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PG&E Letter DCL-11-127

U.S. Nuclear Regulatory Commission
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Diablo Canyon Units 1 and 2
Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Control Room Envelope Testing

Dear Commissioners and Staff:

Purpose

This letter provides the results of the 2011 Diablo Canyon Power Plant (DCPP) Control Room Envelope (CRE) Habitability Program in-leakage testing, and also discusses the 2005 CRE test results previously communicated to the U.S. Nuclear Regulatory Commission (NRC) in light of the 2011 test results.

Summary

On November 8, 2011, Pacific Gas and Electric Company (PG&E) completed in-leakage testing on the control room and mechanical equipment room envelope (the CRE). Analysis of the test results indicate that the measured in-leakage exceeded existing accident analysis assumptions, but the in-leakage would not result in control room operator dose exceeding the General Design Criteria (GDC) -19 limits. Additionally, the 2011 test results have led PG&E to conclude that its determination of zero in-leakage in the previous 2005 test was nonconservative.

2005 CRE Test Results and Report

In January 2005, NUCON International (NUCON) performed testing to determine the unfiltered air in-leakage into the common, pressurized CRE. The testing was performed with one unit in Control Room Ventilation System (CRVS) Mode 4 (pressurization) and one unit in CRVS Mode 3 (recirculation). Four tests were performed using each of the CRVS subtrains to perform pressurization. NUCON's February 3, 2005, test report (issued March 24, 2005) identified the following analyzed worst-case results:

Date	Pressurization Fan Running in CRVS Mode 4	Unfiltered In-leakage (CFM)
January 20, 2005	Unit 1 S-99	59
January 21, 2005	Unit 1 S-98	44
January 21/22, 2005	Unit 2 S-97	19
January 22, 2005	Unit 2 S-96	-9

The above data indicates that three of the four ventilation configurations tested had in-leakage values greater than zero cubic feet per minute (CFM). The result for the fourth configuration was a negative value. At that time, PG&E concluded that these results were adequate to show that the CRE had no unfiltered in-leakage, based on the fourth test configuration (negative value). PG&E's Letter DCL-05-042, dated April 22, 2005, indicated that PG&E had completed testing to confirm the integrity of the DCPP CRE, and that "The January 2005 tracer gas test results are sufficient to show that the DCPP control room envelope has no unfiltered in-leakage."

The CRE for the 2005 test was planned to consist of the main control room and the mechanical equipment room. The CRVS pressurization fan airflow to the separate Technical Support Center (TSC) was therefore isolated for the 2005 test. However, test personnel found that airflow was being diverted into the TSC through common ductwork and a leaking damper. NUCON's February 3, 2005, report stated: "In light of the data collected and all other observations, it is probable that during the first three tests . . . the TSC was acting as part of the CRE. . . . As [tracer gas] was diverted to the TSC, it made the apparent in-leakage appear larger than actual. For the [fourth] test the TSC reached equilibrium with the rest of the ventilation system due to the duration of the injection, thereby eliminating its effect on the observed in-leakage." The report stated: "The observations experienced during the course of these tests and the isolation of the TSC as a source of dilution air and as a collection area for [tracer gas] that could potentially be re-entrained tends toward indicating that the Unit 2 tests, [the fourth] test in particular, are more representative of the total in-leakage measured." DCPP engineers accepted the fourth test to be representative of the CRE. The engineers reasoned that the unexpected TSC leak, identified only after the third test, had invalidated the test results for the first three configurations. Since the leak was accounted for in the final tested configuration, they accepted the results as the official test of record.

Following the DCPP event reported in Event Notification 47223 on August 29, 2011, PG&E further reviewed its 2005 tracer-gas test results. PG&E concluded it could not state with certainty that the CRE had no unfiltered in-leakage in every tested configuration as previously indicated in DCL-05-042. However, DCPP had maintained sufficient operating margin in allowable emergency core cooling system

leakage outside containment to ensure that control room operator dose was maintained less than GDC-19 limits.

PG&E performed an Apparent Cause Evaluation in November 2011 to determine the apparent cause and corrective actions for concluding that the 2005 test demonstrated no unfiltered in-leakage. The evaluation determined that human error (a mindset that a pressurized control room should have zero in-leakage) affected the interpretation of test results and led to the nonconservative determination of zero in-leakage in 2005. Since the results for the first three test configurations were inconsistent with the results for the fourth configuration, additional testing to validate the conclusions would have been appropriate.

2007 License Amendment Request

PG&E's Letter DCL-07-114, "License Amendment Request [LAR] 07-03, Revision to Technical Specification [TS] 3.7.10, Control Room Ventilation System (CRVS)," referred to February 3, 2005, as "the date of the most recent successful tracer-gas test." PG&E submitted this LAR using the consolidated line item improvement process, a standardized approach that allows the NRC to efficiently process licensee-proposed changes to standard TS. DCPP Unit 1 License Amendment (LA) No. 201 and Unit 2 LA No. 202, dated December 23, 2008, included license conditions that specified CRE testing and assessment schedules based on the February 3, 2005, tracer-gas test date. The February 3, 2005, test date was used to establish the date to perform subsequent testing.

2011 8-Hour Notification

On September 12, 2011, at 1745 PDT, DCPP operators declared the CRE inoperable and entered TS 3.7.10.B due to discovery of the inadequately-evaluated 2005 CRE in-leakage test data. Operators made an 8-hour, nonemergency notification to the NRC Headquarters Operations Center at 2257 PDT on September 12, 2011, in accordance with 10 CFR 50.72(b)(3)(ii)(B) for this unanalyzed condition. Operations reported that DCPP personnel determined that the February 3, 2005, test report provided inadequate information to conclude that the CRE in-leakage was zero CFM, as assumed in the Final Safety Analysis Report (FSAR) accident analysis for the most limiting design basis accident. DCPP personnel implemented administrative controls to mitigate the consequences of the 2005 worst-case in-leakage test result of 60 CFM. Based on this situation, PG&E expedited retesting of the CRE to November 2011.

2011 CRE Testing and Operability

NUCON performed the November 2011 testing with one unit in Mode 4 and the other unit in Mode 3. This is the most limiting configuration for operator dose consequences that can be obtained under existing plant configuration controls to ensure both CRVS trains will be available following a design-basis accident, and is in accordance with the guidance in Regulatory Guide 1.197.

NUCON performed four tests using each of the subtrains for pressurization, and performed a final test using the most limiting of the subtrains, along with a supply flowpath to the TSC. PG&E completed the test on November 8, 2011. MPR Associates, Inc. performed an independent review of the test configurations and the test results. The results are shown in the following table:

Date	Pressurization Fan Running in CRVS Mode 4	Unfiltered In-leakage (CFM)
November 4, 2011	Unit 1 S-99	30
November 5, 2011	Unit 1 S-98	19
November 6, 2011	Unit 2 S-97	50
November 7, 2011	Unit 2 S-96	26
November 8, 2011	Unit 2 S-97 + TSC	45

Plant staff reassessed the previously implemented administrative controls and concluded that control room operator doses will continue to be maintained within GDC 19 limits. An operability evaluation was performed to support restoration of OPERABILITY. The CRVS continues to meet its safety function.

PG&E submitted Letter DCL-11-072, LAR 11-06, dated October 24, 2011, to the NRC to support a revision to the FSAR assumption of zero CRE unfiltered in-leakage. PG&E continues to investigate the concerns surrounding this issue and will keep the NRC informed of any new related developments.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter.

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

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