D. O. Foster
Vice President and Project
General Manager
Vogtle Project

Georgia Power

September 13, 1984

United States Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region II - Suite 3100
101 Marietta Street
Atlanta, Georgia 30302

File: X7BG03-M63
Log: GN-418

Reference: Vogtle Electric Generating Plant-Units 1 and 2, 50-424, 50-425; Nuclear Service Cooling Water Supply and Return Piping; also GN-370, dated June 4, 1984.

Attention: Mr. James P. O'Reilly

On May 3, 1984, Mr. R. E. Folker of Georgia Power Company notified Mr. John Rogge of the USNRC of a suspected difference in the settlement of foundation of the nuclear service cooling water tower and nearby valve houses. It was suspected that the settlement difference may lead to an overstressed condition in the piping system connecting the nuclear service cooling water towers and the valve houses. In previous correspondence, Georgia Power Company indicated that a final report on the evaluation of this concern would be submitted to the NRC by September 14, 1984. Georgia Power Company has completed its evaluation and has concluded that this condition is reportable as a substantial safety hazard and a significant deficiency.

Based upon NRC guidance in NUREG-0302, Revision 1, and other NRC correspondence regarding duplicate reporting of significant deficiencies and substantial safety hazards, Georgia Power Company is reporting this event as a significant deficiency pursuant to the requirements of Part 10 CFR 50.55(e). A summary of our evaluation is attached for your information.

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

Yours truly,

D. O. Foster

D. O. Foster

REF/DOF/tdm

xc: U. S. Nuclear Regulatory Commission, Document Control Desk

R. J. Kelly	D. E. Dutton	J. A. Bailey	L. T. Gucwa
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G. F. Head	R. H. Pinson	H. H. Gregory	G. Bockhold
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R. A. Thomas	E. D. Groover	J. L. Vota	C. S. McCall
C. E. Belflower			

1/1 IE 27

EVALUATION FOR A SUBSTANTIAL SAFETY HAZARD
EVALUATION FOR A SIGNIFICANT DEFICIENCY

Nuclear Service Cooling Water Supply and Return Piping

Initial Report:

On May 3, 1984, Mr. R. E. Folker of Georgia Power Company notified Mr. John Rogge of the USNRC of a potentially reportable condition involving a suspected difference in the settlement of foundations of the nuclear service cooling water towers and nearby valve houses. This suspected settlement difference may have resulted in an overstressed condition in the piping systems connecting the nuclear service cooling water (NSCW) towers and the valve houses.

Background Information:

The above condition was discovered during an engineering walkdown of a nearby system. An observation was made that the NSCW pump discharge lines in the cooling tower and valve house were rigidly supported and may be overstressed during plant operation due to differential building settlement and/or building seismic motion.

The NSCW system lines for each unit of Plant Vogtle are routed between the cooling tower and the adjacent valve house. These lines are supported by a pipe support system which is designed to withstand plant operating conditions imposed on the NSCW piping.

The NSCW piping inside the NSCW tower/valve house could be overstressed due to relative seismic motion between the tower and valve house and differential settlement. The pipe support system design does not provide sufficient flexibility to the piping to avoid this potential overstressed condition.

The initial piping system stress calculation incorrectly assumed that the cooling tower and the valve house were on a common base mat. Thus, no differential seismic anchor motion or structural settlement was included. However, since these structures are on different base mats, the differential motion of the two structures must be included in the stress calculation.

Engineering Evaluation:

The isometrics listed in Table 1 define the routing of the portions of the NSCW piping system included in this evaluation. Table 2 contains a listing of the affected process lines. Stresses in these piping systems were reanalyzed with application of seismic anchor motion and structure settlement to the cooling tower and the valve house as separated structures. It was determined the presently designed pipe support system does not provide sufficient flexibility to the pipe, and local overstressing of the pipe beyond the elastic range would be expected.

In lieu of extensive fracture mechanics analysis it was conservatively assumed that the affected lines would fail.

The following analysis was performed to determine the impact on plant safety. This analysis took credit for the water inventory in the NSCW tower basins, but did not take credit for the availability of makeup water.

A facility response analysis was conducted to determine if overstressed lines in systems required to place the plant in a safe shutdown condition or mitigate the consequences of an event (transient or accident condition) could result in unacceptable system functional performance and adversely affect plant safety.

The analysis conservatively assumed the failure of any line (due to overstressing) in one train rendering the train inoperable, concurrent with the most limiting single active failure following the onset of an event which requires a response from that system.

If it was determined that failure of the line could result in unacceptable system functional performance, the deficiency was determined to be reportable and no further analysis was performed. When failure of the line did not result in unacceptable system performance, further analyses were performed according to one or more of the following:

A. A review for potential flooding was performed to determine whether the existing plant analysis enveloped the effects of the piping failure.

B. The line was reviewed for radioactive content and the potential for exceeding offsite exposure guidelines stated in 10 CFR 100 and exposure limits for control room operators in 10 CFR 50, Appendix A, GDC 19.

C. A review was performed of the interaction of non-safety related piping with safety related equipment (seismic 2/1).

The results of the engineering evaluation indicated that the failure of lines noted in Table 3 could have unacceptably compromised system functional performance and adversely affected plant safety, had the incorrect application of seismic motion and differential settlement gone undetected.

Evaluation of Breakdown of Quality Program:

The pipe stress computer program and the engineering desk instruction requires that the analyst include both the foundation settlement and the seismic anchor motion in the analysis of all safety-related piping systems. However, the existence of separate foundations for the NSCW tower and the valve house was not detected during the review of civil/structural drawings and consequently the relative motion of the two structures was not input into the stress analysis computer calculation.

A review of this concern has concluded that there was not a significant quality assurance program breakdown within Bechtel Power Corporation.

Conclusion:

Part 10 CFR 50.55(e) requires the holder of a Construction Permit to notify the Commission of each deficiency found in design and construction which, were it to have remained uncorrected, could have affected adversely the safety of operations of the nuclear power plant at anytime throughout the expected lifetime of the plant and which represents a significant deficiency in final design as approved and released for construction such that the design does not conform to the criteria or basis in the Safety Analysis Report.

Georgia Power Company has concluded that this subject is therefore reportable under the reporting criterion of Part 10 CFR 50.55(e). Georgia Power Company also concluded that this subject constitutes a substantial safety hazard as defined by the reporting criteria of Part 10 CFR 21. Based on NRC guidance in NUREG-0302, Rev. 1 and other correspondence, Georgia Power Company is reporting this concern under the reporting requirements of Part 10 CFR 50.55(e).

Corrective Action:

Corrective action has been completed. These corrective actions include the following:

A. The piping stress analysis has been updated. The analysis includes the following corrected system operation parameters.

   - seismic anchor motion
   - building settlement

   These data have been determined and the analysis of both Units 1 and 2 have been completed.

B. The existing pipe support system of each line in Units 1 and 2 is being evaluated against the results of the stress analysis. Where necessary, pipe supports will be redesigned to ensure that under all postulated plant operating conditions the piping is not overstressed.

TABLE 1
ISOMETRICS SHOWING NSCW PIPING
EVALUATED

UNIT 1	UNIT 2
1K5-1202-004-01/02	2K5-1202-004-01/02
1K5-1202-006-01/02/03	2K5-12-2-006-01/02
1K5-1202-007-01	2K5-1202-011-01
1K5-1202-008-01	2K5-1202-012-01
1K5-1202-009-01	2K5-1202-013-01
1K5-1202-010-01	2K5-1202-014-01
1K5-1202-011-01	2K5-1202-023-01
1K5-1202-012-01	2K5-1202-024-01
1K5-1202-013-01	2K5-1202-029-01/02/03
1K5-1202-014-01	2K5-1202-030-01/03
1K5-1202-023-01	2K5-1202-031-01
1K5-1202-024-01	2K5-1202-032-01
1K5-1202-029-04/06/07	2K5-1202-033-01
1K5-1202-030-01/05/06	2K5-1202-034-01
1K5-1202-031-01	2K5-1202-045-01
1K5-1202-032-01	2K5-1202-046-01
1K5-1202-033-01	2K5-1202-047-01
1K5-1202-034-01	2K5-1202-088-01
1K5-1202-045-01	2K5-1202-181-01
1K5-1202-046-02	2K5-1202-432-01
1K5-1202-048-01	2K5-1202-433-01
1K5-1202-088-02/03	2K5-1202-433-01
1K5-1202-181-01	2K5-1402-020-01
1K5-1202-184-01	2K5-1402-038-01
1K5-1202-185-01	
1K5-1202-432-01	
1K5-1202-433-01	
1K5-1402-020-01	
1K5-1402-038-01	

TABLE 2
NSCW LINES OVERSTRESSED
BY SEISMIC ANCHOR MOTION AND DIFFERENTIAL SETTLEMENT
OF COOLING TOWER/VALVE HOUSE

SYSTEM LINE NO.
1/2-1202-004-24"
1/2-1202-006-24"
1/2-1202-007-12"
1/2-1202-008-12"
1/2-1202-009-12"
1/2-1202-010-12"
1/2-1202-011-12"
1/2-1202-012-12"
1/2-1202-013-12"
1/2-1202-014-12"
1/2-1202-023-18"
1/2-1202-024-18"
1/2-1202-029-6"
1/2-1202-030-6"
1/2-1202-031-18"
1/2-1202-032-18"
1/2-1202-033-18"
1/2-1202-034-18"
1/2-1202-088-24"
1/2-1202-181-24"
1/2-1202-184-18"
1/2-1202-185-18"
1/2-1202-432-4"
1/2-1202-433-4"
1/2-1402-020-4"
1/2-1402-038-4"
1/2-1202-045-3"
1/2-1202-046-3"
1/2-1202-047-3"
1/2-1202-048-3"

TABLE 3

REPORTABLE NSCW SYSTEM PIPING DEFICIENCIES

SYSTEM LINE NUMBERS

1/2-1202-004-24"

1/2-1202-006-24"

1/2-1202-007-12"

1/2-1202-008-12"

1/2-1202-009-12"

1/2-1202-010-12"

1/2-1202-011-12"

1/2-1202-012-12"

1/2-1202-013-12"

1/2-1202-014-12"

1/2-1202-023-18"

1/2-1202-024-18"

1/2-1202-029-6"

1/2-1202-030-6"

1/2-1202-031-18"

1/2-1202-032-18"

1/2-1202-033-18"

1/2-1202-034-18"

1/2-1202-045-3"

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1/2-1202-088-24"

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1/2-1202-185-18"

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PRP
OFFICIAL COPY

Georgia Power
the southern electric system

D. O. Foster
Vice President and Project
General Manager
Vogtle Project

84 SEP 24 P1:44

September 18, 1984

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1K5-1202-014-01	2K5-1202-030-01/03
1K5-1202-023-01	2K5-1202-031-01
1K5-1202-024-01	2K5-1202-032-01
1K5-1202-029-04/06/07	2K5-1202-033-01
1K5-1202-030-01/05/06	2K5-1202-034-01
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1/2-1202-012-12"

1/2-1202-013-12"

1/2-1202-014-12"

1/2-1202-023-18"

1/2-1202-024-18"

1/2-1202-029-6"

1/2-1202-030-6"

1/2-1202-031-18"

1/2-1202-032-18"

1/2-1202-033-18"

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