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Director of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: Docket 50-186
University of Missouri
License R-103

Subject: Difficulty in Emergency Generator to Automatically Assume Emergency Electrical Loads

Description

At 0555 on the scheduled maintenance day, April 19, 1982, while performing the Emergency Generator Load Test (CP-17), the emergency generator failed to automatically assume the emergency electrical loads as required. The motor for the emergency ge erator started as required when the emergency bus automatic transfer switch as shifted, but stalled shortly thereafter while attempting to automatically a ume the emergency electrical loads. The emergency bus loads were returned tr normal facility power and the emergency generator inspected. No cause for the failure to assume load was found. The emergency generator was manually started at 0605. After checking all indications were normal on the emergency generator, it was secured and the load test (CP-17) was performed. The emergency generator started and assumed emergency electrical loads at 0615. Therefore the emergency generator was operable but in a degraded state.

Analysis

The emergency generator is a 45KW generator powered by a Ford 292 cubic inch gasoline engine with a one barrel carburetor fuel system and a 12 volt electric choke.

On April 19, no cause for the emergency generator stalling under load could be identified. The emergency generator was allowed to cool down and the load test (CP-17) was performed again at 2030 to see if the problem could be reproduced with a cold engine. It started and assumed loads automatically.

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The University of Missouri Physical Plant performs the routine preventive maintenance on the emergency generator. Due to the inability to find a cause on April 19 and as a double check of Physical Plant maintenance performance, MURR staff members independently checked the timing, dwell, choke adjustment, and governor setting on the next scheduled maintenance day, May 3. No problems were found in any of the adjustments, but the choke plate was found to occasionally stick closed due to a residue build-up on the choke plate and the carburetor wall. If the choke plate would stick when performing a load test (CP-17), it could prevent the proper fuel mixture being supplied to the engine in response to a power demand increase; which could result in the engine stalling. The carburetor choke plate and intake wall were thoroughly cleaned. The carburetor choke adjustment setting was tested as specified in the emergency generator technical manual.

Since the first attempt to start the emergency generator on April 19, it has been starting properly and handling the emergency electrical loads when required. Prior to April 19, the generator had started automatically by the exercisor on April 12, 1982.

The analysis for loss of electrical power with the reactor operating at 10MW and the emergency generator failing to start is covered in Hazards Summary Report (HRS), Addendum 5, Section 2.4.1, 2.4.2, and 2.5. In this dual failure mode, the reactor will shutdown if not already shutdown and decay heat removal will be performed indefinitely by the in-pool heat exchanger. The control blades are released on loss of electrical current to their electromagnets and drop to the full inserted position by gravity. All process systems are placed in the shutdown condition due to the failsafe design of these systems; i.e. the redundant (only one is required) primary in-pool heat exchanger valves 546A and B open by spring actuation placing the convection cooling in-pool heat exchanger in service. This failsafe design of the system permits shutdown decay heat removal with no electrical power (Appendix D of Addendum 4 to HSR). The containment building integrity could not be indefinitely guaranteed if facility electrical power and emergency generator were not available, but the reactor would be shutdown and containment would not be required.

Corrective Action

The emergency generator was manually started and verified to be able to handle emergency loads. The carburetor choke plate and intake port were cleaned to remove a residue which may have caused the choke plate to stick closed. The electric choke unit was inspected and tested to ensure it was operating properly. Several other choke settings were tested to determine if the emergency generator starting and load assuming capabilities could be improved, but the original choke

setting proved to be the best. The condition of the choke plate and carburetor interval walls will be checked on a routine basis as a part of the preventive maintenance system.

Sincerely,

J. C. McKibben
Reactor Manager

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cc: U. S. Nuclear Regulatory Commission
c/o Document Management Branch

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