

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9103080358 DOC.DATE: 91/03/01. NOTARIZED: NO DOCKET #  
 FACIL:50-275 Diablo Canyon Nuclear Power Plant, Unit 1, Pacific Ga 05000275  
 AUTH.NAME AUTHOR AFFILIATION  
 HUG,M.T. Pacific Gas & Electric Co.  
 SHIFFER,J.D. Pacific Gas & Electric Co.  
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-002-00:on 910201,reactor trip occurred due to steam generator 1-4 low level coincident w/steam flow/feedwater flow mismatch.Caused by erection of scaffolding which isolated air supply.Procedures revised.W/910301 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

### NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD5 LA	1 1	PD5 PD	1 1
	ROOD,H	1 1		
INTERNAL:	ACNW	2 2	ACRS	2 2
	AEOD/DOA	1 1	AEOD/DSP/TPAB	1 1
	AEOD/ROAB/DSP	2 2	NRR/DET/ECMB 9H	1 1
	NRR/DET/EMEB 7E	1 1	NRR/DLPQ/LHFB11	1 1
	NRR/DLPQ/LPEB10	1 1	NRR/DOEA/OEAB	1 1
	NRR/DREP/PRPB11	2 2	NRR/DST/SELB 8D	1 1
	NRR/DST/SICB 7E	1 1	NRR/DST/SPLB8D1	1 1
	NRR/DST/SRXB 8E	1 1	<u>REG FILE</u> 02	1 1
	RES/DSIR/EIB	1 1	RGN5 FILE 01	1 1
EXTERNAL:	EG&G BRYCE,J.H	3 3	L ST LOBBY WARD	1 1
	NRC PDR	1 1	NSIC MAYS,G	1 1
	NSIC MURPHY,G.A	1 1	NUDOCS FULL TXT	1 1

### NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK,  
 ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION  
 LISTS FOR DOCUMENTS YOU DON'T NEED!

FULL TEXT CONVERSION REQUIRED  
 TOTAL NUMBER OF COPIES REQUIRED: LTTR 33 ENCL 33



Pacific Gas and Electric Company

77 Beale Street  
San Francisco, CA 94106  
415/973-4684  
TWX 910-372-6587

James D. Shiffer  
Senior Vice President and  
General Manager  
Nuclear Power Generation

March 1, 1991

PG&E Letter No. DCL-91-044



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

Re: Docket No. 50-275, OL-DPR-80  
Diablo Canyon Unit 1  
Licensee Event Report 1-91-002-00  
Reactor Trip on Steam Generator Low Level with Steam  
Flow/Feedwater Flow Mismatch due to Personnel Error

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PG&E is submitting the enclosed Licensee Event Report (LER) concerning a reactor trip on steam generator low level coincident with steam flow/feedwater flow mismatch due to personnel error.

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

Sincerely,

A handwritten signature in dark ink, appearing to read 'J. D. Shiffer'. The signature is fluid and cursive, with a large initial 'J' and 'S'. Below the signature, the name 'J. D. Shiffer' is printed in a small, sans-serif font.

cc: A. P. Hodgdon  
J. B. Martin  
P. J. Morrill  
P. P. Narbut  
H. Rood  
CPUC  
Diablo Distribution  
INPO

DC1-91-WP-N012

Enclosure

5245S/0085K/ALN/2246



# LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>DIABLO CANYON UNIT 1</b>										DOCKET NUMBER (2) <b>0 5 0 0 0 2 7 5 1</b>					PAGE (3) <b>OF 6</b>			
TITLE (4) <b>REACTOR TRIP ON STEAM GENERATOR LOW LEVEL WITH STEAM FLOW/FEEDWATER FLOW MISMATCH DUE TO PERSONNEL ERROR</b>																		
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 (S)		
02	01	91	91	-	0	0	2	-	0	0	03	01	91					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>0 9 0</b>			<div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> 10 CFR</span> <span><u>50.73 (a)(2)(iv)</u></span> </div> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> OTHER</span> <span></span> </div> <p style="text-align: center;">(Specify in Abstract below and in text, NRC Form 366A)</p>															
LICENSEE CONTACT FOR THIS LER (12)																		
MARTIN T. HUG, SENIOR REGULATORY COMPLIANCE ENGINEER										AREA CODE <b>805</b>		TELEPHONE NUMBER <b>545-4005</b>						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																		
CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS								
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												04		01		91		
ABSTRACT (16)																		
<p>On February 1, 1991 at 0909 PST, with Unit 1 operating at approximately 90 percent power, a Unit 1 reactor trip occurred due to Steam Generator (SG) 1-4 low level coincident with a steam flow/feedwater flow mismatch. A four-hour, non-emergency report was made in accordance with 10 CFR 50.72 (b)(2)(ii) on February 1, 1991, at 1149 PST.</p> <p>The root cause of the event was determined to be personnel error (cognitive). Personnel erecting scaffolding in the area of feedwater regulating valve FCV-530 inadvertently closed valve AIR-I-1-1041, which isolated instrument air supply to feedwater regulating and bypass valves FW-1-FCV-530, 540, 1530, and 1540. The regulating and bypass valves failed closed on loss of instrument air, isolating feedwater flow to two SGs. SG levels decreased and the unit tripped.</p> <p>The corrective actions include: (1) revision of procedures to secure sensitive air valves against accidental closure; (2) issuance of a maintenance policy requiring that all work to be performed prior to the outage must be on the approved daily schedule; (3) issuance of a Work Planning policy on marking work packages; and (4) revision of Administrative Procedure AP C-59, "Elevated Work Structures," to clarify responsibilities and restrictions for erection and removal of scaffolding. A supplemental LER will be issued to report the results of investigation into equipment failures associated with this event.</p>																		



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)
DIABLO CANYON UNIT 1	0 5 0 0 0 2 7 5	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2   OF   6	
		91	-	0 0 2		

TEXT (17)

## I. Plant Conditions

Unit 1 was in Mode 1 (Power Operation) at approximately 90 percent power.

## II. Description of Event

### A. Event:

On December 5, 1990, Maintenance Planning requested that scaffolding be provided to support the inspection and repair of Main Feedwater Regulating Valve (SJ)(FCV) FW-1-FCV-530, which was scheduled for inspection during the upcoming Unit 1 refueling outage.

In December 1990 and January 1991, the work package for erection of the scaffolding was prepared. The work package contained the work order, elevated work structure request form (scaffolding request), component information, and an area map showing the location of equipment. However, the scaffolding request was not fully completed. The dates by which the scaffolding was required were not filled in and the request was not marked as "outage," "pre-outage," or "non-outage" work.

On January 28, 1991, Operations signed off on their review of the scaffolding request. In accordance with Administrative Procedure (AP) C-59, "Elevated Work Structures," Operations reviews scaffolding requests for their potential effect on equipment. Although AP C-59 requires a sketch on the scaffolding request form, it does not specify the level of detail required. The sketch on this scaffolding request form did not provide sufficient detail to show the exact location where the scaffolding was to be erected. Operations did not recognize that the area designated for scaffolding erection included FW-1-FCV-530.

Outage management had scheduled the scaffolding for erection on February 4, during the outage and after plant shutdown. Since erection was scheduled to be performed after plant shutdown, the work package did not appear on the daily (pre-outage) schedule. Work packages on the daily schedule receive additional plant management review and approval before being issued for work.

On January 30, 1991, prior to the scheduled time and during plant operation, erection of scaffolding began near valve AIR-I-1-1041, which is the instrument air isolation valve (LD)(ISV) for valves FW-1-FCV-530 and 540 and Bypass Feedwater Regulating Valves FW-1-FCV-1530 and 1540.

On February 1, 1991, three contractor personnel were setting planks on the scaffolding structure around FW-1-FCV-530 when they heard a hissing noise followed by a loud bang. At approximately 0908 PST, the





# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)	
DIABLO CANYON UNIT 1	0 5 0 0 0 2 7 5	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER					
		91	-	0 0 2	-	0 0	3	of	6

TEXT (17)

control room received steam generator (AB)(SG) level deviation alarms for Steam Generators (SGs) 1-3 and 1-4. Operators responded by attempting to manually open valves FW-1-FCV-530 and 540 from the control room.

On February 1, 1991 at 0909 PST, a Unit 1 reactor trip occurred due to SG 1-4 low level coincident with a steam flow/feedwater flow mismatch. A four-hour, non-emergency report was made in accordance with 10 CFR 50.72 (b)(2)(ii) on February 1, 1991, at 1149 PST.

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

None.

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

1. January 30, 1991: Erection of scaffolding began.
2. February 1, 1991, at 0909 PST: Event/Discovery date. Reactor trip due to SG 1-4 low level with steam flow/feed flow mismatch while contractor personnel were setting planks on scaffolding structure.
3. February 1, 1991, at 1149 PST: The 4-hour non-emergency report to the NRC required by 10 CFR 50.72 (b)(2)(ii) was made.

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

1. Circulating Water Pump (CWP) (KE)(P) 1-1 failed to restart following the 12kV bus power transfer to startup power.
2. The 25kV Motor Operated Disconnect (MOD) switch (EL)(MOD) did not open fully.
3. Control Rod Drive Mechanism (CRDM) Cooling Fan (CD)(FAN) E-13 failed to restart following the power transfer.
4. Main Turbine Stop Valve (SB)(ISV) FCV-145 did not fully close.

These failures are being investigated. The results of these investigations will be reported in a supplemental LER.



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)
DIABLO CANYON UNIT 1	0 5 0 0 0 2 7 5	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4   OF   6	
		91	- 0 0 2	- 0 0		

TEXT (17)

**E. Method of Discovery:**

The event was immediately apparent to plant operators due to alarms and indications received in the control room.

**F. Operator Actions:**

Operators noted that valves FW-1-FCV-530 and 540 were closed and attempted to manually open them from the control room. No response was observed. Operators were about to manually attempt to open bypass valves FW-1-FCV-1530 and 1540 from the control room when the reactor tripped. (However, since closure of AIR-I-1-1041 isolated instrument air to the bypass valves as well as the regulating valves, the bypass valves would not have opened either.)

Following the trip, operators stabilized the plant in Mode 3 (Hot Standby) using Emergency Operating Procedures (EPs) E-0, "Reactor Trip or Safety Injection," and E-0.1, "Reactor Trip Response." Operators restarted CWP 1-1, manually opened the MOD switch, restarted CRDM fan E-13, and locally verified the position of FCV-145. Immediately downstream of FCV-145, Turbine Governor Control Valve (SB)(FCV) MS-1-FCV-141 had closed on the turbine trip, so no other immediate operator action was necessary regarding FCV-145.

**G. Safety System Responses:**

1. The reactor trip breakers (JC)(BKR) opened.
2. The main turbine (TA)(TRB) tripped.
3. The motor-driven and turbine-driven auxiliary feedwater pumps (BA)(P) started.

**III. Cause of the Event**

The causes of the equipment failures are being investigated and will be reported in a supplemental LER. The causes of the unit trip are identified below.

**A. Immediate Cause:**

The immediate cause of the unit trip was valves FW-1-FCV-530 and 540 failing closed upon loss of instrument air.

**B. Root Cause:**

The root cause of the unit trip was determined to be personnel error (cognitive). Following the trip, an immediate investigation determined that instrument air isolation valve AIR-I-1-1041 was in a



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)
DIABLO CANYON UNIT 1	0 5 0 0 0 2 7 5	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER				
		91	-	0 0 2	-	0 0		
		5 of 6						

TEXT (17)

closed position. The investigation concluded that the valve had been inadvertently closed by the personnel who were erecting scaffolding.

## C. Contributory Causes:

1. Prior to the commencement of outage activities, Maintenance management decided that outage-related work should not be performed before the outage unless it was on the daily schedule. Management expectations regarding this decision were not met, since the decision was implemented only within the outage scheduling group, and not emphasized to all other applicable plant personnel. Pre-outage work is screened by plant management, and work that may affect safety-related components is not allowed to be put on the daily schedule. However, because the personnel building the scaffolding were unaware of the management decision, they started the work early even though it was not on the daily schedule.
2. AP C-59 did not provide adequate guidance to preclude the erection of scaffolding around sensitive plant equipment during operation. Specifically, AP C-59 did not define sensitive equipment that would require additional review, did not adequately identify components to be worked, did not specify responsibilities for completing the scaffolding request form, and did not identify the allowed start date or plant modes for the work.
3. The AIR-I-1-1041 valve handle requires a 90 degree rotation to move to the closed position and rotates easily. Therefore, though the handle is near a wall and not easily accessible, it can be closed accidentally.

## IV. Analysis of the Event

### A. Safety Analysis:

Inadvertent loss of all main feedwater flow is a Condition II event, which has been analyzed in Final Safety Analysis Report Update Section 15.2.8, "Loss of Normal Feedwater." The reactor trip and automatic start of the auxiliary feedwater pumps ensured that an adequate supply of water was provided to the SGs to provide for the cooldown of the reactor per design. All safety-related equipment functioned as designed. Therefore, the health and safety of the public was not adversely affected by this event.

## V. Corrective Actions

### A. Immediate Corrective Actions:



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)
DIABLO CANYON UNIT 1	0 5 0 0 0 2 7 5	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	6   OF   6	
		91	-	0 0 2		

TEXT (17)

1. The plant was stabilized in Mode 3 using EPs E-0 and E-0.1.
2. CWP 1-1 and CRDM fan E-13 were restarted and the MOD was manually opened.

**B. Corrective Actions to Prevent Recurrence:**

1. Procedures will be revised to require the handles of sensitive air valves to be tie-wrapped to secure the valves against accidental closure.
2. A maintenance policy will be issued requiring that all work to be performed prior to the outage must be on the approved daily schedule.
3. A Work Planning policy will be issued on marking work packages.
4. AP C-59 will be revised to clarify responsibilities and restrictions for erection and removal of scaffolding. Training on the revision will be conducted in accordance with Administrative Procedure AP E-4 Supplement 6, "Procedure Review and Revision Control."

**VI. Additional Information**

**A. Failed Components:**

None.

**B. Previous LERs:**

None.

**C. Additional Information**

Historically, the most common reactor trip initiators have been associated with SG level control, turbine trips, main feedwater pumps, maintenance, and procedure or design deficiencies. PG&E has an ongoing Trip Reduction Program to evaluate further plant improvements to reduce reactor trips.

