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RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-012-00: on 920808, discovered that TS 3.7.6.1 was not met for auxiliary bldg when both ABVS trains failed in Unit 2. Cause & corrective actions under investigation. W/920908 ltr.

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Pacific Gas and Electric Company

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Gregory M. Rueger
Senior Vice President and
General Manager
Nuclear Power Generation

September 8, 1992

PG&E Letter No. DCL-92-196

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Re: Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Licensee Event Report 1-92-012-00
Entry Into Technical Specification 3.0.3 Due to Auxiliary Building and Fuel Handling Building Ventilation Systems Inoperability Resulting from a Single Failure

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(v)(D), PG&E is submitting the enclosed Licensee Event Report (LER) regarding entry into Technical Specification 3.0.3 due to the auxiliary building and the fuel handling building ventilation systems inoperability resulting from a single failure. The root cause of this event will be provided in a supplement to this LER.

This event has in no way affected the public's health and safety.

Sincerely,

Gregory M. Rueger

cc: Ann P. Hodgdon
John B. Martin
Philip J. Morrill
Harry Rood
CPUC
Diablo Distribution
INPO

DCO-92-EN-N014

Enclosure

1044S/85K/SDL/2246

IE22 1/1

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
DIABLO CANYON UNIT 1	0 5 0 0 0 2 7 5	1 OF 9

TITLE (4) ENTRY INTO TECHNICAL SPECIFICATION 3.0.3 DUE TO AUXILIARY BUILDING AND FUEL HANDLING BUILDING VENTILATION SYSTEMS INOPERABILITY RESULTING FROM A SINGLE FAILURE

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MON	DAY	YR	YR	SEQUENTIAL NUMBER	REVISION NUMBER	MON	DAY	YR	FACILITY NAMES	DOCKET NUMBER (S)
08	08	92	92	- 0 1 2 -	0 0	09	08	92	DIABLO CANYON UNIT 2	0 5 0 0 0 3 2 3
										0 5 0 0 0

OPERATING MODE (9)	1
POWER LEVEL (10)	1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (11)

__X__ 10 CFR 50.73(a)(2)(i)(B),50.73(a)(2)(v)(D)

_____ OTHER -_____

(Specify in Abstract below and in text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)	TELEPHONE NUMBER	
	AREA CODE	
RAYMOND L. THIERRY, SENIOR REGULATORY COMPLIANCE ENGINEER	805	545-4004

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

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
| X | YES (if yes, complete EXPECTED SUBMISSION DATE)	| | NO		02	20	93

On August 8, 1992, at 0918 PDT, with Units 1 and 2 in Mode 1 (Power Operation) at 100 percent power, Technical Specification (TS) 3.7.6.1 was not met for the auxiliary building when both auxiliary building ventilation system (ABVS) trains failed in Unit 2. As a result, TS 3.0.3 was entered.

On August 11, 1992, a preliminary engineering assessment of the fuel handling building ventilation system (FHBVS) and ABVS designs determined that a loss of DC power to the controls of one train of the ventilation systems could cause a loss of the fans in the other trains, resulting in a complete loss of the FHBVS and ABVS. Consequently, the FHBVS and ABVS appear susceptible to a single failure and therefore may be unable to mitigate the consequences of an accident simultaneous with a single failure. In accordance with 10 CFR 50.72(b)(2)(iii)(D), a four-hour, non-emergency report was made to the NRC on August 11, 1992, at 1935 PDT.

The root cause and corrective actions are under investigation and will be provided in a supplement to this LER.

I. Plant Conditions

Units 1 and 2 have been in various modes and at various power levels.

II. Description of Event

A. Summary:

On August 8, 1992, at 0918 PDT, with Units 1 and 2 in Mode 1 (Power Operation) at 100 percent power, Technical Specification (TS) 3.7.6.1 was not met for the auxiliary building (NF) when both Unit 2 auxiliary building ventilation system (ABVS) trains (NF)(VF) failed for approximately 38 minutes. As a result, TS 3.0.3 was entered.

On August 11, 1992, a preliminary engineering assessment of the fuel handling building (FHB)(ND) ventilation system (FHBVS) (ND)(VG) and ABVS designs determined that a loss of 125 VDC sensor power (JG)(EJ) to one train of the ventilation system could cause a loss of the fans (NF)(VF)(FAN) in the other trains, resulting in a complete loss of the FHBVS and ABVS. Consequently, the FHBVS and ABVS appear susceptible to a single failure and therefore may be unable to mitigate the consequences of an accident simultaneous with a single failure. In accordance with 10 CFR 50.72(b)(2)(iii)(D), a four-hour, non-emergency report was made to the NRC on August 11, 1992, at 1935 PDT.

B. Background:

Units 1 and 2 share a common auxiliary building; each unit has two ventilation trains consisting of two trains of control logic panels (POV-1 and POV-2) (JG)(PL), two relay panels (RCV-1 and RCV-2) (JG)(RLY)(PL), and two supply fans and two exhaust fans. The hard-wired solid state control logic panels POV-1 and POV-2 are part of the HVAC control system located in the control room (NA). RCV-1 and RCV-2 are part of the HVAC control system located in the cable spreading room. RCV-1 and RCV-2 also contain the manual control switches (NF)(VF)(HS) for the FHBVS and ABVS. The control systems for each unit are independent from each other.

The ABVS maintains engineered safety feature (ESF) equipment operating temperatures within acceptable limits. The ABVS also reduces the auxiliary building temperatures and filters exhausted air to minimize the amount of radiation released during accident conditions. The ABVS has three modes of operation. The first mode is the "building only" mode, with one supply and one exhaust fan in operation. The second mode is the "building and safeguards" mode, with two supply and two exhaust fans in operation. The third mode is the "safeguards" mode, with one supply and one filtered exhaust fan in operation.

TS 3.7.6.1 requires that two auxiliary building safeguards air filtration system exhaust trains with one common high efficiency particulate air (HEPA) filter (NF)(VF)(FLT) and charcoal adsorber bank (NF)(VF)(ADS) and at least two exhaust fans be operable in Modes 1 through 4 (Hot Shutdown).

Each unit has its own area in the FHB equipped with a ventilation system. The FHBVS provides cooling air to equipment in the FHB as well as ESF equipment located in the auxiliary building. It also reduces FHB radiation levels and radiation releases following a fuel handling accident by filtering the exhausted air.

The FHBVS is designed with 2 supply fans and 3 exhaust fans. The controls for the FHBVS are also located in POV-1, POV-2, RCV-1, and RCV-2. The control systems for each unit are independent from each other. The FHBVS has two modes of operation. The first mode is the "normal operations" mode, where all exhaust air passes through roughing and HEPA filters. The second mode is the "iodine removal" mode, where exhaust air passes through a series of roughing, HEPA, and charcoal filters. The second mode can be initiated manually or automatically by FHB radiation monitors (IL)(MON).

C. Event Description:

On August 8, 1992, at 0900 PDT, the ABVS was operating in the "building and safeguards" mode with two supply and two exhaust fans operating. At 0918 PDT, both trains of the FHBVS and ABVS failed on Unit 2. TS 3.0.3 was entered for Unit 2 because TS 3.7.6.1 was not met for the ABVS. At 0918 PDT, multiple FHBVS and ABVS alarms were received in the control room. At 0920 PDT, the FHBVS control system transferred to the "iodine removal" mode. At 0922 PDT, the control room operators tried to reset the ABVS to "safeguards" mode, but only regained one supply fan. At 0950 PDT, the auxiliary operator shut an air-operated valve (VF)(V) and bled off the line to fail open an ABVS exhaust fan damper (VF)(DMP). At 0956 PDT, TS 3.7.6.1 and TS 3.0.3 were exited by manually starting ABVS Exhaust Fan E-2 for the open damper at the RCV-2 control panel in the cable spreading room and by placing all dampers for the auxiliary building into "safeguards" mode.

Failure of the ventilation systems was determined to be due to a shorted surge suppression diode (JG)(SPP) across a solenoid valve coil (JG)(CL), resulting in a current surge. The short caused a failure of the solenoid circuit "Driver Card" (JG)(ECBD) located in 2-POV-1. When the "Driver Card" failed, it caused failure of the 125 VDC sensor power fuse (JG)(FU) that provides input to the ventilation logic control panel 2-POV-1. The 120 VAC logic power (JG)(EF) was still available.

On August 8, 1992, between 1100 PDT and 1824 PDT, the failed surge suppression diode, "Driver Card", and fuse were replaced. At 1824 PDT, TS 3.0.3 was entered again because the replacement surge suppression diode was installed backwards and subsequently caused the "Driver Card" to fail and the 125 VDC sensor power fuse to blow again. When the replacement fuse failed, the FHBVS and ABVS failure scenario occurred again and TS 3.0.3 was entered. At 1826 PDT, TS 3.0.3 was exited when the auxiliary operator turned off 125 VDC power to 2-POV-1. With 125 VDC sensor power disabled to 2-POV-1, the plant operators manually started ABVS Supply Fan S-34 and Exhaust Fan E-2. Also, the FHBVS was operating in the "iodine removal" mode.

On August 8, 1992, at 2200 PDT, the surge suppression diode, "Driver Card", and fuse were again replaced and the ABVS was returned to service in the "building and safeguards" mode.

On August 8, 1992, the Shift Supervisor initiated a compensatory action to provide the plant operators with directions on how to recover FHBVS and ABVS resulting from a DC power system failure.

On August 11, 1992, a preliminary engineering assessment of the FHBVS and ABVS designs determined that a loss of 125 VDC power to one train of the ventilation systems could cause a loss of the fans in the other trains, resulting in a total loss of FHBVS and ABVS.

On August 11, 1992, at 1935 PDT, a four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(iii)(D). Also, Emergency Procedure (EP) E-0, "Reactor Trip or Safety Injection," was revised to provide the plant operators with guidance on how to recover FHBVS and ABVS resulting from a DC power system failure.

D. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

E. Dates and Approximate Times for Major Occurrences:

1. August 8, 1992, at 0918 PDT: Event/Discovery Date. Both trains of the FHBVS and ABVS failed and TS 3.0.3 was entered because TS 3.7.6.1 was not met.

2. August 8, 1992, at 0956 PDT: TS 3.0.3 and TS 3.7.6.1 were exited by placing the FHBVS and ABVS into the appropriate ventilation modes.

3. August 8, 1992, at 1824 PDT: TS 3.0.3 was entered because TS 3.7.6.1 was not met due to a second failure of the ABVS and FHBVS.

4. August 8, 1992, at 1826 PDT: TS 3.0.3 and TS 3.7.6.1 were exited by placing the FHBVS and ABVS into the appropriate ventilation modes.

5. August 11, 1992: A preliminary evaluation determined that a single failure could result in a loss of both FHBVS and ABVS.

6. August 11, 1992, at 1935 PDT: A four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(iii)(D).

F. Other Systems or Secondary Functions Affected:

None.

G. Method of Discovery:

The event was immediately apparent to plant operators due to alarms and indications received in the control room.

H. Operator Actions:

The control room operators immediately placed the FHBVS in the "iodine removal" mode and the ABVS was reset to a partial "safeguards" mode, with one supply fan operating. The auxiliary operator then isolated the air supply to Damper M-7 and bled off the line to open the ABVS Exhaust Fan Damper M-7. The auxiliary operator then started Exhaust Fan E-2 at the RCV-2 control panel in the cable spreading room.

I. Safety System Responses:

None.

III. Cause of the Event

A. Immediate Cause:

The cause of the event was failure of both trains of the FHBVS and ABVS due to a single failure of a surge suppression diode across a solenoid valve coil.

Preliminary analysis indicates that the loss of voltage to 2-POV-1 created a logic state on 2-POV-1 representing a loss of air flow from the fans controlled by 2-POV-1. Upon detecting fan failure, 2-POV-1 control circuitry switched to "safeguards" mode. Similarly, the loss of sensor power created a logic state on 2-POV-2, representing a loss of air flow from the fans controlled by 2-POV-2, and 2-POV-2 switched to "safeguards" mode.

In "safeguards" mode, only one fan from either 2-POV-1 or 2-POV-2 is designed to start. If either fan fails, the other fan is selected to start. Because all fans on 2-POV-1 and 2-POV-2 indicated failure, 2-POV-1 and 2-POV-2 received fan failure signals at the same time. When the 2-POV-1 and 2-POV-2 control circuits received failure signals simultaneously, the control circuits were unable to create a logic state to start the FHBVS and ABVS. This caused the failure of all Unit 2 fans and dampers of the auxiliary building and FHB.

B. Root Cause:

The root cause is under investigation and will be provided in a supplemental LER.

IV. Analysis of the Event

The FHBVS has the primary safety function of mitigating the release of radioactivity resulting from a fuel handling accident and also provides cooling to ESF equipment.

The primary safety function of the ABVS is to maintain the temperature of ESF equipment within acceptable limits and filter air following a loss-of-coolant accident (LOCA) during the post-LOCA recirculation phase.

PG&E has evaluated the effect of the identified single failure mechanism in the ABVS and FHBVS on plant operation. The following summarizes the results of these evaluations.

FUEL HANDLING BUILDING

PG&E has performed a conservative analysis, which assumes that during a fuel handling accident, the FHBVS is completely lost and all radioactivity is released unfiltered to the atmosphere within a two-hour period. This analysis concluded that the resultant offsite boundary dose is within 10 CFR 100 requirements.

The failure of the FHBVS, coincident with a fuel handling accident, has not been explicitly analyzed for control room operator dose at this time. However, a review of existing analyses, and consideration of event scenarios and timing, indicates that the 10 CFR 50, Appendix A, General Design Criteria 19, limits will not be exceeded within the time required to restore

system operations (within 2 hours). In addition, control room radiation conditions would be monitored by area radiation monitors (IL)(MON) located in the control room. Although the monitors are Design Class II, they are powered from Class 1E power supplies (IL)(JX). The area radiation monitors would provide sufficient indication to allow control room operators to don self-contained breathing apparatus equipment or take additional corrective measures.

PG&E is in the process of formally evaluating the control room operator dose. The results of this evaluation will be presented in a supplement to this LER.

The FHBVS also provides cooling to ESF equipment. Failure of the FHBVS does not immediately jeopardize the operability of any safety-related equipment. A review of room heatup curves indicates that 24 hours is available before any safety-related equipment could be adversely affected. Based on the August 8 failure of the FHBVS, it has been demonstrated that FHBVS can be restored in much less than 24 hours.

PG&E is in the process of evaluating design changes to the FHBVS to eliminate the single failure mechanism. In the interim, compensatory measures have been implemented to ensure that system operation is restored in a manner which mitigates the consequences of a fuel handling accident. Abnormal Operating Procedure (OP) AP-21, "Irradiated Fuel Damage," will be revised prior to fuel movement for the upcoming Unit 1 refueling outage to ensure that the operators start an exhaust fan, which takes suction through the charcoal filter, prior to starting a supply fan during ventilation recovery actions. This will ensure that any radioactivity released from the damaged fuel is contained in the FHB (since there is no driving force before ventilation system recovery) and passes through the charcoal filter prior to release to the environment. This recovery will be completed expeditiously such that ESF equipment heatup is of no concern.

AUXILIARY BUILDING

The FSAR Update Chapter 15 analyzes the offsite exposures from post-LOCA circulation loop leakage in the auxiliary building. Two cases are analyzed: large leakage and long-term small leakage. The large leakage case assumes a single passive failure of a residual heat removal pump seal (BP)(SEAL) and gives credit for filtration of radioactivity by the ABVS charcoal filters. The single-failure criterion of ANS Standard N18.2 does not require an additional single failure. Therefore, there is no affect on the FSAR Update Chapter 15 analysis.

For the small leakage case, no credit was given in the FSAR Update for the charcoal filter. However, different analysis boundary conditions were assumed (i.e., the ventilation system is operating) than would exist with a complete failure of the ABVS. This difference in boundary condition does not affect the offsite boundary dose. The control room dose has not been

explicitly analyzed at this time. A review of existing analyses and consideration of event scenarios and timing indicate that the 10 CFR 50, Appendix A, General Design Criteria 19, limit will not be exceeded within the time required to restore system operations (within 2 hours).

PG&E is in the process of formally evaluating the control room operator dose. The results of this evaluation will be presented in a supplement to this LER.

The ABVS also provides cooling to ESF equipment. Failure of the ABVS does not immediately jeopardize the operability of any safety-related equipment. A review of room heatup curves indicates that 24 hours is available before any safety-related equipment could be adversely affected. Based on the August 8 failure of the ABVS, it has been demonstrated that ABVS can be restored in much less than 24 hours.

PG&E is in the process of evaluating design changes to the ABVS to eliminate the single failure mechanism. In the interim, compensatory measures have been implemented to ensure that system operation is restored in an expeditious manner. EP E-0 has been revised to provide the operators with the necessary guidance to recover the ABVS.

Based on the guidance provided in EP E-0 and the fact that EP E-0 is the first procedure implemented following a reactor trip or safety injection, the operators will restore the ABVS in time to mitigate an accident and provide cooling to ESF equipment.

The above discussions demonstrate that this event did not adversely affect the health and safety of the public.

V. Corrective Actions

A. Immediate Corrective Actions:

1. The diodes, fuses, and control circuitry have been replaced.

2. EP E-0 has been revised to ensure operability of the ABVS.

3. OP AP-21 will be revised to provide guidance to the operators for restoration of the FHBVS should failure occur during or following a fuel handling accident.

B. Corrective Actions to Prevent Recurrence:

Corrective actions are under investigation and will be provided in a supplemental LER.

V.I. Additional Information

A. Failed Components:

To be provided in a supplemental LER.

B. Previous LERs on Similar Problems:

To be provided in a supplemental LER.