



Commonwealth Edison
Braidwood Nuclear Power Station
Route #1, Box 84
Braidwood, Illinois 60407
Telephone 815/458-2801

June 30, 1992
BW/92-0342

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

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you in accordance with the requirement of 10CFR50.73(a)(2)(iv) which requires a 30-day written report.

This report is number: 92-004-00, Docket No. 50-457.

Very truly yours,

K. L. Kofron
Station Manager
Braidwood Nuclear Station

KLK/AS/mko
550/ZD85G

Encl.: Licensee Event Report
No. 92-004-00

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
CECo Distribution List

000015

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PDR ADOCK 05000457
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LICENSEE EVENT REPORT (LER)												Form Rev. 2.0		
Facility Name (1) Braidwood 2										Docket Number (2) 0 5 0 0 0 4 5 7			Page (3) 1 of 0 4	
Title (4) Reactor Trip Due to Loss of Both Motor Generator Sets														
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 5	3 1	9 2	9 2	0 0 4	0 0	0 6	3 0	9 2	None		0 5 0 0 0 1 1			
OPERATING MODE (9) 5			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)											
POWER LEVEL (10) 0 0 0			20.402(b)		20.405(c)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)		73.71(b)					
			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)					
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vi)		Other (Specify in Abstract below and in Text)					
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(vii)(A)							
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)							
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)							
LICENSEE CONTACT FOR THIS LER (12)														
Name R. Zaprzebski, Technical Staff Engineer										TELEPHONE NUMBER AREA CODE 8 1 5 4 5 8 - 2 8 0 1				
Ext. 2760														
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)														
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC				
SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)				
Yes (If yes, complete EXPECTED SUBMISSION DATE)										X NO				
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)														

At 0050 on May 31, 1992, during Unit 2 Reactor Start-Up, the 2B Motor Generator (MG) set tripped while control banks "B" and "C" were being withdrawn. This was followed by a trip of the 2A MG set. At 0054 due to the loss of rod drive power, all control and shutdown rod banks inserted into the core. A manual reactor trip was initiated. The reactor was not critical at the time of the event. The probable cause of the event appears to be a meter indication reading low coupled with a low bus overvoltage (BOV) relay setting. Both the BOV relay and voltmeter indicator were recalibrated prior to the restart. The MG set performance was monitored throughout the subsequent Reactor Startup with no problems being identified. The Unit 1 MG set operation will be tested dynamically during the next refuel outage. Bench testing will be performed on the BOV and overcurrent coils to determine drift due to self heating. There has been a previous reactor trip due to loss of the MG sets, however, the root cause and corrective actions are not applicable to this event.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev 2.0

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (b)				Page (3)		
		Year	///	Sequential Number	///	Revision Number		
Braidwood 2	01510101014517	912	-	01014	-	010	012	Of 014

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: Braidwood 2; Event Date: May 31, 1992; Event Time: 0054
 Mode: 2 - Startup; Rx Power: 00%
 RCS [AB] Temperature / Pressure: 557 degrees F / 2235 psig;

B. DESCRIPTION OF EVENT:

At 00:50 on May 31, 1992, during Unit 2 Reactor Start-Up, the 2B Motor Generator (MG) set tripped while control banks "B" and "C" were being withdrawn. This was followed by a trip of the 2A Motor Generator set.

At 00:54 due to the loss of rod drive power, all control and shutdown rod banks inserted into the core. A manual reactor trip was initiated. The reactor was not critical at the time of the event.

An investigation was immediately launched by the Assistant Superintendent of Operating to determine the root cause. The Technical Staff, Electrical Maintenance Department, and Division Operational Analysis Department were called in to identify and resolve the initiating condition. The investigation began with possible relay/logic combinations which would have caused the trip. All relay targets were checked for indication of actuation with none found. The relays were then tested and verified operable by calibration.

During these calibrations it was identified that the bus overvoltage relay (BOV) had drifted low (285v vs 360v required setpoint) and the 2B MG set voltmeter, which had just been replaced under NWR A52147, was indicating approximately six volts low. Additionally, all Directional Overcurrent and Ground Relays were verified correct and the "B" output breaker was inspected, cleaned, and tested. This completed static testing of the system.

The appropriate NRC notification via the ENS phone system was made at 0205 pursuant to 10CFR50.72(b)(2)(ii).

This event is being reported pursuant to 10CFR50.73(a)(2)(iv) - any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

C. CAUSE OF EVENT:

The following scenario appears to be the probable cause of the trip. The voltmeter indicating six volts lower than actual conditions caused the operators to adjust the voltage up to what was perceived as the correct voltage. In actuality, the voltage was being driven closer to the exciter current relay's (2H) trip voltage of 280V. With the voltage artificially high and demand on the exciter current increased due to movement of both the "B" and "C" control banks, the 2H relay actuated causing the 2B MG set trip.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
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Braidwood 2	0 5 0 0 0 4 5 7	9 2	-	0 0 4	-	0 0		0 3	OF	0 4
TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]										

The BOV relay setting being low resulted in the loss of the 2A MG set. The BOV relay affects the trip logic only during single MG set operation. The BOV relay provides a second level of operating protection when running only one MG set in that if one motor-generator trips, the other MG set will not trip if its exciter current relay trip voltage is exceeded. The BOV relay trip setting of 300V must also be exceeded to trip the one remaining MG set. But in this case, the 2B tripped off and the 2A was expected to carry the load of two control banks being moved. With the BOV relay setpoint drifting down to approximately the same level as the 1H relay setpoint, the second level of protection was effectively removed. So, when the demand was shifted to 2A there was no margin available for the load increase.

The relays that caused this event don't have targets, so the cause could not be confirmed by direct indication. On-Site Review (OSR) 92-043 documented troubleshooting and actions required prior to start-up. To dynamically test and confirm the root cause, the MG set overvoltage protection circuit was monitored during the reactor startup through the use of a strip chart recorder and a first out annunciator box. These points were monitored by the system engineer and OAD personnel during the startup. The following signals were monitored; the 1H and 2H Exciter Current Relays, the Bus Overvoltage (BOV) Relay, and the 2A and 2B 1RV overcurrent relays. This selection allowed constant indication of system status and documentation of any initiating signal in case of a trip.

In the event the monitored points fell outside of the expected ranges the shift engineer would have been notified immediately and evaluated the need to reinsert control rods and terminate the startup. Rods would have been reinserted in the event either MG set trips. The startup proceeded successfully and no deviations were identified.

D. SAFETY ANALYSIS:

There were no safety consequences for this event. The loss of the two MG set output breakers resulted in the loss of power to the rod drive mechanisms which in turn dropped the control rods into the core as designed. All rods were trippable throughout the event and shutdown margin was maintained. At no time was the safety of the plant or public adversely affected.

Under a more severe set of initial conditions, such as the reactor at full power, the consequences of this event would remain unchanged. The control rods would fall into the core upon a loss of power to the CRDMS, and the reactor would shut down.

E. CORRECTIVE ACTIONS:

Braidwood Station routinely tests the relays following refueling. An increase in the calibration frequency of the BOV and overcurrent relays cannot be accomplished with the unit in Mode 1 or 2. Tech Staff will dynamically test the relays during the next forced outage on Unit 2 by completing a partial BwVS 500-1, Control Rod Checkout Following Refueling. NTS Item 457-180-92-00401 will track this activity.

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		Year		Sequential Number		Revision Number								
Braidwood 2	0 5 0 0 0 4 5 7	9	2	-	0	0	4	-	0	0	0	4	0	1
TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]														

Procedures relating to paralleling MG sets will be reviewed and enhanced as necessary to detect any abnormal conditions. This will be tracked to completion by action item 457-180-92-00402.

NWR #A55d14 has been written to test the Unit 1 MG-Set operation and voltage regulators dynamically during refuel outage A1R03.

OAD will perform bench testing of new AV relays (BOV and overcurrent coils) to determine drift due to self heating and temperature. Relay coils are not currently available and NTS Item 457-180-92-00403 will track this to completion.

F. PREVIOUS OCCURRENCES:

There has been a previous occurrence of a Reactor Trip resulting from the loss of both MG sets. The root cause and corrective actions from that event are not applicable to this event.

DVR / LER	TITLE
DVR 20-1-87-22B /	Reactor Trip From Rod Control System
87-035	Motor Generator Set Trip Due to Miscommunication

G. COMPONENT FAILURE DATA:

This event was not the result of component failure, nor did any components fail as a result of this event.