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SCHWENCER,A. Licensing Branch 2

SUBJECT: Withdraws requests for proposed Amends 39 & 4 to Licenses NPF-14 & NPF-22,respectively,revising bypass leakage test requirements.Oversized drawing encl.Aperture card available in PDR.

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Drawings to Pm

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DEC 18 1984

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
REANALYSIS OF FEEDWATER PENETRATION BYPASS
LEAKAGE - WITHDRAWAL OF PROPOSED AMENDMENTS
ER 100450 FILES 842-05, 841-8 Docket Nos. 50-387
PLA-2376 50-388

References: 1. PLA-1765, N.W.Curtis to Dr.T.Murley, July 29, 1983.
2. PLA-2191, N.W.Curtis to A.Schwencer, May 4, 1984.
3. Limerick SER, pages 6-32 and 6-33.

Dear Mr. Schwencer:

Via Reference 1, PP&L issued a final report on a Susquehanna SES Unit 2 deficiency involving feedwater bypass leakage. The conclusion of that report was that a water seal, previously assumed adequate, would not eliminate secondary containment bypass leakage through the feedwater system. PP&L therefore committed to certain corrective actions to ensure that the maximum bypass leakage did not exceed the value assumed in the FSAR LOCA analysis. As a followup to ensure appropriate controls on the revised commitments, PP&L proposed Amendments 39 to NPF-14 and 4 to NPF-22, which revised the bypass leakage test requirements for Susquehanna SES Units 1 and 2 (Reference 2).

Recently, on Unit 2, we have experienced difficulty in achieving pneumatic test results that meet the bypass leakage criteria (please note that we do not have any problems meeting Appendix J criteria for this penetration). This difficulty led us to talk to other utilities for possible solutions based on common experiences, and we found, via Reference 3, that the NRC had allowed credit for a water seal between the feedwater penetration and the Condensate Storage Tank (CST) at the Limerick Station.

PP&L has completed a reanalysis to determine if such an allowance could be justified for the Susquehanna (both Units 1 and 2) design as well, thereby precluding the need for bypass leakage testing of the feedwater penetration. The salient areas of this reanalysis are described below.

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DRAWINGS TO PM

A. Probability of Event

Bypass leakage through the feedwater system has the potential for resulting in significant off-site radiological consequences only upon the simultaneous occurrence of three virtually independent events. These consist of the following:

1. A large, sudden rupture of a system containing reactor coolant. This is not a mechanistic event.

2. A very large degree of reactor core damage, occurring very suddenly. This is not a mechanistic event.

3. A sudden loss of all off-site sources of electrical power.

An event sequence which does not include all three of the above does not result in potential bypass leakage through the feedwater system for the following reasons:

1. Relatively small pipe breaks would result in a much slower reactor depressurization, and, consequently a much lower amount of feedwater system flashing, resulting in a much higher probability of maintaining a water seal inside the feedwater isolation valves.

2. In the absence of severe core damage the off-site radiological consequences obviously would not approach 10 CFR 100 limits, regardless of the existence of a water seal in the feedwater system.

3. Continuity of off-site power availability would allow operation of the condensate pump to maintain a water seal in the feedwater system throughout the event sequence.

Considering the above it is clear that a more than adequate, if not excessive, degree of conservatism exists by assuming the simultaneous occurrence of these three events.

B. Piping System Integrity

The feedwater piping in question is shown on the attached figure. The penetration has one isolation valve inside and one outside of containment. An intermediate check valve exists outside containment that is not considered for containment isolation. Outboard of the isolation valves, the piping is designed to ANSI B31.1 requirements, and is analyzed for all LOCA-induced hydrodynamic loads.

We believe that the piping and equipment outboard of the isolation valves will remain intact post-LOCA, thereby providing a water seal. The three valves described above serve to reduce the pressure seen by the water

seal. Also, the feedwater system is continuously monitored during normal operation, at which time valves in the feedwater system downstream of the feedwater pumps are subjected to approximately 1125 psig (more than two orders of magnitude higher than the post-LOCA condition). Upstream of the feedwater pumps, back to the condensate pumps, the normal pressure is over 500 psig (nearly two orders of magnitude higher than the post-LOCA condition).

C. Water Volume in Piping

PP&L has performed a calculation to show that a water seal bounded by the feedwater pump discharge check valves exists post-LOCA. The assumptions made for this calculation were as follows:

1. Flashing and boiloff occur due to latent heat in the pipe walls and valves.

2. Although the 30-inch header (see figure) serves as a relatively efficient moisture separator which should eliminate entrainment effects, a small fraction of water is assumed to be removed via this method.

3. The beneficial effects of HPCI, RCIC and pump coastdown are neglected.

4. All sensible heat is assumed to enter the water, not escape through pipe insulation.

The results of this conservative calculation reveal that a water seal would, indeed, exist. Assuming depletion at a rate greater than the manufacturer's standard leakage rate for 18" check valves in order to provide conservatism, we believe that a water seal will exist for at least 200 days.

Conclusions

It is PP&L's position that zero bypass leakage should be attributed to the feedwater system pathway. The basis for this position is summarized below.

1. Three virtually independent events have to occur for bypass leakage through the feedwater system to result in a significant off-site dose; this conservative assumption should allow more mechanistic considerations for its mitigation.

2. The feedwater piping system integrity is evidenced by its continuous monitoring during normal operations, during which time it experiences pressures far greater than it would see post-LOCA.

3. A conservative water volume calculation resulted in a minimum 200 day water seal, based on the piping geometry back to the feedwater pump discharge check valves.

Although we stand by the arguments presented above as the basis for our new position, in reality, we believe that a seal inside containment would be restored to the feedwater piping through the use of a condensate pump following restoration of off-site power. One pump need only be operated for a few minutes to completely fill the system. Other water sources, such as the Control Rod Drive pumps or a diesel-driven fire pump, together with temporary hose connections can provide makeup water without off-site power restoration.

Furthermore, although we have not taken credit for it in this application, we would like you to be aware that we have performed a parametric study of the SSES off-site dose analysis excluding water seals and makeup sources, but taking credit for well understood dose reduction factors such as transit time and plateout of certain isotopes along release pathways. The results showed that bypass leakage one to two orders of magnitude higher than that currently assumed in the analysis would not result in doses in excess of 10 CFR 100 limits. Leakage rates of this order of magnitude are assured by Appendix J testing, which is currently required by the Technical Specifications. We feel that these results are a good indication of how conservative the restrictive bypass leakage limit is with respect to its impact on off-site dose.

Based upon the arguments provided in this letter, PP&L withdraws its previous requests for proposed amendments as documented in Reference 2. We will update the FSAR (next annual update) to reflect the position in this letter, but we will no longer test to any bypass leakage requirements other than those required by current Technical Specifications. Any questions on this matter should be directed to Mr. R. Sgarro at 215-770-7855.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

cc: M. J. Campagnone - USNRC
R. H. Jacobs - USNRC

T. M. Gerusky, Director
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Attachment