

February 8, 2007

PG&E Letter DCL-07-013

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Docket No. 50-323, OL-DPR-82  
Diablo Canyon Unit 2  
Licensee Event Report 2-2006-003-00  
Manual Reactor Trip due to Reactor Coolant Pump High Temperature Indication

Dear Commissioners and Staff:

In accordance with 10 CFR 50.73 (a)(2)(i)(A) Pacific Gas & Electric Company is submitting the enclosed Licensee Event Report regarding a manual reactor trip initiated due to reactor coolant pump (RCP) high stator temperature indication.

Investigative actions taken following the Unit 2 reactor trip found that the stator temperature detector was defective and no real RCP high temperature existed.

This event did not adversely affect the health and safety of the public. There are no new or revised regulatory commitments in this report.

Sincerely,

James R. Becker

ddm/2246/A0684192

Enclosure

cc/enc: Terry W. Jackson, NRC Senior Resident Inspector  
Bruce S. Mallett, NRC Region IV  
Alan B. Wang, NRR Project Manager  
Diablo Distribution  
INPO

# 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 OF 5</b>
--	---	---------------------------

TITLE (4)  
**Manual Reactor Trip due to Reactor Coolant Pump High Temperature Indication**

EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)									
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER		REVISION NUMBER	MO	DAY	YEAR	FACILITY NAME		DOCKET NUMBER							
12	10	2006	2006	-	0 0 3	- 0 0	02	08	2007			0	0	0	0	0	0	0	0

OPERATING MODE (9) <b>1</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (11) <b>X</b> <b>10 CFR 50.73 (a)(2)(i)(A)</b>
POWER LEVEL (10) <b>1 0 0</b>	(SPECIFY IN ABSTRACT BELOW AND IN TEXT, NRC FORM 366A)

LICENSEE CONTACT FOR THIS LER (12)

<b>Lawrence M. Parker - Senior Regulatory Services Engineer</b>	TELEPHONE NUMBER
	AREA CODE: <b>805</b> NUMBER: <b>545-3386</b>

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	A   B	T   E		Yes					

SUPPLEMENTAL REPORT EXPECTED (14) <input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	EXPECTED SUBMISSION DATE (15)	MON	DAY	YR
<input checked="" type="checkbox"/> NO				

ABSTRACT (Limit to 1400 spaces. i.e., approximately 15 single-spaced typewritten lines.) (16)

On December 10, 2006, at 16:08 PST, licensed plant operators manually tripped the Unit 2 reactor while it was subcritical. An 8-hour nonemergency notification in accordance with 10 CFR 50.72(b)(3)(iv)(A) was made via the emergency notification system at 2231 PST.

On December 10, 2006, with Unit 2 operating in Mode 1, at 100 percent power, licensed plant operators initiated an unplanned reactor shutdown due to indications of increasing reactor coolant pump (RCP) 2-2 stator temperature. In accordance with plant procedures, operators manually tripped the reactor and shutdown RCP 2-2 when the temperature indication reached 300°F. At the time of the reactor trip, Unit 2 was subcritical in Mode 3, Hot Standby, with Control Rod Bank A at 106 steps withdrawn, all other control rods were fully inserted.

All rods fully inserted in response to the manual reactor trip, and all systems functioned as required. The auxiliary feedwater system was already in service as part of the shutdown. The electrical transmission grid was stable. With the exception of RCP 2-2, all major equipment including the three emergency diesel generators remained operable. The other three RCPs maintained forced circulation of the reactor coolant system.

Investigations identified that a stator resistance temperature detector (RTD) had failed causing a false RCP 2-2 increasing temperature indication. The failed RTD input to the PPC monitoring was replaced with an installed spare RTD that was verified to be operating satisfactorily.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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	2006	-	0	0	3	-	0	0	2	OF	5

TEXT

I. Plant Conditions

Diablo Canyon Power Plant Unit 2 was in Mode 1 (Power Operation) at approximately 100 percent reactor power prior to the event.

II. Description of Problem

A. Background

The Plant Process Computer (PPC)[ID] monitors one of the six original equipment manufacturer's (OEM) installed resistance temperature detector (RTD) temperature elements [TE] for each reactor coolant system (RCS)[AB] reactor coolant pump (RCP) motor. The motor stator temperature indication and alarm is provided to give plant operators an early warning of a potential RCP motor problem. The RTDs are 120 ohm nickel copper RTDs originally installed temperature elements provided by the OEM. While the stator has six stator RTDs installed, only one is connected to and monitored by the PPC.

PPC input to PK 05-02 alarms in the control room at approximately 248°F. The annunciator alarm response procedure requires, in part; "IF at any time ...the... temperature limits is met AND SFM concurs: RCP 2-2 stator at or above 300°F .... THEN ...TRIP the Reactor ... TRIP RCP 2-2."

B. Event Description

On December 10, 2006, at 1048 PST, plant operators received PK 05-02 alarm due to RCP 2-2 stator temp greater than the alarm setpoint. Plant operators reviewed the stator temperature history and identified that the temperature increase began approximately 30 hours prior and had been slowly increasing since.

On December 10, 2006, at 1320 PST, with Unit 2 operating in Mode 1, at 100 percent power, operators initiated an unplanned reactor shutdown due to indication of increasing RCP 2-2 stator temperature. In accordance with plant procedures, operators are required to manually trip the reactor and deenergize a RCP if the stator temperature reaches 300°F.

On December 10, 2006, at 16:08 PST, operators manually tripped the reactor while it was subcritical when the RCP stator temperature reached 300°F. Control Rod Bank A was at 106 steps withdrawn, all other control rods were fully inserted.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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	2006	-	0	0	3	-	0	0	3	OF	5

TEXT

All control rods fully inserted in response to the reactor trip, and all systems functioned as required. The auxiliary feedwater system was already in service as part of the shutdown. The electrical transmission grid was stable. With the exception of RCP 2-2, all major equipment including the three emergency diesel generators remained operable. Unit 2 electrical loads were being supplied by the normal startup power. The three unaffected RCPs maintained forced circulation of the RCS.

On December 10, 2006, at 2231 PST, an 8-hour notification in accordance with 10 CFR 50.72 (b)(3)(iv)(A) was made via the emergency notification system (ENS No. 43042).

Investigations identified that a RCP motor stator RTD had failed causing the false RCP 2-2 increasing temperature indication.

**C. Status of Inoperable Structures, Systems, or Components that Contributed to the Event**

The RCP stator temperature RTD failed, falsely indicating an increasing temperature. No actual RCP degradation occurred other than the RTD.

**D. Other Systems or Secondary Functions Affected**

None.

**E. Method of Discovery**

The condition was known to licensed plant operators due to alarms and indications provided in the control room.

**F. Operator Actions**

Licensed plant operators responded to increasing temperature indication and alarm of RCP 2-2 stator temperature, reduced reactor power and placed Unit 2 in Mode 3, Hot Standby. Plant operators tripped the reactor and deenergized RCP 2-2 in accordance with approved plant procedures.

**G. Safety System Responses**

The reactor trip breakers opened and the control rods fully inserted into the reactor as designed. Nonsafety control systems responded as designed throughout the plant shutdown activities.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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	2006	-	0	0	3	-	0	0	4	OF	5

TEXT

III. Cause of the Problem

A. Immediate Cause

The stator RTD had failed causing a false RCP 2-2 increasing temperature indication for the single instrument indication.

B. Root Cause

Single random failure of the RTD such that plant staff were unable to confirm actual RCP motor temperature.

IV. Assessment of Safety Consequences

Licensed plant operators responded to increasing indication and alarm of RCP 2-2 stator temperature, entered approved plant procedures for power reduction, and manually tripped the reactor while it was subcritical in Mode 3. The cause of the increasing temperature was identified as a failed RTD and not an actual RCP motor abnormal condition.

There were no actual safety consequences involved in this event since no safety related equipment was degraded and an orderly manual reactor shutdown is a normal operating practice previously evaluated in the Final Safety Analysis Report Update.

Also, the condition is not considered a Safety System Functional Failure.

Therefore, the event is not considered risk significant, and it did not adversely affect the health and safety of the public.

V. Corrective Actions

A. Immediate Corrective Actions

The failed RTD input to the PPC monitoring was replaced with an installed spare RTD that was verified to be operating satisfactorily.

B. Corrective Actions

1. The RTD stator temperature alarm response procedure will be revised to provide additional guidance regarding information to be gathered for formal operational decision making prior to initiation of a reactor trip.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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	2006	-	0	0	3	-	0	0	5	OF	5

TEXT

2. A program for RTD health monitoring and performance of periodic data assessment of critical RTDs identified as single point vulnerabilities will be developed to aid in identifying potentially failing RTDs.
3. The PPC alarm setpoint will be revised for the RCP stator RTDs to provide additional margin between alarm initiation and required operator action.

VI. Additional Information

A. Failed Component

The RTDs are 120 ohm nickel copper RTDs originally installed temperature elements provided by the OEM.

B. Previous Similar Events

None.

## OUTGOING CORRESPONDENCE SCREEN (Remove prior to NRC submittal)

Document: PG&E Letter DCL-07-013

Subject: Manual Reactor Trip due to Reactor Coolant Pump High Temperature Indication

File Location S:\RS\RA\LER\2007\DCL07013.DOC

### FSAR Update Review

Utilizing the guidance in XI3.ID2, does the FSAR Update need to be revised? Yes  No   
*If "Yes", submit an FSAR Update Change Request in accordance with XI3.ID2 (or if this is an LAR, process in accordance with WG-9)*

**Commitment #1:** .

Statement of Commitment: The RTD stator temperature alarm response procedure will be revised to provide additional guidance regarding information to be gathered for formal operational decision making prior to initiation of a reactor trip.

Clarification: There are no new commitments contained in this letter.

<i>Tracking Document:</i>	<small>AR or NCR</small> N0002213	<small>AE or ACT</small> Act009
<i>Assigned To:</i>	<small>NAME</small>	<small>ORGANIZATION CODE</small>
<i>Commitment Type:</i>	<small>FIRM OR TARGET</small>	<small>DUE DATE:</small>
<i>Outage Commitment?</i>	<small>YES OR NO</small> No	<small>IF YES, WHICH? (E.G., 2R9, 1R10, ETC.)</small>
<i>PCD Commitment?</i>	<small>YES OR NO</small> No	<small>IF YES, LIST THE IMPLEMENTING DOCUMENTS (IF KNOWN)</small>
<i>Duplicate of New NCR Commitment in PCD?</i>	<small>YES OR NO</small> No	<small>IF YES, LIST PCD NUMBER (e.g., T35905, etc.)</small>
<i>Old PCD Commitment being changed?</i>	<small>YES OR NO</small> No	<small>IF YES, LIST PCD NUMBER, AND CLARIFY TO CLERICAL HOW COMMITMENT TO BE REVISED</small>

**Commitment #2**

Statement of Commitment: A program for RTD health monitoring and performance of periodic data assessment of critical RTDs identified as single point vulnerabilities will be developed to aid in identifying potentially failing RTDs.

Clarification: There are no new commitments contained in this letter.

<i>Tracking Document:</i>	<small>AR or NCR</small> N0002213	<small>AE or ACT</small> Act008
<i>Assigned To:</i>	<small>NAME</small> PGMB	<small>ORGANIZATION CODE</small>
<i>Commitment Type:</i>	<small>FIRM OR TARGET</small>	<small>DUE DATE:</small>
<i>Outage Commitment?</i>	<small>YES OR NO</small>	<small>IF YES, WHICH? (E.G., 2R9, 1R10, ETC.)</small>
<i>PCD Commitment?</i>	<small>YES OR NO</small>	<small>IF YES, LIST THE IMPLEMENTING DOCUMENTS (IF KNOWN)</small>
<i>Duplicate of New NCR Commitment in PCD?</i>	<small>YES OR NO</small>	<small>IF YES, LIST PCD NUMBER (e.g., T35905, etc.)</small>
<i>Old PCD Commitment being changed?</i>	<small>YES OR NO</small>	<small>IF YES, LIST PCD NUMBER, AND CLARIFY TO CLERICAL HOW COMMITMENT TO BE REVISED</small>

**Commitment #2**

Statement of Commitment: The PPC alarm setpoint will be revised for the RCP stator RTDs to provide additional margin between alarm initiation and required operator action.

Clarification: There are no new commitments contained in this letter.

<i>Tracking Document:</i>	<small>AR or NCR</small> N0002213	<small>AE or ACT</small> Act010
<i>Assigned To:</i>	<small>NAME</small> PGMB	<small>ORGANIZATION CODE</small>
<i>Commitment Type:</i>	<small>FIRM OR TARGET</small>	<small>DUE DATE:</small>
<i>Outage Commitment?</i>	<small>YES OR NO</small>	<small>IF YES, WHICH? (E.G., 2R9, 1R10, ETC.)</small>
<i>PCD Commitment?</i>	<small>YES OR NO</small>	<small>IF YES, LIST THE IMPLEMENTING DOCUMENTS (IF KNOWN)</small>
<i>Duplicate of New NCR Commitment in PCD?</i>	<small>YES OR NO</small>	<small>IF YES, LIST PCD NUMBER (e.g., T35905, etc.)</small>
<i>Old PCD Commitment being changed?</i>	<small>YES OR NO</small>	<small>IF YES, LIST PCD NUMBER, AND CLARIFY TO CLERICAL HOW COMMITMENT TO BE REVISED</small>