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POWER**

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Docket No. 50-461

Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Special Report: Valid Test Failure of Division I
Diesel Generator at Clinton Power Station (CPS)

Dear Sir:

Clinton Power Station (CPS) Technical Specification 4.8.1.1.3 requires all diesel generator failures, valid or non-valid, to be reported to the NRC within 30 days pursuant to Specification 6.9.2, SPECIAL REPORTS. Due to a valid failure of the Division I Diesel Generator (DG1A) during surveillance testing on September 21, 1992, the attached Special Report is being submitted in accordance with the CPS Technical Specifications to provide the information required by Regulatory Guide 1.108, Revision 1, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Regulatory Position C.3.b. In addition, this Special Report provides an update on the corrective actions taken or being taken in response to two previous valid failures of DG1A which were reported in IP's Special Report dated August 19, 1992 (reference U-602035).

Submittal of this letter and its attachment satisfies the requirements of CPS Technical Specifications 4.8.1.1.3 and 6.9.2 for submitting a Special Report for diesel generator failures.

Sincerely yours,



F. A. Spangenberg, III
Manager, Licensing and Safety

CLJ/msh

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

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Description of Event

At 0430 hours on September 21, 1992, the Division 1 Diesel Generator (DG1A) was started for routine surveillance per Clinton Power Station (CPS) Procedure 9080.01, "Diesel Generator 1A (1B) Operability - Manual." Although DG1A reached the required voltage and frequency within the time specified by Technical Specification 4.8.1.1.2, when the operator attempted to synchronize the generator to offsite power, the generator output breaker failed to close. The breaker also failed to close on the next four attempts. The breaker door was opened, the closing spring was verified to be charged and the fuses were verified to be properly seated. No flags or other abnormalities were noted. The door was reclosed, and the breaker successfully closed on the next attempt. DG1A was then fully loaded and the surveillance test was completed without further problems.

Maintenance Work Request (MWR) D25008 was initiated to troubleshoot and identify the cause of the breaker failure. Westinghouse representatives were brought on-site to assist in troubleshooting. Upon investigation of the cubicle circuitry/components, minor problems were detected with the phase-to-phase undervoltage relays, but none would have prevented the breaker from closing. The associated main control room switches, control circuitry, breaker cubicle truck-operated contact (TOC) switch, closing coil and spring release coil were all found to operate satisfactorily. However, inconsistent resistance values were noted while monitoring the anti-pump relay coil during troubleshooting. In addition, Maintenance personnel noted that the breaker closure circuitry fuse clip did not have the same amount of spread on the clips as the fuse clip located in a spare cubicle. Although this could have been a contributing factor in the breaker failure, IP does not believe this to be the root cause of the failure since a bad fuse clip connection would have resulted in a "service not available" indication alarm, which was not observed during the attempts to close the breaker. Regardless, the spare fuse clip was used to replace the original.

While reassembling the original breaker, Maintenance personnel discovered that the protective cover over the auxiliary switches and the anti-pump coil was bent in the area of the anti-pump relay. It was noted that the cover was coming into contact with the relay plunger. IP concluded that this could have caused interference and prevented the relay from fully resetting on an intermittent basis. This problem would not have appeared during the attempts to recreate the failure since this cover was removed to provide access to the test points that were monitored.

Following replacement with a spare breaker, the output breaker was racked to the "test" position and successfully cycled three times. The replacement breaker was then racked into the "operate" position. At 2133 hours on September 23, 1992, DG1A was started. The diesel generator was successfully synchronized with offsite power, loaded, and then unloaded three separate times. No problems were experienced during breaker closure. Based on the completion of the operability surveillance and post-maintenance testing of the installed spare breaker, DG1A was restored to operable status at 0020 hours on September 24, 1992.

Root Cause/Corrective Actions

As identified in IP's August 19, 1992 Special Report, the output breaker for DGLA had previously failed to close during testing on July 17, 1992 and August 7, 1992. Failure of the H1 TOC switch was reported as the root cause of those output breaker failures. The H1 TOC switch in the Division I output breaker cubicle was replaced on August 7, 1992. In addition, the switches which perform a similar function in the Division III output breaker cubicle were subsequently inspected, and no abnormalities were noted. IP's August 19, 1992 Special Report stated that the TOC switches in the Division II output breaker cubicle were to be inspected/replaced by October 1, 1992. However, as a result of plant conditions which precluded removing the Division II Diesel Generator from service as planned, these switches were replaced on October 19, 1992, and no abnormal wear was identified. Deferral of this action was discussed with the NRC Resident Inspector for CPS. Further, IP plans to inspect a representative sample of TOC switches in similar breaker cubicles in safety-related applications by the end of the fourth refueling outage (which is currently scheduled to begin in September 1993). The results of these inspections will be evaluated for further corrective actions.

The root cause of the most recent failure of the DGLA output breaker on September 21, 1992 has been determined to be the bent protective cover over the anti-pump relay. The bent cover partially depressed the anti-pump relay plunger so that the contacts operated by the plunger were lightly touching. This resulted in erratic operation of the relay. Also, the bent cover may have cocked the plunger to the side, thus interfering with its operation.

It was determined that there were two possible causes for the bent cover. Either the cover was used as a foot rest as an aid for racking the breaker in or the cover hit a nearby concrete curb while the breaker was being racked out. Because the partially-depressed plunger held the contacts in close proximity, any jarring of the breaker could cause the relay contacts to change state. Depending on the state of the relay contacts, the breaker could randomly fail to close.

Although the bent protective cover could have been a contributing factor to the previous failures, the original H1 TOC switches were shown to lose electrical continuity. Therefore, IP's determination that TOC switch failure was the root cause (or at least a contributing factor) for the previous failures remains unchanged, and replacement of these switches was prudent or necessary. The contribution of the bent protective cover to the July 17, 1992 and August 7, 1992 failures is indeterminate.

As a result of the most recent failure, a corrective action plan was implemented. All of the other Class 1E 4160-Volt Westinghouse breakers were inspected for damage to the protective cover, and no similar conditions were found. Operators and electricians were informed of the cause of the closure failure and a caution was issued on the INPO Operating Experience NETWORK about the interference with the anti-pump relay due to the bent protective cover. IP is returning the damaged breaker to Westinghouse to evaluate the condition of the breaker and identify any defects. The results of this evaluation are expected to be provided to IP by November 15, 1992. In addition, IP will have an independent root cause analysis organization, Failure Prevention, Inc., perform a failure analysis on the anti-pump relay

and TOC switch. This is expected to be completed by February 1, 1993. Further, IP will monitor the closing circuit of the installed output breaker during several surveillance tests of DG1A. The information gathered from both internal and external investigations will be evaluated and any additional corrective actions will be identified by February 28, 1993.

Test Intervals

As of September 21, 1992, DG1A had experienced six valid failures in the last 100 valid tests performed, and three valid failures in the last 20 valid tests performed. In accordance with CPS Technical Specification Table 4.8.1.1.2-1, DG1A continues to be tested at least once per seven days. This testing frequency will be maintained until seven consecutive failure-free demands have been performed and the number of failures in the last 20 valid tests has been reduced to one or less.