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

September 2, 2021

Mr. James M. Welsch
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 NUCLEAR POWER PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 239 AND 240 RE: REVISING TECHNICAL SPECIFICATION 3.2.1, "HEAT FLUX HOT CHANNEL FACTOR ($F_Q(Z)$)," TO IMPLEMENT METHODOLOGY FROM WCAP-17661, REVISION 1 (EPID: L-2020-LLA-0200)

Dear Mr. Welsch:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 239 to Facility Operating License No. DPR-80 and Amendment No. 240 to Facility Operating License No. DPR-82 for the Diablo Canyon Nuclear Power Plant, Units 1 and 2, respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated August 31, 2020.

The amendments revise TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," and TS 5.6.5, "CORE OPERATING LIMITS REPORT (COLR)," to implement methodology from licensing Topical Report WCAP-17661, Revision 1, "Improved RAOC [Relaxed Axial Offset Control] and CAOC [Constant Axial Offset Control] F_Q Surveillance Technical Specifications."

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

Sincerely,

/RA/

Samson S. Lee, 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. 239 to DPR-80
2. Amendment No. 240 to DPR-82
3. Safety Evaluation

cc: Listserv

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. 239
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 August 31, 2020, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and 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. 239 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 prior to Mode 4 entry for Diablo Canyon Nuclear Power Plant, Unit 1, Cycle 24 (Spring 2022).

FOR THE NUCLEAR REGULATORY COMMISSION

Jennifer L. Dixon-Herrity

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Date: 2021.09.02 13:46:00 -04'00'

Jennifer L. Dixon-Herrity, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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

Date of Issuance: September 2, 2021

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. 240
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 August 31, 2020, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and 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. 240, 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 prior to Mode 4 entry for Diablo Canyon Nuclear Power Plant, Unit 2, Cycle 24 (Fall 2022).

FOR THE NUCLEAR REGULATORY COMMISSION

Jennifer L. Dixon-Herrity

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Date: 2021.09.02 14:42:34 -04'00'

Jennifer L. Dixon-Herrity, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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

Date of Issuance: September 2, 2021

ATTACHMENT TO LICENSE AMENDMENT NO. 239

TO FACILITY OPERATING LICENSE NO. DPR-80

AND LICENSE AMENDMENT NO. 240 TO FACILITY OPERATING LICENSE NO. DPR-82

DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-275 AND 50-323

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

Facility Operating License No. DPR-80

REMOVE	INSERT
-3-	-3-

Facility Operating License No. DPR-82

REMOVE	INSERT
-3-	-3-

Technical Specifications

REMOVE	INSERT
3.2-1	3.2-1
---	3.2-1a
3.2-2	3.2-2
3.2-3	3.2-3
3.2-4	3.2-4
5.0-20	5.0-20

(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. 239 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. 240, 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.

*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.

3.2 POWER DISTRIBUTION LIMITS

3.2.1 Heat Flux Hot Channel Factor ($F_Q(Z)$)

LCO 3.2.1 $F_Q(Z)$, as approximated by $F_Q^C(Z)$ and $F_Q^W(Z)$, shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. ----------NOTE---------- Required Action A.4 shall be completed whenever this Condition is entered prior to increasing THERMAL POWER above the limit of Required Action A.1. SR 3.2.1.2 is not required to be performed if this Condition is entered prior to THERMAL POWER exceeding 75% RTP after a refueling. ----------			
$F_Q^C(Z)$ not within limit.	A.1	Reduce THERMAL POWER ≥ 1% RTP for each 1% $F_Q^C(Z)$ exceeds limit.	15 minutes after each $F_Q^C(Z)$ determination
	AND		
	A.2	Reduce Power Range Neutron Flux—High trip setpoints ≥ 1% for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action A.1.	72 hours after each $F_Q^C(Z)$ determination
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.3	Reduce Overpower ΔT trip setpoints ≥ 1% for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action A.1.	72 hours after each $F_Q^C(Z)$ determination
	AND		
	A.4	Perform SR 3.2.1.1 and SR 3.2.1.2.	Prior to increasing THERMAL POWER above the limit of Required Action A.1
B. $F_Q^W(Z)$ not within limits.	B.1.1	Implement a RAOC operating space specified in the COLR that restores $F_Q^W(Z)$ to within limits.	4 hours
	AND		
	B.1.2	Perform SR 3.2.1.1 and SR 3.2.1.2 if control rod motion is required to comply with the new operating space.	72 hours
	OR		
	B.2.1	----------NOTE---------- Required Action B.2.4 shall be completed whenever Required Action B.2.1 is performed prior to increasing THERMAL POWER above the limit of Required Action B.2.1. ----------	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.2.1	Limit allowable THERMAL POWER and AFD limits as specified in the COLR.	4 hours after each $F_Q^w(Z)$ determination
	AND		
	B.2.2	Limit Power Range Neutron Flux - High trip setpoints $\geq$ 1% for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action B.2.1.	72 hours after each $F_Q^w(Z)$ determination
	AND		
	B.2.3	Limit Overpower ΔT trip setpoints $\geq$ 1 % for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action B.2.1.	72 hours after each $F_Q^w(Z)$ determination
	AND		
	B.2.4	Perform SR 3.2.1.1 and SR 3.2.1.2.	Prior to increasing THERMAL POWER above the limit of Required Action B.2.1
C. Required Action and associated Completion Time not met.	C.1	Be in MODE 2.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify $F_Q^C(Z)$ is within limit.	Once after each refueling prior to THERMAL POWER exceeding 75% RTP AND Once within 24 hours after achieving equilibrium conditions after exceeding, by ≥ 20% RTP, the THERMAL POWER at which $F_Q^C(Z)$ was last verified AND In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.2.1.2	Verify $F_Q^w(Z)$ is within limit.	Once after each refueling within 24 hours after THERMAL POWER exceeds 75% RTP AND Once within 24 hours after achieving equilibrium conditions after exceeding, by ≥ 20% RTP, the THERMAL POWER at which $F_Q^w(Z)$ was last verified AND In accordance with the Surveillance Frequency Control Program

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. WCAP-10216-P-A, Relaxation of Constant Axial Offset Control F_Q Surveillance Technical Specification, (Westinghouse Proprietary),
2. WCAP-9272-P-A, Westinghouse Reload Safety Evaluation Methodology, (Westinghouse Proprietary),
3. WCAP-8385, Power Distribution Control and Load Following Procedures, (Westinghouse Proprietary),
4. WCAP-16996-P-A, Revision 1, "Realistic LOCA Evaluation Methodology Applied to the Full Spectrum of Break Sizes (FULL SPECTRUM LOCA Methodology),"
5. WCAP-17661-P-A, Revision 1, “Improved RAOC and CAOC F_Q Surveillance Technical Specifications,”
6. Not used.
7. Not used.
8. Not used.
9. WCAP-8567-P-A, "Improved Thermal Design Procedure,"
10. WCAP-16045-P-A, "Qualification of the Two Dimensional Transport Code PARAGON," and
11. WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology."

(continued)

UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 239 TO FACILITY OPERATING LICENSE NO. DPR-80

AND AMENDMENT NO. 240 TO FACILITY OPERATING LICENSE NO. DPR-82

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-275 AND 50-323

1.0 INTRODUCTION

By letter dated August 31, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20244A192), Pacific Gas and Electric Company (PG&E, the licensee) requested changes to the Technical Specifications (TSs) for the Diablo Canyon Nuclear Power Plant, Units 1 and 2 (Diablo Canyon).

The proposed amendments would revise TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," to implement new surveillance methods for the heat flux hot channel factor (F_Q). The new surveillance methods are applicable to plants using either relaxed axial offset control (RAOC) or constant axial offset control (CAOC) surveillance formulations[1] and are documented in the U.S. Nuclear Regulatory Commission (NRC or the Commission)-approved licensing Topical Report WCAP-17661-P-A, Revision 1, "Improved RAOC and CAOC F_Q Surveillance Technical Specifications," dated February 2019 (ADAMS Accession Nos. ML19225C083 and ML19225C084; not publicly available, proprietary information).[2] A reference to WCAP-17661-P-A, Revision 1 would also be added to TS 5.6.5, "CORE OPERATING LIMITS REPORT (COLR)."

Along with several improvements to the RAOC and CAOC surveillance methodologies, WCAP-17661-P-A, Revision 1, addresses issues previously communicated in Westinghouse Nuclear Safety Advisory Letters (NSALs) 09-05, Revision 1, "Relaxed Axial Offset Control F_Q Technical Specification Actions," and 15-01, "Heat Flux Hot Channel Factor Technical Specification Surveillance."[3] These NSALs note that there are non-conservatisms in the methodology in Standard TS (STS) 3.2.1B, "Heat Flux Hot Channel Factor ($F_Q(Z)$) (RAOC-W(Z) Methodology)," contained in NUREG-1431, Revision 4.0, "Standard Technical Specifications,

[1] Diablo Canyon uses the RAOC methodology.
[2] The non-proprietary publicly available version is WCAP-17661-NP-A, Revision 1, "Improved RAOC and CAOC F_Q Surveillance Technical Specifications," dated February 2019 (ADAMS Accession No. ML19225C081).
[3] Westinghouse Electric Company LLC issues NSALs to its customers to communicate a potential safety issue so that the customers can conduct a review of the issue and determine whether any action is necessary. The NRC does not have official record copies of NSALs 09-5 and 15-1.

Westinghouse Plants," Volume 1, "Specifications," dated April 2012 (ADAMS Accession No. ML12100A222), for plants that have implemented the RAOC methodology.

In accordance with the guidance in NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," dated December 29, 1998 (ADAMS Accession No. ML031110108), NSALs 09-05 and 15-01 contain recommended administrative actions that ensured a very conservative set of compensatory measures to address the non-conservatisms.

2.0 REGULATORY EVALUATION[4]

The specification of and adherence to limits on F_Q ensures that the value of the initial total peaking factor assumed in the accident and transient analyses remains valid. As noted in NUREG-1431, Revision 4.0, Volume 1, and Volume 2, "Bases," dated April 2012 (ADAMS Accession No. ML12100A228), the F_Q limits assumed in the emergency core cooling system (ECCS) performance evaluation are typically limiting relative to the F_Q limits assumed in safety analyses for other postulated accidents and anticipated operational occurrences. Even if the ECCS limits are less limiting than those determined by another safety analysis, specification of and adherence to the F_Q limits still ensures that facility operation remains bounded by the safety analyses.

The regulatory evaluation, thus, identified performance requirements and design criteria contained within Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, "Domestic Licensing of Production and Utilization Facilities." The applicable requirements related to the specific content of TSs, relative to the facility safety analyses, are also included. Finally, Section 2.3 of this staff safety evaluation (SE) summarizes the way in which the regulatory requirements apply specifically to the new TS for F_Q, as described in WCAP-17661-P-A, Revision 1.

2.1 Performance Requirements and Design Criteria

The performance requirements and design criteria applicable to the power distribution assumed in the safety analysis are those that pertain to accident and transient analyses. Primarily, these include the requirements contained in 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," and General Design Criterion (GDC) 10.

The regulation, 10 CFR 50.46, requires, in part, that the ECCS be designed such that an evaluation performed using an acceptable evaluation model demonstrates that acceptance criteria, set forth in 10 CFR 50.46(b), including peak cladding temperature, cladding oxidation, hydrogen generation, maintenance of coolable core geometry, and long-term core cooling are met for a variety of hypothetical loss-of-coolant accidents (LOCAs), including the most severe hypothetical LOCA.

In Section 4.1, "Applicable Regulatory Requirements/Criteria," of the enclosure to its August 31, 2020, letter, PG&E stated the following:

> DCPP Units 1 and 2 [Diablo Canyon] were designed to comply with the Atomic Energy Commission (AEC) (now the Nuclear Regulatory Commission, or NRC)

[4] This regulatory evaluation is adapted from the NRC staff SE approving WCAP-17661-P-A, Revision 1, for use.

> General Design Criteria (GDC[s]) for Nuclear Power Plant Construction Permits, published in July 1967. PG&E has made subsequent commitments to GDCs issued later (e.g., 1971 GDC 10 for reactor design) that are discussed in Section 3.1 of the DCPP [Diablo Canyon] UFSAR [Updated Final Safety Analysis Report]. The applicable criterion listed below related to this change are individually addressed.

Based on the above statement, the NRC staff evaluated the request relative to the PG&E assessment of Diablo Canyon conformance to the GDCs. As discussed in Section 3.1 of the Diablo Canyon UFSAR, Revision 25, dated June 2020 (ADAMS Package No. ML20268B299), the Diablo Canyon units are designed to comply with the draft GDCs published in July 1967 (Proposed Rule, 32 FR 10213, July 11, 1967). PG&E also made subsequent commitments to certain GDCs issued in 1971 (Final Rule, 36 FR 3256, February 20, 1971, as amended at 36 FR 12733, July 7, 1971). Section 3.1 of the UFSAR indicates that the Diablo Canyon licensing basis includes the 1971 GDC 10. The staff evaluated the following Diablo Canyon licensing basis GDC that is relevant to this license amendment request:

GDC 10, “Reactor Design,” states as follows:

> The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

2.2 Technical Specifications Requirements and Guidance

The requirements for TSs are set forth in 10 CFR 50.36, “Technical Specifications.” The regulation, 10 CFR 50.36(c), requires that TSs include, among other items, limiting conditions for operation (LCOs), surveillance requirements (SRs) and Administrative Controls.

The regulation, 10 CFR 50.36(c)(2), contains requirements for LCOs and states, in part, that such TSs “are the lowest functional capability or performance levels of equipment required for safe operation of the facility.” If an LCO is not met, the facility must be shut down, or other acceptable remedial action must be taken. LCOs must be established for each item that meets one or more of four criteria. One of the specified criteria (Criterion 2) is 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 regulation, 10 CFR 50.36(c)(3), “Surveillance requirements,” states, “Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.”

The regulation, 10 CFR 50.36(c)(5), “Administrative Controls,” states, “Administrative controls are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.”

NRC Generic Letter (GL) 88-16, “Removal of Cycle-Specific Parameter Limits from Technical Specifications,” dated October 4, 1988 (ADAMS Accession No. ML031200485), provides guidance for licensees to remove the cycle-specific values of certain operating limits from the

TSs and maintain them in a COLR. The guidance in GL 88-16 provides a means by which the values of certain parameters can be determined and modified on a cycle-specific basis without prior NRC review and approval. Licensees that implement this guidance, licensees must, in part, do the following: (1) use NRC-approved methodology to determine the operating limits; (2) list, in the TS Administrative Controls section, the references used to determine the operating limits; and (3) maintain the limits in a COLR, which must be submitted to the NRC for information. The licensee's TS 5.6.5, "CORE OPERATING LIMITS REPORT (COLR)," contains the plant-specific implementation of the GL 88-16 guidance.

2.3 Discussion

The peak fuel power and the power distribution are input to the safety analyses to establish that a facility will comply with the requirements of 10 CFR 50.46 and GDC 10. Since the peak fuel power and the power distribution are initial conditions of design-basis accidents and transient analyses, based on 10 CFR 50.36(c)(2), facility operation must be controlled by LCOs that are established based on these parameters. Hence, Westinghouse pressurized water reactors (PWRs) have LCOs relative to F_Q. In accordance with 10 CFR 50.36(c)(3), SRs, in part, ensure that the LCO is satisfied. At plants that have implemented GL 88-16, specific parameter values may be administratively controlled, and in such cases, a TS requires that these parameters be determined in accordance with NRC-approved methodology and contained in the facility COLR.

If, during performance of an SR, F_Q is determined not to be within the limit, then the LCO is not met, and the TS remedial actions must be followed to ensure that facility operation remains safe. These remedial actions are based on (1) restoring compliance with the LCO, and (2) adjusting the reactor protection system settings so that the functionality required by GDC 10 is maintained. The NRC staff previously reviewed WCAP-17661 and determined that the RAOC surveillance formulations and required actions proposed in WCAP-17661 are acceptable, and as such, found the submitted -A version of the topical to be acceptable for referencing in licensing applications for nuclear power plants to the extent specified, and under the limitations delineated in the topical report. As part of this review, the NRC staff generically reviewed TS changes needed to ensure that the TS is appropriately revised to be consistent with the NRC finding on WCAP-17661. In the NRC staff SE approving WCAP-17661-P-A, Revision 1, the NRC staff determined that the methodology for determining fuel operating limits and the corresponding TS changes would ensure that the F_Q LCO and RAOC surveillance requirements are acceptable to maintain the fuel operating conditions within the bounds of the safety analyses. In doing so, the licensee would continue to demonstrate that its operating conditions comply with the aforementioned regulatory requirements.

2.4 Summary of Proposed Changes

LCO 3.2.1, under TS 3.2, "Power Distribution Limits," requires that $F_Q(Z)$, as approximated by $F_Q^C(Z)$ and $F_Q^W(Z)$, be within the limits specified in the COLR when the reactor is in MODE 1.

The following table contains the changes that PG&E proposed for Diablo Canyon TS 3.2.1, Conditions A and B, Surveillance Requirements, and TS 5.6.5, "Core Operating Limits Report (COLR)." Deletions are noted by strikeout and additions are in bold text.

Table 1: Changes for TS 3.2.1, Conditions A and B, and Surveillance Requirements

TS 3.2.1 ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
----------NOTE---------- **Required Action A.4 shall be completed whenever this Condition is entered prior to increasing THERMAL POWER above the limit of Required Action A.1. SR 3.2.1.2 is not required to be performed if this Condition is entered prior to THERMAL POWER exceeding 75% RTP [Rated Thermal Power] after a refueling.** ----------		
A. $F_Q^C(Z)$ not within limit.	A.1 Reduce THERMAL POWER ≥ 1% RTP for each 1% $F_Q^C(Z)$ exceeds limit. AND	15 minutes after each $F_Q^C(Z)$ determination
	A.2 Reduce Power Range Neutron Flux-High trip setpoints ≥ 1% for each 1% ~~$F_Q^C(Z)$ exceeds limit~~ **that THERMAL POWER is limited below RATED THERMAL POWER by Required Action A.1**. AND	72 hours after each $F_Q^C(Z)$ determination
	A.3 Reduce Overpower ΔT trip setpoints ≥ 1% for each 1% ~~$F_Q^C(Z)$ exceeds limit~~ **that THERMAL POWER is limited below RATED THERMAL POWER by Required Action A.1.**	72 hours after each $F_Q^C(Z)$ determination

	AND A.4 Perform SR 3.2.1.1 **and SR 3.2.1.2.**	Prior to increasing THERMAL POWER above the limit of Required Action A.1
B. $F_Q^w(Z)$ not within limit.	~~B.1 Reduce AFD limits ≥ 1% for each $F_Q^W(Z)$ exceeds limit.~~ **B.1.1 Implement a RAOC operating space specified in the COLR that restores $F_Q^W(Z)$ to within limits.** **AND** **B.1.2 Perform SR 3.2.1.1 and SR 3.2.1.2 if control rod motion is required to comply with the new operating space.** **OR** **B.2.1 ----------NOTE----------** **Required Action B.2.4 shall be completed whenever Required Action B.2.1 is performed prior to increasing THERMAL POWER above the limit of Required Action B.2.1.** **----------** **Limit allowable THERMAL POWER and AFD limits as specified in the COLR.** **AND** **B.2.2 Limit Power Range Neutron Flux - High trip setpoints ≥ 1% for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action B.2.1.**	~~4 hours~~ **4 hours** **72 hours** **4 hours after each $F_Q^W(Z)$ determination** **72 hours after each $F_Q^W(Z)$ determination**

	AND **B.2.3 Limit Overpower ΔT trip Setpoints ≥ 1% for each 1% that THERMAL POWER is limited below RATED THERMAL POWER by Required Action B.2.1.** **AND** **B.2.4 Perform SR 3.2.1.1 and SR 3.2.1.2.**	**72 hours after each $F_Q^W(Z)$ determination** **Prior to increasing THERMAL POWER above the limit of Required Action B.2.1**

[TS 3.2.1] SURVEILLANCE REQUIREMENTS

~~NOTE~~

~~During power escalation following shutdown, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which a power distribution map is obtained.~~

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify $F_Q^C(Z)$ is within limit.	Once after each refueling prior to THERMAL POWER exceeding 75% RTP AND Once within 24 hours after achieving equilibrium conditions after exceeding, by ≥ 20% RTP, the THERMAL POWER at which $F_Q^W(Z)$ was last verified AND In accordance with the Surveillance Frequency Control Program

SR 3.2.1.2	~~----------NOTE----------~~ ~~If $F_Q^C(Z)$ measurements indicate maximum over z $\left[\frac{F_Q^C(Z)}{K(Z)}\right]$~~ ~~has increased since the previous evaluation of $F_Q^C(Z)$:~~ ~~a. Increase $F_Q^W(Z)$ by the appropriate factor specified in the COLR and reverify $F_Q^W(Z)$ is within limits:~~ ~~or~~ ~~b. Repeat SR 3.2.1.2 once per 7 EFPD [effective full power days] until two successive power distribution measurements indicate~~ ~~maximum over z $\left[\frac{F_Q^C(Z)}{K(Z)}\right]$~~ ~~has not increased.~~ Verify $F_Q^W(Z)$ is within limit.	Once after each refueling ~~prior to~~ **within 24 hours after** THERMAL POWER exceed~~ings~~**s** 75% RTP AND Once within 24 hours after achieving equilibrium conditions after exceeding, by ≥ 20% RTP, the THERMAL POWER at which $F_Q^W(Z)$ was last verified AND In accordance with the Surveillance Frequency Control Program

Table 2: Changes for TS 5.6.5.b

TS 5.6.5.b.	Revision
	b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents: *** 5. ~~Not used.~~**WCAP-17661-P-A, Revision 1, "Improved RAOC and CAOC FQ Surveillance Technical Specifications,"**

3.0 TECHNICAL EVALUATION

The NRC staff evaluated the modified TSs proposed by Diablo Canyon and considered whether the modified TSs are consistent with the regulatory requirements identified in Section 2.1 above. Various F_Q limits, surveillance methods, and remedial actions have been found to satisfy these requirements as documented in the NRC staff SE approving WCAP-17661-P-A, Revision 1, for use. These include the requirements contained in 10 CFR 50.46 and GDC 10. Therefore, in the technical evaluation below, the NRC staff evaluates whether Diablo Canyon has proposed to implement revised RAOC F_Q TSs that are consistent with WCAP-17661-P-A, Revision 1, and whether PG&E has acceptably addressed two limitations that are identified in the NRC staff SE for WCAP-17661-P-A, Revision 1.

3.1 Consistency with WCAP-17661-P-A, Revision 1, and Changes to TS 3.2.1

The NRC staff reviewed the TS changes proposed for Diablo Canyon in comparison to the TSs approved in WCAP-17661-P-A, Revision 1. The NRC staff determined that the changes proposed by PG&E for Diablo Canyon are consistent with the TSs approved by the staff in WCAP-17661-P-A, Revision 1, except for proposed deviations from WCAP-17661-P-A, Revision 1, in the TSs.

Under the proposed change, when the limit for $F_Q^C(Z)$ is exceeded, thermal power will be limited to less than the surveillance power level required by Required Action A.1. The corresponding setpoints will therefore reflect this new thermal power limit. The current Required Action only requires a setpoint reduction of ≥ 1 percent and did not account for surveillances being conducted at reduced power. The Required Actions for Condition B, which are for RAOC plants, would also be revised in the improved F_Q TSs to ensure that compliance with the LCO and to adjust reactor protection settings to provide sufficient margin for non-equilibrium operation. In addition, the TS SR 3.2.1 NOTE, which states, "During power escalation following shutdown, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which a power distribution map is obtained," and modifies the TS 3.2.1 SRs, would be eliminated. The SR NOTE is proposed to be eliminated because it was considered to have been a source of confusion and can be interpreted differently by different utilities implementing the requirement. The first Frequency is modified to be conducted following each refueling within 24 hours after thermal power exceeds 75 percent RTP. The second Frequency is modified in the same way as SR 3.2.1.1.

The difference between the TS approved in WCAP-17661-P-A, Revision 1, and the proposed TS for Diablo Canyon is in the title of TS 3.2.1. In WCAP-17661-P-A, Revision 1, and in the STS, the title of TS 3.2.1 includes reference to both the axial offset control methodology (i.e., RAOC or CAOC), and the surveillance methodology (e.g., "W(Z)" or "T(Z)" function). Neither Diablo Canyon unit includes this level of specificity, and PG&E proposed to retain the current title "Heat Flux Hot Channel Factor ($F_Q(Z)$)." Because this title sufficiently describes the subject of the LCO and associated surveillance, the NRC staff finds that this minor difference between WCAP-17661-P-A, Revision 1, and the proposed Diablo Canyon TS revision is acceptable.

The Completion Times for Required Actions B.2.1, B.2.2, and B.2.3 contain a deviation from those contained in WCAP-17661-P-A, Revision 1. The addition of the phrase "after each $F_Q^W(Z)$ determination" to the Completion Times for Required Action B.2.1, B.2.2, and B.2.3 ensures they apply after each subsequent determination $F_Q^W(Z)$ during performance of Required Action B.2.4, similar to the phrase "after each $F_Q^C(Z)$ determination" that is contained in the Completion Times for Required Actions A.1, A.2, and A.3 associated with $F_Q^C(Z)$ in WCAP-17661-P-A, Revision 1. This will ensure that $F_Q(Z)$ is properly evaluated prior to increasing thermal power above the limit of Required Action B.2.1. Therefore, the methodology and TS changes provided in WCAP-17661-P-A, Revision 1, are applicable to and appropriate for Diablo Canyon and with consideration of the deviations to the Completion Times for Required Action B.2.1, B.2.2, and B.2.3, approved for use by the NRC staff.

The surveillance frequency in WCAP-17661-P-A, Revision 1, for SRs 3.2.1.1 and 3.2.1.2 contains a value of "≥ 10% RTP" for the RTP change for which after achieving equilibrium conditions, the SR must be performed. The Diablo Canyon TS SRs 3.2.1.1 and 3.2.1.2 contain a plant specific value of "≥ 20% RTP" as approved by the NRC as part of conversion to STS in "Conversion to Improved Technical Specifications for Diablo Canyon Power Plant, Units 1 and 2 – Amendment No. 135 to Facility Operating License Nos. DPR-80 and DPR-82 (TAC Nos. M98984 and M98985)," dated May 28, 1999 (ADAMS Accession No. ML022390370). Therefore, the licensee did not propose to revise the Diablo Canyon plant specific value of "≥ 20% RTP" in the SRs 3.2.1.1 and 3.2.1.2 Frequency. The NRC staff finds that this minor difference between WCAP-17661-P-A, Revision 1, and the TS revision proposed for implementation at Diablo Canyon is acceptable because the site-specific value is appropriate and is generally consistent with, although not identical to, the WCAP-17661-P-A, Revision 1 value.

The NRC staff reviewed the remainder of the changes that PG&E proposed for TS 3.2.1 for both units and determined that the changes are consistent with those provided in Appendix A of WCAP-17661-P-A, Revision 1. The overall F_Q surveillance formulation is provided in Section 4 of the licensing topical report. The associated TS requirements and an example application using the RAOC methodology in use at Diablo Canyon are described in Sections 5 and 6, respectively, of the licensing topical report. Section 4.0 of the NRC staff SE that approved WCAP-17661-P-A, Revision 1, provides a detailed technical basis explaining why the new surveillance methodology and associated TS requirements, which are proposed for use at Diablo Canyon, are acceptable. The topical report addresses potential non-conservatisms in TS 3.2.1, "Heat Flux Hot Channel Factor," that are applicable to RAOC plants and concludes that actions are taken to ensure compliance with the LCO and to maintain functionality required by applicable GDC 10 and 10 CFR 50.46 is maintained by accounting for uncertainties in non-equilibrium operation. Because PG&E proposed to implement the new RAOC surveillance methodology in a manner that is consistent with the NRC-approved licensing topical report and provided adequate justification for the deviation, the NRC staff finds that the proposed changes

to TS 3.2.1 are acceptable. Therefore, the staff determined that the 10 CFR 50.36(c)(2) requirements will continue to be met because the TS, as revised by the proposed changes, will continue to require the licensee shut down the reactor or follow any remedial action permitted by the TS until the LCO can be met. The staff also determined that 10 CFR 50.36(c)(3) requirements will continue to be met because the SRs, as revised by the proposed changes, will continue to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

3.2 Evaluation of Limitations for WCAP-17661-P-A, Revision 1

Section 5.0 of the SE approving WCAP-17661-P-A, Revision 1, for use provides two limitations, adherence to which is necessary to ensure acceptable implementation of WCAP-17661-P-A, Revision 1.

Limitation 1 stipulates that the licensee apply approved nuclear methods to calculate surveillance condition-specific A_{XY} factors in manner consistent with the way the original cycle design calculations were performed. This limitation assures that corrections to the calculated transient F_Q surveillance parameter are valid when they are performed during mid-cycle conditions. PG&E addressed this limitation by stating that it will use the Advanced Nodal Code (ANC) nuclear models or Best-Estimate Analyzer for Core Operations – Nuclear (BEACON) core monitoring system described in NRC-approved licensing Topical Report WCAP-12472-P-A, "BEACON Core Monitoring and Operation Support System" (ADAMS Package No. ML003678347), and that PG&E will calculate the A_{XY} factor using similar assumptions as those employed in the cycle depletion calculations. The NRC staff reviewed the information provided by the licensee and finds that it satisfactorily addressed this limitation.

Limitation 2 stipulates that the final reduction in thermal power following a failed F_Q surveillance is to 50 percent RTP. PG&E provided sample COLR input indicating its adherence to this limitation and stated that all COLR input for Diablo Canyon fuel cycles will continue to specify 50 percent RTP as the final power level reduction in the event of a failed F_Q surveillance. The NRC staff reviewed the information provided by the licensee and finds that it satisfactorily addressed this limitation.

Based on its review of the information provided by the licensee, the NRC staff finds that PG&E acceptably addressed the two limitations included in the NRC staff SE approving WCAP-17661-P-A, Revision 1, for use.

3.3 Proposed Changes to TS 5.6.5, Core Operating Limits Report

The NRC staff reviewed the proposed changes to the TS 5.6.5 COLR references for both units. If an LCO is not met, the facility must be shut down, or other acceptable remedial action must be taken. SRs are intended, in part, to ensure that facility operation remains within safety limits and that the LCOs are met. GL 88-16 established the NRC position that licensees could remove the cycle-specific values of certain operating limits from the TS and maintain them in a COLR, provided that certain requirements are met, including revision of TSs to list NRC-approved methodologies for cycle-specific parameters. The NRC staff finds that the proposed inclusion of WCAP-17661-P-A, Revision 1, as Reference 5 in TS 5.6.5b, is acceptable because this methodology is acceptable for use to determine cycle-specific parameters consistent with operating limits and to perform associated surveillances for LCO 3.2.1. Finally, the methodology and TS changes provided in WCAP-17661-P-A, Revision 1, are applicable to and appropriate for Diablo Canyon because both units are Westinghouse PWRs using the RAOC

power distribution surveillance methodology, for which WCAP-17661-P-A, Revision 1, is approved for use by the NRC staff and the applicable limitations are met. Therefore the staff finds that the regulatory requirements of 10 CFR 50.36(c)(5) will continue to be met because the TS, as revised by the proposed changes, will continue contain provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.

3.4 SUMMARY

Based on its review, the NRC staff concludes as follows:

1. PG&E proposes to implement methods described in the licensing topical report that has been approved for use by the NRC staff for formulating and performing the F_Q surveillance,

2. PG&E's proposed implementation is consistent with the TS approved by the staff in WCAP-17661-P-A, Revision 1, and

3. PG&E acceptably addressed the limitations included in the NRC staff SE approving WCAP-17661-P-A, Revision 1, or the proposed deviations are acceptable.

Because WCAP-17661-P-A, Revision 1, (1) provides an acceptable method to determine operating limits and to perform core surveillance in a way that demonstrates compliance with the requirements identified in 10 CFR 50.46 acceptance criteria for LOCAs and GDC 10, and (2) the proposed revised TSs meet the requirements of 10 CFR 50.36(c)(2) for LCOs, 10 CFR 50.36(c)(3) for SRs, and 10 CFR 50.36(c)(5) for Administrative Controls, the NRC staff concludes that the proposed license amendments 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 on January 22, 2021. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. 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 published in the *Federal Register* on November 3, 2020 (85 FR 69655), and there has been no public comment on such finding. 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.

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Date: September 2, 2021

SUBJECT: DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 239 AND 240 RE: REVISING TECHNICAL SPECIFICATION 3.2.1, "HEAT FLUX HOT CHANNEL FACTOR ($F_Q(Z)$)," TO IMPLEMENT METHODOLOGY FROM WCAP-17661, REVISION 1 (EPID: L-2020-LLA-0200) DATED SEPTEMBER 2, 2021

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