

# NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY  
WESTERN MASSACHUSETTS ELECTRIC COMPANY  
HOLYOKE WATER POWER COMPANY  
NORTHEAST UTILITIES SERVICE COMPANY  
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October 6, 1988  
MP-12303

Docket No.: 50-423  
Re: 10CFR50.36

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 3  
Train A Emergency Diesel Generator Failure

This special report is being submitted within thirty days pursuant to Plant Technical Specifications 4.8.1.1.3 and 6.9.2. Plant Technical Specification 4.8.1.1.3 requires that a special report be submitted to the NRC within 30 days for any valid or nonvalid emergency diesel generator (EDG) failure. Plant Technical Specification 4.8.1.1.3 also requires information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977 to be included in the report.

On September 6, 1988, at 0613 hours, with the plant in Mode 1 at 100% power, 2250 psia and 586 degrees Fahrenheit, the "A" EDG output breaker tripped during an attempt to place a load on the engine while it was being tested in parallel with the site electrical system. The "A" EDG was initially paralleled to the system at 0612. The operator attempted to increase load in a controlled manner, but had trouble adjusting to the large swings in load that occurred each time the speed/load switch was operated. Within approximately 1 minute from the time the output breaker was closed, and subsequent to adjusting the speed/load changer to compensate for a sudden large power increase, the output breaker tripped and the engine shut down on reverse power.

The possible causes of uncontrollable power swings are:

- Unit/Parallel Relay (UPR) de-energized while the EDG is operated in parallel with site power.
- Malfunction of the mechanical governor.
- Malfunction of the electrical governor, including the motor-operated potentiometer (MOP) that actually determines the electric governor load/speed setting.
- A mechanical or electrical disruption in an external component that provides an input to the mechanical or electrical governor.

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The UPR relay and its associated circuit were initially thought to be the most likely cause. Load changed significantly for minor adjustments to the MOP. This is symptomatic of the EDG being in the "Unit" mode of speed/load control while being operated in parallel with the site system. An operator who observed the EDG load swings felt the indication gave the appearance of "Unit" speed/load control. However, the control panel operator is confident that the selector switch was in the "Parallel" mode. Switch location and labeling were also discussed with the control board operator, from a human factors point of view, and he felt there was no confusion. An electrical check of the UPR circuit was performed. No circuit malfunction was discovered. The "A" EDG was then started and paralleled to the site electrical system. This time governor response to the load/speed changer was satisfactory. The EDG operated at full load in accordance with the surveillance procedure without any indication of governor control problems. At 1148 hours on September 6, 1988, the "A" EDG was declared Operable.

A further investigation was conducted in order to determine the specific cause of the speed/load control failure. A review was made of all maintenance performed on "A" EDG during the month prior to its failure. Operators, Mechanics, Electricians associated with either the failure itself or maintenance performed prior to the failure were interviewed. Also, a manufacture's representative from Colt Industries was consulted. No definitive cause or legitimate area of component troubleshooting, beyond that already done, could be identified. A second test run of "A" EDG was performed on September 7. The governor responded correctly to all load/speed change demands.

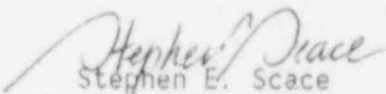
Based on the investigation to date, the most likely cause for the control problem is sticking contacts or relays associated with the UPR circuit. Relays associated with the UPR circuit were inspected and no problems were identified. Any other malfunction would most likely cause a permanent failure, or at least manifest itself once during the two test runs performed subsequent to the speed/load control failure. An air bubble in the mechanical governor oil system could possibly cause an intermittent problem. This is doubtful since it has been approximately nine months since the governor oil has been changed - the most likely time that air bubbles would form. Further indication that the UPR circuit was at fault was the fact that the speed/load control responded in the correct direction (i.e., increase in load for an increase in signal and vice-versa), albeit too rapidly to prevent a reverse power trip. It is highly unlikely that any of the other possible causes would match the load/speed switch signal so precisely.

Considering that the speed/load control failure is due to a faulty UPR circuit, the test in question is considered neither valid nor a failure. During an emergency, the circuit is interrupted and the UPR relay is deenergized. Regulatory Position C.2.e(2) of Regulatory Guide 1.108 states that unsuccessful start and load attempts which can definitely be attributed to malfunction of equipment that is not operative in the emergency operating mode should not be considered valid tests or failures. While evidence to support a UPR circuit failure is circumstantial, all the available facts point to a UPR circuit failure due to an improper switch contact or failure of the relay to actuate. Consequently, there are still no EDG failures in the last 200 valid tests, and the test frequency remains at least once per 31 days as stated in Table 4.8-1 of Technical Specifications and Regulatory Position C.2.d of Regulatory Guide 1.108.

The licensee contact for this special report is Nelson Hulme, who may be contacted at (203)447-1791, Ext. 5398.

Very Truly Yours,

NORTHEAST NUCLEAR ENERGY COMPANY

  
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Station Superintendent  
Millstone Nuclear Power Station

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cc: W. T. Russell, Region I, Administration  
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