



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 27, 2000

Mr. Thomas F. Plunkett
President - Nuclear Division
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: ST. LUCIE UNITS 1 AND 2, REVIEW OF FLORIDA POWER AND LIGHT COMPANY RESPONSES TO GENERIC LETTER 96-06 CONCERNING WATERHAMMER, TWO-PHASE FLOW, AND THERMAL OVERPRESSURIZATION (TAC NOS. M96870 AND M96871)

Dear Mr. Plunkett:

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, 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. Additionally, licensees were requested to evaluate piping systems that penetrate containment to determine if they are susceptible to thermal expansion of fluid which could lead to overpressurization of piping.

By letters dated January 28 and April 22, 1997, and October 30, 1998, Florida Power and Light Company (FPL) provided its responses to GL 96-06 for St. Lucie Units 1 and 2. The October 30, 1998 FPL letter was in response to a NRC request for additional information (RAI) dated July 28, 1997. The NRC staff and its contractor, Scientech, clarified the information provided in the FPL response to the RAI during a conference call on November 9, 1999. The information submitted by FPL for waterhammer and two-phase flow was reviewed by Scientech under contract to U.S. Nuclear Regulatory Commission (NRC). Scientech has completed its review and the results are documented in Letter Report No. 240-6, dated November 1999 (enclosed). With regard to the information that was submitted, Scientech made the following observations:

- Insufficient information about the details and methodology of the Sargent and Lundy waterhammer analysis was provided to enable the staff to complete an independent review of the work that was done.
- Insufficient information about the assumptions inherent in the Sargent and Lundy HYTRAN computer program, the treatment of vapor/liquid interfaces, and code validation was provided to enable the staff to complete an independent assessment of the work that was done.
- The adjustments that were made to the sonic velocity and the pressure pulse duration were not adequately justified, calling into question the validity and conservatism of the HYTRAN results.

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- Based on the evaluations that were completed by Sargent and Lundy, the licensee has concluded that while the system pressure, pipe stress and support loads that result from waterhammer can be accommodated under the functionality rules, certain design allowable limits could be exceeded. Insufficient information about the specific design limits and functionality rules was provided to allow an independent assessment.

While we recognize that FPL is participating in an industry initiative to address the waterhammer concerns that are discussed in GL 96-06 and that additional information will be provided based on the results of this initiative, we believe that our comments concerning the information that had been submitted may be useful. With regard to the two-phase flow issue, the staff is satisfied with FPL's response and consider this aspect of GL 96-06 to be closed.

With regard to the thermally-induced pressurization of piping runs penetrating the containment, FPL has identified, in its submittals of January 28 and April 22, 1997, two penetrations and isolated piping segments within five systems inside the Unit 1 containment, and six penetrations and isolated piping segments within six systems inside the Unit 2 containment, as vulnerable to a water solid volume that may be subjected to an increase in pressure due to heating of trapped fluid. FPL determined that all affected penetrations and isolated piping segments are operable based on the criteria in Appendix F to Section III of the ASME Code. For its long-term corrective actions, FPL committed to install modifications and/or change administrative procedures during the refueling outages of Units 1 and 2 in the fall of 1997 and 1998, respectively.

During the previously mentioned conference call with FPL regarding corrective actions, FPL informed the NRC staff that it has installed thermal relief valves on all affected penetrations. FPL has indicated that it has updated an administrative procedure to drain pipe segments of two of the systems, installed a thermal relief valve on a pipe segment of one system, changed a valve configuration to the open position on a pipe segment of one system, and updated a procedure to provide air in a pipe segment of the remaining affected system inside the Unit 1 containment. FPL has also indicated that it has updated an administrative procedure to drain pipe segments in four of the affected systems, and installed thermal relief valves on pipe segments in the remaining two affected systems inside the Unit 2 containment.

The staff finds that FPL corrective actions provide an acceptable resolution for the issue of thermally-induced pressurization of piping runs penetrating the containment for St. Lucie Units 1 and 2. Therefore, the staff also considers that this aspect of GL 96-06 to be closed.

Sincerely,
/RA/

William C. Gleaves, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Enclosure: As stated

Docket Nos. 50-335 and 50-389
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- Based on the evaluations that were completed by Sargent and Lundy, the licensee has concluded that while the system pressure, pipe stress and support loads that result from waterhammer can be accommodated under the functionality rules, certain design allowable limits could be exceeded. Insufficient information about the specific design limits and functionality rules was provided to allow an independent assessment.

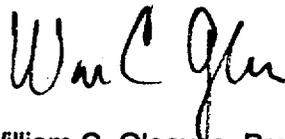
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During the previously mentioned conference call with FPL regarding corrective actions, FPL informed the NRC staff that it has installed thermal relief valves on all affected penetrations. FPL has indicated that it has updated an administrative procedure to drain pipe segments of two of the systems, installed a thermal relief valve on a pipe segment of one system, changed a valve configuration to the open position on a pipe segment of one system, and updated a procedure to provide air in a pipe segment of the remaining affected system inside the Unit 1 containment. FPL has also indicated that it has updated an administrative procedure to drain pipe segments in four of the affected systems, and installed thermal relief valves on pipe segments in the remaining two affected systems inside the Unit 2 containment.

The staff finds that FPL corrective actions provide an acceptable resolution for the issue of thermally-induced pressurization of piping runs penetrating the containment for St. Lucie Units 1 and 2. Therefore, the staff also considers that this aspect of GL 96-06 to be closed.

Sincerely,



William C. Gleaves, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

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