



**Pacific Gas and  
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August 17, 2009

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PG&E Letter DCL-09-059

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 2-2009-001-00  
Technical Specification 3.0.3 One Hour Exceeded  
Due to Failure of Group Step Counters

Dear Commissioners and Staff:

In accordance with 10 CFR 50.73(a)(2)(i)(B) Pacific Gas and Electric Company is submitting the enclosed Licensee Event Report (LER) regarding exceeding Technical Specification (TS) 3.1.7 Limiting Condition for Operation (LCO) and TS 3.0.3 LCO 1-hour allowable time to correct one of two failed reactor shutdown rod bank group step counters. This LER is submitted late due to an oversight.

There are no new or revised regulatory commitments in this report.

This event did not adversely affect the health and safety of the public.

Sincerely,

  
James R. Becker

ddm/2246/50231240

Enclosure

cc/enc: Elmo E. Collins, NRC Region IV  
Michael S. Peck, NRC Senior Resident Inspector  
Alan B. Wang, NRR Project Manager  
INPO  
Diablo Distribution

*JE22*  
*NRR*

# LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE0B-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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4. TITLE  
**Technical Specification 3.0.3 One Hour Exceeded Due to Failure of Group Step Counters**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	17	2009	2009	- 001	- 00	07	19	2009	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE  1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)				
10. POWER LEVEL  100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Steven W. Hamilton – Senior Regulatory Services Engineer	TELEPHONE NUMBER (Include Area Code) (805) 545-3449
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
A				No					

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

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

On March 17, 2009, at 09:25 PDT, with Unit 2 in Mode 1 (Power Operation) at approximately 100 percent reactor power, the 1-hour time allowed by Technical Specification (TS) 3.0.3, to correct one of two reactor shutdown rod group step counters was exceeded.

On February 18, 2009, plant operators identified a Bank "B" group step counter digital display that began to blink indicating degraded battery voltage. On March 8, 2009, the group step counter failed. On March 17, 2009, at 08:25 PDT, plant operators entered TS 3.0.3, following identification of a second group step counter failure for shutdown Bank "B," a condition not allowed by TS 3.1.7.

On March 17, 2009, at 10:18 PDT, one group step counter was replaced and TS 3.0.3 was exited, and TS 3.1.7, Action D was reentered. Plant operators exited TS 3.1.7 at 11:11 PDT following the installation of fresh batteries in the second group demand counter for shutdown Bank "B."

The cause of the event was inappropriate maintenance schedule and priority to replace the group demand counter batteries prior to failure.

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TEXT

I. Plant Conditions

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

II. Description of Problem

A. Background:

The Diablo Canyon Power Plant (DCPP) Unit 2 is a Pressurized Water Reactor (PWR) with 53 shutdown and control rods [AA] designed and provided by the Nuclear Steam Supply System (NSSS) vendor, Westinghouse. The control and shutdown rods are arranged into 4 control rod banks (A through D) and 4 shutdown rod banks (A through D).

Technical Specification (TS) 3.1.7, "Rod Position Indication," Limiting Condition for Operation (LCO) requires that "The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE" in "MODES 1 and 2." TS 3.1.7, Note, states; "Separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator." TS 3.1.7, Action D, requires that with "One demand position indicator per bank inoperable for one or more banks, verify the most withdrawn rod and the least withdrawn rod of the affected banks are  $\leq 12$  steps apart, AND verify by administrative means all DRPIs for the affected banks are OPERABLE once per 8 hours, OR reduce THERMAL POWER to  $\leq 50\%$  RTP" within 8 hours." TS 3.1.7 does not explicitly state an Action for two group step counters per bank inoperable, although Bank "B" has two indicators.

TS 3.1.7, Action D.1.1 and D.1.2 Bases, states: "With one demand position indicator per bank inoperable, the rod positions can be determined by the DRPI System. Since normal power operation does not require excessive movement of rods, verification by administrative means that the rod position indicators are OPERABLE and the most withdrawn rod and the least withdrawn rod are  $\leq 12$  steps apart within the allowed Completion Time of once every 8 hours is adequate."

TS 3.1.7, Action E.1 Bases, states: "If the Required Actions cannot be completed within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The allowed Completion Time is reasonable, based on operating experience, for reaching the required MODE from full power conditions in

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TEXT

an orderly manner and without challenging plant systems.

Technical Specification, LCO 3.0.3 states in part: "When ... an associated ACTION is not provided, ... the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in:

- a. MODE 3 within 7 hours;
- b. MODE 4 within 13 hours; and
- c. MODE 5 within 37 hours...

Where corrective measures are completed that permit operation in accordance with the LCO or ACTIONS, completion of the actions required by LCO 3.0.3 is not required."

The Control Rod Banks provide a movable, thermal and epithermal neutron absorber for core reactivity control and shutdown capability.

The shutdown banks insert negative reactivity for reactor shutdown during all credible events. The shutdown banks have no other functions. The shutdown banks are withdrawn first during reactor startups. All of the shutdown banks are withdrawn one bank at a time. Their withdrawal adds positive reactivity to the reactor. When fully withdrawn, these banks provide the ability to quickly add a large amount of negative reactivity to the reactor, causing it to shutdown. The amount of negative reactivity necessary to shut down the reactor during postulated accidents determined the number of control rods in each shutdown bank.

The axial position of shutdown rods and control rods are determined by two separate and independent systems: the Bank Demand Position Indication (BDPI) System (commonly called group step counters) and the DRPI System.

The BDPI System counts the pulses from the Rod Control System that move the rods. There is one step counter [CTR] for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The BDPI System is considered highly precise (plus or minus 1 step or plus or minus 5/8 inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod.

The purpose of the BDPI is to provide indication of the position demanded of the rod banks and rod groups of the Rod Control System. Because each rod in a given group receives the same motion-governing signals,

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TEXT

demand position is normally indicative of true rod position. However, if a rod does not move when demanded by the Rod Control System (it is stuck or dropped) then demanded position will no longer reflect actual rod position.

The purpose of the group step counters is to count the number of demanded steps for each of the 14 rod groups (both control and shutdown banks). Each group step counter has three digits, which indicate the net number of 5/8 inch steps demanded to that group, as referenced to withdrawal from the fully inserted position. This indication can be manually advanced in the positive or negative direction by depressing the UP or DOWN pushbuttons. The three digit control board display is powered by two 3 Volt Direct Current (VDC) lithium batteries, for a nominal 6 VDC. The display is designed to flash off and on when the battery voltage is less than 4.2 VDC. The indicators have been tested to function with one of the two batteries removed, or as low as 3 VDC.

The plant computer counts the demanded up and down step signals for each rod bank. It also receives individual rod position indication for all 53 control rods from DRPI. The plant computer then compares the position of the individual rod to its bank position and causes an annunciator to alarm if the individual rod is greater than 12 steps from its bank, if any shutdown bank demand or DRPI indicates less than 225 steps, and if any control bank demand indicates improper sequence (bank overlap).

**B. Event Description**

On February 18, 2009, the group step counter for Bank "B," Group I, was identified as blinking, indicating a degraded condition (voltage less than 4.2 VDC).

On March 8, 2009, the group step counter for Bank "B," Group I, stopped blinking and the screen went blank. Plant operators entered TS 3.1.7, Action D1.1, to "Verify by administrative means all DRPIs for the affected banks are OPERABLE," and, Action D.1.2, to "Verify the most withdrawn rod and the least withdrawn rod of the affected banks are  $\leq$ 12 steps apart, once per 8 hours."

On March 17, 2009, at 08:10 PDT, licensed plant operators at the controls questioned the validity of the group step counter for Bank "B," Group II, due to a dimly lit and blinking display.

On March 17, 2009, at 08:25 PDT, plant operators declared the Bank "B,"

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Group II, group step counter inoperable and entered TS 3.0.3.

On March 17, 2009, between 08:36 PDT and 09:25 PDT utility control technicians responded to the control room to implement maintenance activities to replace the BDPI System group step counter batteries.

On March 17, 2009, at 09:40 PDT, plant operators completed a crew brief in preparation for a reactor power reduction ramp to begin not later than 10:30 PDT due to the group step counter display indication failures.

On March 17, 2009, at 10:18 PDT, following the successful replacement of one Bank "B" group step counter with new batteries, plant operators exited TS 3.0.3 and re-entered TS 3.1.7, Action D.

On March 17, 2009, at 11:11 PDT, following the successful replacement of a second Bank "B" group step counter with new batteries, plant operators exited TS 3.1.7, Action D.

On June 18, 2009, based upon questions from the NRC Resident Inspector, this event was determined to be reportable due to the TS 3.0.3 1-hour LCO condition being exceeded and preparations having been initiated by plant operators to implement a power reduction.

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

BDPI System, Bank "B," Group I, group step counter was declared inoperable on March 8, 2009. BDPI System, Bank "B," Group II, was declared inoperable on March 17, 2009, at 08:25 PDT.

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

No additional safety systems were adversely affected by this event.

**E. Method of Discovery**

The BDPI System group step counter display is a primary indicator of reactor rod position provided in the control room on the reactor control operator's console. DCPD licensed plant operators at the controls identified the changes of indication promptly as noted in this report.

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TEXT

**F. Operator Actions**

Utility licensed plant operators maintained Unit 2 in Mode 1 at normal operating temperature and pressure during this event.

Plant operators entered TS 3.0.3 during this event due to the inoperability of indications provided in the control room for the BDPI System Bank "B," Groups I and II, group step counters, for which TS 3.1.7. does not provide a condition or action.

**G. Safety System Responses**

No safety systems were required to respond.

**III. Cause of the Problem**

**A. Immediate Cause**

The BDPI System group step counter display batteries reached their end-of-service-life. Variation in group step counter current draw depleted the batteries in a shorter time period than predicted, resulting in prompt replacement being required.

**B. Root Cause**

The operational cause of this event was lack of operator awareness of the potential TS 3.0.3 implications of a second group step counter failure.

The maintenance related cause of this event was variation in group step counter current draw that depleted the batteries in a shorter time period than predicted resulting in prompt replacement being required.

The maintenance scheduling cause of the event was inappropriate maintenance priority to replace batteries prior to failure and lack of pre-planned maintenance work orders to quickly respond to on-line failures.

**IV. Assessment of Safety Consequences**

There were no safety consequences as a result of this event.

The purpose of the shutdown banks is to insert negative reactivity for reactor shutdown during all credible events. The shutdown banks have no other functions. The shutdown banks are withdrawn first during reactor startups. The

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TEXT

ability of the shutdown bank rods to release upon a reactor trip signal initiation and fall by gravity into the reactor core to assure a shutdown was not adversely affected by this event.

The Unit 2 reactor was maintained in Mode 1 at stable pressure and temperature during this event with reactor trip breaker equipment operable; thus, any at-power accident conditions postulated in the Final Safety Analysis Report Update were unchanged.

The nonconforming condition could not have led to an operator error or rod misalignment, as the shutdown banks were maintained fully withdrawn from the reactor core with computer monitoring alarms available throughout the event.

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

V. Corrective Actions

A. Immediate Corrective Actions

Plant operators entered TS 3.0.3 and maintained Unit 2 in Mode 1 at approximately 100 percent reactor power during the replacement of the group step counters with new batteries installed. This event was entered into the DCPD corrective action program for resolution.

B. Corrective Actions to Prevent Recurrence (CAPR)

DCPD will revise the operators turnover checklist in OP1.DC37 to require a TS review for the potential TS 3.0.3 or other short (less than one shift) TS action shutdown if an additional failure were to occur.

DCPD will revise operating procedure OP1.DC17 attachments regarding TS sheet initiation and verification to review a condition being entered for potential TS 3.0.3 or other short (less than one shift) TS Action. When the potential is identified, the shift manager (SM) is to verify appropriate priority for condition resolution and include the item in the SM turnover in the control room.

DCPD will replace the older group step counters on an expedited schedule during the next routine scheduled refueling outage(s).

DCPD maintenance will update a contingency replacement order for prompt on-line replacement of the group step counters.



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DCPP maintenance priority for group step counter battery replacement will be revised to reflect actual battery service life experience.

VI. Additional Information

A. Failed Components

Generic Battery: 3 VDC Lithium "C" Cell  
DCPP Part Number 76-8495.

B. Previous Similar Events

None.

C. Industry Reports

None.