Progress Energy

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U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63

Supplemental Information Regarding Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions"

Ladies and Gentlemen:

By letters dated October 29, 2002, January 19, 2004, and June 23, 2004, Carolina Power and Light Company (CP&L) doing business as Progress Energy Carolinas, Inc., responded to NRC requests for additional information to facilitate the review of the actions taken by Harris Nuclear Plant (HNP) to address Generic Letter (GL) 96-06. In those responses, HNP's resolution relied in part upon the use of test data obtained during column closure waterhammer testing that had been performed, rather than using a conventional analysis. Subsequently, HNP performed a conventional dynamic piping analysis to calculate new support loads. These new support loads were used to identify supports for modification. These supports were modified during Refueling Outage No. 13 (RFO-13) in the spring 2006. Based on the previous responses provided and the additional actions discussed in this letter, HNP considers that the actions to address GL 96-06 have been completed satisfactorily.

Attachment 1 provides supplemental information regarding GL 96-06 actions taken.

HNP requests that the NRC complete its review of GL 96-06 for HNP.

This document contains no new or revised Regulatory Commitments.

Please refer any question regarding this submittal to Mr. Dave Corlett at (919) 362-3137.

Sincerely,

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A072

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Attachment:

1. Supplemental Information Regarding Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions"

c:
Mr. P. B. O'Bryan, NRC Senior Resident Inspector
Mr. C. P. Patel, NRC Project Manager
Dr. W. D. Travers, NRC Regional Administrator

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DURING DESIGN-BASIS ACCIDENT CONDITIONS"

Background

On September 30, 1996, the NRC issued Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions." GL 96-06 requested that licensees determine: 1) if containment air cooler cooling water systems are susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions and 2) if piping systems that penetrated the containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur. By letter dated October 30, 1996, the Harris Nuclear Plant (HNP) submitted its 30-day response to the NRC indicating that the requested information would be submitted within 120 days of the date of the GL. By letter dated January 28, 1997, HNP submitted its 120-day response that provided a written summary report for each of the requested actions. On June 24, 1998, the NRC sent a request for additional information (RAI) to facilitate the review of HNP's response. By letter dated August 24, 1998, HNP requested that the response to the RAI be deferred pending completion of an industry collaborative project with the Electric Power Research Institute (EPRI) to develop an analytical methodology for evaluating the waterhammer concerns discussed in GL 96-06. By letter dated January 26, 1999, HNP requested another deferral pending the NRC review of the EPRI initiative.

On December 15, 2000, EPRI completed its work on this initiative, and the results were documented in EPRI Technical Reports 1003098 and 1006456 (previously known as EPRI Report TR-113594) and submitted to the NRC for review and approval. On April 3, 2002, the NRC approved the EPRI report and issued a safety evaluation (included as an Appendix to the EPRI Technical Reports). Section 3.3 of the NRC'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 requested in RAIs regarding GL 96-06.

By letter dated October 29, 2002, HNP provided the additional information requested in Section 3.3 of the NRC's safety evaluation, including responses to the RAIs that had been deferred. Subsequently, by letters dated January 19, 2004, and June 23, 2004, HNP responded to additional RAIs to facilitate the review of the actions taken by HNP to address GL 96-06. In those responses, HNP's resolution relied in part upon the use of test data obtained during column closure waterhammer testing that had been performed, rather than using a conventional analysis. This plant-specific analysis of the piping using the displacement method, although viable, did not result in satisfactory closure of GL 96-06 for HNP.

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Supplemental Information

Subsequently, HNP has determined that the conventional method of using a time history waterhammer analysis would be performed. Specifically, a column closure water hammer (CCWH) force time history for the limiting loss of off-site power (LOOP) event was developed to more accurately depict the waterhammer loading.

This analysis consisted of the following three steps:

1) Developing the time dependent forcing functions that would be used in the waterhammer analysis;
2) Applying these forcing functions in a time history waterhammer analysis on the piping to verify pipe stresses and to provide support loads; and
3) Evaluating the supports for these new loads to identify supports for modification.

Pipe stress calculations for the supply and return piping connecting the Train A and Train B containment fan coolers were reanalyzed using the forcing functions developed by ALTRAN Corporation. The stress analysis documented that the pipe stresses met the ASME code allowables. A total of 116 supports were evaluated for the new loads. Based on the results of this conventional analysis methodology, eight supports were identified for modification. These modifications enable the supports and associated piping to withstand loads from potential waterhammer events. The expected result from these modifications is no damage due to potential waterhammers. The following supports were modified during Refueling Outage No. 13 (RFO-13) in the spring 2006:

Train	Hanger No.	Support Type	Remarks
A	1SW-H-00178	Structural	Added two new welded plates
	1SW-H-02034	Rigid Strut	Replaced with new strut, end-attachment, and pipe clamp
	1SW-H-02035	Rigid Strut	Replaced with new strut, end-attachment, and pipe clamp
	1SW-H-02038	Rigid Strut	Added four new welded plates
B	1SW-H-00132	Structural	Redesigned hanger structurally
	1SW-H-00143	Rigid Strut	Installed new welds for existing plate
	1SW-H-00155	Structural	Redesigned hanger structurally
	1SW-H-02185	Rigid Strut	Replaced with new strut, end-attachment, and pipe clamp

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Conclusion

HNP has performed a comprehensive evaluation of the waterhammer and two-phase flow concerns discussed in GL 96-06. HNP has provided sufficient confirmation that the EPRI methodology was properly applied for analyzing the waterhammer concerns discussed in GL 96-06, and that plant-specific risk considerations are consistent with the EPRI risk perspective. In addition, to enable the service water piping and supports associated with the containment cooling system to withstand potential waterhammer loads, HNP has implemented modifications to eight supports, including: replaced with new struts, end-attachments, and pipe clamps; added new welded plates; installed new welds; or redesigned the hangers structurally. With respect to two-phase flow, the two-phase flow analysis has determined that the piping system and components will continue to perform their design-basis functions, including design-basis heat removal capability and piping integrity.

Based on the above, HNP considers that the actions to address GL 96-06 have been completed satisfactorily.