December 22, 2004

Mr. D. E. Grissette
Vice President
Southern Nuclear Operating
Company, Inc.
P.O. Box 1295
Birmingham, AL 35201-1295

SUBJECT: REVIEW OF THE LICENSEE RESPONSE TO GENERIC LETTER 96-06 FOR VOGTLE ELECTRIC GENERATING PLANT (VOGTLE), UNITS 1 AND 2, REGARDING WATERHAMMER AND TWO-PHASE FLOW (TAC NOS. MA8627, MA8628, M96881, AND M96882)

Dear Mr. Grissette:

The purpose of this letter is to provide you with the results of the Nuclear Regulatory Commission (NRC) staff's review of the information you provided regarding Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996. GL 96-06 included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions. Subsequent to issuance of GL 96-06, the Electric Power Research Institute (EPRI) developed an analytical methodology for evaluating the GL 96-06 waterhammer issue that was documented in EPRI Technical Reports 1003098 and 1006456 (previously known as EPRI Report TR-113594), and approved in an NRC staff safety evaluation dated April 3, 2002 (included as an Appendix to the EPRI Technical Reports). Section 3.3 of the staff's safety evaluation requested that licensees who chose to use the EPRI methodology provide additional information to confirm that the EPRI methodology was properly applied and that plant-specific risk considerations were consistent with the EPRI risk perspective; to justify any proposed exceptions to the EPRI methodology; and to provide any additional information that is required to address the GL 96-06 two-phase flow issue.

The Georgia Power Company (GPC), then licensee for the Vogtle units, provided it's initial response addressing the waterhammer and two-phase flow aspects of GL 96-06 in letters dated October 24, 1996, and January 27, 1997. In response to questions that were asked by the NRC, the Southern Nuclear Operating Company (SNC), successor of GPC as the licensee for the Vogtle units, provided additional information in a letter dated October 28, 1998, and indicated that the answers to some questions would be deferred pending completion of the EPRI initiative. Upon completion of the EPRI initiative, SNC updated its October 28, 1998, submittal by letter dated December 2, 2002, to provide responses to the questions that had been deferred and to supplement information that had been submitted previously. However, because SNC used computer codes that have not been reviewed and approved by the NRC to facilitate its application of the EPRI methodology, the licensee was asked to provide additional information in order to demonstrate that its analyses were in fact conservative. The NRC also

requested that SNC clarify certain aspects of the structural analyses that had been completed and describe programmatic controls that exist and measures being taken to assure that excessive back flow will not occur through check valves that are relied upon for minimizing the extent of voiding and severity of waterhammer. The licensee provided this additional information in letters dated March 21, November 14, 2003, and November 5, 2004.

Based on our review of the information that was provided, the NRC staff is satisfied with SNC's evaluation of the GL 96-06 waterhammer and two-phase flow issues. The licensee has provided sufficient confirmation that the EPRI methodology was properly applied for analyzing the GL 96-06 waterhammer issue, and that plant-specific risk considerations are consistent with the EPRI risk perspective. In order to better enable the nuclear service cooling water piping and supports to withstand waterhammer loads, the licensee for Vogtle has implemented the following modifications: addition of new tie-back type supports at various locations (both Units); replacement of various snubbers with rigid struts (both Units); elimination of an existing snubber and pipe support (Unit 1); elimination of various existing snubbers (Unit 2); elimination of an existing spring support (Unit 2); elimination of the outboard valve in a double valve arrangement at various locations of vent, drain, and test valves (Unit 1); modifications to various existing supports to accommodate the new tie-back supports (Unit 1); and modifications to improve the dynamic capability of various existing supports (both units). Corrective measures that have been taken, in-service testing requirements, and periodic inspections as described in the November 5, 2004, submittal provide adequate assurance that excessive back-leakage through check valves and drain down of the nuclear service water system will not occur consistent with the analytical assumptions that have been made. With respect to two-phase flow, the licensee has determined that boiling or flashing in the containment air coolers and associated outlet piping will not take place after cooling water flow has been reestablished following event initiation, and therefore, two-phase flow will not occur.

While we are satisfied with the licensee's resolution of the GL 96-06 waterhammer and two-phase flow issues, we have not performed a detailed quantitative assessment of the licensee's waterhammer or two-phase flow analyses; and we have not reviewed the licensee's use and application of computer codes for performing these analyses. Consequently, these areas could be the subject of future NRC audit or inspection activities. The GL 96-06 issue concerning thermal overpressurization was reviewed by the Mechanical Engineering Branch and documented in a letter to you dated December 14, 1999.

The information provided in SNC letters dated December 2, 2002, and November 14, 2003, indicated that modifications beyond those discussed in the submittal dated October 28, 1998, may be needed. The letters also indicated that any modifications would tentatively be implemented during the twelfth refueling outage for Unit 1 and the eleventh refueling outage for Unit 2. To ensure the NRC staff maintains a complete record of all activities associated with GL 96-06 for Vogtle, we request that SNC submit a brief description of any additional

modifications that were found to be necessary, including the current status of implementation, and inform the NRC staff when all identified plant modifications associated with GL 96-06 have been completed. The NRC staff notes that these letters are for documentation purposes, and considers the review of GL 96-06 for Vogtle to be complete.

Sincerely,

/RA/

Christopher Gratton, Senior Project Manager
Project Directorate II-1
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-424 and 50-425

CONTACT: James Tatum, SPLB/DSSA/NRR
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ADAMS Accession No.: ML043440324 **No major changes to SE (ML043170358) NRR-106

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Mr. D. Grissette

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