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Georgia Power
the southern electric system

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United States Nuclear Regulatory Commission
Region II, Suite 2900
101 Marietta Street, Northwest
Atlanta, Georgia 30323

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Reference: Vogtle Electric Generating Plant-Units 1 & 2; 50-424, 50-525; ESFAS Load Sequencer Board

Attention: Mr. J. Nelson Grace

On January 7, 1987, Mr. C. W. Hayes, Vogtle Project Quality Assurance Manager, notified Mr. M. V. Sinkule of the USNRC Region II of a potentially reportable condition associated with the centrifugal charging pump feeder breaker lockout during engineered safety features actuation system (ESFAS) preoperational testing. This condition was documented in Operations Deficiency Report ODR T-1-86-4271. Georgia Power Company has completed its evaluation and determined that a reportable condition as defined by the reporting criteria of Part 10CFR50.55(e) and Part 10CFR21 does exist. Based upon NRC guidance in NUREG-0302, Revision 1, and other NRC correspondence, Georgia Power Company is reporting this condition pursuant to the reporting requirements of Part 10CFR50.55(e). A summary of our evaluation is attached.

This response contains no proprietary information and may be placed in the USNRC Public Document Room.

Yours truly,

P. D. Rice

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DJC/PDR/wkl
Attachments

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EVALUATION OF A POTENTIALLY REPORTABLE CONDITION
ESFAS LOAD SEQUENCER BOARD

Initial Report: On January 7, 1987, Mr. C. W. Hayes, Vogtle Quality Assurance Manager, notified Mr. M. V. Sinkule of the USNRC Region II of a potentially reportable condition associated with the centrifugal charging pump feeder breaker lockout during a safety injection (SI) condition with subsequent loss of offsite power (LOP). This condition was initially discovered during engineered safety features actuation system - (ESFAS) preoperational testing and documented in Operations Deficiency Report ODR T-1-86-4271.

Background Information: The safety features sequencer board (SFSB) is an electronic logic system with two primary functions:

A. It monitors the voltage on the 4 KV engineered safety features (ESF) bus and sheds selected loads on that bus in the event that bus voltage is lost or degraded.

B. It initiates starting of the emergency diesel generator (EDG), and implements the preprogrammed loading of ESF loads on the ESF buses.

The SFSB is designed to be operable when either or both LOP and/or SI occur. The SFSB is designed to provide maintained and momentary step sequence actuation to allow circuit breakers to close in accordance with preprogrammed sequencer steps.

The SFSB has nine (9) sequence steps at 5-second intervals. The first step is set at 0.5 second after the EDG supply breaker is closed. The charging pump is loaded during the first sequencer step.

During the test simulating an SI condition with subsequent loss of offsite power, the centrifugal charging pump feeder breaker failed to reclose during sequencing, as required, after being shed from the bus.

The circuit breakers used on VEGP for this application are equipped with an anti-pump feature which locks the breakers in the open position if close and trip signals are present at the same time. In the condition identified, two signals, i.e., load shed to open the breaker and the first sequencer step to close the breaker, were simultaneously present at the charging pump feeder breaker. This caused the charging pump feeder breaker anti-pump feature to operate and lock out the breaker, preventing it from closing.

Further evaluation identified that during the first sequencer step a condition existed in which the timing set points for the load shed and the first sequencer step circuits initiating reclosure, overlapped. The timing set point overlap condition was not a problem in the original design (in which momentary step sequence actuation contacts were utilized in the feeder breaker circuits), because simultaneous trip and close signals would not be present. As a result of an earlier project design

review, it was decided that maintained step sequence actuation contacts would be used to sequence the safeguard loads to the 4 KV buses in place of momentary step sequence actuation contacts. The use of the maintained contacts precludes accidental manual opening of the feeder circuit breakers to the safeguard loads. However, the decision to use maintained step sequence actuation contacts for the charging pump feeder breaker created the condition where a breaker anti-pump lockout condition could occur.

A broadness review confirmed that the condition existed only in the charging pump feeder breaker circuit since it only affects circuit breakers in the first sequence step that utilize a maintained contact in the start circuit.

Engineering Evaluation: This deficiency, had it remained uncorrected, coupled with the failure of power to one train of the emergency core cooling system and the loss of offsite power could have resulted in a loss of charging pump capability, until such time that the charging pump circuit breaker could be closed manually. This condition represents a safeguard system availability less than the minimum assumed in the safety analyses. Consequently, this condition is considered reportable.

Quality Assurance Program Breakdown Evaluation: The root cause of this deficiency was an engineering oversight during the evaluation of the change from a momentary to maintained contact. Engineering did not recognize that utilization of a maintained sequencer actuation contact during the first step sequence would create simultaneous trip and close signals to the charging pump circuit breaker. This condition was determined to exist only for the charging pump circuit breaker circuit. A quality assurance program review has concluded that this condition is an isolated case and does not constitute a significant breakdown in Bechtel's quality assurance programs.

Conclusion: Based on the results of the evaluation above, Georgia Power Company has concluded that this condition is reportable pursuant to the requirements of 10CFR50.55(e) and 10CFR21. Based on USNRC guidance in NUREG-0302, Revision 1, and other USNRC correspondence concerning duplicate reporting, Georgia Power Company is reporting this condition pursuant to the requirements of 10CFR50.55(e).

Corrective Action: This condition was resolved by the adjustment of the reset time of the load shed circuit reset timer from 1.0 second to 0.5 second. This assures that the load shed contact will open before the load sequencing starts. The implementation of this design modification in Units 1 and 2 was completed on December 1, 1986, through Field Change Request E-FCRB-1507N.