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 FACIL: 50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Ga 05000323
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 SISK, D. Pacific Gas & Electric Co.
 FUJIMOTO, W.H. Pacific Gas & Electric Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 94-004-00: on 940726, Train B of solid state protection system for unit 2 actuated partial Phase A containment isolations. Caused by failure of XA516 driver card. Operators reset spurious partial Phase A isolations. W/940825 ltr.

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Pacific Gas and Electric Company

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Warren H. Fujimoto
Vice President-Diablo Canyon
Operations and Plant Manager

August 19, 1994



PG&E Letter DCL-94-186

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

Docket No. 50-323, OL-DPR-80
Diablo Canyon Unit 2
Licensee Event Report 2-94-004-00
Partial Phase A Containment Isolations Due to Safeguards
Output Driver Card Failure

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PG&E is submitting the enclosed Licensee Event Report concerning partial Phase A containment isolations for Unit 2 due to the failure of the safeguards output driver card on Train B of the Unit 2 solid state protection system.

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

Sincerely,

A handwritten signature in cursive script, appearing to read 'Warren Fujimoto', with a long horizontal flourish extending to the right.

Warren H. Fujimoto

cc: L. J. Callan
Mary H. Miller
Kenneth E. Perkins
Sheri R. Peterson
Diablo Distribution
INPO

Enclosure

DC2-94-TI-NO34

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LICENSEE EVENT REPORT (LER)

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TITLE (4) **Partial Phase A Containment Isolations Due to Safeguards Output Driver Card Failure**

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)	
07	26	94	94	-	0 0 4	-	0 0	08	19	94			0 5 0 0 0
													0 5 0 0 0

OPERATING MODE (9) **1**

POWER LEVEL (10) **1 0 0**

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (11)

10 CFR _____
 OTHER - 10 CFR 50.78(a)(2)(iv)
 (Specify in Abstract below and in text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

David Sisk - Senior Engineer, Regulatory Compliance

TELEPHONE NUMBER
AREA CODE **805** **545-4420**

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	J G	I B	1 2 0	Y						

SUPPLEMENTAL REPORT EXPECTED (14) YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (16)

On July 26, 1994, at 1411 PDT, 1419 PDT, and 1431 PDT, with Unit 2 in Mode 1 (Power Operation) at 100 percent power, Train B of the solid state protection system (SSPS) for Unit 2 actuated partial Phase A containment isolations. These events constitute engineered safety feature (ESF) actuations. On July 26, 1994, at 1701 PDT, a four-hour, nonemergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(ii).

The partial containment isolations were caused by the failure of the XA516 safeguards output driver card in Train B of the Unit 2 SSPS. The safeguards output driver card failure was due to the failure of the Z7 integrated circuit chip.

Licensed operators reset the spurious partial Phase A containment isolations.

The XA516 safeguards output driver card in Train B of the Unit 2 SSPS was replaced with a new safeguards output driver card. A review of Diablo Canyon Power Plant maintenance history and industry-wide reports indicated that no similar failure with this type of card has been reported or observed; therefore, PG&E determined this failure to be a random event. Thus, no additional corrective actions were deemed necessary.



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I. Plant Conditions

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

II. Description of Problem

A. Summary

On July 26, 1994, at 1411 PDT, 1419 PDT, and 1431 PDT, partial Phase A containment isolations occurred. Since plant parameters were normal and none of the possible signals that could generate a Phase A containment isolation (JM) signal (a Safety Injection (SI) or a manual actuation) had occurred, operations determined the event was due to a spurious actuation. PG&E plant staff determined that a safeguards output card for the solid state protection system (SSPS)(JB) Train B had failed and caused the isolations. SSPS Train B was declared inoperable, removed from service, and the failed safeguards output driver card was replaced with a new card.

B. Background

Technical Specifications (TS) 3.3.1, Reactor Trip System Instrumentation and TS 3.3.2, Engineered Safety Features Actuation System (ESAFS) Instrumentation, require the SSPS to be operable.

The Phase A containment isolation is an ESFAS function responsible for closing all nonessential process lines to and from containment.

C. Event Description

On July 26, 1994, at 1411 PDT, a Phase A containment isolation annunciator alarm was received for Unit 2. The control room operators initiated a control panel walkdown which indicated that the SSPS Train B Phase A containment isolation safety responses had actuated. No safety system responses had actuated from the redundant SSPS Train A and none of the possible signals that could generate a Phase A containment isolation signal (an SI or a manual actuation) had occurred. Therefore, the operators diagnosed the partial phase A containment isolation as a spurious event.

On July 26, 1994, at 1419 PDT, the control room operators reset the Phase A containment isolation signal. At 1419 PDT (25 seconds after the reset), another Phase A containment isolation signal was received. I&C technicians



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and the applicable System Engineer were called to determine the cause of the actuation.

On July 26, 1994, at 1425 PDT, after verifying again that there had not been a SI or a manual actuation for a Phase A containment isolation, and that no safety system responses had been actuated from the redundant SSPS Train A system, control room operators reset the Phase A containment isolation signal. At 1431 PDT, the Phase A containment isolation actuated again.

On July 26, 1994, at 1432 PDT, the System Engineer confirmed the spurious Phase A containment isolation actuation was caused by a failure of Train B for the Unit 2 SSPS.

On July 26, 1994, at 1441 PDT, after verifying again that there had not been a SI or a manual actuation for a Phase A containment isolation, and that no safety actuations were initiated from the redundant SSPS Train A system, control room operators reset the Phase A containment isolation signal and returned the Unit 2 systems to normal status.

On July 26, 1994, at 1500 PDT, Train B for the Unit 2 SSPS was declared inoperable and TS 3.3.1 entered.

On July 26, 1994, at 1933 PDT, the XA516 (JB)(IB) failed safeguards output driver card from SSPS Train B was replaced and tested, and Unit 2 SSPS Train B was returned to operable status.

D. Inoperable Structures, Components, or Systems that Contributed to the Event

None.

E. Dates and Approximate Times for Major Occurrences

- | | | |
|----|------------------------------|--|
| 1. | July 26, 1994, at 14:11 PDT: | Event Date; partial Phase A containment isolation. |
| 2. | July 26, 1994, at 14:19 PDT: | Phase A containment isolation function was reset. |
| 3. | July 26, 1994, at 14:19 PDT: | Event Date: partial Phase A containment isolation. |



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|----|------------------------------|--|
| 4. | July 26, 1994, at 14:25 PDT: | Phase A containment isolation function was reset. |
| 5. | July 26, 1994, at 14:31 PDT: | Event Date: partial Phase A containment isolation. |
| 6. | July 26, 1994, at 14:41 PDT: | Phase A containment isolation function was reset. |
| 7. | July 26, 1994, at 1500 PDT: | SSPS Train B for Unit 2 was declared inoperable. |
| 8. | July 26, 1994, at 1702 PDT: | A four-hour, nonemergency report was made to the NRC. |
| 9. | July 26, 1994, at 1933 PDT: | Failed safeguards output driver card was replaced, the system was tested, and Unit 2 SSPS Train B was returned to operable status. |

F. Other Systems or Secondary Functions Affected

None.

G. Method of Discovery

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

H. Operator Actions

After each actuation, control room operators verified that the alarms were spurious.

I. Safety System Responses

Since the Z7 integrated circuit chip affects only one of eight modules on the XA516 safeguards output driver card, only the relays controlled by Train B for the Phase A containment isolation were energized to actuate. Therefore, not all nonessential process lines to and from containment were isolated. The significant isolations are listed below:



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Valve 8100 closed, which isolated reactor coolant pump (RCP) seal return flow from the RCP to the volume control tank (VCT).

Valve 8152 closed and isolated letdown from the reactor coolant loop to the VCT.

Valve FCV-584 closed and isolated containment instrument air.

Steam generator blowdown was isolated from all four steam generators.

III. Cause of the Problem

A. Immediate Cause

A safeguards output driver card in Train B of SSPS for Unit 2 failed, actuating a partial phase A containment isolation.

B. Root Cause

These containment isolations were caused by the failure of the XA516 safeguards output driver card in Train B of the Unit 2 SSPS. The safeguards output driver card failure was due to the failure of the Z7 integrated circuit chip.

IV. Analysis of the Event

The containment isolation system (CIS) is designed to ensure that all containment process penetrations are capable of completely isolating potential paths for radioactive releases to the environment.

As a component of the CIS, the Phase A containment isolation signal isolates only the nonessential process lines penetrating the containment. These process lines do not increase the potential for damage of equipment when isolated. Phase A containment isolation is actuated by either the SSPS Train A or its redundant Train B due to one of the two following conditions: a SI or a manual actuation.

The partial Phase A containment isolations were caused by a failure in the Z7 integrated circuit chip on safeguards output driver card XA516 in Train B of the Unit 2 SSPS. Though Train B was giving spurious Phase A containment isolation actuations, this train was still capable of responding to a SI or a manual Phase A containment isolation actuation. In addition, Train B is a redundant safety system to Train A of the SSPS, thus Unit 2 still had the capability for a safe shutdown. Therefore, this event did not adversely affected the health and safety of the public.



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V. Corrective Actions

A. Immediate Corrective Actions

1. Control room operators reset the spurious partial Phase A containment isolation actuations.
2. The XA516 safeguards output driver card in Train B of the SSPS for Unit 2 was replaced with a new safeguards output driver card.

B. Corrective Actions to Prevent Recurrence

A review of Diablo Canyon Power Plant maintenance history and industry-wide reports indicated that no similar failure with this type of card had been reported or observed; therefore, PG&E determined this failure to be a random event. Thus, no additional corrective actions were deemed necessary.

VI. Additional Information

A. Failed Components

Model Number: MC668L High Threshold Quad-Nand gate.

Component: Z7 integrated circuit chip on the XA516 safeguards output driver card

Manufacturer/Vendor: Motorola Z7 integrated circuit chip/Westinghouse XA516 safeguards output driver card.

B. Previous LERs on Similar Problems

None.



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