NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO 3150-0104
EXPIRES 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
DIABLO CANYON UNIT 2	0 5 0 0 0 3 2 3	1 OF 0 4

TITLE (4) REACTOR TRIP DUE TO LOW-LOW STEAM GENERATOR WATER LEVEL CAUSED BY MAIN FEEDWATER PUMP TRIP DURING FULL LOAD REJECTION STARTUP TEST

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 1	0 2	8 6	8 6	0 0 1	0 0	0 2	0 3	8 6		0 5 0 0 0
										0 5 0 0 0

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

OPERATING MODE (9)	POWER LEVEL (10)											
1	1 0 0	20.402(b)	20.405(c)	X	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)		50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)		50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)		50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
JACQUELINE R. HINDS, REGULATORY COMPLIANCE ENGINEER	AREA CODE 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)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

At 1400 PST, January 2, 1986, while the unit was in Mode 1 (Power Operation) at 100 percent power, automatic reactor and turbine trips occurred during the performance of the full load rejection startup test. After initiating the load rejection, Main Feedwater Pump 2-1 tripped, resulting in a decrease of flow to the steam generators. This decrease in flow allowed the level in steam generator 2-3 to drop below the low-low steam generator water level reactor trip setpoint.

When the turbine tripped, the operators initiated a unit trip in accordance with the startup test procedure. Following the unit trip, the four reactor coolant pumps and the two circulating water pumps tripped. Plant engineers determined that the current surge following the automatic bus transfer of the 12kV buses initiated by the unit trip caused the 12kV buses to momentarily drop below 10 kV. At 10 kV the startup bus undervoltage tripping relay strips the 12kV buses, thus tripping the reactor coolant pumps and the circulating water pumps. During subsequent load rejection tests, the 12kV bus stripping feature will be defeated (This relay performs no safety related functions.). PGandE is investigating the functioning of the bus undervoltage tripping relay during transients to determine if any permanent corrective actions are needed.

Although the cause of the main feedwater pump trip could not be positively determined, plant engineers concluded that the probable cause of the pump trip was overspeed. In an effort to prevent reoccurrence, the main feedwater pump control oil system was flushed, the speed control system was adjusted to improve system response, and the manual speed changer crossover point was lowered.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
DIABLO CANYON UNIT 2	0 5 0 0 0 3 2 3	8 6	0 0 1	0 0	0 2 OF 0 4

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

I. Initial Conditions

The unit was in Mode 1 (Power Operation) at 100 percent.

II. Description of Event

A. Event:

At 1400 PST, January 2, 1986, automatic reactor and turbine trips occurred during the performance of the full load rejection startup test. The reactor (AB)(RCT) tripped on low-low steam generator water level (15 percent). After initiating the load rejection, Main Feedwater Pump 2-1 (SJ)(P) tripped, resulting in a decrease of flow to the steam generators (AB)(SG). This decrease in flow allowed the water level in steam generator 2-3 to drop below the reactor trip setpoint. Following the load rejection, two pressurizer power operated relief valves (PORVs) (AB)(RV) cycled, and diesel generator 2-2 (EK)(ENG) started but did not load. When the turbine (TA)(TRB) tripped, the operators initiated a unit trip in accordance with the startup test procedure. Following the unit trip, the four reactor coolant pumps (AB)(P) and the two circulating water pumps (KE)(P) tripped. An Unusual Event was declared at 1400 PST and terminated at 1435 PST

The appropriate emergency procedures were followed, the reactor coolant pumps and one circulating water pump were restarted and the unit was stabilized in Mode 3 (Hot Standby) at approximately 1435 PST.

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

None

C. Dates and approximate times for major occurrences:

January 2, 1986, 1400 PST: Event Date

January 2, 1986, 1435 PST: Stable conditions achieved

D. Other systems or secondary functions affected:

None

E. Method of discovery:

Event was immediately apparent due to alarms and indications in the Control Room.

F. Operator actions:

The operators followed the appropriate startup and emergency procedures and placed the unit in a stable condition.

G. Safety system responses:

1. The reactor trip breakers opened.

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

3. The turbine tripped.

4. The reactor coolant pumps and circulating water pumps tripped. The reactor coolant pumps and one circulating water pump were manually restarted.

5. Diesel generator 2-2 sensed undervoltage on the 4kV bus and started, but, per design, did not load.

6. The PORVs cycled as designed in response to the pressure transient created by the load rejection.

III. Cause of Event

A. Immediate cause:

Steam generator 2-3 water level dropped below the low-low steam generator water level reactor trip setpoint, causing a reactor trip.

B. Root cause:

The main feedwater pump trip resulted in a decrease of flow to the steam generators. This decrease in flow, in conjunction with the level transient induced by the load rejection, resulted in the steam generator 2-3 water level dropping below the reactor trip setpoint. Although the cause of the main feedwater pump trip could not be positively determined, plant engineers concluded that the probable cause of the pump trip was overspeed.

Plant engineering determined that the current surge following the automatic bus transfer of the 12kV buses initiated by the unit trip caused the 12kV buses to momentarily drop below 10 kV. At 10 kV, the startup bus undervoltage tripping relay strips the 12kV buses, thus tripping the reactor coolant pumps and the circulating water pumps.

IV. Analysis of Event

The decrease in steam generator water level resulted in automatic actuation of the reactor protection system. The loss of the reactor coolant pumps placed the reactor in a complete loss of forced reactor coolant flow condition. The FSAR Update Section 15.3.4 (September 1985, Revision 1) accident analysis concludes that the complete loss of forced reactor coolant flow, assuming the most adverse initial operating conditions with respect to the margin to departure from nucleate boiling (DNB), does not decrease the departure from nucleate boiling ratio (DNBR) below 1.30; therefore, no core safety limit was violated. Since the RPS responded as designed and the loss of forced reactor coolant flow is bounded by the accident analysis, there were no adverse safety consequences or implications resulting from this event.

V. Corrective Actions

In an effort to prevent the main feedwater pump from tripping on overspeed, the feedwater pump control oil system was flushed, the speed control system was adjusted to improve system response, and the manual speed crossover point was lowered.

During subsequent load rejection tests, the 12kV stripping feature will be defeated (This relay performs no safety related functions). PGandE is investigating whether to permanently remove the ability of the relay to strip the bus, or to change the setpoint at which the buses are stripped.

VI. Additional Information

A. Failed components:

None

B. Previous LERs on similar events:

LER 2-85-13-00 Reactor Trip Due to Low-Low Steam Generator Level Caused by Slow Response of Turbine Interceptor Valves

LER 2-85-24-00 Reactor Trip Due to Low-Low Steam Generator Level Caused by Slow Response of Steam Dump Control System

PACIFIC GAS AND ELECTRIC COMPANY

PG&E

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JAMES D. SHIFFER
VICE PRESIDENT
NUCLEAR POWER GENERATION

February 3, 1986

PGandE Letter No.: DCL-86-024

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 2-86-001-00
Reactor Trip Due To Low-Low Steam Generator Water Level Caused By Main Feedwater Pump Trip During Full Load Rejection Startup Test

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PGandE is submitting the enclosed Licensee Event Report concerning actuation of the Reactor Protection System during the performance of the full load rejection startup test.

This event has in no was 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,

for J. D. Shiffer

Enclosure

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

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