HELPING BUILD ARK

ARKANSAS POWER & LIGHT COMPANY

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July 11, 1975

Mr. A. Giambusso, Director
Division of Reactor Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Arkansas Power & Light Company
Arkansas Nuclear One-Unit 1
Docket No. 50-313
License No. DPR-51
Feedwater System Piping

Dear Mr. Giambusso:

Mr. D. L. Ziemann's letter of May 12, 1975, requested information concerning the possibility of an occurrence at Arkansas Nuclear One-Unit 1 similar to that which occurred at Indian Point 2 which resulted in feedwater system piping damage. Attached find our responses to those items contained in the attachment to the aforementioned letter.

Very truly yours,

William Cavanaugh III
Manager, Nuclear Services

WC:lt

Attachment

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TAX PAYING, INVESTOR OWNED MEMBER MIDDLE SOUTH UTILITIES SYSTEM

COPY SENT REGION IV

ATTACHMENT TO LETTER
CAVANAUGH TO GIAMBUSSO, 7/11/75

QUESTION NO. 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 feedwater piping.

Response

The design of the B&W Once Through Steam Generator requires that the level of the water/steam interface remain below the feedwater inlet nozzles during operation. However, the arrangement of the feedwater nozzles, external ring distribution header, and feedwater piping leading up to the header is such that steam cannot enter the feedwater piping. The piping immediately external to the steam generator contains a "gooseneck" or trap arrangement which will always remain filled with water and preclude any steam entering the feedwater piping.

At ANO-1 there is a small one-inch bypass line around the feedwater control valves which maintains a continuous flowrate to the steam generators prior to power operation. This small flowrate (which begins when the unit is cold) will in inself keep the feedwater lines leading up to the steam generator full of water and preclude steam from entering the piping. Once power operation begins, the normal feedwater flowrate fills the pipes and feedwater flowrate fills the pipes and feedwater distribution header and nozzles with water and they remain filled throughout power operation.

QUESTION NO. 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 dranage characteristics.

Response

Isometric diagrams of main and emergency (auxiliary) feedwater piping are attached. It should be noted that the main and emergency feedwater systems are completely separate.

QUESTION NO. 3

Describe any "water hammer" experiences that have occurred in the feedwater system and the means by which the problem was permanently corrected.

Response

No "water hammers" have occurred in the feedwater system between the feedwater inlet nozzle to the steam generator and outer containment isolation valves.

QUESTION NO. 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 the feedwater lines could not occur at your facility, or if it did occur, that "water hammer" would not occu .

Response

System design and separation of main and emergency feedwater piping preclude the possibility of the feedwater ring being uncovered or steam entering the piping.

QUESTION NO. 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 trip and loss of offsite power.

Response

The steam generator water level is below the feedwater inlet nozzles during power operation. However, steam will not enter the feedwater piping and no pressure wave effects will occur in the piping following a design basis accident with concurrent turbine trip and loss of offsite power due to the "gooseneck" arrangement of the feedwater piping directly external to the steam generator. Even when the main feedwater pumps trip and feedwater flowrate is zero, the trap remains full of water and precludes any steam in the piping.

A test was run at Oconee 1 (a unit similar to ANO-1) from 40% power in which the main feedwater pumps and the turbine generator were tripped and the auxiliary feedwater flow was initiated. The auxiliary feedwater system on the B&W OTSG (including distribution header and piping) is completely separate from the main feedwater system. The auxiliary feedwater enters the unit through a separate header at the top of the tube section. This test very closely simulates the effects of a loss of offsite power on the secondary plant. The steam generator and feedwater piping directly adjacent to the steam generator were monitored for noises using the B&W Loose Parts Monitoring System; no unusual noises were heard confirming the fact that no water hammer in the feedwater piping occurred during the test.

QUESTION NO. 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 effect 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 sufficient low flow rates and still meet the minimum requirements for the system safety functions.

Response

It has been shown in the preceeding responses that system design already precludes the possibility of occurrence of a "water hammer". Therefore, no system design changes are necessary to further protect against this occurrence.