flow at RATED THERMAL POWER	$\geq$ 14% of narrow range instrument span-each steam generator $<$ 42.5% of full steam flow at RATED THERMAL POWER
15. Undervoltage-Reactor Coolant Pumps	$\geq$ 8050 volts-each bus	$\geq$ 7935 volts-each bus
16. Underfrequency-Reactor Coolant Pumps	$\geq$ 54.0 Hz - each bus	$\geq$ 53.9 Hz - each bus
17. Turbine Trip		
a. Low Autostop Oil Pressure	$\geq$ 50 psig	$\geq$ 45 psig
b. Turbine Stop Valve Closure	$\geq$ 1% open	$\geq$ 1% open
18. Safety Injection Input from ESF	N.A.	N.A.
19. Reactor Coolant Pump Breaker Position Trip	N.A.	N.A.
20. Reactor Trip Breakers	N.A.	N.A.
21. Automatic Trip and Interlock Logic	N.A.	N.A.

## LIMITING SAFETY SYSTEM SETTINGS

### BASES

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#### Steam Generator Water Level

The Steam Generator Water Level Low-Low trip protects the reactor from loss of heat sink in the event of a sustained steam/feedwater flow mismatch resulting from loss of normal feedwater. The specified Setpoint provides allowances for starting delays of the Auxiliary Feedwater System.

#### Steam/Feedwater Flow Mismatch and Low Steam Generator Water Level

The Steam/Feedwater Flow Mismatch in coincidence with a Steam Generator Low Water Level trip is not used in the transient and accident analyses but is included in Table 2.2-1 to ensure the functional capability of the specified trip settings and thereby enhance the overall reliability of the Reactor Trip System. This trip is redundant to the Steam Generator Water Level Low-Low trip. The Steam/Feedwater Flow Mismatch portion of this trip is activated when the steam flow exceeds the feedwater flow by greater than or equal to  $1.45 \times 10^6$  lbs/hr for Unit 1 and  $1.49 \times 10^6$  lbs/hr for Unit 2. The Steam Generator Low Water level portion of the trip is activated when the water level drops below 15%, as indicated by the narrow range instrument. These trip values include sufficient allowance in excess of normal operating values to preclude spurious trips but will initiate a Reactor trip before the steam generators are dry. Therefore, the required capacity and starting time requirements of the auxiliary feedwater pumps are reduced and the resulting thermal transient on the Reactor Coolant System and steam generators is minimized.

#### Undervoltage and Underfrequency - Reactor Coolant Pump Busses

The Undervoltage and Underfrequency Reactor Coolant Pump Bus trips provide core protection against DNB as a result of complete loss of forced coolant flow. The specified Setpoints assure a Reactor trip signal is generated before the Low Flow Trip Setpoint is reached. Time delays are incorporated in the Underfrequency and Undervoltage trips to prevent spurious Reactor trips from momentary electrical power transients. For undervoltage, the delay is set so that the time required for a signal to reach the Reactor trip breakers following the simultaneous trip of two or more reactor coolant pump bus circuit breakers shall not exceed 0.9 seconds. For underfrequency, the delay is set so that the time required for a signal to reach the Reactor trip breakers after the Underfrequency Trip Setpoint is reached shall not exceed 0.3 seconds. On decreasing power, the Undervoltage and Underfrequency Reactor Coolant Pump Bus trips are automatically blocked by P-7 (a power level of approximately 10% of RATED THERMAL POWER with a turbine impulse chamber pressure at approximately 10% of full power equivalent); and on increasing power, reinstated automatically by P-7.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 17 TO FACILITY OPERATING LICENSE NO. DPR-80  
AND AMENDMENT NO. 16 TO FACILITY OPERATING LICENSE NO. DPR-82  
PACIFIC GAS AND ELECTRIC COMPANY  
DIABLO CANYON NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2  
DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By letter dated March 13, 1987, as supplemented July 9, 1987, Pacific Gas and Electric Company (PG&E or the licensee) requested amendments to the Technical Specifications appended to Facility Operating License Nos. DPR-80 and DPR-82 for the Diablo Canyon Nuclear Power Plant, Unit Nos. 1 and 2. The proposed amendments would change the reactor trip setting for steam generator low water level from 25% to 15% of the narrow instrument span.

2.0 DISCUSSION AND EVALUATION

The Diablo Canyon Nuclear Power Plant has two reactor trips derived from steam generator water level: low-low level, set at 15% of narrow instrument span; and low level set at 25% of span in coincidence with steam flow/feed flow mismatch (feed flow less than steam flow by a set amount).

Diablo Canyon has reported several reactor trips which occurred during startup when control of steam generator level is performed manually. The trips were caused by the 25% level setting in coincidence with false mismatch signals due to the sensitivity of the instruments for detecting steam and feedflow. Since this circuit was causing spurious reactor trips, the licensee has evaluated the safety implications of changing the level setting to 15% and thus change this reactor trip to occur at the same level setting as the low-low level trip. This would provide the operators controlling level during startup a greater allowable range before the trip setting and should improve operations, leading to less frequent challenges to safety systems and greater reliability.

The licensee reports that, as shown in WCAP-10948\*, low steam generator level in coincidence with low feedwater flow (steam/feedwater flow mismatch) trips were the third most prevalent cause of automatic reactor trips in U.S. Westinghouse-designed plants in the 1980-1985 time frame, accounting for 154 out of 1279 total trips that were analyzed, or about 12 percent of the automatic trips in the 38 Westinghouse plants surveyed.

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\*WCAP-10948, "U.S. Westinghouse Inadvertent Plant Trip Experience: A Historical Review of Information from January 1980 through September 1985. March 1986. (Proprietary)

From the safety standpoint, the steam/feedwater flow mismatch signal in coincidence with a steam generator low level reactor trip set at its current setting of 25% is not used or relied upon in the transient and accident analysis for Diablo Canyon, but the trip is included in technical specification Table 2.2-1 to enhance the reliability of the reactor trip system (discussed further below). The trip provides a measure of diversity and redundancy to the low-low level trip. The licensee does not propose to delete it. The low-low level trip actuates the auxiliary feedwater pumps. The steam/feedwater flow mismatch/low level signal only trips the reactor, and has no other control function.

Since Diablo Canyon has only three level channels for each steam generator level, the low level in coincidence with low feedwater flow reactor trip is needed in order to satisfy IEEE-279, "Criteria for Protection Systems for Nuclear Power Generating Stations." Paragraph 4.7.3 of this standard discusses special requirements for postulated failures where, as here, control and protection functions are combined. Since one protection channel per steam generator provides a control input to the steam generator level control system as well as providing protection, paragraph 4.7.3 requires that two random failures be postulated. Since the low-low reactor trip utilizes 2-out-of-three logic, 2 postulated failures (such as failing high) could prevent protective action. Additional protection is required to cause reactor trip which is provided by the low level circuit. Since the low level circuit uses one-out-of-two logic, and neither channel is used for control functions, this channel would trip on low steam generator level (in coincidence with low feedwater flow). Thus, the requirements of IEEE-279 are satisfied. The licensee proposes to change the setpoint to 15% of the narrow instrument range which is the same value as the low-low steam generator level reactor trip. Therefore, IEEE-279 would continue to be satisfied under the proposed change.

Newer Westinghouse-designed plants being licensed today do not have this low level/mismatch reactor trip. Rather, the requirements of IEEE-279 are satisfied instead by having four channels of protection for each steam generator and a 2-out-of-four trip logic. In this way, a reactor trip would still occur even if two channels should fail.

The transients or accidents in the FSAR that are potentially affected by this setpoint change are:

- loss of feedwater
- loss of off-site power
- rupture of a main feedwater pipe

This safety analyses contained in the Diablo Canyon FSAR Update do not rely on the low level trip (25% setting), but instead rely on the low-low level trip (15%) to provide a reactor trip. Therefore, the safety analyses for Diablo Canyon would be unaffected by the proposed change.

Historically, the original safety analysis for the main feedwater pipe rupture used the low level trip as part of a set of initial conditions in the analysis. One steam generator (affected by the pipe rupture) was assumed to be dry (empty) at the same time the other three steam generators were assumed to generate a reactor trip at the low level (25%) setting. These assumptions were made in order to minimize steam generator fluid inventory and thereby maximize the resultant heatup of the reactor coolant system.

This analysis method for the rupture of a main feedwater pipe has been superseded by the analysis contained in the FSAR Update which uses different assumptions, initial conditions, and methods developed in response to NUREG-0737 Item II.D.1, "Safety and Relief Valve Testing." The revised analysis of this accident was submitted by PG&E on November 25, 1985. The analysis methods were accepted by the NRC staff as part of the resolution of Item II.D.1 for Diablo Canyon on January 27, 1986. The specific results contained in licensee's November 25, 1985 have been reviewed and found acceptable, both with respect to this amendment request and NUREG-0737 Item II.D.1.

In summary, we conclude that the licensee's request to revise the low level trip setpoint to 15% of narrow instrument span is acceptable on the basis that the setpoint of 15% is the value relied upon in the safety analyses. Retaining the low level/low flow mismatch trip at this revised setting will continue the Diablo Canyon design conformance with IEEE-279.

### 3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. We have determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of these amendments.

### 4.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and (3) the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: R. C. Jones, J. Mauck and C. Trammell

Dated: August 27, 1987