

# CATEGORY 1

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SUBJECT: Provides supplemental response to GL 96-06. Results of refined analysis of thermally induced overpressurization of closed sections of piping & results of detailed water hammer analysis, encl.

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**DUKE POWER**

June 30, 1997

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

Subject: Oconee Nuclear Station  
Docket Nos. 50-269, 50-270, 50-287  
Supplemental Response to Generic Letter 96-06:  
Assurance of Equipment Operability and Containment  
Integrity During Design-Basis Conditions

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Conditions", was issued on September 30, 1996. GL 96-06 requested licensees to determine if containment air cooler cooling water systems are susceptible to either water hammer or two-phase flow conditions during postulated accident conditions and to determine if piping systems that penetrate containment are susceptible to thermal expansion of fluid that could lead to overpressurization of piping. Duke Energy Corporation (Duke) responded to GL 96-06 in submittals to the NRC dated October 29, 1996, January 28, 1997, and April 15, 1997.

In the April 15, 1997, submittal, Duke committed to provide additional information regarding the refined analysis of thermally induced overpressurization of closed sections of piping, and the associated schedule for long term resolution of this issue, by June 30, 1997. In addition, Duke committed to provide the results of detailed water hammer analyses by June 30, 1997. Please find information on these two GL 96-06 issues in Attachments 1 and 2, respectively.

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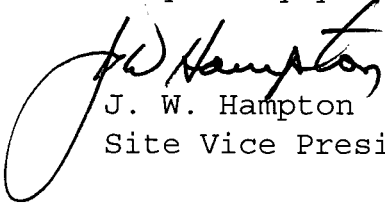
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June 30, 1997  
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Please address any questions to D. A. Nix at (864) 885-3634.

Very truly yours,

A handwritten signature in dark ink, appearing to read "J. W. Hampton". The signature is fluid and cursive, with a large loop at the beginning.

J. W. Hampton  
Site Vice President

Attachments

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ATTACHMENT 1  
Thermally Induced Overpressurization of Reactor Building  
Penetration Piping

Duke plans, as a long term resolution to this issue, to install relief valves, check valves, insulation, or other appropriate devices to preclude thermal overpressurization for containment penetrations. The schedule for installing these modifications is:

Unit 1: Complete in the End-of-Cycle 18 refueling outage currently scheduled for early 1999.

Unit 2: Complete in the End-of-Cycle 17 refueling outage currently scheduled for mid 1999.

Unit 3: Complete in the End-of-Cycle 18 refueling outage currently scheduled for late 1999.

As described in letters to the staff dated January 28, 1997, and April 15, 1997, valve leakage is a technically acceptable method of preventing thermal overpressure where small, but identifiable, leakage is detected by local valve leak rate testing. Duke will continue to verify thermal overpressure protection using this and other previously described methods of overpressurization protection until completion of the modifications proposed above. In the April 15, 1997, submittal, Duke indicated that an elastic/plastic analysis would be performed as a long term resolution of the overpressure issue in lieu of continued reliance on small, identified valve leakage.

Much work has been done to evaluate Oconee's specific piping configurations. As a result, Duke is confident that the existing piping would withstand the increased pressures due to thermal effects. However, there are numerous different piping arrangements in the Oconee reactor buildings, and each situation would require a separate analysis. Therefore, Duke has chosen to pursue resolution by means of modifications. If additional industry efforts determine that thermally-induced overpressurization is not an issue, Duke will reassess the prudence of implementing modifications on the subject penetrations.

ATTACHMENT 2  
Water Hammer Analysis for LPSW system

In response to Generic Letter 96-06, Duke provided the justification for operability of our safety related Reactor Building Cooling Units in a letter dated January 28, 1997. During discussions between Duke and the NRC concerning the information in the January 28, 1997 submittal, the NRC had questions about the qualitative judgments and the input assumptions relative to single failure. In response to the questions, Duke committed to perform a more detailed quantitative analysis and a Failure Modes and Effects Analysis (FMEA). Both of the above analyses have been completed and the results verify our previous operability evaluation. The FMEA indicates that the operability evaluation utilized the bounding single failures. In addition, the more detailed quantitative analysis predicts loads due to possible water hammers that are consistent with those provided in Duke's submittal dated January 28, 1997. Our calculations, actual system testing, discussions with a consultant (ALTRAN), and a review of industry experience continue to provide assurance that the Oconee Low Pressure Service Water System is operable.