



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

October 29, 2010

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 – APPROVAL OF PROPOSED  
REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM WITHDRAWAL  
SCHEDULE (TAC NO. ME4924)

Dear Mr. Conway:

By letter dated October 25, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML102990079), pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, Section III.B.3, Pacific Gas and Electric Company (the licensee) submitted a request to revise the current reactor vessel (RV) materials surveillance program withdrawal schedule for Diablo Canyon Power Plant (DCPP), Unit 1. Specifically, the licensee proposed to modify the DCPP, Unit 1 withdrawal schedule to remove RV Material Surveillance Capsule B during the DCPP, Unit 1 refueling outage (RFO) 17, which is scheduled to begin on May 1, 2012, instead of during RFO 16, which is currently in progress. The licensee requested the change because its refueling staff has not been able to remove the Capsule B access plug on the reactor core barrel flange.

The Nuclear Regulatory Commission staff has concluded that the proposed surveillance capsule withdrawal schedule for DCPP, Unit 1, is in accordance with Appendix H, "Reactor Vessel Material Surveillance Program Requirements," to 10 CFR Part 50, and the recommendations of NUREG-1801, "Generic Aging Lessons Learned (GALL) Report." The staff's safety evaluation is enclosed.

J. Conway

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If you have any questions, please contact me at 301-415-2296 or via e-mail at [fred.lyon@nrc.gov](mailto:fred.lyon@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "CF Lyon".

Carl F. Lyon, Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-275

Enclosure:  
As stated

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO REVISE THE REACTOR VESSEL MATERIAL SURVEILLANCE

PROGRAM WITHDRAWAL SCHEDULE FOR

DIABLO CANYON POWER PLANT, UNIT 1

DOCKET NO. 50-275

1.0 INTRODUCTION

By letter dated October 25, 2010 (Reference 1), Pacific Gas and Electric Company (PG&E, the licensee) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review a request to revise the withdrawal date for reactor vessel (RV) Surveillance Capsule B for Diablo Canyon Power Plant (DCPP), Unit 1. The purpose of the licensee's submittal was to reschedule the removal of Surveillance Capsule B from the 16th refueling outage, which is currently in progress, to the 17th refueling outage, which is scheduled to begin on May 1, 2012, due to emergent complications in the removal process that have occurred during the 16th refueling outage.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," requires 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 Boiler and Pressure Vessel (ASME) 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 the licensee 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 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

Enclosure

its design life. The final capsule associated with the current surveillance program was Surveillance Capsule V, which was removed during the 11th refueling outage. Therefore, the evaluation criteria of ASTM E185-70 do not apply to Surveillance Capsule B, since it does not currently form a part of the licensee's surveillance program. The licensee's RV material surveillance program conforms to ASTM E185.

The most recent withdrawal schedule was submitted on March 12, 2008 (Reference 2), and approved by the NRC staff on September 24, 2008 (Reference 3). 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 a NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," compliant surveillance schedule for the license renewal period. NUREG-1801 provides additional guidance concerning the development of surveillance programs to accommodate the 60-year extended period of operation if license renewal is pursued. NUREG-1801 requires that a capsule be withdrawn at a neutron fluence level exceeding, but as close as practical to, the peak RV neutron fluence at 60 years of operation. This requirement is consistent with an extrapolation of ASTM E185-82 for the extended license period. The licensee's application for license renewal (LRA, Reference 4) 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 LRA 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 it unsuccessfully attempted to remove Surveillance Capsule B from the RV during the current outage. An access plug in the reactor core barrel flange (CBF) could not be removed using the vendor's recommended extraction force. The licensee stated that if the plug itself is damaged or the hole is deformed, the vendor does not have a spare access plug and is not prepared to machine the hole in the CBF during the current refueling outage. The licensee is also concerned for the potential of introducing foreign material into the RV if personnel damage the plug or tool while attempting to remove the plug. These concerns support the delay of Surveillance Capsule B removal.

Based on these technical difficulties and considerations, the licensee proposes to remove Surveillance Capsule B during the 17th DCP, Unit 1 outage instead of the current on-going 16th outage. This would allow the licensee to properly plan and ensure that resources would be available for the safe removal of the access plug. The NRC staff concludes that this is sufficient basis to support approval of the licensee's request. The lack of availability of a replacement plug, insufficient vendor support for machining the hole in the flange, and the potential for damaging the CBF and introducing foreign material inside the RV are technically sufficient justifications for the delay.

### 3.1 Proposed Changes to Schedule for DCPP, Unit 1

If the DCPP LRA is approved, rescheduling Surveillance Capsule B removal from the 16th to the 17th DCPP, Unit 1 refueling outage would increase the neutron fluence for the capsule from that equivalent to 55.7 effective full plant years (EFPY) of operation of the RV to that equivalent to 60.0 EFPY of operation. With this increase, Surveillance Capsule B will still fulfill expectations laid out in NUREG-1801 for surveillance programs spanning the period of extended operation.

In consideration of the technical difficulties encountered in removing Surveillance Capsule B during the DCPP, Unit 1, 16th refueling outage and since removing Surveillance Capsule B during the 17th refueling outage will still meet the expectations of NUREG-1801, 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 October 25, 2010, submittal, the NRC staff concludes that the revised withdrawal date for Surveillance Capsule B of DCPP, Unit 1, is acceptable due to the technical difficulties encountered in removing Surveillance Capsule B during the 16th refueling outage, and since removing Surveillance Capsule B during the 17<sup>th</sup> refueling outage will still meet the expectations of NUREG-1801 and the requirements of 10 CFR Part 50, Appendix H.

### 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 October 25, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML102990079).
2. 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 March 12, 2008 (ADAMS Accession No. ML080850564).
3. Wang, A.B., 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 September 24, 2008 (ADAMS Accession No. ML082380306).
4. 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. ML093340086).

Principal Contributor: D. Widrevitz

Date: October 29, 2010

J. Conway

- 2 -

If you have any questions, please contact me at 301-415-2296 or via e-mail at [fred.lyon@nrc.gov](mailto:fred.lyon@nrc.gov).

Sincerely,

/RA/

Carl F. Lyon, Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-275

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