

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Dresden Nuclear Power Station, Unit 2 DOCKET NUMBER (2) 0 5 0 0 0 2 1 3 7 1 OF 0 1 7

TITLE (4) Reactor Scram During Refueling Due to Motor Control Center (MCC) 28-2 Main Feed Breaker Trip From an Unknown Cause

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)						
0	2	8	8	7	8	7	0	4	0	8	8	7	N/A	0 5 0 0 0			
0	2	8	8	7	0	0	6	0	1	0	4	0	8	8	7	N/A	0 5 0 0 0

OPERATING MODE (8) N THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 8: (Check one or more of the following) (11)

20.402(b)	20.408(a)	X	80.73(a)(2)(iv)	73.71(b)
20.408(a)(1)(i)	80.38(a)(1)		80.73(a)(2)(v)	73.71(c)
20.408(a)(1)(ii)	80.38(a)(2)		80.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 388A)
20.408(a)(1)(iii)	80.73(a)(2)(i)		80.73(a)(2)(vii)(A)	
20.408(a)(1)(iv)	80.73(a)(2)(ii)		80.73(a)(2)(viii)(B)	
20.408(a)(1)(v)	80.73(a)(2)(iii)		80.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Richard H. Johnson Technical Staff Engineer (X-667)	AREA CODE 8 1 5 9 4 2 - 2 9 2 0

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS
X	E	D	5 2 G	0 8 0	Y				

SUPPLEMENTAL REPORT EXPECTED (14)

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

EXPECTED SUBMISSION DATE (16)

MONTH	DAY	YEAR

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

On February 28, 1987, fuel loading was in progress on Unit 2 when a reactor scram and Group II Primary Containment isolation occurred. The earliest intermediate cause identified was the trip of the main feed breaker of Motor Control Center (MCC) 28-2 from Bus 28. Loss of MCC 28-2 caused loss of instrumentation that resulted in a Group II isolation. Loss of MCC 28-2 also caused loss of the 2A Reactor Protection System (RPS) Motor-Generator (MG) Set, which feeds the 2B RPS bus. Loss of the 2B RPS bus de-energized the bypass relays of the Condenser Low Vacuum and Main Steam Isolation Valve scram circuitry. Due to the RPS relay logic design, a trip of RPS Channel A occurred; this, coincident with the loss of 2B RPS bus, gave a full reactor scram. All control rods had been fully inserted prior to this event; consequently, no rod motion occurred at the time of the scram. The 2A RPS MG Set and the main feed breaker of MCC 28-2 were tested, found acceptable, and placed back in service. Investigation found no conclusive root cause for the trip of the main feed breaker of MCC 28-2.

The safety significance of this event was minimal because the trip of MCC 28-2 initiated a reactor scram. This occurred with the reactor shut down for refueling. A related previous event is recorded in Reportable Occurrence 77-9 on Docket #050237.

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TEXT (If more space is required, use additional NRC Form 388A's) (17)

PLANT AND SYSTEM IDENTIFICATION:

General Electric --Boiling Water Reactor - 2527 MWt rated core thermal power.
Energy Industry Identification (EIIS) codes are identified in the text as [XX].

EVENT IDENTIFICATION:

Reactor Scram During Refueling Due to Motor Control Center (MCC) 28-2 Main Feed Breaker Trip From an Unknown Cause.

A. PLANT CONDITIONS PRIOR TO EVENT:

Mode: N - Refueling Reactor Power: 0%

B. DESCRIPTION OF EVENT:

On February 28, 1987, at 1407 hours, a reactor scram and Group II Primary Containment isolation [JM] occurred on Unit 2 while fuel loading and Dresden Instrument Surveillance 600-1 (Reactor Pressure Transmitter/Indicator Feedwater Control [JB] Calibration and Maintenance Inspection) were in progress. Other Control Room indications included transfer of the Instrument Bus [EF] to its reserve supply and trip of the 2A 125V DC Battery Charger [EJ]. All control rods had been fully inserted prior to the event; consequently, no control rod motion took place at the time of the scram. An Equipment Operator (EO) was sent to the Auxiliary Electric Equipment Room immediately after the scram to investigate. The EO found the 2A Reactor Protection System (RPS) [JC] Motor-Generator (MG) Set was tripped. The Instrument Bus [EF] normally fed by Motor Control Center (MCC) 28-2 [ED] had automatically transferred to its reserve feed from MCC 25-2 [ED] (see Figure 1). The EO transferred the 2B RPS Bus [JC] normally fed by the 2A RPS MG Set [JC] to its reserve feed from MCC 25-2, and the scram was subsequently reset in the Control Room at 1429 hours.

An EO was sent to investigate the trip of the 2A 125V DC Battery Charger [EJ]. The Battery Charger was found to have no power coming in. The EO then went over to MCC 28-2 [ED] which feeds the 2A 125V DC Battery Charger [EJ] and found that the MCC was de-energized. The EO re-energized MCC 28-2 [ED] at 1442 hours using the breaker control switch mounted behind MCC 28-2 [ED] to close the main feed breaker from Bus 28 [ED]. Re-energizing MCC 28-2 [ED] resulted in the automatic transfer of the Instrument Bus [EF] back to its normal supply, MCC 28-2 [ED], and also resulted in restoring the feed to the 2A 125V DC Battery Charger [EJ].

C. CAUSE OF EVENT:

Preliminary investigation of this event was performed by the Operating Department using Dresden General Procedure 2-3 (Unit 2/3 Reactor Scram). A detailed investigation of this event was performed by a committee composed of the following individuals: The Corporate Regulatory Assurance Superintendent, the Station Regulatory Assurance Supervisor, a representative from Corporate Nuclear Security, the Station Security Administrator, a Station Operating Engineer, and a senior member of the Station Maintenance Department staff. A subsequent investigation of this event was performed by the Technical Staff. The following discussion

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of the cause of this event is a composite of the results of these three investigation efforts:

Investigation found that the trip of the main feed breaker for MCC 28-2 [ED] from Bus 28 [ED] was the earliest intermediate cause of this event. The trip of this breaker was found to have caused the trip of the 2A RPS MG Set [JC], the subsequent reactor scram, the Group II Primary Containment isolation [JM], and the other Control Room indications. The immediate cause of the reactor scram was the loss of the 2B RPS Bus [JC], which is powered by the 2A RPS MG Set [JC]. Loss of power to the B Reactor Vessel Pressure 600 psig interlock Auxiliary Relay resulted in de-energization of the bypass relays associated with the Condenser Low Vacuum [SH] and Main Steam Isolation Valve (MSIV) [SB] scrams for RPS [JC] Channel A, as well as B. Because the unit was shut down for refueling, a Condenser Low Vacuum [SH] condition existed giving a trip of RPS [JC] Channel A. This trip of RPS [JC] Channel, coincident with the loss of the 2B RPS [JC] Bus, initiated the reactor scram. Investigation found that the RPS [JC] system functioned during this event in accordance with the RPS [JC] relay logic design. The loss of MCC 28-2 [ED] was not the result of refueling activities nor the result of the Feedwater Control surveillance being performed at the time of the scram.

Consequently, investigation focused on possible root causes for the trip of the main feed breaker of MCC 28-2 [ED]. During the investigation, members of the following organizations were interviewed: Operating Department, Electrical Maintenance (EM) Department, Mechanical Maintenance (MM) Department, Station Construction Department, Substation Construction Department, and the general labor contractor. The possible root causes hypothesized and investigated were as follows:

1. Actual overcurrent on MCC 28-2 [ED] causing feed breaker trip.

Investigation Results

The EM Department tested the 2A RPS [JC] MG Set using Dresden Maintenance Procedure (DMP) 040-27 (Megger and Bridge Testing and Acceptance Criteria) under Work Request #D62630. The test results were acceptable indicating that the MG set was not the cause of the trip of the main feed breaker of MCC 28-2 [ED]. No problems were found in the maintenance history of the 2A RPS [JC] MG Set that suggested it had caused an overcurrent. Although other equipment fed from MCC 28-2 [ED] was not similarly tested, no subsequent trips occurred after MCC 28-2 [ED] was re-energized. In summary, investigation found no evidence confirming this hypothesis.

2. Premature trip of main feed breaker to MCC 28-2 [ED] at Bus 28 [ED].

Investigation Results

The EM Department tested the main feed breaker for MCC 28-2 [ED] using DMP 040-12 (G.E. 480V Breakers - Series Overcurrent Trip Device Tests), and

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DMP 7300-4 (Inspection and Maintenance of 480V Breakers Type AK-2A-25) under Work Request #D62631. The test and inspection results were acceptable, and this breaker was returned to service. In summary, investigation found no evidence confirming this hypothesis.

- Manual trip at Bus 28 [ED] of main feed breaker to MCC 28-2 [ED].

Investigation Results

Bus 28 [ED] is on the third floor fo the Unit 2 Reactor Building in a contaminated area used for Control Rod Drive (CRD) [AA] rebuilding and testing. In addition, fire detection and emergency lighting work has recently been done in the area. Investigation found that none of this work was in progress at the time of the event, although fire detection installation work was in progress on the third floor of the Unit 3 Reactor Building. Investigation failed to place any personnel at Bus 28 [ED] at the time of the scram. In summary, investigation found no evidence confirming this hypothesis.

- Remote trip using the breaker control switch mounted behind MCC 28-2 [ED].

Investigation Results

The breaker control switch is protected against accidental operation by a plastic cover and is located in a step-off pad area for access to the Unit 2 turbine pipeway area through a door behind MCC 28-2 [ED]. Investigation showed no personnel in the vicinity of the breaker control switch, or at the MCC itself at the time of the scram. In summary, investigation found no evidence confirming this hypothesis.

In conclusion, the detailed investigation that was performed could not establish the root cause for the trip of the main feed breaker of MCC 28-2 [ED] from Bus 28 [ED].

D. SAFETY ANALYSIS:

When main condenser low vacuum [SH] conditions exist and/or the MSIV's [SB] are closed, a trip of MCC 28-2 [ED] results in a reactor scram. This is of minimal safety significance since these conditions do not normally exist during reactor power operation and there are separate scram signals associated with these conditions. All the RPS [JC] logic responded to this event as designed. Had the reactor been at power when this event occurred, a half scram and a half Group II isolation would have taken place. The Instrument Bus [EF] would have auto-transferred to its reserve feed from MCC 25-2 [ED], as it did on February 28, 1987. Loss of MCC 28-2 [ED] would have been temporary, and the equipment fed by the MCC would have been restored to operable status and the half scram and half isolation reset in a timely manner. Further, redundant components fed from other MCC's would be available. In addition to the 2A 125V DC Battery Charger [EJ], the

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Instrument Bus [EF], and the 2B RPS MG Set [JC], the following safety-related items are fed from MCC 28-2 [ED]:

- a) 2/3 A Standby Gas Treatment System [BH] fan and dampers
- b) Containment Cooling Service Water pump cubicle coolers [VK] for pumps A and B
- c) Unit 2 250V Battery Charger [EJ]
- d) Essential Service Bus [ED] reserve feed
- e) 2A Diesel Generator starting air compressor [LC]

It is concluded that there is minimal safety significance.

The RPS [JC] Bus and Instrument Bus [EF] were successfully re-energized. The 125V batteries were unaffected by the temporary loss of the Battery Charger. A previous occurrence on March 3, 1977 (Reportable Occurrence 77-9 on Docket #050237) involved a trip of MCC 28-2 [ED] while replacing a burned out control switch light bulb. The bulb broke, which caused a short. This resulted in a half scram on RPS [JC] Channel B. As corrective action for the previous occurrence on March 3, 1977, resistors were installed in series with control switch light bulbs so that a short at a bulb would not cause a feed breaker [ED] trip.

E. CORRECTIVE ACTIONS:

Short term actions taken were as follows:

1. The 2B RPS [JC] Bus was transferred to MCC 25-2 [ED] and the scram was reset at 1429 hours.
2. MCC 28-2 [ED] was found to be de-energized upon investigation of the 2A 125V DC Battery Charger [EJ] trip. MCC 28-2 [ED] was subsequently re-energized at 1442 hours by remotely closing the main feed breaker for MCC 28-2 [ED] using the local control switch mounted on the wall behind MCC 28-2 [ED].
3. The 2A RPS [JC] MG Set was tested (discussed above under Cause of Event) and placed back in service powering the 2B RPS [JC].
4. The main feed breaker for MCC 28-2 [ED] was tested by the EM Department (discussed above under Cause of Event).
5. The Station Manager reviewed the event with Nuclear Regulatory Commission Region III Officials on March 4, 1987, during a meeting at Region III Offices.
6. Investigations discussed above under Cause of Event could not establish the root cause of this event.

No further corrective action is deemed necessary.

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F. PREVIOUS OCCURRENCES:

<u>LER Number</u>	<u>Title</u>
77-009 on Docket #050237	MCC 28-2 Main Feed Breaker Trip

Note: Although scrams and half-scrams have occurred on other occasions involving loss of an RPS [JC] Bus, this is the only previous occurrence found involving a trip of an MCC [ED] main feed breaker as an intermediate cause leading to loss of an RPS [JC] Bus.

G. COMPONENT FAILURE DATA:

Manufacturer: General Electric Company

Nomenclature: Circuit Breaker Indoor Metal Clad Thermal Magnetic Air 480V AC, 500 amp

Model Number: AK-2A-25-1

Mfg. Part Number: N/A

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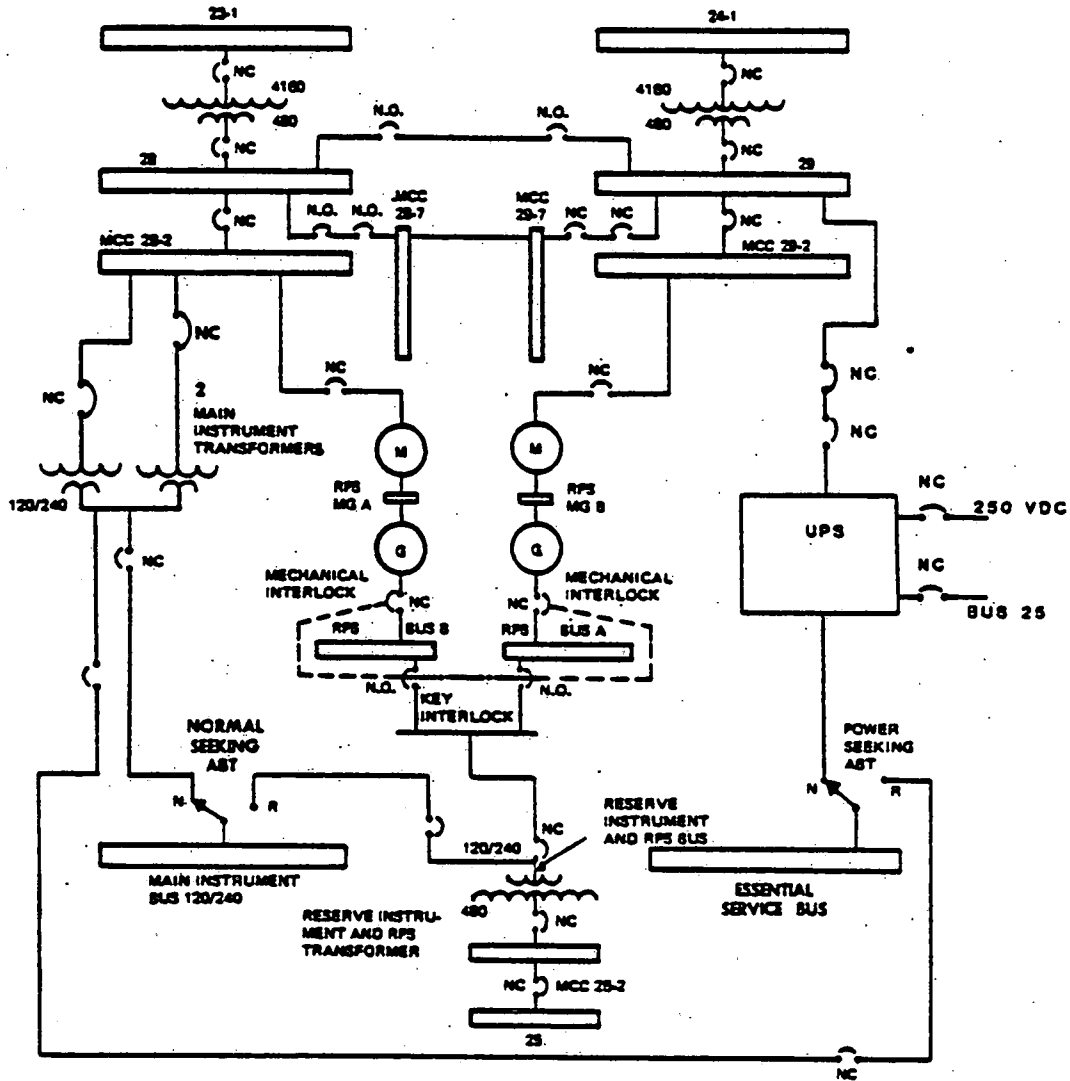


FIGURE 1. REACTOR PROTECTIVE SYSTEM, INSTRUMENT AND ESSENTIAL SERVICE SYSTEM DISTRIBUTION



Commonwealth Edison
Dresden Nuclear Power Station
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Morris, Illinois 60450
Telephone 815/942-2920

April 8, 1987

EDE LTR #87-236

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

Supplemental Licensee Event Report #87-006-01, Docket #050237, is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(iv). This supplement reflects a title change and includes more detailed information on the event, investigation of the cause of the event, safety analysis, and corrective actions.

A handwritten signature in cursive script, appearing to read 'E.D. Eenigenburg'.

E.D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE/kjl

Enclosure

cc: A. Bert Davis, Acting Regional Administrator, Region III
File/NRC
File/Numerical

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