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ACCESSION NBR:9303040193 DOC.DATE: 93/02/25 NOTARIZED: NO DOCKET #  
 FACIL:50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Ga 05000323  
 AUTH.NAME AUTHOR AFFILIATION  
 SISK,D.P. Pacific Gas & Electric Co.  
 RUEGER,G.M. Pacific Gas & Electric Co.  
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 93-001-00:on 930130,turbine trip & reactor trip occurred during routine surveillance test.Caused by inadvertent simulated low condenser vacuum signal that satisfied turbine protection logic.Incident summary issued.W/930225 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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EXTERNAL:	EG&G BRYCE,J.H		2	2		L ST LOBBY WARD		1	1	
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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

February 25, 1993

PG&E Letter No. DCL-93-052



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

Re: Docket No. 50-323, OL-DPR-82  
Diablo Canyon Unit 2  
Licensee Event Report 2-93-001-00  
Turbine Trip and Reactor Trip During Surveillance Testing Due to  
Unknown Cause

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PG&E is submitting the enclosed  
Licensee Event Report regarding an automatic reactor trip due to a main  
turbine trip due to unknown cause.

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

Sincerely,

A handwritten signature in cursive script, appearing to read "Gregory M. Rueger", is written over the typed name.

Gregory M. Rueger

cc: Ann P. Hodgdon  
John B. Martin  
Mary H. Miller  
Sheri R. Peterson  
CPUC  
Diablo Distribution  
INPO

DC2-93-OP-N008

Enclosure

1100S/85K/JCN/2246

040005

9303040193 930225  
PDR ADOCK 05000323  
S PDR

A handwritten signature in cursive script, possibly reading "JCN", is written in the bottom right corner of the page.



# LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>DIABLO CANYON UNIT 2</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 3 2 3</b>	PAGE (3) <b>1</b> OF <b>5</b>
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TITLE (4) **TURBINE TRIP AND REACTOR TRIP DURING SURVEILLANCE TESTING DUE TO UNKNOWN CAUSE**

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 (8)		
01	30	93	93	- 0   0   1	- 0   0	02	25	93			0   5   0   0   0		

OPERATING MODE (9) <b>1</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (11)		
POWER LEVEL (10) <b>1   0   0</b>	<input checked="" type="checkbox"/> 10 CFR <u>50.73(a)(2)(iv)</u> <input type="checkbox"/> OTHER - _____ (Specify in Abstract below and in text, NRC Form 366A)		

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
<b>DAVID P. SISK, SENIOR REGULATORY COMPLIANCE ENGINEER</b>		AREA CODE <b>805</b>	<b>545-4420</b>

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
<input checked="" type="checkbox"/> YES (if yes, complete EXPECTED SUBMISSION DATE)				<input type="checkbox"/> NO		<b>04</b>	<b>30</b>	<b>93</b>

ABSTRACT (16)

On January 30, 1993, at 2147 PST, with Unit 2 at 100 percent power, a turbine trip and reactor trip occurred during a routine surveillance test. Plant operators stabilized the plant in Mode 3 (Hot Standby) in accordance with emergency operating procedures. A four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(ii) on January 31, 1993, at 0009 PST.

An investigation determined that the immediate cause of the main turbine trip was an inadvertent simulated low condenser vacuum signal that satisfied turbine protection logic.

The root cause of this event has not yet been determined. Among the potential causes being investigated are: (1) personnel error, where an operator holding a test lever that blocked a simulated low condenser vacuum test signal may have permitted the lever to move from the full-travel position, unblocking the signal; and (2) mechanical linkage, where malfunction when misadjustment or wear may have resulted in the test lever not being capable of achieving full travel to block the low condenser vacuum test signal.

Corrective actions include issuance of an Operations Department Incident Summary describing the event. A supplemental report will be submitted when a root cause and any appropriate further corrective actions have been identified.



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TEXT (17)

**I. Plant Conditions**

Unit 2 was in Mode 1 (Power Operation) at 100 percent power.

**II. Description of Event**

**A. Summary:**

On January 30, 1993, at 2147 PST, Unit 2 experienced a turbine (TA)(TRB) trip followed by a reactor (AB)(RCT) trip from 100 percent power during the performance of a routine Surveillance Test Procedure (STP) M-21A, "Main Turbine/Generator Functional Tests."

**B. Background:**

STP M-21A tests the main turbine/generator (TRB/GEN) lube oil system pumps (TD)(P) and main turbine trip (JJ) features associated with the turbine autostop oil system (JJ) (low vacuum trip, low lube oil pressure trip, overspeed trip, and thrust bearing wear trip).

Surveillance testing of the main turbine protective functions is performed monthly. An Operations crew performing this testing typically consists of a "test director", a "valve operator", and a "test lever operator."

Testing these turbine trip features at power requires the turbine trip block valve (JJ)(V) to be held closed while these features are in the simulated trip condition to prevent an actual turbine trip during testing. The block valve is manually kept closed during this testing by the "test lever operator" using a lever in a panel adjacent to the turbine casing.

**C. Event Description:**

On January 30, 1993, at approximately 2100 PST, Operations personnel conducted a pre-test briefing among the crew to perform STP M-21A. This briefing emphasized the need for maintaining the test lever in the required position during the test.

On January 30, 1993, at 2105 PST, Operations personnel began STP M-21A. The performance of this test progressed somewhat more slowly than usual, requiring the operator to hold the test lever in the test position longer than normal. The "test lever operator" has stated, as have other personnel involved in performing this test, that during this test the test lever was held continuously in the required position. The "test lever operator" stated that he did shift his weight during the testing.





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TEXT (17)

On January 30, 1993, at 2147 PST, Unit 2 experienced a turbine trip followed by a reactor trip from 100 percent power during the performance of the routine STP M-21A.

During the low vacuum trip test, the main turbine tripped even though the test lever was apparently being held in the block (test lever full-travel) position. Following the turbine trip, the reactor tripped as designed. All safety systems functioned as required. The plant response was essentially normal with the exception of the main feedwater system No. 2 heater drain pump (SJ)(P), which failed to trip. A pressure transient during the trip caused a gasket leak in a flange (SM)(PSF) on the heater drain pump discharge piping (SM)(PSP). Two other flanges in the line were observed to have been affected by the pressure transient.

Following the trip, the "test director" instructed the "test lever operator" to release the test lever since it was still being maintained in the test position.

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

None.

**E. Dates and Approximate Times for Major Occurrences:**

1. January 30, 1993, at 2147 PST: Event/discovery date.  
Unit 2 main turbine tripped during performance of STP M-21A.
2. January 31, 1993, at 0009 PST: A four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(ii).

**F. Other Systems or Secondary Functions Affected:**

None.

**G. Method of Discovery:**

Alarms and other indications in the control room (NA) provided immediate notification to the control room operators that the event had occurred.



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TEXT (17)

## H. Operator Actions:

Plant operators stabilized the plant in Mode 3 (Hot Standby) in accordance with Emergency Operating Procedures (EOPs) E-0, "Reactor Trip or Safety Injection," and E-0.1, "Reactor Trip Recovery."

## I. Safety System Responses:

1. The main turbine tripped.
2. The reactor trip breakers (JC)(BKR) opened and all control and shutdown rods fell into the core.
3. The auxiliary feedwater pumps (BA)(P) started.

## III. Cause of the Event

### A. Immediate Cause:

The turbine tripped on simulated low condenser vacuum (high condenser back pressure) during the performance of STP M-21A. The reactor tripped due to the turbine trip with reactor power greater than P-9 (50 percent).

### B. Root Cause:

The root cause of this event is still being investigated.

Preliminary investigations have considered:

1. Personnel error, where an operator holding a test lever that blocked a simulated low condenser vacuum test signal may have permitted the lever to move from the full-travel position, unblocking the signal.
2. Mechanical linkage malfunction, where misadjustment or wear may have resulted in the test lever not being capable of achieving full travel to block the low condenser vacuum test signal.

This LER will be revised to report the results of the root cause investigation.

## IV. Analysis of the Event

### A. Safety Analysis:

A reactor trip due to a turbine trip is a previously analyzed Condition II event described in the Final Safety Analysis Report



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT (17)

(FSAR) Update Section 15.2.7, "Loss of External Electrical Load and/or Turbine Trip." The FSAR Update shows that following a turbine trip/reactor trip, the automatic steam dump system (SB) accommodates the excess steam generation. Reactor coolant temperatures and pressure do not significantly increase if the steam dump system and pressurizer pressure control system (JD) are functioning properly. Since the 10 percent steam dump and pressurizer control system functioned as designed, the health and safety of the public were not adversely affected, and there were no adverse consequences or safety implications resulting from this event.

## V. Corrective Actions

### A. Immediate Corrective Actions:

Plant operators stabilized the plant in accordance with EOPs E-0 and E-0.1.

### B. Corrective Actions to Prevent Recurrence:

1. An Operations Department Incident Summary has been issued describing the Unit 2 main turbine trip/reactor trip.
2. An Operations Department Night Order Log entry has been made to inform operators of the potential for a turbine trip/reactor trip during performance of STP M-21A.

This LER will be revised to report any additional corrective actions determined to be appropriate as a result of PG&E's root cause investigation.

## VI. Additional Information

### A. Failed Components:

None.

### B. Previous Similar Events:

None.

