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United States Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region II-Suite 2900
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Reference: Vogtle Electric Generating Plant-Units 1 & 2, 50-424, 50-425;
Jumper and Jumper Package Controls
Letter GN-617, dated May 17, 1985

Attention: Mr. J. Nelson Grace

In previous correspondence to the NRC on this subject, Georgia Power Company indicated that we expected to notify the NRC of the results of our evaluation of the above referenced subject on or before August 16, 1985. Georgia Power Company has concluded its evaluation and determined that a reportable condition per the criteria of part 10CFR50.55(e) did exist. Our evaluation also concluded that a reportable condition per Part 10CFR21 did not exist. Enclosed is a copy of our evaluation.

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

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Very truly yours,

D. O. Foster

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EVALUATION FOR A POTENTIAL REPORTABLE CONDITION

Jumper and Jumper Package Control

Initial Report:

On April 19, 1985, Mr. C. W. Hayes, Vogtle Project Quality Assurance Manager, informed Mr. M. Sinkule of the USNRC of a potential reportable condition involving jumper and jumper package control and the internal wiring of equipment. In a subsequent letter to the NRC, Georgia Power Company indicated that a final response could be expected on or before August 16, 1985.

Background Information:

Georgia Power Company conducted a special electrical assessment audit to verify the adequacy and implementation of requirements and controls established for the Vogtle electrical activities. This audit identified concerns associated with the control of jumpers and jumper packages and with the internal wiring of equipment. Several instances were noted of incorrect jumper installations. These included a jumper landed to an incorrect terminal, jumpers not installed, and jumper location incorrect as specified by engineering. Additionally, it appears that the Main Control Board termination cabinets had been wired incorrectly.

It should be noted that jumper packages are originated "by equipment" when they are turned over with a subsystem. When an instrument cabinet has a jumper package that is initially prepared, all electrical drawings will be reviewed and a jumper package will be prepared for the cabinet. This package will give the electrical installer detailed instructions for the internal wiring within the cabinet. This system is completely manual and mandates a tedious review when ascertaining the status of jumper in a specific application. Jumpers that are not installed per the design drawing could cause circuits to be inoperable and therefore, prevent the performance of a safety related function. Additionally, a review of the main control board termination cabinets revealed that the electrical contractor for the Vogtle Project, Cleveland Electric, had inadvertently switched approximately six termination racks.

It should be noted that both of these concerns were detected by the "red-lining" process. The Nuclear Operations group of Georgia Power Company has been red-lining all safety-related electrical circuits. In this process, every circuit is checked to ensure that the electrical connections are properly connected.

Engineering Evaluation:

Bechtel Power Corporation has conducted an engineering evaluation of this condition. This evaluation found incorrectly wired jumpers that could have, if uncorrected, prevented the performance of safety-related functions.

In one case, a jumper wire was not installed as called for by the drawing. This condition could have prevented a damper from opening when the train A motor is running. As a result, the following could have occurred:

- A) The HVAC system upstream of this damper is for clean-up levels of the A, B, C and D piping penetration rooms. Normal emergency design operation for this equipment would require the damper to be opened in order to return approximately 90 percent of the filtered air to these spaces. The remaining percentage is exhausted to the stack. With the damper fully closed, all of the filtered air is discharged to the plant vent. While the fan is operating, the discharge radiation limits would not be exceeded since all exhaust air is filtered prior to discharge.
- B) With the damper closed, the fan would "back up" on the fan curve and would eventually shutdown due to low flow or excessive vibration. Shutdown of this filtration train would not result in exceeding environmental qualification temperatures since each room, where safety related equipment is located, is equipped with individual room cubicle coolers which act independently of the filtration train. Shutdown of the fan would, however, result in the loss of negative pressure in the individual rooms and the migration of radioactivity through the walls and openings and ultimately to the environment, thereby possibly exceeding the maximum allowable radiation dose limits. (10CFR50 Appendix A, GDC 19)

In another case, a missing jumper wire would have prevented the B train of the control building electrical penetration filter unit from operating. The control building filter exhaust system is designed to minimize the release of airborne radioactivity to the outside atmosphere by processing recirculated and exhaust air through carbon filters. This system is part of the engineered safety features (ESF) provided for the building. An assumed single failure of the A train could result under postulated accident conditions, in a spread of radioactivity in the control building.

The audit also identified that equipment internal wiring was not in compliance with vendor drawings. In this case, it was discovered that terminal boards of the Unit 1 main control board termination cabinets were interchanged. The interchanging of the terminal board would result in a failure of the main control board to function properly. The switching of the terminal boards would have been detected during system pre-operational check-out, since none of the affected systems would have properly functioned. The interchanging of the terminal boards occurred in September and October 1983. In November, 1983, procedures were written to control material traceability.

Conclusion:

Georgia Power Company has evaluated the conditions described in the engineering evaluation and concluded that a reportable condition per the criteria of Part 10CFR50.55(e) does exist.

Based upon guidance provided by NUREG-0302 Rev. 1, Georgia Power Company has concluded that this condition is not reportable per Part 10CFR21.

Corrective Action:

1. Jumper and Jumper Package Controls

The corrective action for this condition is essentially complete. These actions included:

- ° Re-training the responsible engineers in the revised procedures and controls for jumper installations.
 - ° Assigning an experienced termination engineer into the equipment group.
 - ° "Jumper packages" are not originated until the Turnover Engineer provides field engineering a list of the equipment in the turnover.
 - ° The QA vault and Turnover Engineer are provided a copy of the "jumper package" list.
 - ° Prior to turnover, field engineering and the QA vault verify all "jumper packages" listed for the turnover are complete and documented.
 - ° A computer tracking system was developed and initiated (about 25% of the data input to date) for jumper control.
 - ° The field procedure controlling the preparation, installation, and Quality Control inspections was completely revised.
2. "Equipment/Component Removal," procedure GD-T-28, Revision 0, was implemented in November, 1983. This procedure provided the controls and documentation necessary to ensure that materials, parts, and components are properly identified and traceable throughout fabrication, erection, and installation of the items. In this sense, it provided the additional measure of control to ensure that equipment partially disassembled during installation or construction was returned to its original condition in a controlled, documented manner prior to use. This procedure supplemented those other procedures which were specific for a particular equipment installation. In its present form, this procedure should prevent the situation from recurring.