



**Pacific Gas and  
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August 13, 2012

PG&E Letter DCL-12-079

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

10 CFR 50.73

Docket No. 50-275, OL-DPR-80  
Diablo Canyon Unit 1  
Licensee Event Report 1-2012-004-00, Mode Transition with Turbine-Driven  
Auxiliary Feedwater Pump 1-1 Inoperable

Dear Commissioners and Staff;

Pacific Gas and Electric Company (PG&E) submits the enclosed Licensee Event Report (LER) regarding an improper mode transition with an inoperable turbine-driven auxiliary feedwater pump. PG&E is submitting this LER in accordance with 10 CFR 50.73(a)(2)(i)(B) and providing the cause, corrective actions and assessment of safety consequences for the event.

PG&E makes no new or revised regulatory commitments (as defined by NEI 99-04) in this report.

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

Sincerely,

James M. Welsch  
*Interim Site Vice President*

wrl8/50491007

Enclosure

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

**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: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-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.

<b>1. FACILITY NAME</b> Diablo Canyon Power Plant	<b>2. DOCKET NUMBER</b> 05000-275	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Mode Transition with Turbine-Driven Auxiliary Feedwater Pump 1-1 Inoperable

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
06	13	2012	2012	04	00	08	13	2012	FACILITY NAME	DOCKET NUMBER

<b>9. OPERATING MODE</b>  3	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)											
	<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)								
<b>10. POWER LEVEL</b>  0	<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 <b>Wilbert R. Landreth, Regulatory Services Engineer</b>	TELEPHONE NUMBER (Include Area Code) <b>(805) 545-6980</b>
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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

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

On June 13, 2012, at 1115 PDT, during the 17th Refueling Outage for Unit 1 (1R17), Diablo Canyon Power Plant (DCPP) entered Technical Specification (TS) 3.7.5.B, due to one auxiliary feedwater (AFW) train being inoperable in Mode 3. After entering Mode 3, steam turbine-driven AFW Pump (TD AFW PP) 1-1 failed its routine and post-maintenance surveillance testing when the pump speed was higher than the acceptable limit and could not be lowered. Plant operators declared TD AFW PP 1-1 inoperable as required by TS 3.7.5. TS 3.7.5.B.1 requires action to restore the AFW train to operable within 72 hours and 10 days from discovery of failure to meet the Liming Condition for Operation.

Mechanical Maintenance (MM) rebuilt TD AFW PP Governor Valve FCV-15 and replaced the valve stem during 1R17. MM reassembled the valve and installed the stem positioning jam nuts. However, due to inadequately detailed work instructions, the jam nuts were installed such that the valve could not be fully closed. The procedure used to perform the work did not include steps requiring a final verification that the valve would fully close. During troubleshooting activities, MM confirmed that FCV-15 was partially open when it should have been fully closed. After repair and reassembly of FCV-15, plant operators successfully completed surveillance testing for TD AFW PP 1-1. On June 14, 2012, at 2256 PDT, plant operators declared the AFW train operable within the TS time limit imposed. DCPP will revise plant procedures to provide detailed instructions to verify a full-closed valve position.

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**NARRATIVE**

**I. Plant Conditions**

During surveillance testing of the Unit 1 auxiliary feedwater (AFW) system [BA], Unit 1 transitioned from Mode 4 (Hot Shutdown) to Mode 3 (Hot Standby). The reactor [RCT] coolant system (RCS) [SJ] temperature and pressure at this time were about 500 degrees Fahrenheit and 1880 pounds per square inch (psig) respectively. The steam generator (SG) [SJ] pressure was approximately 650 psig.

**II. Description of Problem**

**A. Background**

Diablo Canyon Power Plant's (DCPP's) AFW system consists of three AFW supply trains. One train has a full-capacity, approximately 780 gallon-per-minute (gpm), steam turbine-driven AFW Pump (TD AFW PP) 1-1 aligned to all four SGs. The other two trains have half-capacity, motor-driven AFW Pumps 1-2 and 1-3, each supplying approximately 390 gpm to two of the four SGs, with the capability to be manually aligned to any of the four SGs. The function of the AFW system during unit startup and shutdown is to supply the SGs with a secondary heat sink while the main feedwater system [SJ] is unavailable.

Technical Specification (TS) Limiting Condition for Operation (LCO) 3.7.5, "Auxiliary Feedwater System," requires three AFW trains to be operable in Mode 1 (Power Operation), Mode 2 (Startup), and Mode 3. TS LCO 3.7.5 is modified by a note that prohibits mode transition with an inoperable AFW pump [P]. Surveillance Requirement (SR) 3.7.5.2 requires testing of TD AFW PP 1-1 to be performed within 24 hours after reaching 650 psig steam pressure in the SGs.

**B. Event Description**

Mechanical Maintenance (MM) rebuilt TD AFW PP Governor Valve FCV-15 [FCV] and replaced the valve stem during the 17th Refueling Outage for Unit 1 (1R17). After the rebuild, and after the new governor valve stem was installed, MM reassembled the valve and installed the stem positioning jam nuts. However, due to inadequately detailed work instructions, the jam nuts were later found to be installed such that the valve could not travel to its full-closed position. The procedure that MM was using to perform the work did not include any steps that required a final verification that the valve would fully close.

Plant operators reviewed the maintenance that was performed on FCV-15, completed post-maintenance testing, and concluded requirements for declaring TD AFW PP 1-1 operable were satisfied as described by SR 3.0.1 Bases, allowing operators to proceed to Mode 3 where other necessary post-maintenance tests can be completed.

After entering Mode 3 during 1R17, TD AFW PP 1-1 failed its routine and post-maintenance Surveillance Test Procedure (STP) P-AFW-11 when the pump speed was found to be too high, but still below the over-speed trip setpoint, and could not be lowered within the acceptable range using the TD AFW PP speed controller. On June 13, 2012, at 1115 PDT, during 1R17, Pacific Gas and Electric Company (PG&E) entered TS 3.7.5.B, with one AFW train inoperable in Mode 3 due to TD AFW PP 1-1 failing its surveillance test. TS 3.7.5.B.1 requires action to restore the AFW train to operable within 72 hours and 10 days from discovery of failure to meet the Limiting Condition for Operation.

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During troubleshooting activities, MM determined that FCV-15 was about 1/8 inch open when it should have been fully closed. MM corrected the improper position of the valve stem, and reassembled the valve. After final reassembly, plant staff completed surveillance testing of the TD AFW PP and determined that the required surveillance performance criteria was successfully met, confirming satisfactory performance of the valve and thus, the speed control of the pump.

On June 14, 2012, at 2256 PDT, plant operators declared the AFW train operable within the 72-hour time limit imposed by TS Action 3.7.5.B.1. PG&E determined that TD AFW PP 1-1 was consequently inoperable during the mode transition from Mode 4 to Mode 3.

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

None.

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

None.

**E. Method of Discovery**

The unsatisfactory performance of TD AFW PP 1-1 was discovered during the performance of post-maintenance surveillance testing. Troubleshooting determined that plant operators were unable to control the speed of the pump because FCV-15 would not fully close.

**F. Operator Actions**

As described in Section B, "Event Description."

**G. Safety System Responses**

None.

**III. Apparent Cause**

The FCV-15 valve stem was not installed properly due to insufficiently detailed instructions for the governor valve.

**IV. Assessment of Safety Consequences**

The as-found condition of FCV-15 prevented TD AFW PP 1-1 from meeting its surveillance acceptance criteria at recirculation flow. Troubleshooting confirmed the governor was functioning properly, and that the valve was slightly open with the governor servo at its travel limit in the closed direction due to improper positioning because of insufficiently detailed governor valve instructions. Once the improper position was corrected, the governor controller functioned normally, satisfying the surveillance acceptance criteria at recirculation flow. PG&E's evaluation concluded that full-flow performance would not have been affected in the as-found condition.

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**NARRATIVE**

V. Corrective Actions

PG&E will take the following corrective actions:

- 1) Revise plant procedure MP M-3.8, "Terry Turbine Governor Valve Maintenance," to provide detailed instructions for removal and reinstallation of the governor valve stem to ensure governor valve can be fully closed.
- 2) Revise plant procedure MP M-4.25 "Auxiliary Feedwater Pump Turbine Governor Maintenance," to provide detailed instructions for final verification of the governor valve position.

VI. Additional Information

A. Failed Components

None.

B. Previous Similar Events

A previous event occurred on January 3, 2011, when PG&E identified that the TD AFW PP 1-1 was inoperable on November 6, 2010, due to an improperly set speed governor in Mode 3. The TD AFW PP 1-1 post maintenance test identified that the TD AFW PP 1-1 as-found condition exceeded the engineering-established acceptance criteria of 4,260 revolutions per minute for surveillance testing of the pump. PG&E determined that the TD AFW PP 1-1 was consequently inoperable during the mode transition from Mode 4 to Mode 3 (Ref. Licensee Event Report 1-2011-001-01).

PG&E replaced the Unit 2 TD AFW PP 2-1 speed governor during the 14th Refueling Outage for Unit 2 and discovered that the TD AFW PP 2-1 exhibited issues similar to the above. On April 10, 2008, after entry into Mode 3 from Mode 4, the TD AFW PP 2-1 as-found pump speed was lower than the minimum value specified in the STP. PG&E determined that the TD AFW PP 2-1 was consequently inoperable during the mode transition from Mode 4 to Mode 3. This event was recognized more than 3 years after the incident and was therefore not reported in accordance with 10 CFR 50.72 or 50.73.