Information Notice No. 93-96: Improper Reset Causes Emergency Diesel Generator Failures

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

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NRC INFORMATION NOTICE 93-96: IMPROPER RESET CAUSES EMERGENCY DIESEL GENERATOR FAILURES

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the potential for an emergency diesel generator (EDG) to fail to start on demand or to trip during operation due to improper execution of the reset operation at the conclusion of the previous run. It is expected that recipients will review the information for applicability to their facilities and consider actions as appropriate to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

H.B. Robinson

In August of 1987 at the H.B. Robinson plant, startup trips occurred on the "A" EDG. With the assistance of a vendor representative, several steps were taken in an effort to preclude such trips, including replacement of the governor, replacement of the governor oil, replacement of sticky fuel injection pumps, checking of injection pump timing, and rebalancing fuel rack settings. In February of 1988, startup trips were again experienced. It was concluded, after detailed inspection of the latch mechanism parts, that there was a possibility of wear on the tip of the latch, which may have been a contributing factor to the trips. These parts were replaced with new parts.

On June 3, 1992, during the performance of a test activity, the "A" EDG tripped on mechanical overspeed after the engine had been operating approximately one half hour. After detailed consideration of possible scenarios for the trips and considering prior actions taken, it was determined that the most probable cause was a failure to properly reset the trip mechanism after the previous run. It was concluded that operations personnel apparently were unaware of the importance of moving the reset lever through

its full travel. In addition, resetting was difficult for shorter individuals due to the location of the reset lever, which is positioned over the exhaust

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manifold. Operations personnel were subsequently trained on the proper method for actuating the reset lever. Also, a step was provided to permit easier access to the lever.

Duane Arnold

On June 11, 1993, while the Duane Arnold plant was operating at 85 percent of full power, the "A" EDG tripped approximately 3 seconds after the initial start signal during an operability surveillance test. An evaluation was conducted by the licensee of possible EDG trip causes, including occurrence of an actual overspeed condition, failure of the overspeed mechanism, actuation of the emergency stop pushbutton, failure of the emergency stop pushbutton, latch assembly not fully latched, latch assembly failure, mechanical trip mechanism failure, and annunciator circuit or trip lever microswitch failure. It was concluded that the most probable cause of the trip was that the latch assembly was not fully engaged from the previous reset operation and engine startup vibration unlatched the trip mechanism. Less than complete engagement of the latch assembly could be caused by an inadequate reset operation. Corrective actions adopted by the licensee included procedure revisions to ensure a more positive latching operation, improved physical access to the reset lever, and operator training.

The procedure revision directs operators to perform the reset operation a second time following the initial resetting of the trip. The second reset is somewhat easier to perform and should ensure that the latch is fully engaged in the event that the initial latching sequence resulted in a partially latched condition. Verification that the latch is fully seated is accomplished by checking that the reset lever subsequently moves freely.

Discussion

In response to experience with previous trips during fast starts, the diesel manufacturer for both plants, (Coltec/Fairbanks Morse Engine Division), had previously issued a service information letter (SIL, Volume A, Issue 25, dated August 1, 1991) addressing a revised overspeed trip adjustment. The SIL recommended that the overspeed trip setting be raised from the range of 112 to 115 percent to the range of 115 to 117 percent. In light of events that occurred at H.B. Robinson and Duane Arnold, the manufacturer has now advised these licensees that proper resetting of the trip mechanism would be enhanced by slowly moving the reset lever fully to the reset position and back, twice. The inadvertent partial reset latching operations described above may also occur on other units having similar mechanical trip mechanisms.
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This notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

/s/'d by BKGrimes

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