

Commonwealth Edison Company
Byron Generating Station
4450 North German Church Road
Byron, IL 61010-9794
Tel 815-234-5441



DATE September 14, 1995

LTR: BYRON 95-0301
FILE: 3.03.0800 (1.10.0101)

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

Dear Sir:

The Enclosed Licensee Event Report from Byron Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(v).

This report is number 95-004; Docket No. 50-455.

Sincerely,

M. Snow for
K. L. Kofron
Station Manager
Byron Nuclear Power Station

KLK/DB/ba

Enclosure: Licensee Event Report No. 95-004

cc: H. J. Miller, NRC Region III Administrator
NRC Senior Resident Inspector
INPO Record Center
ComEd Distribution List

180036

JE221

SIGNATURE PAGE FOR LICENSEE EVENT REPORT

LER Number
455: 95-004

Title of Event: Inadequate Diesel Generator Post Maintenance Testing Due to Management Deficiency

Occurred: 08/15/95 / 0900
Date Time

Licensee Contact: D. BARAN

OSR DISCIPLINES REQUIRED: A, B, G

JPS / 8/21/95
SES DATE

Acceptance by Station Review:

[Signature] / ABG / 9/8/95
OE Disciplines Date

[Signature] / AG / 9/2/95
SES Disciplines Date

[Signature] / ABG / 9/8/95
RAS Disciplines Date

[Signature] / N/A /
Other Disciplines Date

[Signature] / N/A /
Other Disciplines Date

Approved by: M Snow / 9/14/95
Station Manager Date

LICENSEE EVENT REPORT (LER)

FACILITY NAME BYRON NUCLEAR POWER STATION - UNIT 2										DOCKET NUMBER 0 5 0 0 0 4 5 5					PAGE 1 OF 0 5													
TITLE INADEQUAE DIESEL GENERATOR POST MAINTENANCE TESTING DUE TO MANAGEMENT DEFICIENCY																												
EVENT DATE			LER NUMBER				REPORT DATE			OTHER FACILITIES INVOLVED																		
MONTH	DAY	YEAR	YEAR	SEQ. NUMBER	REVISION	MONTH	DAY	YEAR	FACILITY NAMES Braidwood Unit 1				DOCKET NUMBER(S) 0 5 0 0 0 4 5 6															
0	8	1	5	9	5	9	5	-	0	0	4	-	0	0	0	9	1	4	9	5	0	5	0	0	0			
OPERATING MODE		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (CHECK ONE OR MORE OF THE FOLLOWING)																										
1		20.402(b)				20.405(e)				50.73(a)(2)(iv)				73.71(b)														
POWER LEVEL		20.405(a)(1)(i)				50.36(c)(1)				X 50.73(a)(2)(v)				73.71(c)														
9 9		20.405(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)														
		20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(viii)(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																												
NAME D. BARAN, SR. SYSTEM ENGINEER, X2050												TELEPHONE NUMBER 8 1 5 2 3 4 - 5 4 4 1																
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT																												
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS									
				N																								
SUPPLEMENTAL REPORT EXPECTED												EXPECTED SUBMISSION DATE			MONTH	DAY	YEAR											
<input type="checkbox"/> YES. (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO																												

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

On August 15, 1995 Systems Engineering Department performed a review of Emergency Diesel Generator (DG)(EK) maintenance history to (1) identify occurrences in which voltage regulators were replaced or adjusted, and (2) evaluate the subsequent post maintenance testing performed to verify diesel generator operability. The review identified occurrences in which the voltage regulator for the 2B DG was replaced on December 26, 1990 and December 19, 1991 and 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 2B DG incapable of fulfilling its safety function and is reportable under 10 CFR 50.73(a)(2)(v). Corrective actions to prevent recurrence of DG testing deficiencies include the development of 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 Energy Industry Identification System (EIS) codes are identified in the text as [XX]

A. PLANT CONDITIONS PRIOR TO EVENT:

Event Date/Time 08-15-95 / 0900

Unit 1 MODE 1 - Power Ops Rx Power 98.5 RCS [AB] Temperature/Pressure Normal Operating

Unit 2 MODE 1 - Power Ops Rx Power 99.8 RCS [AB] Temperature/Pressure Normal Operating

B. DESCRIPTION OF EVENT:

On August 15, 1995 Systems Engineering Department performed a review of Emergency Diesel Generator [EK] (DG) maintenance history to (1) identify occurrences in which voltage regulators were replaced or adjusted, and (2) evaluate the subsequent 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 concerns related to testing the diesel generator's ability to perform during accident conditions with the affected unit at power. The review identified two occurrences in which the voltage regulator for the 2B DG was replaced on December 26, 1990 and December 19, 1991 and the subsequent post-maintenance tests inadequately verified the ability of the voltage regulator to perform under all operating conditions.

On December 26, 1990 the 2B DG was started in accordance with 2BOS 8.1.1.2.a-2, 2B Diesel Generator Operability Monthly and Semi-Annual Surveillance. The 2B DG successfully reached rated speed and voltage during the engine start, however, voltage could not be adjusted to support synchronizing the diesel generator to off-site power. The troubleshooting effort identified the voltage regulator as the defective component and it was replaced. The post-maintenance test specified and performed for the replacement activity was 2BOS 8.1.1.2.a-2, 2B Diesel Generator Operability Monthly and Semi-Annual Surveillance. This surveillance adequately tests the performance 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.

On December 11, 1991, while performing the monthly operability surveillance, problems were again experienced while attempting to adjust diesel generator output voltage. Output voltage response while manually adjusting voltage was sluggish. It was determined that the motor operated controller was the source of the problem and it was replaced. The output voltage response did not improve during subsequent diesel generator maintenance and troubleshooting runs. Based on the fact that manual voltage control is not enabled in the emergency mode and that, although sluggish, the diesel generator was still capable of being synchronized with off-site power, On-Site Review 91-187 determined that the 2B DG was operable. On December 19, 1991 the 2B DG was again taken out-of-service and the voltage regulator was replaced in an attempt to correct the sluggish response problem. No improvement, however, was observed following the voltage regulator replacement. On-Site Review 91-190 determined that the 2B DG was operable using the same justification contained in On-Site Review 91-187. The post-maintenance testing performed for this installation included the monthly operability surveillance and a full load reject test. Neither of these tests verified the ability of the voltage regulator to perform under transient loading conditions in the emergency mode.

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TEXT Energy Industry Identification System (EIS) codes are identified in the text as (XX)

B. DESCRIPTION OF EVENT (Cont.):

During refueling outage B2R03 in March 1992, additional troubleshooting determined that the actual cause of the sluggish manual voltage adjustment response experienced in December 1991 was due to a failed relay on the Instantaneous Pre-Position (IPP) circuit board. The IPP circuit board establishes the setpoint voltage of 4160 VAC during emergency mode conditions. This setpoint input into the voltage regulator from the failed IPP circuit board overrode the input from the motor operated controller over a wide adjustment range causing the sluggish response in the test mode. Subsequent post-maintenance testing, which included complete LOOP/LOCA sequence testing adequately verified the performance of voltage regulator installed in December 1991 and associated equipment repaired or replaced during B2R03. However, the voltage regulator installed in December 1990 was never tested under transient loading conditions in the emergency mode.

C. CAUSE OF EVENT:

The cause of this event is a management deficiency. 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 for these activities inadequately verified the performance of the 2B DG in the emergency or accident mode of operation.

D. SAFETY ANALYSIS:

The safety consequence of this event is that the 2B DG may have potentially been incapable of fulfilling its designed safety function from the date the voltage regulator was installed until it was adequately tested during B2R03. During that period the redundant train 2A DG was unavailable on six different occasions including the period in which the 2A DG maintenance teardown was being performed during B2R03. For those occasions in which the 2A DG was inoperable and under design basis accident conditions for Unit 2, no reliable source of emergency power may have been immediately available to ESF/ECCS loads to mitigate the consequences of the accident. During that period, however, the System Auxiliary Transformers were available to power their associated Unit 2 ESF busses as was the ability to cross-tie with Unit 1 emergency or off-site power circuits.

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E. CORRECTIVE ACTIONS:

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

The following actions will be taken to prevent recurrence of these events and involve the implementation of the recommendations by ComEd Mechanical & Structural Engineering, Nuclear Engineering Services as delineated in their letter dated July 27, 1995, CHRON 214686, to all six ComEd sites.

1. Recommendation 1:

Whenever a DG voltage regulator or governor is re-adjusted and/or replaced, an evaluation must be performed to identify the DG operating functions affected by this activity and the affected functions must be fully tested before returning the DG to an operable condition.

This recommendation will be implemented by revising the AC Sources Limiting Condition of Operation Action Requirement Operating Surveillances. These procedure revisions will direct shift management to notify Systems Engineering for all maintenance activities involving DG voltage regulators or governors. Systems Engineering will then be required to perform an evaluation of the DG operating functions affected by these maintenance activities and to specify the necessary post-maintenance testing to restore DG operability. NTS #455-180-95-0004-01.

2. Recommendation 2:

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 and will be applicable for all unit operating modes. NTS #455-180-95-0004-02.

This event and its applicability to specifying and performing adequate post-maintenance testing on all components and systems will be discussed at a System Engineering Department meeting. In addition, this report will be included as required reading for all System Engineers. NTS #455-180-95-0004-03.

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

F. RECURRING EVENTS SEARCH AND ANALYSIS:

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

Nuclear Operations Notification 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 Byron Station.

G. COMPONENT FAILURE DATA:

Although this event is a result of failed equipment in 1990 and 1991, this report addresses the management deficiencies which resulted in adequate post-maintenance testing following the replacement of the failed components.