

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



September 13, 1995
BW/95-0089

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

Gentlemen:

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

This report is number 95-007-00, Docket No. 50-456.

Yours truly,

T.J. Tulon
Station Manager
Braidwood Nuclear Station

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Encl: Licensee Event Report
No. 456-95-007-00

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)

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

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 (MNB 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.

FACILITY NAME (1)
Braidwood 1

DOCKET NUMBER (2)
05000456

PAGE (3)
1 OF 5

TITLE (4) Inadequate Testing of Diesel Generator Voltage Regulator in 1988 due to Management Deficiency

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 NUMBERS
07	13	88	95	-- 007 --	00	09	14	95	None	None

OPERATING MODE (9)	1	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)		
POWER LEVEL (10)	100	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
Dave Gustafson, System Engineering

TELEPHONE NUMBER (Include Area Code)
(815) 458-2801 x2765

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
				N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On August 15, 1995 Systems Engineering Department performed a review of emergency diesel generator (DG) maintenance history to identify occurrences in which voltage regulators were replaced or adjusted and evaluate the subsequent post maintenance testing performed to verify diesel generator operability. The review identified one occurrence on July 13, 1988 in which the voltage regulator on the 1A DG was replaced. Subsequent to this changeout, the post-maintenance testing inadequately verified the ability of the voltage regulator to perform under all operating conditions. This management deficiency potentially could have rendered the 1A DG incapable of fulfilling its safety function and is reportable under 10 CFR 50.73(a)(2)(v). Subsequent testing in October 1989 verified the voltage regulator operable in all modes of operation. One of the corrective actions to prevent recurrence of DG testing deficiencies is to develop a procedure which verifies the performance of the voltage regulator and/or governor under accident transient loading conditions following re-adjustment or replacement with the unit at power.

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TEXT CONTINUATION

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

A. PLANT CONDITIONS PRIOR TO EVENT:

Event Date: July 13, 1988; Event Time: ~2330;
 MODE: 1 - Rx Power: 100 ;
 RCS [AB] Temperature/Pressure: NOT / NOP

B. DESCRIPTION OF EVENT:

On August 15, 1995 Systems Engineering Department performed a review of emergency diesel generator (DG)[EK] maintenance history to identify any occurrences at Braidwood Station in which voltage regulators were replaced or adjusted. Also identified was the type of post maintenance testing performed to verify diesel generator operability. This review was conducted in response to a recent voltage regulator failure at Zion Station and a concern related to the adequacy of their testing of the diesel generator. The review identified one occurrence on July 13, 1988 in which a voltage regulator for the 1A DG was replaced. The subsequent post-maintenance testing inadequately verified the ability of the voltage regulator to perform in the isochronous (emergency) mode of operation.

On July 13, 1988 the 1A DG was started in accordance with 1BwOS 8.1.1.2.a-1, 1A Diesel Generator Operability Monthly and Semi-Annual Surveillance. The diesel generator successfully reached rated speed and voltage during the engine start, however, KVAR's soon began to swing rapidly. The movements could not be stabilized by operators in the control room. The 1A DG was shutdown and troubleshooting efforts identified the voltage regulator as the defective component. The voltage regulator was replaced on 7/14/88. The post-maintenance test performed following the replacement activity was to manually switch from emergency mode to droop two separate times. This was followed by the performance of 1BwOS 8.1.1.2.a-1, 1A Diesel Generator Operability Monthly and Semi-Annual Surveillance. This testing verifies the response of the voltage regulator in the test mode, but it does not verify that it can perform under transient loading conditions in the emergency mode. Transient loading of the EDG in isochronous mode was not performed until the Tech Spec required emergency mode loading was performed in October, 1989 during the first Unit 1 refueling outage (A1R01).

This report is being submitted pursuant to 10CFR50.73(a)(2)(i)(b) - any operation or condition prohibited by the plant's Technical Specifications.

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

C. CAUSE OF THE EVENT:

The cause of this event was a Management Deficiency. In 1988, cognizant personnel failed to recognize the potential operability impact of voltage regulator adjustments, repairs, and replacements in all diesel generator operating modes. As a result, the post-maintenance testing specified and performed inadequately verified the performance of the 1A DG in the emergency or accident mode of operation.

A causal factor involved in this event was the fact that Unit 1 was at full power when the voltage regulator was replaced. Diesel generator emergency mode testing would require the associated ESF bus loads transferred to the DG and the ESF bus to be isolated from off-site power. Transient loading conditions could then be simulated by starting and stopping ESF loads. No procedure existed at the time of this event to test the DG in the emergency mode at power. These factors may have influenced the decision to rely on the normal monthly surveillance to verify DG operability in lieu of challenging the bus and loads.

D. SAFETY ANALYSIS:

This event had no effect on plant or public safety. Testing performed during A1R01 (and all outages since) confirmed that the newly installed voltage regulator was functioning as designed. The new regulator passed all emergency mode transient loading surveillances when tested in October, 1989. Based on our investigations, we conclude that the Braidwood Station 1A Emergency Diesel Generator was fully capable of performing all of its intended safety functions. Specifically this includes the period from 7/88 to 10/89 that the new voltage regulator was installed but had not been adequately tested.

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

E. CORRECTIVE ACTIONS:

Immediate actions included an extensive maintenance history review with increased scope to include governor component repairs, replacements, and adjustments. This review identified several additional maintenance activities involving DG voltage regulators and governors, however, none of the work appears to have affected the diesel generator's performance in the emergency mode of operation.

The following actions will be taken to prevent recurrence of these events:

1. If a DG voltage regulator readjustment and/or replacement occurs and the DG's emergency mode of operation was affected, the DG must be tested under transient loading conditions in the emergency operating mode. This test can consist of the complete DG LOOP/LOCA sequencing test or a special test designed to apply sufficient emergency transient loads to the DG to verify proper voltage regulator response. This recommendation will be implemented in a permanent test procedure which verifies the operability of the diesel generator following voltage regulator and/or governor adjustments, repairs, or replacements with the affected unit at power. This action will be tracked to completion by commitment 456-180-95-00702.
2. Attachment C of the DG Limiting Condition of Operation operating procedure (1/2BwOS 8.1.1-1a) will be revised to add the procedure created in corrective actions #1 above to the surveillance list. In addition a foot note will be added advising operations to evaluate use of this test whenever a voltage regulator/governor failure occurs. This will provide guidance to Operations management concerning failure of the voltage regulator or governor and potential post-maintenance testing requirements required to restore DG operability. This action will be tracked to completion by commitment 456-180-95-00701.
3. BwAP 1600-1 (Action Work Request Processing Procedure) requires that System Engineers evaluate all work packages and assign appropriate post maintenance testing. System Engineers were not required to review all packages in the past.

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F. PREVIOUS EVENT SEARCH:

The following previous events are related to the discovery of the deficiency identified in this report:

- LER 2-95-009 Dresden Unit 2 Tech Spec Required Shutdown Due to Inoperable Unit EDG and Subsequent Manual Reactor Scram To Meet Tech Spec LCO
- NON ZN 22-95-08 1A Emergency Diesel Generator (EDG) Voltage Swings and Entry Into 4 Hour Clock to Hot Shutdown

Both of these events involved DG voltage regulator replacements and the subsequent post-maintenance testing included subjecting the DG to transient accident loading conditions. The Dresden event required a unit shutdown to accomplish the testing, but in the Zion event post-maintenance testing was accomplished with the unit at power. The lessons learned from these two events will prevent recurrence of DG post-maintenance testing inadequacies following governor and/or voltage regulator replacements at Braidwood Station.

Other than the one incident of DG voltage regulator failure noted above, there have been no other occurrences of DG voltage regulators at Braidwood.

G. COMPONENT FAILURE DATA:

Although this event was a result of failed equipment in 1988, this report addresses the management deficiencies which resulted in inadequate post-maintenance testing following the replacement of the failed components. The failure of the DG voltage regulator in question was already reported to NPRDS in 1988 when it occurred.