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

ComEd

October 26, 1999
Bw990074

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Braidwood Station, Unit 1
Facility Operating License No. NPF-72
NRC Docket No. STN 50-456

Subject: Submittal of Licensee Event Report Number 1999-002-00

10 CFR 50.73(a) requires a Licensee Event Report (LER) to be submitted within 30 days after discovery of the event. The purpose of this letter is to provide the subject LER in accordance with 10 CFR 50.73(a)(2)(i)(B) by the required October 28, 1999 submittal date.

The following describes the action and associated Action Tracking number that Braidwood Station is committed to implement in response to this LER:

> Action Tracking No. 16,833 - Review for gaps / overlaps in equipment response time measurements of all procedures credited with satisfying Technical Specification (TS) Surveillance Requirement (SR) 3.3.1.15, "Verify RTS Response Time is within limits," and TS SR 3.3.2.11 and 12, "Verify ESFAS Response Times are within limit."

Should you have any questions concerning this letter, please contact Mr. T. W. Simpkin, Regulatory Assurance Manager, at (815) 458-2801, extension 2980.

Respectfully,

Timothy J. Tulon
Site Vice President
Braidwood Station

IE22

Attachment: Braidwood Station, Unit 1 LER Number 1999-002-00

cc: Regional Administrator - NRC Region III
NRC Senior Resident Inspector - Braidwood Station

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

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

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Braidwood, Unit 1	STN 05000456	1 of 5

TITLE (4) Solid State Protection System (SSPS) Slave Relay Response Time Untested Due to Inadequate Procedures.

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
									Braidwood, Unit 2	STN 05000457
09	28	1999	1999	- 002	- 00	10	26	1999	FACILITY NAME	DOCKET NUMBER

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

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

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(iii)	☐ 73.71(b)
☐ 20.2203(a)(1)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(iv)	☐ 73.71(c)
☐ 20.2203(a)(2)(i)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(v)	☐ OTHER
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)	☐ 50.73(a)(2)(vii)	
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
☐ 20.2203(a)(2)(iv)	☒ 50.73(a)(2)(i)	☐ 50.73(a)(2)(viii)(B)	
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(ii)	☐ 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Terrence W. Simpkin, Regulatory Assurance Manager	(815) 458-2801 x-2980

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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 fifteen single-space typewritten lines 16)

During review of Westinghouse WCAP-14036-P-A, " Elimination of Periodic Protection Channel Response Time Tests," to explore the possible reduction of response time testing, it was determined that the slave relay portion of the response time in the Solid State Protection System (SSPS) was not properly verified, contrary to Technical Specification (TS) Surveillance Requirement (SR) 3.3.2.12. The Shift Manager was notified and SR 3.0.3 was entered for the missed surveillance requirement at 1245 hours, on September 28, 1999. In lieu of actual measurement during the re-performance of the surveillance, the TS allows response time to be assigned for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC. The NRC had previously approved WCAP-14036-P-A and associated references address the slave relays in question. Changes were made to the affected surveillance procedures to allocate a bounding response time for the relays and the surveillance response time compilation was satisfactorily re-performed within the allowed 24-hour time period. SR 3.0.3 was exited at 1715 hours for Unit 2 and at 1810 hours for Unit 1. The slave relay response time was correctly tested during the original pre-operational testing, but was first omitted in the initial 18-month TS surveillance procedure for an unknown reason. This event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B).

A. Plant Conditions Prior to Event:

Unit: Unit 1 / Unit 2 Event Date: 9/28/99 Event Time: 1245 hours

MODE: MODE 1 / MODE 1 Reactor Power: 100 percent / 100 percent Reactor Coolant System (RCS) [AB] Temperature: 581 degrees F. / 581 degrees F.
RCS Pressure: 2235 psig / 2235 psig

B. Description of Event:

On September 28, 1999, during the Braidwood Station review of Westinghouse WCAP-14036-P-A, Revision 1, " Elimination of Periodic Protection Channel Response Time Tests," to explore the possible elimination of a portion of the Reactor Trip System (RTS) [JG] and Engineered Safety Features Actuation System (ESFAS) [JE] channel response time testing at Braidwood and Byron Stations, it was discovered that the current method of testing at both Stations had not demonstrated or verified the response time of the slave relays used in the Solid State Protection System (SSPS) [JE]. When performing response time testing, the length of time for the slave relays to change state was not measured, contrary to Technical Specification (TS) Surveillance Requirement (SR) 3.3.2.12. Under the current SSPS response time surveillance methodology, the response time is effectively measured from when the monitored parameter exceeds its actuation setpoint at the channel sensor up to energization of the slave relay coil, and is also effectively measured from the slave relay contacts to the final actuating device. However, the current method does not " overlap" at the slave relay interface of these measured response time values.

Because the response time of the slave relay itself reacting to its coil being energized and actuating to reposition the appropriate contacts was not accounted for in the surveillance procedure, the response time testing compilation surveillance procedures 1/2BwVSR 3.3.2.12.a and b were declared invalid at 1245 hours, on September 28, 1999. As a result, the surveillance requirements for Engineered Safety Features (ESF) response time testing had not been met in the specified 18-month on a staggered test basis frequency. The Shift Manager was notified and SR 3.0.3 was entered for both Unit 1 and Unit 2. SR 3.0.3 allows up to 24 hours to perform the missed surveillance prior to entering TS Limiting Condition for Operation (LCO) 3.0.3 requiring a unit shutdown.

In lieu of actual measurement during the re-performance of the missed surveillance, the TS allows response time to be assigned for selected components

provided that the components and methodology for verification have been previously reviewed and approved by the NRC. The NRC approved WCAP-14036-P-A and associated references address the slave relays in question. Changes were made to the affected surveillance procedures 1/2BwVSR 3.3.2.12.a and b to allocate a bounding response time from WCAP-14036-P-A and associated references for the affected slave relays. The re-performance of the most recent surveillance response time compilations for both trains of SSPS on each unit, adding the allocated response time for the affected slave relays, were satisfactorily completed within the allowed 24-hour time period. SR 3.0.3 was exited at 1715 hours for Unit 2 and at 1810 hours for Unit 1 on September 28, 1999.

This event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B), " Any operation or condition prohibited by the plant's Technical Specifications."

C. **Cause of Event:**

The cause of this event was due to inadequate procedures. The improper development of the surveillance procedures led to the inadequate testing of the overall response time of the entire channel by failing to ensure the series of response time measurement steps were properly " overlapped." The original pre-operational test procedure tested the relays in question through the contacts on the slave relay, but for an unknown reason during the first refueling outages, the test was changed to only incorporate up to the relay coil and did not include the slave relay contact closure time. The procedure for those slave relays in question was inadequate and did not fully measure the timing sequence.

A historical review indicates the slave relay response time was correctly tested during the Pre-operational Test Program. The ESF system pre-operational test methods performed in the 1986 and 1987 timeframe for both units measured the response time in three parts. Part one measured from the transmitter to the 7300 process racks [JC]. Part two measured from the input test point in the process racks to the energizing of the slave relay coil and pick-up of its contacts. Part three measured from the slave relay coil contacts through to the equipment function. The SSPS output bay " Mode Selector Switch" was in the " Operate" position during the testing. The Operate position applies 120VAC to the slave relay coils to actuate the slave relay. The review indicates the slave relay response time was first omitted in the initial 18-month TS surveillance procedure.

When the initial time response surveillance procedures were developed, the procedures measured the response times through the slave relay coil. Unlike the pre-operational test initial conditions, the SSPS output bay " Mode Selector Switch" was in the " Test" position during the surveillance. In the Test

position, the slave relay will not pick-up the contacts due to the low voltage being applied. This method is still in use. The resulting surveillance did not include measuring the amount of time from when the slave relay completed energizing until the relay contacts completed changing state. The bounding response time now being allocated to the slave relays from WCAP-14036-P-A and associated references was not available in 1985 when the initial surveillance was written.

D. Safety Analysis:

The bounding time now being used is very short compared to the typical two to 15 second actuation times of the ESF equipment, and does not significantly affect the overall response time results. This is confirmed by the recent September 28, 1999, re-performance of the surveillance response time compilations for both trains of SSPS on each unit. Adding the very small bounding response time for the slave relays to the compilations satisfied the overall surveillance test acceptance criteria.

From WCAP-14036-P-A, the bounding response time allocation for the relays remains valid if the slave relays are functioning. The functionality of the slave relays is assured by quarterly surveillance testing, which allows the slave relays to actuate ESF equipment if plant stability is not challenged by ESF actuation. The contacts are electrically verified to have actuated in the event that ESF equipment operation is not desirable.

E. Corrective Actions:

Procedures 1/2BwVSR 3.3.2.12.a, " Unit 1/2 Engineered Safety Features Response Time Compilation for MODE 4 Required Equipment," were immediately revised to add the allowable time limits for the slave relay contacts to actuate, and were satisfactorily performed for both units.

Procedures 1/2BwVSR 3.3.2.12.b, " Unit 1/2 Engineered Safety Features Response Time Compilation for MODE 3 Required Equipment," were immediately revised to add the allowable time limits for the slave relay contacts to actuate, and were satisfactorily performed for both units.

To prevent recurrence, a review for gaps/overlaps in equipment response time measurements of all procedures credited with satisfying TS SR 3.3.1.15, " Verify RTS Response Time is with limits," and TS SR 3.3.2.11 and 12, " Verify ESFAS Response Times are within limit," will be performed.

F. Previous Occurrences:

Review of previous events over the past several years concerning missed surveillances and the usage of inadequate procedures revealed the following Licensee Event Reports (LERs). However, the corrective actions associated with these prior events were not of a nature that would have disclosed this condition or prevented this event from occurring.

LER Number	Title
05000456-97-005	Inadequate P-11 ACOT/Channel Calibration Due to Defective Procedure.
05000456-97-010	SSPS Logic Testing Not Performed Due to Inadequate Testing Design. Testing of safety related logic circuits was inadequate as all functions of some memory logic circuits were not tested.
05000456-98-001	Failure to Test ESF Logic Circuit Due to Oversight By Initial Review (SARA/SARB Relays).
05000456-98-006	Failure to Test Contacts As Required By TS Due to Inadequate Surveillance Procedure Development Prior to Initial Plant Start-up.

G. Component Failure Data:

There were no component failures associated with this event.