

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) **DIABLO CANYON UNIT 2** DOCKET NUMBER (2) **05000323** PAGE (3) **1 OF 06**

TITLE (4) **WIRING CHANGE RESULTED IN INOPERABILITY OF REDUNDANT ACTUATION TRAIN A TO MAIN STEAM ISOLATION VALVE FCV-44**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)			
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES			DOCKET NUMBER(S)
07	27	85	85	019	01	04	15	86				05000
												05000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5 (Check one or more of the following) (11)

OPERATING MODE (9) <b>3</b>	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(e)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
POWER LEVEL (10) <b>000</b>	<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(e)
	<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vi)	<input type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 365A)
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
	<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
	<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
<b>DAVID P. SISK, REGULATORY COMPLIANCE ENGINEER</b>	AREA CODE <b>805</b> <b>595-7351</b>

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

EXPECTED REPORT DATE (14)  YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-spaced typewritten lines) (16)

On November 27, 1985, a blown fuse was discovered on solenoid valve SV-306 (Actuation Train A to Main Steam Isolation Valve (MSIV) FCV-44) during a post-safety injection review (see LER 85-016). An investigation determined that the blown fuse was caused by an incorrect wiring change (personnel error) involving SV-306. This wiring change is believed to have been the cause of fuse failures previously discovered on July 27, 1985, August 14, 1985 and August 29, 1985. Consequently, Actuation Train A to FCV-44 was inoperable from July 27, 1985 to November 27, 1985 and Action 22 of Technical Specification (T.S.) Table 3.3-3 was not met as required by T.S. 3.3.2 Action b. Redundant Actuation Train B was operable and capable of performing its intended function during this time period, with the exception of approximately 32 minutes on November 6, 1985 during the performance of STP I-16B, "Testing of Safety Injection Reset Timer and Slave Relay K602."

On November 27, 1985, the wiring was corrected, and Actuation Train A to MSIV FCV-44 was tested by slave relay actuation and returned to service.

To provide assurance that similar problems did not exist in other systems, each multiple channel engineered safety feature (ESF) that is normally tested by a continuity check was functionally tested by actuation from its associated slave relay(s).

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

I. Initial Conditions

When the event was discovered, the unit was in Mode 3 (Hot Standby) with a reactor coolant temperature of approximately 550 degrees Fahrenheit and a pressure of approximately 2235 psig, but had operated in Mode 1 (Power Operation) to Mode 5 (Cold Shutdown) during the period when the Engineered Safety Features Actuation System (ESFAS) Train A (JE) to Main Steam Isolation Valve FCV-44 (SB)(ISV) was inoperable.

II. Description of Event

A. Event:

On November 27, 1985, during a post-safety injection review (see LER 85-016), the circuit protection fuse (SB)(FU) for ESFAS solenoid valve (SB)(FSV) SV-306 (Actuation Train A to Main Steam Isolation Valve (MSIV) FCV-44) was discovered blown. While troubleshooting for the cause of the blown fuse, an incorrect wiring change was discovered involving SV-306. This wiring change is believed to have been the cause of fuse failures previously discovered on July 27, 1985, August 14, 1985, and August 29, 1985. Consequently, ESFAS Actuation Train A to FCV-44 was inoperable from July 27, 1985 (when the first fuse failure was noted) to November 27, 1985 and Action 22 of Technical Specification (T.S.) Table 3.3-3 was not met as required by T.S. 3.3.2 Action b. Redundant ESFAS Actuation Train B was operable and capable of performing its intended function during this time period, with the exception of approximately 32 minutes on November 6, 1985 during the performance of surveillance test procedure (STP) I-16B, "Testing of Safety Injection Reset Timer and Slave Relay K602."

On November 27, 1985, the wiring was corrected and ESFAS Actuation Train A to MSIV FCV-44 was satisfactorily tested by slave relay (SB)(RLY) actuation and returned to service. All four main steam isolation valves were functionally tested using STP V-3R2, "Exercising Main Steam Isolation Valves FCV-41, 42, 43 and 44".

Both Diablo Canyon Power Plant and General Construction records were reviewed, and no documentation was found which could identify when the wiring change was made. However, results of subsequent investigations indicate that the wiring change was most likely made between retermination work (June 1984) and July 27, 1985 because of the following circumstances:

- In March 1983, preoperational Startup Test TP 33.1, "Containment Isolation and Spray Initiation," demonstrated the wiring to be functionally correct.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

- In June 1984, SV-306 control circuits were "reterminated" after the completion of plant modifications which required a "determination" of SV-306 circuits due to a rerouting of conduit.

Revision 00 of this LER mistakenly attributed the fuse failures of August 14, August 29, and November 27, 1985 to a shorted solenoid in SV-306 and concluded that the wiring change was made during the solenoid replacement on September 6, 1985. However, as discussed above, further investigation has determined that (a) the wiring change was not made during the solenoid replacement; (b) the wiring change most likely occurred between retermination work (June 1984) and July 27, 1985; (c) the wiring change caused the November 27, 1985 fuse failure; and (d) the wiring change is believed to be the cause of the July 27, August 14, and August 29, 1985 fuse failures.

B. Inoperable structures, components, or systems that contributed to the event:

None

C. Dates and approximate times for major occurrences:

- March 1983: Preoperational Startup Test TP 33.1 demonstrated the wiring to be functionally correct.
- June 1984: SV-306 circuits "reterminated" after completion of plant modifications.
- Between June 1984 and July 27, 1985: A wiring change was made for which documentation cannot be located.
- July 27, 1985: Event Date - SV-306 circuit protection fuse was discovered blown.
- August 14, 1985: Same fuse was again found blown.
- August 29, 1985: Same fuse was again found blown.
- September 6, 1985: Solenoid for SV-306 was replaced.
- October 3, 1985: Postmaintenance testing performed on SV-306 using STP V-8, "Determination of Main Steam Isolation Valve Closure Time-Train A Solenoid."

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

9. November 6, 1985: Actuation Train B to MSIV FCV-44 taken out of service for approximately 32 minutes during the performance of STP I-16B.

10. November 27, 1985: Discovery Date - Same fuse was again found blown. Wiring problem was found and corrected. SV-306 was functionally tested by slave relay actuation using STP V-8. Functional testing was completed on all four MSIVs using STP V-3R2.

D. Other systems or secondary functions affected:

None

E. Method of discovery:

This event was discovered by plant technicians troubleshooting to find the cause for the blown fuse discovered during a post-safety injection review on November 27, 1985.

F. Operator actions:

None.

G. Safety system responses:

None

III. Cause of Event

A. Immediate cause:

A short circuit around solenoid valve SV-306 prevented ESFAS Actuation Train A from actuating FCV-44.

B. Root cause:

The root cause is attributed to personnel error (cognitive and procedural) as follows:

1. An incorrect and undocumented wiring change was made which resulted in the inoperability of ESFAS Actuation Train A to MSIV FCV-44.

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2. Postmaintenance testing performed on SV-306 relied on the standard surveillance test STP V-8 to demonstrate operability. However, the incorrect wiring change could not be detected by the STP.
3. The equipment history data base was incomplete. The DCPD procedural requirements for the equipment history data base did not include the requirement to report blown fuses.

IV. Analysis of Event

ESFAS Actuation Train A to FCV-44 was inoperable from July 27, 1985 until November 27, 1985. However, redundant Actuation Train B was operable during this time period, as demonstrated during a main steam isolation following a safety injection on August 29, 1985 (see LER 2-85-007) and during the performance of STP V-3R2 on November 27, 1985. Therefore, Actuation Train B was capable of closing FCV-44 had the need arisen, with the exception of approximately 32 minutes on November 6, 1985 during the performance of STP I-16B. However, if the MSIVs had received a closure signal during these 32 minutes, the main steam system is designed to accommodate a single failure of a MSIV; therefore, this event did not affect the public's health and safety.

V. Corrective Actions

- A. The wiring was corrected, SV-306 was functionally tested by slave relay actuation using STP V-8, and all four MSIVs were functionally tested using STP V-3R2.
- B. To provide assurance that similar problems did not exist in other systems, each multiple channel engineered safety feature (ESF) that is normally tested by a continuity check was functionally tested by actuation from its associated slave relay(s).
- C. Work planning center personnel and maintenance foremen have been counseled to ensure that appropriate postmaintenance functional testing is specified in shopwork followers.
- D. To provide additional assurance that proper postmaintenance testing is conducted on safety-related components, Administrative Procedure C-6S3, "Post Maintenance Testing", was revised to require that the planned postmaintenance testing is reviewed by the organization performing the maintenance to ensure that it confirms the adequacy of the maintenance and also tests the equipment features upon which the maintenance is performed.

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

- E. The Operations Department issued a Shift Order on January 3, 1986 and a Shift Foreman memorandum on January 6, 1986 to require that all blown fuse indications be documented by an Action Request (AR) to provide a complete equipment history data base.
- F. Electrical and I&C maintenance personnel received additional training emphasizing the importance of checking the equipment history data base as part of investigative and troubleshooting techniques during the performance of corrective maintenance.
- G. Although the specific date of the wiring change has not been established, the clearance procedural controls used for work control were strengthened during the transition from plant construction to operation and provide additional assurance that such changes will not occur in the future. Since no changes of the nature described above have been identified as originating after plant operational procedures were implemented, additional strengthening of these procedures does not appear to be necessary.

VI. Additional Information

A. Failed components:

None

B. Previous LERs on similar events:

LER 2-85-014, "Wiring Change Causes the Inoperability of Feedwater Isolation Valve FCV-439." The event described in LER 2-85-014 was discovered after the event date of this LER (2-85-019). Therefore, the corrective actions reported in LER 2-85-014 could not have prevented occurrence of the event described in LER 2-85-019.

C. This event is also the subject of Enforcement Action EA 86-04 issued by NRC Region V on February 12, 1986. PGandE letter DCL-86-071 dated March 14, 1986, provided a response to EA 86-04 and, in addition to the above corrective actions, discussed problems and corrective actions regarding the Technical Review Group investigation.

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# PACIFIC GAS AND ELECTRIC COMPANY

PG&E

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JAMES D. SHIFFER  
VICE PRESIDENT  
NUCLEAR POWER GENERATION

April 15, 1986

PGandE Letter No.: DCL-86-104

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

Re: Docket No. 50-323, OL-DPR-82  
Diablo Canyon Unit 2  
Licensee Event Report 2-85-019-01  
Wiring Change Resulted in Inoperability of Redundant Actuation  
Train A to Main Steam Isolation Valve FCV-44

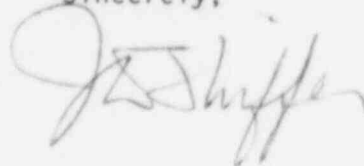
Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(i), PGandE is submitting the enclosed revision to Licensee Event Report 2-85-019-00. Since the submittal of Revision 00 on December 7, 1985, further investigations into this event have resulted in revisions to the description of how and when the wiring change occurred and the duration of the period of inoperability. Due to the substantial changes, revision bars are not included.

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

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,



Enclosure

cc: L. J. Chandler  
R. T. Dodds  
J. B. Martin  
B. Norton  
H. E. Schierling  
CPUC  
Diablo Distribution  
INPO

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