

Commonwealth Edison Company  
Braidwood Generating Station  
Route #1, Box 84  
Braceville, IL 60407-9619  
Tel 815-458-2801

June 20, 1997  
BW/97-0034

**ComEd**

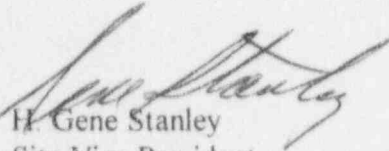
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Washington, D.C. 20555

To Whom It May Concern:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted in accordance with the requirement of 10 CFR 50.73(a)(2)(iv), which requires a 30-day report.

This report is number 97-003-00, Docket No. 50-456.

Yours Truly,

  
H. Gene Stanley  
Site Vice President  
Braidwood Nuclear Station

HGS/EW/vk  
I:\shared\admin\bw970034.doc

Enc: Licensee Event Report  
No. 456-97-003-00

cc: NRC Region III Administrator  
NRC Resident Inspector  
INPO Record Center  
ComEd Distribution Center  
I.D.N.S.  
I.D.N.S. Resident Inspector

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## LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT

FACILITY NAME (1):

Braidwood Unit 1

DOCKET NUMBER (2)

05000456

PAGE (3)

1 of 4

TITLE (4)

Manually Opened Reactor Trip Breakers Due to a Control Rod Drive Bank Overlap Malfunction

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 NAME	DOCKET NUMBER	
5	24	97	97	003	00	6	23	97	FACILITY NAME	DOCKET NUMBER	
OPERATING MODE (9)		3	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10)		000									
			<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)			<input type="checkbox"/> 50.73(a)(2)(iii)			<input type="checkbox"/> 73.71(b)	
			<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(3)(ii)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)			<input type="checkbox"/> 73.71(c)	
			<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 20.2203(a)(4)			<input type="checkbox"/> 50.73(a)(2)(v)			<input type="checkbox"/> OTHER	
			<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)			<input type="checkbox"/> 50.73(a)(2)(vii)			(Specify in Abstract below and in Text, NRC Form 366A)	
			<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)			<input type="checkbox"/> 50.73(a)(2)(viii)(A)				
			<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)			<input type="checkbox"/> 50.73(a)(2)(viii)(B)				
			<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(ii)			<input type="checkbox"/> 50.73(a)(2)(x)				
LICENSEE CONTACT FOR THIS LER (12)											
NAME								TELEPHONE NUMBER (Include Area Code)			
Elaine White, Root Cause Investigator								(815) 458-2801 Extension 2158			
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	AA	A4S6	X999	N							
SUPPLEMENTAL REPORT EXPECTED (14)											
YES (If yes, complete EXPECTED SUBMISSION DATE)					X		NO		EXPECTED SUBMISSION DATE (15)		
									MONTH DAY YEAR		

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

On 5/19/97, surveillance BWVS 500-2, Checkout of the Bank Overlap Unit, was successfully performed by the system Engineering Department. The purpose of this surveillance is to verify that the Bank Overlap Function and the Non-Urgent Alarms of the Rod Control System (AA) are operational.

At 1728 on 5/24/97, surveillance BWVS 500-4, Initial Criticality After Refueling and Nuclear Heating Level, was initiated in conjunction with procedure 1BWGP 100-2, Plant Startup. During the reactor startup, manual rod movement occurred as expected until approximately 2225 when the Nuclear Station Operator (NSO, Licensed) was manually withdrawing Control Bank C and D. It was observed that Control Bank C was not moving as expected in response to its demand signal from the bank overlap unit. Annunciator 1-10-A7, Rod Deviation Power Range Tilt, alarmed; at 2310 the reactor was manually tripped by the NSO.

The cause of the improper rod bank overlap was determined to be a failure of the thumbwheel switches due to dirty contacts. The safety significance of this event is minimal since the Rod Control System is a control system not required for safety.

Corrective actions for this event included stopping rod withdrawal, and manually initiating a Reactor Trip; all rods fully inserted. Subsequently, the contacts were cleaned. The bank overlap surveillance procedure will be revised to include additional verifications.

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Braidwood Unit 1	05000456	97	003	00	2 of 4

(If more space is required, use additional copies of NRC Form 366A)(17)

**A. PLANT CONDITIONS PRIOR TO EVENT:**

Unit(s): 01                      Event Date: 5/24/97                      Event Time: 2310 Hours  
Reactor Mode(s): 3              Power Level(s): 000%              RCS [AB] Temp./Press. 556 / 2241

**B. DESCRIPTION OF EVENT:**

There were no systems or components inoperable at the beginning of this event that contributed to the severity of the event.

On 5/19/97, surveillance BWVS 500-2, Checkout of the Bank Overlap Unit, was successfully performed by the System Engineering Department. The purpose of this test is to verify that the Bank Overlap Function and the Non-Urgent Alarms of the Rod Control System (AA) are operational. This surveillance operates the control rod step counter in both the forward and reverse direction, using the thumbwheel switches. The bank overlap unit is tested by observing the group selection lights, P/A Bank Position step counters, and Control Room step counters as the control rods are withdrawn. The bank overlap unit is tested with a twelve step overlap (rather than 113 steps in normal operation) to minimize changes in shutdown margin during the surveillance.

At 1728 on 5/24/97, surveillance BWVS 500-4, Initial Criticality After Refueling and Nuclear Heating Level, was initiated. This surveillance was performed in conjunction with procedure 1BWGP 100-2, Plant Startup. All surveillance prerequisites were performed and initialed by the test director. At approximately 2101, the Nuclear Station Operator (NSO, Licensed) began manually withdrawing control rods (procedure steps F.7 to F.9).

Withdrawal of the control rods follows a programmed sequence which includes a preset overlap from one bank to the next. Bank A is withdrawn first. When it reaches a preset position, overlap point S1, Bank B is engaged and begins to withdraw. At this point both banks continue to withdraw until a second preset position, overlap point S2, where Bank A is disengaged. Movement of Bank B continues to the next overlap point, overlap point S3 where Bank C engages. A similar pattern continues until overlap point S6, where Bank C disengages and bank D withdraws independent of the other control banks.

During the reactor startup, manual rod movement occurred as expected until approximately 2225 when the NSO observed that Control Bank C was not responding to the withdrawal signal. Control Bank C had disengaged at 218 steps rather than 228 steps as indicated by overlap point S6. Control Bank D continued to respond as expected to its demand signal. Annunciator 1-10-A7, Rod Deviation Power Range Tilt, alarmed. At 2310, the decision was made to manually trip the reactor and 1BWEP-0, Reactor Trip or Safety Injection Unit 1, was entered.

The manual reactor trip was reported to the NRC Operations Center via the Emergency Notification System at 0046 on 5/24/97 in compliance with 10CFR50.72(b)(2)(ii).

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Work Request 970058940 was initiated to troubleshoot and repair the rod control system. Troubleshooting included observing the indicator lights for Card A206, in the Rod Control (RD) logic cabinet while simulating a withdrawal signal. Proper indications were observed through a 10 step range, indicating that Card A210 (Bank Overlap Logic) was operating properly. Simulated motion was continued through all regular bank overlaps. Normal indications occurred on all overlaps until the "Control Bank C" stop position (overlap point S6) which stopped at 448 (instead of 458).

Thumbwheel switch S6 was cycled to clean the suspected dirty contact in the tens position. The thumbwheel switch was returned to its initial position and was retested using a simulated signal. Proper bank overlap indications were observed for all control banks. The test was repeated to provide additional assurance of proper system function.

This event is being reported pursuant to 10CFR50.73(a)(2)(IV) an event resulting in a manual actuation of an engineered safety feature.

**C. CAUSE OF EVENT:**

System engineering has determined the cause of the improper rod bank overlap to be a failure of the thumbwheel switches due to dirty contacts.

The function of the bank overlap unit is to keep incremental changes in reactivity constant during control rod movement.

**D. ASSESSMENT OF SAFETY CONSEQUENCES:**

The safety significance of this event as it occurred was minimal. With Control Bank C at 218 steps, it was very near its normal, fully withdrawn position for power operation. The failure of the control bank to fully withdraw was promptly identified and mitigated by the control room operator.

Had the event occurred under more limiting circumstances, e.g. at 100% power, the significance would be minimal. The effects of operating with a single control bank inserted 10 steps from normal would manifest themselves in a slightly lower shutdown margin and slight increase in core peaking factors. These parameters are routinely monitored per Technical Specifications to ensure they remain within analyzed limits. Additionally, the Technical Specification shiftly comparison of Digital Rod Position Indication (DRPI) to Demand would quickly identify and lead to resolution of the problem.

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**E. CORRECTIVE ACTIONS:****Immediate Corrective Actions:**

All rod motion was stopped. Reactor Trip Breakers were manually opened. Troubleshooting revealed the S6 thumbwheel switch for the Bank Overlap circuitry of the Rod Control System had dirty contacts which did not provide the proper stop point for the Control Bank C rods. The thumbwheel switch was exercised to clean the contacts and retested twice.

**Long-term Corrective Actions:**

The bank overlap surveillance procedure, BwVS 500-2, will be changed to include steps to exercise the thumbwheel switches prior to repositioning them after the test is complete. Additional steps will be added to verify the proper crossover points are set. This item will be tracked by NTS# 45618097SCAQ00003.

An Effectiveness Review will be performed and tracked to completion by NTS# 45618097SCAQ00003ER.

**F. PREVIOUS OCCURRENCES:**

There have been no previous Licensee Event Reports for failure of the Bank Overlap Unit for Braidwood Station.

**G. COMPONENT FAILURE DATA:**

<u>MANUFACTURER</u> -----	<u>NOMENCLATURE</u>	<u>MODEL</u>	<u>MFG. PART NO.</u>
Digitron Co. Pasadena, CA.	Digitswitch		13021-3