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PG&E Letter DCL-12-001

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

10 CFR 50.73

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 & 2
Licensee Event Report 1-2011-008-00
Diablo Canyon Power Plant - Control Room Ventilation System Design Vulnerability

Dear Commissioners and Staff:

Pacific Gas and Electric Company is submitting the enclosed Licensee Event Report in accordance with 10 CFR 50.73(a)(2)(ii)(B) regarding a design vulnerability in the control room ventilation system for both units.

There are no new or revised regulatory commitments in this report.

This event did not adversely affect the health and safety of the public.

Sincerely,

James R. Becker

mlpy/50438661
Enclosure
cc/enc: Elmo E. Collins, NRC Region IV
Michael S. Peck, NRC Senior Resident Inspector
Alan B. Wang, NRR Project Manager
INPO
Diablo Distribution

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE

Control Room Ventilation System Design Vulnerability

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Diablo Canyon Unit 2	05000 323
11	03	2011	2011	- 8 -	0	01	03	2012	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☑ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
L. Mark Padovan, Regulatory Services Supervisor	(805) 545-4540

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☑ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On November 3, 2011, at 1550 PDT, operators determined that the Diablo Canyon Power Plant (DCPP) control room ventilation system (CRVS) had a design vulnerability whereby unfiltered air supplied to the control room could exceed the flowrates used in the licensing-basis analysis of design basis accident consequences. Pacific Gas and Electric Company (PG&E) discovered this vulnerability during performance of control room in-leakage testing required by Technical Specification Surveillance Requirement 3.7.10.5. At 2051 PDT on November 3, 2011, PG&E made an 8-hour non-emergency report (NRC Event Notification 47414) under 10 CFR 50.72(b)(3)(ii)(B).

PG&E determined that the control room pressurization system airflow could bypass the supply filter if no CRVS booster fan in the associated train was operating. This would allow as much as 800 SCFM of unfiltered air to be delivered to the control room following an accident that resulted in initiation of the CRVS pressurization mode. Operators would have corrected the condition within 30 minutes after initiation of an SI by manually selecting the train's redundant subtrain in accordance with actions specified in DCPP EOP E-0, App. E. PG&E had not previously included this 30 minutes of unfiltered air supply to the control room in the analysis of record. This design vulnerability could have potentially resulted in operator dose greater than analyzed. Plant staff verified that all components and redundant components in each ventilation train were OPERABLE, and established configuration controls to ensure operator dose would continue to meet regulatory limits. Human error on the part of a 1991 Technical Review Group to eliminate the design vulnerability was the apparent cause of this issue. PG&E will implement corrective actions to eliminate the design vulnerability.

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NARRATIVE

I. Plant Conditions

At the time of discovery, Units 1 and 2 were in Mode 1 (Power Operation) at 100 percent power.

II. Description of Problem

A. Background

The Unit 1 and 2 common control room ventilation system (CRVS) provides a protected environment from which operators can control the units from the common control room following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. The CRVS consists of two trains (one CRVS train from each unit) that recirculate and filter the air in the common control room envelope (CRE), and a CRE boundary that limits the in-leakage of unfiltered air. A CRVS train is OPERABLE when the associated:

a. main supply fan (one), filter booster fan (one) and pressurization fan (one) are OPERABLE;
b. high-efficiency particluate-air (HEPA) filters and charcoal adsorbers [ADS] are not excessively restricting flow, and are capable of performing their filtration functions; and
c. ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

Each train is comprised of two redundant, full-capacity, active components so that each train is composed of two subtrains. Technical Specification (TS) 3.7.10 for the CRVS pertains to the two CRVS trains rather than the four subtrains. Either of the two redundant subtrains are manually selected via a switch in the control room, with either subtrain in each unit capable of satisfying the CRVS train operability requirement (see page 5 for system diagram).

The CRVS is an emergency system, parts of which may also operate during normal unit operations. Upon receipt of an actuating signal, the normal air supply to the CRE is isolated, and the stream of outside ventilation air from the pressurization system and recirculated control room air is passed through a system filter. The pressurization system draws outside air from either the north end or the south end of the turbine building. The prefilters remove any large particles in the air to prevent excessive loading of the HEPA filters and charcoal adsorbers.

The CRVS is designed to maintain a habitable environment in the Units 1 and 2 common CRE for the duration of the most severe Design Basis Accident without exceeding 5-rem whole body dose or its equivalent to any part of the body (calculated over 30 days).

B. Event Description

On November 3, 2011, at 1550 PDT, operators determined that the Diablo Canyon Power Plant (DCPP) CRVS had a design vulnerability whereby control room pressurization airflow could bypass the supply filter if neither CRVS booster fan in the train was operating. This would allow as much as 800 cubic feet per minute of unfiltered air to be delivered to the control room following an accident that resulted in initiation of the CRVS pressurization mode. Operators would have corrected this condition within 30 minutes after initiation of a safety injection by manually selecting and starting the train's redundant subtrain in accordance with existing, proceduralized actions specified in DCPP Emergency Operating Procedure (EOP) E-0, "Reactor Trip or Safety Injection," Appendix E, "ESF Auto Actions, Secondary and Auxiliaries Status."

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Pacific Gas and Electric Company (PG&E) had not previously included this 30 minutes of unfiltered air supply to the control room in the analysis of record. This design vulnerability could have potentially resulted in operator dose greater than analyzed. Plant staff verified that all components and redundant components in each ventilation train were OPERABLE, and established configuration controls to ensure operator dose would continue to meet regulatory limits. At 2051 PDT on November 3, 2011, PG&E made an 8-hour non-emergency report (reference NRC Event Notification 47414) under 10 CFR 50.72(b)(3)(ii)(B).

C. Status of Inoperable Structure, Systems, or Components That Contributed to the Event

None.

D. Other Systems or Secondary Functions Affected

This situation applies to both Units 1 and 2 when the CRVS pressurization mode is required. However, the CRVS trains remained capable of performing their normal ventilation functions.

E. Method of Discovery

PG&E discovered this vulnerability during performance of Surveillance Test Procedure (STP) M-57, "Control Room Ventilation System Tracer Gas Test," to satisfy TS Surveillance Requirement 3.7.10.5.

F. Operator Actions

Plant staff verified that all components and redundant components in each ventilation train were OPERABLE, and established configuration controls to ensure operator dose would continue to meet regulatory limits. Operations issued an Operations Standing Order instructing operators to enter TS 3.7.10.A any time a CRVS supply fan or a booster fan is not available. PG&E had also previously revised STP M-87, "Operational Leak Inventory of ECCS Systems Outside Containment Likely to Contain Highly Radioactive Fluids Following an Accident," to limit post-loss-of-coolant-accident emergency core cooling system (ECCS) leakage. These actions ensured operator doses are maintained less than the Final Safety Analysis Report accident analysis results for the highest unfiltered air inleakage rate reported in STP M-57 as well as the 800 scfm of filter bypass flow.

G. Safety System Responses

None.

III. Cause of the Problem

PG&E first identified and documented this design vulnerability in 1991 in a nonconformance report. Human error on the part of a Technical Review Group (root cause evaluation team) in 1991 to eliminate the design vulnerability was the apparent cause of this issue in that the team focused on managing the consequences of the design vulnerability rather than eliminating it (see Section VI.B, "Previous Similar Events," of this LER).

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IV. Assessment of Safety Consequences

PG&E modeled the potential dose to control room operators using the as-found condition of 800 scfm bypass flow, tested CRE unfiltered in-leakage of 51 scfm and ECCS leakage of 0.42 gallons per minute, and concluded that the dose to control room operators would not have exceeded 5-rem whole body dose or its equivalent to any part of the body (calculated over 30 days) if one subtrain in each train was started within 30 minutes. ECCS leakage over the past 3 years has remained less than 0.14 gpm. PG&E's review of CRVS configuration for the past 3 years confirmed that at least one subtrain in each CRVS train was functional and available to operators at all times.

V. Corrective Actions

PG&E will implement actions to eliminate the design vulnerability.

VI. Additional Information

A. Failed Components

None

B. Previous Similar Events

PG&E first identified and documented this design vulnerability in 1991 in Nonconformance Report DC0-91-EN-N028. A PG&E Technical Review Group determined that a postulated single, active failure of one of the redundant booster fans or booster fan dampers in the CRVS could potentially cause the CRVS to be outside its design basis, as there was neither an alarm to notify control room operators of the failure nor an automatic switchover to the unaffected redundant CRVS train. In this situation, the potential existed for an undetected failure of a booster fan or damper during the pressurization mode 4, resulting in infiltration of unfiltered airborne radioactivity into the control room. To correct the deficiency PG&E installed ribbon-type streamers on the CRVS booster fan recirculation duct registers in the control room to enable control room operators to diagnose booster fan or its inlet damper status. Procedural guidance was provided in EOP E-0 to instruct the operators how to use the streamers to verify the proper operation of the booster fans while CRVS was in Mode 4.

C. Industry Reports

None

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NARRATIVE

CRVS Diagram