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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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PDR

NRC Form 388A	· · · · · · · · · · · · · · · · · · ·				U.8	NUC	LEAR RE	GULATO	RY CON	MISSION
	LICENSEE EVENT REPOR	T (LER) TEXT CONTINU	IOITA	N		API EX	PROVED C PIRES: 8/3	0M8 NO. 11/85	3150-0	104
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<u>PLAI</u>	T AND SYSTEM IDENTIFICATION:									
Gene Ener	eral Electric - Boiling Water Rea gy Industry Identification (EIIS	ctor - 2527 MWt rate ) codes are identifi	ed cor led in	re tl n the	hermai e text	l po t as	ower. a [XX	].		
EVE	T IDENTIFICATION:				-					
, Rea Brea	tor Scram During Refueling Due t aker Trip From an Unknown Cause.	o Motor Control Cent	er (N	1CC)	28-2	Ma	in Fe	ed ·	:	
Â.	PLANT CONDITIONS PRIOR TO EVENT:									
· ·	Mode: <u>N - Refueling</u>	Reactor Power: <u>0%</u>		•						
В.	DESCRIPTION OF EVENT:									
	On February 28, 1987, at 1407 ho isolation [JM] occurred on Unit Surveillance 600-1 (Reactor Press Calibration and Maintenance Insp indications included transfer of and trip of the 2A 125V DC Batter fully inserted prior to the even place at the time of the scram. Auxiliary Electric Equipment Roc The EO found the 2A Reactor Prot Set was tripped. The Instrument (MCC) 28-2 [ED] had automaticall MCC 25-2 [ED] (see Figure 1). T fed by the 2A RPS MG Set [JC] to was subsequently reset in the Co	yurs, a reactor scram 2 while fuel loading sure Transmitter/Ind pection) were in prog the Instrument Bus rry Charger [EJ]. All it; consequently, no An Equipment Operat om immediately after section System (RPS) Bus [EF] normally f by transferred to its The EO transferred the o its reserve feed frontrol Room at 1429 h	n and g and licato gress [EF] ll con contr tor (I the s [JC] fed by s rese ne 2B com MC nours	Grot Dre or F to to to col EO) Scran Mot erve RPS CC 2	up II sden eedwa ther ( its r its r l rod rod m was s m to or-Ge tor C feed Bus 5-2,	Pr Ins ter Con ese s h otti inv fr [JC and	imary trume Cont trol rve s ad be on to to t estig ator rol C om ] nor the	Cont nt rol   Room upply en ok he ate. (MG) enter mally scraf	[JB] y r n	ment
	An EO was sent to investigate the The Battery Charger was found to to MCC 28-2 [ED] which feeds the the MCC was de-energized. The H the breaker control switch mount breaker from Bus 28 [ED]. Re-en- transfer of the Instrument Bus [ and also resulted in restoring to	he trip of the 2A 125 b have no power comin 2 2A 125V DC Battery 30 re-energized MCC 2 2 ed behind MCC 28-2 [ 3 hergizing MCC 28-2 [ 3 hergizing MCC 28-2 [ 3 hergizing to the 2A 12 3 hergizing to the 2A 12	5V DC ng in Char 28-2 [ED] ED] ro nal su 25V DO	Bat ger [ED] to c esul uppl C Ba	tery he EO [EJ] at l lose ted i y, MC ttery	Cha th and 442 the c C C C C h	rger en we foun hour main he au 8-2 [ arger	[EJ] nt ov d that s us: feed tomat ED], [EJ]	ver at ing d tic	
C.	CAUSE OF EVENT:									
	Preliminary investigation of the using Dresden General Procedure investigation of this event was individuals: The Corporate Regu Regulatory Assurance Supervisor the Station Security Administrate member of the Station Maintenard	is event was performe 2-3 (Unit 2/3 Reactor performed by a commi- ulatory Assurance Sup , a representative for tor, a Station Operation penartment staff	ed by or Sc: ittee perin: rom Co ting ]	the ram) com tend orpo Engi ubse	Oper . A posed ent, rate neer, quent	ati det of the Nuc an ir	ng De ailed the Stat lear d a s vesti	parts follo ion Secus enio: gatio	ment owin rity r	lg 7,

of this event was performed by the Technical Staff. The following discussion

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104 EXPIRES: 8/31/85

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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

RC Form 366A

NRC Form 386A (9-83)		U.S. NUCLEAR REGULATORY COMMISSION
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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.

# 3. 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.

4. 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 autotransferred 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 items are fed from MCC 28-2 [ED	RPS MG Set [JC], the ]:	e following safety-rel	ated						
	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 startin	g air compressor [LC	].							
	It is concluded that there is m The RPS [JC] Bus and Instrumen 125V batteries were unaffected A previous occurrence on March \$2050237) involved a trip of MCC light bulb. The bulb broke, wh on RPS [JC] Channel B. As corr March 3, 1977, resistors were bulbs so that a short at a bulb	inimal safety signif t Bus [EF] were succe by the temporary los 3, 1977 (Reportable 28-2 [ED] while rep ich caused a short. ective action for the installed in series would not cause a fe	icance. essfully re-energized. s of the Battery Charg Occurrence 77-9 on Do lacing a burned out co This resulted in a ha e previous occurrence with control switch li eed breaker [ED] trip.	The er. cket ntrol switch lf scram on ght						
Е.	CORRECTIVE ACTIONS:									
	Short term actions taken were a	s follows:								
	<ol> <li>The 2B RPS [JC] Bus was tra at 1429 hours.</li> </ol>	nsferred to MCC 25-2	[ED] and the scram wa	s reset						
	2. MCC 28-2 [ED] was found to be de-energized upon investigation of a 125V DC Battery Charger [EJ] trip. MCC 28-2 [ED] was subsequently at 1442 hours by remotely closing the main feed breaker for MCC 24 the local control switch mounted on the wall behind MCC 28-2 [ED]									
	3. The 2A RPS [JC] MG Set was placed back in service powe	tested (discussed ab ring the 2B RPS [JC]	ove under Cause of Eve	nt) and						
	4. The main feed breaker for M (discussed above under Caus	CC 28-2 [ED] was tes e of Event).	ted by the EM Departme	nt						
	5. The Station Manager reviewe Region III Officials on Mar	d the event with Nuc ch 4, 1987, during a	lear Regulatory Commis meeting at Region III	sion Offices.						
	6. Investigations discussed ab root cause of this event.	ove under Cause of E	vent could not establi	sh the						
	No further corrective action is	deemed necessary.								
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NRC FORM 386A (9-83)

NRC Form 366A (9-83)

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F. PREVIOUS OCCURRENCE	<u>S:</u>				
LER Number	<u>1111e</u>				
77-009 on Dock #050237	et MCC 28-2 Main	Feed Breaker	Trip		
Note: Although scr loss of an R involving a leading to l	ams and half-scrams hav PS [JC] Bus, this is th trip of an MCC [ED] mai oss of an RPS [JC] Bus.	e occurred on e only previou n feed breaker	other occas 18 occurrenc as an inte	ions invo e found rmediate	lving cause
G. COMPONENT FAILURE D	ATA:			ALL DO	
Manufacturer: Gene	ral Electric Company				
		·			
Nomenclature: Circ 500	uit Breaker Indoor Meta amp	1 Clad Thermal	l Magnetic A	ir 480V A	.C,
Model Number: AK-2	A-25-1	·	•		•
Mfg. Part Number:	N/A				
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Commonwealth Edison Dresden Nuclear Power Station R.R. #1 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.

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