



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

March 2, 2012

Mr. John T. Conway
Senior Vice President – Energy Supply
and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
77 Beale Street, Mail Code B32
San Francisco, CA 94105

SUBJECT: DIABLO CANYON POWER PLANT, UNIT NO. 1: SAFETY EVALUATION FOR
REQUEST TO REVISE THE REACTOR VESSEL MATERIAL SURVEILLANCE
PROGRAM WITHDRAWAL SCHEDULE (TAC ME7615)

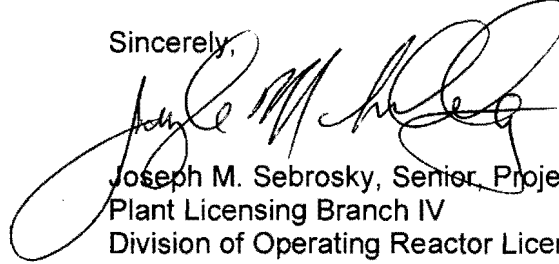
Dear Mr. Conway:

By letter dated November 21, 2011, as supplemented by letter dated December 29, 2011, Pacific Gas and Electric Company (the licensee) submitted a request to revise the current reactor vessel materials surveillance program withdrawal schedule for Diablo Canyon Power Plant (DCPP), Unit 1, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," Section III.B.3. Specifically, the licensee proposed to reschedule the removal of Surveillance Capsule B from the 17th refueling outage, which is scheduled for May 2012, to the 23rd refueling outage, which is scheduled for May 2022. The change is requested to support data acquisition needed for Draft E of the Materials Reliability Program's Coordinated Pressurized Water Reactor (PWR) Reactor Vessel Surveillance Program.

Based on the enclosed safety evaluation, the U.S. Nuclear Regulatory Commission (NRC) staff concludes that the revised surveillance capsule withdrawal date for Surveillance Capsule B for DCPP, Unit 1, is acceptable because withdrawal and testing of capsule V during the Unit 1 11th refueling outage fulfilled the third and final recommendation of ASTM E185-70 for the current DCPP Unit 1 operating license, and removing Surveillance Capsule B during the 23rd refueling outage is in accordance with 10 CFR Part 50, Appendix H, and will meet the recommendations of NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," December 2010.

If you have any questions, please contact me at (301) 415-1132 or joseph.sebrosky@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph M. Sebrosky". The signature is fluid and cursive, with a large loop at the end.

Joseph M. Sebrosky, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-275

Enclosure:
Safety Evaluation

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO REVISE THE REACTOR VESSEL MATERIAL

SURVEILLANCE PROGRAM WITHDRAWAL SCHEDULE

DIABLO CANYON POWER PLANT, UNIT 1

DOCKET NO. 50-275

1.0 INTRODUCTION

By letter dated November 21, 2011 (Reference 1), as supplemented by letter dated December 29, 2011 (Reference 2), Pacific Gas and Electric Company (the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) to revise the current reactor vessel (RV) materials surveillance program withdrawal schedule for Diablo Canyon Power Plant (DCPP), Unit 1, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," Section III.B.3. Specifically, the licensee proposed to reschedule the removal of Surveillance Capsule B from the 17th refueling outage, which is scheduled for May 2012, to the 23rd refueling outage, which is scheduled for May 2022. The change is requested to support data acquisition needed for Draft E of the Materials Reliability Program's Coordinated Pressurized Water Reactor (PWR) Reactor Vessel Surveillance Program (CRVSP).

2.0 REGULATORY EVALUATION

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," require licensees to monitor changes in the fracture toughness properties of ferritic materials in the RV beltline region of light water nuclear power reactors which result from exposure of these materials to neutron irradiation and the thermal environment. Appendix H states that the design of the surveillance program and the withdrawal schedule must meet the requirements of the edition of American Society for Testing and Materials (ASTM) E185, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," current on the issue date of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code to which the RV was purchased, although the editions through ASTM E185-82 may be used. The applicable ASTM E185 for DCPP, Unit 1, is ASTM E185-70. Additionally, Appendix H requires that licensees submit the ASTM E185 compliant schedules to the NRC for staff approval.

ASTM E185-70 recommends that sets of specimens be removed at three or more separate times. It specifically recommends one capsule be removed at a neutron fluence corresponding

Enclosure

to the neutron exposure of the RV at no greater than 30 percent of the designed life. There is no specific requirement for when the data point shall be obtained for the second capsule, and the third data point obtained shall correspond to the neutron fluence of the RV near the end of its design life. The final capsule associated with the current surveillance program was Surveillance Capsule V, which was removed during the 11th refueling outage. The licensee's RV material surveillance program for the current operating license, which will expire in May 2025, conforms to ASTM E185-70.

The most recent change to the withdrawal schedule, submitted on October 25, 2010 (Reference 3), and approved by the NRC staff on October 29, 2010 (Reference 4), was needed because there was a problem removing Capsule B as originally planned during the fall 2010 outage. The requirements of Appendix H and ASTM E185-70 regarding the initial license period (the first 40 years of service for DCP, Unit 1) have already been met, and data from Surveillance Capsule B will be used as part of the Materials Reliability Program's PWR CRVSP. The CRVSP provides additional guidance concerning the development of surveillance programs to accommodate extended periods of operation if license renewal is pursued at DCP, Unit 1, and/or other PWRs in the commercial fleet in the United States. The goal for the CRVSP, which is consistent with NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," December 2010 (Reference 5), is that a capsule be withdrawn at a neutron fluence level exceeding, but not greater than twice, the peak RV neutron fluence at 60 years of operation. This goal is also consistent with an extrapolation of ASTM E185-82 for the extended license period. The license renewal application dated November 23, 2009 (Reference 6) for DCP, Units 1 and 2, is currently under NRC staff review.

3.0 TECHNICAL EVALUATION

The surveillance capsule withdrawal plan spanning the initial license period has already been completed and, as such, forms no part of this evaluation. The DCP license renewal application and the associated withdrawal schedule have not yet been approved; however, the NRC staff believes that the proactive consideration of Surveillance Capsule B for the period of extended operation adds to the consideration of this request and addresses it below.

The licensee stated in Reference 1 that the requested change had been initiated to facilitate data acquisition for the PWR CRVSP. The licensee stated in Reference 2 that this change will benefit DCP, Units 1 and 2, as well as Beaver Valley Power Station, Unit 1, Donald C. Cook Nuclear Plant, Unit 1, McGuire Nuclear Station, Unit 1, and Salem Nuclear Generating Station, Units 1 and 2, because the materials included in Surveillance Capsule B are similar to the limiting beltline material in each of the aforementioned plants.

3.1 Proposed Changes to Schedule for DCP, Unit 1

If the requested change to the withdrawal schedule is approved and Surveillance Capsule B is withdrawn in May 2022, the neutron fluence for the enclosed materials would be $3.44E+19$ n/cm² (E>1 MeV). The maximum fluence for the license renewal period at DCP, Unit 1 (found in Table 4.2-4 of Reference 6), is $2.06E+19$ n/cm² (E>1 MeV). With this proposed withdrawal schedule, the fluence for Surveillance Capsule B will be 1.67x the maximum fluence value for 54 effective full power years at DCP, Unit 1, thereby meeting the 1x to 2x maximum fluence expectations laid out in ASTM E185-82 and GALL for the period of extended operation.

In consideration of the licensee's request, removing Surveillance Capsule B during the 23rd refueling outage at DCP, Unit 1, does meet the expectations of ASTM E185-82 and GALL for the period of extended operation and meets the requirements of 10 CFR Part 50, Appendix H. Based on the above, the NRC staff concludes that the proposed change in schedule is acceptable.

4.0 CONCLUSION

Based on the NRC staff's review of the licensee's submittals, the NRC staff concludes that the revised withdrawal date for Surveillance Capsule B at DCP, Unit 1, is acceptable because the withdrawal and testing of capsule V during the Unit 1 11th refueling outage fulfilled the third and final recommendation of ASTM E185-70 for the current DCP Unit 1 operating license, and removing Surveillance Capsule B during the 23rd refueling outage will meet the requirements of 10 CFR Part 50, Appendix H and the ASTM E185-82 and the recommendations in the GALL report.

5.0 REFERENCES

1. Becker, J. R., Pacific Gas and Electric Company, letter to U.S. Nuclear Regulatory Commission, "Revision to the Unit 1 Reactor Vessel Material Surveillance Program Withdrawal Schedule," dated November 21, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML113260072).
2. Peters, K. J., Pacific Gas and Electric Company, letter to U.S. Nuclear Regulatory Commission, "Revision to the Unit 1 Reactor Vessel Material Surveillance Program Withdrawal Schedule," dated December 29, 2011 (ADAMS Accession No. ML113640038).
3. Becker, J. R., Pacific Gas and Electric Company, letter to U.S. Nuclear Regulatory Commission, "Diablo Canyon Unit 1, Revision to the Unit 1 Reactor Vessel Material Surveillance Program Withdrawal Schedule," dated October 25, 2010 (ADAMS Accession No. ML102990079).
4. Lyon, C. F., U.S. Nuclear Regulatory Commission, letter to John Conway, Pacific Gas and Electric Company, "Diablo Canyon Power Plant, Unit No. 1 – Approval of Proposed Reactor Vessel Material Surveillance Capsule Withdrawal Schedule (TAC No. MD8371)," dated October 29, 2010 (ADAMS Accession No. ML103010159).
5. U.S. Nuclear Regulatory Commission, NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," December 2010 (ADAMS Accession No. ML103490041).
6. Becker, J. R., Pacific Gas and Electric Company, letter to U.S. Nuclear Regulatory Commission, "Diablo Canyon Units 1 and 2, License Renewal Application," dated November 23, 2009 (ADAMS Accession No. ML093340125).

Principal Contributor: P. Purtscher

Date: March 2, 2012

J. Conway

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If you have any questions, please contact me at (301) 415-1132 or joseph.sebrosky@nrc.gov.

Sincerely,
/RA/

Joseph M. Sebrosky, Senior, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-275

Enclosure:
Safety Evaluation

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