



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

June 29, 1990

Ltr: BYRON 90-0615

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 as a Supplemental Report.

This report is number 89-005-01; Docket No. 50-454.

Sincerely,

R. Ploniewicz  
Station Manager  
Byron Nuclear Power Station

RP/MM/jr

Enclosure: Licensee Event Report No. 89-005-01

cc: A. Bert Davis, NRC Region III Administrator  
W. Kropp, NRC Senior Resident Inspector  
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LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Byron, Unit 1 Docket Number (2) 0 5 0 0 0 4 5 4 Page (3) 1 of 0 4

Title (4)  
DIESEL GENERATOR INOPERABLE DUE TO DEFICIENT POST-MAINTENANCE TESTING

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 Number(s)
0 5	0 1	8 9	8 9	0 0 5	0 1	0 7	1 1	9 0	NONE	0 5 0 0 0 1 1 0 5 0 0 0 1 1

OPERATING MODE (9) 1

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in Text)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

POWER LEVEL (10) 0 8 6

LICENSEE CONTACT FOR THIS LER (12)

Name Roger Flahive, Technical Staff Supervisor Ext. 2243 TELEPHONE NUMBER AREA CODE 8 1 5 2 3 4 - 5 4 4 1

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

SUPPLEMENTAL REPORT EXPECTED (14)

Yes (If yes, complete EXPECTED SUBMISSION DATE)  NO

Expected Submission Date (15) \_\_\_\_\_

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

On May 1, 1989, at 0810, the 1A Diesel Generator failed to load to 5500 kW within 60 seconds as required by Technical Specifications. The Diesel Generator started normally, loaded to 5400 kW in approximately 40 seconds, and gradually loaded to 5700 kW.

After investigation, it was determined that the Diesel Generator did not load adequately because the maximum fuel setting on the fuel control system was set too low. It is believed that maintenance, performed on April 19, 1989, slightly reduced the maximum fuel setting. Byron Station is assuming that the Diesel Generator was inoperable for the 12 days following the maintenance and that the Limiting Condition for Operation Action Requirement time limits were exceeded. Therefore, this event is reportable per 10CFR50.73(a)(2)(i)(B) for operation in a condition prohibited by our Technical Specifications.

Following the failure, the fuel control system was properly adjusted using the original setup instructions provided by the vendor. The vendor instructions have been included in procedures for post-maintenance testing of the diesel fuel control system.

There were no manual or automatic safety system actuations during the event. There has been one unrelated previous occurrence of a Diesel Generator failing to load to 5500 kW within 60 seconds.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Byron, Unit 1      0 | 5 | 0 | 0 | 0 | 4 | 5 | 4      8 | 9 | - | 0 | 0 | 5 | - | 0 | 1      0 | 2    OF    0 | 4

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

A. PLANT CONDITIONS PRIOR TO EVENT:

Event Date/Time 05/01/89 / 0810

Unit 1 MODE 1 - Power Operation      Rx Power 86%      RCS [AB] Temperature/Pressure Normal Operating

B. DESCRIPTION OF EVENT:

On May 1, 1989, at 0810, the 1A Diesel Generator [EK] failed to load to the required 5500 kW within 60 seconds. This occurred during the 1A Diesel Generator Semi-Annual Operability Surveillance 1BOS 8.1.1.2.a-1. The Diesel Generator started normally, loaded to 5400 kW in approximately 40 seconds, then maintained that load for several minutes. As the engine warmed up, it gradually loaded to 5700 kW. The engine responded slowly to load change demands from the Main Control Board and was unloaded and stopped locally. The Shift Control Room Engineer (Senior Reactor Operator) entered the Limiting Condition for Operation Action Requirement (LCOAR) 1BOS 8.1.1-1a for one inoperable Diesel Generator.

The LCOAR for one inoperable Diesel Generator requires verification of other AC power sources within 8 hours and restoration of the Diesel Generator to operable status within 72 hours or else requires plant shutdown. The LCOAR was not entered until after the Diesel Generator failed its semi-annual operability surveillance. It is believed that the Diesel Generator became inoperable during maintenance activities performed on April 19, 1989. Therefore, it is conservative to assume that the Diesel Generator was inoperable for approximately 12 days and that the LCOAR time was exceeded. Based on this assumption, this event is reportable per 10CFR50.73(a)(2)(i)(B) for operation in a condition prohibited by our Technical Specifications.

After investigation, it was determined that the Diesel Generator did not load adequately because maintenance on the fuel control system inadvertently lowered the maximum fuel setting. In this condition, the Diesel Generator could not reach 5500 kW in 60 seconds. The fuel control settings were corrected and the Diesel Generator was tested and declared operable on May 1, 1989.

There were no manual or automatic safety system actuations during the event. Plant conditions remained stable throughout the event. There were no systems or components inoperable prior to the event that contributed to the event other than those mentioned.

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

C. CAUSE OF EVENT:

The intermediate cause of the Diesel Generator failing to load to 5500 kW within 60 seconds was an incorrect maximum fuel setting. The fuel settings were inadvertently changed when maintenance was performed on the fuel control system. Maintenance was performed because the left bank of the 1A Diesel Generator cylinders were operating at a lower temperature than the right bank. On April 19, the fuel metering rods were adjusted to balance the cylinder exhaust temperatures. As preventive maintenance, the fuel control cylinder (bimba cylinder) was also replaced. This component had not yet failed, but was showing signs of degradation. It is believed that replacing the bimba cylinder affected the fuel rack span and zero reference. The net effect was a slight reduction in the maximum fuel setting.

The bimba cylinder has been replaced previously without a noticeable impact on the fuel control settings. The vendor manuals and existing procedures gave no indication that replacing the bimba cylinder could have such an impact. The post-maintenance activities verified proper temperature balance on the exhaust cylinders and that the Diesel Generator could be gradually loaded to 5500 kW. However, the proper minimum and maximum fuel settings were not verified. The improper fuel settings went undetected because the Diesel Generator requires more fuel to load quickly than to load gradually. Therefore, the engine was able to pass the post-maintenance gradual loading test, but could not pass the fast loading surveillance. In this instance, the 1A Diesel Generator was capable of being loaded to 5700 kW gradually, but not to the required 5500 kW within 60 seconds.

The root cause of the event was inadequacies in maintenance procedures and post-maintenance testing. The procedures failed to indicate that replacing the bimba cylinder could affect Diesel Generator fuel control parameters. The post maintenance testing, performed under the normal monthly operability (gradual loading) surveillance, was not capable of detecting the altered fuel control settings.

D. SAFETY ANALYSIS:

The safety consequences of this event are minimal because of the small amount of the fuel misadjustment. Under worst case conditions, the 1A Diesel Generator is required to load to 5500 kW within 60 seconds. The engine was capable of loading to 5400 kW in less than 60 seconds. This capacity is sufficient to sequentially start all needed engineered safety features and emergency shutdown loads under most accident scenarios.

The worst case event would be the simultaneous occurrence of a total loss of offsite power, and a limiting-case, large-break loss-of-coolant accident (LOCA). For this accident, the Updated Final Safety Analysis (UFSAR) states that the loading requirements for the Diesel Generators are calculated based upon the maximum design brake horsepower of each load. These loads would only be applied to the Diesel Generator at the maximum flow conditions during the injection phase of the LOCA. The 1A Diesel Generator may not have been able to supply AC power to all required equipment under these conditions. This accident is considered to have a very low probability for occurrence. The Diesel Generator had sufficient capacity to assume the required loads for all other accidents analyzed.

The 1B Diesel Generator was operable and available throughout the time that the 1A Diesel Generator was inoperable. The 1B Diesel Generator could have supplied emergency AC power to the redundant train of safety systems if the 1A Diesel Generator failed to assume its required load. Therefore, this event did not affect plant or public safety.

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

E. CORRECTIVE ACTIONS:

Following the failure, the fuel control system was properly adjusted using the original set up procedure provided by the vendor (Woodward Governor). The procedure included instructions for setting up the fuel racks and linkage, including adjustments for fuel rack balance, span and zero reference. Proper startup, fast loading and maximum design loading (6050 kW) were verified during maintenance testing. The semi-annual operability surveillance was then reperformed with acceptable results.

The vendor instructions were incorporated into Byron Station Maintenance Procedures. BMP 3108-12, "Fuel Control System Adjustments," was approved for use on 11/13/89. This action was tracked by Action Item Record 89-18300.

A review of all Cooper-Bessmer Manuals was in progress prior to this event and is now complete.

Additional corrective actions have been taken by the Station to improve the Vendor Technical Information Program (VTIP).

Although not a result of this event, but to emphasize the importance of vendor information, the station has now dedicated a coordinator for VETIP. To date communication has been issued to all department heads stressing the importance of incorporating vendor technical information into not only maintenance procedures but also the vendor manuals.

Additionally, an Awareness Meeting will be held with each maintenance department and technical staff stressing the importance of controlling equipment technical information per BAP 1340-14, "Vendor Manual Control." Action Item Record 454-225-90-14600 will ensure this action is completed.

F. PREVIOUS OCCURRENCES:

There has been one previous occurrence of a Diesel Generator failing to load to 5500 kW in less than 60 seconds. As documented in Byron Deviation Investigative Report (DIR) 6-2-88-070, the 2A Diesel Generator experienced a component failure that interfered with proper loading. The 2A Diesel Generator failure is not similar to the event included in this report.

G. COMPONENT FAILURE DATA:

Not Applicable.