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SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards response to NUREG-0737 Item II.K.3.28,automatic depressurization sys accumulator qualification.Design basis & justification provided.Response to be incorporated into next amend to FSAR.

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February 17, 1982

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

Docket Nos. 50-387
50-388

SUSQUEHANNA STEAM ELECTRIC STATION
RESPONSE TO NUREG 0737, ITEM II.K.3.28,
ADS ACCUMULATOR QUALIFICATION
ER 100450 FILE 841-2
PLA-998

Dear Mr. Schwencer:

Attached is a response of NUREG 0737, Item II.K.3.28. This response will be included in Chapter 18 of the FSAR in the next amendment. This completes our action on this item.

Very truly yours,

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

DPM/mks

Attachment

cc: R. Perch - NRC

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ATTACHMENT

Statement of Response

The design basis and justification for the ADS accumulators are given below. This design basis is different than stated in NUREG 0737, Requirement II.K.3.28.

The criteria for short-term and long-term ADS operations, as specified in the FSAR, are as follows:

a. Short-Term ADS Operation -

Accumulator capacity is sufficient for each ADS valve to provide two actuations against 31.5 psig (70% of 45 psig) drywell pressure (see FSAR Subsection 5.2.2.4.1 and response to Question 211.67).

b. Long-Term ADS Operability of 100 Days -

The safety related nitrogen storage system contains adequate gas in storage (N_2-bottles) for 30 days after a postulated DBA (see FSAR Subsection 9.3.1.5.1). However, N_2-bottles could be replaced periodically to provide capacity for at least 100 days operation of the ADS.

Justification for meeting these criteria is given below.

1. Short-Term ADS Design Basis

Short-term is defined for this discussion as the time required to depressurize the reactor to the residual heat removal (RHR) shutdown cooling pressure permissive setpoint, stabilize the reactor water level and place the reactor in the shutdown cooling mode.

Each ADS accumulator is presently sized to provide two ADS safety/relief valve (S/RV) actuations at 70% of drywell design pressure. This is equivalent to six actuations of the ADS S/RVs at atmospheric pressure in the drywell. The ADS valves are designed to operate at 70% of drywell design pressure because that is the maximum pressure for which rapid reactor depressurization through the ADS valves is required (greater drywell pressures are associated only with the short duration primary system blowdown in the drywell immediately following a large pipe break). For large breaks which result in higher drywell pressure, sufficient reactor depressurization occurs due to the break to preclude the need for ADS. One ADS actuation at 70% of drywell design pressure is sufficient to depressurize the reactor and allow inventory makeup by the low pressure ECC systems. However, for conservatism, the ADS accumulators are sized to allow two ADS actuations at 70% of drywell design pressure.

This design provides sufficient nitrogen to the ADS valves to permit depressurization until the RHR shutdown cooling mode can be initiated.

Preoperational testing of the ADS valves at 70% of design drywell pressure is not practical because it would require pressurizing the drywell during ADS valve testing. Thus, an equivalent number of valve actuations at atmospheric pressure is normally included in the ADS system test specification.

2. Long-Term ADS Design Basis

The basis for the long-term ADS requirement is derived from the long-term cooling acceptance criterion (Criterion 5) of 10CFR50.46. Criterion 5 states:

> "Long-Term Cooling. After any calculated successful initial operation of the ECCS, the calculated core temperature shall be maintained at an acceptably low value and decay heat shall be removed for the extended period of time required by the long-lived radioactivity remaining in the core."

This criterion requires that either ADS be operable in conjunction with the low pressure ECCS pumps or that RHR shutdown cooling and water makeup capability be operable, to ensure long-term core cooling.

The primary purpose of long-term ADS is to keep the reactor pressure low enough so that low pressure ECC systems can be used to keep the core cooled. The ADS is not required after the decay heat is low enough so the vessel will not be pressurized above the shutoff head of the low pressure ECCS pumps.

The duration for which the ADS must be available is dependent on factors such as the power of the reactor at the time of the LOCA, break size and location, available injection systems, and availability of RHR shutdown cooling. The long-term ADS design requirement is 100 days. This is based on a judgment of the time required to make any necessary repairs to the RHR shutdown cooling system or ADS, thus ensuring the core would be kept cool.

Based on the 10CFR50 requirement, a long-term depressurization capability is provided by supplying nitrogen to the ADS accumulators using a safety grade system. The safety related nitrogen storage (N_2-bottles) system contains adequate gas in storage for 30 days after a postulated DBA. However, these nitrogen bottles could be replaced periodically by bringing portable N_2-bottles to provide long-term operation of the ADS. (At Susquehanna, these bottles are located in an area that is accessible following a loss-of-coolant accident.)

From the above discussion, PP&L concludes that the Susquehanna design of ADS pneumatic supply system meets the intent of NUREG-0737, Item II.K.3.28.