August 1, 2008

Mr. John Conway
Senior Vice President - Station
Generation and Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 770000
San Francisco, CA 94177-0001

SUBJECT: DIABLO CANYON POWER PLANT, UNITS NOS. 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION REGARDING SUPPLEMENTAL RESPONSE TO GENERIC LETTER 2004-02, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED-WATER REACTORS" (TAC NO. MD4682 AND MD4683)

Dear Mr. Conway:

By letter dated February 1, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080420438), Pacific Gas and Electric Company (PG&E, the licensee) for the Diablo Canyon Power Plant, Units Nos. 1 and 2 (DCPP) submitted a supplemental response to Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors." The NRC staff review of the licensee's submittal was performed by a team of 10 subject matter experts (SME). The detailed review was focused on the areas described in an NRC letter dated November 21, 2007, "Content Guide for Generic Letter 2004-02 Supplemental Responses" (ADAMS Accession No. ML073110389). The review process included a separate "holistic" review of the licensee's submittal, informed by inputs from the SME, that focused on whether the licensee has demonstrated overall that its corrective actions for GL 2004-02 are adequate.

The NRC staff notes that PG&E has been proactive in addressing the issues associated with GL 2004-02. For example, PG&E installed larger ECCS strainers well before GL 2004-02 was issued. In addition, PG&E has performed plant-specific in-vessel downstream effects testing ahead of the Pressurized Water Reactor Owners Group planned testing on the same subject.

However, based on the reviews described above, the NRC staff concluded that additional information is needed for the NRC staff to conclude there is reasonable assurance that GL 2004-02 has been satisfactorily addressed for DCPP. A request for additional information (RAI) is enclosed. The NRC requests the licensee to respond to these RAIs within 90 days of receipt of this letter. If the licensee concludes that more than 90 days is needed to respond to the RAIs, the licensee should request additional time, including a basis for why such time is needed.

If the licensee concludes, based on its review of the RAIs, that additional corrective actions for GL 2004-02 are needed, the licensee should request an extension of time to complete such corrective actions. Criteria for such extensions are contained in SECY-06-0078 (ADAMS Accession No. ML053620174), and many examples of previous requests and approvals can be found on the NRC's sump performance website, http://www.nrc.gov/reactors/operating/ops-experience/pwr-sump-performance.html.

In earlier correspondence (ADAMS Accession No. ML070090657 and ADAMS Accession No. ML071010537), the NRC granted PG&E additional time beyond the GL 2004-02 due date of December 31, 2007, to complete specified corrective actions. The NRC understands that the licensee will provide additional results of its GL 2004-02 analyses, including downstream effects components and systems analyses and downstream effects fuel and vessel analyses, in a future GL 2004-02 supplemental response. Given the time frame the licensee evidently plans to submit a final response to GL 2004-02, the NRC staff is open to a reasonable proposal from the licensee that would coordinate its replies to the attached RAIs with its final GL submittal. The NRC staff review of that submittal could result in additional RAIs.

If you or your staff has any questions concerning the resolution of this matter, please contact Alan B. Wang at (301) 415-1445.

Sincerely,

/RA Jack Donohew for/

Alan B. Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosure: Request for Additional Information

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

REGARDING SUPPLEMENTAL RESPONSE TO GENERIC LETTER 2004-02

DATED FEBRUARY 2, 2008

DIABLO CANYON POWER PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-275 AND 50-323

By letter dated February 1, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080420438), Pacific Gas and Electric Company (PG&E, the licensee) for the Diablo Canyon Power Plant, Units Nos. 1 and 2 (DCPP) submitted a supplemental response to Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors." The NRC staff has reviewed the supplemental response and has determined that we require the following additional information to complete our review:

1. Please verify that debris generation values were maximized, in light of the reduced zones of influence (ZOIs) for certain debris sources and the fact that the licensee's break selection methodology does not follow the incremental location guidance provided by the Nuclear Energy Institute (NEI) and the NRC staff. Please explain whether the originally applied break selection methodology was reconsidered once the ZOIs were reduced.

2. Please provide the basis for comparability/use of the jet impingement testing resulting ZOIs with a 3.5 inch jet when much larger jets could be experienced in a loss-of-coolant accident (LOCA).

3. Please provide the volumes of the inactive and sump pools to substantiate the 15% entrapment fraction of all debris in the inactive pools (i.e., is the volume of inactive pools greater or equal to 15% of total pool volume), and provide the justification for assuming all of the latent debris, instead of being distributed throughout containment, would be located in the sump pool during the pool fill phase, thereby maximizing the credit for latent debris to be captured in inactive pool volumes.

4. Please provide the basis for crediting reflective metal insulation (RMI) debris with filtering out paint chips at the debris interceptors in light of the facts that (1) an insufficient amount of RMI for paint chip filtering may be destroyed for some break scenarios for which coating debris is generated, (2) the size distribution of actual destroyed RMI may be biased toward less transportable pieces than assumed by the NEI and NRC staff guidance for debris transport to the sump strainer, and (3) the flow velocity in the pool may not in actuality transport RMI to the interceptors for some of the breaks for which coating debris is generated (i.e., the transport metrics are biased towards maximizing RMI transport to the sump strainers).

5. Please state whether the fire stops and unjacketed debris in containment outside the crane wall would be exposed to the runoff of spray drainage streams, and state whether this effect was accounted for in the erosion testing that was performed on these materials (as opposed to assuming that all spray flow was in the form of fine droplets).

6. Please provide the amount of each size category of fiber added to each head loss test (e.g., fine, small, large, and intact). Provide a comparison between the amount of each fiber size category added to each test versus the amount of each fiber size category predicted to reach the strainer in the transport calculation. Verify that the fine fibers added to the test flume had not agglomerated during preparation and entered the test flume as suspended fiber.

7. Please provide an evaluation that shows that the stirring in the tank to prevent debris settling did not affect the formation of the strainer debris bed in a non-prototypical or non-conservative manner (prevention or wash away of debris beds, or disturbance of the debris bed by non-prototypical intrusion of paint chips or large pieces of fiber).

8. Please provide a basis for not performing a time-based extrapolation of the test data out to the emergency core cooling system (ECCS) mission time. [The staff understands that the integrated chemical head loss test was run for the number of fluid turnovers that would occur in the plant. However, there are potential time-based debris bed change mechanisms that could result in additional head loss (e.g., compaction). It has been observed in testing, after many test rig fluid volume turnovers, that after particulate debris has been filtered from the water the strainer head loss continues to increase with time.]

9. The supplemental response states that the strainer is completely submerged for a large-break LOCA at the onset of recirculation. However, the supplemental response also states that the top of the strainers are at 93.6 ft and the water level is at 93.4 ft at the onset of recirculation. This implies that the strainer is not fully submerged at the onset of recirculation. Please provide clarification as to whether the strainer is submerged at the onset of recirculation. If it is not, provide an evaluation of the acceptability of the strainer performance under partially submerged conditions.

10. The supplemental response states that for a small-break LOCA (SBLOCA) the strainer is not submerged completely. The response describes how the strainers were modified to reduce the potential for vortexing under partially submerged conditions and tested to verify the modifications were effective. However, it was not stated whether strainer testing was completed for partial submergence conditions with the expected debris loading on the strainer. Please provide an evaluation of strainer performance under partially submerged and debris laden conditions. Additionally, provide information that verifies that the clean strainer head loss calculation includes losses associated with the flow straighteners added to prevent vortex formation during SBLOCAs. [Regulatory Guide 1.82, Revision 3 discusses criteria that the strainer should meet under various conditions, including a criterion for allowable head loss for partially submerged strainers.]

11. Please provide justification for the computed limiting ECCS flow rate being “worst case flow conditions.” Please include a description of the methodology used to determine the maximum flow rate (e.g., runout flow from the vendor pump curve, a calculation using a

standard hydraulics code, etc.), as well as a description of the assumptions and the assumed system and component configuration that provides the conservative maximum flow rate (e.g., for single pump operation, can flow cross over to downstream piping in the non-operating train?).

12. Please provide a revised table of net positive suction head (NPSH) available and NPSH margin calculation results which does not include clean strainer head loss and head loss from accumulated debris.

13. Please verify that the 9.7 g/l AlOOH concentration for the Diablo Canyon settling test shown in the Figure 6 note is correct. The staff notes that the AlOOH precipitate settlement data provided in WCAP-16530-NP was obtained after diluting the various mixing tank concentrations to a 2.2 g/l concentration and that a higher concentration would favor more rapid settling.

Diablo Canyon Power Plant, Units 1 and 2
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