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Office of Inspection and Enforcement
Region II - Suite 2900
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Atlanta, Georgia 30323

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Reference: Vogtle Electric Generating Plant-Units 1 and 2; 50-424, 50-425;
GE AKR 30 and 50 Circuit Breakers, GN-499 dated 12/20/84

Attention: Mr. James P. O'Reilly

In recent correspondence to the NRC on the above referenced subject, Georgia Power Company indicated that the NRC would be informed of the results of this evaluation by February 1, 1985. Georgia Power Company has concluded its evaluation for a potentially reportable condition and has determined that a reportable condition could exist per the reporting requirements of Part 10 CFR 50.55(e). Enclosed is a copy of our evaluation of this condition.

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

Yours truly,

D. O. Foster

REF/DOF/tm
Enclosure

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**EVALUATION OF A POTENTIALLY REPORTABLE CONDITION
GENERAL ELECTRIC MODEL AKR 30 AND 50 CIRCUIT BREAKERS**

Initial Report

On November 29, 1984, Mr. R. E. Folker of Georgia Power Company contacted Mr. W. H. Rankin of the USNRC concerning the above referenced subject. In subsequent correspondence to the NRC, Georgia Power Company indicated that a final report concerning the results of the evaluation of this condition would be made to the USNRC by February 1, 1985.

Background Information

On June 15, 1982, General Electric informed the USNRC that reportable defects exist on some of its low voltage power circuit breakers and on ground break relay components. In their letter General Electric stated:

"The General Electric Company has recently encountered a limited number of instances where electrically operated AKR 30 and AKR 50 Low-Voltage Power Circuit Breakers failed to close upon command. The cause of failure has been traced to a steel part used in these breakers which was incompletely hardened. As far as we have been able to determine, the percentage of breakers exhibiting this reduced life is small.

The General Electric Company has also recently encountered a limited number of occurrences of a switch used in conjunction with the electrical closing circuitry in AKR-30 and AKR-50 Low-Voltage Power Circuit Breakers failing to operate as intended. This malfunction occurs as a result of improper hardening of the molded case which enclosed the switch mechanism. The mis-operation of this switch results in the possibility that the breaker may not close upon electrical command.

The General Electric Company has also recently encountered a limited number of incidents where ground break relay components caused the associated circuit breaker to trip without a ground fault having occurred. This erroneous command results from a latent manufacturing defect in the Silicon Controlled Rectifier used in the Ground Break Relay." None of the subject Ground Break Relays were supplied to Plant Vogtle.

Thus, GE, in their letter of June 15, 1982 to the NRC identified three specific potential defects with the circuit breakers. The first potential defect involved an improperly hardened steel part used within the circuit breaker as a breaker closing spring prop. The second potential defect was associated with a switch mechanism molded case that was improperly cured. This condition causes the actuator to bind only after the switch is installed in the circuit breaker and only after the case has cured for approximately two years. The third potential defect concerned defective solid state tripping components in relays used for ground fault detection and breaker tripping, but is not applicable to Plant Vogtle.

General Electric Company is the supplier of 480 V load centers which use the above referenced circuit breakers as a sub-component. The load centers are used as central distribution points for large loads that require 480 V AC power. These circuit breakers, when closed, energize specific safety related equipment.

It should be noted that when this condition was originally reviewed, it was believed to be limited to the circuit breakers associated with the Steam Turbine Exciter System.

Engineering Evaluation

The plant safety analysis has been performed on the basis that certain safety related process loads (pump, fans, etc.) are energized when required to perform their intended safety function. General Electric has determined that the first and second potential defects discussed in the background section could exist for the safety related and non-safety related breakers supplied to Georgia Power Company for use at the Vogtle Electric Generating Plant. The potential failure of these breakers to energize and power safety related components could have prevented the accomplishment of an intended safety function.

Evaluation of Quality Assurance Programs

GE manufactured the molded switch cases in their Morrison, Illinois facility. The root cause of these failures was due to a worn insert used in the molds which, due to excessive use, had decreased in size, allowing an undersized hole in the molded switch cases. The inspection control program included a detailed first parts dimensional inspection with subsequent periodic dimensional checks to monitor the molding process. This is standard industry practice. GE has repaired the worn insert in the mold.

The steel parts in the breaker arm were manufactured in the Vega Baja, Puerto Rico plant of General Electric. The apparent root cause of the failure was attributed to impurities in the gas mixture used in the heat treating process for hardening these parts. Subsequent to the hardening process, the parts were checked only on a sampling basis. It is believed that this constitutes a significant breakdown in the quality assurance program of this facility with regard to Criteria IX, Control of Special Processes. Inadequate measures apparently allowed the heat treating process to be improperly controlled. To resolve this deficiency, GE has discontinued the performance of the heat treating process at their Vega Baja plant. Subsequent heat treating is being performed by an outside vendor with all parts subjected to a 100% receipt inspection, including hardness tests. The corrective action is considered adequate.

Conclusion

The potential defects associated with the improperly hardened steel part and the undersized hole in the molded cases have been reviewed

and evaluated by Georgia Power Company. Georgia Power Company has concluded that a reportable condition per the criteria of part 10 CFR 50.55(e) could exist. General Electric, as previously noted, has informed the NRC of the existence of this concern per the criteria of Part 10 CFR 21.

Corrective Action

General Electric has identified the suspect circuit breakers that may have the previously discussed concerns. Most of the circuit breakers (safety related and non-safety related) have been returned to General Electric for modification. The few remaining circuit breakers will be scheduled for modifications in the near future.