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ACCESSION NBR:8712090134 DOC.DATE: 87/12/04 NOTARIZED: NO DOCKET #
FACIL:50-323 Diablo Canyon Nuclear Power Plant, Unit 2; Pacific Ga 05000323
AUTH.NAME AUTHOR AFFILIATION
SISK,D.P. Pacific Gas & Electric Co.
SHIFFER,J.D. Pacific Gas & Electric Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-024-00:on 871107,manual reactor trip after discovery of arcing in isophase bus motor operated disconnect switch.
W/8 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6
TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD5 LA	1	1	PD5 PD	1	1
	TRAMMELL,C	1	1			
INTERNAL:	ACRS MICHELSON	1	1	ACRS MOELLER	2	2
	AEOD/DOA	1	1	AEOD/DSP/NAS	1	1
	AEOD/DSP/ROAB	2	2	AEOD/DSP/TPAB	1	1
	ARM/DCTS/DAB	1	1	DEDRO	1	1
	NRR/DEST/ADS	1	0	NRR/DEST/CEB	1	1
	NRR/DEST/ELB	1	1	NRR/DEST/ICSB	1	1
	NRR/DEST/MEB	1	1	NRR/DEST/MTB	1	1
	NRR/DEST/PSB	1	1	NRR/DEST/RSB	1	1
	NRR/DEST/SGB	1	1	NRR/DLPQ/HFB	1	1
	NRR/DLPQ/QAB	1	1	NRR/DOEA/EAB	1	1
	NRR/DREP/RAB	1	1	NRR/DREP/RPB	2	2
	NRR/DRIS/SIB	1	1	NRR/PMAS/ILRB	1	1
	REG FILE 02	1	1	RES DEPY GI	1	1
	RES TELFORD,J	1	1	RES/DE/EIB	1	1
	RGN5 FILE 01	1	1			
EXTERNAL:	EG&G GROH,M	5	5	FORD BLDG HOY,A	1	1
	H ST LOBBY WARD	1	1	LPDR	2	2
	NRC PDR	1	1	NSIC HARRIS,J	1	1
	NSIC MAYS,G	1	1			

TOTAL NUMBER OF COPIES REQUIRED: LTTR 47 ENCL 46

RIDS/ADDS

RIDS/ADDS

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 0 5

TITLE (4): MANUAL REACTOR TRIP AFTER DISCOVERY OF ARCING IN ISOPHASE BUS MOTOR OPERATED DISCONNECT SWITCH DUE TO HIGH RESISTANCE AT THE CONTACTS

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
1 1	0 7	8 7	8 7	0 1 2 4	0 0	1 2	0 4	8 7		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 9 8

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

- [X] 10 CFR 50.73(a)(2)(iv)
- [ ] OTHER (Specify in Abstract Below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (AREA CODE)
DAVID P. SISK, REGULATORY COMPLIANCE ENGINEER	8 0 5 5 9 5 - 7 3 5 1

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	
D	E	L M O D	P 2 9 5	NO							

SUPPLEMENTAL REPORT EXPECTED (14)

- [X] YES (If yes, complete EXPECTED SUBMISSION DATE)
- [ ] NO

EXPECTED SUBMISSION DATE (15): MONTH 0 1 | DAY 3 1 | YEAR 8 8

ABSTRACT (16)

At 1315 PST, November 7, 1987, with the unit in Mode 1 (Power Operation) at 98 percent power, a manual reactor trip was initiated when arcing was discovered in the non safety related isophase bus motor-operated disconnect (MOD) switch. The unit was stabilized in Mode 3 (Hot Shutdown) at 1430 PST. The four-hour nonemergency report required by 10 CFR 50.72 was made at 1330 PST. On Monday, November 9, 1987 a replacement MOD was obtained. The replacement switch and the switches from the unaffected phases were inspected, cleaned, lubricated, and aligned. The unit was returned to power on November 14, 1987.

The MOD failure was caused by a combination of high ambient temperature and high resistance at the contacts. The high resistance was caused by dust and hardened lubricant on the contacts and a slight misalignment of some contacts. A comprehensive preventive maintenance procedure is being developed for the isophase bus MODs. A supplemental report will be submitted after completion of the event investigation to report any additional findings and corrective actions taken to prevent recurrence.

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I. Initial Conditions

Unit 1 was in Mode 1 (Power Operation) at 98 percent power.

II. Description of Event

A. Event:

At 1310 PST, November 7, 1987, with the unit in Mode 1 (Power Operation) at 98 percent power, a roving fire watch discovered arcing in the non-safety related isophase bus motor operated disconnect (EL)(MOD) area and immediately reported to the control room. Operators were immediately sent to verify the report.

At approximately 1314 PST, the operators verified the arcing to be in the isophase bus (EL)(BU). The Shift Foreman (SFM) immediately initiated a fast ramp down.

At approximately 1315 PST, the operators on the scene provided the SFM with additional information on the magnitude of the arcing and the fact that the arcing was in MOD switch. The SFM immediately initiated a unit trip.

The four-hour nonemergency report required by 10 CFR 50.72 was made at 1330 PST.

The unit was stabilized in Mode 3 (Hot Shutdown) at 1430 PST. Investigation determined that the arcing had occurred in the phase C MOD.

On Monday, November 9, 1987 a replacement was obtained for the damaged phase C MOD switch.

The replacement switch and the switches from the unaffected phases were inspected, cleaned, lubricated, and aligned under the supervision of a vendor representative.

The unit was returned to power on November 14, 1987.

B. Inoperable structures, components, or systems that contributed to the event:

None.

C. Dates and approximate times for major occurrences:

1. November 7, 1987, 1310 PST: Fire watch discovered arcing.

2. November 7, 1987, 1314 PST: Operators confirm arcing. Shift Foreman initiated fast ramp down.

3. November 7, 1987, 1315 PST: Event date - manual unit trip.

4. November 7, 1987, 1330 PST: Four-hour nonemergency report to the NRC as required by 10 CFR 50.72.

5. November 7, 1987, 1430 PST: Unit stable in Mode 3.

6. November 8, 1987: Removed damaged disconnect. Searched for replacement.

7. November 9, 1987: Obtained replacement disconnect switch.

8. November 10, 1987: Replacement disconnect arrived on site.

9. November 11/12, 1987: Replacement phase C disconnect was inspected, cleaned, and installed. Phase A and B contacts were inspected, cleaned, and the contacts on all three phases were lubricated.

10. November 13, 1987: Alignment completed on all three phases of MOD.

11. November 14, 1987, 0213 PST: Unit 2 paralleled to PG&E grid.

D. Other systems or secondary functions affected:

None

E. Method of discovery:

The trip was manually initiated.

F. Operator actions:

The appropriate emergency procedures were followed, and the unit was stabilized in Mode 3.

G. Safety system responses:

1. The turbine (TA)(TRB) tripped.

2. The reactor trip breakers (JC)(BKR) opened.

3. The control rod drive mechanisms (AA)(TRB) allowed the control rods to drop into the reactor (AC)(RCT).

4. Auxiliary feedwater (AFW) pumps (BA)(MO)(P) started per design.

5. Main feedwater (SJ) was isolated.

III. Cause of Event:

A. Immediate cause:

The Shift Foreman initiated a manual unit trip when arcing was verified in the isophase bus MOD switch.

B. Root cause:

The arcing was caused by high resistance at the disconnect's contacts (EJ)(MOD). The high resistance was caused by a combination of problems including:

1. High ambient temperature, during the five weeks preceeding this event.

2. Accumulation of dust on the contacts, hardened lubricant on the contacts, and a slight misalignment of some contacts. The MOD was installed in the early 1970's allowing ample time for the orginal lubricant to dry out and dust to collect. Maintenance did not correct these problems in time to prevent this event because:

   a. Vendor maintenance recommendations did not address cleaning of the contacts.

   b. The vendor changed the type of lubricant recommended to prevent oxidation of the silver contacts with a lubricant that did not harden; however, PG&E was never notified of the change.

c. Cleaning of contacts on the transformer end of the disconnect would have required disassembly of the disconnect. A partial visual inspection of these hidden contacts did not show a excessive level of debris.

IV. Analysis of Event

In the worst credible failure of the main generator (EL)(GEN) MOD switch, with no operator intervention, a turbine trip and subsequent reactor trip would result. The turbine trip with subsequent reactor trip is a previously analyzed condition 2 event. Under the worst credible failure conditions, the MOD switch failure would have caused the loss of one of the two offsite power sources to the plant electrical system. The startup power system and all three diesel generators (EK)(DG) for Unit 2 were available throughout this event. The Unit 1 offsite power sources were not affected by this event. Thus the health and safety of the public was not affected during or after this event.

V. Corrective Actions

A. A comprehensive preventive maintenance procedure covering inspection, cleaning, and alignment is being developed for the isophase bus MODs on both units.

B. A detailed investigation of the event is being conducted. The report will provide recommendations for long term corrective actions to preclude recurrence of this event. A supplemental report will be submitted to report any additional findings and any corrective actions determined to be necessary to prevent recurrence.

VI. Additional Information:

A. Failed components:

Motor operated disconnect switch.

Originally manufactured by H. K. Porter but is current being manufactured by Delta-Unibus.

25,000 volt, 16,000 ampere self cooled or 32,000 ampere forced air cooled.

H. K. Porter drawing number L-82506X3.

B. Previous LERs on similar events:

There have been no previous failures of the MODs on either unit.

PACIFIC GAS AND ELECTRIC COMPANY

PG&E

77 BEALE STREET • SAN FRANCISCO, CALIFORNIA 94106 • (415) 781-4211 • TWX 910-372-6587

JAMES D. SHIFFER
VICE PRESIDENT
NUCLEAR POWER GENERATION

December 4, 1987

PG&E Letter No.: DCL-87-293

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

Re: Docket No. 50-323, OL-DPR-82
Diablo Canyon Unit 2
Licensee Event Report 2-87-024-00
Manual Reactor Trip After Discovery of Arcing in Isophase Bus Motor-Operated Disconnect Switch due to High Resistance at the Contacts

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PG&E is submitting the enclosed Licensee Event Report concerning a manual reactor trip after discovery of arcing in the isophase bus motor operated disconnect switch.

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

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

Enclosure

cc: J. B. Martin
M. M. Mendonca
P. P. Narbut
B. Norton
B. H. Vogler
CPUC
Diablo Distribution
INPO

1818S/0052K/DY/1856

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