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SUBJECT: Forwards emergency request for approval of change to Tech Spec 4.6.4. Change proposes deferral of Surveillance Requirements 4.6.4b.1 & 4.6.4b.2 for one drywell/wetwell vacuum breaker until outage for repairs. Fee paid.

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APR 15 1987

Director of Nuclear Reactor Regulation
Attention: Dr. W. R. Butler, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
EMERGENCY CHANGE REQUEST - PROPOSED
AMENDMENT 50 TO LICENSE NO. NPF-22
PLA-2843 FILES A17-2, R41-2 Docket No. 50-388

Dear Mr. Butler:

This letter is an emergency request for approval of a change to Susquehanna SES Unit 2 Technical Specification 4.6.4. The change proposes deferral of Surveillance Requirements 4.6.4b.1 and 4.6.4b.2 for one drywell/wetwell vacuum breaker until an outage occurs where its inoperable test circuit can be repaired.

BACKGROUND:

Monthly surveillance tests 4.6.4b.1 and 4.6.4b.2 require full cycling of each drywell/wetwell vacuum breaker and reverification of associated position indication. On April 11, 1987, during the most recent performance of these tests, one vacuum breaker (there are five pairs total) failed to cycle open. The problem has been traced to a short circuit in the coil of the solenoid valve which allows air pressure to cycle the vacuum breaker in its test mode. When the test button was depressed, a fuse blew and position indication was lost. When the fuse was replaced, position indication returned, indicating the valve was closed. Resistance measurements on the coil verified that a short circuit had occurred; therefore, the vacuum breaker had never cycled open since the solenoid valve failed to operate.

JUSTIFICATION FOR DEFERRAL OF SURVEILLANCES:

Five pairs of vacuum breakers are installed on downcomers in the wetwell in order to mitigate transient pressure differentials between the drywell and the wetwell. (See Attached FSAR figures 6.2-56 and 6.2-57, sheet 2). In order to completely assess the reliability of the vacuum breaker with the inoperable test circuit, both its pressure equalization function as well as the bypass leakage ramifications if it fails to reclose must be addressed.

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A. Pressure Equalization:

The vacuum breakers are sized for their primary safety function of maintaining drywell integrity in the event of an inadvertent drywell spray actuation. During this transient, cold spray water is passed through the drywell atmosphere resulting in a drop of vapor region temperature and a corresponding drop in vapor region pressure. Given only four pairs of vacuum breakers (i.e., assuming a single failure), a peak negative differential pressure of -4.72 psid was determined for Susquehanna by analysis (Ref. FSAR Subsection 6.2.1.1.4) and this is within the design limit of -5 psid for the external walls of the drywell. However, examination of our current levels of procedural protection against inadvertent actuation of this manual system indicates that this event is extremely improbable. The Emergency Operating Procedure which controls drywell spray initiation (EO-200-103 for Unit 2) is attached and indicates a very specific set of guidelines for ensuring that the sprays are not actuated unless containment integrity is assured. Additionally, hardware to cause such actuation requires repositioning of keylock switches. Therefore, for the inadvertent drywell spray initiation to be a concern, the following sequence of events must occur: First, a LOCA during the period of the deferred surveillance; second, failure of the subject operable, untestable vacuum breaker in the closed position; third, a single failure of another vacuum breaker in a different pair (again in the closed position); finally, the operator has to manipulate more than one keylock switch and virtually ignore his procedure for an "inadvertent" initiation to occur. Based on this unlikely chain of events this event is not given further consideration as a limiting one for the vacuum breaker pressure equalization function.

Since the inadvertent spray actuation is not credible, the limiting event for containment pressurization is the DBA-LOCA. During this event, condensation of steam in the drywell and steam flow from the drywell to the wetwell creates a negative pressure in the drywell with respect to the wetwell. The attached curve illustrates the pressure response for this event assuming the operation of 4 pairs of vacuum breakers (the fifth is assumed to be the single failure); the peak negative differential pressure is -2.5 psid. Given the current problem, the attached conservative calculation was performed in order to determine the peak differential pressure assuming only 3 pairs of vacuum breakers operate, thereby bounding our current situation. This value was calculated to be -4.4 psid, which is still within the Technical Specification limit of -5.5 psid (Ref. Section 5.2.2, attached).

B. Bypass Leakage:

The concern with bypass leakage is that after a small break accident in the drywell, steam which is collected in the drywell can "bypass" the downcomer path to the suppression pool via the open vacuum

breakers and build up in the wetwell air space, eventually exceeding the wetwell design pressure. Wetwell sprays are manually actuated to mitigate this transient, but the analysis does not assume any open pairs of vacuum breakers.

Each of the five pairs of vacuum breakers has its two valves series in order to ensure that a bypass pathway is not created if one vacuum breaker sticks open; i.e., two valves must fail open in order for the pathway to exist.

Currently, the untestable, operable vacuum breaker is closed, and therefore a single failure is not a concern. However, since it is being proposed that the monthly surveillance be deferred, the reliability of the vacuum breaker reclosure function must be addressed.

A qualitative assessment shows that the potential for a pair of vacuum breakers to fail to reclose after opening in response to a pressure transient is very improbable for the following reasons:

1. Required Conditions - In order for the consequences to be unacceptable, both vacuum breakers would have to open and fail to reclose simultaneously during the postulated small break accident, which in turn would have to occur during the period of the deferred surveillance. This is highly unlikely given the reliability of the testable vacuum breaker in the pair (which is being tested monthly), the known closed status of the untestable operable vacuum breaker and operable position indication to alert us to any change in the status of either valve.

2. Valve type - The vacuum breakers are basically simple swing check valves whose operation is not enhanced by testing; i.e., not cycling the valve is not postulated to cause any binding. They would be difficult to stick open unless a physical blockage was introduced, and this would be extremely unlikely to occur in both valves simultaneously when the small break was occurring. Position indication would alert us any time a valve was not closed.

3. Test History - Based on a review of Susquehanna records, no SSES vacuum breaker has ever failed to open or to reclose.

CONCLUSION:

Based on the above assessment of the safety functions affected by the proposed change, it will not cause any adverse consequences to the safe operation of SSES Unit 2.

NO SIGNIFICANT HAZARDS CONSIDERATIONS

I. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

Based on a review of the inadvertent drywell spray event for which the vacuum breakers were sized, it was shown that this event was extremely improbable. This is primarily because of the emergency procedures that have been developed since the licensing basis was formed. These procedures provide specific guidance to the operator that essentially precludes the event from occurring. Moreover, more than one keylock switch has to be "inadvertently" manipulated for the sprays to actuate.

Therefore, although the original FSAR evaluation is based on inadvertent drywell spray initiation this change does not affect it because the event is not credible.

Given the above, the current situation was evaluated against the DBA-LOCA and conservatively assumed to cause a double failure - a given failure of the untestable vacuum breaker and a single failure. Our calculation shows, as described above, that the event will be mitigated with only three pairs of operable vacuum breakers. Therefore, the consequences of the event are still acceptable. Nothing has occurred to increase the probability of the DBA-LOCA for which the vacuum breakers are required to operate.

II. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

No hardware or procedural changes are proposed that would create a new event requiring evaluation.

III. The proposed change does not involve a significant reduction in a margin of safety.

The justification above, based on the LOCA event, showed that the pressure equalization function of just three pairs vacuum breakers was within the design requirements of the analysis. The margin provided to the limit for the LOCA event, approximately 1 psid, is greater than the previously approved margin of approximately 0.3 psid for the inadvertent drywell spray event. With respect to the bypass leakage function, it was shown that the untestable vacuum breaker is currently closed and that for bypass leakage to occur, a small break accident would have to occur during the deferred surveillance period <u>and</u> that both the untestable vacuum breaker and the testable vacuum breaker in that pair would have to fail to reclose. This chain of events is highly unlikely and therefore the decrease in safety margin due to reduced testing is insignificant.

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BASIS FOR EMERGENCY REQUEST

10CFR50.91 provides guidance on what information the NRC requires in support of an application for an emergency change.

First, it requires the applicant to justify that an emergency exists, i.e., ". . . failure to act in a timely way would result in derating or shutdown of a nuclear power plant . . . ". Unit 2 is currently operating at full power. Failure to relieve PP&L of the requirement to perform the surveillance as specified will require declaring the subject vacuum breaker inoperable and subsequent entry into Technical Specification action 3.6.4a at 0010 hours on April 19, 1987, when the surveillance interval expires (including the grace period allowed by Specification 4.0.2). Action 3.6.4a requires restoration of the inoperable vacuum breaker within 72 hours, and if this cannot be done, forces the unit to hot shutdown within the following 12 hours, and cold shutdown within the subsequent 24 hours. Since we firmly believe that the surveillance cannot be performed due to the inoperable test circuit, the condition clearly meets the NRC criteria.

Secondly, 10CFR50.91 requires the licensee to ". . . explain why this emergency situation occurred and why it could not avoid this situation . . .". The subject event involved an unexpected equipment failure on April 11, 1987. Therefore, application in advance of the situation was impossible. Based on the time necessary to understand the failure and to prepare and review this proposal internally, we believe that this application has been submitted in a timely fashion.

Any questions on this request should be directed to Mr. R. Sgarro at (215) 770-7916. Pursuant to 10CFR170, the appropriate fee is enclosed.

Very truly yours,

B. D. Kenyon
Senior Vice President - Nuclear

cc: NRC Document Control Desk (original)
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