

PG&E Letter DCL-23-038

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

10 CFR 50, App. H

Docket No. 50-275, OL-DPR-80
Diablo Canyon Unit 1
Revision to the Unit 1 Reactor Vessel Material Surveillance Program Withdrawal
Schedule

References:

1. NRC Letter, "Diablo Canyon Power Plant, Unit No. 1: Safety Evaluation for Request to Revise the Reactor Vessel Material Surveillance Program Withdrawal Schedule (TAC ME7615)," dated March 2, 2012 (ML120330497)
2. NRC Letter, "Response to Request to Withdraw the Diablo Canyon Power Plant, Unit Nos. 1 and 2, License Renewal Application," dated April 16, 2018 (ML18093A115)
3. PG&E Letter DCL-22-085, "Request to Resume Review of the Diablo Canyon Power Plant License Renewal Application or, Alternatively, for an Exemption from 10 CFR 2.109(b), Concerning a Timely Renewal Application," dated October 31, 2022 (ML22304A691)

Dear Commissioners and Staff:

Pursuant to 10 CFR 50, Appendix H, Section III.B.3, Pacific Gas and Electric Company (PG&E) hereby requests approval for a revision to the Unit 1 reactor vessel material surveillance program withdrawal schedule.

In Reference 1, NRC approved the withdrawal schedule for the Diablo Canyon Power Plant (DCPP) Unit 1 Capsule B during the Unit 1 Twenty-Third Refueling Outage (1R23) conducted in 2022. The approved withdrawal schedule supported obtaining reactor pressure vessel fluence data for the period of extended operation which is only applicable to license renewal. Subsequent to NRC's approval, by Reference 2, NRC granted PG&E's request to withdraw the DCPP license renewal application. Because the Unit 1 Capsule B removal was to support DCPP license renewal, it was not withdrawn in 1R23.

In September 2022, the California Governor signed Senate Bill No. 846 (Dodd), which reversed the prior California Public Utilities Commission decision approving the retirement of DCPD by the expiration of the current operating licenses. By Reference 3, PG&E notified the NRC of the intent to submit a new DCPD license renewal application no later than December 2023. Consequently, Unit 1 reactor pressure vessel fluence data is now needed for license renewal and PG&E requests revision to the Unit 1 reactor vessel material surveillance program withdrawal schedule to allow withdrawal of Capsule B during the Unit 1 Twenty-Fourth Refueling Outage (Fall 2023) or Unit 1 Twenty-Fifth Refueling Outage (Spring 2025).

DCPD has withdrawn and tested three capsules from Unit 1 that meet the three recommendations of ASTM E185-70 and the approved supplemental surveillance capsule withdrawal changes listed in NRC staff Safety Evaluation dated September 4, 1992. The withdrawal and testing of Capsule V during the Unit 1 Eleventh Refueling Outage fulfilled the third and final recommendation of ASTM E185-70 for the current DCPD Unit 1 operating license. Therefore, the proposed removal of Capsule B does not deviate from DCPD's current reactor vessel materials surveillance program requirements. DCPD installed the Unit 1 Capsule B in the vessel in the Unit 1 Fifth Refueling Outage at a vessel exposure of 5.86 effective full power years (EFPY). The proposed withdrawal schedule allows Capsule B to be withdrawn at approximately 33.58 – 34.97 plant EFPY or a fluence of $3.39\text{E}+19$ – $3.56\text{E}+19$ n/cm² at the capsule (approximately 96.19 – 101.01 EFPY). This will provide data for PG&E and the NRC to review for license renewal, and can be utilized by the industry and Electric Power Research Institute for further analysis.

Enclosure 1 provides a description and assessment of the proposed change to the reactor vessel material surveillance program withdrawal schedule.

The Unit 1 reactor material surveillance program withdrawal schedule is provided in the DCPD Updated Final Safety Analysis Report (UFSAR) Table 5.2-22. Enclosure 2 provides a mark-up of the affected DCPD UFSAR page that will be incorporated into the DCPD UFSAR upon approval of this schedule revision.

To support implementation of the revised withdrawal schedule, PG&E requests approval of this proposed change by August 31, 2023. The request for expedient turnaround is to ensure PG&E will have adequate time to mobilize the required special resources and to secure support for removal of the Unit 1 Capsule B in the Unit 1 Twenty-Fourth Refueling Outage, which is scheduled to begin in October 2023.

PG&E makes no new or revised regulatory commitments (as defined by NEI 99-04) in this letter.

If you have any questions, please contact Mr. Philippe Soenen at (805) 459-3701.

Sincerely,



Paula Gerfen
Senior Vice President and Chief Nuclear Officer

May 15, 2023

Date

Enclosures

cc: Diablo Distribution
cc/enc: Lauren Gibson, License Renewal Branch Chief
Brian K. Harris, NRC Senior Project Manager
Mahdi O. Hayes, NRC Senior Resident Inspector
Samson S. Lee, NRC Senior Project Manager
Robert J. Lewis, NRC Acting Region IV Administrator

DESCRIPTION AND ASSESSMENT

1.0 BACKGROUND

Appendix H to Title 10 of the Code of Federal Regulations (10 CFR) Part 50 (Reference 1) requires a material surveillance program to monitor changes in the fracture toughness properties of ferritic material in the reactor vessel beltline region that result from exposure of these materials to neutron irradiation and the thermal environment. Under this program, fracture toughness test data are obtained and analyzed from material specimens exposed in surveillance capsules that are withdrawn periodically from the reactor vessel. Test results must be reported to the NRC within 18 months of the date of the capsule withdrawal. In addition, Section III.B.3 of Appendix H to 10 CFR 50 requires the NRC to approve the capsule withdrawal schedule prior to implementation.

The design of the surveillance program and the withdrawal schedule must meet the requirements of the edition of ASTM E185 that is current on the issue date of the ASME Code to which the reactor vessel was purchased. The ASTM E185 version of record for Diablo Canyon Power Plant (DCPP) Unit 1 is ASTM E185-70 (Reference 2). A Unit 1 supplemental reactor vessel surveillance capsule program schedule was requested by DCPP in Pacific Gas and Electric Company (PG&E) Letter DCL-92-072, dated March 31, 1992 (Reference 3). The NRC approved this program in a letter to PG&E dated September 4, 1992 (Reference 4).

The schedule to withdraw Capsule B during the Unit 1 Twenty-Third Refueling Outage (1R23) was requested by DCPP in 2011 (Reference 5) and approved by the NRC in 2012 (Reference 6). In its approval letter, NRC noted the "requirements of Appendix H and ASTM E185-70 regarding the initial license period (the first 40 years of service for DCPP, Unit 1) have already been met."

Subsequent to NRC's 2012 approval, the NRC granted PG&E's request to withdraw the DCPP license renewal application (Reference 7). Therefore, Unit 1 Capsule B, which was only scheduled for removal to support license renewal, was not removed in 1R23 and was designated as a "standby" capsule.

In September 2022, the California Governor signed Senate Bill No. 846 (Dodd), which reversed the prior California Public Utilities Commission decision approving the retirement of DCPP by the expiration of the current operating licenses. In October 2022, PG&E notified NRC of the intent to submit a new DCPP license renewal application no later than December 2023 (Reference 8). Consequently, Unit 1 reactor pressure vessel fluence data is now needed for the period of extended operation for license renewal. The objective of the change to the withdrawal schedule is to align with NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," December 2010 (Reference 9) for a capsule withdrawal at a neutron fluence level exceeding, but not greater than twice, the peak reactor vessel neutron fluence at 60 years of operation.

2.0 DESCRIPTION OF CHANGES TO THE REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM WITHDRAWAL SCHEDULE

The Unit 1 Reactor Vessel Material Surveillance Program withdrawal schedule is located in the DCPD Updated Final Safety Analysis Report (UFSAR) (Reference 10). The proposed change revises the Unit 1 Capsule B withdrawal schedule from a "standby" capsule to withdrawn at approximately 33.58-34.97 plant effective full power years (EFPY).

Unit 1 Capsule B was installed in the vessel in the Unit 1 Fifth Refueling Outage at a vessel exposure of 5.86 EFPY per UFSAR Table 5.2-22, note (b). The lead factor for Capsule B at the 40 degree location is 3.47 per UFSAR Table 5.2-22. The equivalent exposure on Capsule B if it is withdrawn during the Unit 1 Twenty-Fourth Refueling Outage (1R24) is projected to be $(33.58 - 5.86) \times 3.47 = 96.19$ EFPY (neutron fluence of $3.39\text{E}+19$ n/cm²) or during the Unit 1 Twenty-Fifth Refueling Outage (1R25) is projected to be $(34.97 - 5.86) \times 3.47 = 101.01$ EFPY (neutron fluence of $3.56\text{E}+19$ n/cm²).

3.0 ANALYSIS

10 CFR Part 50

The staff approved the revised capsule withdrawal schedule of 1R23 in its safety evaluation dated March 2, 2012 (Reference 6). The staff concluded that removing Unit 1 Capsule B during 1R23 would have met the expectations of NUREG-1801 and the requirements of 10 CFR Part 50, Appendix H. PG&E is requesting approval to revise this surveillance capsule removal until 1R24 or 1R25 to support data acquisition for the period of extended operation.

PG&E is asking for approval of withdrawal in a two refueling outage window based on previous experience with attempting to remove Unit 1 Capsule B. Specifically, in 2010, PG&E could not remove Capsule B due to difficulty with the access plug on the reactor core barrel flange that provides access to the capsule (Reference 11). In 1R24, PG&E plans to attempt Capsule B withdrawal. However, in the event Capsule B cannot be removed, PG&E is conducting parallel contingency planning for alternate means of removal in 1R25. The core barrel is scheduled for removal in 1R25, which allows alternate access paths to the capsule. PG&E concludes that either withdrawal schedule meets the expectations of NUREG-1801, Revision 2, and the requirements of 10 CFR Part 50, Appendix H.

10 CFR Part 54

PG&E plans to submit a new DCPD license renewal application no later than December 2023 (Reference 8) using the expectations of NUREG-1801, Revision 2 (Reference 9). NUREG-1801, Revision 2, Section XI.M31, Reactor Vessel Surveillance, states the "program withdraws one capsule at an outage in which the capsule receives a neutron fluence of between one and two times the peak

reactor vessel wall neutron fluence at the end of the period of extended operation." The maximum fluence calculated for the license renewal period at DCP Unit 1 is $2.01E+19$ n/cm² (E>1 MeV) (References 6 and 12). With the proposed withdrawal schedule, the fluence for Unit 1 Capsule B will be 1.69x to 1.77x the maximum fluence expectations for the period of extended operation. Therefore, the proposed withdrawal schedule is consistent with the expectations laid out in ASTM E185-82 and NUREG-1801, Revision 2.

The DCP Unit 2 surveillance capsule withdrawal program currently meets the expectations of NUREG-1801, Revision 2; therefore, no changes in the DCP Unit 2 surveillance capsule withdrawal program are needed.

4.0 REFERENCES

1. Code of Federal Regulations, Title 10, Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements."
2. American Society of Testing and Materials, "Standard Recommended Practice for Surveillance Tests for Nuclear Reactor Vessels," ASTM E185-70.
3. PG&E Letter DCL-92-072, "Supplemental Reactor Vessel Radiation Surveillance Program," dated March 31, 1992 (ML16341G505).
4. NRC Letter, "Evaluation of Diablo Canyon Unit 1 Supplemental Reactor Vessel Radiation Surveillance Program (TAC No. M83285)," dated September 4, 1992 (ML16341G686).
5. PG&E Letter DCL-11-122, "Revision to the Unit 1 Reactor Vessel Material Surveillance Program Withdrawal Schedule," dated November 21, 2011 (ML113260072).
6. NRC Letter, "Diablo Canyon Power Plant, Unit No. 1: Safety Evaluation for Request to Revise the Reactor Vessel Material Surveillance Program Withdrawal Schedule (TAC ME7615)," dated March 2, 2012 (ML120330497).
7. NRC Letter, "Response to Request to Withdraw the Diablo Canyon Power Plant, Unit Nos. 1 and 2, License Renewal Application," dated April 16, 2018 (ML18093A115).
8. PG&E Letter DCL-22-085, "Request to Resume Review of the Diablo Canyon Power Plant License Renewal Application or, Alternatively, for an Exemption from 10 CFR 2.109(b), Concerning a Timely Renewal Application," dated October 31, 2022 (ML22304A691).
9. NUREG-1801, "Generic Aging Lessons Learned (GALL) Report." Revision 2, December 2010 (ML103490041).

10. Diablo Canyon Power Plant Updated Final Safety Analysis Report, Revision 26, September 2021.
11. PG&E Letter DCL-10-141, "Revision to the Unit 1 Reactor Vessel Material Surveillance Program Withdrawal Schedule," dated October 25, 2010 (ML102990079).
12. Westinghouse Report WCAP-18655-NP, "Ex-Vessel Neutron Dosimetry Program for Diablo Canyon Unit 1 Cycle 22," dated August 2021.

Mark-up of DCPD UFSAR Table 5.2-22

**REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM
WITHDRAWAL SCHEDULE**

<u>UNIT 1</u>				
<u>Capsule^{(f)(g)}</u>	<u>Location</u>	<u>Lead Factor^(d)</u>	<u>Fluence at Capsule Center (n/cm²)^(d)</u>	<u>Removal Time (Plant EFPY)^(a)</u>
S	320°	3.48	2.83E+18	1.25 (Tested, 1R1)
Y	40°	3.45	1.05E+19	5.86 (Tested, 1R5)
T	140°	3.45	1.05E+19	5.86 (Removed, 1R5)
Z	220°	3.45	1.05E+19	5.86 (Removed, 1R5)
V	320°	2.26	1.36E+19	14.3 (Tested 1R11)
C ^(b)	140°	3.47	1.22E+19	15.9 (Removed 1R12)
D ^(b)	220°	3.47	1.22E+19	15.9 (Removed 1R12)
B ^(b)	40°	3.47	Standby(3.39E+19 - 3.56E+19 projected)	Standby33.58-34.97 (Planned 1R24/1R25)
A ^(b)	184°	1.32	Standby	Standby
U	356°	1.24	Standby	Standby
X	176°	1.24	Standby	Standby
W	4°	1.24	Standby	Standby
<u>UNIT 2</u>				
<u>Capsule</u>	<u>Location</u>	<u>Lead Factor^(d)</u>	<u>Fluence at Capsule Center (n/cm²)^(d)</u>	<u>Removal Time (EFPY)^(a)</u>
U	56°	5.20	3.30E+18	1.02 (Tested, 2R1)
X	236°	5.39	9.06E+18	3.16 (Tested, 2R3)
Y	238.5°	4.56	1.53E+19	7.08 (Tested, 2R6)
W ^(e)	124°	5.35	2.78E+19	11.49 (Removed, 2R9)
V ^(e)	58.5°	4.57	2.38E+19	11.49 (Tested, 2R9)
Z ^(e)	304°	5.35	2.78E+19	11.49 (Removed, 2R9)

- (a) Approximate full power years from plant startup.
 (b) Four supplemental capsules installed at 5.86 EFPY (EOC5).
 (c) Deleted in Revision 16.
 (d) Approximate values taken from WCAP-17299-NP (Rev. 0) or WCAP-18655-NP (Rev. 0) for Units 1 and 2.
 (e) Capsule EFPY for Unit 2 capsules removed in 2R9; W = 61.5, V = 52.5, and Z = 61.5
 (f) Unit 1 capsules T, U, W, X, and Z are Type 1 (base metal only)
 (g) Unit 1 capsules S, V, and Y are Type 2 (base metal and weld)