Pacific Gas and Electric Company

David H. Oatley
Vice President and
General Manager

Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, CA 93424

805.545.4350
Fax: 805.545.4234

December 9, 2003

PG&E Letter DCL-03-166

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

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
180-Day Response to Request for Information Pursuant to Generic Letter 2003-01, "Control Room Habitability"

Dear Commissioners and Staff:

This letter provides the Pacific Gas and Electric Company's (PG&E) 180-day response to the Nuclear Regulatory Commission's (NRC) request for information pursuant to Generic Letter (GL) 2003-01, "Control Room Habitability," dated June 12, 2003. PG&E provided its 60-day response to GL 2003-01 in PG&E Letter DCL-03-096, dated August 8, 2003.

Since late 1999, PG&E has proactively participated in a joint-effort with the Strategic Teaming and Resource Sharing (STARS) alliance to confirm the habitability of the Diablo Canyon Units 1 and 2 control room. STARS consists of six plants operated by TXU Generation Company LP, AmerenUE, Wolf Creek Nuclear Operating Corporation, Pacific Gas and Electric Company, STP Nuclear Operating Company and Arizona Public Service Company. The STARS effort included a series of peer assessments performed during the year 2000 to demonstrate that control room habitability was maintained in accordance with regulatory requirements and the facility's design and licensing bases. The assessments concluded that each facility's control room(s) was designed and maintained such that the likelihood of unfiltered inleakage was low. In the absence of confirmatory testing, the assessments concluded that regulatory requirements and the design and licensing bases were met at each facility. In addition, the assessments concluded that confirmatory testing was necessary. The results of these assessments and the STARS plan to perform inleakage testing was reported to the NRC in a letter on March 5, 2001, "Submittal of the Strategic Teaming and Resource Sharing (STARS) Engineering Report on Control Room In-leakage (ULNRC-04402)."

A102

STARS developed the "component test" referred to in NRC Regulatory Guide (RG) 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactor, May 2003." This test was determined to be a more suitable method for determining control room inleakage for the robust design, low-leakage control rooms characteristic of the STARS facilities. STARS provided information to the NRC in a letter on August 31, 2001, "Submittal of Strategic Teaming and Resource Sharing (STARS) Additional Information on Control Room Habitability (STARS-01002)," regarding the suitability of component testing at their facilities.

During the last few years, STARS has actively participated in various industry and public forums with the NRC to address issues surrounding control room habitability. A central issue of those forums was what constitutes an acceptable test for control room inleakage. A number of licensees had tested their control rooms using a version of American Society for Testing and Materials (ASTM) consensus standard E741, "Standard Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution." STARS performed comparison testing between the ASTM E741 method and the component test method for two facilities' control rooms to validate the acceptability of the component test method. The testing demonstrated that the results of the two test methods correlated. In addition, the testing confirmed the previous assessment findings that the control rooms had a robust design and were maintained such that inleakage could be expected to be low. The tests determined that there was no control room unfiltered inleakage at each facility. The results of these tests were reported to the NRC in a letter on June 7, 2002, "Strategic Teaming and Resource Sharing (STARS) 'Demonstration of the Component Test Method for Determining Control Room In-leakage' (STARS-02008)." The June 7, 2002, letter stated that STARS plants planned to use the component test method for any future baseline testing of their control rooms.

NRC RG 1.197 provides conditions for component testing to be acceptable for determining control room envelope integrity. RG 1.197 states that:

(1) an integrated test (i.e., the ASTM E741 method) should be conducted in concert with the component test,
(2) the results of the two methods should correlate, and
(3) the components tested should account for no less than 95 percent of the control room envelope inleakage as determined by the integrated test.

RG 1.197 further states these conditions are necessary when subsequent control room envelope integrity tests are intended to be component tests. Although PG&E believes that the component method has been adequately demonstrated as an acceptable stand-alone test, to be responsive to the requirements of GL 2003-01 and RG 1.197, PG&E intends to conduct correlation testing of its control room design using the two methods.

Enclosure 1 contains PG&E's 180-day response to GL 2003-01.

If you have any questions or require additional information, please contact Stan Ketelsen at (805) 545-4720.

Sincerely,

David H. Oatley
Vice President and General Manager - Diablo Canyon

jer/3664
Enclosure
cc: Edgar Bailey, DHS
Bruce S. Mallett
David L. Proulx
Diablo Distribution
cc/enc: Girija S. Shukla

**Response to the Requested Information of
NRC Generic Letter 2003-01**

Below is Pacific Gas and Electric Company's (PG&E's) 180-day response to NRC Generic Letter (GL) 2003-01, "Control Room Habitability," dated June 12, 2003.

NRC Request 1

Confirm that your facility's CRE meets its applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRE and CREHSs are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing basis.

PG&E Response:

PG&E has not performed a tracer gas test to confirm that the most limiting unfiltered inleakage into the control room envelope is no more than the value assumed in its design basis radiological analyses for control room habitability. See response to item 1(a) below for more detail.

As stated in the Diablo Canyon Power Plant (DCPP) Final Safety Analysis Report Update (FSARU) Chapter 3, "Design of Structures, Components, Equipment, and Systems," the DCPP units were designed to comply with the Atomic Energy Commission (AEC) (now the Nuclear Regulatory Commission, or NRC) General Design Criteria (GDC) for Nuclear Power Plant Construction Permits, published in July 1967. The DCPP construction permits were issued in April 1968 and December 1970 for Units 1 and 2, respectively. FSARU Appendix 3.1A lists the GDCs published as Appendix A to 10 CFR 50 in February 1971 and discusses DCPP conformance with the 1971 GDC.

PG&E, assisted by peers from the Strategic Teaming and Resource Sharing (STARS) alliance, performed a control room habitability assessment from February 8 through 11, 2000. In the absence of confirming testing for control room inleakage, the assessment confirmed that the control room habitability systems were designed, constructed, configured, operated, and maintained consistent with the control room habitability design and licensing bases. Some issues regarding control room design were identified during the assessment. These issues did not prevent meeting the GDCs. These issues were summarized in a report to the NRC on March 5, 2001, "Submittal of the Strategic Teaming and Resource Sharing (STARS) Engineering Report on Control Room In-leakage (ULNRC-04402)." The two issues identified for DCPP and their status are as follows (reference Appendix S of the March 5, 2001, STARS Engineering Report on Control Room In-Leakage):

Item	Issue	Status
2	The cable spreading room below the control room was essentially at the same pressure as the control room when the HVAC system was operating in emergency mode.	Design changes have been implemented to modify operation of the battery room ventilation system which was causing high pressure in the cable spreading room. Action is complete.
9	Any leakage past the normal exhaust dampers would be pulled into the filter units and become potential additional filtered in-leakage not accounted for in the accident analysis. Any leakage past the double isolation sets of normal supply and smoke exhaust dampers is potential unfiltered in-leakage. These potential sources of in-leakage require component testing.	Implementation of design changes to provide isolation capability for damper inspection and maintenance is scheduled for completion during December 2003. Following installation, damper inspection, and repairs if needed, will be performed. Then component testing of the dampers will be performed in the same time frame as tracer gas testing to correlate the two tests. Testing is planned for July-August 2004.

PG&E has reviewed the previous assessment findings from 2000 and has confirmed that they remain valid. In response to NRC request 1(b) below, PG&E has conducted an additional assessment to address maintaining reactor control capability in the event of smoke. This review and additional assessment were performed as required to confirm that regulatory requirements and the control room habitability design and licensing bases continue to be met. The results of the smoke assessment are discussed below in item 1(b).

PG&E has established administrative controls that ensure continued compliance with the control room habitability design and licensing bases. A summary of these controls is provided below. These controls include the following:

1. Surveillance Test Procedure (STP) M-6A, "Routine Surveillance Testing of Control Room Ventilation System," tests the system's ability to function correctly including checking fan starts, damper lineups and preheater operation.

2. STP M-53, "Control Room Ventilation System - DOP and Halide Penetration Test," tests for filter bypass leakage, and includes the control room pressurization test.

3. STP M-70A, "Inspection of Fire Barrier and HELB Penetration Seals," inspects the adequacy of control room fire barrier and high energy line break (HELB) penetrations, and is used as a post maintenance test for new and existing penetrations of this type following installation, repairs or maintenance.

4. STP M-70C, "Inspection/Maintenance of Doors," inspects the adequacy of control room doors that provide one or more of the following functions: (1) fire door, (2) flood protection door, (3) HELB door, or (4) heating, ventilation or air conditioning (HVAC) door.

5. Administrative Procedure CF3.ID9, "Design Change Package Development," provides comprehensive review requirements for design modifications affecting the control room boundary.

6. Administrative Procedure AD7.DC8, "Work Control," provides controls for breaching the control room envelope, including envelope penetrations and control room doors.

7. Equipment Control Guideline 80.1, "Doors Required for HELB, HVAC, or Flood Protection," provides controls for control room doors including completion times for nonfunctional and degraded control room doors. Also, compensatory measures are specified for cases in which a control room door must be held open for an extended period (such as for maintenance).

PG&E plans to continue to work in alliance with STARS to ensure that the control room habitability program is maintained in the long-term.

NRC Request 1(a)

That the most limiting unfiltered inleakage into your CRE (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for CRE habitability. Describe how and when you performed the analyses, tests, and measurements for this confirmation.

PG&E Response:

The large break loss-of-coolant accident (LOCA) and the fuel handling accident inside containment are currently the limiting control room dose analyses of record. The calculated exposures to control room personnel for the large break LOCA are 30 rem thyroid and 0.12 rem whole body and the exposures for the containment fuel handling accident are 11.56 rem thyroid and 0.007 rem whole body.

As part of a proposed license amendment request (LAR), the need for recirculation of the control room atmosphere through charcoal filters is being evaluated for the fuel

handling accident inside containment. If the control room ventilation system does not recirculate the control room atmosphere through these filters after the accident, the exposures to control room personnel would be approximately 22.3 rem thyroid and 0.008 rem whole body.

In addition, PG&E has submitted PG&E Letter DCL-03-034, "License Amendment Request 03-05, Revision of Technical Specification (TS) 3.7.10, 'Control Room Ventilation System (CRVS),' TS 3.7.12, 'Auxiliary Building Ventilation System (ABVS),' TS 3.7.13, 'Fuel Handling Building Ventilation System (FHBVS),' and TS 5.5.11, 'Ventilation Filter Testing Program (VFTP),'" dated April 2, 2003, which would result in TS changes for the plant ventilation systems. In support of this LAR an analysis of a fuel handling accident in the fuel handling building was performed to support elimination of the charcoal filtration in the fuel handling building exhaust if the fuel has at least 100 hours of post-shutdown decay time. The calculated control room exposures for this event are 22.3 rem thyroid and 0.00752 rem whole body.

The accident analysis for the large break LOCA is discussed in FSARU Section 15.4.1. The radiological consequences are discussed in FSARU Section 15.5.17.3 and are tabulated in FSARU Table 15.5-63. A 10 standard cubic feet per minute (scfm) inleakage rate per NUREG-0800, *Standard Review Plan,* Section 6.4, was assumed in the analysis to account for the possible pathway through the single doors from the equipment condensing unit areas to the heating, ventilation, and air conditioning equipment room. Estimated post-accident exposures to control room personnel during egress-ingress are 4.7 rem thyroid and 0.0066 rem whole body (Reference FSARU Table 15.5-63). The egress-ingress exposures are not part of the assumed 10 scfm unfiltered inleakage contribution from NUREG-0800 and are incurred during transit outside of the control room envelope. Direct radiation exposures account for an additional 0.076 rem whole body. The remainder of the exposures (25.31 rem thyroid and 0.0398 rem whole body) are attributable to airborne fission products in the control room envelope.

The accident analysis for the fuel handling accident inside containment was submitted in LAR 01-04 (PG&E Letter DCL 01-104 dated October 17, 2001) and approved by License Amendments No. 155 (Unit 1) and No. 155 (Unit 2) dated October 21, 2002. This analysis assumed that containment was open to the environment at the time of the accident and credited operation of the control room ventilation system after the initial release. An unfiltered inleakage rate of 10 cfm was assumed for the analysis. In the context of control room habitability, it should be noted that the fuel handling accident is a very short duration event (the event duration is 2 hours) and is insensitive to inleakage assumptions.

The accident analysis for the fuel handling accident inside the fuel handling building was submitted in LAR 03-05 and amended by PG&E Letter DCL-03-095, "Supplement 1 to License Amendment Request 03-05, Revision of Technical Specification (TS) 3.7.10, 'Control Room Ventilation System (CRVS),' TS 3.7.12,

'Auxiliary Building Ventilation System (ABVS),' TS 3.7.13, 'Fuel Handling Building Ventilation System (FHBVS),' and TS 5.5.11, 'Ventilation Filter Testing Program (VFTP),'" dated August 8, 2003. This analysis assumed that the fuel handling building ventilation system was not available to mitigate the consequences of the event. In addition, this evaluation assumed that air supplied to the control room was unfiltered.

PG&E has not performed a test to confirm the accident analysis inleakage assumption. Assessments performed in 2000 determined that PG&E and each of the other STARS facilities' control room envelopes had minimal vulnerability to unfiltered inleakage. Integrated testing and component testing, as described in NRC Regulatory Guide (RG) 1.197, was performed at Comanche Peak and Palo Verde. These test results validated the assessment findings for these facilities.

An integrated test and component test for control room inleakage are being planned for DCPP. This will justify use of component tests for subsequent testing. Implementation of design changes to provide isolation capability for damper inspection and maintenance was recently initiated, but has been temporarily suspended pending resolution of welding machine electrical interference problems. Following installation of isolation capability, the isolation dampers will be inspected, and repaired if necessary. Component testing and tracer gas testing will then be performed. The testing is currently planned for July-August 2004. This scheduling places the testing between the two refueling outages scheduled for 2004 (the current refueling outage schedules are: Unit 1 Twelfth Refueling Outage; March 22 to May 9, 2004, and Unit 2 Twelfth Refueling Outage; October 25 to December 6, 2004).

DCPP will perform component testing in the same time frame as integrated testing for its common control room to allow the two test methods to be correlated. The results from the two test methods will meet the conditions specified in NRC RG 1.197.

NRC Request 1(b)

That the most limiting unfiltered inleakage into your CRE is incorporated into your hazardous chemical assessment. This inleakage may differ from the value assumed in your design basis radiological analyses. Also confirm that the reactor control capability is maintained from either the control room or the alternate shutdown panel in the event of smoke.

PG&E Response:

During the 2000 assessments, PG&E determined that there were no offsite storage or transportation of hazardous chemicals that presented a threat to control room habitability. In addition, there were no onsite hazardous chemicals that posed a credible threat to control room habitability. Consequently, engineered controls for the control room are not required to ensure habitability against a hazardous chemical threat. Therefore, the amount of unfiltered inleakage is not incorporated into PG&E's hazardous chemical assessment. PG&E has re-reviewed the results of the hazardous chemical assessment performed in 2000 and has determined there has been no change. There are no offsite or onsite hazardous chemicals that would pose a credible threat to control room habitability.

The 2000 assessments did not evaluate the reactor control capability in the event of smoke since this issue was not fully developed at that time. Subsequently PG&E has completed an additional assessment which provides this confirmation consistent with Regulatory Position 2.6 of NRC RG 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors," dated May 2003. A summary of the smoke assessment is provided below.

Smoke Assessment Summary

RG 1.196 endorses (in part) NEI 99-03, "Control Room Habitability Assessment Guidance," dated June 2001 as a means of evaluating control room habitability in the event of smoke. NEI 99-03 Appendix E, "Smoke Infiltration Impact on Safe Shutdown," with clarifications provided by RG 1.196, Regulatory Position 2.6, provides a qualitative assessment tool for managing the issue of smoke infiltration into the control room. The DCPP smoke assessment used NEI 99-03, Appendix E as a guide and addresses the assessment actions specified in NEI 99-03.

The assessment verified that the hot shutdown panel (HSP) used as remote shutdown of the reactor is not within the control room envelope (CRE). The HSP is several floors beneath the CRE.

The assessment verified that the HSP and the CRE are adequately separated by distance and numerous fire barriers. With completely separate heating, ventilation, and air conditioning (HVAC) systems supplying the two areas, smoke within one area would

not affect the habitability of the other area. Furthermore, the CRE has significant operating options allowing the control room to be isolated with recirculated, filtered air available for continuous manning.

The assessment verified that a fire or smoke event anywhere within the plant would not simultaneously render the HSP and the CRE uninhabitable, nor would it prevent access from the CRE to the HSP in the event remote shutdown is required. Alternative routes from the CRE to the HSP are available for operator use.

Plant procedures are used to realign the CRE HVAC System in the event of a fire affecting the CRE environment. Casualty Procedure CP M-6, "Fire," requires operators to assess the HVAC mode of operation and make changes if desired or necessary to maintain and protect the CRE environment.

In the event that the CRE becomes uninhabitable, ten self-contained breathing apparatus (SCBA) units are provided within the CRE for operators to use, either to stay in the CRE or evacuate to the HSP. Nine operators are required per shift to be SCBA qualified. An additional eight SCBAs are provided on the turbine deck just outside the CRE. Furthermore, portable fans are appropriately staged to allow operators to provide ventilation in the event that a loss of power event has occurred.

The results of this assessment are being used to clarify Abnormal Operating Procedure OP AP-8A, "Control Room Inaccessibility - Establishing Hot Standby," to require operators to assess egress safety before leaving the CRE upon an evacuation order.

In summary, the assessment guidance provided by NEI 99-03 has been used to evaluate the CRE, the HSP, their HVAC systems and operating procedures for maintaining reactor control in the event of a smoke incident. The only action item identified from this assessment was the need to clarify OP AP-8A as discussed above. PG&E concludes the CRE, HSP and associated HVAC systems and procedures are in accord with NRC regulations and guidance specified by GL 2003-01.

NRC Request 1(c)

That your Technical Specifications verify the integrity of your CRE and the assumed inleakage rates of potentially contaminated air. If you currently have a ΔP surveillance requirement to demonstrate CRE integrity, provide the basis for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your ΔP surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable surveillance methodology (e.g., ASTM E-741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.

If your facility does not currently have a technical specification surveillance requirement for your CRE, explain how and on what frequency you confirm your CRE integrity.

PG&E Response:

PG&E's TS require that a surveillance be performed on a 24-month staggered test basis to verify that one CRVS train can maintain a positive pressure of greater than or equal to 0.125 inches water gauge, relative to the outside atmosphere during the pressurization mode of operation. The TS Bases state that this surveillance requirement verifies the integrity of the control room enclosure, and the assumed inleakage rates of potentially contaminated air.

PG&E believes that the positive pressure surveillance verifies the operability of the CRVS train and provides an indication of control room boundary integrity, although not confirmation. In light of the ASTM E741 testing results, inleakage testing appears to be the best method to confirm boundary integrity.

PG&E plans to submit a TS change to incorporate a Control Room Integrity Program that will include periodic verification of control room inleakage. This change is expected to be consistent with Industry/TSTF Standard Technical Specification Change Traveler, TSTF-448. PG&E is aware that the NRC is currently reviewing TSTF-448 and has not yet approved it. It is anticipated that any issues that the NRC staff may have with TSTF-448 will be resolved in the near future so that approval can be achieved to support the submittal of a timely change to the DCPP TS. PG&E plans to submit a TS change within 90 days after the availability of TSTF-448 for use.

PG&E does not believe any plant modifications are required, other than those already in progress, to incorporate a Control Room Integrity Program into TSs as described above.

As discussed under the 1(a) response above, PG&E has submitted LAR 03-05. This LAR includes a change to TS 3.7.10, "Control Room Ventilation System (CRVS)," to add a new required action for two CRVS trains being inoperable due to an inoperable

control room boundary. The proposed action has a completion time of 24 hours. The current TS requires entry into TS 3.0.3 for this condition. The proposed action, which is consistent with NUREG-1431, Revision 2, "Standard Technical Specifications Westinghouse Plants," dated April 2001 is intended to allow sufficient time to diagnose, plan, possibly repair, and test most problems that would occur with the control room boundary, without requiring entry into TS 3.0.3.

NRC Request 2.

If you currently use compensatory measures to demonstrate CRE habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures.

PG&E Response:

PG&E does not use compensatory measures to demonstrate control room envelope habitability.

PG&E performed a self-assessment of control room habitability in 2000 and concluded that regulatory requirements and the design and licensing bases were being met. PG&E has subsequently performed additional assessments and plans to perform confirmatory inleakage testing. PG&E plans to submit a TS change to incorporate a Control Room Integrity Program that will include periodic verification of control room inleakage. These additional measures will provide assurance to demonstrate CRE habitability.

NRC Request 3.

If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principle Design Criteria" regarding control room habitability, in addition to responding to items 1 and 2 above, provide the documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence, etc.) of the basis for this conclusion and identify your actual requirements.

PG&E Response:

As stated in the response to Request for Information Item #1, the DCPP units were designed to comply with the AEC GDCs for Nuclear Power Plant Construction Permits published in July 1967. DCPP FSARU Appendix 3.1A provides a discussion of conformance with the 1971 GDCs (Appendix A to 10 CFR 50).