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PG&E Letter DCL-03-055

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 2-2003-004-00
Manual Reactor Trip Due to a Single Random Fuse Failure

Dear Commissioners and Staff:

In accordance with 10 CFR 50.73(a)(2)(iv)(B)(1) PG&E is reporting the initiation of a manual reactor trip due to a single random fuse failure.

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

Sincerely,

David H. Oatley

ddm/2246/A0578747
Enclosure
cc: Ellis W. Merschoff
David L. Proulx
Girija S. Shukla
Diablo Distribution
INPO

IE22

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Diablo Canyon Unit 2	0 5 0 0 0 3 2 3	1 OF 6

TITLE (4)

Manual Reactor Trip Due to a Single Random Fuse Failure

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
03	17	2003	2003	- 0 0 4 -	0 0	05	16	2003		0 5 0 0

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

LICENSEE CONTACT FOR THIS LER (12)

	TELEPHONE NUMBER	
	AREA CODE	
Lawrence M. Parker - Senior Regulatory Services Engineer	805	545-3386

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
D	A A	F U S E	B 5 6 9	N					

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MON	DAY	YR
[ ] YES (If yes, complete EXPECTED SUBMISSION DATE)	[X] NO				

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

On March 17, 2003, at 0818 PST, with Unit 2 in Mode 3, "Hot Standby," licensed utility plant operators responding to a difference between digital rod position indication and demand position indication in the control room, initiated a manual reactor trip in accordance with plant procedures. The plant operators stabilized the plant and technicians identified a single random failure of a control rod moveable gripper fuse. At 1348 PST, plant operators made an 8-hour, nonemergency notification in accordance with 10 CFR 50.72(b)(2)(iv).

Plant technicians replaced the fuse and licensed plant operators confirmed proper operation by performance of surveillance testing.

The root cause of this event was the single random fuse failure. A review of maintenance and surveillance test results confirmed that the incidence of fuse failures is sufficiently low to presume the failure is a single random fuse failure.

Corrective actions to prevent recurrence include revision of Surveillance Test Procedure R-1C, "Digital Rod Position Indicator Functional Test," to include guidance regarding verification of rod motion prior to exceeding 12 steps and operator training regarding the change.

I. Plant Conditions

Unit 2 was in Mode 3, Hot Standby, at normal operating pressure and temperature preparing for restart following the eleventh refueling outage (2R11).

II. Description of Problem

A. Background

The rod control system [AA] is a Design Class II system for positioning the reactor control rods for reactor power modulation by manual or automatic control of control rod banks. The rod control system is provided motive power through the redundant Design Class I Reactor Trip breakers that open to perform the safety related function of rod insertion by removing all motive power to the rod drive mechanism. The rod group demand position indication is located in the control room on the control board and records the individual rod position demands made for rod motion.

The digital rod position indication (DRPI) system measures the position of the control rod drive mechanism shafts within the control rod drive housings so the positions of the control rods within the core are verified. The DRPI system consists of dual sets of rod position detectors (groups A and B) for each rod drive housing: two data cabinets, and a main control board display unit. Each group's data cabinet is provided power from an independent 110 VAC to 15 VDC power supply.

Equipment Control Guideline (ECG) 41.1, "Reactivity Control Systems - Position Indication System – Shutdown" (relocated from Technical Specification 3/4.1.3.3), requires that one DRPI system shall be operable when the reactor trip breakers are closed. With less than the above required position indicators operable, immediately open the reactor trip breakers. Surveillance Requirement (SR) 41.1.3, requires verification "that each DRPI agrees within 12 steps of the group demand position indication for the full indicated range of rod travel, once prior to criticality after each removal of the reactor vessel head."

Surveillance Test Procedure (STP) R-1A, "Exercising Full Length Control Rods," withdraws or inserts each rod bank at least 10 steps in any one direction and confirms that the Digital Rod Position Indication (DRPI) system responds to each rod that is moved.

TEXT

STP R-1C, "Digital Rod Position Indicator Functional Test," verifies the OPERABILITY of the DRPI System. The rod banks are individually withdrawn in 24 step increments while a comparison is made between the DRPI indication and the demand step counter for each rod. When the bank is fully withdrawn, it is then inserted to the rod bottom light emitting diode (LED) point and the position at which each rod bottom LED was actuated is recorded.

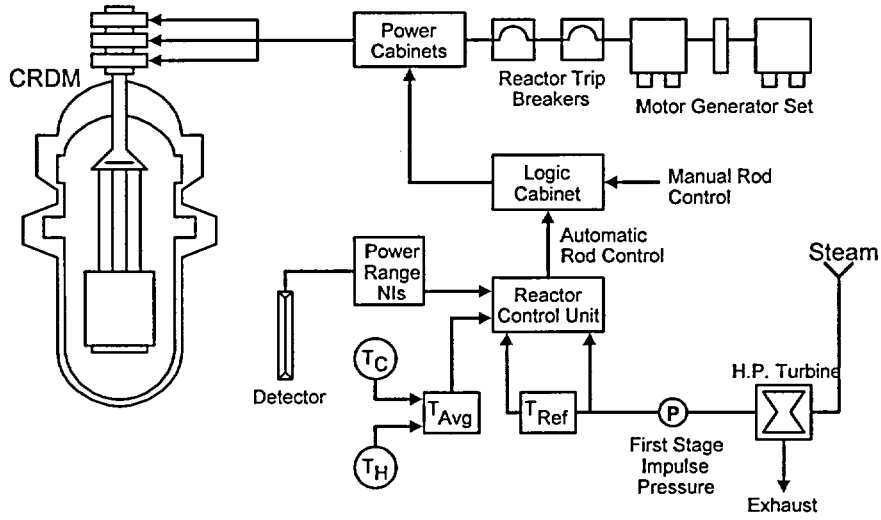

FIGURE 1: Block Diagram of Rod Control System

B. Event Description

During plant restart following 2R11 plant operators initiated DRPI operability testing of control bank B in accordance with STP R-1C.

On March 17, 2003, at 0818 PST with Unit 2 in Mode 3, licensed utility plant operators responding to an indicated difference between the rod demand position indication and the DRPI of a single control rod, greater than 12 steps and initiated a manual reactor trip in accordance with plant procedures.

On March 17, 2003, at 1348 PST, plant operators made a 8-hour, nonemergency notification in accordance with 10 CFR 50.72(b)(2)(iv).

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

Control rod drive system power supply fuse (FU21) for Rod F2 was open.

D. Other Systems or Secondary Functions Affected

None.

E. Method of Discovery

The condition was discovered during the scheduled performance of STP R-1C as required by plant ECG 41.1.

F. Operator Actions

Licensed utility plant operators initiated a manual reactor trip and opened the reactor trip breakers removing power from the rod control system in accordance with plant procedures.

G. Safety System Responses

The reactor trip breakers opened and all reactor control rods not fully inserted dropped to their bottom, fully inserted position as designed.

III. Cause of the Problem

A. Immediate Cause

The rod control demand position indication and DRPI had an observed difference of approximately 18 steps, or greater than 12 steps requiring the immediate opening of the reactor trip breakers.

B. Root Cause

A single random failure of the Control Rod F2 moveable coil power supply fuse (FU21) prevented rod F2 from movement upon demand. This caused the rod F2 to remain on the core bottom as indicated by the DRPI system while the demand counter counted up to approximately 18 steps.

B. Contributory Cause

STP R-1C did not explicitly specify actions to identify improper DRPI indications prior to a 12-step difference between rod demand and rod position. The rod control exercising procedure, STP R-1A contains a scope discussion to verify proper DRPI indication for rod bottom indication and channel indication differences at approximately 6 steps, and halting the test at 10 steps. This discussion was not included in STP R-1C.

TEXT

IV. Assessment of Safety Consequences

Procedure controlled pre-operation testing discovered the inoperable system prior to pulling more than one shutdown bank. A power supply fuse (FU21) was identified as failed open preventing control Rod F2 from being moved, thus, no unanticipated positive reactivity change was possible. At the time of this event, the boron level in the reactor coolant system was approximately 1765 ppm, which was within the core shutdown margin requirements. Thus, compliance with the shutdown margin requirements during testing was always maintained.

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

1. Unit 2 rod control system was deactivated by manually tripping the unit, deenergizing the gripper circuits, such that if any rod were withdrawn, the rods would have inserted into the core as designed.

2. Plant technicians identified that a failed moveable gripper coil fuse (FU21) for Rod F2 prevented the rod from withdrawal.

3. Plant technicians replaced the failed fuse and subsequent rod motion verified proper rod control system response and agreement between DRPI and the rod demand position indication.

B. Corrective Actions to Prevent Recurrence

1. Plant procedure STP R-1C, will be revised to provide guidance regarding confirmation of rod motion prior to exceeding 12 steps demand indication.

2. Plant operators will receive training for the change to STP R-1C.

VI. Additional Information

A. Failed Components

Component: Fuse, 10A 250V ceramic cartridge
Manufacturer: BUSS # 2432B59

B. Previous Similar Events

LER 1-2000-011, reported a manual reactor trip due to a rod control buffer memory card failure. The card was replaced and personnel performed the required maintenance verification testing. The corrective actions taken would not have prevented this event, as the failed components are unrelated.

LER 1-1998-006, reported an entry into Technical Specification 3.0.3 due to a single random failure of the DRPI group A power supply voltage regulating circuit. No corrective actions were identified as a result of this event. Additionally, the fuse failure being reported is associated with the rod control system and not the DRPI system power circuits.

LER 2-96-005-00, reported an event where a manual reactor trip was initiated upon discovery that the DRPI system was inoperable in Mode 3 (Hot Standby) during startup. This event was caused by personnel error, cognitive, in that the test switch was left in the test position after maintenance. Corrective actions included a maintenance procedure revision to incorporate lessons learned. The corrective action would not have prevented this event as the corrective action addressed a maintenance procedure not involved with this event.