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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

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This report is being submitted under 10 CFR 21 and as a "voluntary LER" to identify a defective voltage regulator on an emergency diesel generator.

DESCRIPTION OF CONDITION

NRC Form 396A

On October 21, 1987, at 1100 EDT with both units 1 and 2 in mode 5 (cold shutdown) it was discovered while troubleshooting a voltage regulator problem on emergency diesel generator (D/G) 2A-A (EIIS Code EK), that a voltage regulating diode was incorrectly installed. During the performance of Surveillance Instruction (SI) -26.2A, "Loss Of Offsite Power With Safety Injection - D/G 2A-A Containment Isolation Test," D/G 2A-A came up to speed and the circuit breaker that connects the D/G to the 6900 volt shutdown board (EIIS Code EB) closed with the D/G terminal voltage at approximately 5200 volts.

Investigation into the cause of the slow development of voltage revealed that a diode in the voltage regulator was installed with the polarity reversed. The voltage regulator with the reversed diode was manufactured by Basler Electric Company (Model No. 32101-102), and was installed on November 8, 1986 following troubleshooting for voltage swing problems. The voltage regulators for the remaining D/Gs were inspected and all were found with correctly installed diodes. Additionally, a spare voltage regulator in stores was inspected and was also found to be correct.

A 10 CFR 21 report was approved by the Manager of Division of Nuclear Licensing and Regulatory Affairs (DNLRA) on November 18, 1987, and notification was made by R. H. Shell, Manager, Regulatory Affairs to J. Brady, NRC Region II the same day.

No operator action was required as a result of this finding because only one train of D/Gs is required to be operable in mode 5 to satisfy technical specifications and both 'B' train D/Gs were operable at the time of discovery. The D/Gs provide emergency power to equipment that is common to both units in addition to the unit equipment for which the D/G is designated.

CAUSE OF EVENT

The immediate cause of this event was a defective component. The voltage regulator with a reversed diode had a slowed response and consequently, adequate voltage was not available at the time the breaker closed. Further, the post maintenance test that was performed subsequent to the installation of the voltage regulator in November 1986 did not detect the reversed diode because it verified that the D/G came up to speed and had acceptable voltage in less than 10 seconds, but did not consider the D/G attaining operating speed before operating voltage. The root cause has not been determined and is still under evaluation. LICENSEE EVENY REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROV	ED ON	AB NO	31	50-01	04
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ANALYSIS OF EVENT

AC Form 386A

This event is reportable under 10 CFR 21 as a defect that could have created a substantial safety hazard assuming a single failure and as a "voluntary LER" to keep the Nuclear Regulatory Commission (NRC) informed of ongoing activities at Sequoyah Nuclear Plant.

The D/Gs are the Class 1E power source for backup emergency power for safe shutdown. Based on the Final Safety Analysis Report Section 8.3, when the D/G has reached a speed of 850 RPMs and a voltage of 80 percent of nominal, the D/G is automatically connected to the 6900 volt shutdown board. The vast majority of equipment that would be powered by the D/Gs during a loss of offsite power is qualified to start at a minimum of 80 percent of nameplate rating. During the performance of SI-26.2A the voltage level was below that 80 percent of nameplate level, but all motors started, accelerated, and ran; however, there is no assurance that the motors will consistently start at less than their qualified voltage level.

CORRECTIVE ACTION

The defective voltage regulator with the reversed diode has been repaired and SI-26.2A has been performed with acceptable results. An investigation is continuing to evaluate post maintenance testing when adjustments, repairs, or replacement of D/G voltage regulators is performed and will be completed by December 31, 1987. Standard Practice SQM-66, "Post Maintenance Testing" will be revised by November 25, 1987 to ensure testing requirements will be evaluated on any voltage regulator work on an individual case basis until the investigation is complete. The root cause of this event is still under investigation. This investigation will include determining why the voltage relays allowed breaker closure before 80 percent voltage was attained. The results will be provided in a revision by January 31, 1988.

This event will be included in the Office of Nuclear Power (ONP) Nuclear Experience Review program.

ADDITIONAL INFORMATION

The voltage regulator was purchased under TVA Contract No. 78P13-24251 dated March 31, 1987, from Basler Electric Company, Box 269, Route 143, Highland Illinois, 62249. Sequoyah Nuclear Plant is the only licensed TVA facility with Basler Model No. 32101-102 voltage regulators installed.

The diesel generators were supplied by Morrison-Knudsen Company Inc., with Basler voltage regulators.

07670

TENNESSEE VALLEY AUTHORITY Sequoyah Nuclear Plant Post Office Box 2000 Soddy-Daisy, Tennessee 37379

November 20, 1987

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

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 1 - DOCKET NO. 50-327 - FACILITY OPERATING LICENSE DPR-77 - REPORTABLE OCCURRENCE REPORT SQR0-50-327/87070

The enclosed licensee event report provides details concerning a diesel generator voltage regulator that had a slowed voltage response because of a component defect found during surveillance testing. This event was reported in accordance with 10 CFR 21 and as a "voluntary LER."

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. Smith Plant Manager

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Enclosure cc (Enclosure):

> J. Nelson Grace, Regional Administrator U. S. Nuclear Regulatory Commission Suite 2900 101 Marietta Street, NW Atlanta, Georgia 30323

Records Center Institute of Nuclear Power Operations Suite 1500 1100 Circle 75 Parkway Atlanta, Georgia 30339

NRC Inspector, Sequoyah Nuclear Plant