Enclosure

SAFETY EVALUATION REPORT

Introduction

By memorandum dated May 29, 1984 (R. Starostecki (Region I) to D. G. Eisenhut (NRC), IE Region I requested an assessment by NRR of the (regulatory) position set forth in Standard Review Plan (SRP) 6.2.1.1.C. The issue relates to the allowable bypass leakage via the vacuum breakers between the drywell and the wetwell air space region for Susquehanna Steam Electric Station Units 1 and 2 (SSES). As stated in the May 29, 1984 memorandum, the region's concern dealt with the lack of test acceptance criteria for the set points of the position indication switches that are mounted on the drywell-to-suppression chamber vacuum breakers.

Background

Both SSES Units 1 and 2 are equipped with five sets of drywell to wetwell vacuum breaker valves. A set consists of two 24" valves in series attached to selected downcomers. The inboard vacuum breakers are connected to a common alarm; similarly, each outboard vacuum breaker is connected to another common alarm. The alarm in the control room indicates when any valve is not fully closed. Additionally, there exists individual vacuum breaker position indication in the main control room. Item 3.a of Appendix A to SRP 6.2.1.1.C states in part that the indicators should have adequate sensitivity to detect a total valve opening, for all valves, that is less than the bypass capability ($A/\sqrt{K}$ = 0.05 ft² for SSES Units 1 and 2).

Evaluation

As stated in the FSAR, the SSES switches have a hysteresis of 0.025." However, this hysteresis is multiplied through the mechanical linkage to the valve disk so that the inboard valve can be as much as 0.32" off the seat before the "not fully closed" light comes on. The outboard valve has a better tolerance, but can be off the seat by as much as 0.2," under similar conditions. These set point tolerances could result in an equivalent steam bypass leakage path of $A/\sqrt{K}$ = 0.23 ft² for the vacuum relief system. This bounding condition would yield a leakage path which is four times greater than the recommendation of the SRP. Therefore, the information available to the operator is not sufficient to make a positive determination of the leak tight integrity of the vacuum breakers. We note that these valves are located inside the wetwell air space region, which is normally inerted. Therefore, visual inspection is not a viable option to correct this deficiency. Accordingly, use of properly calibrated limit switches is the only practical means for determining adequate vacuum breaker closure.

Conclusions and Planned Actions

Based on our review, we conclude that compliance with the provision of SRP 6.2.1.1.C regarding the sensitivity of the limit switches would be sufficient to assure containment integrity. However, the licensee is not committed to meet this SRP in their current licensing status. To require such compliance would involve a backfit declaration with a supporting value impact appraisal.

An assessment of the importance of the above discussed issue to other plants with BWR containments was also requested in the May 29, 1984 memorandum. Since the Standard Technical Specification does not have a surveillance requirement on these indicators, we find that similar situations can exist at other BWR facilities. In addition, since the position in Appendix A to SRP Section 6.2.1.1.C only applies in the review of all CP and OL applications with Mark I, Mark II and Mark III containments, we cannot backfit this as a requirement for operating BWRs. However, considering the consequence of exceeding the bypass capability of the plant on the overall plant safety, due to inadequate indicator sensitivity, we are considering recommending the issuance of an IE Information Notice to all operating plants with BWR containments. This information Notice would describe the nature of problems encountered to date and their significance to plant safety. It would also provide guidance by reference to staff's recommendations set forth in SRP 6.2.1.1.C.

In the interim (pending completion of the aforementioned planned actions), continued operation of all BWR Plants (including SSES Units 1 and 2) is justified on the following bases:

1. The vacuum breaker valves are tested monthly to assure free movement. Opening of the valves with the air actuators and closing them by venting the air assures that the valves will be functional.

2. It is very unlikely that all vacuum breaker disks would be off the seat by the bounding amount corresponding to the "not fully closed light indication.

3. For the majority of Mark I plants that are operating with a ΔP between the drywell and wetwell, valves disk displacement will be detected by a loss of the ΔP.

4. Spring force holding the valve in the closed position results in a large torque acting on the valve seat.

5. The bypass leakage test conducted at 18 month intervals insures that the drywell to wetwell leakage is within the bypass capability of the plant.

6. For Mark II plants, the vacuum breakers are mounted two in series. The likelihood of both valve disks in the same line being off the seat is further reduced.

to verify the opening time and setpoint will not be conducted and is not necessary because:

(a) The valves are simple mechanical devices qualified for the environment,

(b) The setpoint and opening time are verified in manufacturers preoperational tests, and

(c) The valves are exercised and inspected in accordance with the Technical Specifications.

The containment depressurization rate analysis for a postulated inadvertent spray actuation assumed that the vacuum breakers open instantaneously after a differential pressure of 3 psi is reached. One set out of five sets of vacuum breakers was assumed not to open in the analysis.

The orifice diameter of the valves is 19.4 inches based on flow measurement. The loss coefficient was calculated based on actual flow measurements conducted in the manufacturer's shop. Refer to subsection 6.2.1.1.3.2.2.

Each of the inboard vacuum breakers is connected to a common alarm which indicates when any valve is not closed. Each of the outboard vacuum breakers is connected to a common alarm which indicates when any valve is not closed. There is individual vacuum breaker position indication in the main control room for each valve.

Table 6.2-3 provides the performance parameters of the related engineered safety feature systems which supplement the design conditions of Table 6.2-1 for containment cooling purposes during post blowdown long term recirculation operation. Performance parameters given include those applicable to full capacity operation and to conservatively reduced capacities assumed for containment analyses.