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 0 5

TITLE (4) UNIT TRIP, TURBINE TRIP, AND SUBSEQUENT REACTOR TRIP DUE TO LOSS OF ELECTROHYDRAULIC CONTROL FLUID

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)
										0 5 0 0 0
0 1	0 5	8 7	8 7	0 0 1	0 0	0 2	0 3	8 7		0 5 0 0 0

OPERATING MODE (9)	1
POWER LEVEL (10)	0 3 3

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

[X] 10 CFR 50.73(a)(2)(iv)

[ ] OTHER (Specify in Abstract below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (AREA CODE)
THOMAS A. NELSON, REGULATORY COMPLIANCE ENGINEER	8 0 5 5 9 5 - 7 3 5 1

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

[ ] YES (If yes, complete EXPECTED SUBMISSION DATE)

[X] NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (16)

On January 5, 1987, at 2235 PST, with the unit in Mode 1 (Power Operation), a unit trip, turbine trip, and subsequent reactor trip occurred while the unit was being ramped down in power because of low electrohydraulic (EH) control fluid level. The appropriate emergency procedures were followed and the unit was stabilized in Mode 3 (Hot Standby) at 2247 PST.

The low EH control fluid level was caused by leakage from a fitting on a turbine stop valve, FCV 143. The fitting most likely was disturbed during fire fighting and cleanup after a minor loose insulation fire several days earlier.

The significant event notification required by 10 CFR 50.72 was made at 2311 PST, January 5, 1987.

The EH reservoir was filled and the leaking fitting was inspected. There was no damage to the fitting, and it was returned to service. The entire EH system was walked down, and all fittings were checked for proper installation and tightness; no discrepancies were found. The system was then pressure checked, and no leakage was found.

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I. Initial Conditions

The unit was in Mode 1 (Power Operation) at 33 percent power undergoing startup testing after its first refueling outage.

II. Description of Event

A. Event:

On January 5, 1987, at 2045 PST, a low-level alarm was received on the electrohydraulic (EH) control fluid (TG) reservoir. The Senior Control Operator (SCO) checked the EH fluid level and found the sump approximately five-eighths full. The SCO investigated and could find no cause for the low level. The Auxiliary Operator (AO) was informed of the need to refill the reservoir before the end of the shift. At 2223 PST a low-low level lockout was received on the EH system, and the EH pumps tripped as designed. The lockout was manually held in reset to allow time to fill the reservoir. Preparations to take the unit off line were made, and the unit was started on a rampdown in power from 33 percent.

Shortly after the rampdown was started, the EH low-low level lockout relay was released when it began to smoke, and the EH pumps shut down. As the EH fluid pressure decreased, the turbine governor and stop valves drifted closed. The resulting decrease in steam supplied to the turbine allowed PS-30 (IT)(PDE) to start the timer in the generator antimotoring relay (TRB)(02). PS-30 senses the high-pressure turbine differential pressure and on low differential pressure initiates a 30-second timer in the antimotoring relay to prevent generator motoring. At 2235 PST the generator antimotoring relay caused a unit trip, which separates the generator from the PGandE electrical system and initiates a turbine trip (TA)(TRB). The turbine trip occurred at greater than 10 percent power, so the P-7 permissive was satisfied and a reactor trip (AB)(RCT) occurred. The appropriate emergency procedures were followed and the unit was stabilized in Mode 3 (Hot Standby) at 2247 PST.

The significant event notification required by 10 CFR 50.72 was made at 2311 PST, January 5, 1987.

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

None.

C. Dates and approximate times for major occurrences:

1. January 5, 1987, 2235 PST: Event date

2. January 5, 1987, 2247 PST: Stable conditions achieved

3. January 5, 1987, 2311 PST: 10 CFR 50.72 notification completed

D. Other systems or secondary functions affected:

None

E. Method of discovery:

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

F. Operator actions:

In anticipation of separating the unit from the PGandE electrical system, due to loss of EH control fluid, the operators started manually transferring the electrical buses to startup power. During the transfer, bus G feeder breakers to auxiliary and startup power both tripped on overcurrent. This is discussed in Section VI.B. The operators followed the appropriate procedures and placed the unit in a stable condition.

G. Safety system responses:

1. The turbine tripped.

2. The reactor trip breakers opened.

3. The control rod drive mechanism allowed the control rods to drop into the reactor.

4. Diesel generator 1-2 started but did not load (see Section VI.B).

III. Cause of Event

A. Immediate cause:

The reactor trip was caused by the turbine trip above the P-7 permissive. The turbine trip was caused by a loss of turbine load and the subsequent unit trip on the antimotoring relay. The loss of turbine load was caused when the turbine governor valves drifted closed due to loss of EH fluid pressure.

B. Root cause:

The fitting that leaked EH control fluid was examined and found to be in good condition. The fitting is believed to have been disturbed during fire fighting and cleanup after a minor insulation fire that occurred on January 2, 1987. Since no other fittings were found to be loose or improperly installed, and the system had functioned properly prior to the fire, it is suspected that a run of pipe had been stepped on, which loosened the fitting's mechanical seal and allowed it to leak.

IV. Analysis of Event:

The reactor trip that resulted from the turbine trip is a previously analyzed Condition II event. Thus, there were no unanalyzed safety consequences or implications resulting from this event.

V. Corrective Actions:

The electrohydraulic control fluid reservoir was refilled. The entire electrohydraulic control system was walked down, and all fittings were checked for proper installation and tightness; no loose fittings were found. When the system was brought to operating pressure and all fittings were checked for leakage, none was found. The proper operation of the low-low level lockout relay was subsequently verified.

VI. Additional Information

A. Failed components:

None

B. Follow-up of Bus G overcurrent:

As mentioned in Section II.F, an operator was switching the electrical buses from auxiliary to startup power as part of the procedure for taking the unit off line. The operator placed the manual bus transfer switch for bus G to the transfer to startup position and waited for the bus G startup feeder breaker to close. After an extended period of time (compared to the other buses), the operator let go of the transfer switch. At that instant, the indicating light for startup power came on, indicating the breaker had closed, but the auxiliary breaker did not open, leaving the two systems paralleled through bus G. The operator started to open the auxiliary breaker, but both breakers tripped on overcurrent before that could be done. Diesel generator 1-2 started when the bus deenergized but did not load because the breakers were tripped on overcurrent.

After extensive investigation, it was determined that the auxiliary breaker did not open when the startup breaker closed because the signal to trip the breaker was removed when the manual transfer switch was released. For the auxiliary breaker to successfully trip, the manual transfer switch must be in the startup position and the startup breaker must be closed. The startup breaker auxiliary contact is plunger-operated off the breaker position. When the manual transfer switch was released, the closing coil for the startup breaker had already been energized, so the breaker was in the process of closing; but by the time the plunger-operated auxiliary contact closed, the manual transfer switch was released, so the auxiliary breaker trip logic was no longer satisfied.

The likelihood of this event recurring is very low since the manual transfer switch must be released in a 10-millisecond window in the transfer scheme. An Operations Incident Report will be issued describing the event on bus G. It will stress that system voltage mismatch may cause the transfer scheme to take an extended period of time to operate.

C. Previous LERs on similar events:

None.

PACIFIC GAS AND ELECTRIC COMPANY

PG&E

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JAMES D. SHIFFER
VICE PRESIDENT
NUCLEAR POWER GENERATION

February 3, 1987

PGandE Letter No: DCL-87-017

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

Re: Docket No. 50-275, OL-DPR-80
Diablo Canyon Unit 1
Licensee Event Report 1-87-001-00
Unit Trip, Turbine Trip, and Subsequent Reactor Trip
Due to Loss of Electrohydraulic Control Fluid

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PGandE is submitting the enclosed Licensee Event Report concerning a unit trip, turbine trip, and subsequent reactor trip due to loss of electrohydraulic control fluid.

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
J. B. Martin
M. M. Mendonca
P. P. Narbut
B. Norton
H. E. Schierling
CPUC
Diablo Distribution

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