

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

500C Chestnut Street Tower II

APR 30 1979

50-327/328
50-390/391

Mr. James P. O'Reilly, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II - Suite 3100
101 Marietta Street
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

SEQUOYAH AND WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - DIESEL GENERATOR
RELAY TACHOMETER FAILURES - NCR 5P - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
C. R. McFarland on January 30, 1979. An interim report was submitted
on February 28, 1979. Enclosed is our final report.

If you have any questions concerning this matter, please get in touch
with M. R. Wisenburg at FTS 854-2581.

Very truly yours,

J. E. Gilleland
Assistant Manager of Power

Enclosure

cc: Mr. John G. Davis, Acting Director (Enclosure) ✓
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

REGULATORY DOCKET FILE COPY

7905040562

Boia
S/11

ENCLOSURE

SEQUOYAH AND WATTS BAR NUCLEAR PLANTS UNITS 1 AND 2 DIESEL GENERATOR RELAY TACHOMETER FAILURES NCR 5P FINAL REPORT

Description

During periodic testing and, in one case, during preoperational testing, one relay tachometer on each of three diesel generator sets failed to operate properly. Trouble shooting revealed that three zener diodes in the voltage regulation circuit of the relay tachometer had burned and opened. This failure did not prevent the diesel generator sets from operating because there are two identical relay tachometers connected in parallel on each set and both must fail to prevent operation of that diesel generator. After the second failure, all remaining relay tachometers were inspected, and it was discovered that the three zener diodes in the voltage regulation (power supply) circuit of all relay tachometers were discolored from excessive heat. However, operating currents and temperatures of the zener diodes were checked and found to be within specifications for those diodes.

The relay tachometers are used to detect speed and to control diesel support functions, isolate the air start motors, flash the generator field, and close the generator output breaker. A failure of both relay tachometers on one set could prevent the circuit breaker to the shutdown board from closing.

An improper design of the voltage regulation circuit of the relay tachometers resulted in this deficiency. The relay tachometers were incapable of dissipating the heat generated while in the standby mode. This heat buildup during standby conditions caused the diodes to overheat and burn open.

Although there have been no such failures at any other TVA nuclear facility, there is a possibility of similar failures at Watts Bar Nuclear Plant (WBNP). The WBNP diesel generators contain similar relay tachometers from the same manufacturer.

Safety Implications

Multiple failures of relay tachometers could prevent closure of the circuit breaker to the shutdown board. Failure of this circuit breaker to close would prevent utilization of the output from the emergency diesel generator which could have been detrimental to the safety of the plant.

Corrective Action

The immediate corrective action was to replace all diodes which had overheated and to closely monitor the operation of all relay tachometers.

The final corrective action was to replace all relay tachometers with later model relay tachometers. As an additional corrective action, "voltage-dropping" resistors were installed between the relay tachometers and the power supply to provide voltage protection. These resistors are removed from the circuit by relay action upon receipt of a start signal. All of the above actions were recommended by the diesel generator vendor.

After the above corrective action was completed, a post-modification test was successfully performed on each diesel generator at Sequoyah Nuclear Plant.

Since the relay tachometers on the WBNP diesel generators are similar to those which failed at Sequoyah Nuclear Plant (SNP), the corrective action outlined above will also be applied at WBNP, except that preoperational testing will take the place of the separate, post-modification test performed at SNP.

Means Taken to Prevent Recurrence

TVA feels that the changes outlined above will prevent recurrence of the type of deficiency which is the subject of this nonconformance. In addition, TVA has requested that the vendor of the SNP and WBNP emergency diesel generators keep us more closely informed of alterations or improvements made to upgrade emergency diesel generators manufactured since we purchased the SNP and WBNP sets.

The components in the diesel generator sets at all other TVA nuclear facilities that perform the same function as the SNP and WBNP relay tachometers will be reviewed for adequacy.