Docket Nos. 50-269
50-270
and 50-287

AUG 1 1 1976

Duke Power Company
ATTN: Mr. William O. Parker, Jr.
Vice President
Steam Production
Post Office Box 2178
422 South Church Street
Charlotte, North Carolina 28242

Gentlemen:

RE: Oconee Nuclear Station Units Nos. 1, 2, and 3

A number of reported instances of reactor vessel overpressurization in Pressurized Water Reactor (PWR) facilities have occurred in which the Technical Specifications implementing 10 CFR Part 50 Appendix G limitations have been exceeded. The majority of cases have occurred during cold shutdown in which the primary system has been in water solid conditions. These overpressurization events have been initiated by a variety of causes, including the following:

(1) Isolation of RHR system/letdown system while charging to a water solid primary system,

(2) Thermal expansion following the starting of a primary coolant pump due to stored thermal energy in steam generators,

(3) Inadvertent actuation of safety injection accumulators, and

(4) Initiation of operation of a reactor coolant pump or a high pressure safety injection pump.

In essentially all of the events reported, a single personnel error, equipment malfunction or procedural deficiency has been sufficient to cause the event.

We believe that appropriate steps should be taken promptly by all PWR licensees to minimize the likelihood of additional occurrences of reactor vessel overpressurization. To that end we recently completed a series of meetings with several PWR licensees and NSSS suppliers in which we discussed the reported overpressurization events and assessed the measures that are currently being employed to either avoid or reduce the probability of similar occurrences, or to control the pressure transient to less than Appendix G limits. Examples of those measures identified by the various licensees are as follows:

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(1) Complete avoidance of water solid conditions by either maintaining a pressurizer steam bubble or by providing a low pressure nitrogen blanket in the pressurizer when a steam bubble cannot be maintained,

(2) Disabling High Pressure Injection and Safety Injection pumps by disconnecting electrical power supplies when at low primary system temperatures,

(3) Installation of dual setpoint pressurizer power relief valve(s) to provide protection against exceeding Appendix G limits while at low primary system temperatures,

(4) Minimization of time at water solid conditions and upgrading plant procedures to include appropriate warnings and cautions when such operations are necessary, and

(5) Installation of relief valves in charging pump discharge lines with a setpoint to provide protection against exceeding Appendix G limits.

It was noted in our discussions with the PWR licensees that, for the majority of those plants involved, not all potential overpressurization events would be prevented by the measures they had identified and that some of the remaining measures may have undesirable effects on reactor safety.

Based on the information gathered to date, we have concluded that all PWR licensees should evaluate their system designs to determine susceptibility to overpressurization events. Specifically, you should provide the following:

(1) An analysis of the Reactor Coolant System (RCS) response to pressure transients that can occur during startup and shutdown. Any design modifications determined to be necessary to preclude exceeding Appendix G limits are to be incorporated in this analysis. The analysis should include a plot of pressure as a function of time until termination of the event. The analysis should assume the most limiting initial conditions (e.g., one RHR train operating or available for letdown, other components in normal operation when the system is water solid such as pressurizer heaters and charging pumps, and one or more reactor coolant pumps in operation) with the worst single failure or operator error as the initiating event. Justification should be provided for the choice of limiting conditions and worst single failure or operator error assumed in the analysis.

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(2) A description of those design modifications determined to be necessary, including equipment performance specifications and system operational sequences. The design basis used in the choice of equipment should be included, and

(3) A schedule for the prompt implementation of the proposed design modifications.

The basic criteria to be applied in determining the adequacy of overpressurization protection are that no single equipment failure or single operator error will result in Appendix G limitations being exceeded.

For those situations in which the necessary design changes identified cannot be implemented within the next few months, you should identify short-term measures to reduce the likelihood that overpressurization events will occur in the interim period until the permanent design changes can be made. Short term measures should be identified separately for immediate implementation within the terms and conditions of your license. Short term measures might include some combination of, but would not be limited to, the following suggestions:

(1) Procedural changes to minimize the time in which the primary system is in a water solid condition,

(2) Upgrading existing plant procedures and administrative controls to assure that appropriate warnings and cautions are included to alert the operator whenever the potential for primary system overpressurization exists,

(3) Provide alarms and/or indications to alert the operator whenever primary system pressure increases toward Appendix G limits,

(4) Introducing temporary plant modifications for pressure relief, and

(5) Assignment of additional personnel to monitor plant operations when water solid.

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Modifications to preclude or minimize the probability of reactor vessel overpressurization events are plant dependent and the examples given may or may not be adaptable to your specific system design. Consideration must also be given to the potential effects of both the short term and long term measures you consider to assure that other aspects of nuclear safety are not compromised.

To verify compliance with Appendix G pressure-temperature limits during startup and shutdown, you should assure that the appropriate instrumentation is installed to provide a continuous permanent record over the full range of both pressure and temperature. This instrumentation should be in service during long periods of cold shutdown as well as during startup and shutdown operations. Reliance upon the plant computer to reconstruct a pressure transient is not considered sufficient because of the likelihood of computer downtime especially during plant shutdown conditions.

We request that you notify us within 20 days after receipt of this letter that you will provide all the information requested within 60 days or explain why you cannot meet this schedule and provide the schedule that you will meet.

This request for generic information was approved by GAO under a blanket clearance number B-180225 (R0072); this clearance expires July 31, 1977.

Sincerely,

Original signed by

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

cc: Mr. William L. Porter
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