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USNRC REGION
ATLANTA, GEORGIA

Vogtle Project
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May 3, 1982

United States Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region II - Suite 3100
101 Marietta Street
Atlanta, Georgia 30303

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Attention: Mr. James P. O'Reilly

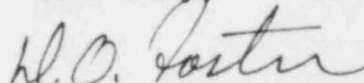
Reference: Vogtle Electric Generating Plant - Units 1 and 2
50-424; 50-425 Cable Tray Splice Bolts

Gentlemen:

Georgia Power Company has concluded its evaluation concerning this item and determined it is reportable under Part 10 CFR 50.55(e) and Part 10 CFR 21. Enclosed is our evaluation for this item.

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

Yours truly,



D. O. Foster
Project General Manager

DOF/CWH/tlp

xc: U. S. Nuclear Regulatory Commission
Attn: Victor J. Stello, Jr., Director
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Evaluation for a Significant Deficiency
Evaluation for a Substantial Safety Hazard
Cable Tray Splice Bolts

Initial Reports:

On November 16, 1981, Mr. Chet Sarver of Georgia Power Company reported a potential deficiency to Mr. J. Rogge of the NRC concerning cable tray splice bolts. Interim reports were submitted to the NRC that requested an extension of the submittal of the final report until April 30, 1982.

Background:

On October 28, 1981, Non-Conformance Report ED-379 was written by Georgia Power Company concerning the failure of the heads of bolts being used for cable tray splice bolts. Cable tray splice plates are attached to one end of cable tray sections with splice plate bolts at P&W Industries and similar bolts are inserted into splice plates by construction personnel when joining cable tray sections. Splice bolts are furnished in bulk by P&W Industries with two types of finish; a "silver-colored" zinc finish and a "gold-colored" iridite finish. The failure of the splice bolts has been limited to dull "silver-colored" zinc finished bolts. The other type of bolt that has been furnished is a "gold-colored" iridite finished bolt. Both the "gold" and "silver" bolts supplied have minor dimensional variations. The procurement specification calls for hardened steel, cadmium plated bolts with ribbed necks, Phillips punch, and flanged lock nuts. The "silver" bolts are made of C1022 steel; the "gold" bolts are made from C1018 steel. The bolts supplied by NSS Industries to P&W Industries generally conform to the requirements of the purchase specifications. Georgia Power Company and P&W Industries conducted torque tests and hydrogen embrittlement testing of these splice bolts.

P&W Industries evaluated hydrogen embrittlement and bolt overtorquing as potential contributors. Based upon test results, hydrogen embrittlement was not considered to be a cause of this problem. Also, tests on the "silver-colored" bolts have demonstrated the capability of withstanding over 100ft-lbs of torque without breaking. Although the P&W Industries report on bolt torque is not conclusive as to the significance of overtorquing, it is P&W Industries' opinion that the failures of the dull "silver-colored" bolts were due to manufacturing defects of the bolts; such as folds and metallic or non-metallic inclusions in the metal rods used by NSS Industries for the fabrication of the bolts. It is suspected that the inclusions or defects reduced the fracture torque of the dull "silver-colored" bolts and made them more susceptible to breakage.

It should be noted that the Bechtel construction specification requires that the splice plate bolts be "snug-tight" as defined by AISC Part 5, Specification for Structural Joints, paragraph 5(D) during field installation.

Lastly, an audit of P&W Industries quality program was performed by Bechtel in September 1981 at which time, no significant deficiencies were observed. P&W's quality program is considered acceptable (without restrictions) to meet the requirements of Bechtel's Quality Assurance Manual for Nuclear procurement. Based on this information and subsequent discussions with P&W, Georgia Power Company believes that their quality program is adequate, and the bolt failures do not appear to be caused by a breakdown of their quality program.

Engineering Evaluation:

Cable tray splice plate bolts are not a structural load-carrying component. Splice plate bolts are used as fasteners to connect adjoining sections of cable tray to form one continuous cable tray system. Failure of the bolts could result in excessive tray movement during a seismic event resulting in a potential for cable damage or system response to a seismic event that could lead to more widespread impacts.

Conclusion:

Since the failure of the splice bolts could result in excessive tray movement during a seismic event, and since the potential existed that both safety trains could have been affected, it can be concluded that this deficiency, were it to have remained unresolved, could have affected adversely the safety of operation of the nuclear power plant at any time throughout the expected lifetime of the plant.

Also, the splice bolt failures represent a significant deviation from performance specifications which will require extensive repair to establish the adequacy of the system to perform its intended safety function.

For Part 10 CFR 21 reportability, the failure of the splice bolts represents a defect in a delivered component such that a major degradation could have occurred in a safety system. Major degradation is considered to be a loss of redundancy, if in conjunction with a single failure, a required safety function could not be performed.

Corrective Action:

"Silver" bolts on newly installed cable trays are being replaced with "gold" bolts. All "silver" bolts in the field warehouse have been placed on hold. Selected failed bolts have been replaced with "gold" bolts, while other failed bolts have not yet been replaced. All "silver" bolts will be replaced using "gold" bolts.

P&W Industries has stated that the "gold" bolts are satisfactory; this was also observed in field tests. P&W Industries is now supplying cable tray with only "gold" bolts.

GPC Construction has agreed to implement a torque verification program on factory installed cable tray splice plate bolts shipped to Plant Vogtle from P&W Industries. The torque values of these bolts will be monitored over a period of approximately 3 months to determine if any further corrective action is required.

Mr. James R. Sipper of Georgia Power Company will be responsible for the corrective action. The corrective action of replacing the "silver" bolts with "gold" bolts will be completed by Georgia Power Company on or before December 31, 1982.