



**Commonwealth Edison**  
 Byron Nuclear Station  
 4450 North German Church Road  
 Byron, Illinois 61010

August 19, 1992

LTR: BYRON 92-0566  
 FILE: 2.07.400

Mr. A. Bert Davis  
 Regional Administrator  
 Region III  
 U.S. Nuclear Regulatory Commission  
 799 Roosevelt Road  
 Glen Ellyn, IL 60137

SUBJECT: Byron Unit 1 Operating License NPF-37, Docket No. 50-454  
 Reporting of Emergency Diesel Generator Failures

Dear Mr. Davis:

This report is submitted in accordance with Byron Station Unit 1 Operating License NPF-37 Appendix A, Technical Specification 4.8.1.1.3, reporting of Diesel Generator Failures.

This report addresses one valid failure experienced on the 1A Diesel Generator (DG). The criteria to determine valid and nonvalid tests and failures is in accordance with section C.2.e of Regulatory Guide 1.108.

The attached Deviation Investigation Report DIR 06-01-92-036 is a summary of the current 1A DG failure. The Diesel Generator was out of service 24.7 hours for replacement of the failed component. This was the first valid failure during the last 20 valid tests for the 1A DG. Therefore, the 1A DG will remain on a monthly test interval per Technical Specification 4.8.1.1.2.a. This was the fourth valid failure in the preceding one hundred Unit 1 Diesel Generator valid tests.

Sincerely,

R. Pleniewicz  
 Station Manager  
 Byron Nuclear Power Station

RP/EEH/ph

Attachments

cc: Byron Station NRC Senior Resident Inspector  
 U.S. NRC Document Control Desk, Washington D.C.  
 INPO Record Center  
 CECO Distribution List

(4066z/VS)

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DEVIATION INVESTIGATION REPORT (DIR)

Form Rev 2.

Facility Name  
Byron Nuclear Power Station

PAGE  
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Title  
1A Diesel Generator Inoperable Due to Reverse Power Trip

EVENT DATE			DIR NUMBER				REPORT DATE			OPERATING MODE		
MONTH	DAY	YEAR	STA	UNIT	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR		1
07	01	92	06	01	92	036	00	08	12	92		098

CONTACT FOR THIS DIR

NAME	Ext.	TELEPHONE NUMBER
E. Hernandez, Technical Staff	2685	AREA CODE: 815, NUMBER: 234-544
R. Wegner, Asst. Tech Staff Supervisor	2274	

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	
				Y							

SUPPLEMENTAL REPORT EXPECTED

EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
<input type="checkbox"/> YES (if yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO			

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

A. PLANT CONDITIONS PRIOR TO EVENT:

Event Date/Time 07/01/92 / 1016

Unit 1 MODE 1 - Power Operating Rx Power 97.3% RCS [AB] Temperature/Pressure Normal Operating

Unit 2 MODE 1 - Power Operating Rx Power 99.4% RCS [AB] Temperature/Pressure Normal Operating

B. DESCRIPTION OF EVENT:

On July 1, 1992 at 0830, the 1A Diesel Generator [EK] (DG) was started per Byron Operating Procedure BOP DG-11 for a maintenance run to calibrate the engine vibration switch. Following a successful start, the 1A DG was synchronized to ESF Bus 141. At approximately 0940, the Unit 1 Nuclear Station Operator (NSO-licensed) attempted to increase the generator load from 4100 Kw. The generator load dropped to approximately 3000 Kw and load started fluctuating. The NSO attempted to regain control using the governor switch and load rapidly increased to 5500 Kw where it remained stable temporarily. At approximately 1015, the NSO reduced the generator load to 2750 Kw. While adjusting the governor control switch in the "increase" direction, the diesel generator load reduced to zero, causing a generator "Reverse Power" trip. Technical Specification Limiting Condition for Operation Action Requirement (LCOAR) 1BOS 8.1.1-1a was entered for the inoperable diesel generator. There were no systems or components inoperable at the beginning of the event which contributed to event. No manual or automatic safety system actuations occurred as a result of the event. Operator actions did not contribute to the event.

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

B. DESCRIPTION OF EVENT: (continued)

Subsequent troubleshooting indicated an intermittent failure of the normally de-energized 31MX relay. The function of the normally de-energized relay is to prevent the governor control circuit from picking up or shedding too much load (this mode of operation is called the droop mode) when connected parallel to the bus. Following replacement of the 31MX relay, the 1A DG was started for a maintenance run. The NSO closed the output breaker and 1A DG began to load uncontrollably. Several attempts were made to gain control of the governor control circuit; none were successful. The 1A DG was shutdown and troubleshooting activities were again initiated. The motor operated potentiometer (MOP) was removed and replaced (the MOP provides a variable speed reference input to the governor control circuit). In addition, the 4EX3X and 4X relays were cleaned and verified operable. These relays align the electronic governor with a fixed resistance for a constant speed reference. The governor control circuit was inspected for any loose connections. No abnormal conditions were found. Another maintenance run was performed, and governor/load swings were still present.

Based on discussions with the Cooper-Bessemer governor representative, Maintenance, Operating, and Technical Staff the 1A DG was started and ran unloaded. The frequency response was checked with the mechanical governor out of the circuit. No abnormal conditions were found.

A jumper with a test switch was installed across contacts 7 & 8 of the 31MX relay to check for contact continuity. Upon further investigation contacts 5 & 6 and 7 & 8 were found open. The contacts are required closed in the normally de-energized position of the 31MX relay. The closed contacts maintain the governor control circuit in the droop mode. The 1A DG was shutdown and the contacts were repositioned to the required configuration of normally closed by the Electrical Maintenance personnel. The 1A DG was started for a maintenance run at 1100 on 07/02/92 and synchronized to ESF Bus 141. The 31MX relay was energized and de-energized using jumpers to verified proper contact continuity. No load oscillations were observed during the run.

Following completion of the maintenance activity, the 1A DG was started per the monthly operability surveillance 1BOS 8.1.1.2.a-1. At 1717 on 07/02/92, the operability surveillance was completed and LCOAR 1BOS 8.1.1-1a was exited.

C. CAUSE OF EVENT:

The root cause for the event was the intermittent operation of the 31MX relay. Based on discussions with the Woodward Governor representative, an intermittent operation of the 31MX relay will result in the governor control circuit to switch to isochronous mode (in this mode of operation the governor maintains a constant speed regardless of load). In the isochronous mode if the diesel generator is parallel to a bus, the governor control circuit will either rapidly increase in an attempt to control system load or decrease resulting in a generator reverse power trip. Following the initial replacement of the 31MX relay, the subsequent load swings experienced on the 1A DG were attributed to the mispositioning of contacts 5 & 6 and 7 & 8. Inadequate procedures for administrative control during Receipt Inspection resulted in installing the 31MX relay with the contacts mispositioned.

D. SAFETY ANALYSIS:

There were no safety consequences as a result of this event. The 1B Diesel Generator was fully operable and could have provided emergency power if required under more severe conditions. In addition, the 2A and 2B Diesel Generators were fully operable and could have been cross-tied to Unit 1 if necessary.

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

E. CORRECTIVE ACTIONS:

The 31MX relay and motor operated potentiometer were removed and replaced. The contacts 5 & 6 and 7 & 8 were repositioned to the correct configuration.

The Electrical Maintenance Surveillance 1/2 BHS DG-1 will be revised to verify proper contact continuity across the 5 & 6 and 7 & 8 contacts of the 31MX relay during the 18-month DG inspections. A Nuclear Work Request will be written to reposition contacts 5 & 6 and 7 & 8 on the existing relays in the Stores warehouse. Proper verification of the contact configuration will be added during the receipt inspection of future 31MX relays. The three Action Items will be tracked by NTS Item #4542009203600-01.

F. RECURRING EVENTS SEARCH AND ANALYSIS:

There have been several instances of unstable load control on the Byron Diesel Generators. Only one of the events was attributed to intermittent operation of the 31MX relay. The other failures were attributed to other governor control circuit relays.

a) EVENT SEARCH (DIR, LER)

DIR	TITLE
06-01-88-076	1B DG Failure to Control Load

b) INDUSTRY SEARCH (OPEX's NPRDS)

None found.

c) NWR

B94308

d) ANALYSIS

No adverse trend identified.

G. COMPONENT FAILURE DATA:

MANUFACTURER	NOMENCLATURE	MODEL NUMBER	MFG PART NUMBER
General Electric	125 VDC Relay	N/A	12HFA151A2H

H. OTHER RELATED DOCUMENTS:

None found.

I. EFFECTIVENESS REVIEW:

None scheduled.

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TEXT Energy Industry Identification System (EII5) codes are identified in the text as [XX]

J. ADDITIONAL DATA:

- a) Affected Technical Specification: 3/4.8.1, AC Sources
- b) Procedures: 1/2 BHS DG-1, \_A or \_B Diesel Generator 18 month Electrical Inspection  
1BOS 8.1.1.2.a-1, 1A Diesel Generator Operability Monthly Surveillance  
1POS 8.1.1-10, AC Sources
- c) Cause Code: D14
- d) Equipment Involved: 1A Diesel Generator
- e) Other: Diesel Generator, Governor, Relay, Contacts