Docket No. 50-261

MAY 1 5 1975

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Carolina Power & Light Company
ATTN: Mr. J. A. Jones
Senior Vice President
336 Fayetteville Street
Raleigh, North Carolina 27602

Gentlemen:

The Nuclear Regulatory Commission staff's continuing review of reactor power plant safety indicates that the potential for occurrence and the potential consequences of secondary system fluid flow instability in PWRs (characterized as "water hammer") need to be adequately analyzed by licensees and the results evaluated by the staff. It has been found that events that caused damage to the feedwater system piping at the Indian Point 2 facility (1) and other operating plants can occur as a consequence of uncovering the feedwater sparger or the feedwater inlet nozzles in the steam generator. Subsequent events, including the operation of the Auxiliary Feedwater System, can result in the generation of an instability or pressure wave that is propagated through the piping that can result in failure of the piping and/or its supports. Structures, systems, and components important to safety should be designed and constructed so that destructive type fluid flow instability will not occur during normal, upset, or accident conditions. Based on information presently available to us, the feedwater and/or auxiliary feedwater systems in your plant may be susceptible to flow instabilities.

We request that you provide us with analyses and other relevant information needed to determine the potential for occurrence and the potential consequences of such an event in your plant using the guidance provided in the enclosure. Since piping layouts and system designs are substantially different from plant to plant, you should determine and indicate in your response the applicability to your plant of each of the items

(1) "Feedwater Line Incident Report - Indian Point Unit No. 2", dated January 14, 1974, as supplemented by submittal dated January 16, 1974. Results of test program are shown in submittals dated March 12, 1974, and August 30, 1974.

OFFICE	ORB#3	ORB#3	ORB#3			
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DATE	5/ 14 /75	5/ 14 /75	5/ 15 /75			

Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-166

in the enclosure. If the results of your analyses indicate that changes in the design or operation of structures, systems, or components are necessary to prevent the water hammer event or assure system integrity, you should provide information on your plans to make these changes in your facility. Any design modifications proposed should include appropriate consideration of the guidelines and requests for information in the enclosure. Within 10 days after receipt of this letter, notify us 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,

George Lear, Chief
Operating Reactors Branch #1
Division of Reactor Licensing

Enclosure:
Information Required

cc w/enclosure:
See next page

OFFICE ➤						
SURNAME ➤						
DATE ➤						

cc:

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Shaw, Pittman, Potts, Trowbridge & Madden
Barr Building
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Washington, D. C. 20006

Hartsville Memorial Library
Home and Fifth Avenue
Hartsville, South Carolina 29550

INFORMATION REQUIRED

1. Describe all operating occurrences that could cause the level of the water/steam interface in the steam generator to drop below the feedwater sparger or inlet nozzles, and allow steam to enter the sparger and/or the feedwater piping.
2. Describe and show by isometric diagrams, the routing of the main and auxiliary feedwater piping from the steam generators outwards through containment up to the outer containment isolation valve and restraint. Note all valves and provide the elevations of the sparger and/or inlet nozzles and all piping runs needed to perform an independent analysis of drainage characteristics.
3. Describe any "water hammer" experiences that have occurred in the feedwater system and the means by which the problem was permanently corrected.
4. Describe all analyses of the feedwater and auxiliary feedwater piping systems for which dynamic forcing functions were assumed. Also, provide the results of any test programs that were carried out to verify that either uncovering of the feedwater lines could not occur at your facility, or if it did occur, that "water hammer" would not occur.
   a. If forcing functions were assumed in analyses, provide the technical bases that were used to assure that an appropriate choice was made and that adequate conservatisms were included in the analytical model.

b. If a test program was followed, provide the basis for assuring that the program adequately tracked and predicted the flow instability event that occurred, and further, that the test results contained adequate conservatisms and an acceptable factor of safety, e.g., range of parameters covered all conceivable modes of operation.

c. If neither a. or b. have been performed, present your basis for not requiring either and your plans to investigate this potential transient occurrence.

5. Discuss the possibility of a sparger or nozzle uncovering and the consequent pressure wave effects that could occur in the piping following a design basis loss-of-coolant accident, assuming concurrent turbine trip and loss of off-site power.

6. If plant system design changes have been or are planned to be made to preclude the occurrence of flow instabilities, describe these changes or modifications, and discuss the reasons that made this alternative superior to other alternatives that might have been applied. Discuss the quality assurance program that was or will be followed to assure that the planned system modifications will have been correctly accomplished at the facility. If changes are indicated to be necessary for your plant, consider and discuss the effects of reduced auxiliary feedwater flow as a possible means of reducing the magnitude of induced pressure waves, including positive means (e.g., interlocks) to assure sufficiently low flow rates and still meet the minimum requirements for the system safety function.