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

February 11, 1994
Bw/94-0027

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)(i)(B), which requires a 30-day written report.

This report has been revised to add other facilities involved and correct incorrect dates in the report. We are sorry for any inconvenience this may have caused.

This report is number 93-006-01, Docket No. 50-456.

K.L. Kofron
Station Manager
Braidwood Station

Encl: Licensee Event Report
No. 50-456/93-006-01

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

220040

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. 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 (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Braidwood 1	05000456	1 OF 4

TITLE (4)
Potential Inoperability of the Auxiliary Feedwater Switchover due to Inadequate Design Change

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 NUMBERS
									Byron Units 1/2	05000454/455
12	09	93	93	-- 006 --	01	02	11	94	FACILITY NAME Braidwood Unit 2	DOCKET NUMBER 05000457

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.402(b)		20.405(c)		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)(vii)		OTHER
	20.405(a)(1)(iii)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
	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	TELEPHONE NUMBER (Include Area Code)
B. Acas, Station Support Engineering	(815)458-2801 x2554

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
				No						

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

Braidwood Station has identified a potential operability issue regarding the availability of the motor driven Auxiliary Feedwater pumps (1,2 AF01PA). During an external event (seismic, tornado) where the Condensate Storage Tank (CST) was not available, concurrent with the motor driven AF pump being required to autostart; the pump would start and potentially could trip on low suction pressure (after a 2.5 sec time delay). The switchover of the AF pump suction to the safety related essential service water (SX) supply occurs 4 sec after pump start. Since both time delay relays will reset upon pump trip the automatic switchover may not occur. A determination was made that the motor driven AF pumps were inoperable and a LCOAR was entered. The event was caused by an inadequate modification design that failed to consider all failure modes effects on the AF system. A Temporary Alteration was installed to move the feeds for the 4 second SX switchover time delay relay to the AF pump starting circuitry. This keeps the timer active when the pump is receiving an auto start signal, ensuring SX switchover occurs on low suction pressure independent of pump trip.

NRC FORM 366A (5-92) U.S. NUCLEAR REGULATORY COMMISSION

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LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Braidwood 1	05000456	93	-- 006 --	00	2 OF 4

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

A. PLANT CONDITIONS PRIOR TO EVENT:

Units: Braidwood 1/2; Event Date: December 9, 1993;
Event Time: 1600;
Mode: 1 - Power Operation; Rx Power: 100%
RCS [AB] Temperature/Pressure: NOT/NOP

B. DESCRIPTION OF EVENT:

On December 8, 1993 Braidwood identified a potential operability issue regarding the availability of the motor driven Auxiliary Feedwater (AF) [BA] pumps (1,2 AF01PA) during an external event (seismic, tornado) where the Condensate Storage Tank (CST) was not available.

The AF pump suction circuitry is designed as follows: If suction pressure should fall to 14.1 psia coincident with two of four steam generator levels reaching the lo-lo setpoint on any steam generator, or two of four reactor coolant pump buses undervoltage, or any safety injection signal, the Essential Service Water (SX) [BI] suction valves will open if their control switches are in the automatic position. This actuation is blocked for the first 4 seconds. If suction pressure continues to drop to 12.5 psia, the Auxiliary Feedwater Pump will trip. This trip is blocked for the first 2.5 seconds.

The operability issue centered around a potential scenario in which the CST is lost due to an external event, concurrent with the motor driven AF pump being required to autostart. In this case the pump would start and potentially could trip on low suction pressure (after a 2.5 sec time delay). It was found that since both time delay relays will reset upon pump trip the automatic switchover may not occur, as required, to provide a safety related water supply to the AF pump suction.

On December 9, 1993 at 1600, the motor driven AF pumps for both Units were declared inoperable after the scenario was confirmed and determined to be credible. The Limiting Condition for Operation Action Requirement (LCOAR) 3.7.1.2.a was entered due to the potential unavailability of the motor driven AF pumps during the above stated scenario.

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Braidwood 1	05000456	93	-- 006 --	00	3 of 4

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

B. DESCRIPTION OF EVENT (continued):

The time delay relays, for pump trip and SX switchover on low suction pressure, were installed on the motor driven AF pump in 1987 (M20-1-87-079, Construction ECN 37022 for Unit 2) in response to a suction pressure transient which occurs upon motor driven pump start. This was done in order to avoid inadvertent pump trip or SX switchover when starting the motor driven AF pumps.

No systems or components were inoperable at the beginning of this event which contributed to this event.

The LCOAR was exited at 1130 on December 11, 1993.

This event is reportable per 10CFR50.73.(a)(2)(i)(B).

C. CAUSE OF THE EVENT:

The cause of this event is due to a design change installed in 1987 (M20-1-87-079, Construction ECN 37022 for Unit 2) which did not consider all possible failure modes which could affect the AF system. The design change installed time delay relays on the motor driven AF pump low suction pressure trip and SX switchover. The time delay relays are interlocked with auxiliary contacts on the pump breaker which causes the time delay relays to reset after pump trip. Severe suction transients, like loss of CST, could cause the suction pressure to reach the pump trip setpoint between 2.5 and 4 seconds. Because of the interlock with the pump breaker, this would prevent the SX switchover from occurring for the motor-driven AF pump concurrent with ESF actuation. In this case, the pump would start and trip repetitively.

D. SAFETY ANALYSIS:

The event is a concern when the CST suction supply to the AF pumps is not available, such as a loss of CST due to a seismic event or a tornado. This scenario would also require an actuation signal resulting from an SI signal, lo-lo S/G level, or RCP bus undervoltage. Due to the unlikely combination of events described above the probability of this event occurring is low.

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Braidwood 1	05000456	93	-- 006 --	00	4 OF 4

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

D. SAFETY ANALYSIS (continued):

In the case where the unavailability of the CST is known to the operators, Braidwood Emergency Procedures require the operator to manually switch the AF suction supply to SX. In the case where the CST is undergoing a normal depletion (e.g., faulted steam generator), the pump would have gradually lost suction pressure, and the automatic switchover to SX would have occurred without pump trip. Therefore, in both these cases, the "A" Train of the AF system would have performed its safety function.

This event does not apply to the "B" Train diesel driven AF pump since time delay relays were not installed in the diesel circuit. The "B" train diesel driven AF pump will remain operable during the event and is capable of providing the necessary flow to the S/G's.

E. CORRECTIVE ACTIONS:

Temporary Alterations, 93-1-018 and 93-2-025 were installed in order to move the interlock for the 4 second SX switchover time delay relay from the breaker auxiliary contacts to the AF pump starting circuitry. This keeps the timer active when the pump is receiving an auto start signal with the control switch in AFTER TRIP regardless of AF pump breaker status, ensuring SX switchover occurs on low suction pressure independent of pump trip. This will provide adequate suction to the pump with the loss of CST.

Following installation, during writing of the temporary alteration test package, an additional characteristic of the temporary alteration circuit was recognized. It was determined that the circuit would be effective with the control switch in AFTER TRIP, but not with the control switch in AFTER CLOSE. Station Operators were notified through administrative controls to not take the control switch to AFTER CLOSE after an auto-start, and that while running the pump manually the automatic switchover is not active. These corrective actions are considered adequate to ensure operability, but are not considered a long term solution. The long term solution is being tracked by NTS# 456-180-93-00601.

F. PREVIOUS OCCURRENCES

LER 50-456/89-008; AF Pump Suction Pressure Switches found out of calibration due to failure to consider head correction.

G. COMPONENT FAILURE DATA

None.