



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

May 24, 2011

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 2 – REVISION TO REGULATORY COMMITMENT FOR GENERIC LETTER 2008-01, "MANAGING GAS ACCUMULATION IN EMERGENCY CORE COOLING, DECAY HEAT REMOVAL, AND CONTAINMENT SPRAY SYSTEMS" RESPONSE (TAC NO. ME5870)

Dear Mr. Conway:

By letter dated March 17, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110800125), Pacific Gas & Electric Company (PG&E, the licensee) submitted a supplement to the response for the Diablo Canyon Power Plant (DCPP), Unit 2, to Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems" (ADAMS Accession No. ML072910759). In its supplement, PG&E requested to revise a regulatory commitment made in the initial responses to GL 2008-01 dated October 14, 2008, and February 9, 2010, under Technical Assignment Control (TAC) No. MD7821 (ADAMS Accession Nos. ML082970194 and ML100430827, respectively).

Specifically, the licensee proposed to revise the commitment to install a Residual Heat Removal (RHR) system line high-point vent from DCPP, Unit 2's Refueling Outage 16 to Refueling Outage 18, currently scheduled for September 2014. In this supplement, the licensee further committed to perform additional ultrasonic test inspections of the related RHR line high point during Unit 2 Refueling Outages 16 and 17.

As set forth in the enclosure, the U.S. Nuclear Regulatory Commission staff has completed its review of this request and concludes that the proposed revision is acceptable, and that the licensee has acceptably demonstrated "that gas accumulation is maintained less than the amount that challenges operability of these systems, and that appropriate action is taken when conditions adverse to quality are identified," as stated in GL 2008-01. This revision does not alter the NRC staff's original conclusion for the closure of the PG&E GL 2008-01 response.

J. Conway

- 2 -

If you have any questions, please contact me at (301) 415-1445 or via e-mail at [alan.wang@nrc.gov](mailto:alan.wang@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Alan B. Wang". The signature is fluid and cursive, with a small "FOR" written below it.

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

Docket No. 50-323

Enclosure:  
As stated

cc w/encl: Distribution via Listserv

SUMMARY OF U.S. NUCLEAR REGULATORY COMMISSION STAFF'S REVIEW

SUPPLEMENT TO RESPONSE TO GENERIC LETTER 2008-01, "MANAGING

GAS ACCUMULATION IN EMERGENCY CORE COOLING, DECAY HEAT

REMOVAL, AND CONTAINMENT SPRAY SYSTEMS"

TO REVISE REGULATORY COMMITMENT

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON POWER PLANT, UNIT 2

DOCKET NO. 50-323

By letter dated March 17, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110800125), Pacific Gas & Electric Company (PG&E, the licensee) submitted a supplement to the response for the Diablo Canyon Power Plant (DCPP), Unit 2, to Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems" (ADAMS Accession No. ML072910759). In its supplement, PG&E requested to revise a regulatory commitment made in the initial responses to GL 2008-01 dated October 14, 2008, and February 9, 2010, under Technical Assignment Control (TAC) No. MD7821 (ADAMS Accession Nos. ML082970194 and ML100430827, respectively).

Specifically, the licensee proposed to revise the commitment to install a Residual Heat Removal (RHR) system line high-point vent from DCPP, Unit 2's Refueling Outage 16 (2R16) to Refueling Outage 18 (2R18), currently scheduled for September 2014. The proposed revision would allow the licensee to install the vent during the Unit 2 2R18 so that it coincides with planned system drains every three outages. The RHR system must be drained to install the vent, and the next planned window is 2R18. In this supplement, the licensee further committed to perform additional ultrasonic test (UT) inspections of the related RHR line high point during Unit 2's 2R16 and Refueling Outage 17 (2R17).

During the GL 2008-01 evaluation, PG&E identified a potential gas accumulation local high point in an RHR injection header. The branch line off the RHR injection header leads to an inverted "U" configuration to form a branch line high point that can be vented through a high-point valve. The RHR branch line connects to an accumulator, which is a potential gas intrusion source, via the safety injection (SI) test line. During DCPP, Unit 2's Refueling Outage 15 (2R15), the walkdown of the as-built piping configuration inside containment revealed that the long horizontal RHR branch line pipe is sloped away from the inverted "U" resulting in a local high point at the RHR injection header "T." The local high point is higher in elevation than the bottom of the RHR branch line's ascending elbow which leads to the inverted "U" branch line high point by 1.5 inches. Leakage from the accumulator through the SI test line could result in gas accumulation in the identified local high point at the RHR injection header "T" instead of at the

Enclosure

existing high-point vent on the "U."

PG&E proposed to revise the regulatory commitment it made in response to GL 2008-01 that stated,

PG&E will install a vent at this high point on the RHRP [RHR pump] line during Unit 2 refueling outage sixteen (2R16).

The commitment would be revised to state,

PG&E will install a vent at this high point on the RHR line during the Unit 2 Refueling Outage Eighteen (2R18).

PG&E will also add a new commitment that states,

PG&E will perform an ultrasonic test (UT) inspection at this local high point to inspect for gas accumulation following the dynamic venting of the RHR heat exchangers coming out of the Unit 2 Refueling Outage Sixteen (2R16) and Unit 2 Refueling Outage Seventeen (2R17).

The revision would allow PG&E to optimize its refueling outage and not have to drain down the RHR line until the already planned window in 2R18.

PG&E has identified three gas intrusion mechanisms that could result in gas accumulation at the RHR injection header "T" local high point. The intrusion mechanisms are: (1) leakage from the accumulator through a series of test line isolation valves; (2) gas transport after reactor coolant system (RCS) vacuum refill mid-loop operation when coming out of an outage; and (3) RCS leakage through a series of check and isolation valves. PG&E installed four manual isolation valves in series in the line between the accumulator and the RHR injection header "T" local high point. The four valves make it unlikely that gas would be able to leak past all four valves and into the RHR injection header. PG&E also performs dynamic venting of the RHR heat exchangers to flush out any potential gas that may accumulate during the RCS vacuum refill coming out of a refueling outage. The new commitment to perform UT inspections on the location when coming out of outages 2R16 and 2R17 along with the dynamic venting of the system would reasonably assure that gas would not accumulate in the RHR injection header "T" local high point.

PG&E identified multiple ways that gas could come from the RCS. These intrusion mechanisms include: (1) RCS cold leg back-leakage through check valves; (2) RCS hot-leg leakage through the SI test line interface; (3) accumulator back-leakage through the second check valve; (4) out-gassing of a dissolved gas from the RCS in the RHR injection line upstream of the first check valve; and (5) de-gassing of the refueling water storage tank (RWST) water at the RHR injection header "T." These intrusion mechanisms are shown not to be credible gas accumulation mechanisms at the RHR injection header "T" due to the high-point vent valve at the inverted "U", a large number of valves that the gas would have to leak through, and the static pressure head of the RWST.

If precursors are identified that may lead to gas accumulation, PG&E's Gas Intrusion Program requires that the precursors are entered into the Corrective Action Program for further evaluation and investigation. The evaluation could lead to UT of the RHR injection header "T" local high point.

Along with the commitment to perform UT after 2R16 and 2R17, PG&E has demonstrated that DCCP, Unit 2 can reasonably be expected to operate safely, and that gas accumulation at the local high point on the RHR injection header "T" will not challenge the operation of systems significant to plant safety. The NRC staff concludes that the revision of the commitment to extend the installation of the high point vent valve from 2R16 to 2R18 is acceptable.

The NRC staff has reviewed the requested extension of PG&E's GL 2008-01 commitment to install a high-point vent in the Unit 2 RHR system piping. The NRC staff concludes that the proposed revision is acceptable. PG&E demonstrated an understanding of gas intrusion mechanisms and procedures for maintaining assurance that there is no gas accumulation. The staff concludes that PG&E has acceptably demonstrated "that gas accumulation is maintained less than the amount that challenges operability of these systems, and that appropriate action is taken when conditions adverse to quality are identified," as stated in GL 2008-01.

J. Conway

- 2 -

If you have any questions, please contact me at (301) 415-1445 or via e-mail at [alan.wang@nrc.gov](mailto:alan.wang@nrc.gov).

Sincerely,

/RA by James Polickoski for/

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

Docket No. 50-323

Enclosure:  
As stated

cc w/encl: Distribution via Listserv

**DISTRIBUTION:**

PUBLIC  
LPLIV Reading  
RidsAcrsAcnw\_MailCTR Resource  
RidsNrrDssSrxb Resource  
RidsNrrDorlDpr Resource  
RidsNrrDorlLpl4 Resource

RidsNrrLAJBurkhardt Resource  
RidsNrrPmDiabloCanyon Resource  
RidsOgcRp Resource  
RidsRgn4MailCenter Resource  
JPolickoski, NRR

**ADAMS Accession No. ML111430693**

\*Memo dated

OFFICE	NRR/LPL4/PM	NRR/LPL4/PM	NRR/LPL4/LA	NRR/DSS/SRXB/BC	NRR/LPL4/BC	NRR/LPL4/PM
NAME	JPolickoski	AWang	JBurkhardt	AUises *	MMarkley	AWang (JPolickoski for)
DATE	5/24/11	5/23/11	5/24/11	5/19/11	5/24/11	5/24/11

**OFFICIAL RECORD COPY**