



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

February 23, 2017

Mr. Edward D. Halpin  
Senior Vice President, Generation  
and Chief Nuclear Officer  
Pacific Gas and Electric Company  
Diablo Canyon Power Plant  
P.O. Box 56, Mail Code 104/6  
Avila Beach, CA 93424

**SUBJECT: DIABLO CANYON POWER PLANT, UNITS 1 AND 2 - ISSUANCE OF  
AMENDMENTS RE: REVISE TECHNICAL SPECIFICATION 3.4.12, "LOW  
TEMPERATURE OVERPRESSURE PROTECTION (LTOP) SYSTEM"  
(CAC NOS. MF7501 AND MF7502)**

Dear Mr. Halpin:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment No. 229 to Facility Operating License No. DPR-80 and Amendment No. 231 to Facility Operating License No. DPR-82 for the Diablo Canyon Power Plant, Units 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated March 23, 2016, as supplemented by letters dated September 28, 2016, and January 18, 2017.

The amendments revise TS 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," to reflect the mass input transient analysis that assumes an emergency core cooling system centrifugal charging pump and the normal charging pump capable of simultaneously injecting into the reactor coolant system during applicability of TS 3.4.12.

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,

A handwritten signature in black ink, appearing to read "Singal B. Singal for".

Balwant K. Singal, Senior Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:

1. Amendment No. 229 to DPR-80
2. Amendment No. 231 to DPR-82
3. Safety Evaluation

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

PACIFIC GAS AND ELECTRIC COMPANY

DOCKET NO. 50-275

DIABLO CANYON NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 229  
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 March 23, 2016, as supplemented by letters dated September 28, 2016, and January 18, 2017, 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. 229 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 is effective as of its date of issuance and shall be implemented within 180 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert J. Pascarelli, Chief  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Facility  
Operating License No. DPR-80  
and Technical Specifications

Date of Issuance: February 23, 2017



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

**PACIFIC GAS AND ELECTRIC COMPANY**

**DOCKET NO. 50-323**

**DIABLO CANYON NUCLEAR POWER PLANT, UNIT 2**

**AMENDMENT TO FACILITY OPERATING LICENSE**

Amendment No. 231  
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 March 23, 2016, as supplemented by letters dated September 28, 2016, and January 18, 2017, 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 (SSER 32, Section 8)\* and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 231, 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 is effective as of its date of issuance and shall be implemented within 180 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert J. Pascarelli, Chief  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Facility  
Operating License No. DPR-82  
and Technical Specifications

Date of Issuance: February 23, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 229  
TO FACILITY OPERATING LICENSE NO. DPR-80  
AND AMENDMENT NO. 231 TO FACILITY OPERATING LICENSE NO. DPR-82  
DIABLO CANYON POWER PLANT, UNITS 1 AND 2  
DOCKET NOS. 50-275 AND 50-323

Replace the following pages of the Facility Operating License Nos. DPR-80 and DPR-82, and 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.

Facility Operating License No. DPR-80

REMOVE  
3

INSERT  
3

Facility Operating License No. DPR-82

REMOVE  
3

INSERT  
3

Technical Specifications

REMOVE  
3.4-23  
3.4-24  
3.4-25  
3.4-26

INSERT  
3.4-23  
3.4-24  
3.4-25  
3.4-26

- (4) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This License shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The Pacific Gas and Electric Company is authorized to operate the facility at reactor core power levels not in excess of 3411 megawatts thermal (100% rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 229 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) Initial Test Program

The Pacific Gas and Electric Company shall conduct the post-fuel-loading initial test program (set forth in Section 14 of Pacific Gas and Electric Company's Final Safety Analysis Report, as amended), without making any major modifications of this program unless modifications have been identified and have received prior NRC approval. Major modifications are defined as:

- a. Elimination of any test identified in Section 14 of PG&E's Final Safety Analysis Report as amended as being essential;



- (4) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
  - (5) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.
- C. This License shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
- (1) Maximum Power Level  
  
The Pacific Gas and Electric Company is authorized to operate the facility at reactor core power levels not in excess of 3411 megawatts thermal (100% rated power) in accordance with the conditions specified herein.
  - (2) Technical Specifications (SSER 32, Section 8)\* and Environmental Protection Plan  
  
The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 231, 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) Initial Test Program (SSER 31, Section 4.4.1)  
  
Any changes to the Initial Test Program described in Section 14 of the FSAR made in accordance with the provisions of 10 CFR 50.59 shall be reported in accordance with 50.59(b) within one month of such change.

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\*The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.12 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.12

An LTOP System shall be OPERABLE with:

- a. no safety injection pumps capable of injecting into the RCS;
- b. a maximum of one Emergency Core Cooling System (ECCS) centrifugal charging pump capable of injecting into the RCS;
- c. the normal charging pump (NCP) aligned to the LTOP orifice when it is capable of injecting into the RCS;
- d. the accumulators isolated; and
- e. one of the following pressure relief capabilities;
  1. Two Class I power operated relief valves (PORVs) with lift settings within the limits specified in the PTLR, or
  2. The RCS depressurized and an RCS vent of  $\geq 2.07$  square inches.

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#### NOTES

1. The NCP aligned to the LTOP orifice and two ECCS centrifugal charging pumps may be made capable of injecting for  $\leq 1$  hour for pump swap operation.
  2. Accumulator may be unisolated when accumulator pressure is less than the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.
- 

APPLICABILITY:

MODE 4, when any RCS cold leg temperature is  $\leq$  LTOP arming temperature specified in the PTLR,

MODE 5,

MODE 6, when the reactor vessel head is on and the vessel head closure bolts are not fully de-tensioned.

ACTIONS

-----NOTE-----  
LCO 3.0.4b is not applicable when entering MODE 4  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more safety injection pumps capable of injecting into the RCS.	A.1 Initiate action to verify zero safety injection pumps are capable of injecting into the RCS.	Immediately
B. Two ECCS centrifugal charging pumps capable of injecting into the RCS.  <u>OR</u> The NCP is not aligned to the LTOP orifice when it is capable of injecting into the RCS.	B.1 Initiate action to verify the NCP is aligned to the LTOP orifice and a maximum of one ECCS centrifugal charging pump is capable of injecting into the RCS.	Immediately
C. An accumulator not isolated when the accumulator pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	C.1 Isolate affected accumulator.	1 hour
D. Required Action and associated Completion Time of Condition C not met.	D.1 Increase RCS cold leg temperature to > LTOP arming temperature specified in the PTLR.	12 hours
	<u>OR</u> D.2 Depressurize affected accumulator to less than the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One required RCS Class I PORV inoperable in MODE 4.	E.1 Restore required RCS Class I PORV to OPERABLE status.	7 days
F. One required RCS Class I PORV inoperable in MODE 5 or 6, with the vessel head closure bolts not fully de-tensioned.	F.1 Restore required RCS Class I PORV to OPERABLE status.	24 hours
G. Two required RCS Class I PORVs inoperable.  <u>OR</u>  Required Action and associated Completion Time of Condition A, B, D, E, or F not met.  <u>OR</u>  LTOP System inoperable for any reason other than Condition A, B, C, D, E, or F.	G.1 Depressurize RCS and establish RCS vent of $\geq 2.07$ square inches.	8 hours

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.4.12.1	Verify a maximum of zero safety injection pumps are capable of injecting into the RCS.	In accordance with the Surveillance Frequency Control Program
SR 3.4.12.2	Verify a maximum of one ECCS centrifugal charging pump is capable of injecting into the RCS and the NCP is aligned to the LTOP orifice when it is capable of injecting into the RCS.	In accordance with the Surveillance Frequency Control Program
SR 3.4.12.3	Verify each accumulator is isolated when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.	In accordance with the Surveillance Frequency Control Program
SR 3.4.12.4	Not used	
SR 3.4.12.5	Verify required RCS vent $\geq 2.07$ square inches open.	In accordance with the Surveillance Frequency Control Program
SR 3.4.12.6	Verify PORV block valve is open for each required Class I PORV.	In accordance with the Surveillance Frequency Control Program
SR 3.4.12.7	Not used	
SR 3.4.12.8	<p>-----NOTE-----</p> <p>Not required to be performed until 12 hours after decreasing any RCS cold leg temperature to <math>\leq</math> LTOP arming temperature specified in the PTLR.</p> <p>-----</p> <p>Perform a COT on each required Class 1 PORV, excluding actuation.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.4.12.9	Perform CHANNEL CALIBRATION for each required Class I PORV actuation channel.	In accordance with the Surveillance Frequency Control Program



UNITED STATES  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 229 TO FACILITY OPERATING LICENSE NO. DPR-80  
AND AMENDMENT NO. 231 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 March 23, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16084A588), as supplemented by letters dated September 28, 2016, and January 18, 2017 (ADAMS Accession Nos. ML16272A478 and ML17018A432, respectively), Pacific Gas and Electric Company (PG&E, or the licensee) requested changes to the Technical Specifications (TSs) for the Diablo Canyon Power Plant (DCPP), Units 1 and 2.

The amendments revise TS 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," to reflect the mass input transient analysis that assumes an emergency core cooling system (ECCS) centrifugal charging pump (CCP) and the normal charging pump (NCP) capable of simultaneously injecting into the reactor coolant system (RCS) during applicability of TS 3.4.12. The proposed changes differentiate between the ECCS CCPs and the nonsafety-related NCP, and provides a restriction on alignment of the NCP (i.e., the NCP must be aligned to the LTOP orifice) during applicability of TS 3.4.12. Briefly, the specific wording of TS 3.4.12 currently allows operation of only one CCP at a time (whether the CCP is a safety-related pump or nonsafety-related pump) when the LTOP system is operable. This is overly restrictive to plant operations and therefore, this license amendment is revising the TSs to allow combined operation of the NCP that is capable of injecting into the RCS only through the LTOP orifice and one safety-related CCP (i.e., one ECCS CCP) that is also capable of injecting into the RCS when the LTOP system is operable. Further, the LTOP orifice was designed to ensure that the total maximum mass injection capability with the NCP remained bounded by the original NRC-approved LTOP mass injection analysis with the Positive Displacement Pump (PDP). Therefore, no new mass injection analysis is required to support this license amendment approval.

The supplemental letters dated September 28, 2016, and January 18, 2017, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on May 10, 2016 (81 FR 28899).

## 2.0 REGULATORY EVALUATION

### 2.1 System Description

The LTOP system controls RCS pressure at low temperatures so the integrity of the reactor coolant pressure boundary (RCPB) is not compromised in low-temperature modes of operation. Limiting Condition for Operation (LCO) 3.4.12 provides overpressure protection by specifying a maximum coolant input capability and an adequate pressure relief capability.

### 2.2 Applicable Regulatory Requirements

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. In Section 50.36, "Technical specifications," of Title 10 of the *Code of Federal Regulations* (10 CFR), the NRC established its regulatory requirements related to the content of TSs. Pursuant to 10 CFR 50.36, TSs are required to include items in the following five specific categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings, (2) LCOs, (3) surveillance requirements (SRs), (4) design features, and (5) administrative controls. The rule does not specify the particular requirements to be included in a plant's TS. The regulations in 10 CFR 50.36(c)(2)(i), state, in part,

"Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility."

More specifically, 10 CFR 50.36(c)(2)(ii) states, in part,

A technical specification limiting condition for operation of a nuclear reactor must be established for each item meeting one or more of the following criteria: [ ... ]  
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.

The LTOP system controls RCS pressure at low temperatures so that the integrity of the RCPB is not compromised by violating the pressure and temperature limits required by 10 CFR Part 50, Appendix G, "Fracture Toughness Requirements." The LCO ensures that only a limited inventory of mass input sources are available for injection into the RCS during low-temperature operation, consistent with Criterion 2 of 10 CFR 50.36(c)(2)(ii).

## 3.0 TECHNICAL EVALUATION

### 3.1 Proposed TS Changes

Current TS LCO 3.4.12 states, in part:

An LTOP System shall be OPERABLE with no safety injection pumps and a maximum of one centrifugal charging pump capable of injecting into the RCS and the accumulators isolated and one of the following pressure relief capabilities:

- a. Two Class I power operated relief valves (PORVs) with lift settings within the limits specified in the PTLR [pressure-temperature limits report], or
- b. The RCS depressurized and an RCS vent of  $\geq$  [greater than or equal to] 2.07 square inches.

-----NOTES-----

- 1. Two charging pumps may be made capable of injecting for  $\leq$  [less than or equal to] 1 hour for pump swap operation.
- 2. Accumulator may be unisolated when accumulator pressure is less than the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T [pressure-temperature] limit curves provided in the PTLR.

Revised TS 3.4.12 would state, in part:

An LTOP System shall be OPERABLE with:

- a. no safety injection pumps capable of injecting into the RCS;
- b. a maximum of one Emergency Core Cooling System (ECCS) centrifugal charging pump capable of injecting into the RCS;
- c. the normal charging pump (NCP) aligned to the LTOP orifice when it is capable of injecting into the RCS;
- d. the accumulators isolated; and
- e. one of the following pressure relief capabilities;
  - 1. Two Class I power operated relief valves (PORVs) with lift settings within the limits specified in the PTLR, or
  - 2. The RCS depressurized and an RCS vent of  $\geq$  2.07 square inches.

-----NOTES-----

- 1. The NCP aligned to the LTOP orifice and two ECCS centrifugal charging pumps may be made capable of injecting for  $\leq$  1 hour for pump swap operation.
- 2. Accumulator may be unisolated when accumulator pressure is less than the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.

Current Condition B states:

Two centrifugal charging pumps capable of injecting into the RCS.

Revised Condition B would state:

Two ECCS centrifugal charging pumps capable of injecting into the RCS.



OR

The NCP is not aligned to the LTOP orifice when it is capable of injecting into the RCS.

Current Required Action B.1 states:

Initiate action to verify a maximum of one centrifugal charging pump is capable of injecting into the RCS.

Revised Required Action Condition B.1 would state:

Initiate action to verify the NCP is aligned to the LTOP orifice and a maximum of one ECCS centrifugal charging pump is capable of injecting into the RCS.

Current SR 3.4.12.2 states:

Verify a maximum of one centrifugal charging pump is capable of injecting into the RCS.

Revised SR 3.4.12.2 would state:

Verify a maximum of one ECCS centrifugal charging pump is capable of injecting into the RCS and the NCP is aligned to the LTOP orifice when it is capable of injecting into the RCS.

3.2 NRC Staff Evaluation

The licensee is requesting changes to TS 3.4.12 as the specific wording currently allows operation of only one CCP at a time (whether the CCP is a safety-related pump or nonsafety-related pump (NCP)) when the LTOP system is operable. The licensee states that this is overly restrictive to plant operations and therefore, requests revisions to DCPD TSs to allow combined operation of the NCP (that is capable of injecting into the RCS only through the LTOP orifice) and one safety-related CCP (i.e., one ECCS CCP) that is also capable of injecting into the RCS, when the LTOP system is operable.

The licensee provided design features of the LTOP orifice (Attachment 4 of the Enclosure to letter dated March 23, 2016), and stated that it was designed to ensure that the total maximum mass injection capability with the NCP remained bounded by the original NRC-approved LTOP mass injection analysis with the nonsafety-related PDP (NRC letter dated May 13, 2004 (ADAMS Accession No. ML041400243)). Therefore, the licensee states that no new mass injection analysis is required to support this license amendment request (LAR). Note that in 2007 and 2008, the licensee replaced the PDPs on Units 1 and 2 respectively with nonsafety-related CCPs (called NCPs) in order to alleviate operational issues associated with the PDPs. The licensee stated that the original PDP flowrate was fairly constant near 100 gallons per minute (gpm) for all RCS operating pressure conditions and that the current LTOP mass injection analysis is based on the PDP flow. The licensee also states that the runout flowrate of the NCP is about 200 gpm but is limited to 120 gpm by the flow choking orifice (LTOP orifice). The calculations performed in support of the design change established that the limiting LTOP orifice design characteristics in conjunction with the limiting NCP design characteristics would

result in maximum flows that were significantly less than already analyzed with the PDP. The licensee stated that this provided a high degree of assurance that the final NCP installed configuration would not result in any additional loss of LTOP margin associated with the existing LTOP PDP mass injection limits. The licensee provided LTOP maximum injection flowrate curves (Figure 1 of the Enclosure to letter dated March 23, 2016), for the CCP with PDP and the CCP with the NCP aligned to the LTOP orifice. These curves show that the flow with the CCP and NCP aligned to the LTOP orifice is significantly reduced over the existing mass injection analysis (using the CCP and PDP).

Given that the maximum NCP flowrate through the LTOP orifice (120 gpm) is larger than the PDP flowrate (100 gpm), NRC staff requested the licensee provide additional details on how the injection curves were determined and explain how the original maximum injection flow curve is still bounding since there is the possibility of larger flowrates with the NCP (120 gpm vs. 100 gpm). In its letter dated September 28, 2016, the licensee stated that the 120 gpm was a design input for the LTOP orifice and is not representative of the maximum flow of the NCP aligned to the LTOP orifice as installed at DCCP. The licensee stated that the flow through the LTOP orifice from the NCP is lower than 120 gpm, due to the actual installed configuration and the flow-induced backpressure from the downstream flow path (piping, valves, etc.) during applicable LTOP analysis conditions.

The licensee calculated the original maximum LTOP injection flows using a steady state fluid hydraulics computer code that explicitly models the detailed physical configuration of the DCCP Chemical and Volume Control System (CVCS). The computer model includes all piping lengths, fittings, valves, and flow elements for the CVCS geometry of interest. The model also includes the flow versus pressure characteristics of the CCP and PDP. A similar analysis was performed with the NCP aligned to the LTOP orifice.

Table A of the Enclosure to letter dated September 28, 2016, shows the original calculated flow contributions of the safety-related CCP and PDP, which includes an LTOP analysis penalty to provide an operating margin to the actual calculated values. Table B provides the calculated flow contributions of the safety-related CCP and the NCP through the LTOP orifice, which demonstrates that the original analysis flows were limiting.

Figure 4 of Attachment 4 to the Enclosure of letter dated March 23, 2016, shows the pressure drop acceptance criteria for the LTOP orifice. This figure shows flowrates from 50 to 80 gpm, however, the maximum flowrate of the NCP through the LTOP orifice is stated to be 120 gpm. The NRC staff requested the licensee to explain why the current 50 to 80 gpm is acceptable. In its letter dated September 28, 2016, the licensee stated that the flow through the LTOP orifice from the NCP is lower than 120 gpm, due to the actual installed configuration and the flow induced backpressure from the downstream flow path (piping, valves, etc.) during applicable LTOP analysis conditions. The licensee also stated that Figure 4 represents the Preservice Surveillance Test (PST) acceptance criteria. The objective of the PST was to verify that the flow resistance of the LTOP orifice installed is greater than the flow resistance modelled in the LTOP analysis, and a flow range of 50 to 80 gpm was specified based on the expected LTOP orifice backpressure for the PST condition.

The licensee provided a summary of the mass input analysis in Attachment 5 to the Enclosure of its letter dated March 23, 2016. The analysis used the RETRAN code and NRC-approved methodology from WCAP-14040-NP-A, Revision 4, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," (ADAMS Accession No. ML050120209). The summary focused on key plots of the results, and

a summary of the results explaining how the results conform to the applicable acceptance criteria. While NRC staff reviewed the summary information presented, given the fact that the existing LTOP maximum flows are bounding relative to the proposed TS changes, NRC staff did not review the previously approved analysis as it has not been updated.

#### Changes to Technical Specifications

The changes to TS 3.4.12 are described as follows:

- 1) A new condition was added to LCO 3.4.12 stating:

An LTOP System shall be OPERABLE with:

- c. the normal charging pump (NCP) aligned to the LTOP orifice when it is capable of injecting into the RCS.

The NRC staff determines this change to be acceptable given the existing LTOP analysis mass injection curves bound the total mass flow from all pumps capable of injecting into the RCS during LTOP operation.

- 2) Note 1 to LCO 3.4.12 was revised to state,

The NCP aligned to the LTOP orifice and two ECCS centrifugal charging pumps may be made capable of injecting for  $\leq 1$  hour for pump swap operation.

This change included the addition of the NCP aligned to the LTOP orifice, while the original Note 1 only included the two ECCS pumps. While the flow from two ECCS pumps and the NCP aligned to the LTOP orifice is not addressed in the mass input analysis, this condition is consistent with NRC approved TSTF-285, Revision 1 "Charging Pump Swap LTOP Allowance," (ADAMS Accession No. ML040620093, approved by NRC letter dated May 12, 1999 (ADAMS Accession No. ML090750111)), which states in part:

Note 1 allows [two charging pumps] to be made capable of injecting for  $\leq 1$  hour during pump swap operations. One hour provides sufficient time to safely complete the actual transfer and to complete the administrative controls and surveillance requirements associated with the swap. The intent is to minimize the actual time that more than [one] charging pump is physically capable of injection.

In addition, TSTF-285 also states, in part:

One hour is reasonable considering the small likelihood of an event during this brief period and the other administrative controls available (e.g., operator action to stop any pump that inadvertently starts).

The licensee described its administrative and procedural controls for swapping ECCS CCPs. There are procedural requirements in place for pump swap operations that minimize operator error. For this 1-hour time window, there are at least two pressure relief devices for overpressure protection. Therefore, the NRC staff agrees that the 1-hour window allowed in Note 1 gives adequate time for safe completion of the pump swap. The NRC staff also determined that the procedural controls and additional available safety features provide

assurance that the initiation of a mass input transient while two ECCS CCPs are capable of injecting into the RCS would be very unlikely, and its effects could be acceptably mitigated. Based on these considerations, the NRC staff concludes that the proposed revision to TS LCO 3.4.12 is acceptable.

- 3) LCO 3.4.12, CONDITION B and associated REQUIRED ACTION B.1 was updated to address an NCP not aligned to the LTOP orifice when it is capable of injecting into the RCS. This condition/action is necessary, as the mass flow from the NCP could exceed the analyzed condition if the flow was not through the LTOP orifice. Therefore, the NRC staff concludes that the proposed revision to LCO 3.4.12, CONDITION B and associated REQUIRED ACTION B.1 is acceptable.
- 4) SR 3.4.12.2 was updated to include verification that the NCP is aligned to the LTOP orifice when it is capable of injecting into the RCS. This action is necessary as the mass flow from the NCP could exceed the analyzed condition if the flow was not through the LTOP orifice. Therefore, the NRC staff concludes that the proposed revision to SR 3.4.12.2 is acceptable.

### 3.3 Results of NRC Staff Evaluation

The proposed changes to the LCO will restrict the available mass input sources to be consistent with those assumed in the safety analysis, which is consistent with 10 CFR 50.36(c)(2)(ii) in that the LCO will restrict operation to the initial conditions assumed in the mass input transient analysis. This restriction assures that the RCS will not exceed the pressure/temperature limits required by 10 CFR 50, Appendix G. Based on these considerations, the NRC staff concludes that the proposed LCO revisions are acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the California State official was notified of the proposed issuance of the amendments. In an e-mail dated January 24, 2017 (ADAMS Accession No. ML17025A298), the State official provided the following comments:

At this time, the California State Liaison Officer Robert B. Weisenmiller has the following comments with regard to the License Amendment: Pacific Gas and Electric Company (PG&E), Docket Nos. 50-275 and 50-323, Diablo Canyon Nuclear Power Plant (DCPP), Unit Nos. 1 and 2 that would revise Technical Specification (TS) TS 3.4.12, "Low temperature Overpressure Protection (LTOP) System," to reflect mass input transient analysis that assumes an emergency core cooling system (ECCS) centrifugal charging pump (CCP) and the normal charging pump (NCP) capable of simultaneously injecting into the reactor coolant system (RCS) during the TS 3.4.12 applicability posted in the *Federal Register* on May 10, 2016 (81 FR 28899).

Updated to the Technical Specifications appear to have technical merits, and are defensible but the California State Liaison Officer has two comments due to the potential of the license amendment to impact facility operating safety.

- The license amendment does not clearly outline the circumstances and rationale for the subject LAR to be submitted approximately eight years later (on March 23, 2016).

- During this approximately eight year period, the license amendment does not identify if any related protective measures, other than the installed Flow Choking Orifice, were considered or implemented.

California State Liaison Officer did not have any comments on the amendment being issued. The comments are related to the period of operation after replacement of the PDP with NCP (2007/2008 to the date of approval of this amendment request). Since the comments do not apply to this amendment request, the comments are being addressed separately via e-mail dated January 31, 2017 (ADAMS Accession No. ML17031A385).

## 5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has 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 published in the *Federal Register* on May 10, 2016 (81 FR 28899). Accordingly, the amendments meet 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 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) there is reasonable assurance that 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: Robert M. Beaton, NRR/DSS/SRXB

Date: February 23, 2017

SUBJECT: DIABLO CANYON POWER PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: REVISE TECHNICAL SPECIFICATION 3.4.12, "LOW TEMPERATURE OVERPRESSURE PROTECTION (LTOP) SYSTEM," (CAC NOS. MF7501 AND MF7502), DATED FEBRUARY 23, 2017.

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**ADAMS Accession No.: ML17018A341**

\*Memo dated January 3, 2017

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